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CERAMBYCOID LARVAE OF EUROPE AND SOVIET UNION (COLEOPTERA, CERAMBYCOIDEA). PART III.

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Abstract: Part III of the monograph deals with the subfamily Lepturinae of the family Cerambycidae. Provided are descriptions, keys to genera and species, and short chapters on bionomics and classification. Proposed is a preliminary tribal classification based on larval morphology of all known genera, and a new generic synonymy: *Fallacia* MULSANT et REY, 1863 = *Leptalia* LECONTE, 1873, syn. n. Some new combinations are established. Larvae of 51 genera and 132 species are described, data on an additional genus and 19 species are available in the literature.

Key words: Cerambycidae, Lepturinae, morphology, keys, bionomics, taxonomy.

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INTRODUCTION

Part III treats the subfamily Lepturinae in a way similar to that used for the previous groups. Again, the reader must consult Part I for general chapters explaining terminology etc.

Unlike other subfamilies except for Spondylinae (Aseminae sensu Part I; cf. Part II: 123), the subfamily Lepturinae seems to be generally a Holarctic group (see Part I: 14), which made the work more pleasant and satisfying on the one hand, but also more difficult and of greater responsibility on the other hand. It has been found impossible to avoid the due comments upon some consequences of larval morphology on the classification by claiming that the Holarctic material is not representative enough, or that it is too insufficiently known (although this is certainly true particularly for some regions, and some most regretable gaps are indicated in the taxonomic chapter). I have tried to cope with these problems in a way not irritating taxonomists working mainly with the adult stage, however, similarly as in the first volume, some indisputable facts had to be put plainly and unambiguously.

A few Nearctic species have been described, either to provide comparison with the type species *(Evodinus, Gaurotes, Encyclops)*, or to complete a newly delimited genus *(Fallacia)*.

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Subfamily Lepturinae LATREILLE, 1804

General morphology

Note: The extremely adaptive curious larvae of the genera *Apiocephalus* and *Capnolymma* (Figs 1A, B; Part I, Fig. 12E; BÖVING et CRAIGHEAD, 1931, Plate 100, undetermined Lepturine larva, figure K is ventral view, not dorsal; GARDNER, 1931; DUFFY, 1957, 1968; NAKAMURA et KOJIMA, 1983) possess some unique apomorphies which have not been incorporated in the following general morphological description: Cranium of a very unusual shape. Medial frontal line absent. Frontal lines and transfrontal line absent in *Apiocephalus*. Antennae on the first (medial) cranial process, and very far from pleurostoma. Epistomal margin with two conical processes. Prothoracic mediopraesternum poorly defined. Particularly epipleurum of anterior abdominal segments with long processes. Anal tube and dorsal anal papilla ± fused with segment 9, only two ventral papillae distinct.

Body white, yellowish, rarely (mainly *Dinoptera*) greyish, cylindrical to extremely depressed dorsoventrally, covered with dense to very sparse (then occasionally extremely long and stout) setae.

Head at most by half retracted, often (particularly in Rhagiini) largely salient and strongly sclerotized. Cranium moderately (Fig. 33B) to extremely (Figs 17A, 21H) depressed, always transverse (but subquadrate in *Toxotinus,* see KOJIMA et HAYASHI, 1969: 181, Figs 4A, B), as a rule narrower than prothorax, but occasionally nearly equally broad (Fig. 24H).

Frontal lines almost always distinct, rarely diffuse (*Alosterna,* Fig. 32A), meeting or almost meeting at frontal base. Frons triangular, rarely half-oval (Figs 32D, E, 33A). Rudimentary incurved sections of original frontal sutures occasionally ± preserved (Fig. 6C), and/or their transverse fragments tend to join with each other, then called the transfrontal line (Figs 5A, 9C, 20A, 21C etc.). The transfrontal line, however, always ± absent in youngest larvae. Medial frontal line distinct, in young larvae extended along the whole frontal length, in later instars mostly weakened or interrupted by the transfrontal line (Fig. 5A), or not reaching the epistomal margin (Fig. 18A). The latter indicates real absence of anterior endocarina, the former caused by a lack of sclerotized exocuticle in that region; both enabling flexion or breakage of the cranial cuticle along the transfrontal line during ecdysis, which seems particularly important in some strongly depressed forms, i.e. mainly Rhagiini.

Postfrons flat to distinctly concave, with at least one pair of postfrontal setae (they may be miniature, Fig. 18A, or strongly moved anteriorly and occasionally hardly distinguishable from praefrontal setae, Fig. 28A). Praefrons may be much darkened, in later instars mostly transversely striate or rugose; bearing at least four pairs of setae (see Part I, Fig. 6E; if sparse and distributed in the three groups as figured, they are often numbered in descriptions, e.g. 2, 1, 1 or 2, 1, +, beginning from the medial two pairs, and told of as praefrontal setae 1–4; "+" means a greater inconstant number of setae in the group). If supplemented by other setae, the main

four praefrontal setae may be often distinguished by their greater length and thickness.

Postcondylar and frontal carinae absent (rarely anterior frontal margin with a pair of transverse tubercles, Fig. 24B). Separate epistomal carina absent, epistomal margin abruptly declivous to almost flat (may be entirely flat medially, in the same plane with clypeus). Six or more epistomal setae, smaller number aberrant. Clypeus broad, trapezoidal, filling the entire space between dorsal mandibular articulations; convex to almost flat, usually ± pigmented at base, primitively (e.g. some Xylosteini, *Rhamnusium, Oxymirus* etc.) also along sides. Setae mostly absent, or one seta may be inconstantly present on one or both lateral margins; however, setae often or always present in species of *Evodinus*.

Labrum from cordate or subcircular and largely sclerotized (always associated with well developed mandibular type II) to transverse (occasionally several times as broad as long) and with distinct pigmentation restricted to basal region. Hind epipharyngeal region (facing in situ the hypopharyngeal part of labium) from narrow and strongly raised (Figs 4H, 25D etc.) to broad and flat (e.g. all Rhagiini, Figs 10B, 13E, 19C, 20D, 23I), usually with 5 + 5 sunken sensilla posteriorly, sometimes they are multiplied. Medial group of sensilla composed usually of several (often 6) trichoid to peg-shaped sensilla, and usually six sunken sensilla and two minute setae before them; particularly in groups with low broad posterior region the elements arranged in a very distinct transverse row (e.g. Fig. 10B). Epipharyngeal setae reaching at most that medial group of sensilla (Figs 4H, 29A), often surrounding it and making it hardly visible; occasionally the setae much restricted or absent, the anterior region usually largely covered with microtrichia (Figs 10B, 23I; this alternation of essentially microtrichial × essentially setal cover is also characteristic on the ligula, see below, but the setal and microtrichial covers on the two structures are neither correlated nor alternating). Tormae from very short or almost absent (tribes I to IV and some Lepturini, see taxonomic chapter) to very long and running far backwards along sides of hind region (usual in Rhagiini).

Pleurostoma mostly raised and strongly sclerotized, rarely (e.g. *Pseudovadonia*) rather thin, often with various macrosculpture. Subfossal process distinct to absent. Gena mostly ± broadly darkened, often rugose (Figs 7A, 8A), rarely almost not differentiated from epicranium. Stemmata from six pairs to absent (most completely so in some subterranean genera like *Stenocorus, Akimerus* or *Pseudovadonia,* but even then the main stemmata ± discernible in very young larvae).

Epicranium usually at least finely pigmented (often strongly so in species with largely salient head). Two dorsal longitudinal rows of four miniature setae usually ± distinct, particularly in Rhagiini (Fig. 21E etc.). Adfrontal seta (see Part I, Fig. 6E) in the forms with relatively more retracted head often moved across the frontal lines into postfrontal region (Fig. 10F etc; usually correlated with the postfrontal setae shifted strongly anteriorly). Both epicranial halves usually ± roundly convex laterally (rarely angulate, Fig. 18B, or with sides subparallel, Figs 20A, 32D), and usually fused only very shortly or almost in one point, i.e. the duplicated

region short or absent (but relatively longer in a few Lepturini, particularly *Alosterna,* Figs 32A, B, and in some Xylosteini where in *Xylosteus* both halves fused along practically whole length, Fig. 2A).

Hypostomal lines always distinct, may or may not reach postoccipital line. Gula and hypostoma forming a distinct unit - the ventral sclerite. Gular lines sometimes very distinctly raised, in some most primitive situations distinctly joining metatentorial pits with basal margin of labiomaxillary complex, giving a pictorial image of the origin of the gula (Fig. 2J; see Part I: 45–46). Gula usually ± long and well exposed, seldom the whole ventral sclerite very short (Fig. 32D). Medial gular line primitively diffuse (Figs 1G, 2J), but more frequently narrower and ± distinct. Metatentorines always distinct, sometimes (particularly in some depressed Rhagiini, Fig. 8B) very far from hind margin. Metatentorium internal, not visible or poorly visible from ventral view, metatentorial bridge thin.

Antennae moderately long to miniature, originally three-segmented (Fig. 38D), in some groups two- or *(Dinoptera)* one-segmented (segments 3 and/or 2 disappeared, Figs 17B, 31J, L). Main antennal sensillum always conical and distinct, ± ventral or at most ventromedial in regard to the third segment (if present).

Mandibular types I or (primitively) II, all transitional situations exist (Figs 1C, D, 3F, 22G, 24E, 28F to I etc.). Basal part laterally often roughly rugose, bearing two to several setae, molar portion devoid of setae, rarely with an indistinct tubercle (Fig. 7D). Border zone usually at least laterally striate or distinctly microsculptured, may be step-like. Apical part externally usually smooth, rarely (e.g. *Rhamnusium*) distinctly microsculptured; with three (tribes I to IV, Figs 1C, D, 3F, G, 4D, 5I, 6H, always distinct) or two (Rhagiini and Lepturini, Figs 7B, C, occasionally rather indistinct) inner keels reaching apex. In a few species (always having type I with two keels) the apex distinctly doubled (Figs 19F, 23B, 32C), sometimes only in younger larvae.

Labiomaxillary complex attached to ventral sclerite by much more than the width of gula at middle (but in a few primitive species with very distinct raised gular lines they are diverging anteriorly and almost reaching lateral margins of maxillary connecting lobes). Basal components usually well separate, only in some strongly depressed Rhagiini ± fusing. Cardo free, moderately large to small, usually ± sclerotized and bearing one short seta. Maxillary palpiger usually large, with at least lateral (usually also ventral) pigmentation, often with a basal spot on the border with stipes. Mala ± cylindrical (Fig. 5H etc.), or at most slightly broadened and carinate dorsomedially (Fig. 25F), and making an impression (in the ventral view) that it grows out from the palpiger; in Tribe II *(Rhamnusium* and *Enoploderes)*, however, the palpiger is relatively small and the mala very broad, inserted above small reduced ligula when not in use (Figs 2H, I, 4B). Mala with a ± distinct oblique ventral pigmented band except for *Cortodera.* Maxillary palps three-segmented. Both palpiger and the first palpal segment without a laterodorsal process, but the first palpal segment occasionally with some structures resembling vestiges of such

process. Mentum distinctly separated from submentum (except for *Enoploderes*), the former with ± distinct pigmented spots on posterior angles, sometimes connected into a continuous basal band. The apodeme at the base of praelabium sometimes pigmented, forming and irregular, paired or incontinuous dark spot (Fig. 29J etc.). Labial palpigers separately pigmented, rarely the pigmentation fused *(Sachalinobia)*. Palps in tribes I to IV positioned strongly ventrally in regard to ligula (which thus does not reach at all between the palps, Fig. 5G), in Rhagiini and Lepturini they are lateral (i.e. ligula reaches between the palps, Fig. 35A). Ligula of varying size and shape, occasionally pigmented at base (very strongly so e.g. in Tribe III, Fig. 5G), may have two types of cover: A microtrichial one, with only a few (often only two) ventral setae (Figs 35A, 34B), or a setal one, with microtrichia ± restricted to small patches on sides and ± invisible in ventral view (Figs 27A, B). Transitional situations not infrequent.

Pronotal lateral furrows rudimentary or wanting, but relatively distinct impressions present in Xylosteini (Fig. 2C), in *Centrodera* surrounded with microspines. Anterior pigmentation of protergum usually ± distinct (rarely, e.g. in some *Grammoptera,* almost absent), interrupted only by a medial cleavage line, with characteristic often group-specific anterior outline (e. g. Fig. 26 F); alar lobes usually largely sclerotized. Seldom (e.g. *Rhagium,* Fig. 9A, and particularly *Pseudovadonia,* Fig. 32E) pronotum in later instars posteriorly largely ± distinctly sclerotized as well. *Dinoptera* with very characteristic smoke-black spots on alar lobes (Fig. 18A). Posterior pronotal half often distinctly sculptured, but rarely microspiculate (*Akimerus,* most *Stenocorus, Evodinus, Vadonia moesiaca*). Epipleurum entirely delimited, tapering anteriorly. All pleural and sternal components separate, or at most the episternum and/or epimeron poorly separate from the epipleural fold; the genus *Pseudogaurotina* remarkable by almost complete fusion of the sternellar fold with sternal parts of the coxosternum, the coxae, on the other hand, being relatively distinctly separate (Fig. 15B). Microspines usually at least on sternellar fold anteriorly, often on coxosternum, mediopraesternum, episternum, epipleurum. Rudimentary transsternal line may be slightly visible on the sternellar fold. Spinasternum sometimes distinctly developed.

Pterothorax with praescuto-scutal and scuto-scutellar lines ± distinct, at least praescutum and scutum almost always largely microspiculate. Postnotum non-developed, meso- and metanotum similar to each other. Scutum-I ± defined, more distinct on mesothorax. Metanotum (more rarely also mesonotum) sometimes with ± distinct ± numerous central smooth granules (e.g. Fig. 30D). Large mesothoracic spiracle on the border between epipleurum and alar lobe, not protruding or at most slightly protruding into prothorax, narrowly to broadly oval, with varying numbers of extremely small to extermely large marginal chambers. Rudimentary metathoracic spiracle usually distinct, lying clearly in the anterior epipleural region. Pleurum narrow, episternum ± separated from epimeron (Part I, Fig. 9B). In some species with long functioning legs (a secondary derived situation in the Ceramby-

cidae; e.g. *Dinoptera*) the pleurum tends to renew its contact with the alar lobe. Transsternal lines distinct, basisternum may or may not be divided (often only mesobasisternum with distinct dividing lines). Coxae ± defined, relatively large, in some species with very long legs even fairly prominent and functioning again to a certain extent as a leg segment. Various ventral areas may bear microspines, transsternal lines may be on one or both sides lined with a ± complete row of granules.

Legs best developed among all Cerambycidae, but primitively only moderately long and slender (Figs 4G, 26A), all cases of very long legs *(Acmaeops* sg. *Gnathacmaeops*, Fig. 19B, *Dinoptera*, *Judolia*, Fig. 30F, *Oedecnema)* are undoubtedly secondary, as well as the very robust legs of some Lepturini (Fig. 30A). Always full number of leg segments. Trochanter mostly with a ± distinct sclerotized ring at base. Tibiotarsus usually as long as or longer than femur, both segments may be finely (rarely rather strongly, Fig. 4G) sclerotized. Praetarsus from slender and needle--shaped to broad, compressed and sickle-shaped (Fig. 30E), always with a distinct seta from inner side. Claw ± sclerotized.

Abdomen with ± distinct (rather flat in some extremely depressed Rhagiini) ambulatory ampullae on segments 1 to 7, the seventh ampullae often reduced, or the dorsal one absent, then (rarely) the seventh ventral ampulla may be lacking as well. Ampullae primitively granulate, granulation reduced or absent in many Rhagiini. Dividing pattern on both dorsal and ventral ampullae usually distinct. Anterior transverse line of dorsal ampullae may (Figs 5D, 10A) or may not (Figs 5E, 10E) be doubled; one lateral impression on each side, rarely (e.g. some strongly depressed forms) somewhat more complex (Fig. 16H), but never two broadly separate impressions. Ampullae on segments 1 to 5 modified in *Encyclops* (see generic description). Abdominal spiracles ± smaller than the mesothoracic one (only slightly so in *Pseudovadonia*), marginal chambers usually fewer and relatively slightly larger. Epipleurum of segments 1 to 9 well defined and protuberant, but less distinctly so on anterior segments of some cylindrical non-depressed larvae, particularly when they are unnaturally extended. Pleural discs absent, pleural tubercles present on segments 1–8 (the first one may be smaller), without sclerotized pits, bearing at least 2 stronger and usually at least 1–2 shorter setae. Pleural lobes distinctly separate (Fig. 3D; less so on segment 8), but fused with the epipleural fold on segments 1–5 in Xylosteini (Fig. 1E). Design of ventral ampullae (granules, microspines etc.) essentially similar to metathoracic sternum, but may somewhat differ from dorsal ampullae. Urogomphi present in some Xylosteini and Tribe III, the caudal armature of Tribe II may also represent modified urogomphi. Tribes IV, Rhagiini and Lepturini with an unpaired caudal spine (Figs 6D, 8G, I, 13C, D, 15I, J, 31G), or caudal armature absent; a special modification of posterior margin of the ninth tergum occurs in *Encyclops* (see generic description). It is not clear to me if the unusual caudal armature of the genus *Teledapus* (see Part I: 68) figured by DUFFY (1968) belongs to segment 9 or 10, although DUFFY (l. c.) states the former. Anal tube ±

posteroventral, occasionally very large (Figs 31I, 33F, 34G), in some strongly depressed subcortical forms almost ventral and used for locomotion, then anal papillae sometimes microspiculate (Figs 16E, F). In *Enoploderes* the anal segment poorly separate from segment 9 (Fig. 3H). Anus always triradiate.

To make possible more detailed descriptions within the given page limit, the following set of abbreviations of some morphological terms has been used in the special part. These abbreviations are used as ordinary words (i.e. without a full stop), for both singular and plural, and some are used both for the noun and its adjective. I have tried to make them meaningful and readily suggesting the unabbreviated form, so I hope they would not present a great difficulty for the reader.

Head

cr – cranium
fl – frontal line
pof – postfrons
epmg – epistomal margin
mfl – medial frontal line
lbr – labrum
plst – pleurostoma
mstm – main stemma
vstm – ventral stemma
hyp – hypostoma
gl – gular line
mtt – metatentorial pit
ant – antenna
lmx – labiomaxillary complex
pamx – maxillary palp
prlb – praelabium
plb – labial palp
ecr – epicranium
tfl – transfrontal line
prf – praefrons
eps – epistomal setae
cl – clypeus
eph – epipharynx
sfp – subfossal process
dstm – dorsal stemma
vs – ventral sclerite
hypl – hypostomal lines
mgl – medial gular line
pocl – postoccipital line
md – mandible
pgmx – maxillary palpiger
mt – mentum
pglb – labial palpiger

Thorax and abdomen

proth, mesoth, metath – thoracic segments
abd – abdomen
lfur – lateral furrow
epl – epipleurum
mpst – mediopraesternum
cxst – coxosternum
trch – trochanter
ptrs – praetarsus
mgch – marginal chambers
daa – dorsal amb. ampulla
plt – pleural tubercle
atu – anal tube
msp – microscopic spines
pn – pronotum
al – alar lobe
lpst – lateropraesternum
stlf – sternellar fold
bst – basisternum
ti – tibiotarsus
spir – spiracle
aa – ambulatory ampulla
vaa – ventral amb. ampulla
carm – caudal armature
apl – anal papillae
mspte – microspiculate

Note: I have personally seen larvae of all the taxa dealt with below, unless otherwise mentioned. Authors of genera and species are given usually only if these taxa are not treated in the special part of the present volume, and only when mentioned for the first time.

1. General remarks

Having removed the Vesperidae (unrelated to Cerambycidae), Apatophyseinae (unrelated to Lepturinae) and Necydalinae (which, however, are probably closely related), the Lepturinae became a rather coherent well-defined group. In a larval monograph, the above claim must be promptly made less optimistic by adding "as far as larvae are known", but the lack of knowledge is not so deep and painful in this (perhaps essentially Holarctic, see Part I: 14) subfamily in comparison with some other ± worldwide ones.

Primarily, the absence of knowledge of larval *Corennys* BATES and *Formosopyrrhona* HAYASHI is most regretable. These two undoubtedly Lepturine genera are usually classified in the tribe Eroschemini LACORDAIRE, 1869. This classification is quite incorrect, since the genus *Eroschema* PASCOE belongs to Cerambycinae (I am much indebted to R. de Keyzer for presenting me the larvae and adults of *Eroschema poweri* PASCOE from Australia). No material (incl. adults) available of *Pyrocalymma* THOMSON, another Oriental genus classified in the Eroschemini. Other obscure points include the curious Mexican *Vesperoctenus* BATES, some Oriental genera of uncertain position (incl. *Teledapus* PASCOE, see Part I: 68), the North American genus *Piodes* LECONTE, practically all Neotropical genera (which are puzzling by the complete lack of larval material rather than by unusual adults), and surely also other groups the importance of which is not obvious to me. Larval material of the Ethiopian and particularly Madagascan Lepturine-like forms is badly needed in order to confirm or refuse the suspicion from Part I (p. 14) suggesting they are not Lepturinae.

That is why some tribes tentatively proposed below, for which there is no available name, have not been named. The author wished to avoid creating new names of the family category, which might later turn out inconvenient or unjustified when there is a more complete larval material available, or which may be rejected by other taxonomists.

In the taxonomic chapter of Part I, only a few problems concerning apomorphic and plesiomorphic states of characters have been touched. At least some additional remarks are needed for understanding particularly division 2 of the present chapter. Although these problems are often far from being clear, I do not want to be unfair to the reader by avoiding possibility of being later criticized for some erroneous or unwarranted opinions. Thus, without a great reasoning (which would take many pages, and would sometimes appear almost mysterious anyway), I bring below

my vision of an "ur-Cerambycid" larva, limited liability, based on the numerous larvae of various groups which have passed through my hands. I readily agree that this image is both full of question marks and disagreeing with some of the very few previous concepts (cf. DANILEVSKY, 1979).

Body ± large, non-depressed, with short setae.

Head relatively strongly retracted. Both epicranial halves ?partly fused, cranium with a ± deep posterior notch. Endocarina present. Frontal lines entering ?separately dorsal duplicate cranial region. Indistinct vestiges of original frontal sutures present, but no distinct transfrontal line developed. Epistomal, frontal and postcondylar carinae ??present. Clypeus broad, labrum long, sclerotized. Stemmata six. Gula short (?absent), metatentorines absent, metatentorial bridge broad, "dividing" occipital foramen. Antennae moderately long, three-segmented, main sensillum ?conical. Mandibular type II with three inner keels reaching apex. Labiomaxillary complex robust, cardo large, free, connecting lobe divided, mala ??broad, ligula densely setose.

Prothorax with distinct lateral furrows (but not interrupting anterior sclerotization), epipleurum fully delimited, tapering anteriorly. Mediopraesternum distinct.

Postnotum not developed, both meso- and metanotum divided by two transverse curved lines. Coxae well defined. Spiracles with marginal chambers present, numerous, small.

Legs relatively short, praetarsus bearing at least one seta.

Abdominal ampullae seven, without microspines, perhaps not granulate, dorsal ones with two, ventral ones with ?one transverse line, both with one lateral impression on each side. Epipleurum distinctly protuberant ?only on some posterior segments, but on the anterior ones in such a condition that the protuberantness could be readily restored. Pleural lobes separate from epipleurum. Urogomphi present, anus triradiate.

Feeding in dead rotting wood, perhaps underground, pupation possibly occurring in the soil.

A primitive Lepturine larva should be modified as follows: Body ?moderately large. Frontal lines almost meeting at frontal base. Epistoma absent. Gula long, metatentorines distinct, metatentorium internal or at least strongly oblique. Main antennal sensillum conical. Maxillary connecting lobe undivided. Mala narrow. Primitive type of ligular cover unclear. Lateral furrows vestigial. Abdominal ampullae granulate. Epipleurum on anterior abdominal segments ± protuberant as well.

A distinguishing reader will notice that the Lepturinae are in this concept decidedly not a primitive group, and equally the subcortical habit is not at all a primitive feature (see also chapter on bionomics). The possible Holarctic origin of the group would be in agreement with this concept.

2. Tribal classification

Having all the above in mind, the following tribes could be preliminarily proposed:

I. Xylosteini
II. A tribe comprising the genera *Rhamnusium* and *Enoploderes*
III. A tribe comprising the genera *Oxymirus*, *Anthophylax* and *Neanthophylax*

IV. A tribe comprising the genera *Sachalinobia* and *Xenoleptura*
V. Rhagiini
VI. Lepturini

Main differences between the tribes (except those between Rhagiini and Lepturini) are well visible from the generic key. Distribution of a few more important characters:

Tribes I to IV differ from Rhagiini and Lepturini by two characters, at least the first of which is an undoubted plesiomorphy: They have three distinct inner mandibular keels, and the ligula does not reach between the labial palps. However, it is not improbable that the mandibular keel (perhaps the middle one) has been lost parallelly and independently in the Rhagiini and Lepturini. In any case, Rhagiini cannot be derived from any Lepturini and vice versa (see below). In fact, any of the above tribes cannot be derived from any of the remaining ones.

Tribes I and III at least primitively possess urogomphi. The peculiar types of caudal armature of Tribe II may be derived from urogomphi. The terminal caudal spines of tribes IV to VI are with the greatest probability newly developed structures (among other, they differ in position). At least the spine of *Judolidia* must have originated independently of those in the other two tribes. Primitive Lepturini have the morphology of the ninth abdominal segment very similar to some urogomphi-bearing forms, and rudimentary urogomphal sclerotization (sometimes even paired) may be present, although urogomphal spines never occur. It should be noted that the *Oedecnema*-group also may bear apparent vestiges of the spine base, but it is hard to say whether the spine has been lost or yet undeveloped. In any case it seems that these terminal unpaired secondary sclerotizations may be developed relatively easily.

Tribes I to IV and Lepturini primitively have mandibular type II, Rhagiini always have type I.

In tribes I and II we do not know forms with three distinct main stemmata, but the fusion (often rather imperfect) probably occurred only recently, and I believe their basic forms did have three separate main stemmata.

On the other hand, we find in these tribes forms with very primitive gular morphology, where the conspicuously raised gular margins (gular lines) distinctly connect the medial extremities of the metatentorial pits with the basal margin of the maxillary connecting lobes (see Figs 1F, 2I, and the commentary on the origin of the gula in Part I: 45–46).

The fused abdominal pleural lobes and epipleura 1–5 in the Xylosteini are regarded, with some hesitation, as an apomorphic character. They are in other subfamilies usually separate even if the epipleura 1–5 are not distinctly protuberant.

The relatively distinct rudiments of the pronotal lateral furrows in that tribe are, on the other hand, a distinct autplesiomorphy.

Although a broad mala has been proposed above as a primitive character of the

whole family (with a series of question marks; the proposal based mainly on the situation in the Prionine stock, in the non-Prionine stock just the opposite may be true, ± narrow mala present in the Lamiinae, Spondylinae, *Ulcchaetes* of Necydalinae, all Lepturinae except for Tribe II, in the very primitive Cerambycini and some other basic groups of Cerambycinae, and in all Apatophyseinae), I consider the very broad mala of the genera *Rhamnusium* and *Enoploderes* to be an autapomorphy, partly also because it is connected with the unique reduction and modification of the ligula (see Fig. 2H).

Tribes I, II and IV to VI have at least primitively seven dorsal and ventral ambulatory ampullae, which is undoubtedly the original number both for Lepturinae and the whole family. Surprisingly, Tribe III, although rather archaic in many characters, always has only six dorsal ampullae, and the seventh ventral ampulla is at least very much reduced.

Tormae are very short or almost absent in tribes I to IV and basic forms of Lepturini, always well developed in Rhagiini.

Transfrontal line distinct in Tribe III, many Rhagiini (apparently just the more ancient forms, in some advanced ones perhaps secondarily lost), less so in some Lepturini. Distinct transfrontal line largely correlated with a strongly sclerotized cranium.

Perhaps it is not unimportant to note that adults of tribes I to III and V primitively have wings with large ± closed "anal cell". In tribes IV and VI this cell, as far as known, always absent. (I have been unable to check this character in the Xylosteini, since *Xylosteus* has this cell apparently at most rudimentary. The cell present in some *Centrodera* according to LEECH, 1963, with figures, and LINSLEY et CHEMSAK, 1972: 32. However, my single adult female specimen of *C. sublineata* LECONTE does not possess this cell.) This character combined with the number of larval mandibular keels precludes classifying of the genera *Sachalinobia* and *Xenoleptura* in the Rhagiini.

I would like to call attention to one character, the significance of which is not clear to me. I have no adults of *Anthophylax* or *Neanthophylax* available for dissection, but the male genitalia of *Oxymirus cursor* are extremely large, unusually shaped, and quite dissimilar to the apparently rather uniform situation in other Lepturinae examined by me or described in the literature (no males available of *Centrodera*).

Taken from the other side, the respective tribes could be briefly characterized as follows (A - apomorphic, P - plesiomorphic, ? - uncertain):

Tribe I (Xylosteini REITTER, 1912): Urogomphi primitively present (P). Distinct rudiments of lateral furrows (P). Primitively a perfect archaic mandibular type II with three inner keels (P; Fig. 1C, compare with mandibles of Parandrinae or some Prioninae figured in Part I). Ligula not reaching between labial palps (?). Gular lines primitively very distinctly and completely raised (P). Mala narrow (?P). Pleural

lobes 1–5 fused with epipleurum (A). Ampullae seven (P). Tormae nearly lacking (?P). Distinct transfrontal line non-developed (P). Adults with anal wing cell primitively present (P).

This tribe contains the genera *Centrodera* LECONTE, *Xylosteus* FRIVALDSZKY (incl. *Leptorhabdium* KRAATZ), and probably *Caraphia* GAHAN. Larvae of the latter genus not available to me. Described (in Japanese) and figured by KOJIMA et WATANABE (1960) and KOJIMA et HAYASHI (1969). Unfortunately, each of these papers undoubtedly illustrates a different species, or at least illustrations of two species are mixed. For obvious reasons (the same first author) I take as correct the illustrations in the later publication (which also agree better with other Xylosteini). However, the illustration of protergum is ± identical in both, and it shows no distinct rudiments of lateral furrows, but this may be an "illustration artifact". The pronotal base is illustrated as distinctly roughly longitudinally striate (see also KOJIMA et al., 1975), which is also the case in *Centrodera,* and the lateral furrows may simply be included among the longitudinal striae. The larva of *Caraphia* has urogomphi (KOJIMA et al., l. c.). The genera *Caraphia* and *Centrodera* may be closely related, and larvae of *Caraphia* may run down (at least partially) to *Centrodera* in the present generic key. Concerning the problem of which species has been actually described by KOJIMA et WATANABE (l. c.), I perhaps have conspecific larvae (sent to me by S. Imasaka, originally under the name of *Caraphia lepturoides*). Judging from some additional data by Mr. Imasaka, from an associated pupa, and based on comparison and elimination, the larvae could belong to *Japanostrangalia dentatipennis* (PIC) (Lepturini). The Oriental genera *Notorhabdium* and *Palaeoxylosteus*, recently described by OHBAYASHI et SHIMOMURA (1986), are considered by the authors to be closely related to *Xylosteus* s. l. Larvae unknown.

All that has been said above about *Centrodera* applies to *C. decolorata* (HARRIS), the type species of *Centrodera.* From the paper by LEECH (1963) it was evident that "*Centrodera*" *spurca* (LECONTE), and then probably also some other related species, show other affinities. The larvae of "*C.*" *spurca* are now available to me (from the collection of the California Academy of Sciences, San Francisco); they run down to Rhagiini (ligula reaching between labial palps; two inner mandibular keels reaching apex, type II-keel ?absent or very strongly reduced - this is hard to establish, all the available specimens were collected from the soil, and their mandibles are extremely strongly abraded; transfrontal line present; medial frontal line fails to reach epistomal margin; gula not very sharply separate from submentum; pronotal lateral furrows nearly absent; dorsal ambulatory ampullae ± non-granulate; abdominal pleural lobes 1–5 separate; caudal spine present). However, they are not congeneric with any Rhagiini larvae known to me, representing probably the most primitive form known in that tribe (tormae not very long; gular lines very distinctly raised; ligula - of the microtrichial type - narrow and largely sclerotized, somewhat resembling Tribe III). However, neither *C. decolorata* nor "*C.*" *spurca* have any relations

to the subfamily Apatophyseinae, and the apparent similarity of habits of "*C.*" *spurca* and *Apatophysis barbara* LUCAS, pointed out by LEECH (l.c.), is convergent and accidental (larvae of *Apatophysis* incl. *A. barbara* available).

Tribe II: Differs from Xylosteini as follows: Urogomphi (in the form of two spines) absent, but the caudal armature might have originated from the urogomphi (?). Lateral furrows nearly absent (A). Mandibular type II does occur, although not in its "classical" form. Mala broad (?A). Pleural lobes separate (P). Ampullae primitively seven.

Genera *Rhamnusium* LATREILLE and *Enoploderes* FALDERMANN (i.e. probably incl. *Pyrotrichus* LECONTE and *Pyrenoploderes* HAYASHI, although larvae of the North American and Japanese species unknown). This tribe ± corresponds with the tribe Rhagiini as used by Japanese authors (KOJIMA et HAYASHI, 1969; HAYASHI, MORIMOTO et KIMOTO, 1984; KUSAMA et HAYASHI, 1971; HAYASHI, 1980) who include the genera *Rhagium*, *Enoploderes (Pyrotrichus)* and *Xenophyrama* BATES (perhaps close to *Rhamnusium*, but larvae unknown). Unfortunately, just the genus *Rhagium* must be removed.

Tribe III: Differs from Xylosteini as follows: Urogomphi always present. Lateral furrows almost absent (A). Mandibular type II occurs, although less typical. Gular lines not so distinctly and completely raised (A). Pleural lobes separate (P). Dorsal ampullae six in number (A). Transfrontal line present (A).

Genera *Oxymirus* MULSANT, *Anthophylax* LECONTE, *Neanthophylax* LINSLEY et CHEMSAK. Larvae of some other possible candidates (e.g. some Oriental forms) unknown.

Tribe IV: Differs from Xylosteini as follows: Urogomphi absent, caudal spine present (A). Lateral furrows nearly absent (A). Gular lines never so distinctly completely raised (A). Pleural lobes separate (P). Adults with anal wing cell absent (A).

Genera *Sachalinobia* JAKOBSON and *Xenoleptura* DANILEVSKY, LOBANOV et MURZIN. The two genera are undoubtedly related, although in the past classified quite differently (*Sachalinobia* in Rhagiini near such genera as *Gaurotes*, *Xenoleptura hecate* in the genus *Stenurella* of Lepturini!).

Tribe V (Rhagiini MULSANT, 1839): Differs from Xylosteini as follows: Urogomphi absent, caudal spine often (?primitively) present (A). Lateral furrows almost absent (A). Always mandibular type I (A) with two inner keels (A). Ligula reaching between labial palps (?). Gular lines may be raised, but not so distinctly and completely (A). Pleural lobes separate (P). Ampullae primitively seven. Tormae always well developed (?A). Distinct transfrontal line often (?primitively) present (A).

Many genera. From the present list (p. 203) the genera *Rhagium* through *Macropidonia*. I would like to point out that the genera *Cortodera* and *Grammoptera* run down readily to this tribe. The genera *Grammoptera* and *Alosterna* are unrelated, and some errors in assigning species to these genera [e.g. *Alosterna perpera* DANILEVSKY (= *chalybeela* auct. nec BATES) and *erythropus* (GEBLER) classified under *Grammoptera*

until recently] must be treated as taxonomic failures. As already noted (Part I: 14–15), the genus *Desmocerus* DEJEAN undoubtedly belongs to the present tribe, too. Some of its characters suggest an affinity towards the *Gaurotes* - *Pseudogaurotina* group. There is even a distinct tendency to develop the unique apomorphy of *Pseudogaurotina* (Fig. 15B, see generic description). However, some distinct differences also exist (e.g. antennal segment 2 present, 3 absent, maxillary palpiger pigmented). Also the bionomics of *Pseudogaurotina* and *Desmocerus* seem conspicuously related - they both feed in living Loniceraceae, while other Lepturinae seldom feed in fresh living tissues of woody plants. The larvae of the essentially Oriental genera *Apiocephalus* GAHAN and *Capnolymma* PASCOE, although extremely adaptive and with many unique apomorphies (see p. 3), leave no other alternative than to include them in the present tribe as well, perhaps close to such genera as *Acmaeops* and *Dinoptera*. They do not have even the slightest affinity towards the Xylosteini where occasionally classified.

Tribe VI (Lepturini LATREILLE, 1804): Differs from Xylosteini as follows: Urogomphi absent, caudal spine rarely present (A). Lateral furrows indistinct or almost absent (A). Mandibular type II primitively present, but always only two inner keels (A). Ligula reaching between labial palps (?). Gular lines may be raised, but not so distinctly and completely (A). Mala at most slightly broadened (?P). Pleural lobes separate (P). Primitively seven ampullae. Tormae primitively very short. Transfrontal line may be ± present, but almost never sharp and distinct (?). Anal wing cell absent (A).

Many genera. From the present list (p. 203) the genera *Eustrangalis* through *Stenurella*.

There are no sharp mutually exclusive differences between the tribes Rhagiini and Lepturini. The combination of occurrence in some groups of mandibular type II and universal lack of anal wing cell (Lepturini), as opposed to occurrence in some groups of large anal wing cell and universal lack of mandibular type II (Rhagiini), although well characterizing the two tribes, is of course of little help during identification. Some other tendencies (but no one universally applicable for distinguishing the two tribes) as follows:

Rhagiini: Very often depressed forms. Transfrontal line often sharp and distinct (not in the whole *Fallacia* - *Pidonia* group). Relatively sparse and stable cranial setae irrespective of the density of body setae. Medial frontal line in later instars almost always shortening anteriorly (e.g. Fig. 18A). Lateral furrows usually ± absent. Mediopraesternum seldom with microspines *(Akimerus)*, then pronotum largely microspiculate. Border zone between ventral sclerite and labiomaxillary complex usually rather flat, border line often not sharply defined in the middle. Caudal armature often present. Ampullae often non-granulate.

Lepturini: Never depressed, subcortical forms (only larvae of the *Oedecnema*-group very slightly depressed and often spending relatively long initial period of

development under bark). Density of cranial and body setae ± correlated (partial exceptions: *Pseudalosterna, Pseudovadonia*). Sharp transfrontal line never present (but relatively distinct e.g. in *Lepturobosca* and some related forms). Medial frontal line usually interrupted (i.e. the anterior fragment present, e.g. Fig. 28B etc.), more rarely shortened anteriorly. Mediopraesternum not infrequently microspiculate, pronotum devoid of microspines except for *Vadonia moesiaca*. Ventral sclerite always sharply distinctly separate from labiomaxillary complex. Caudal armature known only in *Judolidia*. Ampullae always granulate (granules may be very much restricted or almost absent in *Judolidia* and some species of *Pachytodes*).

It is to be noted that in almost all the above partial differences the derived state apparently occurs in the Rhagiini, often connected with the subcortical habits and depressed body.

There is no need for the tribe Encyclopini LeConte, 1873, as used by some Japanese authors or Lobanov, Danilevsky et Murzin, 1981. The larvae of *Encyclops* are with no doubt related to the *Fallacia* - *Pidonia* group, which in turn may be apparently included in the Rhagiini, although not very typical. In any case the tribal name Encyclopini would have to be used for the whole group, not only for the genus *Encyclops* as it has been done by the above authors (for *Neoencyclops* see below).

Leaving the problems of tribal classification, I regret that a cladistic analysis based on larval characters is so far not possible. Besides the gaps in our knowledge of the larval stage of extant Lepturinae, there are two other reasons, probably only partly caused by those gaps. First, in many characters it is not clear which is the plesiomorphic situation. Also parallel occurrence of characters, or even multiple switching from one state of a character to the other and vice versa apparently have not been infrequent. Such must have been the case e.g. with the essentially setal × essentially microtrichial cover of ligula, whichever alternative would be selected as the plesiomorphic one. Also some reductions (the seventh ambulatory ampulla, the third antennal segment) and fusions (three main stemmata) must have occurred parallelly several times. Secondly, I believe that some apomorphic characters that now seem to characterize some tribes (e.g. the fused main stemmata of tribes I and II, or the reduced seventh dorsal ampulla of Tribe III) do not belong to their groundplan. If we knew only the genus *Xylosteus* from the Xylosteini, it would be very difficult to reveal that the broadly fused epicranium is not a synapomorphy of the tribe.

Nevertheless, one conclusion seems to be relatively justified. The Xylosteini might be the most ancient one of the present six tribes. The numerous archaic features (one of which, namely the distinct rudiments of lateral furrows, seems to be an autplesiomorphy), combined with the very characteristic fusing of pleural lobes 1–5 with the epipleurum (a character considered apomorphic by the present author), should corroborate this in my opinion.

Of the genera employed in special part of the present volume, larvae of type species of the following genera are not at my disposal (and in most cases apparently unknown): *Anthophylax* (see p. 45), *Pseudogaurotina*, *Macropidonia*, *Dokhtouroffia* (but both species of the genus are very closely related), *Anastrangalia* (see below), *Strangalia* (see below).

Because of the extreme similarity of larvae, *Leptorhabdium* has been reduced to a subgenus of *Xylosteus*. However, larvae of the type species of *Leptorhabdium* [*Xylosteus gracilis* KRAATZ = *L. illyricum* (KRATZ)] are unknown.

The larvae of *Oxymirus mirabilis* differ significantly from those of the type species, *O. cursor*. Having examined larvae of some North American species of the genus *Anthophylax*, it has become clear that they are congeneric with *O. mirabilis*, which has been therefore transferred to that genus. Larvae of *Neanthophylax* LINSLEY et CHEMSAK are not at my disposal, but if the tentative determination is correct, then the larva of "*Anthophylax tenebrosus*" [*Neanthophylax tenebrosus nigrolineatus* (VAN DYKE) according to LINSLEY et CHEMSAK, 1972] is probably very similar to larvae of *Anthophylax* (CRAIGHEAD, 1923).

Having studied larvae of the North American *Evodinus monticola* (the type species of *Evodinus*), I find it fully possible to classify the two Palaearctic species in the genus *Evodinus*. Thus, *Evodinellus* PLAVILSHCHIKOV has been abandoned.

Similarly, comparing larvae of the North American *Gaurotes cyanipennis* (the type species of *Gaurotes*) with Palaearctic *Carilia* and *Paragaurotes*, it has been found entirely possible to treat the latter two, and particularly *Paragaurotes*, as subgenera of *Gaurotes*. Giving to each of them generic status would only obscure their undoubted close relationship. See *Gaurotes*.

On the other hand, larvae of the genus *Pseudogaurotina* differ conspicuously both morphologically and bionomically, and the generic status is fully warranted. True affinities of the two North American species assigned to that genus by LINSLEY and CHEMSAK (1972) remain to be investigated. I have seen adults of *P. abdominalis* (BLAND), and they almost surely do not belong to *Pseudogaurotina*, and may be related to *Carilia*. Also, the adults of *Pseudogaurotina* are mostly found on their host plants, while the two North American species seem to routinely visit various flowers [however, single flower record for *P. cressoni lecontei* (CASEY) is *Lonicera* - LINSLEY et CHEMSAK, l.c., and this is the host genus for the European *P. excellens*]. If the host plant records for *P. cressoni* (BLAND) (*Pseudotsuga* and *Abies*) are correct, then it could be taken as another evidence against classifying them in *Pseudogaurotina*.

For convenience, *Gnathacmaeops* has been here included under *Acmaeops* as a subgenus, although certain larval characters are somewhat transitional towards

Dinoptera. It is incorrect to include all Palaearctic species under *Gnathacmaeops* (CHEREPANOV, 1979; a similar concept was apparently accepted by HAYASHI, 1980, who included *Acmaeops septentrionis* under *Gnathacmaeops*).

Dinoptera is simply an ex-group of *Acmaeops* still more specialized for a relatively free mode of life. It has been found convenient to treat *Dinoptera* as a separate genus because of some conspicuous apomorphic characters (antenna, black spots on proalar lobes etc.). However, larvae of some other as yet unknown *Dinoptera*--species may bridge this gap.

CHEMSAK (1964) and LINSLEY et CHEMSAK (1972) considered the PLAVILSHCHIKOV's (1936) designation of *Cortodera humeralis* SCHALLER as the type species of *Cortodera* MULSANT invalid since that species was not in the original list by MULSANT, even though it is a senior synonym of *Granmoptera spinosula* MULSANT which was in that list. However, PLAVILSHCHIKOV did synonymize these two names (he listed *spinosula* MULSANT as an aberration of *humeralis*), and the designation is therefore valid [International Code of Zoological Nomenclature, 3rd Edition, 1985, Article 69a(v)].

The type species is not altered since GRESSITT (1951), whose designation was taken as the first valid one by the above American authors, designated the same species.

Based on larval morphology, the following inevitable synonymy has emerged: *Fallacia* MULSANT et REY, 1863 = *Leptalia* LECONTE, 1873, syn. n. The genus thus now has one Palaearctic and one Nearctic species (see *Fallacia*). Although it is related to *Encyclops* (as suggested by LINSLEY et CHEMSAK, 1972: 99), larval differences are sharp and significant, precluding any possibility of fusion of these two genera (such a possibility has been suggested by the same authors on p. 61).

Larvae of *Nakanea vicaria* have been found extremely similar to the subgenus *Etorufus* of the genus *Pedostrangalia,* and *Nakanea* has been reduced to a subgenus of the latter genus. In fact, it should be perhaps synonymized with *Etorufus*. The American group around "*Leptura*" *obliterata* (HALDEMAN), classified in *Leptura* s. str. by LINSLEY and CHEMSAK (1976), is of the same taxonomic position, and is unrelated to *Leptura*. Synonymization of *Nakanea* with *Leptura* (l. c.) is therefore incorrect.

Macroleptura has been synonymized with *Megaleptura* CASEY by KUSAMA et HAYASHI (1971: 102). Since the larvae of *Leptura thoracica* (the type species of *Macroleptura*) differ distinctly from single available larva of *Leptura emarginata* F. (the type species of *Megaleptura*), I prefer to refuse the above synonymy, and to retain *L. thoracica* and *L. regalis* in the subgenus *Macroleptura*. Larvae of the latter species are not available, but, judging from CHEREPANOV (1979), they should be essentially similar to *L. thoracica*. The generic name *Stenura* DEJEAN, 1837 (which has the same type species with *Megaleptura*; CHEMSAK, 1964) is, according to KUSAMA et HAYASHI (l. c.), a nomen nudum (but is not according to J. A. Chemsak, communicated in a private letter), and, moreover, a junior homonym of *Stenura* CUVIER, 1829 (Aves).

Larvae of *Anastrangalia sanguinea* (LECONTE) (the type species of *Anastrangalia*) not available, and unknown. Those described under that name by CRAIGHEAD (1923) misidentified, belonging to some *Pedostrangalia*-species from the *obliterata*-group (see above).

Distribution of species among the genera *Corymbia, Stictoleptura* and *Brachyleptura* had to be somewhat modified (some species usually classified under *Corymbia* and/or *Brachyleptura* had to be transferred to *Stictoleptura,* see below). Larvae of *Stictoleptura canadensis* (OLIVIER) [whose ssp. *cribripennis* (LECONTE) is the type of *Stictoleptura*] run down to *Stictoleptura variicornis* in the present key to genera and species of the *Leptura*-group. Differences between the three genera may disappear when larvae of additional species are known*).

Larvae of *Anoploderomorpha cyanea* are very similar to those of *Anoplodera sexguttata* (type of *Anoplodera*), much more so than the larvae of *Anoplodera rufiventris,* and the (sub)generic name *Anoploderomorpha* PIC (type species: *Leptura excavata* BATES) has been therefore dropped. Larvae of *A. excavata* not available, described (in Japanese), keyed and figured (head) by KOJIMA et al. (1975). It is not excluded that *Anoplodera rufiventris* should be better classified in the genus *Xestoleptura* CASEY, so far employed only for North American species, but the available larval material of *Xestoleptura* [two larvae of *X. crassipes* (LECONTE)] is not sufficient for making such a shift, and the relations between the genera *Xestoleptura, Anoplodera, Anoploderomorpha* and *Strangalepta* CASEY are to be elucidated by further studies.

The genera *Nivellia* through *Stenurella* form a distinct coherent group, and are therefore placed at the end of Lepturini, following such advanced forms as *Pseudovadonia.* I call attention to the fact that *Rutpela* is unrelated to *Leptura,* and closely related to *Strangalia.*

Larvae of *Strangalia luteicornis* (F.) (the type species of *Strangalia*) are unavailable and unknown. Those described by CRAIGHEAD (1923) are misidentified, belonging probably to some species of *Typocerus* LECONTE. Larvae of two other species of *Strangalia* described by him [*S. famelica* NEWMAN and *S. bicolor* (SWEDERUS)] are rather similar to *S. attenuata,* differring only in a few unimportant details**), and the name *Strangalina* AURIVILLIUS is not needed for the latter and some related East Asian species. Even the larvae of another more remotely related species described by CRAIGHEAD [*S. acuminata* (OLIVIER)] have proved rather similar, indicating we can expect similar larvae also in some Asian (sub)genera such as *Idiostrangalia* NAKANE et OHBAYASHI and *Leptostrangalia* NAKANE et OHBAYASHI. The larva of *Leptostrangalia hosohana* (OHBAYASHI) described (in Japanese) and figured by KOJIMA et al. (1975).

*) See footnote on p. 141.

**) Regardless of the key in CRAIGHEAD (1923: 91), *S. bicolor* and *S. famelica* do not have granules (tubercles) on meso- and metanotum, which is also correctly stated in the description of *S. bicolor* (l. c.: 93). From the 1+1 specimens available, I can confirm the absence.

From the present list of species (p. 203), the following are, to my knowledge, new combinations: *Xylosteus caucasicus (Leptorhabdium)*; *Anthophylax mirabilis* (transferred from *Oxymirus*); *Fallacia macilenta (Leptalia)*; *Pedostrangalia vicaria (Nakanea)*; *Stictoleptura palmi* (from *Corymbia*); *Stictoleptura fontenayi* (from *Corymbia*); *Stictoleptura variicornis* (from *Corymbia*); *Stictoleptura cardinalis* (from *Corymbia*); *Stictoleptura cordigera* (from *Corymbia* or *Brachyleptura*); *Stictoleptura erythroptera* (from *Brachyleptura*); *Rutpela inermis* (from *Leptura*).

From the limited North American material I have seen (if not commented upon above), the following species are covered by the present description of the *Leptura*-group: *Bellamira scalaris* (SAY) (unrelated to *Strangalia*); *Typocerus velutinus* (OLIVIER) (extremely similar to *Leptura* s. str.); *Strangalepta vittata* (SWEDERUS) (similar to *Anoplodera*); *Analeptura lineola* (SAY); *Leptura (Megaleptura) emarginata* F; *Xestoleptura crassipes* (LECONTE) (antennal segment 3 practically absent); *Ortholeptura valida* (LECONTE); *Brachyleptura rubrica* (SAY) (in the present key runs down to *Stictoleptura,* namely *S. variicornis,* but adfrontal setae moved deep into postfrontal region); *Pygoleptura nigrella* (SAY) (may be somewhat related to *Dokhtouroffia,* although does not run to that genus in the present key - the mediopraesternum not microspiculate).

Larvae of *Lepturopsis biforis* (NEWMAN) and *Trigonarthris proxima* (SAY) are relatively similar to Palaearctic *Lepturobosca,* but differ e.g. by mandibular morphology (type I in *Trigonarthris,* larger type II-keel in *Lepturopsis*), or by numerous ligular setae. Judging from CRAIGHEAD (1923), the larva of *Cosmosalia chrysocoma* (KIRBY) should be similar to *Trigonarthris.* Although undoubtedly a member of the Lepturini, *Charisalia americana* (HALDEMAN) not similar to any Palaearctic larvae known to me.

With a few modifications, larvae of *Trachysida aspera* (LECONTE) are fully covered by the present description of *Nivellia* (see note under that genus).

Larvae of *Strophiona nitens* (FORSTER) run down to Rhagiini. No closely related Palaearctic forms known to me, but e.g. *Akimerus* may be a nearest Palaearctic counterpart.

As a result of the present volume, larvae of all Lepturine genera occurring in the region are known except for *Lemula* BATES. Larvae of *Macropidonia* not at my disposal. *Neoencyclops* MATSUSHITA et TAMANUKI has been synonymized with *Grammoptera* by DANILEVSKY (1988). Regarding the genus *Gaurotina* GANGLBAUER, it has not been found in the USSR. Examining shortly the collection of N. N. Plavilshchikov in Moscow, I found the following: 1. The two specimens which served for description of *Pseudogaurotina magnifica* (PLAVILSHCHIKOV, 1958), claimed in the description to be a male and a female, are both females (no dissection made). 2. The single specimen on which the presence of *Gaurotina* in the USSR has been based (*Gaurotina superba* GANGLBAUER morpha *sichotensis* from the same paper by PLAVILSHCHIKOV) is decidedly not conspecific with Chinese specimens of *G. superba* (a specimen from China - morpha *obscurithorax* described in the same paper - placed in the same box), and is apparently a male of *Pseudogaurotina* (no dissection made). Thus a possibility

cannot be excluded that this specimen is a male of *Pseudogaurotina magnifica* (although colour differences from the two females are striking). DANILEVSKY (1988) also considered this specimen distinct from *Gaurotina superba,* but retained it in the genus *Gaurotina.*

Short account of bionomics

The Lepturinae are usually considered "a typical diurnal flower-visiting group" (FORCHHAMMER, 1981). I would like to point out that this concerns mainly some modern groups of the two most advanced (and at present also species-richest) tribes, i.e. the Lepturini and Rhagiini. On the other hand, most of the primitive forms (Xylosteini, Tribe II, *Oxymirus,* and perhaps some others of which I do not have sufficient bionomical information available) are pronouncedly crepuscular or nocturnal, and often do not visit flowers, or at least are not typical flower-visitors.

This subfamily includes the most specialized extremely flattened subcortical larval forms known in the whole family. Nevertheless, it is important to stress that even in this subfamily the subcortical larval habit is undoubtedly an advanced character, occurring exclusively in the tribe Rhagiini, and even here the primitive forms might not have been subcortical (cf. e.g. the apparently most primitive subgenus *Hagrium* of the genus *Rhagium*). Similarly to the family as a whole, dead or rotting wood must be regarded as the original food material also for the Lepturinae. Of the six tribes presently dealt with, dead (usually ± rotten) wood serves as the food material for tribes I to IV, almost all Lepturini, and very few Rhagiini. Some bionomically aberrant forms occur only in the two latter tribes (see below).

Oviposition usually not preceded or followed by a special modification of the oviposition site. Eggs are often numerous (up to several hundreds), sometimes laid in batches, larvae of many species often work gregariously.

Some groups tend to feed about the ground level, in standing stems or stumps penetrating into root bases (*Sachalinobia, Rhagium sycophanta, Stenurella melanura,* apparently also *bifasciata*), or usually underground (*Pachyta,* most *Pidonia*-species, *Judolidia,* the whole *Oedecnema*-group, which, however, often occurs also in roots of uprooten trees). Larvae of *Macropidonia* and *Pseudosieversia* may feed on roots of their host trees externally. The most specialized root feeders (the genera *Akimerus* and *Stenocorus*) often feed in very deep roots (up to about 50 cm) far from the stem or stump, and usually proceed from thin distal roots towards thicker proximal ones. Oviposition in these genera probably occurs in the soil.

Certain groups (Tribe II, *Pedostrangalia* s. str.) are found exclusively in died out parts of living trees, in dead wood in contact with the living tissue, sharing these habits with some Spondylinae (see Part I, genera *Anisarthron, Schurmannia, Alocerus*).

Only very few species feed in fresh living tissue of woody plants (*Pseudogaurotina,* North American *Desmocerus* and *Strophiona nitens*). Some groups (*Encyclops, Pidonia quercus*) mine in the outer bark of living trees. Only recently have been discove-

red habits of some Lepturinae feeding on herbaceous plants *(Brachyta,* some *Cortodera, Vadonia)*. Some North American *Typocerus*-species also feed on underground parts of grasses [*T. octonotatus* (HALDEMAN), cf. LINSLEY et CHEMSAK, 1976].

The whole genus *Cortodera* is very interesting bionomically. In addition to the herbaceous plant feeders, larvae of *C. humeralis* live in the surface soil layer and feed in rotting buried twig fragments, acorns, thinner shallow dead roots etc., usually changing several times the food object. Larvae of *C. femorata* have been so far found only in fallen spruce cones.

Both wood-feeding and subcortical species often occur in material rich in fungi, and at least in some cases the fungi are an important food component. Such species, if not bound to a particular host-specific fungus (which is apparently the case e.g. in *Grammoptera abdominalis*), and particularly when living in a very highly decayed material, may then be "widely polyphagous", i.e. practically independent of the host tree (hardwoods, conifers) and its part (wood, bark) (*Alosterna,* apparently also *Pseudalosterna*). The larvae of *Pseudovadonia livida* are unique by living freely in fungus-infested soil, and this species (closely related to *Pseudalosterna* by the way) illustrates nicely the tendency pointed out above - the wood as the fungus substrate has been simply dropped. Since finishing the manuscript of Part I, also some Cerambycid larvae, incl. one Lepturine [*Bellamira scalaris* (SAY)], have been shown to use (KUKOR et MARTIN, 1986a, KUKOR, COWAN et MARTIN, 1988) or to be able to use (KUKOR et MARTIN, 1986b) acquired fungal enzymes, and cellulolytic enzymes in particular, for their digestion (cf. Part I: 70), and this appearance may be widespread in the Lepturinae. Perhaps the conclusions about self-produced cellulases (Part I: 70) were premature, caused e.g. by overlooking of such an external enzymatic source. MARTIN (1987: 89–90) writes about this problem: "...the idea that cerambycid larvae are able to secrete all of the enzymes required for cellulose digestion is not based upon any strong evidence. It was a conclusion accepted without corroboration when the only other possibility that had been considered, that the midgut cellulases were produced by microbial endosymbionts, had to be rejected." On the other hand, some Cerambycidae (particularly Cerambycinae) feed in dry, long-dead, evidently fungus-free wood, and some of them *(Hylotrupes, Stromatium)* have been shown to be able to digest cellulose. Thus, a question apparently still remains about origin of the cellulolytic activity in such species.

Pupation usually occurs in the food material. However, several ecological groups pupate ± universally (and with greatest probability secondarily) in the soil. Among them are *Pseudovadonia livida* (see above and habits of this species), the herbaceous plant feeders (probably small size of the host plant, some specimens of *Vadonia* may pupate in the plant if of a sufficient size), most of the root feeders (particularly the most specialized groups; an easier adult emergence might be the reason), and some species living under very loosen bark (exclusively Rhagiini: *Evodinus, Gaurotes,* most *Acmaeops, Dinoptera*). The apparently universal pupation in the soil of larvae

of Tribe III (see also CRAIGHEAD, 1923), if secondary, is hard to explain (see also Part I: 69).

The (last) winter usually passed in the larval (praepupal) stage. Adult overwintering known in *Xylosteus, Sachalinobia, Rhagium* and *Eustrangalis,* pupal overwintering occurs in most specimens of *Evodinus,* and apparently also in *Stenocorus quercus.*

Development period rarely shorter than two years. One-year development occurs in some herbaceous plant feeders (at least some *Cortodera,* maybe partly *Brachyta,* but apparently not *Vadonia*), perhaps also in some *Grammoptera*-species.

Besides the Japanese Cerambycine *Kurarua rhopalophoroides* (see Part II: 202, and the reference therein), the genus *Cortodera* is the only one known to me in the whole family to contain parthenogenetic species or populations (DANILEVSKY et MIROSHNIKOV, 1985, and personal observation, see habits of *C. umbripennis).* This appearance is known to occur in the Caucasus, and is apparently partially responsible for the difficulties with classification of the genus.

Distribution of the Lepturinae has been briefly commented upon in Part I: 14.

Key to genera or generic groups

Note: The Nearctic genus *Centrodera* has been included since it may be generally similar to the Asian *Caraphia.*

1 (16) Mandible with three distinct inner keels (Figs 1C, D, 5I, 6H etc.). Ligula fails to reach between labial palps (Figs 2H, 5G). Urogomphi present, or with various unique characters (see key couplets 2, 6), or large caudal spine (Fig. 6D) combined with microspiculate mediopraesternum and three main stemmata.

2 (5) Pleural lobe of abdominal segments 1 to 5 fused with epipleurum (Fig. 1E). Rudiments of lateral furrows in form of very distinct deep impressions (Fig. 2C). Epicranial halves shortly to almost entirely fused dorsally (Figs 1F, 2A) (Xylosteini).

3 (4) Urogomphi present. Epicranial halves only shortly fused. Ligula densely setose. Mandibular type II (Fig. 1C) ..... *(Centrodera)*

4 (3) Urogomphi absent. Epicranial halves entirely fused. Ligula with only a few ventral setae, covered with microtrichia. Mandibular type I (Fig. 1D) ..... *Xylosteus*

5 (2) Pleural lobes on segments 1 to 5 separate (Fig. 3D). Rudiments of lateral furrows very shallow, indistinct, or absent. Epicranial halves touching ± in one point (Fig. 5A etc.).

6 (9) Mala very broad (Figs 2H, I, 4B). Caudal armature of unusual types (Figs 2J, 3H) (Tribe II).

7 (8) Ninth abdominal tergum with long caudal process. Ambulatory ampullae on segments 1 to 7. Antennae three-segmented ..... *Rhamnusium*

8 (7) Ninth abdominal tergum with transverse finely sclerotized gently bilobed protuberance. Ampullae on segments 1 to 6. Antennae two-segmented ..... *Enoploderes*

9 (6) Mala narrow, cylindrical (Fig. 5H). Caudal armature different.

10 (13) Urogomphi present (Fig. 5B). Six dorsal ampullae. Cranium brightly pigmented, later instars with distinct transfrontal line (Fig. 5A) (Tribe III).

11 (12) Labrum long, epipharynx largely setose (Figs 4E, H). Mandibular type II (Fig. 4D) ..... *Oxymirus*

12 (11) Labrum short, epipharyngeal setae restricted (Figs 4F, I). Mandibular type I (Fig. 4C) ..... *Anthophylax*

13 (10) Single caudal spine on large triangular base (Fig. 6D). Seven dorsal ampullae. Cranium almost unpigmented, without distinct transfrontal line (Fig. 6C) (Tribe IV).

14 (15) Labrum cordate, very slightly transverse, mandibular type II (Fig. 5I). Ventral sclerite long, with up to about 20 setae on each side (Fig. 6A) ..... *Sachalinobia*

15 (14) Labrum strongly transverse, mandibular type I (Figs 6G, H). Ventral sclerite much shorter (about 3.2 – 3.5), available larvae with 6 – 13 setae on each side ... *Xenoleptura*

16 (1) Mandible with two inner keels which may be blunt, reduced, indistinct (Figs 7B, C, 19F, 24E etc.). Ligula distinctly reaching between labial palps (Fig. 35A, best visible in apical view). Pleural lobes of abdominal segments 1 to 5 separate, mala narrow (at most slightly broadened dorsomedially, Fig. 25F), caudal armature absent or unpaired spine (Figs 8I, 11G, H, I etc.), but latter spine never combined with both three main stemmata and distinct microspines on mediopraesternum (Rhagiini + Lepturini).

17 (66)! Third antennal segment developed, antennae three-segmented (Fig. 38D), rarely two--segmented (second segment completely reduced, Fig. 17B). (The genus *Cortodera*, pronouncedly transitional in this character, has been included both here and under 66.)

18 (27) Ninth abdominal tergum bearing caudal spine, often borne from large triangular base (in mature larvae of *Gaurotes*, spine may be very much reduced and hidden among stout setae, Figs 15I, J).

19 (26) Cranium in later instars yellow-orange to ferrugineous, with distinct ± sharp transfrontal line; distinctly pigmented even in young larvae. Prothoracic mediopraesternum not microspiculate except for *Akimerus*, then pronotum with large microspiculate area as well (Fig. 9C).

20 (25) Dorsal ampullae non-granulate, largely microspiculate (Figs 10A, E, 12C).

21 (22) Seventh dorsal ampulla absent or entirely rudimentary. Anterior transverse line of dorsal ampullae simple (Fig. 10E) ..... *Stenocorus*

22 (21) Seventh dorsal ampula at most slightly reduced, anterior transverse lines of dorsal ampullae broadly doubled, inclosing large separate microspiculate area (Figs 10A, 12C).

23 (24) Pronotum (Fig. 9C) and mediopraesternum microspiculate. Stemmata absent (main stemmata poorly visible in very young larvae) ..... *Akimerus*

24 (23) Pronotum (Fig. 12B) and mediopraesternum devoid of microspines. All six pairs of stemmata well developed, or at most ventral stemma indiscernible ..... *Pachyta*

25 (20) Dorsal ampullae granulate, microspines much restricted ..... *Gaurotes*

26 (19) Distinct transfrontal line absent. Cranium in later instars at most pale yellow, in young larvae unpigmented. Mediopraesternum microspiculate, pronotum smooth .... *Judolidia*

27 (18) Caudal armature absent.

28 (33) Ampullae ± non-granulate, entirely microspiculate (Fig. 23K) or at least distinctly microreticulate, dull.

29 (30) Seven ambulatory ampullae. Three distinct main stemmata. Protergal pigmented band with two pairs of distinct narrow anterior notches. Darker genal pigmentation about twice as broad as pleurostoma ..... *Fallacia*

30 (29) Both dorsal and ventral ampullae on segments 1 to 6. Main stemmata ± fused into one oval structure with three contiguous pigment spots (Fig. 23A). Protergal pigmentation on each side broadly emarginate, without notches. Darker genal pigmentation narrow, only around main stemmata, ventrally absent.

31 (32) Anterior epipharyngeal region with numerous setae reaching to bases of tormae .... *Pseudosieversia*

32 (31) Anterior epipharyngeal region devoid of setae (Fig. 23I) ..... *Pidonia*

33 (28) Ampullae distinctly granulate, granules smooth, shining (Figs 15A, 25A, 26K, 30B, C,

33D), rarely microspines rather widespread and granules somewhat restricted (e.g. Fig. 31E), but then one main stemma and at least ventral ampulla 7 present.

34 (41) Antennae miniature, second segment extremely reduced, unsclerotized, hardly visible, or ± absent (Figs 17B, 20B). Transfrontal line in later instars present, narrow, ± as sharp as frontal lines (Figs 15E, 16A, C, D, 20A, 21C, D). Ventral sclerite devoid of setae, or at most one seta on each side (Figs 14D, 15C, 19H).

35 (40) Epicranium with sides strongly convex. Two or three main stemmata on each side. Maxilla slender, mala with bright oblique pigmented band (Figs 14D, 15K, 16A, C, D).

36 (37) Dorsal ampullae only laterally granulate, largely microspiculate (Fig. 15A). Body and head not extremely depressed ..... *Pseudogaurotina*

37 (36) Dorsal ampullae flat, entirely finely granulate, microspines much restricted to absent. Body and particularly head extremely depressed (Fig. 17A).

38 (39) Head with sides less abruptly convex, labiomaxillary complex relatively larger (Figs 15D, K). Pleural tubercles smaller (Fig. 14G). (Check the larvae once more, small caudal spine probably present.) ..... *Gaurotes*

39 (38) Head with sides strongly convex, labiomaxillary complex relatively smaller (Figs 16A, C, D, 19A). Pleural tubercles extremely large (Fig. 19D) ..... *Acmaeops*

40 (35) Epicranium with sides poorly convex to subparallel, head narrow. One main stemma. Maxilla robust, mala without ventral pigmented band (Figs 19E, H, 20A, E) ..... *Cortodera*

41 (34) Antennae longer, second segment well developed, sclerotized. Transfrontal line indistinct, or at least much more diffuse than frontal lines (relatively distinct e.g. in *Lepturobosca* and some related genera). Ventral sclerite bearing at least 2–4 distinct setae on each side, usually much more.

42 (49) Epicranial halves touching ± in one point (Figs 24B, 26B). Meta- and occasionally also mesonotum with distinct central granules, and ligula with only very few ventral setae, covered with coarse microtrichia. (Note: Genera from other regions exist bridging these differences.)

43 (44) Both dorsal and ventral ampullae on segments 1 to 6. Labrum almost twice as broad as long, three main stemmata present (rarely partly fusing) ..... *Neopiciella*

44 (43) Seventh ampullae present, although sometimes strongly reduced. Labrum at most very slightly shorter than broad, cordate to subcircular (Fig. 25C), or only one main stemma.

45 (48) Three main stemmata, rarely partly fusing. Labrum almost not transverse, cordate to subcircular, largely sclerotized.

46 (47) Epistomal margin simple, obliquely declivous (Fig. 25B). Prothoracic pigmented band with one very indistinct lateral notch on each side (Fig. 24H). Prothoracic coxosternum without distinct microspines ..... *Pedostrangalia*

47 (46) Epistomal margin with a pair of transverse protuberances (Fig. 24B; they would be probably reduced in young larvae). Prothoracic pigmented band with two pairs of anterior notches. Coxosternum anteriorly very distinctly roughly microspiculate ..... *Eustrangalis*

48 (45) One main stemma. Labrum transverse, only basal half distinctly sclerotized (Fig. 26D) ..... *Lepturobosca*

49 (42) Epicranial halves fused along some length (at least one-fifth, usually at least one-fourth of medial frontal length). Metanotum rarely granulate, then ligula bearing dense stout setae (Fig. 27A).

50 (53) Ligula ± densely setose (Figs 27A, B; in *Vadonia moesiaca*, dorsal and ventral setae separated by a narrow band of microtrichia across apex).

51 (52) Protergal pigmented band with three anterior notches on each side, medial one may

be very broad and shallow (Fig. 26F-d,e). Legs short, hind femur and tibiotarsus combined shorter than, or seldom as long as one-fourth of distance between inner edges of hind trochanters ..... *Leptura*-group

52 (51) Dorsal prothoracic band on each side broadly emarginate, without notches (Fig. 26F-f). Hind femur and tibiotarsus combined at least slightly longer than one-fourth of hind legs' basal distance, legs occasionally very long (Fig. 30F) ..... *Oedecnema*-group

53 (50) Ligula with about 2–4 ventral setae, otherwise covered with long dense (occasionally very coarse) microtrichia (Figs 34B, 35A).

54 (55) Three main stemmata. Praefrons at least in later instar larvae with distinct tubercles on both sides of medial frontal line (Fig. 33B). Mentum with basal pigmentation uninterrupted, ventral sclerite long (about 2.5–2.9) ..... *Nivellia*

55 (54) One or two (Fig. 33H) main stemmata (three pigment spots may be distinct). Praefrons without tubercles. Mentum with two ± broadly separate basal spots (narrowly connected in *Nustera*, then ventral sclerite very short, about 4).

56 (57) Two very large main stemmata on each side (Fig 33H). Ventral sclerite very short, ligula short, broad (Fig. 33G) ..... *Nustera*

57 (56) One oval to circular main stemma, rarely lower main stemma partly indistinctly separate. Ventral sclerite and ligula longer (Figs 34A, B, 37A).

58 (63) Prothoracic mediopraesternum devoid of microspines.

59 (62) Main stemma poorly convex, with pigment rather indistinct and usually not fused. Dorsal and ventral stemmata almost indiscernible. Protergal pigmented band with two anterior notches (Fig. 26F-a).

60 (61) Epicranial halves shortly fused (about one-fourth of medial frontal length, Fig. 33E) ..... *Cornumutila*

61 (60) Epicranial halves broadly fused (about one-half of medial frontal length, Fig. 34A) ..... *Strangalomorpha*

62 (59) Main stemma large, ± abruptly convex, with very large ± compact pigment spot, at least dorsal stemmata with very distinct pigment spots, too (Fig. 34K). Prothoracic pigmented band with three notches (*Strangalia*-group pars) ..... *Stenurella*

63 (58) Prothoracic mediopraesternum with two large distinct occasionally fusing microspiculate areas*) (*Strangalia*-group pars).

64 (65) Prothoracic pigmented band with three notches on each side (Fig. 26F-c). Maxillary palpiger without basal spot. Adfrontal seta not shifted across frontal line. Mandible with about 1–3 short supplementary setae at upper main seta ..... *Rutpela*

65 (64) Prothoracic band with two pairs of notches (Fig. 26F-b), middle pair absent or entirely rudimentary. Maxillary palpiger with basal spot ± developed. Adfrontal seta shifted into postfrontal region. Two mandibular setae ..... *Strangalia*

66 (17)! Third antennal segment absent, antennae two-segmented, rarely *(Dinoptera)* one-segmented (second segment completely reduced as well).

67 (72) Ninth tergum with caudal spine borne on large triangular base (Figs 8G, 13C, D, I, J, 14A, B), latter present even if spine itself rather reduced.

68 (71) Pronotum devoid of microspines.

69 (70) Ventral sclerite moderately long (about 2.8–3.2). Almost always more than six episto-

*) Here also the genus *Strangaliella* HAYASHI, 1976, which does not occur in the region dealt with. One available larva of the Japanese *S. nymphula* (BATES, 1884) has the prothoracic band (very pale yellowish) with three notches, the maxillary palpiger without basal spot, the adfrontal seta not shifted across the frontal line, and two mandibular setae. Epicranial halves broadly fused (about as in *Strangalomorpha*). Microspiculate areas on mediopraesternum very large, only apex with a larger smooth area. Ligula with microtrichia extremely rough, not much finer than and up to more than half as long as the two ventral setae.

mal setae and 3–4 mandibular setae (Fig. 8E). Ligula densely setose (Fig. 7G). Dorsal prothoracic pigmented band with two lateral notches on each side (as in *Rhagium sycophanta*, Fig. 9A) ..... *Rhagium* pars

70 (69) Ventral sclerite very short (about 5). Six epistomal and two mandibular setae. Ligula bearing very sparse setae (usually only two setae visible in ventral view). Dorsal prothoracic band without notches ..... *Brachyta*

71 (68) Pronotum with narrow basal microspiculate area (Fig. 13A; occasionally rather fine and indistinct!) ..... *Evodinus*

72 (67) Caudal spine absent.

73 (74) Seventh ventral ampulla absent. Ampullae 1 to 5 (esp. 2 to 5) very large, broad, particularly dorsal ones deeply medially impressed (poorly visible on contracted larvae), ampulla 6 much narrower and not bilobed (Fig. 22J). Hind margin of ninth tergum raised and poorly to very distinctly (Fig. 22L) finely striate ..... *Encyclops*

74 (73) Seventh ventral ampulla present. Ampullae 1 to 6 similar one another. Hind margin of ninth tergum not raised or striate.

75 (80) Depressed forms, cranium strongly convex laterally (Figs 7I, J, 18B, 21E, G, 22A, B). Seventh dorsal ampulla well developed. Antennae rather short to miniature. Ventral sclerite longer (distinctly below 4, Fig. 8B), and/or three large main stemmata.

76 (77) Hind margin of pronotum with a distinct transverse row of setae (Fig. 9A). Ligula with numerous setae (as in *Rhagium bifasciatum*, Fig. 7G). Usually not three distinctly separate main stemmata (Fig. 8A) ..... *Rhagium* pars

77 (76) Hind margin of pronotum almost without setae (Figs 18A, 21F). Ligula with about 2–4 ventral setae, apical and dorsal margins covered with microtrichia. Three large main stemmata (Fig. 21H).

78 (79) Body greyish, with extremely long stout setae, prothoracic alar lobes with large dark spots (Fig. 18A). Sides of epicranium somewhat angulate (Fig. 18B) ..... *Dinoptera*

79 (78) Body white, setae finer, shorter, prothoracic alar lobes without dark spots. Sides of epicranium ± abruptly roundly convex (Figs 21E, F, G, 22A, B) ..... *Grammoptera*

80 (75) Not or less depressed, cranium laterally moderately convex to subparallel (Figs 19H, 20A, 28C, 32A, B, D, 33A). Seventh dorsal ampulla absent or *(Pseudalosterna)* rudimentary, only in *Vadonia* distinct, then antennae rather long. Ventral sclerite very short (4 or usually more), one main stemma (in *Pseudovadonia* ± absent).

81 (82) Antenna miniature, second segment extremely reduced (Fig. 20B). Transfrontal line in later instars sharp (Figs 20A, 21D). Mala without ventral oblique pigmented band (Fig. 19H) ..... *Cortodera*

82 (81) Antennae ± long, second segment at most slightly transverse (Figs 31J, L). Transfrontal line diffuse (Fig. 32A) or absent (Figs 32E, 33A). Mala with ventral pigmented band.

83 (84) Seventh dorsal ampulla distinct. Anal tube small. Protergal pigmented band with three pairs of anterior notches (*Leptura*-group pars) ..... *Vadonia* (some specimens)

84 (83) Seventh dorsal ampulla absent or entirely rudimentary. Anal tube broad (Fig. 31I). Protergal pigmentation without notches.

85 (86) Frontal lines ± diffuse, epicranial halves very broadly fused (Figs 32A, B). Mandibles normal, apex simple ..... *Alosterna*

86 (85) Frontal lines sharp, frons half-oval, epicranial halves shortly fused (Figs 32D, E, 33A). Mandibular apex blunt, ± distinctly doubled (Fig. 32C) ..... *Pseudalosterna*-group

Genus *Xylosteus* FRIVALDSZKY, 1838 (incl. *Leptorhabdium* KRAATZ, 1879)

Type species: *Xylosteus spinolae* FRIVALDSZKY, 1838 (monobasic)

Body white, moderately, elongate very slightly depressed, covered with dense very short fine pale ferrugineous to unpigmented setae.

Head about by half retracted. Cr transverse (1.3–1.4), moderately depressed (1.9–2.1), narrower than proth, widest slightly behind middle, anterior region ± distinctly finely microgranulate. Mouthframe narrowly sclerotized, otherwise cr almost unpigmented. Ecr halves fused almost along whole length (Fig. 2A), sides strongly roundly convex. All cr setae concentrated anteriorly, pof setae almost indistinguishable from others, adfrontal setae very small or absent.

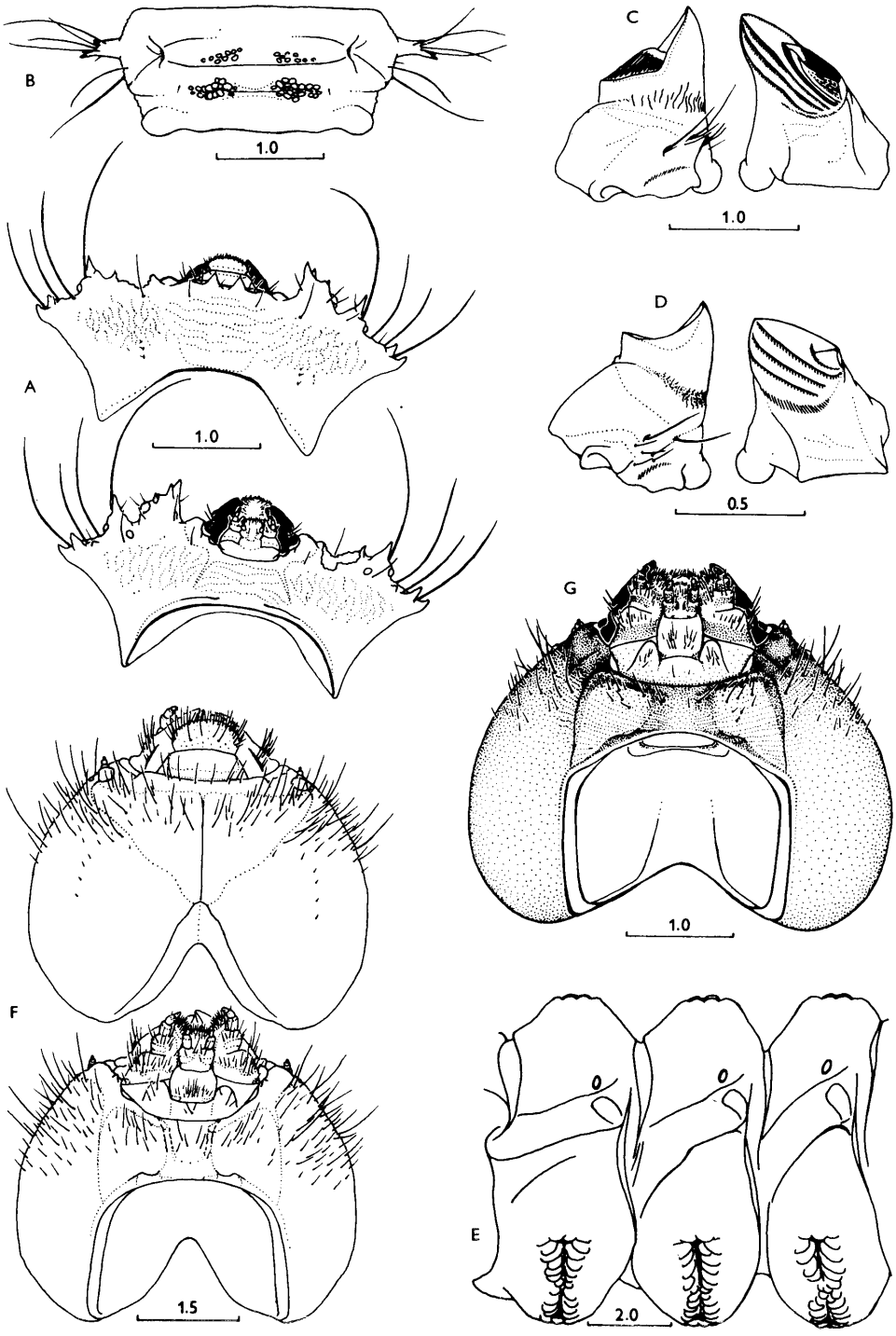
Fl almost indiscernible along much of their length, bisecting ant ring, ± distinctly reaching anterior cr margin. Tfl absent. Frons rather smooth, flat to broadly concave posteriorly, prf region convex, at most very finely pigmented, in later instars bearing numerous setae (a remarkably dense group in anterior frontal angles), main four pairs of prf setae mostly distinguishable due to greater length. Epmg gently emarginate, narrowly strongly sclerotized, obliquely declivous. Six strong eps close to cl margin. Mfl distinct, uninterrupted, reaching epmg.

Cl very small, narrow, moderately convex, gently tapering, yellowish to ferrugineous at base. Lbr strongly transverse, ± oval, basal half pigmented, two strong discal setae isolated, dense anterior and sparser longer lateral marginal setae. Eph with two groups of very few stout setae at anterior margin, medial group consisting of six trichoid sensilla and several scattered sunken sensilla, both not arranged in a distinct transverse row. Tormae almost absent. Hind region feebly raised, relatively broad, with two strips of very distinct microtrichia along sides and reaching far onto anterior region.

Plst moderately raised, strongly sclerotized, sfp absent, or a very low elongate protuberance. Genal pigmentation narrower than plst. One broadly oval feebly convex mstm (about as large as first ant segment's cross-section), facing somewhat laterad (gena not protuberant), pigment inconspicuous, not compact. One indistinct dstm ± without pigment, vstm ± absent.

Vs moderately long (about 3.5–4.5), moderately to strongly convex, not darker than ecr, ± smooth except for fine microsculpture. Anterior margin gently smoothly emarginate, raised and abruptly separate from lmx base, in hyp region deeply sclerotized. Hypl distinct, almost straight, ± diverging posteriorly, reaching pocl. Mtt very small, very close to finely pigmented hind margin. Gl at most feebly raised, mgl

Plate 1: A - *Apiocephalus punctipennis,* head, dorsal (upper) and ventral (lower) views (left medial cranial process broken). B - *A. punctipennis,* abdominal segment 5, ventral view. C - *Centrodera decolorata,* right mandible, dorsolateral (left) and medial (right) views. D - *Xylosteus bartoni,* dtto. E - *Centrodera decolorata,* abdominal segments 4 to 6 from right side, lateroventral view (setae omitted). F - *C. decolorata,* head, dorsal (upper) and ventral (lower) views. G - *Xylosteus bartoni,* head, ventral view.


B
1.0
C
1.0
A
1.0
D
0.5
G
1.0
F
1.5
E
2.0

entirely diffuse, ± absent. Both hyp and gular regions with several anterior setae.

Ant moderately long, three-segmented. Ant ring flat, narrowly sclerotized. Connecting membrane large, ant deeply retractile. Segments sclerotized, second at least slightly shorter than broad, third cylindrical, usually longer than broad, main sensillum very large, slender, occasionally reaching apex of segment 3.

Md relatively short (Fig. 1D), border zone shallowly impressed, not striate, roughly microsculptured. Md type I, apex and dorsal angle ± sharp, cutting edge emarginate, usually somewhat angulate. More or less distinct rudiments of type II-keel present (occasionally visible from above). Three very distinct inner keels. Outer face apically smooth, basally moderately rugose, with two strong and at least one small seta, other surface of basal part smooth.

Lmx small, non-flattened. Base at most finely pigmented. Cardo large, without seta. Distal maxilla robust, stipes almost without laterodorsal flattened extension. Pgmx with distinct ventral pigmentation, basal spot ± absent. Mala cylindrical, robust (broader than pamx), with relatively dense stout setae on distal portion. Pamx relatively short, robust, slightly exceeding mala, segment 2 at most as long as 3, third moderately conical. Mt with small lateral pigmented spots at base. Prlb relatively gracile, basal apodeme unpigmented. Pglb abruptly prominent, palb pronouncedly ventral in regard to ligula, moderately long, separated by up to 1.5 times their width, segments' length usually subequal. Ligula narrow, with large basal pigmented area, bearing several ventral setae, apical and dorsal margins covered with long dense microtrichia.

Proth robust, moderately transverse, with distinct yellow to yellow-orange dorsal band with two pairs of narrow anterior notches. Posterior pn half finely irregularly (hind margin ± longitudinally) rugose, with four longer and a few minute setae. Lfur exceptionally distinct (Fig. 2C). Lpst at most finely pigmented anteriorly, bearing numerous setae. Mpst in mature larvae with greater number of setae. Distinct msp on epl, episternum, cxst, stlf, two variable patches (from almost absent to almost connected) on mpst.

Meso- and metanotum divided by indistinct lines, scutum very narrow at middle. Metanotum with several distinct smooth central granules, mesonotum sometimes with much less distinct granules as well, otherwise both completely mspte. Al not remarkably protuberant. Mesoth spir broadly oval, about as long as pamx (which is rather short), upper hind margin with up to about 15 (20) small mgch. Metath spir extremely reduced, unpigmented, almost indiscernible. Sterna with two complete rows of granules, usually a ± distinct third incomplete row of much smaller granules before first row. Granulate area at least anteriorly surrounded with msp. Bst almost undivided, coxae poorly defined anteriorly, fused with bst.

Legs moderately long (hind ti about as long as pamx, distal legs much shorter than half of their basal distance), stout, bearing sparse setae. Trch very long (at least half as long as femur), with very distinct basal ring. Femur usually slightly shorter

than ti, both unpigmented. Ptrs shorter than ti, not compressed, claw slender, needle--shaped, at most gently curved, seta borne in basal third.

Seven distinctly granulate protuberant aa, seventh aa slightly reduced. Daa with two simple transverse lines, lateral impressions sometimes indistinctly doubled (Fig. 2F). Daa ± completely mspte along periphery (esp. at anterior angles), and narrowly on scutal plate. Abd. spir. much smaller than mesoth one, of similar shape, hind margin with up to about 15 small to moderately large mgch. Plt large, broadly elliptical, with two long and occasionally as many as 12 short setae. Vaa with ± complete mspte band along periphery, distinct msp at least at anterior angles. Carm absent, atu short, moderately large, posteroventral, apl covered with numerous short setae.

Larvae of four species available, very similar to each other.

1 (2) Ventral sclerite slightly longer (Fig. 2A). Body setae very pale, almost unpigmented. Mesonotum with at least one-two indistinct smooth granules in middle (sg. *Leptorhabdium* KRAATZ, 1879) ..... *caucasicus*

2 (1) Ventral sclerite slightly shorter (Fig. 1G). Body setae distinctly ferrugineous. Mesonotum without granules (*Xylosteus* s. str.) ..... *spinolae, bartoni, caucasicola*

Xylosteus (Leptorhabdium) caucasicus (KRAATZ, 1879), comb. n.

Setae paler, most of body setae almost unpigmented, poorly visible. Pof region ± flat. Lbr with anterior margin ± rounded. Vs slightly longer (below 4, Fig. 2A). Palb separated at base by at most slightly more than their width. Msp much restricted, extremely indistinct. Mpst with very small lateral broadly separate (occasionally almost absent) mspte areas. Protergal band pale yellow. Mesonotum with several indistinct smooth granules in middle, all granules smaller and more numerous. Largest available larva 19 mm.

Habits: Larvae in rotten wood of various deciduous trees (DANILEVSKY et MIROSHNIKOV, 1985). Development period (judging from the available larvae) at least two years. Pupation summer /autumn, adults overwinter in pupal cells.

Distribution: NE coast of Black Sea, Transcaucasia, North Iran, Asia Minor.

Material: 25. 7. 1971, SU, Krasnodar region, Krasnaya Polyana, 3/I, *Castanea*-stump, B. M. Mamaev lgt., coll. IS and S; 8. 6. 1959, SU, Krasnodar region, Kudeista, 4/–, *Fagus*-stump, collector not stated, coll. IS.

Xylosteus (s. str.) *spinolae* FRIVALDSZKY, 1838

In the single available larva, no hopeful differences have been found from *X. bartoni*. Spir mgch rather long and narrow, distinctly overreaching elliptical spir outline. Mspte areas on mpst relatively broadly separate. Single available larva 12 mm.

Host plants: Larvae known apparently mainly from *Corylus avellana* (see also DEMELT, 1966), feeding in dead wood, habits apparently similar to other *Xylosteus*-species. SAMA (1988) cites also *Picea* and *Abies*, but the source of those data is not known to me.

Distribution: S Austria, N Italy, N Yugoslavia, ?S Hungary, ?Rumania.

Material: 10. 5. 1968. Austria, Karawanken, Bärental, 1/I, *Corylus*, M. Sláma lgt. et coll.

Xylosteus (s. str.) *caucasicola* PLAVILSHCHIKOV, 1936

No reliable differences have been found from *X. bartoni*. Largest available larva 20 mm.

Host plants: Larvae found in rotting wood of dead fallen stems and stumps of *Quercus* and *Cerasus*, probably polyphagous. Habits similar to *X. caucasicus*.

Distribution: NE coast of Black Sea (NW Caucasus).

Material: 23. 7. 1971, SU, Caucasus, Guzeripl', 5/I, *Quercus*, lgt. D, coll. IS and S.

Xylosteus (s. str.) *bartoni* MAŘAN et OBENBERGER, 1933

Body setae distinctly ferrugineous. Pof region esp. in later instars distinctly concave. Anterior lbr margin at most feebly rounded, usually straight, cut. Vs slightly shorter (above 4, Fig. 1G). Palb separated at base by up to about 1.5 times their width. Msp more distinct, mpst with two large approaching (in some specimens even connected) mspte areas (Fig. 2B). Protergal band yellow to yellow-orange. Mesonotum without granules, all granules larger and less numerous. Length up to 23 mm.

Host plants: *Pinus* and *Picea* known to me. Habits apparently similar to other species.

Distribution: SE Bulgaria.

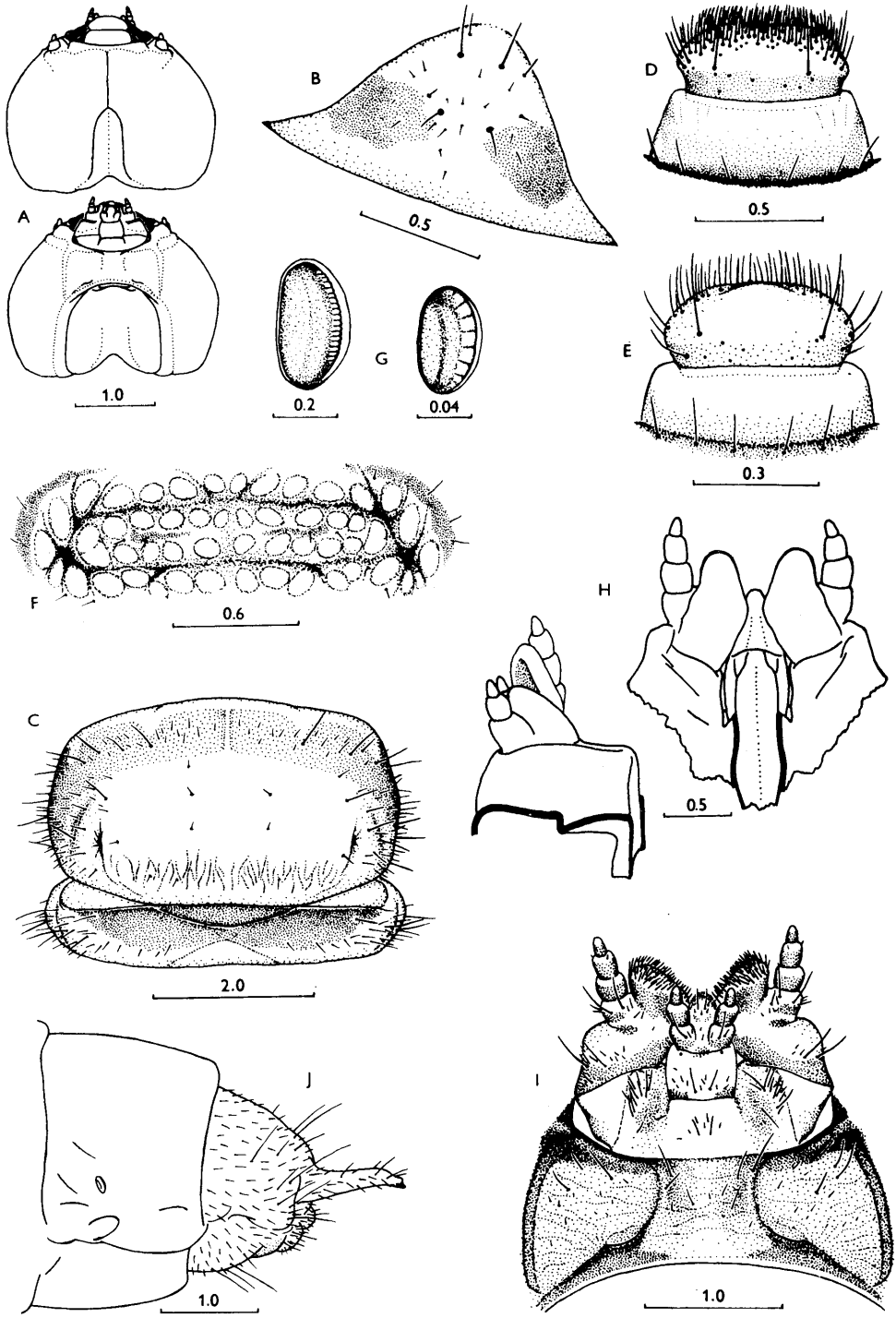
Material: 1979, Bulgaria, Rila, Rilski Monastir, 4/I, *Pinus* and *Picea*, J. Hála lgt., coll. S; 20. 6. 1982, Bulgaria, Pirin, Begovica (1750 m), 20/I, *Picea*, S. Kadlec lgt., ccll. S; 5.–8. 8. 1984, same data, many exuviae of last instar larvae.

Genus *Rhamnusium* LATREILLE, 1829

Type species: *Rhagium salicis* F., 1787 = *Cerambyx bicolor* SCHRANK, 1781 (monobasic).

Note: There is some uncertainity as to which is the proper name of the type species. In most of recent literature it can be found under the name *Rhamnusium bicolor* (SCHRANK) (described as *Cerambyx bicolor*). This name has been revealed to be a junior primary homonym of *Cerambyx* (now *Trachyderes*) *bicolor* VOET, 1778 (SILFVERBERG, 1977), and has been replaced by *Cerambyx*

Plate 2: A - *Xylosteus (Leptorhabdium) caucasicus*, head, dorsal (upper) and ventral (lower) views (setae omitted). B - *Xylosteus bartoni*, prothoracic mediopraesternum. C - *X. bartoni*, pro- and mesothorax, dorsal view. D - *X. bartoni*, labrum and clypeus. E - *Xylosteus (Leptorhabdium) caucasicus*, dtto. F - *Xylosteus bartoni*, second dorsal ambulatory ampulla. G - *Rhamnusium bicolor*, second left abdominal spiracle of last instar (left) and young (right) larvae. H - *R. bicolor*, diagrammatic illustration of labiomaxillary complex in dorsal view (right) and labium and right maxilla in lateral view from left side (left). I - *R. bicolor*, labiomaxillary complex and ventral sclerite. J - *R. bicolor*, abdominal segments 8–10, lateral view (setae omitted from segment 8).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virgo VOET, 1778, i.e. by a senior (not junior!!) synonym, which, however, had not been usually cited in synonymy. AURIVILLIUS (1912) cited *virgo*, although older, in the synonymy of *bicolor* with a question mark. On the other hand, LOBANOV DANILEVSKY et MURZIN (1981) refused *virgo* VOET, stating that this author did not use the binominal nomenclature in the publication concerned (VOET, 1778, Cat. Col. II). Nevertheless, other names from the same publication are commonly used. Neither the above publication nor the type material of *virgo* VOET (if existing; to explain the question mark in AURIVILLIUS l.c.) are at my disposal. Until the problem is solved, I preserve *R. bicolor* (SCHRANK).

Body white or yellowish, robust, not much depressed, with short ferrugineous setae, in older and esp. mature larvae with dense cover of very short supplementary setae (Figs 2J, 3A, B; but absent from some more sclerotized regions, e.g. most of pn and proth al).

Head less than by half retracted, large, only slightly narrower than proth. Cr strongly transverse (about 1.6), depressed (about 2.2), pale, yellow in mature larvae, at most poorly microreticulate, widest at or usually very slightly behind middle. Ecr ± smooth, with numerous anterior setae, main adfrontal seta ± touching fl; sides abruptly roundly convex, both ecr halves touching almost in one point, posterior notch angulate, about 90 degrees.

Fl narrow, almost straight, passing through ant openings, distinctly reaching anterior cr margin. Original frontal sutures discernible, broad, diffuse, their transverse sections tend to develop transfrontal line (Fig. 3C). Pof very shallowly concave, main pair of setae strongly shifted anteriorly. Prf in later instars distinctly transversely striate, moderately convex, not remarkably darkened, with greater number of setae, particularly dense groups in anterior angles. Epmg gently emarginate to straight, narrowly sclerotized except for larger spots at dorsal md articulations, esp. laterally abruptly steeply declivous. Eps close to cl border, almost always more than six setae present (up to about 20). Mfl reaching epmg, in later instars much weakened in tfl region.

Cl small, tapering, moderately convex, may bear some minute setae, basal half and ± also lateral margins sclerotized. Lbr transverse, subelliptical, slightly convex in middle, basal half pigmented. Marginal setae rather dense, moderately long, two strong isolated discal setae, a few small ones may be associated. Tormae almost absent, hind eph region broad, flat, often with small medial sclerite (Fig. 3E), anteriorly with a transverse row of minute knob-shaped sensilla. Anterior region almost unsclerotized, with large broadly separate setose areas.

Plst strongly abruptly raised, deeply sclerotized, sfp usually distinct (Fig. 3C), on average best developed among all Lepturinae. Genal pigmentation about as wide as plst. One large ± strongly protuberant mstm facing anteriorly due to protuberant gena; pigment incompletely fused, distinct to inconspicuous. Dstm variable, indistinct, vstm indistinct to absent.

Vs (Fig. 2I) relatively short (about 3.5–3.8), feebly convex, not darker than ecr, ± smooth, gl very strongly raised. Anterior margin well separated from lmx base.

very shallowly emarginate (or ± straight in middle), hyp portion dark. Hypl slightly curved, at most gently diverging, reaching (almost reaching) pocl. Mtt long, very distinct, moderately broadly separate from darkened hind margin. Mgl broad, diffuse, reaching anterior margin. Number of setae rather variable.

Ant short, three-segmented, deeply retractile. Ant ring sclerotized, slightly ventromedially raised. Segments finely pigmented, second distinctly transverse, third cylindrical, at most slightly longer than broad, about as long as large moderately elongate main sensillum.

Md (Fig. 3F) short, robust, type I. Border zone ± striate. Apical part externally distinctly microreticulate to microrugose, dull, with 1–2 indistinct longitudinal ledges. Apex prominent, cutting edge shallowly emarginate. Three distinct inner keels and two short ridges below dorsal angle. Basal part ± smooth, lateral face uneven, with several setae.

Lmx (Figs. 2H, I) small, robust, non-flattened. Basal parts well separated, connecting lobes remarkably protuberant, very distinctly sclerotized, esp. in later instars with unusually numerous setae. Cardo very large, without distinct seta. Distal maxilla robust, pgmx with ± distinct ventral pigmentation and large basal spot, pamx moderately long, segments subequal or slightly decreasing in length from 1 to 3, third segment elongate. Mala extremely broad, inserted above labium when at rest, bearing dense short setae, with broad pigmented band. Labium not step-like, mt with broadly separate spots at base. Basal prlb apodeme largely pigmented. Pglb prominent, separately pigmented, palb pronouncedly ventral in regard to ligula; latter very small, usually with ± distinct basal pigmented spots, bearing a few (usually two) ventral setae and several short dorsal setae, covered with short dense microtrichia. Palb separated by at most slightly more than their width.

Msp present in usually large but much variable extent. Proth: Stlf, at least small spot on cxst, mpst (broad transverse band to ± absent). Meso- and metath: Nota (scutellum inconstantly), coxae and bst in variable extent. Abd: Daa (anterior margin and scutal plate) - large extent to ± absent; vaa (anterior and lateral margins) - may be almost absent. Very characteristic are rather distinct msp along pterothoracic and abd intersegmental dorsal and ventral zones.

Proth broad, short, protergal band narrow, yellow to yellow-orange, without notches, al slightly sclerotized. Pn in later instars with several scattered discal setae, irregularly rugose. Lfur almost absent. Epl and venter ± unpigmented. Lpst with greater number of setae (not taking into account dense cover of minute setae).

Meso- and metanotum with transverse lines broadly separate (scutum not interrupted), esp. metanotum in later instars usually with several ± distinct granules. Al moderately protuberant. Mesoth spir moderately large (in later instars at most slightly longer than palb), narrow, ferrugineous, hind margin with up to several tens of very small mgch. Metath spir in later instars well discernible. Sterna sharply granulate, transsternal lines deep, bst undivided, coxae poorly defined anteriorly.

Legs moderately long (hind legs distinctly shorter than half of their basal distance),

slender. Trch with distinct basal ring and several setae. Femur as long as, or usually slightly longer (!) than ti, bearing numerous setae, both segments unpigmented. Ptrs almost as long as ti, slender, not compressed, claw needle-shaped, seta borne about middle or even nearer to apex.

Seven granulate aa, seventh one slightly reduced. Daa with two simple transverse lines and one pair of lateral impressions. Spir narrow, ferrugineous, in later instars with up to about 20 small mgch (Fig. 2G). Plt relatively flat, two long and variable number of short setae, first plt remarkably smaller. Ninth tergum with curious long finely sclerotized caudal process terminated by a sclerotized point with a less sclerotized tubercle above it (Fig. 2J). Atu very small, apl bearing ± numerous short setae.

Following various authors (e.g. HEYROVSKÝ, 1955), and regardless of PLAVILSHCHIKOV (1936) and VILLIERS (1978), I consider *Rhamnusium gracilicorne* THÉRY, 1894 to be a synonym of the type species (see also SCHMIDT, 1987). Also *R. graecum* and *R. algericum* may prove to be only colour forms of *R. bicolor* (e.g. DEMELT, 1963, lists both *bicolor* and *graecum* collected the same day on the same locality in Turkey on *Aesculus*, perhaps even on the same tree). Both adults and larvae of this remarkable isolated genus are extremely variable, and a well-founded taxonomic revision is badly needed.

1 (2) Hind epipharyngeal region with a distinct sclerite (Fig. 3E). Lateral clypeal pigmentation distinct ..... *bicolor*-group
2 (1) Epipharyngeal sclerite absent. Lateral clypeal pigmentation much paler than basal one, in young larvae ± absent ..... *testaceipenne*

Rhamnusium bicolor (SCHRANK, 1781)

Main differences from *R. testaceipenne* in the key. Mstm with pigment always very indistinct to ± absent. Msp on mpst extremely variable (see generic description), in one available larva absent. Length up to 30 mm.

Host plants: *Populus* (a very frequent host), *Aesculus, Ulmus, Salix, Fagus* and other deciduous trees. Larvae always in dead parts of living trees, in dead wood in contact with living tissue. At least three-year development. Pupation spring/summer in the wood, flight in summer. Adults lead a very hidden mode of life, at least partly crepuscular or nocturnal, only rarely on flowers.

Distribution: Europe except North. See the note above.

Material: 17. 3. 1960, SU, Voronezh region, Tellerman, 4/?, *Ulmus*, B. M. Mamaev lgt., coll. IS; 22. 8. 1963, SU, Ural region, Volodarsky, 2/?, *Populus*, F. M. Turundaevskaya lgt., coll. IS; 1965–1987, CS (various spots), +/I, *Populus*, lgt. et coll. M. Sláma and S.

Rhamnusium graecum SCHAUFUSS, 1862

Extremely similar to *R. bicolor*. Mstm often with distinct pigment spot. Msp on mpst in available larvae never so much reduced as in some specimens of *bicolor*. Length up to 30 mm.

Host plant: All the available larvae have been collected in *Populus*. Habits apparently similar to *bicolor*.

Distribution: East of Mediterranean area (Greece, Turkey, Syria), up to Transcaucasia.

Material: 10. 6. 1984, Turkey, Ankara, Kizilcahamam, 1/I, G. Sama lgt. et coll; Turkey, Büyükadar, 1/?, lgt. P. Schurmann, coll. M. Sláma; 15. 6. 1981, Greece, Tripolis, 5/I, M. Sláma lgt. et coll.

Rhamnusium algericum PIC, 1896

No differences found from *R. bicolor*. Largest available larva 20 mm.

Habits similar to other species. Known host plants include *Quercus, Acer, Populus*. Adults in late May–June (G. Sama, pers. comm.).

Distribution: Algeria.

Material: 24. 4. 1987, Algeria, Tizi Ouzou, Yakouren, 5/I, *Quercus suber*, G. Sama lgt. et coll.

Rhamnusium testaceipenne PIC, 1897

Main differences in the key. Mstm may have distinct pigment spot. Mpst with at most narrowly interrupted mspte band. Length up to 30 mm.

Host plant: *Carpinus*. Habits similar to *R. bicolor*.

Distribution: Crimea, Caucasus, Transcaucasia, North Iran, Asia Minor uncertain.

Material: 15.–16. 6. 1979, SU, Azerbaidzhan, Avrora, 13/I, *Carpinus*, lgt. D, coll. IS and S.

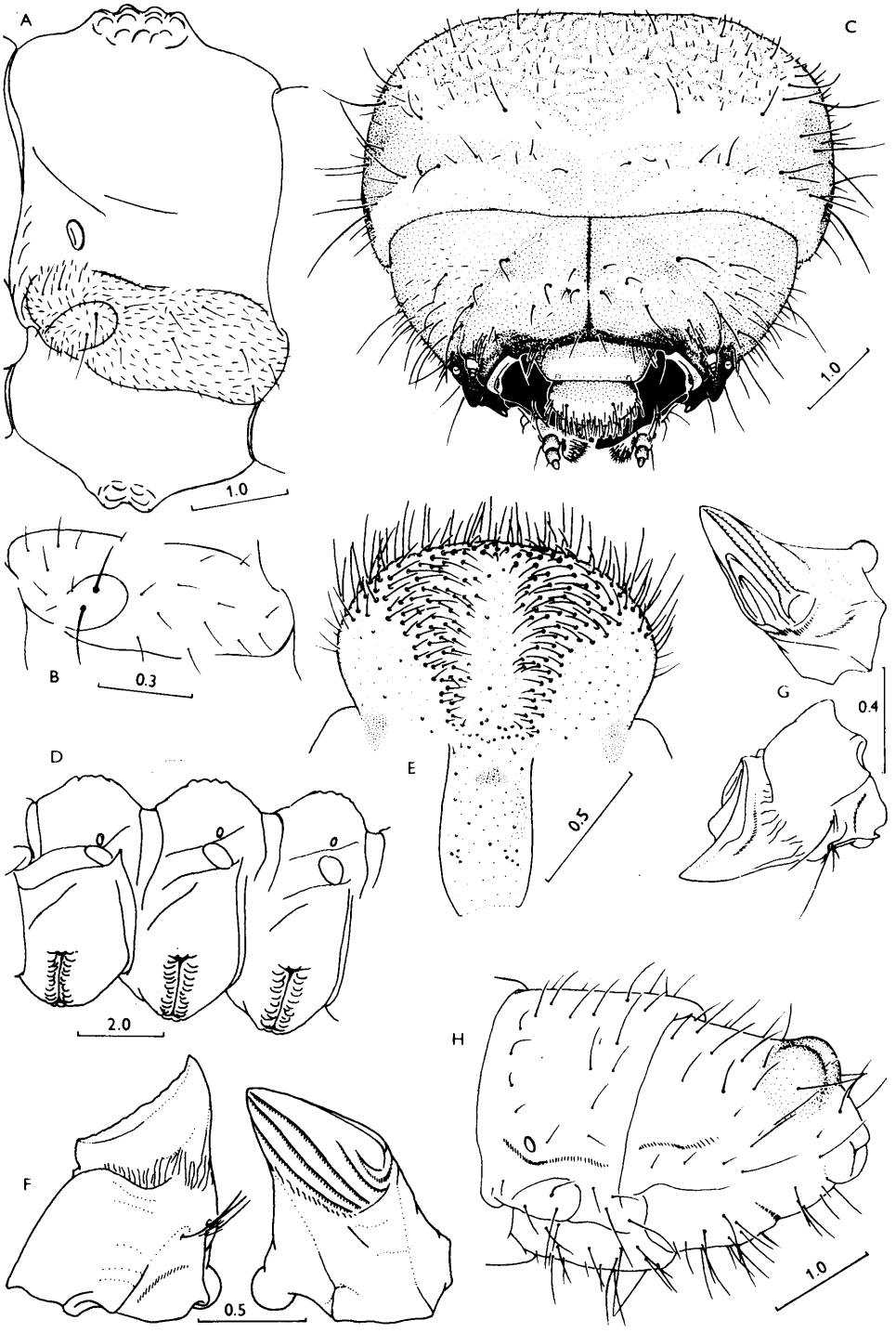
Genus *Enoploderes* FALDERMANN, 1837

Type species: *Enoploderes sanguineus* FALDERMANN, 1837 (monobasic)

Body white, elongate, almost not depressed, covered with moderately long ferrugineous setae.

Head very large, less than by half retracted (Fig. 4A). Cr strongly transverse (1.61), much depressed (2.32; one specimen measured), very broad, almost as broad as proth, almost unpigmented except for mouthframe, not microgranulate, widest shortly behind middle. Ecr smooth, setae moderately dense, adfrontal setae ± not separated from others; sides abruptly convex, both ecr halves touching almost in one point, posterior notch angulate, slightly less than 90 degrees.

Fl indistinct due to poor cr pigmentation, anteriorly touching ant ring from below (not distinctly bisecting it), reaching anterior cr margin. Tfl absent. Frons ± smooth, short and broad, feebly concave behind. Main pof setae small, shifted far forward. Four main pairs of prf setae accompanied by several shorter ones. Epmg sclerotized, ± straight, gently obliquely declivous. Six or usually more (up to about 10–12) eps not far from cl border, main six pairs rather long. Mfl uninterrupted, reaching epmg.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Cl moderately broad, convex, roundly tapering, basal half finely pigmented. Lbr long, slightly shorter than broad, flat, largely pigmented except for narrow anterior margin, with several discal setae. Anterior eph region finely sclerotized, two large narrowly separate setose areas reaching far behind. Tormae almost absent. Hind region narrow, raised, with short longitudinal sclerotized belts along sides.

Plst strongly raised, deeply sclerotized, sfp ± present (a low elongate tubercle). Gena ± smooth, fine pigmentation about 1.5–2 times as broad as plst. One large distinctly convex mstm, pigment distinct, three spots often incompletely fused. Other stemmata ± absent.

Vs moderately long (3–3.1), not darker than ecr (i.e. almost unpigmented), flat, almost smooth, gl slightly raised. Anterior margin straight, dark except for narrow medial area, distinctly separated from lmx base. Hypl narrow, gently curved, slightly diverging, reaching pocl. Mtt close to finely pigmented hind margin, relatively close to each other, very distinct, their medial extremities abruptly curved forward. Mgl ± indiscernible. About 15 setae on each side.

Ant moderately long, two-segmented, pointed remarkably ventrad. Ant ring almost not raised, connecting membrane large, dorsally ± smoothly passing into cr cuticle. Segments pigmented, second in later instar larvae about as long as broad. Main sensillum large, elongate.

Md (Fig. 3G) robust, type II. Border zone indistinctly striate. Apex very long, sharp; three distinct inner keels. Type II-keel with neither dorsal nor inner plate distinctly striate. Apical part with outer face very distinctly microsculptured, dull. Basal part ± smooth, somewhat gibbose laterally, with several setae.

Lmx (Fig. 4B) moderately large, non-flattened. Basal parts well separate, connecting lobe in later instars finely sclerotized medially, cardo very large, with a short seta. Distal maxilla short, robust, pgmx extremely small, ventral pigmentation present, basal spot absent. Pamx moderately long, segments 1 and 2 subequal, third shorter, moderately elongate. Mala extremely broad, triangular, with very dense an setaed broad pigmented band. Submentum tends to fuse medially with mt, latter with small broadly separate basal spots. Pglb pigmentation tends to fuse. Basal prlb apodeme unpigmented. Palb pronouncedly ventral in regard to ligula, latter small, very narrow, covered with sparse short very stout setae. Palb separated by at most slightly more than their width.

Proth broad in front, distinctly tapering towards base (Fig. 4A). Protergal band pale yellow, unusually narrow, ± without notches, al behind it almost unsclerotized.

◀

Plate 3: A - *Rhamnusium bicolor,* mature larva, abdominal segment 7, lateral view from left side (setae figured only on protuberant epipleural fold). B - *R. bicolor,* young larva, left epipleural fold of abdominal segment 7. C - *R. bicolor,* head and prothorax, dorsal and slightly anterior view (note abruptly protuberant upper pleurostoma and large subfossal process). D - *R. bicolor,* abdominal segments 4 to 6 from right side, lateroventral view (setae omitted). E - *R. bicolor,* epipharynx. F - *R. bicolor,* right mandible, dorsolateral (left) and medial (right) views. G - *Enoploderes sanguineus,* left mandible, dorsolateral (lower) and medial (upper) views. H - *E. sanguineus,* abdominal segments 8 to 10, lateral and slightly posterior view.

Pn with two pairs of discal setae, roughly irregularly rugose, lfur absent. Venter unsclerotized. Lpst with greater number of setae, about 10 setae on mpst. Msp much restricted (stlf and cxst, even there indistinct).

Meso- and esp. metanotum with several distinct granules, some regions covered with very fine hardly visible msp. Al slightly protuberant. Mesoth spir about as long as pamx, narrow, up to about 20 small mgch. Metath spir almost unpigmented, hardly discernible. Bst undivided, sterna granulate, coxae poorly defined anteriorly, indistinct msp on coxae and small adjacent regions of bst.

Legs not much shorter than half their basal distance, slender. Trch well developed, with narrow basal ring. Femur and ti subequal, both unpigmented, former in later instars with relatively numerous setae. Ptrs slender, shorter than ti, seta borne slightly before middle.

Six granulate strongly protuberant aa, granules large, moderately protuberant. Daa with two simple transverse lines and one pair of lateral impressions, msp almost absent. Spir narrow, up to about 10 small mgch. Plt moderately large, oval, two strong and 1–5 short setae. Vaa ± devoid of msp. Ninth tergum with transverse finely sclerotized slightly bilobed protuberance. Atu very short almost fused with segment 9 (Fig. 3H). Apl small, nearly glabrous, anus almost terminal. Length of available larvae up to 20 mm.

Only larvae of the type species available. Three widely geographically separated species known, one from Japan, one from North America.

Enoploderes sanguineus FALDERMANN, 1837

Habits (DANILEVSKY et MIROSHNIKOV, 1981, 1985): Larvae in dead parts of living trees, in dead brownish wood in contact with living tissue (wound scars, inner walls of tree hollows etc.). At least two-year development, pupation in spring, flight late April to May. Larvae found in *Populus, Salix*, may develop also in other deciduous trees, and perhaps even in conifers.

Distribution: Caucasus (incl. northern foothills), Transcaucasia, North Iran, Albania (HEYROVSKÝ, 1967).

Material: 6. 6. 1979, SU, Azerbaidzhan, Gasnalyan, 7/1, *Populus*, lgt. D, coll. IS and S.

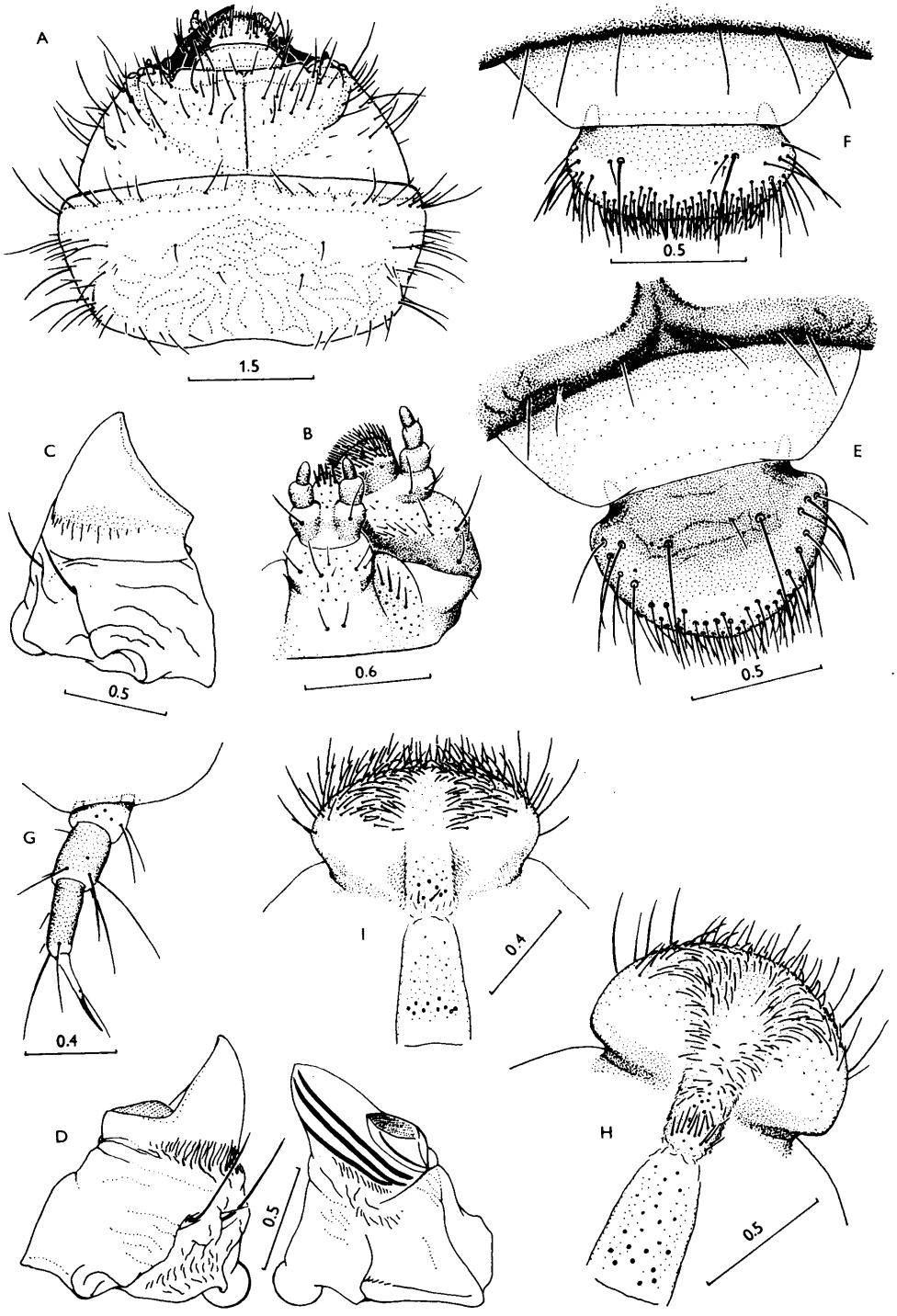
Genus *Oxymirus* MULSANT, 1863

Type species: *Cerambyx cursor* L., 1758 (monobasic)

Body white or yellowish, elongate, very slightly depressed, with moderately long stout ferrugineous setae.

▶

Plate 4: A - *Enoploderes sanguineus*, head and prothorax, dorsal view. B - *E. sanguineus*, labium and left maxilla, ventral view. C - *Anthophylax mirabilis*, left mandible, dorsolateral view. D - *Oxymirus cursor*, right mandible, dorsolateral (left) and medial (right) views. E - *O. cursor*, epistomal margin, clypeus and labrum. F - *Anthophylax mirabilis*, dtto. G - *Oxymirus cursor*, right fore leg, anterior view. H - *O. cursor*, epipharynx. I - *Anthophylax mirabilis*, dtto.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Head (Fig. 5A) less than by half retracted. Cr transverse (1.4–1.5), moderately depressed (2.1–2.2), slightly narrower than proth, overall brightly pigmented, widest slightly behind middle, at least some anterior regions finely microreticulate. Ecr in later instars distinctly rugose along fl, sides abruptly roundly convex, moderately numerous anterior setae. Both ecr halves touching ± in one point, hind margin of 90 degrees or slightly less. Main adfrontal seta close to fl.

Fl sharp, narrow, almost straight, passing through ant openings, reaching anterior cr margin. Tfl sharp, narrowly interrupted. Frons in later instars roughly rugose. Pof moderately concave posteriorly. Prf at least slightly darker, at most gently convex, with greater number of setae, main four pairs usually distinguishable. Epmg almost straight, steeply declivous, abruptly raised above cl. Six strong eps close to cl border. Mfl distinct, reaching epmg, in later instars weakened in tfl region.

Cl narrow, relatively long, moderately convex, strongly roundly tapering, basal half and sides yellowish. Lbr small, flat, cordate, only very slightly transverse, almost entirely sclerotized. Two strong and usually several small discal setae (Fig. 4E). Eph (Fig. 4H) almost unsclerotized, tormae extremely short, transverse, hind region abruptly raised, narrow, two large setose areas reaching far behind, microtrichia much restricted.

Plst abruptly raised, strongly sclerotized, sfp at most low minute tubercle. Gena ± smooth, darker pigmentation about as wide as plst. In young larvae three mstm, in mature ones usually ± fused; very distinct, convex, pigment fine yet distinct. Two distinct convex broadly separate dstm with fine pigment spots. Small vstm mostly present.

Vs (Fig. 5C) moderately long (about 2.7–2.8), convex, not darker than ecr, uneven, hind angles prominent, gula not raised. Anterior margin gently smoothly emarginate, sharply separated from lmx base, dark except for short medial section. Hypl diverging, at most slightly curved, almost reaching pocl. Hind margin darkened, mtt small, broadly separate from each other, close to hind margin. Mgl narrow, reaching anterior margin. About 10–15 setae on each half.

Ant miniature, almost not retractile (connecting membrane reduced, narrow), three-segmented. Ant ring strongly sclerotized. Second segment strongly transverse yet distinct, sclerotized. Third segment about as long as broad, and about as long as rather large main sensillum.

Md (Fig. 4D) very short and robust, type II. Border zone distinctly striate. Apex prominent, three distinct inner keels. Type II-keel moderately large, dorsal plate finely striate, cutting edge angulate. Basal part laterally uneven, in later instars with some supplementary short setae.

Lmx small, non-flattened, labium very distinctly step-like (Fig. 5F). All basal components distinctly separate, may be finely sclerotized. Cardo large, no distinct seta. Distal maxilla relatively short and robust. Pgmx with broad ventral band and large basal spot. Pamx moderately long, segments 2 and 3 subequal in length, third slender. Mala apically narrow, cylindrical, moderately dorsomedially broadened at

base, with very broad pigmented band, bearing dense long stout setae on apical part and along dorsomedial margin. Mt with uninterrupted basal pigmentation. Prlb basal apodeme broadly distinctly sclerotized, pglb prominent, pigmentation narrowly separate, palb pronouncedly ventral in regard to ligula, rather long, separated by at most slightly more than their width, segments subequal, second slender. Ligula narrow (Fig. 5G), long, distinctly separated from hypopharyngeal part (Fig. 5F), with large bright basal pigmentation, covered with dense long microtrichia, with only a few ventral setae.

Bright protergal band present, with one lateral narrow indistinct notch on each side. Al largely sclerotized. Pn ± unsclerotized, irregularly rugose, with sparse scattered setae. Lfur almost absent. Lpst anteriorly, episternum, cxst anteriorly and mpst basally may be slightly sclerotized. Lpst with greater number of setae, about 10 setae on mpst. Msp much restricted, extremely indistinct (stlf anteriorly, cxst, episternum).

Meso- and metanotum non-granulate, tend to develop an X-shaped dividing pattern. Praescutum and scutum mspte. Al slightly protuberant. Mesoth spir elliptical, slightly longer than pamx, hind margin with up to about 40 very distinct narrow mgch. Rudimentary metath spir sclerotized, very distinct. Sterna sharply granulate, bst undivided. Msp usually on coxae and before anterior row of granules. Esp. metacoxa relatively poorly defined anteriorly.

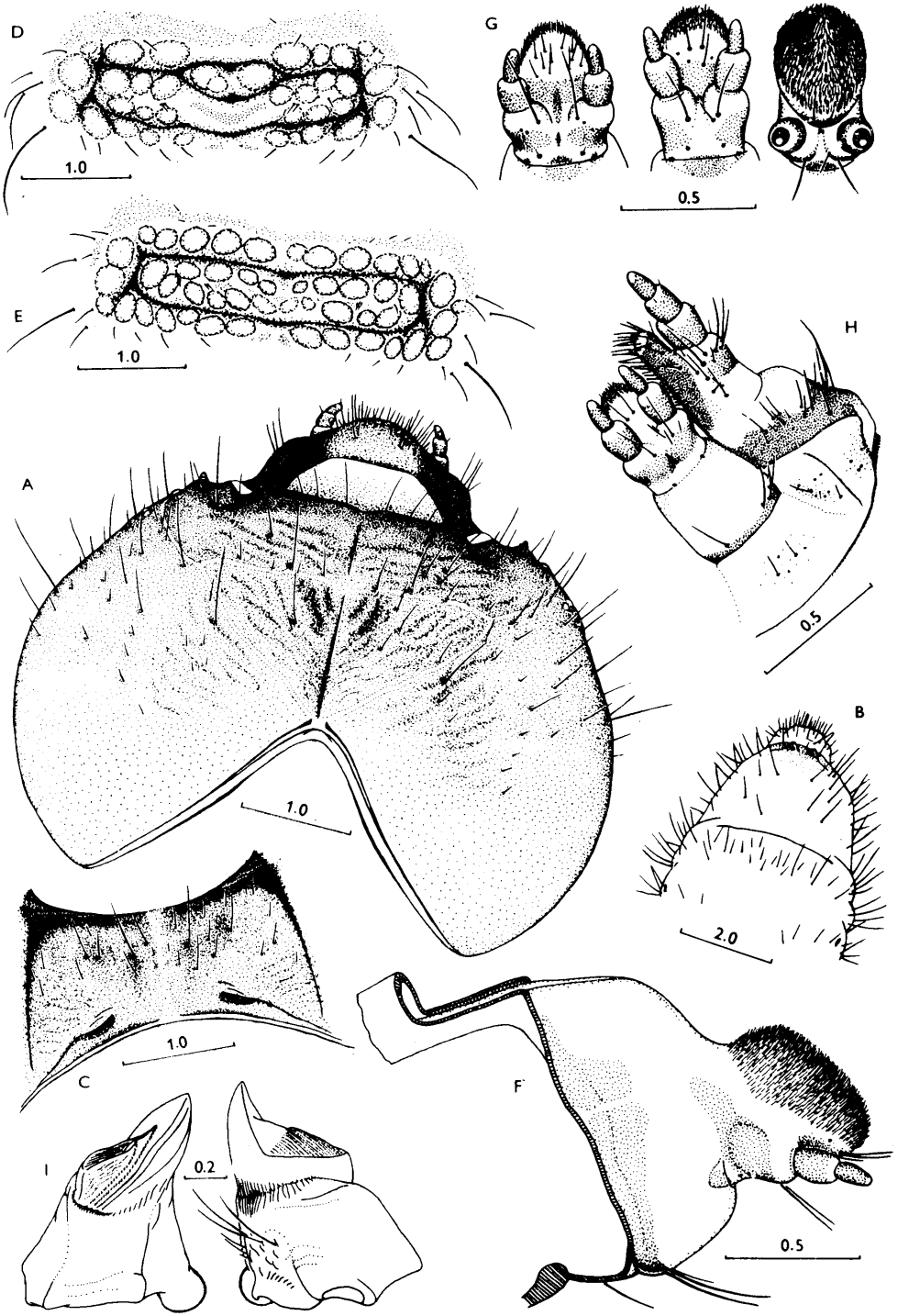
Legs about as long as in *Xylosteus,* very slender (Fig. 4G). Trch with very distinct basal ring and several setae. Femur slightly shorter than ti, both in later instar larvae very distinctly sclerotized, with sparse long stout setae. Ptrs almost as long as ti, very slender, seta borne before middle, usually in basal third.

Aa well protuberant, covered with large granules. Six daa, anterior transverse line ± doubled in middle (Fig. 5D), msp usually along anterior and lateral margins and on scutal plate. Abd spir broadly oval, ferrugineous, up to about 25–30 small narrow mgch. Plt distinct, moderately large, elliptical, bearing 3–6 setae. Six vaa, seventh one extremely reduced, not protuberant; msp at least along anterior and lateral margins. Ninth tergum tapering posteriorly, finely sclerotized and bearing stout conical urogomphi turned upwards (Fig. 5B). Atu small, apl bearing several setae, dorsal one may be finely sclerotized. Length up to 38 mm.

Apparently single species known (see general taxonomic chapter), but taxonomic status of some North American forms is not clear.

Oxymirus cursor (L., 1758)

Host plants: *Picea, Pinus, Abies, Larix, Fagus, Alnus.* Apparently polyphagous, slightly preferring conifers. Larvae in dead decaying moist wood (stumps, fallen trees etc.), usually in shady situations. Development period probably about three years. Last instar larvae leave the wood and overwinter in the soil pupal chamber, pupation in the next spring. Adults in summer, rarely on flowers, apparently predominantly night-active, crawling on the ground, can be occasionally found in pitfall traps.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Distribution: Europe, West Siberia.

Material: CS, various spots, +/I, (some series), from all the above mentioned host trees, lgt. et coll. M. Sláma and S; 22. 5. 1966, SU, Ukraine SSR, Rakhov, 7/−, *Alnus*, coll. IS; 22. 6. 1963, SU, Ukraine SSR, Kvasy, 4/−, *Picea*, coll. IS.

Genus *Anthophylax* LeConte, 1850

Type species: *Anthophylax viridis* LeConte, 1850 (Thomson design., 1864). North America, larvae not available, described by Craighead, 1923.

Similar to *Oxymirus*, main differences as follows: Cl shorter, more narrowly pigmented along base, sides unpigmented, almost straight. Lbr strongly transverse, anterior half unpigmented (Fig. 4F). Eph setae restricted to small anterior areas (Fig. 4I), hind region less raised, microtrichia more widespread. Mstm even in mature larvae usually not completely fused, often three mstm present. Dstm usually close together. Vs slightly shorter (about 3−3.1), hind angles less prominent, hypl less diverging, often distinctly fail to reach pocl. Md type I, type II-keel rudimentary, invisible from above (Fig. 4C), border zone poorly striate or just distinctly microsculptured, two lateral setae. Palb separated by about 1.5 times their width, ligula broader (Fig. 5G). Anterior transverse line of daa may not be doubled. Seventh vaa may be totally lacking.

Single species in the region.

Anthophylax mirabilis (Motschulsky, 1838), comb. n.

Setae relatively dense, vs usually with about 15−20 setae on each side, apl with numerous short setae. Anterior transverse line of daa not doubled (Fig. 5E). Frons very densely roughly rugose. Vaa 7 ± absent, without granules. Largest available larva 30 mm.

Host plants: *Carpinus, Fagus, Quercus, Corylus, Populus, Salix* (Mamaev et Danilevsky, 1975), *Ulmus*. Larvae in decaying wood ("white rots"). Pupation unobserved, probably in soil.

Distribution: Caucasus, Transcaucasia, North Iran.

Material: 1966 and 1971, SU, Caucasus, Krasnodar region, 9/−, *Ulmus* and *Carpinus*, lgt. B. M. Mamaev and D, coll. IS and S. Larvae not reared, determined by elimination and comparison with *Oxymirus cursor*, no doubt about determination.

Plate 5: A - *Oxymirus cursor*, head, dorsal view. B - *O. cursor*, abdominal segments 8 to 10, dorsal view. C - *O. cursor*, ventral sclerite. D - *O. cursor*, first dorsal ambulatory ampulla. E - *Anthophylax mirabilis*, dtto. F - *Oxymirus cursor*, labium, lateral view (showing distinct step between submentum and praelabium). G - Praelabium of *Anthophylax mirabilis*, ventral view (left), and *Oxymirus cursor*, ventral (middle) and apical (right) views. H - *Sachalinobia koltzei*, labium and left maxilla, ventral view. I - *S. koltzei*, left mandible, dorsolateral (right) and medial (left) views.

Genus *Sachalinobia* JAKOBSON, 1899

Type species: *Sachalinobia retata* JAKOBSON, 1899 = *Brachyta koltzei* HEYDEN, 1887 (orig. design.)

Body white, moderately elongate, very slightly depressed, with short moderately dense ferrugineous setae.

Head much less than by half retracted, very large, only very slightly narrower than proth (Fig. 6C). Cr strongly transverse (1.51, one specimen measured), moderately depressed (about 2.3), pale yellow, widest behind middle, largely smooth and shining, at most some regions (gena, gula) feebly microgranulate. Ecr with dense anterior setae, main adfrontal seta ± in fl. Ecr sides very abruptly protuberant (Figs 6A, B), rounded, both halves meet almost in one point, hind margin angulate, less than 90 degrees.

Fl moderately distinct, narrow, at most gently S-curved at middle, passing through ant openings, rather distinctly reaching anterior cr margin. Particularly later instar larvae with broad diffuse yet well discernible rudiments of original frontal sutures (Fig. 6C). Frons smooth, posteriorly flat, anteriorly convex, main pair of pof setae not pushed forward, prf setae 2, 1, + and some small ones, second main pair moved very distinctly backwards. Epmg moderately sclerotized (except for deeply sclerotized md articulations), gently emarginate, abruptly declivous. Six long eps narrowly separate from sharply defined cl border line. Mfl narrow, in later instars ± fails to reach epmg.

Cl extremely narrow, slightly convex, with very narrow strongly sclerotized basal band and finely sclerotized basal half. Lbr slightly transverse, cordate, flat, almost entirely sclerotized, marginal setae sparse, one long discal pair. Hind eph region very narrow, abruptly raised, its anterior transverse row composed of minute basiconic sensilla. Tormae almost absent. Anterior region finely sclerotized, with very dense stout setae reaching transverse row of sensilla.

Plst deeply sclerotized, raised, sfp absent. Gena ± smooth, very fine pigmentation about as wide as plst. All six stemmata present, small, dstm and vstm poorly convex yet even vstm with small pigment spot.

Vs (Fig. 6A) long (about 2.2–2.4), feebly convex, pale, not darker than ecr, fairly smooth. Anterior margin deeply emarginate, raised, sharply separate from lmx base, broadly sclerotized. Hypl very narrow, curved, strongly diverging at base, by far not reaching pocl. Mtt short, relatively close to slightly darkened hind margin. Gl slightly raised, gula narrow, long, mgl broad, diffuse, reaching anterior margin. Available larvae with up to 20 setae on each side.

Ant short, three-segmented, moderately retractile, surrounded by slightly raised sclerotized ant ring. Segment 2 strongly transverse, very short, third segment about as long as broad, relatively robust, main sensillum about equally long, slightly elongate.

Md type II (Fig. 5I), short, robust, similar to e.g. *Pedostrangalia* (cf. Fig. 24E), with large dorsal and inner striated plates, several lateral setae, but with three inner keels.

Lmx very small, non-flattened (Figs 5H, 6A). Basal components well separate, very finely sclerotized, cardo large, without distinct seta. Maxilla slender, pgmx long, with broad pigmented band, basal spot absent. Pamx long, far exceeding mala, first segment longer, 2 and 3 subequal, third elongate. Mala very slender, narrower than first pamx segment, with sparse very strong apical and dorsomedial setae, extremely broadly sclerotized. Labium somewhat step-like, distal labium narrow, mt with narrow continuous basal pigmented band. Prlb small, narrow, basal spot absent, pglb pigmentation fused. Palb relatively long, ventral in regard to ligula, very close together, separated by less than their width. Ligula narrow, with two ventral setae, densely clothed with very long golden to ferrugineous microtrichia, only narrow dorsal medial area smooth.

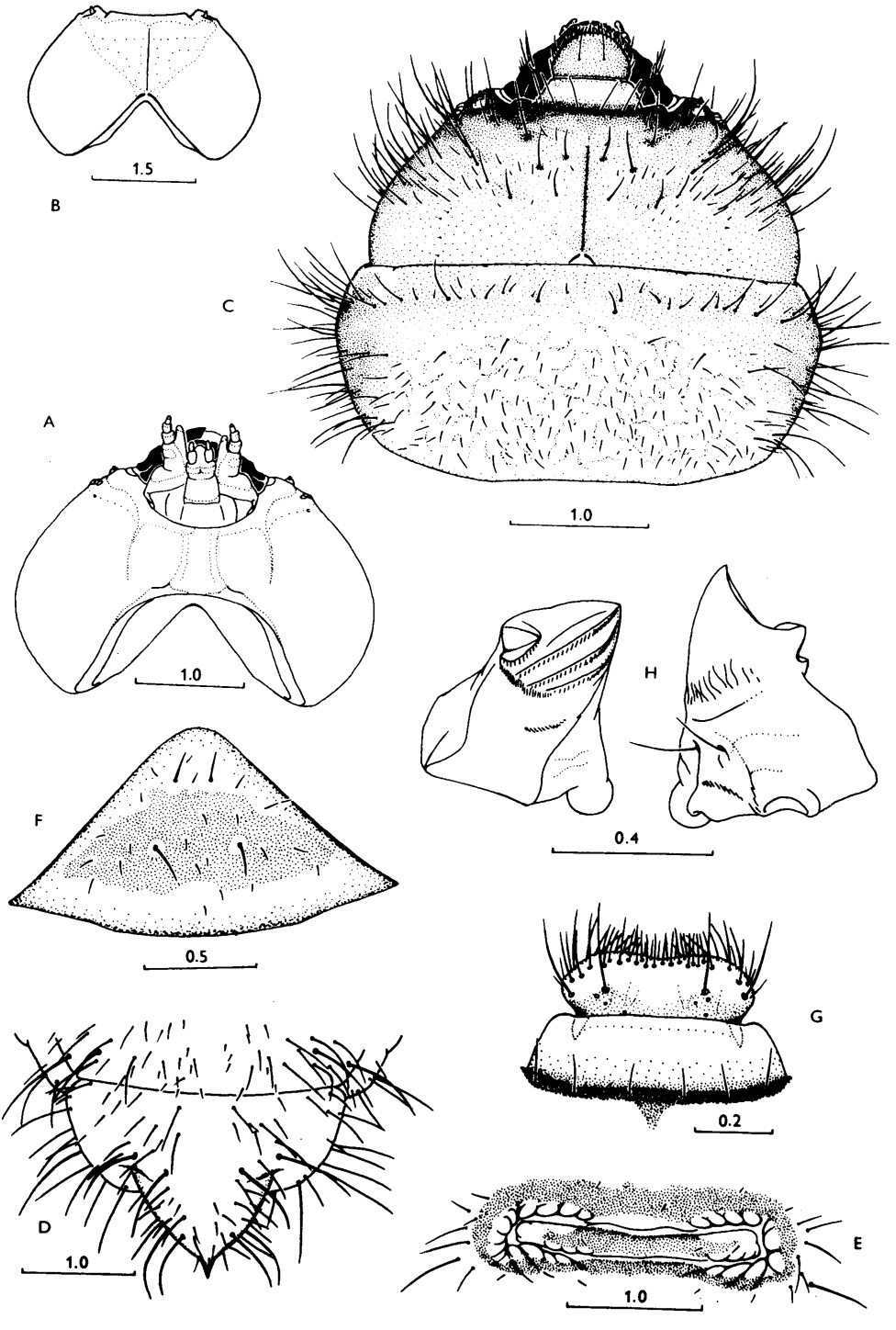
Proth broadest of body segments, distinct yellow protergal band with three anterior notches, al posteriorly more finely sclerotized. Basal pn half distinctly rugose, posteriorly with unusually numerous distinct setae (Fig. 6C). Lfur absent. Lpst finely sclerotized anteriorly, bearing very numerous setae, mpst with four stronger and esp. in later instars numerous short setae. Very distinct msp on mpst (Fig. 6F), exst and stlf anteriorly.

Meso- and metanotum non-granulate, scutum almost interrupted, praescutum and scutum coarsely mspte. Al moderately protuberant. Mesoth spir large, about as long as pamx, moderately broadly oval, available larvae with up to 17 moderately large mgch. Metath spir very distinct, sclerotized. Sterna with several smooth granules along transsternal lines (except in middle), granules of anterior row much more distinct, granulate area almost continuously surrounded with very distinct msp. Bst undivided. Coxae poorly defined anteriorly.

Legs moderately long (hind legs slightly shorter than half of their basal distance), relatively slender, with sparse setae. Trch large, with several setae and distinct basal ring. Femur and ti subequal in length, almost unpigmented. Ptrs slightly shorter, slender, not compressed, seta borne near middle.

Seven aa, last ones slightly reduced. Daa (Fig. 6E) laterally granulate, very distinct msp present along periphery and on scutal plate. Anterior transverse line simple. Spir much smaller than mesoth ones, with up to 10 moderately large mgch. Plt moderately large, broadly oval, bearing about 5–8 setae. Vaa generally similar to pterothoracic sterna. Ninth tergum with large sclerotized spine borne from very large finely marginally sclerotized triangular base far overreaching atu (Fig. 6D). Atu moderately broad, very short, apl bearing short setae. Largest (non-mature) available larva 19 mm; length up to 30 mm (CHEREPANOV, 1979).

A Holarctic genus, one Palaearctic and one Nearctic species known (treated by some authors as mere subspecies).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D
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Sachalinobia koltzei (HEYDEN, 1887)

Host plants: *Abies, Pinus.* According to CHEREPANOV (1979), eggs are laid on lower parts of dead stems or stumps, larvae work in relatively scund wood at the ground level, or mostly penetrate into large roots. Three-year life cycle. Pupation in outer wood. CHEREPANOV writes: "Pupation takes place at the end of summer. Transformed adult beetles stay for winter. Overwintering occurs both in the wood and in soil. ... It cannot be excluded that a portion of larvae pupate in early spring." I have found no data about adults visiting flowers.

Distribution: Far East (Amur-Ussuri region, NE China, Korea, Sakhalin, Japan).

Material: 12. 5. 1969, SU, Ussuri region, Suputinka Nat. Res., 3/I, *Pinus*, B. M. Mamaev lgt., coll. IS.

Genus *Xenoleptura* DANILEVSKY, LOBANOV et MURZIN, 1981

Type species: *Strangalia hecate* REITTER, 1886 (orig. design.)

Generally similar to *Sachalinobia,* differs mainly as follows:

Body more elongate, setae very fine.

Cr even paler, slightly less depressed (about 2.1–2.2), widest about middle. Main adfrontal seta moved slightly more anteriorly. Fl less distinct, in mature larvae not reaching anterior cr margin. Original frontal sutures less distinct, with a tendency to develop broad diffuse tfl; mfl in later instars much weakened in that region, reaching epmg. Cl very small, flat, trapezoidal, narrow strongly sclerotized basal rim less distinct. Lbr (Fig. 6G) extremely short, ± cut anteriorly, only basal half sclerotized. Hind eph region broader, poorly raised, with small indistinct medial sclerite, anterior region with setae restricted to two sparse groups at anterior margin. Tormae ± absent. Stemmata usually larger, more convex, dstm rarely tend to fuse. Vs moderately long (3.2–3.5), very feebly convex, hind margin distinctly darkened. Gl at most indistinctly raised. Available larvae with 6–13 setae on each half of vs.

Md type I (Fig. 6H), type II-keel rudimentary, border zone step-like, coarsely striate, only two lateral setae. Lmx very small, pgmx and pamx relatively shorter, sclerotization of mala much narrower, segment 2 of pamx usually shortest. Labium not distinctly step-like, mt with large transverse yet broadly separate basal spots, basal prlb apodeme may be slightly pigmented, pglb sclerotization narrowly separate, palb shorter, separated by about their width. Ligula with microtrichia more restricted, dorsal smooth area broader.

Proth relatively narrower, basal pn half bearing very few minute setae. Lpst unpigmented, mpst with up to about 10 setae, mspte area may be medially constricted or even narrowly interrupted. Metanotum usually with some very indistinct granules.

◀

Plate 6: A - *Sachalinobia koltzei,* head, ventral view (setae omitted). B - *S. koltzei,* shape of cranium, dorsal view. C - *S. koltzei,* head and prothorax, dorsal view. D - *S. koltzei,* abdominal segment 9 with caudal spine, dorsal view. E - *S. koltzei,* first dorsal ambulatory ampulla. F - *S. koltzei,* prothoracic mediopraesternum. G - *Xenoleptura hecate,* epistomal margin, clypeus and labrum. H - *X. hecate,* left mandible, dorsolateral (right) and medial (left) views.

Mesoth spir with up to about 10 small mgch. Pterothoracic sterna with msp before first row of granules and on coxae, bst divided (more distinctly so on metath). Legs shorter, weaker, ptrs seta borne about basal third.

Aa distinctly granulate, ± devoid of msp. Seventh aa much reduced. Abd spir very small, with a few indistinct small mgch. Plt bearing two stronger and 1–2 short setae. Vaa usually with a small group of msp at anterior margin in medial impression. Atu slightly larger, caudal spine on average slightly shorter, its base less prominent. Length up to 18 mm.

Single species known.

Xenoleptura hecate (REITTER, 1886)

Host plant: *Juniperus*. Larvae feed in decaying wood ("dark rot") where also pupate. Often in stumps. Adults visit flowers.

Distribution: Mountains of Central Asia.

Material: 24. 2. 1978, SU, Tadzhikistan, Takob, 1/–, *Juniperus*, lgt. D, coll. S; 14. 6. 1965, SU, Kirgizia, Sary-Chelek, 3/I, *Juniperus*, B. M. Mamaev lgt., coll. IS.

Genus *Rhagium* F., 1775

Type species: *Cerambyx inquisitor* L., 1758 (CURTIS design., 1839)

Note: The genus includes three rather sharply different subgenera. To avoid repeating, the generic description lacks some data which had to be included in the species descriptions.

Body white or yellowish, moderately elongate, almost cylindrical to strongly depressed, bearing short to moderately long at least finely pigmented setae.

Head less than by half retracted (Figs 8E, F). Cr (Figs 7H, I, J) strongly transverse (1.5–1.8), ± depressed (2–3), broad, at most slightly narrower than proth, entirely pigmented, yellow to bright ferrugineous. Ecr ± smooth, or at most very finely rugose along fl, sides convex, rounded; ± numerous anterior setae, usually several adfrontal setae (main one not necessarily distinguishable), one may be moved shortly across fl. Ecr halves touching almost in one point, hind cr notch angulate, 90 degrees or less.

Fl narrow, sharp, in *Hagrium* and *Megarhagium* slightly S-curved, entering ant openings, in later instars of some species not reaching anterior cr margin. Tfl present or absent. Pof very finely loosely striate, main pair of setae not moved anteriorly. Prf usually slightly darker, at most gently convex, very finely transversely striate, setae 2, 1, 1, or (*Rhagium* s. str.) 2, 1, +, other setae absent or very few. Epmg moderately sclerotized (excepting heavily sclerotized md articulations), in some species almost not distinguished medially from prf, raised to flat. Six or usually more eps, medial pair slightly separated from cl border. Mfl in later instars not reaching epmg, yet never absent from prf.

Cl flat, moderately to very broad, strongly tapering, may rarely bear a lateral seta. Lbr large, transverse, subelliptical, flat, basal half finely sclerotized, broad anterior region densely setose (setae often reaching to main discal pair). Eph (Fig. 9F) usually finely sclerotized, posterior region broad, flat, with ± distinct small medial sclerite and anterior transverse row of about 8–10 minute sensilla. Tormae strongly sclerotized, very long, running almost directly backwards along ± whole hind region, with short indistinct anteromedial branches. Anterior setae reaching slightly behind transverse row of sensilla.

Plst deeply sclerotized, abruptly raised, sfp absent. Young larvae with ± distinct three mstm, in later instars usually ± fusing, variable, feebly convex, in some species being gradually reduced. Pigment usually ± distinct, never completely fused. Two small dstm present, vstm inconspicuous to absent.

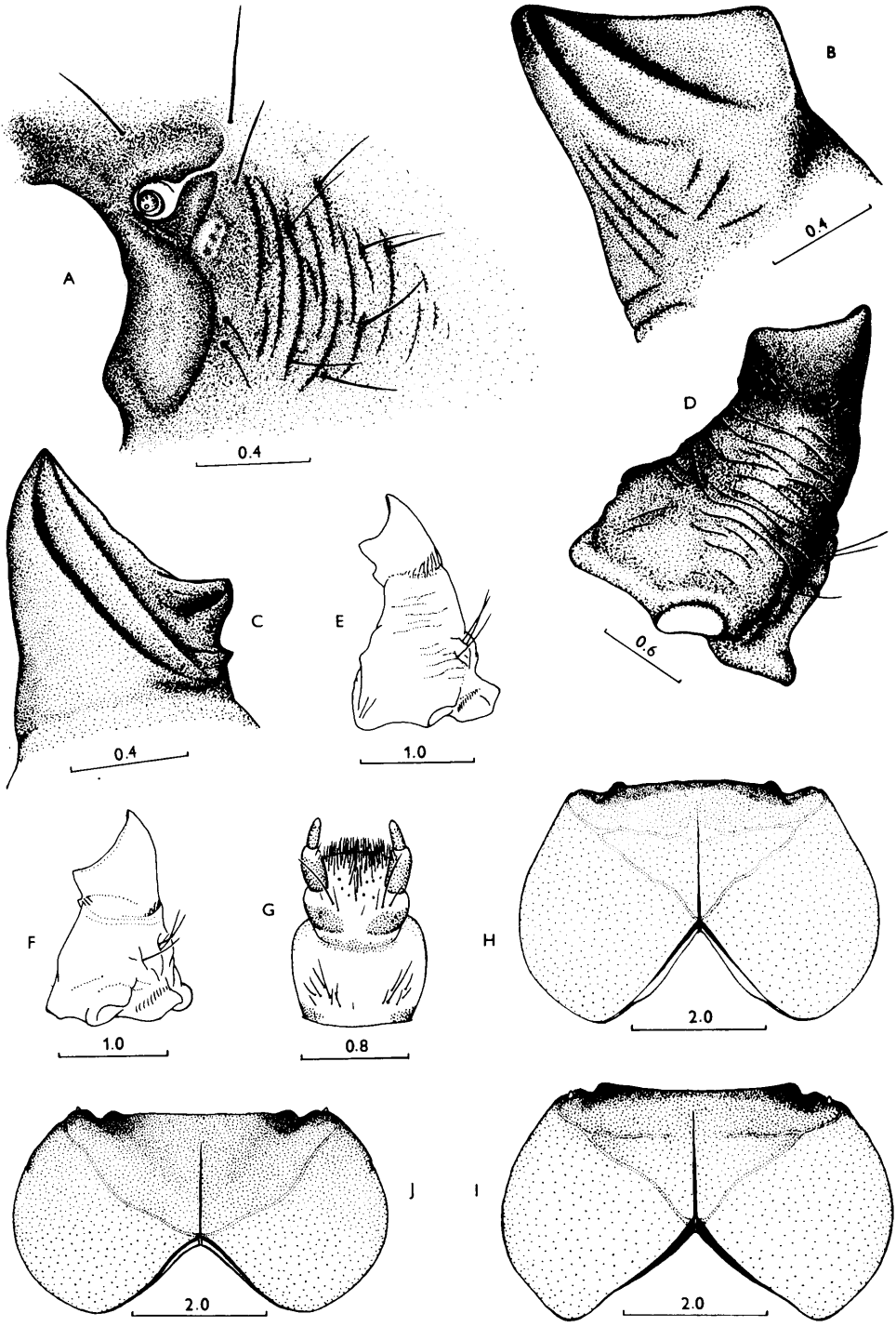
Vs moderately long (2.8–3.2), not darker than ecr, often distinctly microreticulate, dull, gently emarginate to almost straight and at least laterally dark anteriorly. Hypl short, dark, parallel or (particularly in *Hagrium*) slightly diverging, by far not reaching pocl. Hind margin may be darkened, mtt distinct, ± broadly separate from that margin. Gula at most feebly raised (some *Hagrium*-specimens), mgl narrow, ± reaching anterior margin. About 2–6 setae on each side, all in or close to gular region (Fig. 8B).

Ant miniature, two-segmented (segment 3 absent). Ant ring broadly heavily sclerotized, swollen. Connecting membrane moderately large, antenna may be entirely retracted. Segments ± pigmented, second always ± transverse, main sensillum moderately large, usually slightly elongate.

Mandibular type I (Figs 7D, E, F), long to very long, distal part slender. Cutting edge ± deeply emarginate, two ± distinct inner keels (Figs 7B, C), often a small supplementary tooth behind dorsal angle. Basal part with 1 + 2–3 (rarely 1 + 1) lateral setae, and with a ± prominent medial tubercle.

Lmx relatively large, esp. in *Rhagium* s. str. distinctly flattened. Lmx base finely sclerotized (connecting lobe may be more strongly sclerotized), submentum poorly separated from connecting lobes, cardo large, bearing short seta. Distal maxilla (Fig. 9B) long, slender (less so in *R. pygmaeum*), pgmx large, broadly pigmented and usually with narrow transverse basal spot. Mala long, slender, with broad pigmented band, with dense long apical and dorsomedial setae. Pamx slender, very long (far exceeding mala), segments usually decreasing in length from 1 to 3, or 1 and 2 subequal. Distal labium (Fig. 7G) short, broad. Mentum with basal spots broadly separate, prlb usually with narow basal spot present, pglb pigmentation broadly separate, palb slender, very long, far exceeding ligula, separated at base by 2–3 times their own width. Ligula very broad, bearing dense setae.

Proth short, broad, ± depressed. Protergal band distinct, with two small lateral notches on each side (Fig. 9A), al distinctly almost completely sclerotized. Pn behind protergal band ± finely sclerotized as well, fairly smooth, very finely irregularly grooved, with ± distinct oblique impressed lines at middle. Two to several scattered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short setae. Lfur ± absent. Hind margin with distinct transverse row of numerous setae. Epl, lpst, episternum and cxst anteriorly ± sclerotized. Lpst with greater number of setae (occasionally very numerous). Msp usually on stlf and cxst, may be lacking.

Meso- and metanotum non-granulate, at least praescutum and scutum mspte, latter uninterrupted. Al distinctly protuberant. Mesoth spir broadly oval, small (much shorter than pamx, which are, however, very long), rarely more than 20 small to moderately large mgch. Metath spir always well discernible. Bst divided by deep oblique furrows (may be less distinct on metath). Coxa poorly defined anteriorly.

Legs moderately long (hind legs distinctly shorter than half of their basal distance), slender. Trch large, bearing a few setae, basal ring distinct. Femur and ti subequal, with moderately dense setae, may be finely pigmented. Ptrs at most as long as ti, slender, non-compressed, claw needle-shaped, at most slightly curved, seta borne about middle.

Aa seven (seventh ones ± reduced). Daa with anterior transverse line broadly doubled, one pair of lateral impressions (Figs 8C, D). Abd spir small, broadly oval. Plt large, oval, moderately to strongly elongate. Ninth tergum may bear sclerotized spine on large triangular base. Atu broad, short, apl bearing short setae.

From six to eight species usually recognized in the region, larvae of all of them at my disposal.

1 (8) Caudal spine (or at least its sclerotized base when spine itself rarely reduced) present (Fig. 8G).

2 (3) Ambulatory ampullae very distinctly granulate, granules sharp, smooth (Fig. 8C). Cranium widest slightly behind middle (Fig. 7H). Mandibular apex acute, separated from dorsal angle by more than one-third of mandibular length (Figs 7C, 8E) (sg. *Hagrium* VILLIERS, 1978) ..... *bifasciatum*

3 (2) Ambulatory ampullae with at most poorly defined granules, largely to completely microspiculate. Cranium widest about middle (Fig. 7I). Mandibular apex blunt, separated from dorsal angle by at most one-third of mandibular length, usually much less (about as in *R. sycophanta,* Figs 7B, D) (sg. *Megarhagium* REITTER, 1913, pars).

4 (5)! At least some lateral granules of a few posterior dorsal ampullae with discal area smooth, devoid of microspines. Mediopraesternum usually with 10–14 setae*) .... *caucasicum*

5 (4)! Granules of dorsal ampullae in later instars usually completely covered with microspines.

6 (7)! Later instar and esp. mature larvae with gena broadly pigmented and ± roughly rugose

*) The differences between *R. mordax, caucasicum* and *fasciculatum* (and esp. the first two) are not entirely reliable, young larvae will often prove indeterminable.

◀

Plate 7: A - *Rhagium mordax*, upper left pleurostoma and gena, anterolateral view. B - *R. sycophanta*, apex of right mandible, medial view. C - *R. bifasciatum*, dtto. D - *R. sycophanta*, right mandible, dorsal view. E - *R. inquisitor*, dtto. F - *R. bifasciatum*, right mandible, dorsal and slightly lateral view. G - *R. bifasciatum*, mentum and praelabium, ventral view. H - *R. bifasciatum*, cranium, dorsal view. I - *R. mordax*, dtto. J - *R. inquisitor*, dtto.

(Fig. 7A). Setae denser, mediopraesternum with up to about 30 setae, mostly more than 16 setae present ..... *mordax*

7 (6)! Even mature larvae with gena more narrowly pigmented and at most much more finely rugose. Setae sparser, mediopraesternum with less than 20 setae, usually 10–14..... ..... *fasciculatum*

8 (1) Ninth abdominal tergum without caudal spine or its base, at most marginally swollen.

9 (12) Cranium less depressed (up to 2.6), transfrontal line in later instars present, praefrontal setae 2, 1, 1 (sg. *Megarhagium* REITTER, 1913, pars).

10 (11) Ambulatory ampullae with microspines much restricted, all granules smooth .... *pygmaeum*

11 (10) Ampullae completely covered with microspines (Fig. 8D) ..... *sycophanta*

12 (9) Cranium extremely depressed (about 2.7–3), transfrontal line absent in all instars, praefrontal setae 2, 1, + (*Rhagium* s. str.) ..... *inquisitor* s. l.

Rhagium (Hagrium) bifasciatum F., 1775

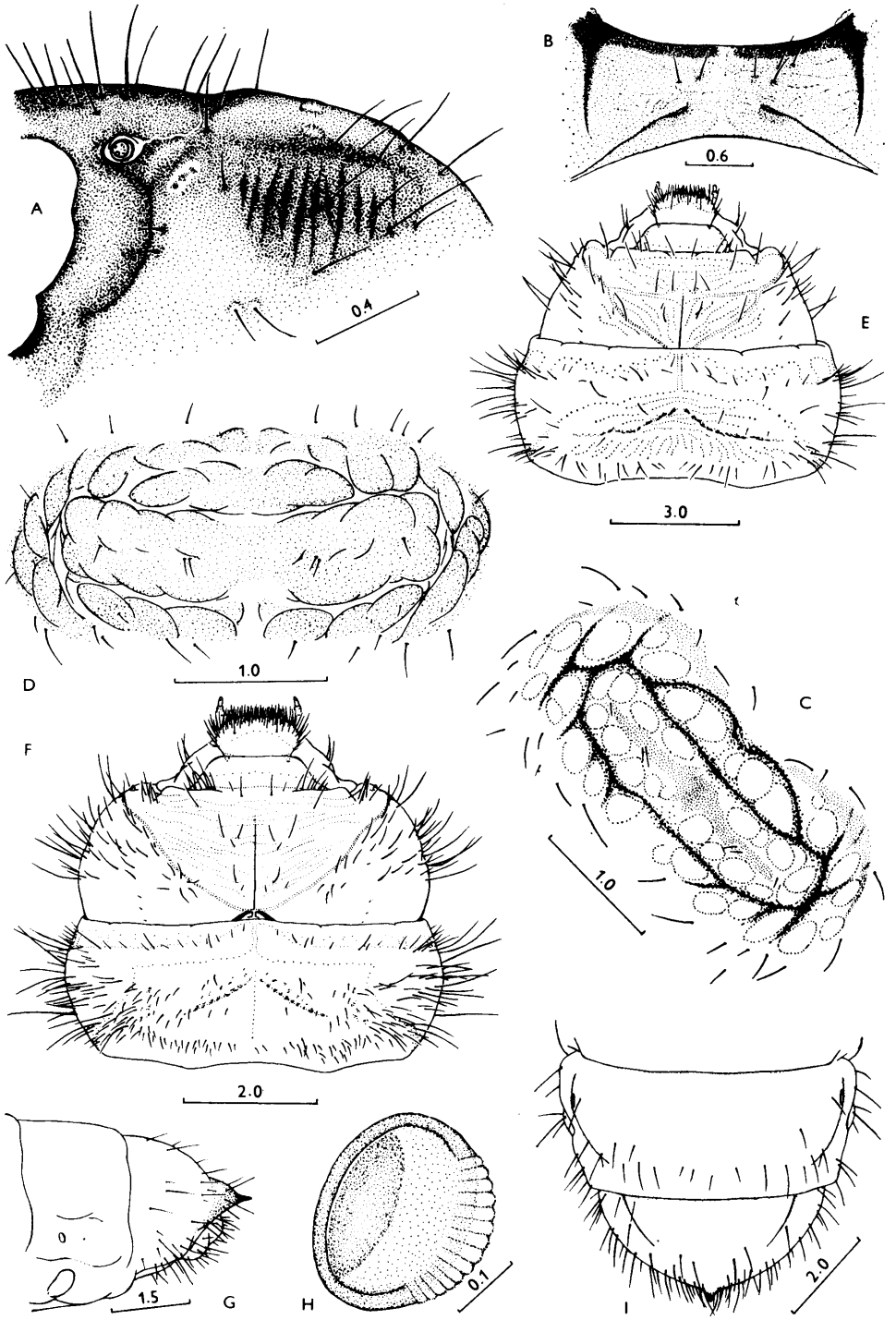
Body almost not depressed, setae sparse. Head distinctly retracted (Fig. 8E). Cr (Fig. 7H) moderately transverse (about 1.5), moderately depressed (about 2.3), widest behind middle, ecr halves as if somewhat "inflated", broadly rounded in cross-section. Pof distinctly concave on both sides of mfl. Tfl in later instars distinct, each half ± broadened medially. Prf setae 2, 1, 1–2 and at most very few supplementary ones. Epmg relatively dark, ± distinctly raised above cl level, occasionally with a pair of low transverse tubercles. Almost always more than six eps, less than 20. Cl moderately broad, trapezoidal, sides straight. Eph transverse row composed of short trichoid sensilla. Plst and gena relatively smooth, genal pigmentation becoming gradually paler posteriorly. Mstm relatively well developed. Vs distinctly longitudinally convex, anterior margin relatively distinctly separate from lmx base, almost entirely dark, hypl usually slightly diverging. Md (Fig. 7F) shorter, more robust, apex acute, cutting edge and inner keels sharp (Fig. 7C), apex and dorsal angle separated by more than one-third of md length, basal part not remarkably sculptured. Lmx less depressed.

Proth pigmentation moderately bright, pn very finely sclerotized, setae of posterior row less numerous. Mpst with about 6–10 setae. Mesoth spir with up to about 15 small mgch. Legs unpigmented. Pterothoracic sterna and aa with sharply defined smooth granules (Fig. 8C). Abd spir up to 10 small mgch. Sharp long caudal spine (Fig. 8G). Length up to 35 mm.

Host plants: Polyphagous (*Picea, Pinus, Abies, Fagus, Quercus, Castanea, Betula*; DUFFY, 1953, lists many others). Differs from all other *Rhagium*-species by spending most of its larval period in the wood, not under bark. Larvae feed in dead moist rotting wood (stumps, fallen

▶

Plate 8: A - *Rhagium inquisitor*, left pleurostoma and gena, anterolateral and slightly ventral view. B - *R. inquisitor*, ventral sclerite. C - *R. bifasciatum*, fifth dorsal ambulatory ampulla. D - *R. sycophanta*, dtto. E - *R. bifasciatum*, head and prothorax, dorsal view. F - *R. inquisitor*, dtto. G - *R. bifasciatum*, abdominal segments 8 to 10, laterodorsal view. H - *Akimerus schaefferi*, third left abdominal spiracle. I - *A. schaefferi*, end of abdomen of mature larva, dorsal view.


A
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F
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I
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trunks) in shady situations. At least two- or three-year development, pupation summer/autumn, adults overwinter in their pupal cells. Adults almost never on flowers (also other *Rhagium*-species do not visit flowers, or only occasionally).

Distribution: Europe except North-East, Caucasus, Transcaucasia, Asia Minor.

Material: Many larvae from SU (Caucasus), CS, France, Spain, taken from all the hosts mentioned, coll. M. Sláma, E. Vives, S, IS.

Rhagium (Megarhagium) mordax (DEGEER, 1775)

Body distinctly depressed, setae denser, head less retracted, cr (Fig. 7I) on average more transverse (about 1.6) and depressed (about 2.4–2.5), widest about middle, anteriorly very distinctly microreticulate, dull. Ecr halves more depressed and less broadly rounded in cross-section. Pof almost flat. Tfl in later instars present, medial extremities not broadened. Prf setae 2, 1, 1, other setae seldom present. Epmg very flat and feebly sclerotized medially, almost always more than six eps, rarely as many as 16. Cl broader, sides usually gently emarginate. Eph transverse row composed of very short spine-like sensilla. Plst at most very finely rugose, gena in later instars broadly sclerotized and roughly rugose (Fig. 7A). Stemmata in later instars not very conspicuous, pigment often indistinct. Vs almost flat, very distinctly microreticulate, anterior margin medially flat, poorly sclerotized, and not very sharply separate from lmx base. Hypl usually almost parallel. Md long, apically slender, all apical structures blunt, apex and dorsal angle separated usually by less than one-third of md length. Basal part may be finely transversely striate. Lmx distinctly flattened.

Proth pigmentation moderately distinct, pn distinctly sclerotized, posterior setal row dense. Mpst with up to about 20–26 setae. Abd spir slightly larger, up to about 20 moderately large mgch. Only metasternum and vaa more distinctly granulate, pterothoracic sterna and all aa usually completely covered with msp. Legs in mature larvae very finely sclerotized. Aa 7 more reduced than in *R. bifasciatum*. Caudal spine present (rarely reduced), its base slightly shorter, more strongly sclerotized. Length up to 35 mm.

Habits: Polyphagous, slightly preferring deciduous trees. Larvae in or under bark of dead stumps and trunks, rarely in outer sapwood (if highly decayed), avoid dry situations. Pupation in or under bark, occasionally the pupal cell surrounded by long wooden fibres (as usual in *R. inquisitor*). At least two-year development, adults overwinter in pupal cells.

Distribution: Europe, West Siberia.

Material: Many larvae from France, CS, SU, taken from various hardwoods and conifers, coll. M. Sláma, IS, S.

Rhagium (Megarhagium) caucasicum REITTER, 1889

Extremely similar to *R. mordax*, main distinguishing characters in the key (not entirely reliable; larval material limited, all from the same locality, geographical variability unknown). Setae less numerous, about as in *R. fasciculatum*. Gena inter-

mediate. Main stemmata in mature larvae usually with conspicuous pigment. Largest available larva 30 mm.

This form has been usually treated as a subspecies of *R. mordax*, but DANILEVSKY (1982) treats it as a separate species.

Host plants: In Talysh, larvae found almost exclusively in *Pterocarya pterocarpa*, one specimen obtained from *Quercus* (DANILEVSKY, l. c.). Habits similar to *R. mordax*.
Distribution: Caucasus, Transcaucasia, North Iran, Turkey.
Material: 6. 4. 1978, SU, Azerbaidzhan, Avrora, 4/I, *Pterocarya*, lgt. D, coll. IS.

Rhagium (Megarhagium) fasciculatum FALDERMANN, 1837

Very similar to *R. mordax*. Later instars differ well by the much less pigmented and at most finely rugose gena (young larvae of *R. mordax* have the gena paler and ± smooth as well). Setae sparser, slightly stronger, mpst with less than 20 setae, usually 10–12. Length up to 35 mm.

Habits similar to *R. mordax*. Polyphagous.
Distribution: Caucasus, Transcaucasia, North Iran, adjacent regions of Turkey.
Material: 1966–1985, SU, Caucasus (Krasnodar region; valley of Dalra-river), 4/I, *Picea, Abies, Cerasus*, lgt. O. Pultar, B. M. Mamaev and D, coll. IS and S.

Rhagium (Megarhagium) pygmaeum GANGLBAUER, 1881

Differs from *R. mordax* as follows: Setae sparse, mpst in available larvae with about 10 setae. Msp much restricted, daa with at most small spots on scutal plate and at anterior angles. Cr slightly less depressed (below 2.4). Available larvae have six eps. Gena narrowly pigmented, ± smooth. Stemmata well developed. Caudal spine absent. Largest available larva 20 mm, length up to 28 mm (DANILEVSKY, 1982).

Host plants: *Quercus* (preferred), *Carpinus*. According to DANILEVSKY (l. c.), larvae feed under bark of long-time dead trees, standing or fallen, often with fungi, in rather dry situations, and usually solitarily (other *Rhagium*-species may be often found in numbers). Otherwise the habits apparently similar to *R. mordax*.
Distribution: Transcaucasia (Talysh), North Iran.
Material: 6. 4. 1980, SU, Azerbaidzhan, Avrora, 3/I, *Quercus*, lgt. D, coll. IS.

Rhagium (Megarhagium) sycophanta (SCHRANK, 1781)

Differs from *R. mordax* as follows: Setae denser, mpst with up to about 40 (rarely 50) setae. Cr on average slightly more transverse (up to 1.7) and depressed (2.4–2.65). Six to ten eps. Eph row composed of longer trichoid sensilla. Plst may bear distinct macrosculpture, gena narrowly pigmented, at most finely rugose. Stemmata small, in mature larvae may almost disappear (see habits). Upper mstm (if present) always

far from ventral two. Hypl often gently diverging. Md with basal part often coarsely transversely striate (Fig. 7D). Pn often with several discal setae (in other *Megarhagium* usually 1–2 pairs). Mesoth spir with mgch larger, usually extending beyond elliptical spir outline, up to about 30 mgch present. Ampullae very poorly granulate, usually entirely mspte (Fig. 8D). Caudal spine absent. Length up to 45 mm.

Host plants: *Quercus*, *Castanea* (strongly preferred), some authors list also others (*Betula*, *Alnus* - DEMELT, 1966). Conifers (PLAVILSHCHIKOV, 1936) highly improbable. Habits generally similar to *R. mordax* except for great affinity for root bases. In fact the author's observations indicate that perhaps a great majority of larvae live underground (then pupation sometimes in the soil).

Distribution: Europe except North, Asia Minor, western Siberia (sporadically).

Material: Many larvae from Spain, Hungary, CS, SU (Voronezh region), *Quercus* and *Castanea*, lgt. B. M. Mamaev, E. Vives and S, coll. E. Vives, IS, S.

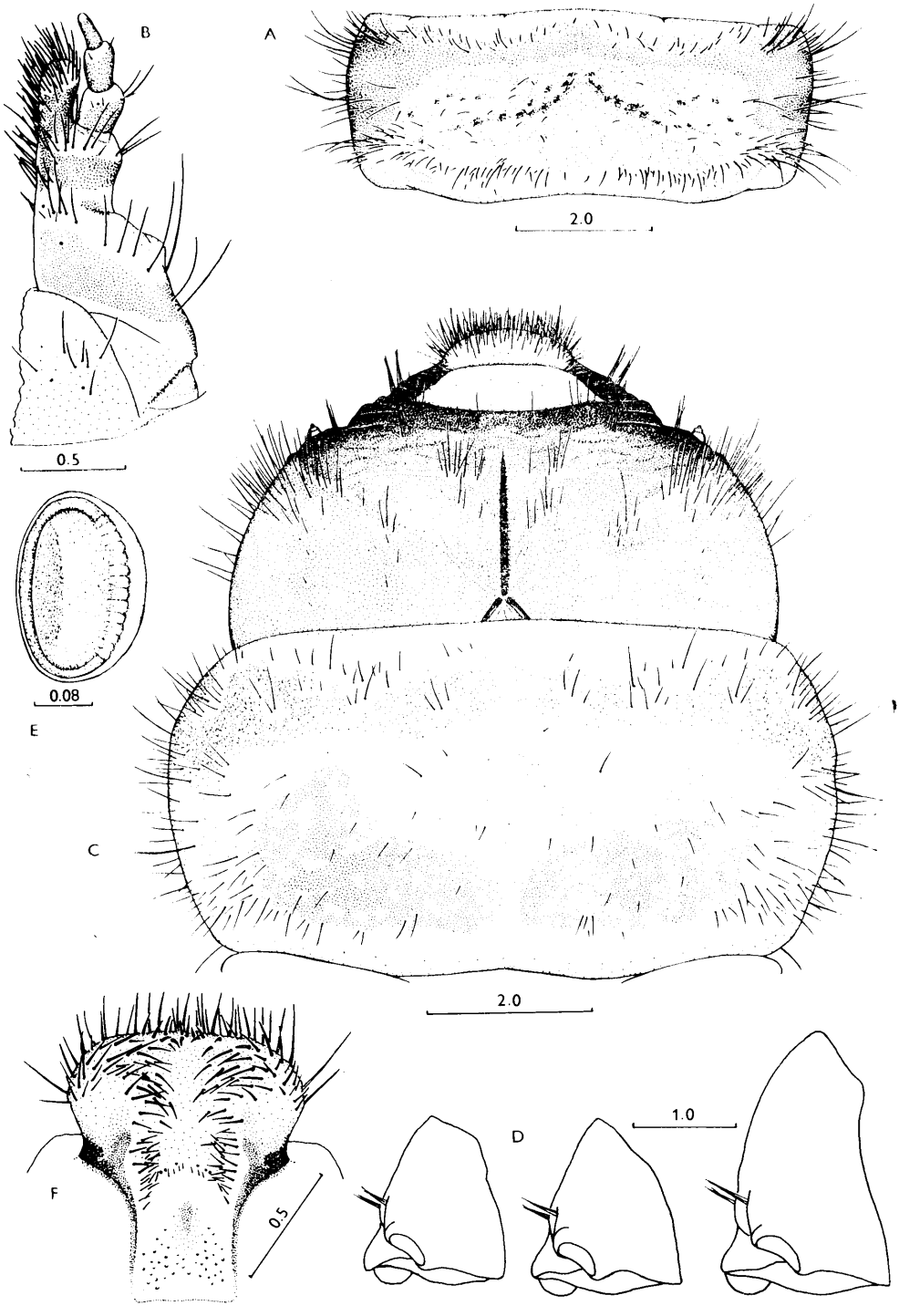
Rhagium (s. str.) *inquisitor* (L., 1758) (sensu lato)

Body much depressed, with moderately dense setae. Head very little retracted (Fig. 8F). Cr (Fig. 7J) brightly pigmented, strongly transverse (over 1.7), extremely depressed (2.7–3), widest in middle, poorly microreticulate. Fl usually almost straight, pof flat, tfl absent (or minute lateral rudiments present). Prf flat, almost in same plane with cl, prf setae 2, 1(–2), +, first pair in some specimens reduced. Eps very numerous, 20 eps not exceptional. Cl broad, extended laterally, basal half distinctly sclerotized. Eph row composed of extremely short tooth-like sensilla. Lateral cr margin in later instars anteriorly very much depressed, almost carinate, strongly sclerotized rugose area below it almost separated from plst (Fig. 8A, cf. 7A). Mstm incompletely fused, distinct. Dstm inconspicuous, lying on lateral cr edge. Vs (Fig. 8B) flat, hypl parallel, anterior margin flat, mtt very far from hind margin. Md (Fig. 7E) extremely long, more acute than in *Megarhagium*, apex and dorsal angle close together, supplementary tooth large, cutting edge usually angulate. Lmx much depressed, maxillae very slender.

Proth pigmentation usually bright, pn distinctly sclerotized, usually with several discal setae. Mpst very broadly rounded anteriorly, in mature larvae finely sclerotized, with about 10 (less than 20) setae. Mesoth spir with up to about 20 small mgch. Legs in mature larvae finely sclerotized. Pterothoracic sterna and aa similar to *Megarhagium* (at most poorly indistinctly granulate), granules partly to largely smooth, not mspte. Carm absent. Length up to 30 mm.

The number of species recognized by various authors in the subgenus *Rhagium* s. str. varies considerably, from one (LINSLEY et CHEMSAK, 1972) to about ten.

Plate 9: A - *Rhagium sycophanta*, prothorax, dorsal view. B - *R. inquisitor*, left maxilla and connecting lobe, ventral view. C - *Akimerus schaefferi*, head and prothorax, dorsal view. D - *A. schaefferi*, outline of left mandible (variability of shape), dorsal view. E - *Stenocorus quercus*, third left abdominal spiracle. F - *Rhagium bifasciatum*, epipharynx.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2.0
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D
1.0

Larvae will not usually help with such problems, being on average much more similar than adults, yet I wish to point out that, from the limited material available, the specimens from eastern USA (Massachusetts) seem rather distinctly different from the Palaearctic and Mexican ones.

Host plants: Polyphagous, but conifers strongly preferred. The larvae are strictly subcortical, and not penetrating into roots. Otherwise habits similar to *R. mordax*. If under bark, the pupal cell usually (particularly in conifers) surrounded by a barrier of long wooden fibres.

Distribution: Holarctic.

Material: Many larvae from Algeria, Spain, France, Greece, Hungary, CS, SU [Ukraine, Caucasus, lake Baikal, Tuva, Kurile Islands (Kunashir; *R. japonicum* BATES)], Mexico (Oaxaca), USA (Massachusetts), from *Pinus, Picea, Abies, Larix, Cedrus*, several larvae from *Betula, Fagus*, larvae found by the author also in *Quercus*.

Genus *Akimerus* SERVILLE, 1835

Type species: *Rhagium cinctum* F., 1787 = *Leptura schaefferi* LAICHARTING, 1784 (monobasic)

Similar to *Stenocorus*, main differences and restrictions as follows:

Body in non-mature larvae even more elongate, setae shorter, ferrugineous.

Cr bright orange-ferrugineous. Anterior ecr setae in later instar larvae rather dense (Fig. 9C), one long and several shorter adfrontal setae, main seta close to (± touching) fl. Both ecr halves fused along very short line. Medial extremities of both tfl halves only slightly broadened. Pof often with distinct longitudinal rudiments of original frontal sutures. Main pof setae not remarkably shifted anteriorly. Prf setae in later instars +, +, +, setae of second and third group clustered into very characteristic tufts (Fig. 9C). Epmg medially flat, later instar larvae usually with more than six eps. Eph (Fig. 10B) anteriorly without setae. Sfp absent. Vs short (about 3.4–3.8), almost flat, gula slightly raised, may be shade darker than hyp region, mgl sharp, narrow, reaching anterior margin. Up to about 12 setae on each side, one pair usually in gular region.

Ant longer, segment 2 up to as long as broad. Like in *Stenocorus*, mandibles extremely variable (Fig. 9D), in later instars with several setae arranged in two tufts similar to those on prf. Lmx base in mature larvae distinctly sclerotized, pgmx and prlb without basal spots, second pamx segment remarkably elongate, as long as first, segment 3 shorter.

Proth (Fig. 9C) with bright orange pigmentation, protergal band with two anterior notches and in later instars usually with two pale inclosed spots on each side. Hind pn half with large mspte area of very characteristic shape, in later instars with some scattered setae. Mpst bearing up to about 20 setae, and with large central unpaired mspte area.

Pterothoracic al feebly protuberant, in very large specimens may be finely sclerotized. Mesoth spir with up to about 40 or even more relatively large narrow mgch.

Bst very poorly divided, coxae well defined, transsternal lines somewhat obliterated at middle.

Aa (Fig. 10A) very largely mspte, seventh aa only slightly reduced. Anterior transverse line of daa very broadly doubled. Abd spir with up to about 20 large mgch (Fig. 8H). Anterior mspte area of vaa in later instars with unusually numerous short inclosed setae. Transsternal lines indistinct medially. Caudal spine smaller, borne from a very short broad base (latter almost absent in mature larvae, Fig. 8I). Apl in mature larvae with numerous setae. Length up to 50 mm.

A West-Palaearctic genus, two species known, only larvae of the type species available.

Akimerus schaefferi (LAICHARTING, 1784)

Host plants: *Quercus*. Some others that have been cited (*Ulmus, Carpinus* - PLAVILSHCHIKOV, 1936, and quoted by other authors) require confirmation. Larvae always in deep roots, not even approaching the ground level. Habits similar to *Stenocorus*. Larvae found in dead or dying (sometimes rather fresh) roots of old trees, or of large stumps. At least three-year development. One pupa found in the soil in late May, one mature larva in April, pupation therefore occurs in spring, but mature larvae very probably overwinter in the soil pupal cells. May be accompanied by larvae of *Stenocorus*, in shallow roots and root bases being gradually replaced by *Rhagium sycophanta*. Flight June–July, adults usually not on flowers, can be often found on the vegetation around the host trees.

Distribution: Central and South Europe.

Material: 1978–1987, CS, Moravia m., Ledhice +/I, *Quercus*, lgt. et coll. S.

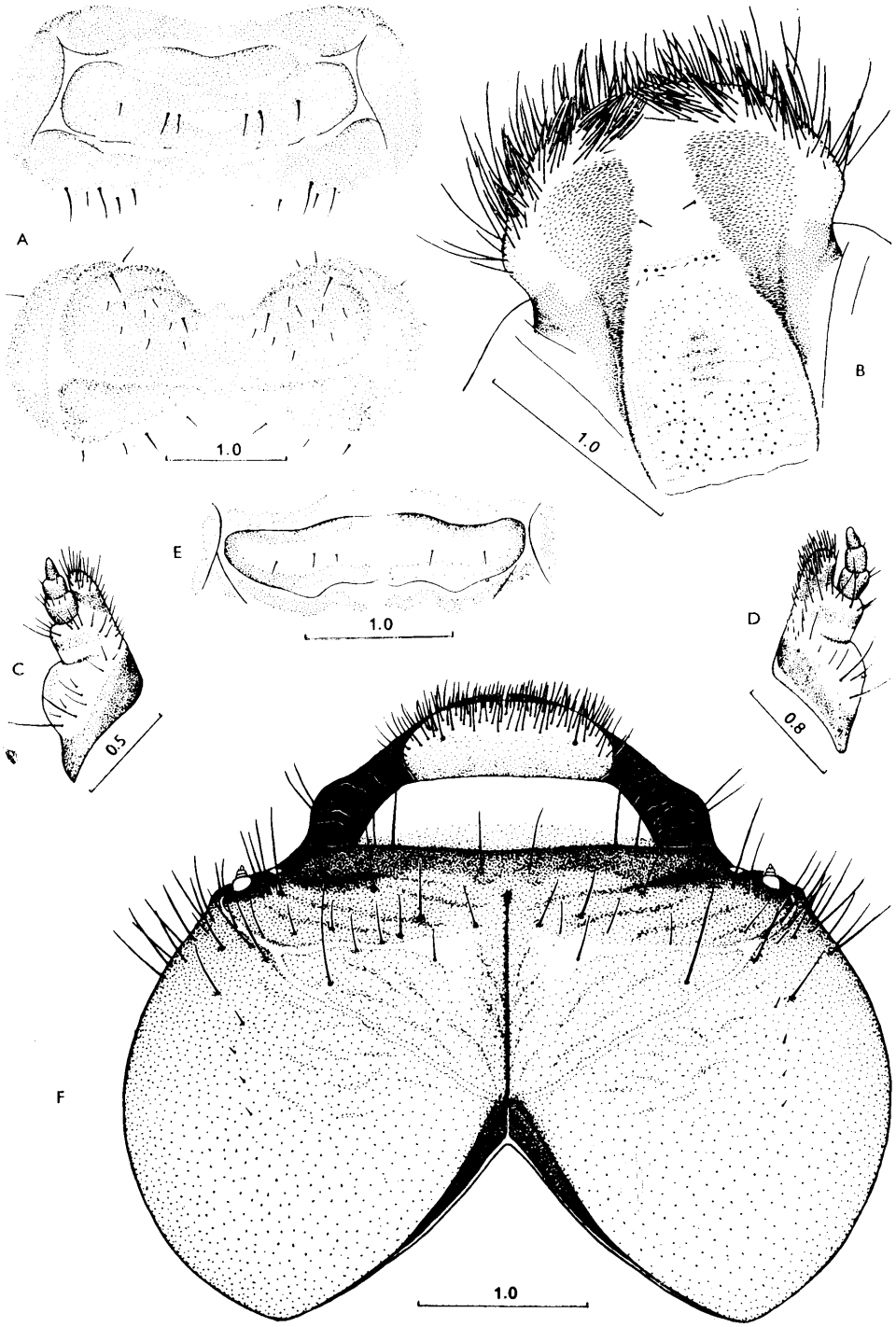
Genus *Stenocorus* MÜLLER, 1764

Type species: *Leptura meridiana* L., 1758 (PLAVILSHCHIKOV design., 1936)

Body white or yellowish, distinctly depressed, fairly elongate, with moderately dense short at least finely pigmented setae.

Head (Figs 10F, 11E, F) in natural position slightly less than by half retracted. Cr transverse (1.5–1.7), distinctly depressed (2.3–2.6), slightly narrower than prothorax, yellow to orange-ferrugineous, not distinctly microgranulate, widest at most slightly behind middle. Anterior ecr region with moderately dense setae, usually more than one adfrontal seta, main one may be shifted into pof region. Ecr with sides strongly roundly convex, both halves fused along a very short line (*Anisorus*, Fig. 10F), or almost in one point, hind cr notch angulate, slightly less than 90 degrees.

Fl narrow, sharp, S-curved to almost straight, in young larvae passing through ant openings to anterior cr margin, in later instars (except for *Anisorus*) ± ending in ant pits. Tfl present, narrow, medial extremities of both halves ± broadened. Pof almost flat, in later instars finely rugose, main pair of setae moved far forward, occasionally almost touching tfl. Pale longitudinal pof lines at most rudimentary.


A
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E
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C
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D
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F
1.0

Prf ± flat, distinctly transversely grooved, remarkably darker than pof and ecr. Main setae 2, 1, 1–4, and in later instars mostly some supplementary ones. Epmg dark, ± straight, well separate from cl, moderately to distinctly declivous. Six eps, medial pair well separate from cl border. Mfl in later instars shortened anteriorly, occasionally almost absent from prf region.

Cl broad, relatively flat, strongly tapering, basal half finely sclerotized. Lbr large, transverse, half-oval to subelliptical, flat, basal half sclerotized, anterior half bearing dense short setae, main discal pair not isolated. Eph flat, hind region broad, with numerous posterior sunken sensilla, may bear a diffuse medial sclerite, anterior transverse row composed of very short tooth-shaped sensilla. Tormae long, running almost straight backwards along most of hind region. Anterior region bearing numerous setae sparsely reaching shortly behind transverse row of sensilla.

Plst deeply sclerotized, much raised, sfp absent or very low elongate tubercle. Gena at most finely rugose, pigmentation usually not broader than plst. Stemmata in later instars indiscernible, distinct sclerotized protuberance present in place of mstm. In youngest larvae, pigment spots of at least mstm visible.

Vs short (3.5–5), gently convex to almost flat, not darker than ecr, in later instars finely rugose. Anterior margin at most gently emarginate, laterally raised, sclerotized, medially rather flat, sclerotization disappearing. Hypl broad, dark, at least slightly diverging, fail to reach pocl. Mtt short, distinct, moderately separate from ± darkened hind margin. Gl ± not raised, mgl narrow, indistinct, hardly reaching anterior margin. About 3–6 (10) setae on each side, all in hyp region, gula glabrous.

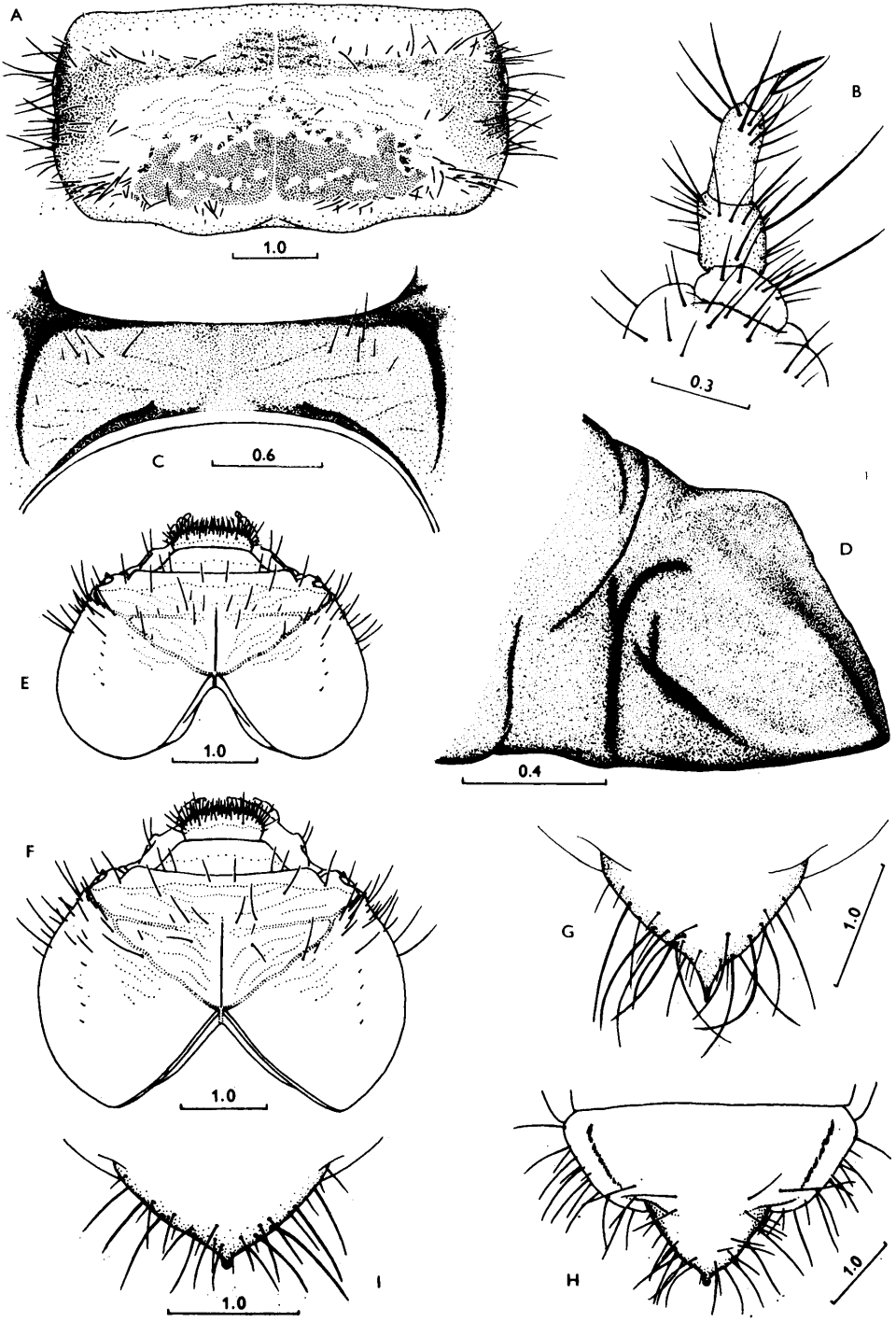
Ant very short, three-segmented. Ant ring strongly sclerotized, slightly raised, ant may be entirely retracted. Segments in later instars at least finely sclerotized. second transverse, third small, about as long as broad, and about as long as elongate main sensillum.

Md type I, moderately long, remarkably variable in shape and, moreover, often strongly abraded (particularly in larvae collected from soil pupal chambers). Border zone ± striate. Apex, dorsal angle and two inner keels usually ± blunt. Basal part ± transversely striate, with distinct lateral protuberance and 1 + 1 setae, rarely one small supplementary seta present, inner face with at most very low tubercle.

Lmx moderately large, not much depressed, submentum poorly separate from connecting lobes, both finely sclerotized. Cardo moderately large, mostly with minute seta. Distal maxilla relatively robust (Figs 10C, D). Pgmx large, with ± distinct ventral pigmentation and usually distinct basal spot. Pamx moderately long, segments usually gradually shortening from 1 to 3, or subequal. Mala narrow, short, cylindrical, with broad sclerotized band and numerous stout long apical and dorso-

◀

Plate 10: A - *Akimerus schaefferi*, fifth dorsal (upper) and ventral (lower) ambulatory ampullae. B - *A. schaefferi*, epipharynx. C - *Stenocorus ?tataricus*, right distal maxilla, ventral view. D - *S. meridianus*, left distal maxilla, ventral view. E - *S. quercus*, fifth dorsal ambulatory ampulla. F - *S. quercus*, head, dorsal view.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medial setae. Mt with small broadly separate basal spots. Prlb broad, basal apodeme ± pigmented, pglb pigmentation broadly separate, palb moderately long, ligula broad (palb separated by about twice their width), short, with sparse ventral, apical and dorsolateral setae (number rather variable) and narrow marginal band of short microtrichia (± transitional situation between "setal" and "microtrichial" ligula types - see general morphology).

Proth (Fig. 11A) broad, short. Dorsal pigmented band narrow (in some species very indistinct), with one inconspicuous lateral notch, al broadly sclerotized. Pn with two minute discal setae, with large to much restricted mspte area except for *Anisorus*. Lfur ± absent. Epl and lpst in later instars yellowish anteriorly. Lpst with greater number of setae, mpst with four stronger and some short setae. Msp on cxst and stlf (fine or absent in *Toxotochorus*).

Meso- and metanotum non-granulate, mspte, scutum uninterrupted. Al moderately protuberant. Mesoth spir broadly oval, about as long as pamx segments 1 + 2, hind margin with up to about 20 moderately large mgch. Rudimentary metath spir very distinct, sclerotized. Sterna not granulate, transsternal lines surrounded with narrow band of msp. Bst divided by very distinct oblique lines. Coxae relatively well defined.

Legs moderately long, distinctly shorter than half of their basal distance, in mature larvae bearing dense setae (Fig 11B). Trch large, with distinct basal ring. Femur about as long as ti, both in later instars finely pigmented laterally. Ptrs slightly shorter, slender, non-compressed, seta usually borne somewhat before middle.

Aa non-granulate, relatively largely mspte (Fig. 10E), aa 7 extremely reduced, or seventh daa absent. Daa divided by two transverse lines (anterior one simple) and one pair of lateral impressions. Abd spir with up to about 15 moderately large mgch (Fig. 9E). Plt moderately large, oval, with up to 8–9 (usually 3–6) setae. Transsternal lines distinct. Ninth tergum with caudal spine on ± large marginally sclerotized base (Figs 11G, H, I). Atu broad, apl much protuberant, with several short setae.

Five species at my disposal, but only two of them reared to adult stage. Much larger material required to confirm the differences within *Stenocorus* s. str.

1 (2) Pronotum devoid of microspines and dorsal ampulla 7 absent. Epicranial halves shortly fused, main adfrontal seta always deep inside postfrontal region (Fig. 10F) (sg. *Anisorus* MULSANT, 1863) ..... *quercus*

2 (1) Pronotum largely microspiculate (Fig. 11A), if spines much restricted (may be probably entirely lacking), then strongly reduced dorsal ampulla 7 present. Epicranial halves

◀

Plate 11: A - *Stenocorus meridianus*, prothorax, dorsal view. B - *S. quercus*, left hind leg, anterior view. C - *S. quercus*, ventral sclerite. D - *S. quercus*, apex of left mandible, medial view. E - *Stenocorus* sp., head, dorsal view. F - *S. amurensis*, dtto. G - *S. ?tataricus*, caudal spine, dorsal view. H - *S. meridianus*, end of abdomen with caudal spine, dorsal view. I - *Stenocorus* sp., caudal spine, dorsal view.

touching almost in one point, main adfrontal seta never deeply inside postfrontal region (Figs 11E, F).

3 (4) Microspines on pronotum much reduced, covering only ± small separate areas at hind margin. Dorsal ampulla 7 much reduced yet distinct, microspiculate (Fig. 12A). Caudal spine rather long (Fig. 11G) (sg. *Toxotochorus* REITTER, 1907) ..... *tataricus*

4 (3) Pronotum with large microspiculate area (Fig. 11A). Dorsal ampulla 7 absent, rarely rudiments with some microspines present. Caudal spine shorter (Figs 11H, I) (*Stenocorus* s. str.).

5 (6)! Microspines on pronotum coarser, ± uniform, microspiculate area and inclosed smooth spots therefore with distinct border lines, smooth spots in later instars larger (Fig. 11A). Caudal spine base on average longer (Fig. 11H) ..... *meridianus*

6 (5)! Microspines on pronotum esp. anteriorly finer, border lines not easily seen, smooth spots smaller. Caudal spine base on average shorter (Fig. 11I).

7 (8) Head broader, posterior cranial angles more rounded, frontal lines meeting at ± 180 degrees (Fig. 11E). West Palaearctics ..... sp. indet.

8 (7) Head not so broad, posterior cranial angles more prominent, frontal lines meeting at an obtuse angle (Fig. 11F). Far East ..... *amurensis*

Stenocorus (s. str.) *meridianus* (L., 1758)

Cr brightly pigmented, orange in mature larvae. Ecr halves touching ± in one point. Fl in mature larvae ± ending in ant openings. Adfrontal seta not moved into pof region. Medial ends of both tfl halves only moderately broadened. Main prf setae usually 2, 1, 1 (i.e. only one seta above ant). Epmg medially rather flat. Vs longer (at most slightly over 4). Md usually more slender, more acute, cutting edge often emarginate. Apical part of maxilla relatively larger, pgmx with broad ventral pigmentation (Fig. 10D). Pn with large mspte area, in later instars with large ± inclosed smooth spots (Fig. 11A), msp coarser, distinct. Seventh daa absent. Caudal spine in later instars moderately long (Fig. 11H). Setae stout, ferrugineous. Largest available larva 28 mm.

Host plants: *Quercus, Ulmus, Acer, ?Fraxinus*, probably fairly polyphagous on deciduous trees. Larvae always underground, in dead roots, usually begin feeding in thin distal roots and proceed towards more proximal thicker ones; often far from the stem or stump; initially under bark, later instars often in the wood if highly decayed. Apparently three-year development. Pupation in spring in the soil, flight spring/summer. According to CHEREPANOV (1979), the eggs are laid in soil, and the first instar larvae actively search for the food source; fertility of females very high, in one dissected female he found 282 eggs.

Distribution: Europe except North, West Siberia.

Material: 28. 5. 1960, SU, Voronezh region, Tellerman, 2/–, *Acer*, B. M. Mamaev lgt., coll. IS; 1978, CS, Bohemia c., Neratovice, 6/I, *?Fraxinus* (indet. stump), lgt. et coll. S; 1978 and 1980, CS, Moravia m., Lednice, 3/I, *Quercus* (and ex ovo), lgt. et coll. S.

Stenocorus (s. str.) sp. indet. [*?insitivus* (GERMAR, 1824)]

Very similar to *S. meridianus*, main differences in the key, should be confirmed on much larger material. Setae finer. Largest available larva about 25 mm.

Host plant: Larvae found in oak roots *(Quercus)*.

Material: 26. 5. 1982, SU, Nakhichevan' ASSR, Bichenek, 2/–, *Quercus*, lgt. D, coll. IS. Of the three possible candidates [*insitivus* (GERMAR), *biformis* (TOURNIER), *vittidorsum* (REITTER)] occurring in Transcaucasia, the first alternative is the most probable one.

Stenocorus (s. str.) *amurensis* (KRAATZ, 1879)

Single available larva differs from *meridianus* mainly as follows: All pigmentation paler, cr yellow-orange. Msp finer (see key). Rudimentary seventh daa present, with two very small paramedian mspte areas. Maxilla more similar to *S. tataricus* (but this difference between *meridianus* and *tataricus* not sharp). Setae finer. Length 23 mm.

Host plants (CHEREPANOV, 1979): *Salix, Padus, Acer, Ulmus, Quercus, Juglans, Phellodendron* Habits similar to *S. meridianus*.

Distribution: Far East (Amur-Ussuri region, NE China, Korea, Sakhalin, ?Japan).

Material: 17. 5. 1967, SU, Ussuri region, Suputinka, 1/–, indet. roots, ?B. M. Mamaev lgt., coll. IS.

Stenocorus (Toxotochorus) ?tataricus (GEBLER, 1841)

Differs from *meridianus* as follows: Generally slightly less depressed. Epmg low yet very distinctly steeply raised (particularly in mature larva). Apical portion of maxilla relatively smaller, pgmx pigmentation narrower (Fig. 10C). Proth mspte area much restricted, variable, small, often broken into several ± small spots at hind margin, anterior pigmented band paler. Msp on proth stlf and cxst fine, absent in one mature larva. Seventh daa strongly reduced yet present, poorly protuberant, transverse lines ± preserved, at least scutal plate with msp (Fig. 12A). Caudal spine on average distinctly longer (Fig. 11G, much longer in one mature larva). Largest available larva 38 mm.

Habits: Both available series taken under *Juglans*-logs, feeding probably in the bark of the ground-facing region.

Distribution: Soviet/Chinese Central Asia, up to South Altai.

Material: 29. 6. 1978, SU, Kirgizia, Sary-Chelek, 2/–, *Juglans*, A. V. Kompantsev lgt., coll. IS; 22. 5. 1976, SU, Kirgizia, Osh region, Kara-Alma, 2/–, *Juglans*, lgt. Yanushev, coll. IS. Adults not reared. Based on the collecting sites, we associate the larvae with the subgenus *Toxotochorus*, and very probably with *S. (T.) tataricus*.

Stenocorus (Anisorus) quercus (GOETZ, 1783)

In addition to the key, differs from *meridianus* as follows: Cr paler, at most yellow-orange. Fl even in mature larvae ± reaching anterior cr margin. Medial extremities of both tfl halves broadened into ± large pale areas. Usually 2–4 setae on each side above ant. Epmg gently raised. Vs in later instars shorter (about 4.7–5, Fig. 11C).

Md apical part usually broad and very blunt (Fig. 11D). Largest available larva 28 mm.

Host plants: *Quercus, Acer campestre*. Habits similar to *S. meridianus*. A number of pupae found early November (Neratovice), one pupa found April (Lednice), therefore it seems that pupae overwinter in their soil pupal chambers.

Distribution: Europe except North, Caucasus, Transcaucasia.

Material: 23. 7. 1978, CS, Slovakia m., Kamenica n/Hr., exuvia/I, *Acer campestre*, lgt. et coll. S; 1978, CS, Bohemia c., Neratovice, 6/I (+ numerous exuviae), *Quercus* (two larvae ex ovo), lgt. et coll. S; 1980 and 1987, CS, Moravia m., Lednice, 7/I, *Quercus*, lgt. et coll. S.

Genus *Pachyta* DEJEAN, 1821

Type species: *Leptura octomaculata* F., 1792 = *Leptura quadrimaculata* L., 1758 (WESTWOOD design., 1840)

Body white, elongate, strongly depressed, with moderately dense not very long ferrugineous setae.

Head (Fig. 12B) less than by half retracted. Cr strongly transverse (about 1.8), very much depressed (2.6–3.1), slightly narrower than proth, orange to ferrugineous, not remarkably microgranulate, widest very slightly behind middle. Ecr smooth, with sparse anterior setae, sides strongly roundly convex. One strong adfrontal seta close to fl, sometimes with other miniature ones. Ecr halves touch almost in one point, hind cr notch angulate, about 90 degrees.

Fl narrow, sharp, slightly S-curved, ± ending in ant openings. Posterior frontal angle short, blunt, ± rounded. Tfl distinct, narrow, rather widely interrupted in middle. Pof flat, distinctly finely obliquely rugose, mostly only main pair of setae present, not shifted anteriorly, longitudinal pale lines at most rudimentary in later instars. Prf even in mature larvae at most shade darker than pof, flat, with fine transverse grooves, setae 2, 1, +. Epmg dark, very shallowly emarginate, medially almost in same plane with cl. Often more than six eps, medial pair rather broadly separate from cl broder. Mfl shortening anteriorly, in mature larvae almost absent from prf region.

Cl broad, flat, strongly tapering, basal half finely pigmented. In two of total four available larvae of *P. quadrimaculata,* cl bearing a seta on one side. Lbr transverse, flat, ± half-elliptical with somewhat cut anterior margin, basal half yellow, anterior margin rather densely setose, one pair of stiff discal setae ± isolated. Eph setae reaching bases of tormae level, tormae long, running obliquely backwards. Hind eph region very broad, poorly raised, with distinct small medial sclerite and anterior transverse row of very short tooth-shaped sensilla.

Plst broad, raised, strongly sclerotized, sfp absent. Gena smooth, dark pigmentation reaching narrowly behind mstm. Usually six pairs of stemmata, three large convex mstm in an oblique curved row, with distinct pigment spots, two well separated slightly less convex dstm. Vstm small, sometimes almost without pigment.

Vs moderately long (3.1–3.6), almost flat, not darker than ecr, very finely sparsely transversely grooved. Anterior margin flat, very shallowly emarginate (almost straight at middle), in hyp region broadly sclerotized, in gular region paler. Hypl diverging, often slightly curved, not reaching pocl. Mtt short, broadly separate from ± darkened hind margin. Gula at most slightly raised, mgl narrow, sharp, reaching anterior margin. Mostly one pair of setae in gular and one in hyp region.

Ant short, three-segmented, segment 2 hardly as long as broad, segment 3 about as long as broad, at most slightly longer than relatively small moderately elongate main sensillum. Ant ring heavily sclerotized, slightly raised, antenna may be largely retracted.

Md moderately long, type I, both apex and dorsal angle prominent, relatively sharp, cutting edge shallowly emarginate, two distinct inner keels. Border zone striate. Basal part at most finely transversely striate, with three (rarely four) lateral setae.

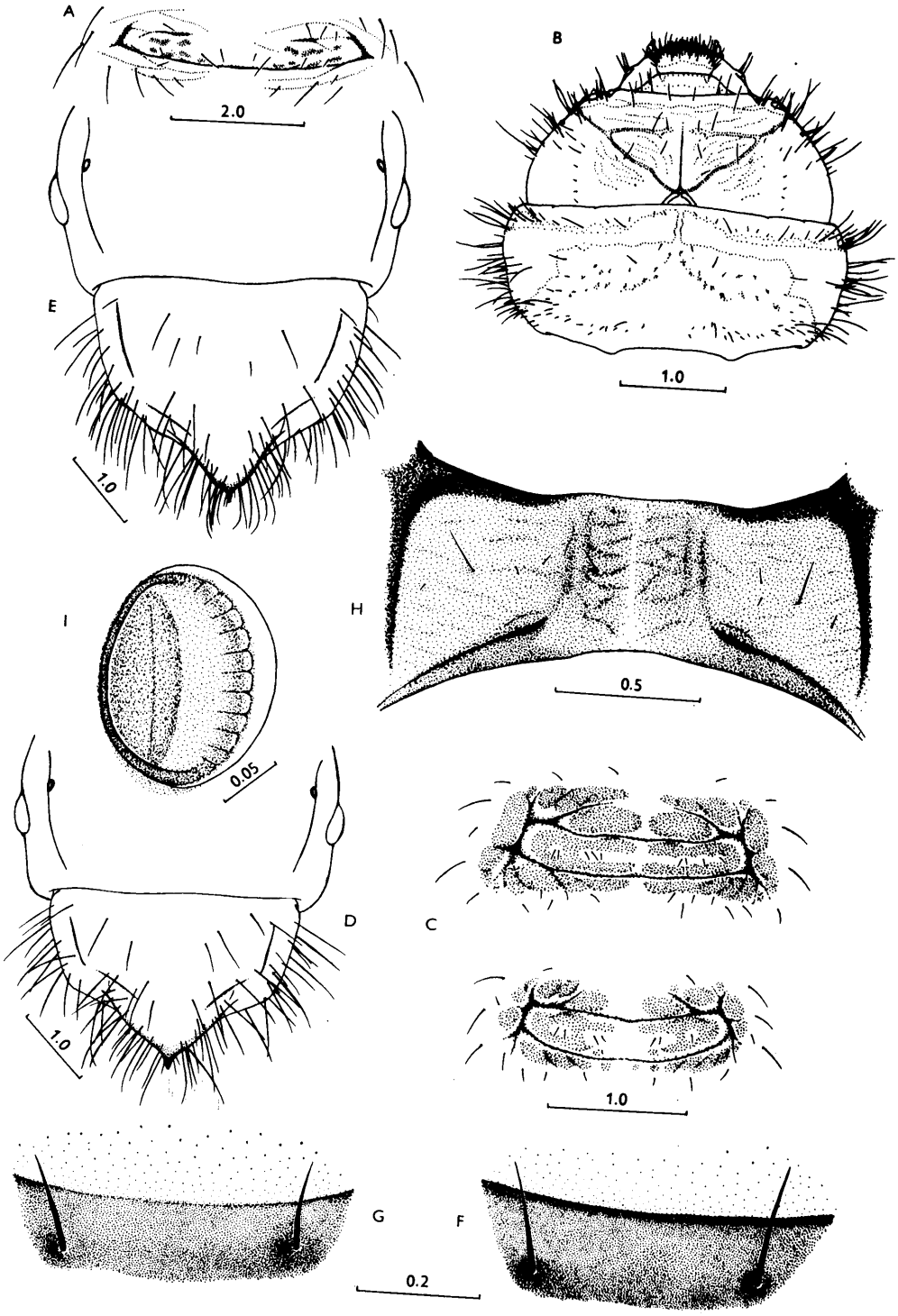
Lmx small, flat, basal components relatively well separate, connecting lobes in later instars finely sclerotized, cardo with distinct seta. Maxilla slender, pgmx large, pigmented, basal spot inconspicuous or absent. Mala narrow, bearing long stout setae, with broad oblique sclerotized band. Pamx long, relatively slender, first two segments subequal, third shorter, elongate. Labium short, robust, mt with two broadly separate basal spots, prlb basal spot indistinct or absent. Palb separated by about 1.5 times their width. Ligula short, broad, apically and along dorsal margins with moderately numerous strong setae, microtrichia in limited extent, very short, hardly visible.

Proth (Fig. 12D) short, broad. Bright protergal band, al largely strongly sclerotized, one indistinct lateral notch on each side. Pn without posterior row of setae, discal setae very few, miniature. Lfur ± absent. Episternum and anterior areas of epl and lpst in later instars sclerotized. Lpst with sparse setae, mpst mostly with four strong and 2–6 short setae. Msp present on cxst and stlf anteriorly.

Meso- and metanotum non-granulate, mspte, scutum not interrupted. Al distinctly protuberant. Mesoth spir about as long as pamx segments 1 + 2, broadly oval, hind margin with up to about 25 moderately large mgch. Rudimentary metath spir very distinct, sclerotized. Sterna ± non-granulate, transsternal line surrounded with broad mspte band. Bst almost undivided. Coxae relatively well defined.

Legs moderately long, slender, with rather dense strong setae. Trch distinct, bearing several setae, basal ring weakened to interrupted medially. Ti at most slightly shorter than femur, both unpigmented. Ptrs about as long as ti, slender, non-compressed, slightly curved, seta borne about middle.

Aa seven, seventh ones at most slightly reduced. Daa (Fig. 12C) almost not granulate, largely mspte, anterior transverse line broadly doubled, one pair of lateral impressions. Abd spir broadly oval, up to about 20 moderately large mgch. Plt moderately large, elliptical, with numerous setae (about 5–12). Vaa very poorly granulate, entirely mspte. Caudal spine present (Figs 12D, E). Atu broad, apl with numerous relatively long stout setae.


A
2.0
B
1.0
E
1.0
H
0.5
I
0.05
D
1.0
C
1.0
G
F
0.2

A Holarctic genus. Three species in the region dealt with, larvae of two of them at my disposal.

1 (2)! Base of caudal spine shorter and broader (Fig. 12D). Seventh dorsal ampulla almost not reduced. Cranium much depressed (about 2.9 – 3.1) ..... *quadrimaculata*
2 (1)! Base of caudal spine longer, more slender (Fig. 12E). Seventh dorsal ampulla slightly reduced (Fig. 12C). Cranium less depressed (about 2.6 – 2.8) ..... *lamed*

Pachyta quadrimaculata (L., 1758)

Main differences in the key. In available larvae always more than six eps (maximum 7 + 5). Epmg passing quite smoothly into cl (Fig. 12G). Vstm almost flat, with little or no pigment, but always distinct at least as a pale spot. Largest available larva 28 mm.

Host plant: *Pinus* (single known, perhaps also other conifers). Larvae under bark (later instars sometimes also in the wood) of dead shallow roots (often at a distance from the stem) or root bases; one of rather specialized root feeders. Pupation occurs in spring in the soil, flight in summer. Three-year development according to CHEREPANOV (1979).

Distribution: Coniferous forests of Europe and Siberia up to Transbaikalia, absent from the Far East.

Material: 14. 7. 1979, SU, lake Baikal, Bukhta Sennaya, 4/I, *Pinus*, lgt. et coll. S.

Pachyta lamed (L., 1758)

Main differences in the key. Mostly only six eps. Epmg even in middle separated from cl by a more distinct groove, or by a step (Fig. 12F). Vstm convex, with ± distinct pigment spot.

Host plant: *Picea*. Habits similar to *P. quadrimaculata*. CHEREPANOV (1979) and PALM (1957) mention three-year life cycle.

Distribution: Coniferous forests from Europe to Japan; North America, if we accept *liturata* KIRBY, 1837 as a subspecies of *lamed*.

Material: 16. 8. 1978, CS, Bohemia m., Lenora, 3/I, *Picea*, lgt. et coll. S; 1963 and 1964, Sweden, Dalarna, Näs, 2/?, *Picea*, coll. M. Sláma; 26. 6. 1957, Sweden, Lapland, Arvidsjaur, 2/I, *Picea*, lgt. T. Palm, coll. S.

Pachyta bicuneata MOTSCHULSKY, 1860

Larvae not available, described and figured in CHEREPANOV (1979), apparently very similar to the two preceding species. According to CHEREPANOV, they differ by the lack of ventral stemma, and by the dorsal stemmata much less distinct in

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Plate 12: A - *Stenocorus ?tataricus*, seventh dorsal ambulatory ampulla. B - *Pachyta quadrimaculata*, head and prothorax, dorsal view. C - *P. lamed*, sixth and seventh dorsal ambulatory ampullae. D - *P. quadrimaculata*, end of abdomen with caudal spine, dorsal view (setae omitted from segment 8). E - *P. lamed*, dtto. F - *P. lamed*, middle of frontoclypeal border with medial pair of epistomal setae. G - *P. quadrimaculata*, dtto. H - *Evodinus clathratus*, ventral sclerite. I - *E. clathratus*, third left abdominal spiracle.

comparison with the main ones (less convex, pigment indistinct). However, CHEREPANOV states that the ventral stemmata are also absent in *P. quadrimaculata* - in my four larvae they are always visible. However, *P. bicuneata* and *quadrimaculata* are apparently allopatric.

Host plants: *Pinus* (Japanese authors have listed also *Larix* and *Picea*). Habits apparently similar to the preceding species.

Distribution: Far East (Amur-Ussuri region, NE China, Korea, Sakhalin).

Genus *Evodinus* LECONTE, 1850

Type species: *Leptura monticola* RANDALL, 1838 (monobasic). North America, larvae available and covered by the following description.

Similar to *Pachyta*, differs as follows:

Body less elongate.

Cr less transverse (about 1.6) and depressed (2.4–2.7), on average paler, yellow to orange, anterior region distinctly microgranulate. Ecr finely rugose along fl, posterior frontal angle more prominent, fl indistinctly reaching anterior cr margin. Prf setae 2, 1, 1 - 3, six strong eps. Mfl even in mature larvae ± reaching into prf region. Cl often (in *E. monticola* almost always) with one or even more setae on each side. Transverse eph row composed of minute trichoid sensilla. Tormae shorter, oblique, not connected with sclerotized bands running along sides of hind region (Fig. 13E). Anterior eph region with sparse setae. One large mstm with distinct pigment spot, one smaller yet distinct dstm (Fig. 13B), vstm indistinct or absent. Vs (Fig. 12H) with anterior sclerotization slightly narrower, hypl slightly diverging or ± parallel, may or may not reach pocl. Hyp region very distinctly microgranulate. Mtt shorter, broadly distant, hind vs margin may not be darkened. Gl somewhat raised. Usually about 2–6 setae on each side.

Ant two-segmented, segment 2 very short, annular. Apical md part flat, apex, dorsal angle and two inner keels blunt. Basal part with 1 + 1 (rarely 1 + 2) setae. Lmx slightly less depressed and more robust. Pgmx always with large basal spot. Pamx shorter, segment 2 shorter than 1. Prlb with distinct basal pigmentation (usually one large central and two small lateral spots present). Ligula with setae sparser to very sparse, microtrichia more widespread.

Proth pigmentation paler, lateral notches very indistinct, epl and episternum usually unpigmented. Setae sparser, pn with two discal setae, lpst with a distinct tendency to develop a transverse row of about five strong setae on each side, other setae mostly sparse. Mpst with about 6–8 setae. Msp very fine, pn with narrow posterior mspte area (Fig. 13A).

Mesoth spir with up to about 18 mgch, sterna slightly more distinctly granulate. Legs with setae sparser, stronger, trch with distinct basal ring, ti usually slightly longer than femur, both in later instars finely sclerotized, claw usually not curved.

Daa laterally poorly granulate, vaa more distinctly granulate, granules mspte to smooth. Abd spir with up to about 8–10 large mgch (Fig. 12I). Plt bearing about 4–8 setae. Caudal spine usually sharp, long (Figs 13C, D). Particularly dorsal apl covered with fine msp.

A Holarctic genus. Four species known, two of them in Palaearctic Region.

1 (2) Hypostomal lines distinctly fail to reach postoccipital line, gula usually with one macroscopic seta on one or both sides, rarely devoid of setae. Anterior gular margin straight or slightly recurved, distinctly "disturbing" smooth emargination of anterior margin of ventral sclerite (Fig. 12H). Caudal spine base usually poorly dorsally protuberant (Fig. 13D) ..... *clathratus*

2 (1) Hypostomal lines almost to fully reaching postoccipital line. Gula without macroscopic setae. Anterior margin of ventral sclerite ± smoothly emarginate. Caudal spine base abruptly dorsally protuberant, in later instars may ± project above spine (Fig. 13C) ..... *borealis*

Evodinus clathratus (F., 1792)

Main differences in the key. Cl may or may not bear usually one small lateral seta on one or both sides. Stemmata on average more distinct, mstm abruptly convex, dstm usually ± convex as well (Fig. 13B). Vs on average slightly shorter (3.3–3.6), hypl slightly diverging. Ligula with very sparse setae, dorsal setae at most in some mature larvae more numerous. Granules of particularly daa may be ± devoid of msp. Largest available larva 17 mm.

Host plants: *Picea, Fagus, Salix,* probably polyphagous. Larvae feed under relatively loose bark of dead branches or stems. Probably two-year development, before the second overwintering the mature larvae fall out on the ground, usually pupae overwinter in subsphaerical soil pupal chambers. Flight in late spring and summer, adults on flowers.

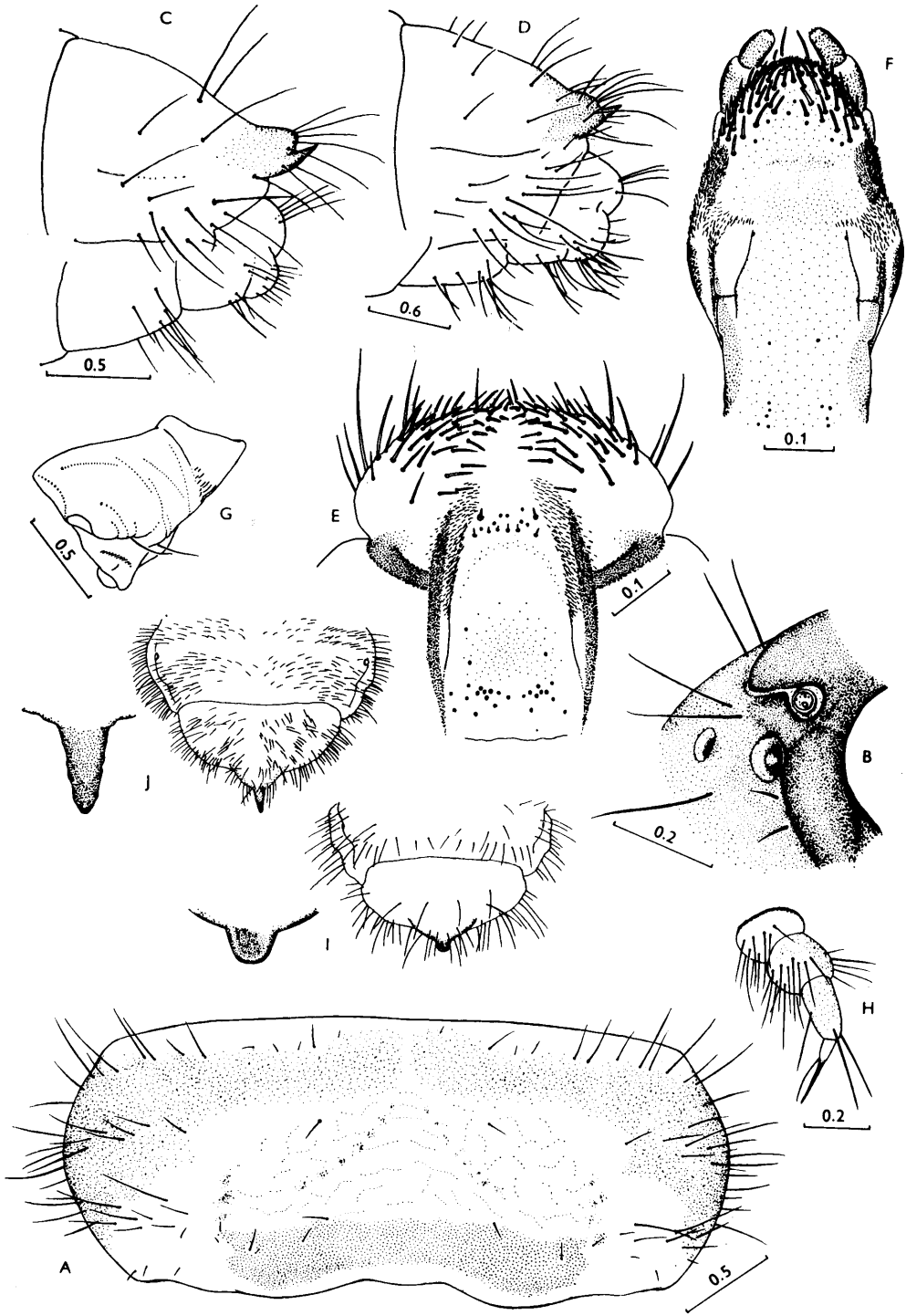
Distribution: Central Europe.

Material: 1976–1986, CS, Slovakia c. (various localities), 7/1, *Fagus* and *Picea,* lgt. et coll. S; 6. 6. 1966, SU, Ukrainian SSR, Rakhov, 3/–, *Salix,* B. M. Mamaev lgt., coll. IS [these latter larvae described in MAMAEV and DANILEVSKY (1975) erroneously as *Pachyta quadrimaculata*].

Evodinus borealis (GYLLENHAL, 1827)

Main differences in the key. Stemmata slightly less distinct, dstm ± flat. Vs on average slightly longer (3.0–3.4), hypl ± diverging, usually only about 2 setae on each side in hyp region. Ligula even in young larvae with greater number of dorsal setae, in later instars setae rather dense (Fig. 13F). Aa more distinctly granulate, all granules (incl. those on pterothoracic sterna) devoid of msp (which are more restricted and very fine). Largest available larva 15 mm.

Host plants (CHEREPANOV, 1979): *Pinus, Picea, Abies, Larix.* Habits apparently similar to *E. clathratus.* Often in leftovers after forest work. Some larvae leave the host material and pupate as late as the next spring.


C
0.5
D
0.6
F
0.1
G
0.5
E
0.1
J
B
0.2
I
H
0.2
A
0.5

Distribution: North and NE Europe (reaching Czechoslovakia and Ukraine), Siberia to Japan.

Material: 15. 8. 1975, SU, Amur region, Zeya, 5/–, *Larix*, lgt. D, coll. IS; SU, Siberia, ?Irkutsk, 5/–, *Picea*, collector not stated, coll. IS. Adults not reared, larvae determined by elimination and according to CHEREPANOV (l.c.), no doubt about determination.

Evodinus monticola (RANDALL, 1838)

Larvae remarkable by practically invariable presence of 1–4 relatively distinct setae on each side of cl. Hypl usually parallel, not reaching pocl. Gula devoid of setae. Ligula with numerous dorsal setae. Practically all granules mspte, but msp occasionally very fine and indistinct. Length up to 22 mm.

Habits (judging from the data by CRAIGHEAD, 1923, appendix, and GARDINER, 1970) similar to the two Palaearctic species. Known only from conifers *(Picea, Pinus, Tsuga, Pseudotsuga)*.

Distribution: North America.

Material: About 25 larvae from eastern USA (Tennessee, Pennsylvania, W. Virginia), *Pseudotsuga* and *Picea* (some series without host plant data), coll. British Museum (N. H.) (London), Ohio State University (Columbus), and U.S. National Museum (Washington, D.C.).

Genus *Brachyta* FAIRMAIRE, 1864

Type species: *Leptura interrogationis* L., 1758 (orig. design.)

The following generic description has been based on larvae of the type species (the only one available). Data about additional three species described by CHEREPANOV (1979) follow *B. interrogationis*. However, I cannot swear that these three species would run down to *Brachyta* in the present generic key since many important characters were not described.

Comparing the relevant descriptions (TIPPMANN, 1946, CHEREPANOV, 1978, 1979), it seems that *Brachyta eurinensis* (CHEREPANOV, 1978) is almost certainly a synonym of *B. breiti* (TIPPMANN, 1946), being ± identical both morphologically and distributionally. The latter species was apparrently unknown to CHEREPANOV. A study of the type specimens needed.

Body white or yellowish, very robust, only very slightly depressed, with very dense short fine ferrugineous setae.

Head (Fig. 14C) in natural position almost by half retracted, with relatively sparse setae contrasting with dense body setae. Cr moderately transverse (about 1.4), not much depressed (about 1.9), much narrower than proth, yellow-orange in mature larvae, feebly microgranulate, widest at most very slightly behind middle, in later instars anterior region distinctly rugose. Ecr with sparse anterior setae, later instars usually with several adfrontal setae, some of them (incl. main one)

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Plate 13: A - *Evodinus clathratus*, prothorax, dorsal view. B - *E. clathratus*, right upper pleurostoma and genal region with stemmata, anterior view. C - *E. borealis*, abdominal segments 9 and 10, lateral view. D - *E. clathratus*, dtto. E - *E. borealis*, epipharynx. F - *E. borealis*, labium, dorsal view. G - *Brachyta interrogationis*, right mandible, dorsal view. H - *B. interrogationis*, left fore leg, anterior view. I - *B. bifasciata*, end of abdomen and enlarged caudal spine, dorsal view (after CHEREPANOV, 1979; no scale given). J - *B. variabilis*, dtto (after CHEREPANOV, 1979; no scale given).

lying ± in fl. Sides poorly convex, both halves fused along a very short line, hind cr notch almost 90 degrees.

Fl sharp, at most gently S-curved, in later instars ± ending in ant pits. Tfl sharp (slightly diffuse medially), interrupted. Pof usually slightly concave on both sides, pale lines may be present, main pair of setae at most slightly shifted forward. Prf gently convex, distinctly transversely rugose, almost not darker than pof, main setae 2, 1, 1—3, and often some other minute ones. Epmg dark, gently emarginate, ± obliquely declivous. Mostly six eps, rarely 1—2 supplementary ones, medial pair close to cl border. Mfl shortened anteriorly.

Cl broad, slightly convex, abruptly tapering, broadly brightly pigmented at base. Lbr strongly transverse, flat, basal half sclerotized, anterior half with short stout setae, discal pair poorly separate. Eph basically similar to *Evodinus,* hind region almost without sclerite, transverse row composed of very short tooth-shaped sensilla, anterior region shorter, setae slightly denser, stouter.

Plst relatively narrow, sclerotized, raised, usually roughly rugose, sfp usually present, + prominent robust conical tubercle. Gena almost not distinguished from ecr. Stemmata similar to *Evodinus,* slightly smaller, dstm often incompletely fused.

Vs very short (about 5), distinctly longitudinally convex, not darker than ecr. Anterior margin very shallowly emarginate, relatively distinctly separated from lmx base, almost entirely sclerotized. Hypl broad, tapering, diverging, reaching or almost reaching pocl. Mtt relatively long, narrow, close to ± darkened hind margin. Gula at most very slightly raised, in later instars with very distinct reticulate grooves. Mgl narrow, indistinct, not reaching anterior margin. Setae variable, usually 2—3 longer and some minute setae on each side, gula may or may not bear setae.

Ant miniature, similar to *Evodinus,* almost one-segmented. Md short, robust (Fig. 13G), in details similar to *Evodinus.* Lmx generally similar to *Evodinus,* less depressed, distal parts shorter and more robust, base almost unsclerotized, basal prlb spot more reduced or absent, ligula with very sparse thin dorsal setae.

Proth (Fig. 14C) relatively narrow. Protergal band very narrow, with one indistinct lateral notch, al finely sclerotized. Pn with at most very few scattered minute discal setae, not mspte, lfur absent. Lpst anteriorly yellowish, bearing very numerous setae, mpst even in very young larvae with more than 10 setae, in later instars usually about 20. Very fine msp on exst and stlf.

Meso- and metanotum non-granulate, finely mspte. Al slightly protuberant. Mesoth spir small, broadly oval, with up to about 20 small mgch. Metath spir distinct. Sterna ± granulate, granules finely mspte. Bst undivided, coxae well defined.

Legs extremely short for this subfamily, stout, ± conical, hind legs in later instars not much longer than one-fourth of their basal distance. Trch and femur bearing rather dense setae, former with conspicuous basal ring. Femur in later instars hardly longer than broad, distinctly pigmented, ti longer, elongate, ptrs about as long as ti, slender, non-compressed, seta borne about middle.

Aa seven, esp. daa very poorly granulate (scutal plate devoid of granules), almost entirely very finely mspte, seventh aa slightly reduced. Daa with anterior transverse line broadly doubled. Abd spir broadly oval, moderately large (first one only slightly smaller than mesoth spir), up to about 15 small mgch. Plt rather large, broadly obtusely oval, with up to about 20 setae. Vaa more distinctly granulate. Large caudal spine present. Atu short, moderately broad, apl bearing setae, their glabrous inner lips covered with very fine msp.

The genus *Brachyta* apparently restricted to Palaearctic region.

Brachyta interrogationis (L. 1758)

Caudal spine in later instars short, cut, flattened (Fig. 14B). Body setae very dense. Daa very indistinctly granulate. Length up to 25 mm.

Habits (CHEREPANOV, 1979, VINCENT et GUILLOT, 1983, O. Odvárka, pers. comm.): Host plants include *Geranium sylvaticum* (Europe), *Paeonia, Euphorbia, Rhodiola rosea* (Siberia). Eggs are laid at base of the host plants, first instar larvae invade rhizomes or roots, initially feeding internally, advanced larvae readily leave the plant and feed on the roots externally. One- or two-year life cycle, pupation in soil. According to CHEREPANOV, pupation occurs in spring, and adults emerge the same year; VINCENT et GUILLOT stated that, in France, pupation occurs in autumn and adults overwinter in the soil. Apparently there is some variability in the development pattern (see *B. variabilis*). Adults usually on flowers of their host plants.

Distribution: Europe except South, Caucasus, Siberia to Japan.

Material: 1978, CS, Bohemia occ., Vejprty, 4/I, *Geranium sylvaticum*, O. Odvárka lgt., coll. S; 1982, France, Clermont-Ferrand, 3/I, *Geranium sylvaticum*, R. Vincent lgt., coll. S; 21. 8. 1973, SU, Tuva region, Ishtii-Khem, 4/I, *Paeonia*, lgt. D, coll. IS.

CHEREPANOV (1979) described larvae of three additional species. He brought the following larval key (references to drawings added by me):

1 (4) Caudal spine broad, flattened, not or hardly longer than broad at base (Figs 13I, 14B).
2 (3) Ninth abdominal tergum bearing dense numerous setae (Fig. 14B) ..... *interrogationis*
3 (2) Ninth abdominal tergum with sparse single setae, four of them arranged in a transverse discal row, six apically on caudal spine base (Fig. 13I) ..... *bifasciata*
4 (1) Caudal spine long, non-flattened, round in cross-section at base, slender, elongate, 2–2.5 times as long as broad (Figs 13J, 14A).
5 (6) Body with dense ferrugineous setae, dorsal ampullae without distinct granules ..... *variabilis*
6 (5) Body with not dense pale setae, dorsal ampullae with distinct granules (Fig. 14A) ..... *eurinensis*

The above key can be used only for later instar larvae (young larvae of *B. interrogationis* have sparse setae, and may have long acute caudal spine).

Brachyta variabilis (GEBLER, 1817)

Setae dense, perhaps even denser than in *interrogationis,* scutal plate with greater number of setae (in *interrogationis* usually with 3–5 pairs). Aa apparently similar to *interrogationis,* poorly granulate (i.e. non-granulate of CHEREPANOV). Length up to 25 mm.

Host plants: Found predominantly in *Euphorbia pilosa,* rarely in others (e.g. indet. Fabaceae). Mostly two-year development. Habits similar to *B. interrogationis.* A small portion of larvae pupate in autumn and adults overwinter in pupal cells.

Distribution: From NE Europe through Siberia to Far East incl. Korea and Sakhalin, absent from Japan.

Brachyta bifasciata (OLIVIER, 1792)

Setae sparser, yet scutal plate with 5–7 setae on each side. Body apparently very robust. Judging from illustration, protergal band broader and very brightly pigmented. Aa non-granulate. Length "over 25 mm".

Host plant: *Paeonia.* Habits similar to *B. interrogationis.* Two-year life cycle. Pupation in spring after the second overwintering.

Distribution: East Siberia to Korea, Sakhalin and Japan.

Brachyta eurinensis (CHEREPANOV, 1978) [? = *breiti* (TIPPMANN, 1946)]

Main differences in the key. Legs, according to CHEREPANOV, "two-segmented, with slender needle-shaped claw" (i.e. three-segmented, claw = praetarsus; this is, however, hard to believe, since it would be a unique case in the whole subfamily). Length up to 25 mm.

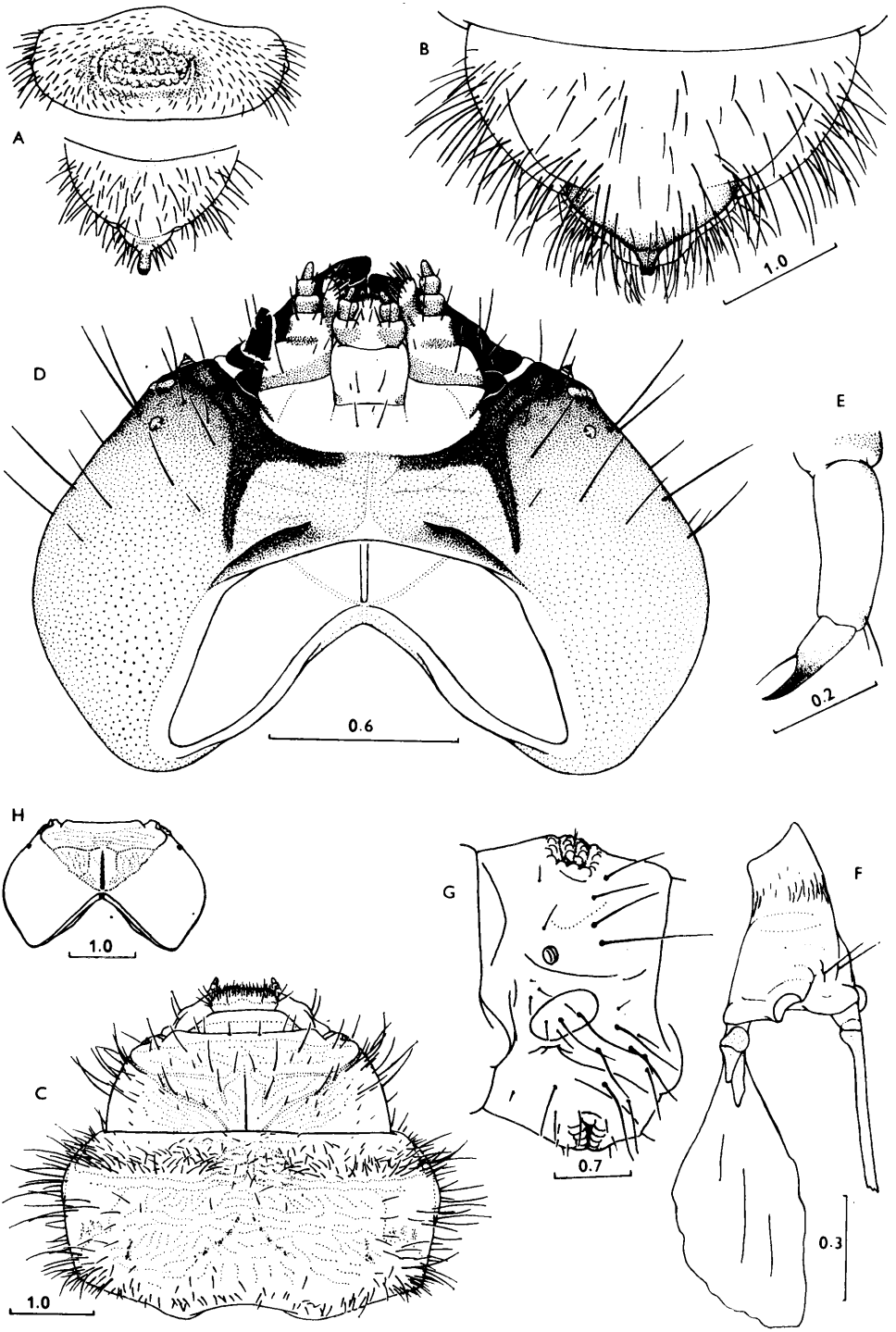
Host plants unknown, the larvae found in forest soil with various plants (*Koeleria cristata, Carex pediformis, Colurix geoides, Astragalus adsurgens, Bupleurum multinerve, Veronica incana* and others). Pupation in the soil (one adult found in soil on July 17th).

Distribution: Known from Tuva region (upper Enisei) and Transbaikalia (Shilka-river).

Genus *Pseudogaurotina* PLAVILSHCHIKOV, 1958

Type species: *Gaurotes splendens* JAKOVLEV, 1893 (orig. design.). Larvae unknown.

Plate 14: A - *Brachyta eurinensis,* abdominal segment with dorsal ambulatory ampulla, and end of abdomen with caudal spine, dorsal view (after CHEREPANOV, 1979; no scale given). B - *B. interrogationis,* end of abdomen with caudal spine, dorsal view. C - *B. interrogationis,* head and prothorax, dorsal view. D - *Pseudogaurotina excellens,* half-grown larva, head, ventral view. E - *P. excellens,* tibiotarsus and praetarsus of right fore leg, posterior view. F - *P. excellens,* right mandible (with apodemes partly preserved), dorsal and slightly lateral view. G - *Gaurotes virginea,* sixth abdominal segment from left side. H - *Pseudogaurotina excellens,* shape of cranium, dorsal view.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Distinctly differs from *Gaurotes,* main differences and restrictions as follows: Body very robust, only moderately depressed, setae slightly shorter and finer. Head in natural position almost by half retracted. Cr (Figs 14D, H) less depressed (about 2.5–2.6), widest slightly behind middle, bright orange-ferrugineous even in very young larvae. Only some regions (hyp, often gena and some frontal regions) ± distinctly microreticulate. Ecr sides abruptly convex, hind cr notch much deeper, about 90 degrees. Fl ± straight. Pof darker than ecr, ± distinctly rugose, ± raised between pale longitudinal lines. Epmg medially gently sloping. Anterior cr opening very small, narrow, cr proportions very different (cf. Figs 14D, H, 15D, K), cl, lbr, md and lmx much smaller. Hind eph region at most finely sclerotized, anterior region devoid of setae, largely covered with distinct microtrichia except for smooth medial area. Vs (Fig. 14D) very small, moderately long (about 3.7), anterior margin more deeply emarginate, hypl diverging, sometimes almost reaching poel, both hypl and pigmentation of anterior margin extremely broad, hind margin broadly darkened, gular setae usually absent.

Md small, shorter, more robust (Fig. 14F), basal part with 1 + 1 setae. Lmx very small, less flattened, base almost unsclerotized. Distal maxilla more robust, pamx shorter, pigmentation of first segment not interrupted. Distal labium on average not so broad, mt with basal spots smaller, basal prlb apodeme usually almost unpigmented, palb separated by about twice their width.

Pn roughly rugose, anterior pigmented band fine, almost absent in young larvae. Lpst distinctly rugose, may have a few small supplementary setae. Proth coxae relatively well defined (also in some other forms with long legs, e.g. *Dinoptera, Acmaeops* sg. *Gnathacmaeops, Grammoptera ustulata, Judolia* etc.), but in this genus followed by ± complete fusion of sternal (bst) portion of exst with stlf (i.e. also with medial portion of bst; see Part I, p. 56, and "all Lepturinae" on line 14 should be replaced by "almost all Lepturinae"). This is an inconspicuous but ± unique modification among all Lepturinae (Fig. 15B).

Pterothoracic al slightly less protuberant. Mgch not so large as in *Carilia.* Mesosternum very poorly granulate, pterothoracic sterna and aa largely mspte, msp narrowly (on daa broadly, Fig. 15A) medially interrupting transverse lines and rows of granules. Pterothoracic coxae well defined, prominent and ± functioning as a leg segment. Distal legs very long, strong, in young larvae about as long as, in mature ones slightly shorter than half of their basal distance. Femur and ti subequal in length, esp. former finely sclerotized (but very strongly so at base and esp. at femuro-tibial joint). Ptrs slightly longer than one-half of ti, much compressed, claw strong, crescent-shaped (Fig. 14E). Abd spir extremely large, first one only slightly smaller than mesoth spir. Ninth tergum broadly rounded, carm absent. Apl glabrous (!) and without distinct msp. Largest available larva 17 mm.

Three rather rare Palaearctic species known, one from Europe, two others from East Asia. See also general taxonomic chapter.

Pseudogaurotina excellens (BRANCSIK, 1874)

Host plant: *Lonicera nigra*; DEMELT (1966) lists *L. tatarica*. Larvae feed under bark of living branches, protected only by a very thin outer bark. Galleries of later instar larvae deeply engraved in the wood surface, and relatively restricted (the larva apparently feeds partly on the tissue by which the plant tries to heal the wound). Pupation in a shallow cavity under bark surrounded by wood fibres; one mature (but not praepupal) larva found in its pupal cell in September, pupation seems to occur in spring. Apparently three-year development. Adults on the host plant, apparently not visiting other flowers.

Distribution: Carpathian Mountains.

Material: 6. 9. 1980, CS, Slovakia, Kralovany, 9/−, *Lonicera nigra*, lgt. et coll. S; 13. 10. 1977, CS, Slovakia, Lower Tatras, Mlynná dolina, 1/−, *Lonicera nigra*, S. Bílý lgt., coll. Natn. Mus. Prague. Adults not reared, but seen on *Lonicera*-bushes on both localities, absolutely no doubt about determination.

Genus *Gaurotes* LECONTE, 1850

Type species: *Rhagium cyanipenne* SAY, 1824 (monobasic). North America, larvae available and covered by the following generic description.

Body white or yellowish, extremely depressed, with sparse long very stout ferrugineous setae.

Head very little retracted (Fig. 15E). Cr (Fig. 15K) strongly transverse (about 1.6−1.7), extremely depressed (2.6−3.1), widest at middle, almost as broad as proth, entirely yellow-orange to ferrugineous. Ecr at most finely rugose, with very sparse stout setae, one strong adfrontal seta very close to fl. Sides moderately roundly convex, both ecr halves touching in one point, hind margins include an obtuse angle.

Fl very sharp, ± S-curved, in mature larvae ending in ant openings, abruptly curved before them due to strongly depressed cr. Tfl sharp, very distinct, discernible even in fairly young larvae, narrowly interrupted, in mature larvae ± connected in front of shortened mfl; often with distinct posterior branches. Pof ± flat, often finely obliquely grooved, only main pair of setae present, rather short, in or even slightly behind middle. Prf ± flat, finely transversely grooved, ± darker than pof, setae 2, 1, 1 (rarely 2), first pair very small. Epmg ± straight, feebly sclerotized except for dark md articulations, medially flat, ± in same plane with cl, epmg/cl border not very sharp. Six eps, medial pair slightly shifted backwards and very small. Mfl very dark, in later instars shortened anteriorly, in mature larvae ± absent from prf.

Cl broad, flat, almost unpigmented, abruptly tapering, extended laterally. Lbr moderately large, transverse, ± oval, flat, basal margin narrowly sclerotized, anterior margin with several longer and numerous short setae, discal pair long, stout, ± isolated. Hind eph region very broad, almost not raised, with ± distinct medial sclerotized area and long anterior transverse row of minute tooth-shaped sensilla. Tormae

long, slender, running backwards along sides of hind region. Anterior region with setae sparse, reaching about bases of tormae level.

Plst narrow, dark ferrugineous, moderately raised, smooth, sfp absent. Gena relatively smooth, usually ± broadly darkened. All six pairs of stemmata present (or ventral two mstm ± fusing), extremely large. Mstm strongly convex, dstm and vstm usually not smaller, less convex and with less conspicuous pigment spots.

Vs (Fig. 15C) moderately long (about 2.7–3.6), almost flat, not darker than ecr. Anterior margin shallowly broadly emarginate, flat, sclerotized except for middle of gula, in gular region not very distinctly separated from lmx base. Hypl dark, moderately broad, ± straight, subparallel or at most very slightly diverging, not reaching pocl. Mtt short, broadly separate, very far from at most very slightly darkened hind margin. Gula at most feebly raised, mgl extremely narrow, ± reaching anterior margin. Gula may bear one ± distinct seta on each side, or setae absent.

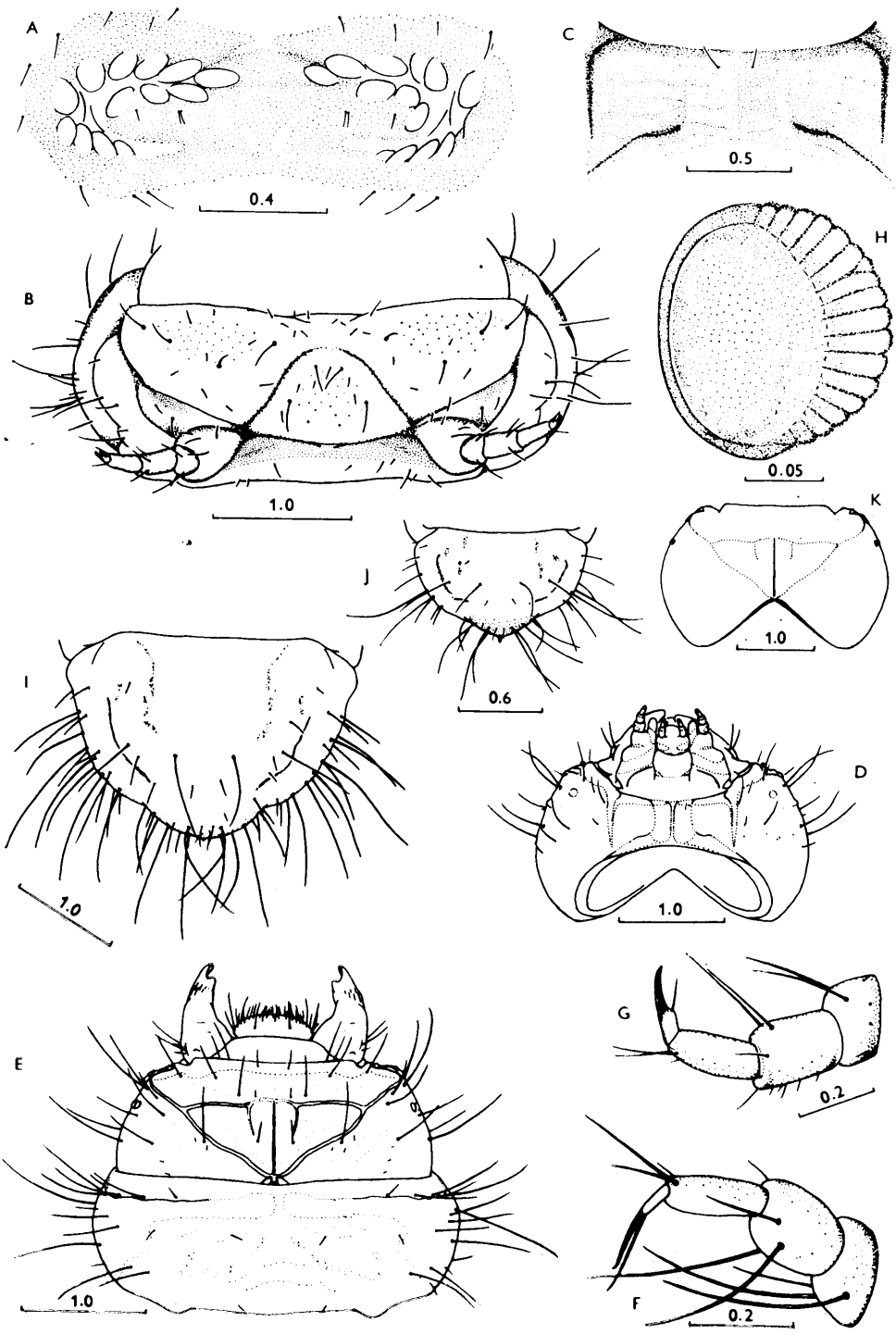
Ant miniature, almost not projecting from cr, not much retractile, second segment extremely reduced, unsclerotized, practically incorporated in apical region of segment 1 (like in *Acmaeops*, Fig. 17B). Third segment very small, without its sensilla shorter than elongate main sensillum. Ant ring heavily sclerotized.

Md type I, extremely variable in shape, long to extremely long, slender (Fig. 15E), apically blunt, cutting edge very short, ± emarginate, two blunt inner keels. Border zone ± striate, basal part relatively smooth, with two strong setae and often one or several miniature ones at dorsal main seta.

Lmx moderately large (Fig. 15D), flat, with very sparse setae. Base finely sclerotized, submentum poorly separated from connecting lobes, cardo relatively small, with minute seta. Distal maxilla slender, pgmx very large, with broad basal spot and without usual ventral pigmentation. Mala cylindrical, bearing sparse very stout setae, with distinct oblique sclerotized band. Pamx long, slender, segments subequal in length, third slender, sclerotization of segment 1 ventromedially interrupted. Distal labium broad, mt with distinct transverse basal spots, pglb pigmentation broadly separate, prlb basal apodeme usualy ± pigmented, palb moderately long, separated by about twice their width or more, ligula broad, with about four ventral setae, narrowly fringed with short microtrichia, dorsal setae absent.

Proth broad, short (Fig. 15E), much depressed. Pn in later instars relatively smooth, in mature larvae finely sclerotized, with one pair of minute discal setae. Protergal band narrow, yellow, occasionally almost absent from pn, without anterior notches, al broadly sclerotized. Lfur absent. Lpst, mpst and epl anteriorly in later instars finely sclerotized. Each lpst half usually with 5 setae in a transverse row. Mpst

Plate 15: A - *Pseudogaurotina excellens*, fifth dorsal ambulatory ampulla. B - *P. excellens*, prothorax, ventral view. C - *Gaurotes ussuriensis*, ventral sclerite. D - *G. virginea*, head, ventral view (labiomaxillary setae omitted). E - *G. virginea*, head and prothorax, dorsal view. F - *G. ussuriensis*, right fore leg, anterior view. G - *G. virginea*, left hind leg, anterior view. H - *G. virginea*, third left abdominal spiracle. I - *G. virginea*, mature larva, end of abdomen with caudal spine (particularly small in this specimen), dorsal view. J - *G. virginea*, half-grown larva, end of abdomen with caudal spine, dorsal view. K - *G. virginea*, shape of cranium, dorsal view.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anteriorly broadly rounded, with four stronger and 2–4 minute setae. Msp indistinct, restricted, may be present on stlf and medial cxst.

Meso- and metanotum non-granulate, praescutum and scutum mspte. Al strongly protuberant. Mesoth spir moderately to very large, broadly oval, with up to 25–30 large to very large mgch. Metath spir small yet distinct. Sterna granulate (mesosternum less distinctly so), msp usually at least on coxae and episternum, often ± continuously along whole granulate area. Coxae well defined, rather prominent.

Legs (Figs 15F, G) relatively long, broadly separate and thus distinctly shorter than one-half of their basal distance, bearing sparse setae. Trch large, bearing several setae, basal ring medially interrupted. Femur slightly shorter than ti, both at most very finely sclerotized, ptrs slightly shorter than ti, not or moderately compressed.

Seven flat distinctly granulate aa, granules smooth, seventh aa slightly reduced in size. Daa with msp much restricted, at most along anterior and lateral margins and narrowly on scutal plate, sometimes completely lacking. Anterior transverse line indistinctly doubled or, esp. on posterior segments, simple. Abd spir distinctly smaller than mesothoracic ones, very broad, particularly in *Carilia* with very large numerous mgch (Fig. 15H). Plt relatively smaller (Fig. 14G), oval, abruptly protuberant, with 2–3 long and 2–3 shorter setae. Vaa with msp at least along anterior margin. Ninth tergum with caudal spine on broad short finely sclerotized base; spine relatively large in young larvae (Fig. 15J), in mature ones small to minute (Fig. 15I) with very short base; nevertheless, I have seen not a single specimen without caudal spine. Atu short, moderately broad, posteroventral, apl with very few miniature setae, esp. in *Carilia* with distinct msp.

Three Palaearctic species available.

1 (2) Ventral sclerite in later instars longer (3 and less, Fig. 15D). Praetarsus distinctly compressed, claw strong, curved (Fig. 15G). Spiracles with very large marginal chambers (Fig. 15H) (sg. *Carilia* MULSANT, 1863) ..... *virginea*

2 (1) Ventral sclerite shorter (about 3.3–3.7, Fig. 15C). Praetarsus slender, not compressed, claw needle-shaped, at most slightly curved, somewhat similar to *Acmaeops* s. str. (Fig. 15F). Spiracles with marginal chambers smaller (sg. *Paragaurotes* PLAVILSHCHIKOV, 1921).

3 (4) Far East islands incl. Japan ..... *suvorovi*

4 (3) Mainland East Asia ..... *ussuriensis*

Gaurotes (Carilia) virginea (L., 1758)

Main characters in the key. Cr dark orange-ferrugineous, very strongly depressed (about 3 in mature larvae), strongly shining, only ventral face poorly microreticulate, anterior cr angles more prominent, making cr more quadrangular (Fig. 15K). Stemmata large, mstm abruptly protuberant, with large black pigment spots. Mtt slits pigmented. Msp more distinct and on average more widespread, daa often with

msp at anterior angles, vaa usually with msp present also behind second row of granules. Length up to 18 mm.

Host plants: *Picea*. CHEREPANOV (1979) lists from Siberia also *Pinus*, *Abies* and *Larix*. Larvae under loosen bark (often with galleries of bark beetles) of dead stems or branches, avoid too moist situations. Two-year development, before the second overwintering the larvae drop on the ground and overwinter in the soil where pupation occurs the next spring. Adults on flowers.

Distribution: Europe, Siberia, Far East (absent from islands except Sakhalin).

Material: 1976–1980, CS, Slovakia c. (various localities), about 20/I, *Picea*, lgt. et coll. S.

Gaurotes (Carilia) kozhevnikovi PLAVILSHCHIKOV, 1915

Larvae not available. Described by CHEREPANOV (1979), apparently extremely similar to the preceding species, differences mentioned by CHEREPANOV have not been confirmed on my larvae of *G. virginea*. The main difference listed (pale unpigmented caudal spine in *G. kozhevnikovi*) may work in a portion of larvae, but the form and degree of sclerotization of the caudal spine in *G. virginea* have prooved extremely variable.

Host plant: *Pinus*. Habits similar to *G. virginea*.

Distribution: Far East (Ussuri-region, NE China, Korea).

Gaurotes (Paragaurotes) ussuriensis BLESSING, 1873

In addition to the key differences, cr (and all body pigmentation, e.g. spir) on average paler, yellow to orange, cr usually less depressed (about 2.8), ecr ventrally ± distinctly microgranulate. Mstm slightly less prominent, pigment spots smaller. Md usually extremely long, apical part flat, very large, cutting edge usually less emarginate, or not at all. Msp more restricted, usually absent from daa and behind second row of granules on vaa. Largest available larva 19 mm.

Host plants (CHEREPANOV, 1979): *Juglans* (preferred), *Ulmus*, *Acer*, *Quercus*, *Padus*, *Armeniaca*, *Alnus*. Habits seem similar to *G. virginea*.

Distribution: Far East (Amur-Ussuri region, NE China, Korea), absent from islands.

Material: 1964–1979, SU, Ussuri region, 14/–, *Juglans*, *Fraxinus*, *Phellodendron*, lgt. B. M. Mamaev, A. V. Kompantsev and D, coll. IS. Adults not reared, determined by elimination and according to CHEREPANOV, 1979; almost no doubts.

Gaurotes (Paragaurotes) suvorovi SEMENOV, 1914

Extremely similar to *G. ussuriensis*, no reliable morphological differences found, those cited by CHEREPANOV (1979) completely covered by individual variability. Frons anteriorly always ± roughly very distinctly microgranulate. Mtt very poorly pigmented, slit itself usually ± pale (in available larvae of *G. ussuriensis* usually pigmented). Largest available larva 19 mm.

Bionomics (CHEREPANOV, l.c.): Larvae in *Acer, Sorbus, Alnus, Quercus, Salix, Ulmus, Betula* (our larvae also from *Padus*). Habits similar to other species.

Distribution: Far East islands (Sakhalin, South Kuriles, Japan). Treated by some authors as a subspecies or a mere form of Japanese *G. (P.) doris* BATES, 1884 (e.g. HAYASHI, 1980).

Material: 1972 and 1977, SU, Kurile Islands, Kunashir, 11/–, *Padus, Ulmus, Alnus*, lgt. B. M. Mamaev, A. V. Kompantsev and D, coll. IS. Adults not reared, determined by elimination.

Gaurotes (s. str.) *cyanipennis* (SAY, 1824)

The type species; larvae generally similar to Palaearctic species, particularly to *Paragaurotes*. Cr very distinctly microgranulate, anterior angles less prominent, more rounded. Stemmata and vs similar to *Paragaurotes*. Claw intermediate. Spir on average smaller, mgch as in *Paragaurotes*. Despite the key in CRAIGHEAD (1923: 82), caudal spine present, although very small (as in most other species). Largest available larva 20 mm.

Habits (judging from CRAIGHEAD, l.c.) similar to other species, larvae in deciduous trees, particularly *Juglans*, pupate in the soil.

Distribution: North America.

Material: Three larvae from eastern USA (Virginia, Ohio), coll. U.S. Natn. Museum (Washington, D.C.), and Ohio State University (Columbus).

Genus *Acmaeops* LECONTE, 1850

Type species: *Leptura proteus* KIRBY, 1837 (CASEY design., 1913). North America, larvae available and covered by the following generic description.

Similar to *Gaurotes*, main differences as follows:

Body setae sparse to moderately dense, pale to bright ferrugineous.

Cr (Figs 16A, C, D, 19A) extremely transverse (about 1.7–1.9). Ecr with sides abruptly protuberant, esp. in *A. marginatus* almost angulate. Hind cr notch obtusely angulate, in *A. pratensis* more rounded. Anterior cr opening proportionally narrower, cl, lbr, md and lmx much smaller (cf. Figs 19A and 15D). Eph setae hardly reaching bases of tormae level, microtrichia longer and reaching farther onto anterior region (Fig. 19C; in *Gaurotes* almost restricted to sides of posterior region). Lower two mstm in *Gnathacmaeops* not fusing. Vs smaller, relatively longer (2.3–2.7), hypl more often slightly diverging, sometimes indistinctly reaching pocl. Mtt very small. Vs usually devoid of setae.

Md extremely variable, on average not so blunt apically, cutting edge always deeply emarginate. Lmx small, base in some species almost unsclerotized, prlb basal apodeme usually unpigmented, palb separated by about 1.5–2 times their width, ligula on average narrower, with microtrichia longer.

In *Gnathacmaeops*, proth sclerotization very poor and procoxae well defined, prominent, ± separate from sternal part of cxst.

Meso- and metanotum differ in *A. pratensis* (see species key). Spir on average slightly smaller. Pterothoracic coxae in *Gnathacmaeops* abruptly prominent. Legs differ strongly in both subgenera (see species key). Plt extremely large (Fig. 19D), broadly oval, with numerous setae (more than 10 setae not infrequent). Caudal spine absent, ninth tergum, however, in most species with ± distinct posterior prominence suggesting spine base of *Gaurotes* (e.g. Fig. 16A). Apl bearing short fine setae, in *Gnathacmaeops* nearly glabrous.

Larvae of five Palaearctic species available.

1 (6) Legs moderately long, similar to *Gaurotes* (esp. *Paragaurotes*), distal hind legs shorter than half of their basal distance, claw slender, not distinctly compressed or sickle-shaped (Fig. 16G). Later instar larvae with lower two main stemmata ± fusing (Fig. 17B) (*Acmaeops* s. str.).

2 (3)! Posterior frontal angle short, very broad, postfrons more strongly transverse (width/medial length ratio about 2.4), cranium always very strongly transverse, sides abruptly protuberant to somewhat angulate (Fig. 16D). Ninth abdominal sternum with up to 10 setae on each side ..... *marginatus*

3 (2)! Posterior frontal angle more prominent, postfrons less transverse (about 2.1 – 2.2, rarely up to 2.3), cranium usually less transverse, with sides not so abruptly protuberant (Fig. 16C). Ninth abdominal sternum in later instars with 10 or mostly more setae on each side (Fig. 16E).

4 (5)! Anterior dorsal ampullae with distinct microspines along anterior margin and on scutal plate, anterior ventral ampullae with microspines along both anterior and posterior margin ..... *?angusticollis*

5 (4)! Scutal plates and hind margin of ventral ampullae without microspines ..... *septentrionis*

6 (1) Legs extremely long (Figs 16A, 19B), praetarsus hardly half as long as tibiotarsus, claw compressed, sickle-shaped. Two lower main stemmata separate (sg. *Gnathacmaeops* LINSLEY et CHEMSAK, 1972).

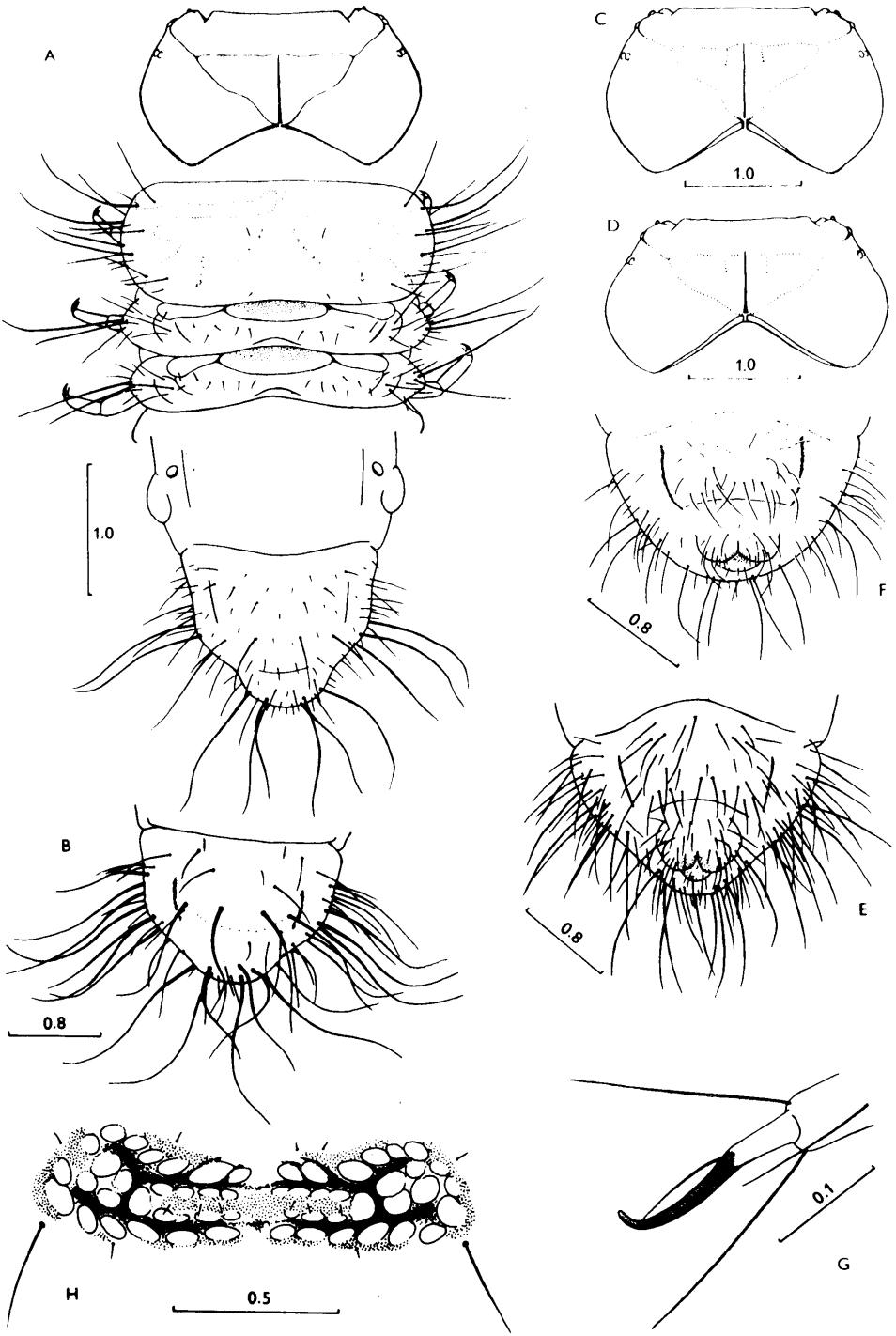
7 (8) Meso- and particularly metathoracic scutum almost to completely devoid of microspines, and with several granules along praescuto-scutal lines. Long body setae few, other setae much shorter (Fig. 16A) ..... *pratensis*

8 (7) Meso- and metathoracic scutum anteriorly largely microspiculate, without granules. Short and long body setae not differing so sharply (Fig. 16B) ..... *brachypterus*

Note: Larvae of *A. proteus* (KIRBY, 1837) (the type species) are extremely similar to Palaearctic species of *Acmaeops* s. str., particularly *A. septentrionis*. Two larvae available, coll. Great Lakes For. Res. Centre, Sault Ste Marie, Ontario, Canada. Described also by GARDINER (1954).

Acmaeops (s. str.) *septentrionis* (THOMSON, 1866)

Main characters can be extracted from the key. Body with rather dense long stout ferrugineous setae, ninth abd sternum in later instars with more than 12 setae on each half (Fig. 16E). Cr poorly microreticulate, usually (but not always) less transverse (about 1.7), less depressed (about 2.8). Posterior cr notch distinctly angulate. Proth sclerotization more distinct, pn in later instars with distinct orange anterior band, proth al strongly sclerotized. Pterothoracic scuta with large anterior mspte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areas. Plt with greater number of long setae. At least vaa often with msp (but much restricted, see key). Apl with short distinct setae. Length up to 18 mm.

Host plants: *Picea*. CHEREPANOV (1979) lists *Pinus* and *Larix* from Siberia! Larvae under ± loosen bark of dead standing or falles stems, habits similar to *Gaurotes virginea* (larvae have been once found together with the latter species). According to CHEREPANOV (l.c.), most larvae spend the second winter in their soil pupal chambers, but some leave the host as late as the next spring.

Distribution: North and montane Central Europe, Siberia to Far East, some Far East islands (Sakhalin, ??Japan - see note under *A. marginatus*).

Material: 3. 8. 1956, Sweden, Norbotten, Overkalix, 2/I, *Picea*, T. Palm lgt., coll. S; 1977 to 1979, CS, Slovakia c., Lower Tatras (Lipt. Hrádok and Donovaly), 9/I (part), *Picea*, lgt. et coll. S.

Acmaeops (s. str.) *smaragdulus* (F., 1792)

Larvae not available, described by CHEREPANOV (1979), apparently very similar to *A. septentrionis*. I must have seen larvae of this species in undetermined series from Siberia, but I am unable to distinguish them from the latter species. Given length: Up to 14 mm, may be undoubtedly larger.

Host plants: Apparently all four principal Pinaceae (*Picea, Abies, Pinus, Larix*). Habits similar to *A. septentrionis*.

Distribution: North Europe (and rarely also from the Alps), Siberia to Far East (not in Japan).

Acmaeops (s. str.) *marginatus* (F., 1781)

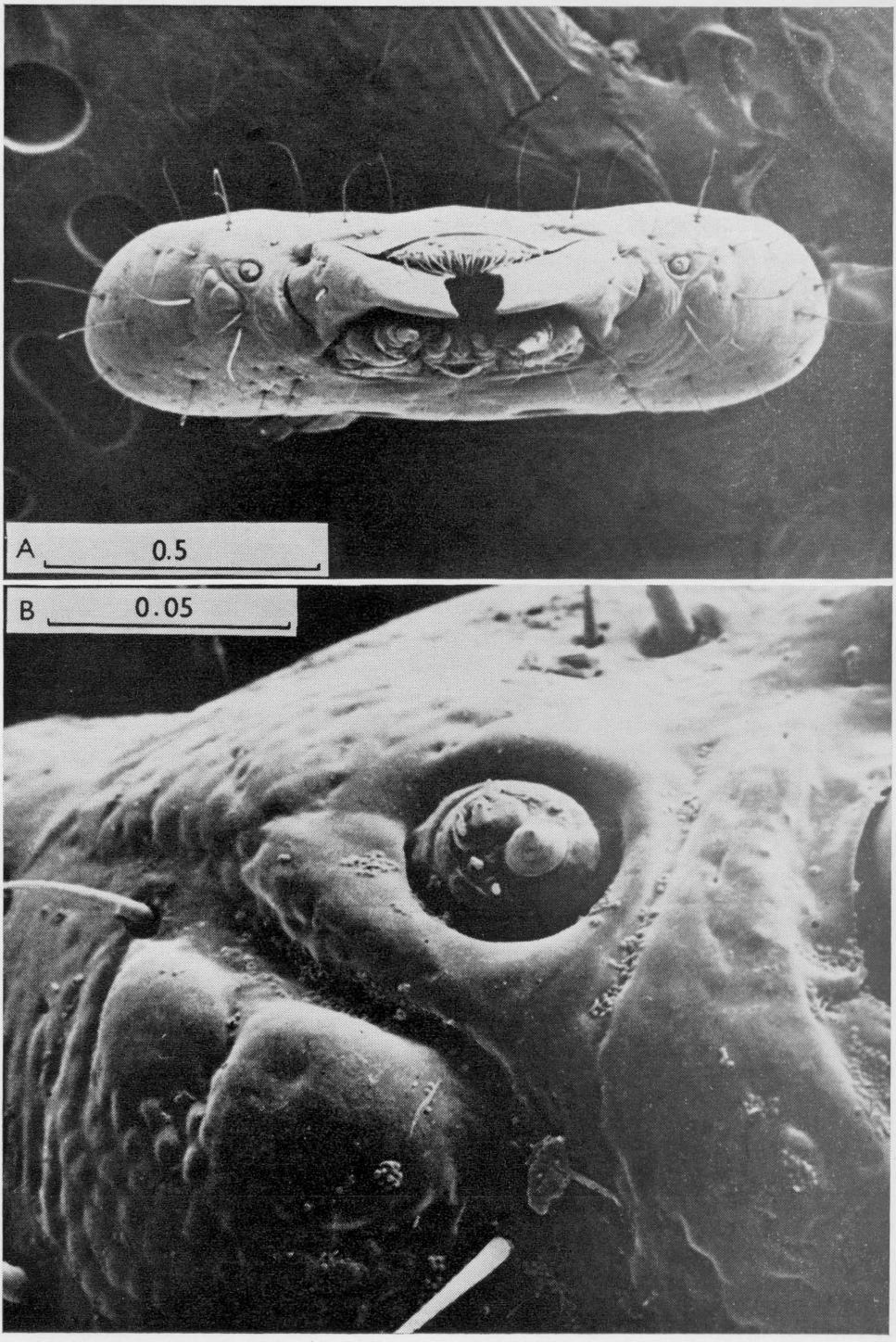
Main characters in the key, additional differences from *septentrionis* as follows: Setae slightly sparser. Cr in later instars usually more transverse (about 1.9) and depressed (about 3, Fig. 17A). At least some anterior daa usually with small restricted mspte areas, esp. at anterior margin. Pterothoracic sterna and at least some anterior vaa usually with ± distinct msp also posterior to second row of granules. Length up to 19 mm.

Host plants: *Pinus*, rarely *Picea*. Habits similar to the preceding species. Larvae have been found also in thicker dead branches of living trees. The present author has found this species usually in spots with distinct subcortical fungus growth, and almost never in lower stem regions with thick bark.

Distribution: Europe except South, Siberia to Far East incl. some islands (Kunashir according to CHEREPANOV, 1979). Some authors mention this species from Japan (KOJIMA et HAYASHI, 1969), others list *A. septentrionis* (HAYASHI, 1980). Evidently the same species occurs in Hokkaido

◀

Plate 16: A - *Acmaeops pratensis*, shape of cranium (upper), thorax (middle), and end of abdomen (lower), dorsal view. B - *A. brachypterus*, end of abdomen, dorsal view. C - *A. septentrionis*, shape of cranium, dorsal view. D - *A. marginatus*, dtto. E - *A. septentrionis*, end of abdomen, ventral view. F - *A. ?angusticollis*, dtto. G - *A. septentrionis*, left middle praetarsus, medial view. H - *Dinoptera collaris*, second dorsal ambulatory ampulla.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and South Kuriles, but there is apparently some uncertainity as to which one of the two. It seems also strange that CHEREPANOV (l.c.) found the larvae of *A. septentrionis* mostly in *Pinus* and *Larix* - in Europe, as far as I know, they have been always found in *Picea*. The classification and distribution of these two species apparently need further study.

Material: 1977–1984, CS, Bohemia c., Neveklov env., +/1, *Pinus*, lgt. et coll. S; 26. 10. 1980, CS, Praha-Zbraslav, 1/–, *Pinus*, lgt. et coll. S; 1968, SU, Saratov region, Khopër Nat. Res., 1/–, *Pinus*, N. B. Nikitsky lgt., coll. IS.

Acmaeops (s. str.) *?angusticollis* (GEBLER, 1833)

In addition to the key differences, differs from *A. septentrionis* as follows: Setae distinctly finer, ninth abd sternum in available larvae with 10–19 setae on each side. Posterior margin of ninth tergum broadly rounded (Fig. 16F), almost without spine-base-like prominence (which is usually more pronounced in all other species - Figs. 16A, B, E). Msp occupy even larger area than in most *marginatus* (see key). Ptrs base may be slightly compressed. Length up to 14 mm.

Habits (CHEREPANOV, 1979): Oviposition in bark crevices on stems and branch bases of dying or freshly fallen trees, *Pinus sibirica* preferred. Larvae under bark, feeding on phloem tissue. Two-year development, pupation in spring under the bark, pupal cell shallowly impressed on the wood surface, surrounded by fibrous shavings. Flight mid-June to August. Thus, this species differs markedly from all others by feeding in fresher trees and pupation in the food material.

Distribution: Siberia (incl. Mongolia and North China), Soviet Far East, Korea, Sakhalin.

Material: SU, lake Baikal, Irkutsk, 5/–, from a series of *Acmaeops*-larvae taken from *Pinus sibirica* and *Picea*. Adults not reared, larvae associated tentatively with *A. angusticollis* because of their small size (two of them evidently mature), and because they differ slightly from both *A. marginatus* and *A. septentrionis* (see note under *A. smaragdulus*). They agree with the larvae of *A. angusticollis* figured in CHEREPANOV (l.c.) by the broadly rounded ninth abdominal tergum, although they differ in the number of setae on sternum 9.

Acmaeops (Gnathacmaeops) pratensis (LAICHARTING, 1784)

Main characters in the key. Body in some specimens with very fine marginal greyish shade. Ninth abd sternum bearing sparse short thin setae. Cr both dorsally and ventrally relatively distinctly microreticulate, dull; much depressed (usually about 3). Posterior cr notch ± rounded medially (Fig. 16A), only in younger larvae angulate. Proth pigmentation very pale, pn almost without anterior pigmented band. Distal legs much longer than half of their basal distance, bearing relatively very short sparse setae, ti and esp. femur in later instars finely sclerotized. Plt (in agreement with other body setae) with two strong long setae, other setae very short and thin. Aa devoid of msp. Apl almost glabrous. Largest available larva 11 mm.

Host plants: *Picea, Pinus*. Judging from the published data (PALM, 1956; CHEREPANOV,

◀

Plate 17 (scanning electron micrographs): A - *Acmaeops marginatus*, head, anterior view. B - *A. marginatus*, right upper pleurostoma, antenna and main stemmata, anterior view.

1979), the habits are similar to most other *Acmaeops*-species, but larvae under very loosen bark with galleries of other subcortical insects, the gallery of the *Acmaeops*-larva itself may be rather indistinct. PALM (l.c.) compared larval habits with those of some subcortical "Malacodermata" (Cantharoidea + Cleroidea), but the comparison concerns only general appearance and type of progression (although the larvae may certainly devour on occasion other subcortical insects, as usual in many Cerambycid larvae) - the larvae are apparently very active, capable of caterpillar-like movements when removed from the gallery (as are also some other Lepturinae incl. all *Acmaeops*--larvae I have seen alive), and using their long legs for locomotory purposes. Development lasts apparently two years, pupation in soil.

Distribution: Holarctic. In Palaearctics - coniferous forests from North and Central Europe to Far East (absent from Japan). Also listed for some more southern regions (Caucasus, Transcaucasia, even Syria), and through high mountains penetrates into Central Asia.

Material: 28. 5. 1961, Sweden, 1/?, *Picea*, label by State Forest Institute Stockholm, coll. M. Sláma; 17. 8. 1956, Sweden, Lapland, Arvidsjaur, 4/1, *Picea*, lgt. T. Palm, coll. S.

Acmaeops (Gnathacmaeops) brachypterus K. et J. DANIEL, 1899

Similar to *A. pratensis*, main differences in the key. Available larvae without greyish body shade. Posterior cr notch angulate. Proth pigmentation even less distinct, al only very feebly sclerotized. Legs even slightly longer (Fig. 19B), femur and ti unpigmented, ptrs relatively larger. Largest available larva 14 mm.

Host plant: Larvae found under bark of dead branch (several cm in diam.) of a living tree of *Picea tianshanica*. Apparently two-year development (adults collected on the surrounding vegetation). Pupation unobserved.

Distribution: Central Asia.

Material: 7. 7. 1976, SU, Kirgizia, Frunze env., Ala Archa (2500 m.), 2/–, *Picea*, S. Bílý lgt., coll. Natn. Mus. Prague. Adults not reared, but almost no doubt about determination.

Genus *Dinoptera* MULSANT, 1863

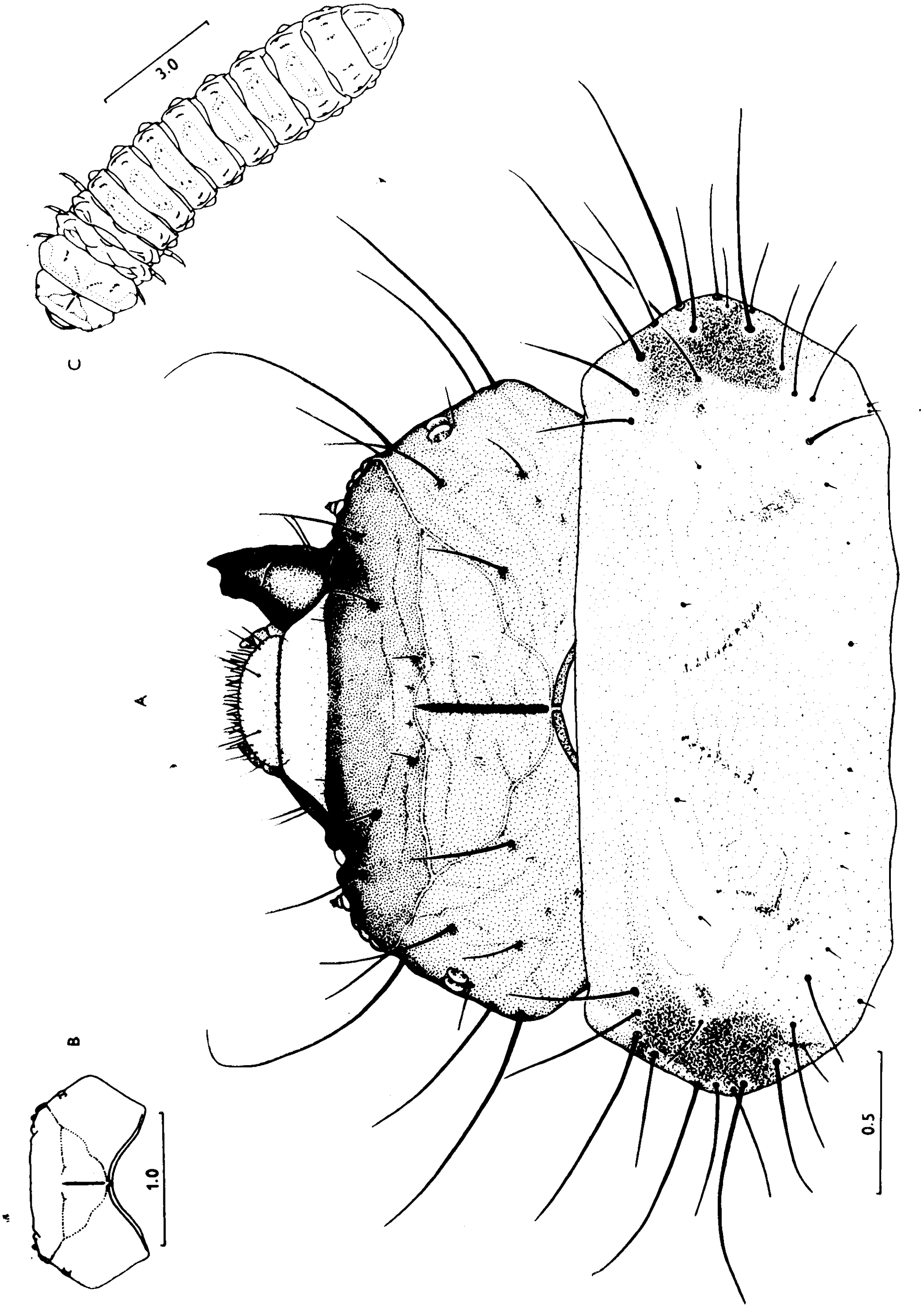
Type species: *Leptura collaris* L., 1758 (monobasic)

Similar to *Gaurotes* and particularly *Acmaeops*, differs from the former as follows:

Body yellowish, esp. marginally with very distinct greyish shade, short, broad, extremely depressed, integument tough, thoracic al and abd plt extremely protuberant (Fig. 18C), setae extremely sparse, reddish, dorsal and ventral ones almost eliminated, marginal setae extremely long and stout, all setae with distinct sclerotized basal rings.

Head (Fig. 18A) very characteristic. Cr (Fig. 18B) very strongly transverse (about 1.9), extremely depressed (about 3.4 in later instars), brightly ferrugineous, not microsculptured. Ecr entirely very distinctly rugose, sides angulate, hind dorsal margin arcuate. Fl strongly S-curved, indistinctly reaching anterior cr margin.

Plate 18: A - *Dinoptera collaris*, head and prothorax, dorsal view. B - *D. collaris*, shape of cranium, dorsal view. C - *D. collaris*, body shape, dorsal view.


A
B
C
3.0
1.0
0.5

Longitudinal pale pof lines often developed, pof setae miniature, borne from broad pits. Prf setae 1(−2), 1, 1, medial pair miniature or absent, second pair very small, esp. first three pairs lying in broad depressions. Epmg extremely flat, six very small eps (lateral pair unstable, occasionally lacking. Anterior cr opening and mouthparts similar to *Acmaeops*. Lbr small, half-elliptical, with relatively sparse pale marginal setae, discal pair isolated. Eph similar to *Acmaeops,* but setae restricted to anterior margin, microtrichia reaching yet farther onto anterior region. Stemmata extremely large, lower two mstm not fusing. Vs similar to *Acmaeops,* hypl diverging, mtt very broadly separate.

Third ant segment absent, ant practically one-segmented. Md moderately large, not extremely long. Lmx similar to *Acmaeops,* all pigmentation paler, mt very short and broad, third pamx segment long, slender, in mature larvae sometimes longer than segments 1 or 2. Palb separated by about twice their width.

Proth (Fig. 18A) with large brown-black spots on al, anterior margin (incl. pigmented band) with dense minute dark sclerotized dots (modified msp). Cxst and stlf devoid of msp.

Coxae and distal legs similar to *Acmaeops* sg. *Gnathacmaeops,* femur and ti strongly sclerotized. Pterothoracic al often with distinct mspte area. Spir very broadly oval, distinctly rimmed, mgch moderately large. Mesosternum almost not granulate, metasternum and vaa with two medially interrupted rows of granules, pterothoracic sterna and aa with relatively large somewhat variable extent of msp. Daa (Fig. 16H) with dividing pattern rather indistinct. Spiracular abd area distinctly protuberant. Carm absent, ninth tergum similar to *Acmaeops* (particularly *Gnathacmaeops*). Atu strongly ventral, apl ± glabrous, with msp, ventral two apl rather protuberant.

Larvae of two species known, one of them at my disposal.

Dinoptera (s. str.) *collaris* (L., 1758)

Length up to 12 mm.

Host plants: Polyphagous on deciduous trees, reliable records include *Quercus, Acer, Fraxinus, Populus, Cornus, Euonymus, Malus, Pirus.* Larvae live rather freely under very loosen not very thick dry bark of dead branches, exposed roots, thin dead stems etc., and are capable of crawling freely on the surface of various objects. Contrary to DUFFY (1953), I found larvae independently of any galleries of other insects, feeding on untouched phloem layer of the bark. Two-year life cycle, second winter spent in soil, pupation in spring. Adults are typical flower-visitors.

Distribution: Not quite clear. Europe except North, western Siberia, Caucasus, Transcaucasia, Asia Minor, Syria, Iran.

Material: 17. 8. 1960, SU, Voronezh region, Tellerman, 3/−, *Acer,* I. N. Lyamtseva lgt., coll. IS; 1979−1981, CS (several southern localities), 21/−, *Malus, Fraxinus, Euonymus, Cornus,* lgt. O. Pultar and S, coll. S. Adults not reared, larvae of this species cannot be mistaken for any other Central European Cerambycid.

Dinoptera (s. str.) *minuta* (GEBLER, 1832)

Larvae not available, described by CHEREPANOV (1979), apparently very similar to *D. collaris*. Antenna not described. Differs by stronger more pigmented setae and some other minute details. Geographically separated from *D. collaris*. Length up to 10 mm.

Host plants: *Acer, Fraxinus*. Habits similar to *D. collaris*.
Distribution: Amur-Ussuri region, NE China, Korea, Sakhalin, Japan.

Genus *Cortodera* MULSANT, 1863

Type species: *Grammoptera spinosula* MULSANT, 1839 = *Leptura humeralis* SCHALLER, 1783 (PLAVILSHCHIKOV design., 1936)

Body (Figs 19E, 20E) white or yellowish, short, broad, extremely robust, feebly to distinctly depressed, with moderately to very dense ferrugineous setae.

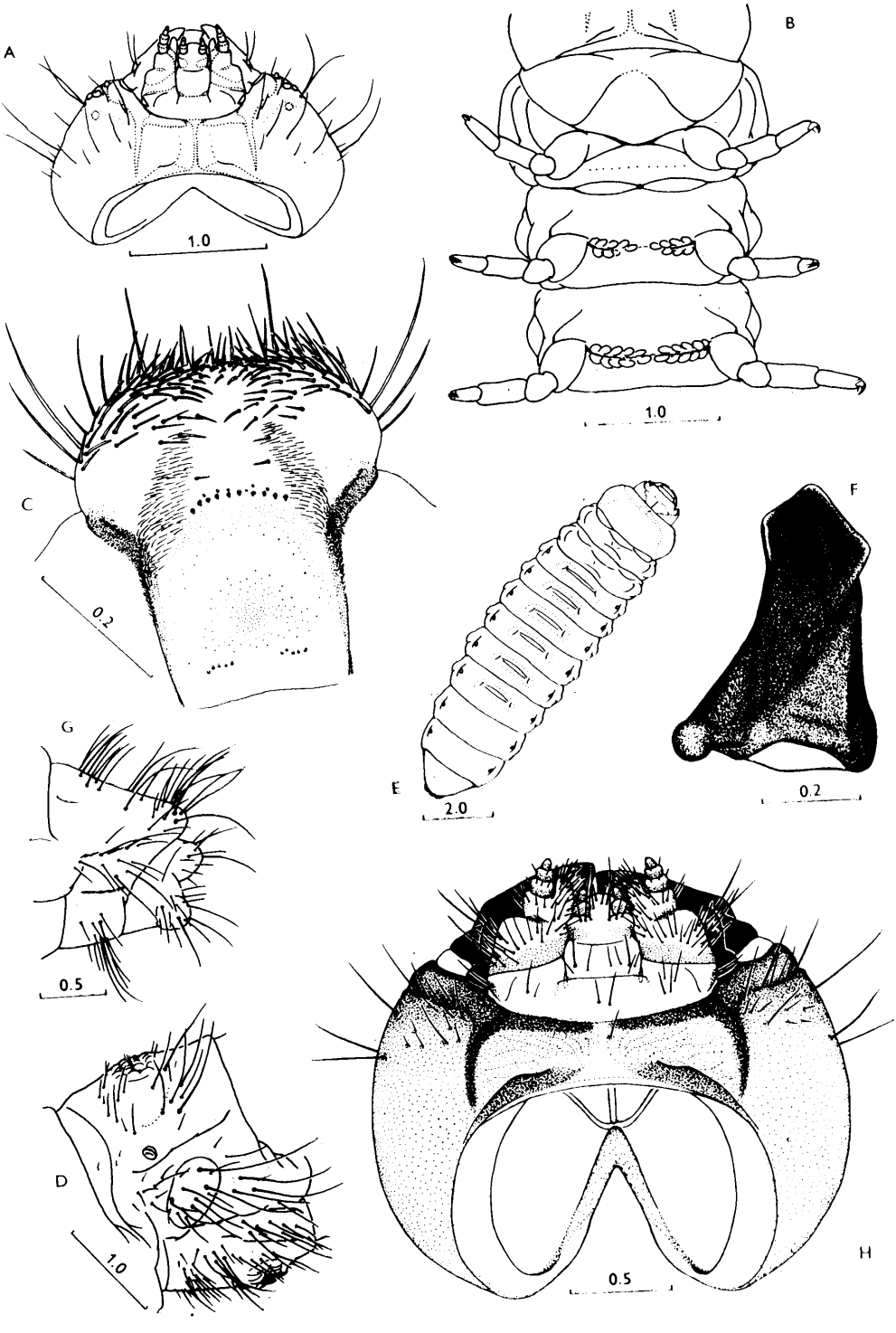
Head (Figs 19A, 20A, 21C, D) almost by half retracted. Cr slightly transverse (1.3–1.4), not much depressed (about 1.8–2.2), much narrower than proth, entirely orange to ferrugineous, widest usually slightly behind middle, almost not microreticulate. Ecr with very sparse anterior seta (despite often remarkable density of body setae), one strong adfrontal seta in fl, or shifted far into pof region. Sides very slightly convex or subparallel, both ecr halves very shortly fused (almost in one point in *C. humeralis* and *femorata*), posterior cr notch angulate, 90 degrees or less.

Fl sharp, ± S-curved, enter ant openings, may indistinctly reach anterior cr margin. Pof ± flat, finely rugose, with one ± discal pair of setae. Tfl sharp, in mature larvae ± connected before shortened mfl. Longitudinal pale pof lines often distinct, sometimes ± complete original frontal sutures present (Fig. 21C). Prf convex, uneven, slightly darker than pof, setae 2, 1, 1 and often 1–2 short supplementary ones. Epmg sclerotized, straight or very gently emarginate, ± abruptly obliquely declivous, sharply separate from cl. Six distinct eps, medial pair slightly separated from cl border.

Cl broad, short, almost flat, ± strongly tapering, basal half finely sclerotized. Lbr flat, ± strongly transverse, narrowly strongly sclerotized along base. Hind eph region broad, feebly raised, with ± distinct medial sclerotized area and anterior transverse row of six or more short to tooth-shaped sensilla. Tormae slender, extremely long, running backwards along sides of hind region. Anterior setae from moderately numerous to almost absent, microtrichia variable.

Plst not much sclerotized, moderately raised, sfp absent. Gena smooth, fine darker pigmentation about as wide as plst. One ± distinct mstm, dstm fusing or usually fused, lying almost behind mstm (not behind and above as usual). Vstm may be distinct.

Vs very short (about 4.5–7) yet slightly convex, not darker than ecr. Anterior


A
1.0
B
1.0
C
0.2
E
2.0
F
0.2
G
0.5
D
1.0
H
0.5

margin poorly raised, broadly sclerotized, gently emarginate. Hypl broad, reaching or almost reaching pocl. Mtt narrow, close to ± darkened hind margin. Gula not raised, mgl distinct, reaching anterior margin. Setae absent, or at most one pair in gular region.

Ant miniature, deeply retractile, almost without a more sclerotized raised basal ring. Second segment nearly completely reduced, third segment miniature or almost absent, main sensillum large (Fig. 20B).

Md type I, moderately long, border zone at most indistinctly striate, apex, dorsal angle and two inner keels blunt, apex sometimes ± double (Fig. 19F), cutting edge at most shallowly emarginate. Basal part at most finely transversely grooved, with two setae.

Lmx ± large, very robust (Fig. 19H). Base unsclerotized, cardo small, bearing distinct seta. Distal maxilla extremely short and robust, pgmx relatively small, with ventral pigmentation much restricted to absent, basal spot in later instars usually large. Mala and pamx short, former with sparse stout setae and with pigmentation restricted to medial spot, i.e. without ventral oblique pigmented band (unique in Lepturinae). Mt almost without basal spots (i.e. lateral sclerotization not reaching ventrally). Prlb basal apodeme may be pigmented, large pglb pigmentation ± broadly separated. Palb short, stout, separated by about 1.5–2 times their width, ligula broad, with very few (in some species often only two) ventral/apical setae, dorsal face glabrous, microtrichia usually restricted to dorsal margins, ± invisible in ventral view.

Proth small, narrow, at most as broad as other body segments (Fig. 20E), often much narrower (Fig. 19E). Protergal band without anterior notches, narrow to almost absent, al very finely sclerotized. Pn relatively smooth, often finely sclerotized, lfur absent. Lpst may be finely sclerotized, msp ± absent.

Pterothoracic nota with or without msp, metanotum (sometimes mesonotum as well) may bear several medial granules. Al almost not protuberant. Mesoth spir of medium size, broadly oval, with greater number of moderately large distinct mgch (up to about 40 particularly large mgch in *C. femorata*). Metath spir distinct. Sterna granulate, msp restricted to absent, bst at most poorly divided, coxae relatively well defined anteriorly.

Legs moderately long to very short, rather different in various species (Figs 21A, B), with sparse setae even in very hairy species. Trch with distinct basal ring and several setae. Femur always much shorter than ti, both may be very finely pigmented.

◀

Plate 19: A - *Acmaeops septentrionis*, head, ventral view (labiomaxillary setae omitted; epicranium in this specimen with sides more strongly protuberant than usual in this species, cf. Fig. 16C). B - *A. brachypterus*, thorax, ventral view (setae omitted; drawn from an extended specimen, segments normally more strongly transverse). C - *A. marginatus*, epipharynx. D - *A. septentrionis*, sixth abdominal segment from left side. E - *Cortodera humeralis*, body shape, dorsal view. F - *C. humeralis*, right mandible, medial view. G - *C. humeralis*, end of abdomen, lateral view. H - *C. villosa*, head, ventral view.

Ptrs shorter than ti, almost not compressed, claw slender, seta borne in proximal half.

Six dorsal and seven ventral granulate aa, seventh vaa moderately reduced. Daa with anterior transverse line not distinctly doubled. Abd spir with up to about 20 (30 particularly large in *C. femorata*) mgch. Plt large, oval. Carm absent, abd apex always very hairy, atu posteroventral, very short, broad, apl with numerous distinct setae.

A Holarctic genus, larvae of great majority of species unknown due to somewhat unusual habits which have been only recently discovered. Five species at my disposal.

1 (4) Ventral stemma present, with distinct pigment spot. Mandibular apex broadly doubled (Fig. 19F). Setae sparser, prothoracic latero- and mediopraesternum usually with 4–5 and 3 pairs respectively, or *(C. femorata)* only a few shorter supplementary setae present.

2 (3)! Posterior frontal angle less prominent, usually more rounded (Fig. 20A). Hypostomal lines at most slightly diverging, reaching or almost reaching postoccipital line. Pigmentation of labial palpigers separated by one width of second palpal segment or less ..... *humeralis*

3 (2)! Posterior frontal angle sharp, prominent (Fig. 21C). Hypostomal lines not reaching postoccipital line, usually more diverging. Pigmentation of labial palpigers separated by one width of second palpal segment or more ..... *femorata*

4 (1) Ventral stemma indiscernible (or at most small pigment spot may be present in very young larvae). Mandibles normal, or ventral one of two apical lobes very small. Setae very dense (Fig. 20E), both medio- and lateropraesternum in later instars with numerous setae.

5 (8) Body almost devoid of microspines, pterothoracic nota (at least in later instars) not microspiculate.

6 (7) Adfrontal setae lying ± in frontal lines. Both main and dorsal stemmata with distinct pigment spots. Transverse epipharyngeal row composed of at least 8 very short tooth-shaped sensilla ..... *?umbripennis*

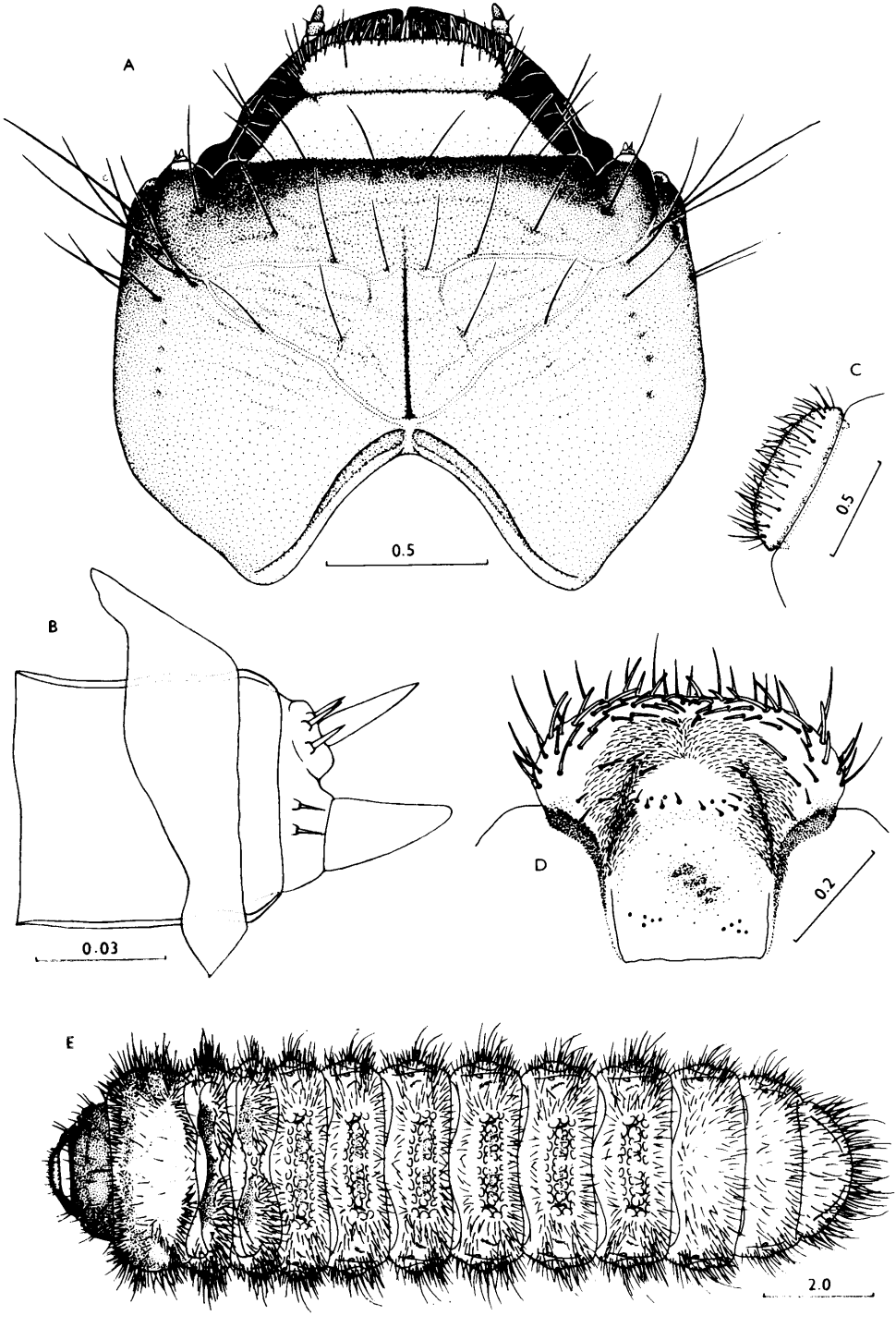
7 (6) Adfrontal seta in later instars moved ± deep into postfrontal region. Dorsal stemma almost without pigment, that of main stemmata not very distinct, composed of small often loose black granules. Transverse epipharyngeal row composed of six short (yet not tooth-shaped) sensilla ..... *holosericea*

8 (5) Body with distinct microspines, pterothoracic scutum largely microspiculate .... *villosa*

Cortodera humeralis (SCHALLER, 1783)

Main characters in the key. Integument very tough. Body in mature larvae very broad, distinctly more depressed (Fig. 19E). Setae moderately dense, stout, long, pn bearing one discal pair. Cr ± parallel-sided (Fig. 20A). Adfrontal setae ± in fl. Ecr halves fused almost in one point. Pof setae discal in position. Lbr very strongly transverse, ± cut anteriorly, discal setae isolated. Transverse eph row composed of

Plate 20: A - *Cortodera humeralis,* head, dorsal view. B - *C. humeralis,* left antenna, medial view. C - *C. villosa,* labrum. D - *C. villosa,* epipharynx. E - *C. villosa,* mature larva, dorsal view.


A
0.5
C
0.5
B
0.03
D
0.2
E
2.0

at least 8 tooth-shaped sensilla, anterior region with extremely sparse setae. All stemmata distinct, main one extremely large, facing anteriorly. Third ant segment almost absent (Fig. 20B). Basal prlb apodeme pigmented.

Pn finely sclerotized, with narrow yet continuous anterior band. Pterothoracic nota largely mspte. Legs moderately long, slender (Fig. 21A). Aa almost devoid of msp. Ninth abd segment in dorsal view ± conical, apl strongly protuberant, with stout setae (Fig. 19G). Length up to 13 mm.

Habits: Larvae found in *Quercus* and *Prunus*, but probably polyphagous on various hardwoods (it is often difficult to identify the food material). Larvae live in surface soil layer under trees and feed in buried twig fragments, shallow dead roots, one larva found in an old acorn; larvae usually change several times the food object. Apparently one-year development, pupal chamber constructed in autumn in the soil, pupation occurs very early in spring, pupal stage very short.

Distribution: Central and South Europe.

Material: 1979 – 1986, CS, Slovakia m., Kamenica n/Hr., 11/I, *Quercus* and *Prunus spinosa*, lgt. et coll. S.

Cortodera femorata (F., 1787)

Similar to *C. humeralis*, main differences in the key. Generally slightly less sclerotized. Body even in mature larvae not so markedly broadened at middle, subparallel, head relatively larger. Particularly in this species very often present ± complete longitudinal pof pale lines (Fig. 21C). Pigment spots of dstm and vstm smaller. Mgch particularly large and numeorus (see generic description). Ninth abd segment on average not so distinctly conical. Largest available larva 14 mm.

Habits were first discovered by B. Ehnström and S. Lundberg in Sweden (EHNSTRÖM et LUNDBERG, in press). The only food material so far known are spruce cones *(Picea)*. Larvae bore in central collumn and occasionally also in scale bases of older fallen cones, particularly of those partly buried in humus or fallen leaves. This also indicates that eggs are laid only after the cone has fallen from the tree. Pupation unobserved by me, but some indirect observations strongly suggest pupation in the soil. Apparently two-year development.

Distribution: Europe.

Material: 14. 7. 1966, Sweden, Uppland, Österåker, 1/I, B. Ehnström lgt., coll. S; 3. 4. 1973, Sweden, Östergötland, Simonstorp, 2/I, B. Ehnström lgt., coll. S; 1986 – 1987, CS, Bohemia c., Neveklov env., 24/ –, lgt. et coll. S.

Cortodera ?umbripennis REITTER, 1890

In many respects intermediate between *humeralis-femorata* and the other two species. Differs from *C. humeralis* as follows: Integument finer. Body less depressed, proth only in mature larva distinctly narrower than following body segments. Setae dense, most of them extremely short. Cr slightly less angulate anteriorly, ecr halves more broadly fused. Lbr slightly less transverse. Vstm indiscernible, mstm and dstm smaller yet both with distinct pigment spots. At most small supplementary tooth

below md apex. Prlb basal apodeme unpigmented. Pn almost without anterior pigmentation. Body practically devoid of msp. Legs extremely short and very robust (Fig. 21B), hind distal legs in mature larva hardly as long as one-fourth of their basal distance. Ninth abd segment shorter, not distinctly conical. Apl less protuberant, with shorter setae. Largest available larva 12 mm.

Host plant: Probably *Ranunculus*. Two half-grown larvae found in the soil of an alpine meadow (one was damaged, the other fed until mature and then preserved as well). The search for larvae was provoked by numerous adults (all females, the population probably parthenogenetic) of *C. umbripennis* sitting on *Ranunculus*-flowers on that spot. I was unable to find out what the larvae actually consumed in the nature, but the single intact larva readily consumed *Ranunculus*-roots, growing very rapidly. Judging from the half-grown larvae collected in July, the development of at least a portion of individuals at this elevation (over 2,000 m.) probably lasts two years.

Distribution: Caucasus, Transcaucasia, Turkey, Syria.

Material: 26. 7. 1979, SU, Caucasus, Cheget (about 2,700 m.) 2/−, lgt. et coll. S.

Cortodera holosericea (F., 1801)

Main characters in the key. Integument fine, body very slightly depressed, narrower. proth only in mature larvae narrower than following body segments. Setae very dense, but pn usually with one discal pair. Cr with sides gently convex, adfrontal seta ± deep in pof region. Ecr halves moderately broadly fused. Pof setae slightly shifted forward. Lbr less transverse, ± rounded anteriorly, with sparse short setae covering whole anterior half. Transverse eph row composed of six short yet not tooth-shaped sensilla, anterior setae more numerous. Pigment of mstm rather indistinct, dstm almost without pigment. Vestigial third ant segment present. Md normal. Basal prlb apodeme usually pigmented. Pn finely sclerotized, pigmented band very indistinct. Body ± devoid of msp. Legs just slightly longer than in *C. umbripennis*. Ninth abd tergum broadly rounded behind. Apl moderately protuberant, with short setae. Length up to 20 mm.

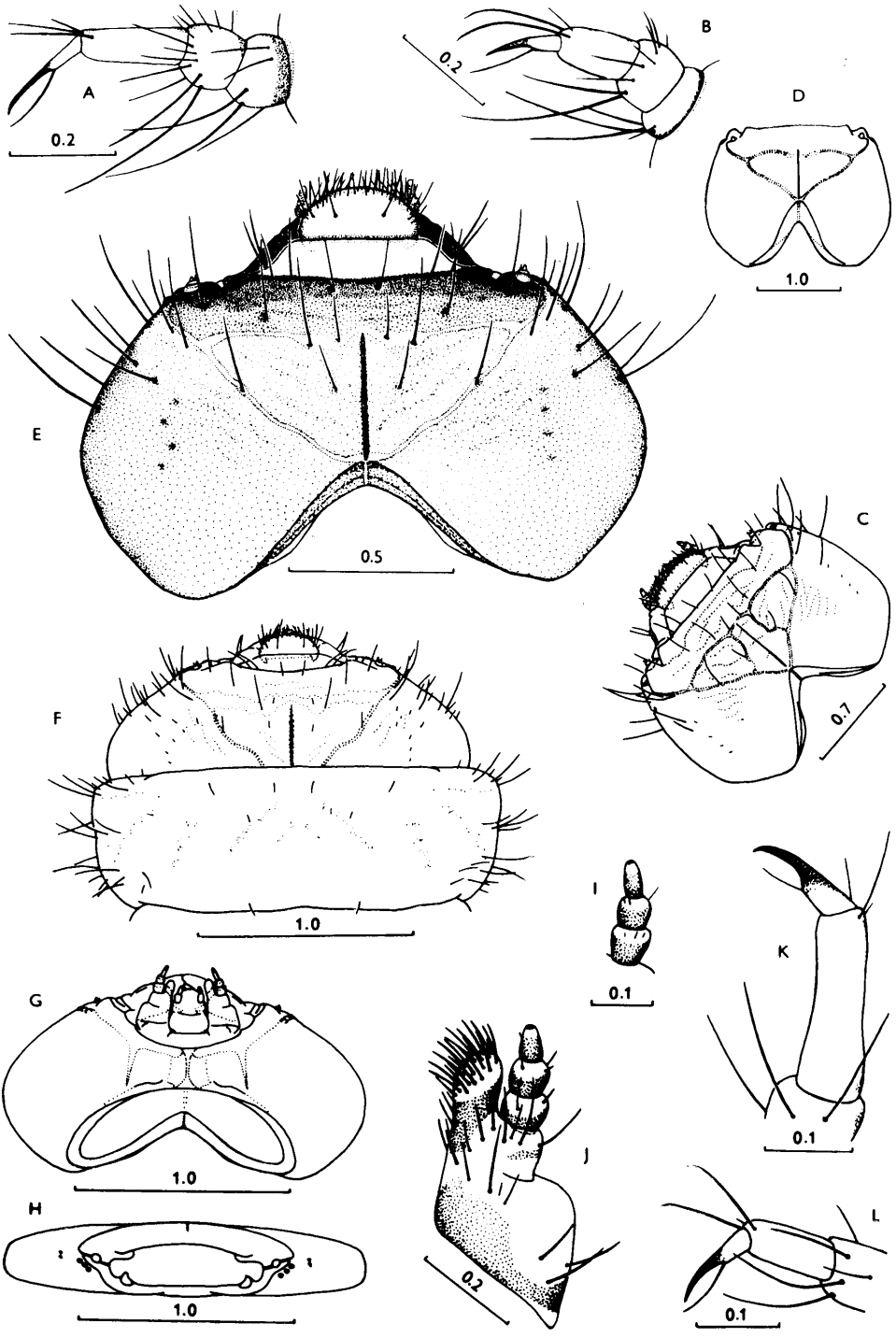
Host plant: *Centaurea triumfettii*. Larvae in roots, later instars probably in the soil. One-year development, pupation probably in the soil in spring (in breedings, larvae do not pupate in autumn). Adults on the host plant (observations by other collectors).

Distribution: SE Europe, reaching NE Italy, Austria, S Slovakia.

Material: July 1981, CS, Slovakia m., Plešivec, 11/−, *Centaurea triumfettii*, lgt. et coll. S; 20. 11. 1984, Italy, Marche, M. Catria, 8/I, *Centaurea*, G. Sama lgt., coll. G. Sama and S.

Cortodera villosa HEYDEN, 1876

Similar to *C. holosericea*. Proth and head larger (Fig. 20E), proth never considerably narrower than other body segments. Pn almost unsclerotized, often with more than two discal setae. Adfrontal setae always deep inside pof region. Lbr with setae more numerous (Fig. 20C). Anterior eph region with very sparse setae and two large


A
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B
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D
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E
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C
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F
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I
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K
0.1
G
1.0
H
1.0
J
0.2
L
0.1

narrowly fused areas of microtrichia (Fig. 20D). Pigment of mstm distinct, dstm usually with small pigment spot. Prlb basal apodeme unpigmented. Certain body areas mspte (pterothoracic scuta anteriorly, scutal plates of daa, at least anterior margin of vaa, inner lips of apl). Legs longer, slightly shorter than in *C. humeralis*, robust. Length up to 17 mm.

Host plants: *Centaurea jacea, C. stoebae.* Larvae in roots, advanced larvae may probably leave the plant and feed externally. Pupation unobserved, very probably in the soil. One-year development. Many larvae kept alive for rearing of adults appeared to be parasitized by larvae of the family Mermithidae (Nematoda).

Distribution: Generally similar to *C. holosericea.*

Material: 1979–1986, CS, Slovakia m., Štúrovo env., +/I, *Centaurea*, lgt. et coll. S.

Genus *Grammoptera* SERVILLE, 1835

Type species: *Leptura praeusta* F., 1787 = *Leptura ustulata* SCHALLER, 1783 (Westwood design., 1840)

Body white, elongate, strongly depressed, with sparse moderately long ± fine reddish to almost unpigmented setae.

Head less than by half retracted. Cr strongly transverse (about 1.6–1.7, more than 2 in *G. merkli*), strongly to extremely depressed (about 2.5–3, 4.5 in *G. merkli*), very slightly narrower than proth, yellow-orange to ferrugineous, may be very distinctly microgranulate, widest about or behind middle. Ecr bearing sparse moderately long setae, one adfrontal seta very close to (or right in) fl. Sides abruptly to extremely convex (Figs 21E, G, 22A, B) yet rounded, not angulate. Both ecr halves fused along a very short line, hind cr notch of 90 degrees or slightly more.

Fl distinct, sharp or somewhat diffuse about middle, ± straight. Pof flat, with one pair of setae (occasionally very short). Tfl present, ± sharp, in mature larvae connected before mfl. Prf darker than pof, short, at most very feebly convex. Setae 2, 1, 1, first pair short. Epmg flat, usually gently emarginate, very gently sloping, broadly not very deeply sclerotized (in *G. merkli* ± in same plane with cl, and almost not distinguished from prf). Six eps, medial pair pushed somewhat backwards. Mfl in later instars shortened anteriorly, in mature larvae restricted to pof.

Cl moderately broad, ± flat, abruptly tapering, almost unsclerotized. Lbr flat, transverse, oval to half-circular, with only narrow basal margin distinctly sclerotized, discal pair of setae isolated. Hind eph region broad, poorly raised, transverse row composed of short tooth-shaped sensilla. Tormae moderately long, oblique. Anterior

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Plate 21: A - *Cortodera humeralis*, right hind leg, anterior view. B - *C. ?umbripennis*, dtto. C - *C. femorata*, head, dorsal view. D - *C. holosericea*, shape of cranium, dorsal view. E - *Grammoptera ruficornis*, head, dorsal view. F - *G. merkli*, head and prothorax, dorsal view. G - *G. merkli*, head, ventral view (setae omitted). H - *G. merkli*, shape of cranium, anterior view. I - *G. ruficornis*, left maxillary palp, ventral view. J - *G. abdominalis*, left maxilla, ventral view. K - *G. ustulata*, right hind tibiotarsus and praetarsus, anterior view. L - *G. ruficornis*, dtto.

region with setae restricted to front margin, and with rather large paired areas covered with microtrichia.

Plst moderately raised, smooth, sfp absent. Gena ± smooth, finely pigmented around mstm. Six pairs of stemmata present, three mstm separate (Fig. 21H), with distinct pigment spots. Dstm and vstm much smaller, with at most small pigment spots, dstm often lie in a larger paler area.

Vs moderately long (3–4.5), feebly convex or flat, not darker than ecr. Anterior margin flat, gently emarginate, at least in hyp region broadly sclerotized. Hypl broad, diverging, almost reaching pocl. Mtt fairly distant from hind margin, latter broadly darkened. Gula almost not distinguished, mgl very distinct, reaching anterior margin (Fig. 22C). Several inconstant setae (usually one longer and some minute ones on each side).

Ant short (miniature in *G. merkli*), two-segmented, moderately retractile, ant ring not raised dorsally (except for *G. merkli*). Segments at most finely pigmented, segment 2 short, annular. Main sensillum large, elongate, one of remaining sensilla very long as well, although much more slender.

Md type I, md moderately long, variable, usually not very sharp, cutting edge ± emarginate, two blunt inner keels, dorsal one may be almost lacking. Border zone not striate. Basal part relatively smooth, two stout setae.

Lmx small (extremely so in *G. merkli,* Fig. 21G), flat, with very sparse setae. Lmx base at most very finely sclerotized, cardo moderately large, mostly with a short seta. Maxilla slender, pgmx large, with or without ventral pigmentation, basal spot lacking. Pamx long, relatively slender (Figs 21I, J), in *G. merkli* segment 3 much longer than others. Mala narrow, characteristically broadened apically, with oblique sclerotized band and sparse stout setae. Distal labium broad, mt with indistinct broadly separate basal spots, prlb basal apodeme unpigmented, pglb sclerotization broadly separate, palb moderately long, separated at base by 1.5–2 times their width. Ligula broad, short, with usually two ventral setae, apical and dorsal margins bearing ± long microtrichia.

Proth short, broad. Pn with anterior pigmentation very indistinct or almost absent, more distinct on al where with one obscure anterior notch; al feebly sclerotized. Pn finely rugose, with two discal setae, lfur absent. Lpst and mpst may be very finely sclerotized, former with up to about 10 setae on each side, latter usually bearing 4 stronger and 2–4 short setae. Msp ± absent.

Meso- and metanotum non-granulate, praescutum and scutum mspte. Al distinctly protuberant. Mesoth. spir. small, in some species very feebly sclerotized, with up to about 10 relatively large broad mgch. Metath spir well discernible. Sterna granulate along transsternal lines, msp often absent, or at most restricted and indistinct. Bst poorly divided, coxae ± defined anteriorly.

Legs (Figs 21K, L) relatively long (particularly in *G. ustulata*), not very robust, bearing very sparse setae. Trch large, bearing several setae, basal ring poorly developed (at least medially absent). Femur shorter than ti, both usually unsclerotized.

Ptrs of varying form, sclerotized claw occupying most of its length, seta borne in basal half.

Abd practically devoid of msp. Aa seven, moderately protuberant, covered with moderately protuberant granules. Seventh aa slightly reduced. Daa with lateral impressions often not simple, irregular or indistinctly doubled, anterior transverse line at most very indistinctly doubled. Abd spir very small, broadly oval, up to about 8 broad mgch. Plt small, oval, two long and 1–3 short setae. Ninth tergum posteriorly rounded or slightly quadrangular, carm absent. Atu moderately large, posteroventral, apl with sparse short setae (± glabrous in *G. merkli* and *angustata*). In some species (e.g. *G. ustulata,* Fig. 22D) ventral two apl with distinct prominent (when protruded) locomotory protuberances.

A Holarctic genus. Larvae of seven Palaearctic species at my disposal. One North American species available [*G. exigua* (NEWMAN, 1841)], fully covered by the above description, similar to *G. ruficornis* or *viridipennis*.

1 (2) Body and esp. head extremely depressed (Figs 21F, G, H, cranial width/height ratio far over 4), cranium extremely broad, mouthparts relatively extremely small ..... *merkli*
2 (1) Body and head less depressed (cranial width/height ratio at most slightly over 3), cranium narrower, mouthparts relatively much larger (Figs 21E, 22A, B).
3 (4) Legs long (hind distal legs about as long as one-half of their basal distance, hind tibiotarsus at least as long as one-fourth of ventral sclerite width), particularly hind praetarsus much shorter than tibiotarsus, distinctly compressed (Fig. 21K). Cranium very roughly microgranulate ..... *ustulata*
4 (3) Legs much shorter, praetarsus at most slightly compressed, claw ± needle-shaped (Fig. 21L). At most some cranial regions microgranulate.
5 (12) West Palaearctics.
6 (11)! Ventral sclerite longer (about 3.5, rarely approaching 4, Fig. 22C–a, b, c). At least lateral sections of transfrontal line relatively sharp and narrow (Figs 21E, 22A).
7 (10)! Maxillary palpiger in later instar larvae with narrow yet distinct ventral pigmented band. Posterior end of medial gular line not remarkably broadened, pale spot small or absent (Fig. 22C–b).
8 (9)! Transfrontal line very sharp along whole length. North Africa ..... *angustata*
9 (8)! Transfrontal line about as in *G. ruficornis* (Fig. 21E), medial extremities of each half broadened into ± large pale areas. Sicily ..... *viridipennis*
10 (7)! Maxillary palpiger without discernible ventral pigmentation. Medial gular line usually with broadly triangular pale spot at posterior end (Fig. 22C–c) ..... *ruficornis*
11 (6)! Ventral sclerite short (about 4 and more, Fig. 22C–d). Transfrontal line ± broad, diffuse ..... *abdominalis*
12 (5) Far East ..... *gracilis*

Grammoptera merkli FRIVALDSZKY, 1884

This species has an aberrant extremelly adaptive larva (Figs 21F, G, H) which cannot be mistaken for any other Palaearctic larva known to me.

Body very strongly depressed, with very fine unpigmented setae. Cr extremely depressed (4.5 in single available larva), very strongly transverse, distinctly micro-

reticulate. Ecr laterally very abruptly convex. Tfl not very distinct. Epmg entirely flat, in same plane with cl. Mouthparts extremely small in comparison with cr width. Stemmata relatively small. Vs long (3.1), entirely flat, mtt unpigmented. Ant miniature. Md with deeply emarginate cutting edge. Third segment of pmx cylindrical, extremely long, much longer than first or second.

Thoracic segments very short and broad. Proth almost without pigmentation. Spiracles very pale, feebly sclerotized. Mesoth sternum poorly granulate, medially non-granulate and with transsternal line almost absent. Legs intermediate between *G. ustulata* and other species. Abd much narrower than head and proth. Apl ± glabrous. Available larva 7 mm.

Host plants: *Cornus, Crataegus,* and probably others. One-year development period, larvae under bark, pupation February–March, adults April–May (G. Sama, pers. comm.).

Distribution: Asia Minor.

Material: 4. 6. 1983, Turkey, Namrun, 1/I, *Cornus,* lgt. et coll. G. Sama.

All the following species differ from *G. merkli* as follows: Body less depressed, setae at least finely pigmented, longer, stouter. Cr much less depressed (about 2.5 to 3.2) and less transverse. Ecr sides less abruptly convex. Tfl more distinct. Epmg gently obliquely sloping. Mouthparts relatively larger. Mtt ± pigmented. Ant larger. Md with cutting edge usually shallowly emarginate. Third pamx segment hardly longer than first or second. Thoracic segments not so strongly transverse, first abd segment practically as broad as proth. Spir distinctly pigmented. Mesoth sternum distinctly granulate (although less distinctly so than metath one), transsternal line uninterrupted.

Grammoptera ustulata (SCHALLER, 1783)

Cr strongly depressed (about 2.8–3), very roughly almost continuously microgranulate, widest about middle. Ecr in later instars roughly rugose along fl. Fl and tfl sharp. Vs flat, long (about 3). Pgmx ventrally unpigmented, third pamx segment cylindrical, slender, often slightly longer than 1 or 2. Dorsal proth sclerotization more distinct than in other species. Legs long (see key), femur may be very finely sclerotized, ptrs much shorter than ti, broad, compressed incl. claw (Fig. 21K). Length up to 12 mm.

Host plants: *Quercus, Crataegus, Juglans,* probably also others. Larva under bark of dry branches or thin stems, never in too moist situation. Pupation under the bark or in the wood. Development period unknown (?one year).

Distribution: Europe except North, Caucasus, Transcaucasia, Asia Minor.

Material (all lgt. et coll. S): 21. 8. 1976, Bulgaria, Ropotamo, Arkutino, 2/I, *Crataegus*; 13. 9. 1979, CS, Slovakia m., Plešivec env., ?/–, *Quercus*; 21. 10. 1981, CS, Slovakia m., Štúrovo env., 2/–, *Quercus.*

Grammoptera angustata PIC, 1892

Very similar to *G. ruficornis* and particularly *G. viridipennis,* differs from latter by very sharp tfl. Basal lbr pigmentation relatively broader than in other species. Apl practically glabrous. Largest available larva 7 mm.

Host plant: *Ilex aquifolium*. Larvae under bark of dead branches without remarkable fungus growth. Pupation under bark or shallowly in the surface wood. Adults in April (G. Sama, pers. comm.).

Distribution: North Africa (North Algeria).

Material: 27. 4. 1987, Algeria, Tizi Ouzou, Akfadou, 2/I, *Ilex,* G. Sama lgt., coll. S.

Grammoptera viridipennis PIC, 1893

Extremely similar to *G. ruficornis,* some hopeful differences in the key (they are very subtle, should be confirmed on a greater number of specimens). Cr shape more similar to *G. abdominalis* (Fig. 22B), with sides anteriorly straight, then abruptly curved. Largest available larva 8 mm.

Host plants: SAMA et SCHURMANN (1980) list *Acer, Castanea, Quercus* and *Pirus*. Habits probably similar to *G. ruficornis*.

Distribution: Sicily.

Material: 25. 4. 1984, Italy, Sicily, Madonie, Piano Zucchi, 5/I, *Acer pseudoplatanus, Quercus pubescens,* lgt. G. Sama, coll. G. Sama and S.

Grammoptera ruficornis (F., 1781)

Cr usually strongly depressed (about 3), widest about or slightly behind middle, only some areas (e.g. gena) relatively distinctly microreticulate. Ecr at most finely rugose along fl, sides more broadly rounded (Fig. 21E). Fl and tfl ± sharp. Vs almost flat, moderately long (usually about 3.5, rarely approaching 4). Pgmx without ventral pigmentation. Third pamx segment ± cylindrical, slender (Fig. 21I). Protergal pigmentation pale, almost absent from pn. Legs short (see key), ptrs slightly shorter than ti, almost not compressed, claw needle-shaped (Fig. 21L). Length up to 11 mm.

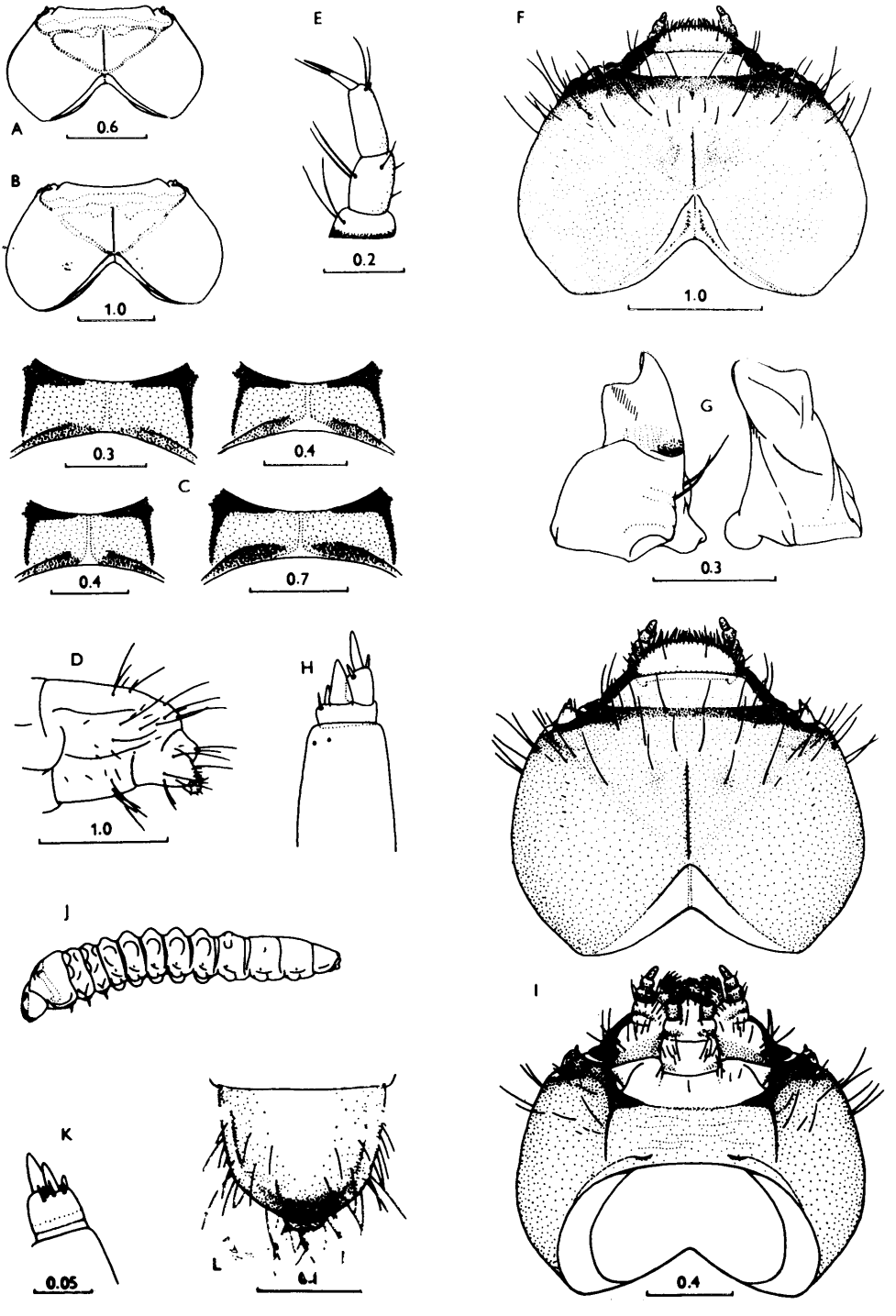
Host plants: Polyphagous, but no record from conifers known to me. Larvae under bark of dead ± fungus-infested branches where also pupate in the spring. Oval pupal cells often surrounded by wooden fibres. Apparently one-year development.

Distribution: Similar to *G. ustulata.*

Material: 1977–1983, CS, various spots, +/I, *Acer, Fraxinus, Ulmus, Populus, Euonymus, Rhamnus, Ribes, Malus,* lgt. et coll. M. Sláma and S; 18. 8. 1976, Bulgaria, Ropotamo, Arkutino, 12/I, *Frangula,* lgt. et coll. S.

Grammoptera gracilis BRANCSIK, 1914

Single praepupal larva available. Similar to *G. abdominalis,* or perhaps somewhat intermediate between *abdominalis* and the three preceding species, but no reliable


A
0.6
B
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E
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C
0.4
0.7
G
0.3
D
1.0
H
J
K
0.05
L
0.1
I
0.4

Grammoptera angustata PIC, 1892

Very similar to *G. ruficornis* and particularly *G. viridipennis*, differs from latter by very sharp tfl. Basal lbr pigmentation relatively broader than in other species. Apl practically glabrous. Largest available larva 7 mm.

Host plant: *Ilex aquifolium*. Larvae under bark of dead branches without remarkable fungus growth. Pupation under bark or shallowly in the surface wood. Adults in April (G. Sama, pers. comm.).

Distribution: North Africa (North Algeria).

Material: 27. 4. 1987, Algeria, Tizi Ouzou, Akfadou, 2/1, *Ilex*, G. Sama lgt., coll. S.

Grammoptera viridipennis PIC, 1893

Extremely similar to *G. ruficornis*, some hopeful differences in the key (they are very subtle, should be confirmed on a greater number of specimens). Cr shape more similar to *G. abdominalis* (Fig. 22B), with sides anteriorly straight, then abruptly curved. Largest available larva 8 mm.

Host plants: SAMA et SCHURMANN (1980) list *Acer, Castanea, Quercus* and *Pirus*. Habits probably similar to *G. ruficornis*.

Distribution: Sicily.

Material: 25. 4. 1984, Italy, Sicily, Madonie, Piano Zucchi, 5/1, *Acer pseudoplatanus, Quercus pubescens*, lgt. G. Sama, coll. G. Sama and S.

Grammoptera ruficornis (F., 1781)

Cr usually strongly depressed (about 3), widest about or slightly behind middle, only some areas (e.g. gena) relatively distinctly microreticulate. Ecr at most finely rugose along fl, sides more broadly rounded (Fig. 21E). Fl and tfl ± sharp. Vs almost flat, moderately long (usually about 3.5, rarely approaching 4). Pgmx without ventral pigmentation. Third pamx segment ± cylindrical, slender (Fig. 21I). Protergal pigmentation pale, almost absent from pn. Legs short (see key), ptrs slightly shorter than ti, almost not compressed, claw needle-shaped (Fig. 21L). Length up to 11 mm.

Host plants: Polyphagous, but no record from conifers known to me. Larvae under bark of dead ± fungus-infested branches where also pupate in the spring. Oval pupal cells often surrounded by wooden fibres. Apparently one-year development.

Distribution: Similar to *G. ustulata*.

Material: 1977–1983, CS, various spots, +/1, *Acer, Fraxinus, Ulmus, Populus, Euonymus, Rhamnus, Ribes, Malus*, lgt. et coll. M. Sláma and S; 18. 8. 1976, Bulgaria, Ropotamo, Arkutino, 12/1, *Frangula*, lgt. et coll. S.

Grammoptera gracilis BRANCSIK, 1914

Single praepupal larva available. Similar to *G. abdominalis*, or perhaps somewhat intermediate between *abdominalis* and the three preceding species, but no reliable

depressed (about 2.4), narrower than proth, very pale yellowish, widest slightly behind middle, not or only indistinctly microsculptured, ± shining. Ecr smooth, fused along considerable length, hind margin not remarkably pigmented, anterior setae sparse, fine, adfrontal setae moved deep into pof region; sides broadly roundly convex.

Fl about as in *Pidonia,* almost not curved. Tfl in later instars present (a very broad transverse pale zone). Pof remarkably concave, one pair of pof setae, moved far forward. Prf before broad tfl darker than pof, setae 2, 1, 1 and usually a few smaller ones. Mfl narrow, ± reaching epmg, in mature larvae ± interrupted by tfl, but anterior fragment tends to disappear.

Epmg, eps, cl, lbr and eph similar to *Pidonia,* both cl and lbr slightly longer (less transverse), lbr with basal half finely sclerotized.

Particularly upper plst region strongly sclerotized and raised. Gena finely rugose, dark pigmentation esp. in mature larvae broad, about twice as broad as plst. Three contiguous yet not fusing separately convex large mstm in a moderately oblique row, pigment spots distinct, separate. Two ± distinct dstm present.

Vs short (about 3.9–4.5), paler than gena but darker than ecr, almost flat. Anterior margin gently emarginate, ± flat, narrowly sclerotized except at middle where interrupted by broad diffuse mgl. Gl may be slightly raised. Hypl narrow, slightly curved and diverging, reaching (or almost reaching) pocl. Mtt short, very close to narrowly darkened hind margin. Available larvae with 2–4 setae on each side (one of them usually in gular region).

Ant (Fig. 22H) similar to *Pidonia,* second segment less reduced, third hardly longer than broad, shorter than main sensillum, one of its apical sensilla particularly large and long. Md (Fig. 22G) moderately long, border zone at most very indistinctly striate, apex and dorsal angle prominent, not very sharp, cutting edge deeply emarginate, two blunt inner keels. Basal part as in *Pidonia.* Lmx very similar to *Pidonia,* about as large as in *P. lurida* (Fig. 23F), slightly shorter and broader.

Protergal band pale, at most yellow, with two pairs of narrow anterior notches, al finely sclerotized. Pn finely irregularly rugose, distinctly microreticulate, dull (similarly to most other body surface), bearing very few minute setae. Lfur ± absent. Lpst at most finely sclerotized anteriorly, bearing greater number of scattered setae. Mpst very distinctly microreticulate (not entirely asperate despite CRAIGHEAD, 1923: 89), with four stronger and usually 2 minute setae. Very fine msp on cxst medially, stlf anteriorly, and two mspte areas may be also at basal mpst margin.

Pterothoracic nota mspte, without granules. Mesoth spir very poorly sclerotized, broadly oval, up to about 10 small subquadrate mgch. Metath spir unpigmented, almost indiscernible. Sterna ± not granulate, ± mspte, mesoth bst divided.

Legs (Fig. 22E) generally similar to *Pidonia.* Femur slightly shorter than ti. Claw almost not curved, seta borne about middle of ptrs.

Seven aa, seventh ones both dorsally and ventrally markedly reduced. Aa at most very indistinctly granulate, ± largely mspte. Daa with anterior transverse line at

most very indistinctly doubled. Spir similar to mesoth ones, smaller, up to about 8 mgch. Plt small, oval, with 2 longer and at most 2–3 shorter setae. Carm absent, ninth tergum rounded posteriorly. Atu similar to *Pidonia*.

Two species known, one from Palaearctic and one from Nearctic region. Since the genus is presented in a new sense, the North American species (classified in *Leptalia* so far) has been included, too. Larvae very similar, some of the differences listed below would probably turn out invalid in larger series.

Fallacia elegans (FALDERMANN, 1837)

Setae ± ferrugineous. Cr smooth, strongly shining. Plst rather smooth, sfp absent. Pigment spots of mstm larger, subcontiguous. Vstm as a pale spot in dark genal pigmentation. Gl almost not raised. Protergal pigmentation more distinct, yellow. Mpst with two mspte areas at basal margin. Aa only very slightly impressed medially, for great part only microgranulate, msp more restricted, absent before praescuto-scutal line, on parascutum and coxal lobes. Largest available larva 14 mm.

Habits: "The larva developed in the wood of a thin rotten alder branch *(Alnus)* where also pupated" (DZHAVELIDZE et DANILEVSKY, 1981, on the larva of which an exuvia is available - see "Material"). Almost nothing known about the other two available larvae, except for the host plant *(Fagus)* of one of them.

Distribution: Caucasus, Transcaucasia, North Iran.

Material: 4. 4. 1981, SU, Adzharia, Kintrish Nat. Res., exuvia/l, *Alnus*, lgt. D, coll. IS; 3. 8. 1966, SU, Krasnodar region, Krasnaya Polyana, 1/–, host and collector not stated, coll. IS; 10. 8. 1985, SU, Caucasus c., valley of Dalra-river, 1/–, fallen *Fagus* (with numerous larvae of *Rhagium fasciculatum*), lgt. O. Pultar, coll. S.

Fallacia macilenta (MANNERHEIM, 1853), comb. n.

Setae ± unpigmented. Cr less shining, some regions finely microsculptured. Plst slightly rugose, low elongate sfp present. Pigment spots of mstm smaller, well separate. Vstm indiscernible. Gl slightly raised (not in all specimens - CRAIGHEAD, 1923: 89). Protergal pigmentation (esp. on pn) very pale yellowish. Mpst with mspte areas absent or very small (a narrow basal mpst margin of the single available somewhat contracted larva cannot be seen without damaging it). Aa ± entirely mspte, perhaps slightly more deeply impressed medially (this may be a fixation artefact). Single available larva 13 mm.

Habits: According to CHEMSAK and POWELL (1971), the larvae develop in various deciduous trees *(Umbellularia, Alnus, Salix)*. Larval habits somewhat variable according to the condition ot the tree infested. Generally, larvae were found in stem fragments lying on the ground (other larvae, like the one available to me, found in stumps), in parts with some moisture, under bark, or in the surface wood layer when rotten. Pupation in the food material ?in spring (but no larvae were found in pupal cells in April, and the pupae might have overwintered). At least two-year development. Adults fly from March to July (LINSLEY et CHEMSAK, 1972).

Distribution: Pacific coast of North America.

Material: 13. 7. 1879, USA, Alaska, Popof Is., 1/I, decaying *Alnus*-stump, T. Kincaid lgt., coll. U.S. Natn. Mus., Washington, D.C.

Genus *Encyclops* NEWMAN, 1838

Type species: *Encyclops pallipes* NEWMAN, 1838 = *Leptura caerulea* SAY, 1826 (monobasic). North America, larvae available and covered by the following generic description.

Generally similar to *Pidonia*, main differences and restrictions as follows.

Body (Fig. 22J) slender, only anteriorly and posteriorly slightly depressed, anterior abd segments somewhat quadranguar due to very broad bilobed aa; setae relatively sparse, fine, rather pale.

Head (Fig. 22I) with cr less transverse (about 1.3–1.4) and depressed (about 2.2–2.3), mouthframe more finely sclerotized, ferrugineous. Ecr halves shortly fused (duplicate region about as long as one-third of medial frontal length), smooth, sides very feebly convex (about as in *Pidonia quercus*). Fl almost straight, rather distinctly reaching anterior cr margin. Only lateral fragments of tfl (but then rather sharp) may be poorly visible. Frons ± flat, at most finely rugose, prf setae 2, 1, 1. Epmg ± straight, very finely narrowly sclerotized. Lbr larger, much less transverse. Eph transverse row composed of short trichoid sensilla, tormae short (not connected with sclerotized bands along sides of posterior region), almost transverse. Plst moderately raised. Gena may be finely narrowly darkened. Mstm and dstm with distinct black pigment spots (see note under *E. caeruleus*). Only very short lateral sections of anterior vs margin dark, hypl (almost) reaching pocl, mtt extremely broadly separate, hind vs margin not darkened, setae absent.

Third ant segment absent (despite CRAIGHEAD, 1923: 89; his third segment is another large sensillum, Fig. 22K, cf. with 22H). Connecting membrane larger. Md border zone indistinct (reduced to short lateral impression), apex not doubled. Lmx large (about as in *Pidonia quercus*), all pigmentation very pale. Mala more robust, slightly broadened apically. Pamx with segment 2 shortest. Palb separated by slightly less than twice their width. Ligula unsclerotized, with two ventral setae, apical and dorsal margins covered with long pale microtrichia.

Body in later instars devoid of msp, some in other genera almost invariably mspte regions are only roughly microgranulate. Young larvae with some extremely indistinct msp (pterothoracic nota, proth stlf).

Pn relatively smooth, unsclerotized, with two discal setae. Lpst unpigmented, with greater number of setae. Pterothoracic nota may have 2–4 large indistinct flat medial granules. Legs proportionally similar to *Fallacia* (Fig. 22E), moderately long, setae much longer. Femur and ti unpigmented. Ptrs seta borne before middle. All spir very poorly sclerotized, mesoth spir with up to about 10–12 small mgch, metath spir almost indiscernible.

Aa 2 to 5 very broad, esp. daa 2–5 deeply medially impressed, ± bilobed (indistinct in contracted larvae). Aa 1 and particularly 6 much narrower, not bilobed.

Pterothoracic sterna and aa covered with large not very distinct granules (except for medial impression on aa 2–5, also ± interrupting esp. dorsal transverse lines). Plt larger. Hind margin of ninth abd tergum transversely swollen, slightly sclerotized and at least indistinctly very finely ± longitudinally striate (Fig. 22L).

Species of the genus *Encyclops* inhabit East Asia and North America. Larvae of three species available.

1 (2) One of remaining apical antennal sensilla very large, not much shorter than main sensillum (Fig. 22K). North America ..... *caeruleus*
2 (1) All remaining apical antennal sensilla small, at most half as long as main sensillum. East Palaearctics.
3 (4) Caudal protuberance more distinct, very finely longitudinally striate (Fig. 22L). South Kurile Islands, Japan ..... *olivaceus*
4 (3) Caudal protuberance smaller, much less distinctly and less regularly striate. Ussuri region ..... sp. (*?macilentus*)

Encyclops caeruleus (SAY, 1826)

Pigment of stemmata in available larvae lacking (probably a fixation artefact). Mtt broadly distinctly pigmented. Ant with second segment less reduced and not fused with first, with one of apical sensilla very large (see key). Spir with small mgch. Aa 2–5 less strongly specialized, medial impressions even on daa not completely obliterating all structures. Caudal protuberance finely longitudinally striate. Natural length of available larvae about 10 mm.

Habits (CRAIGHEAD, 1923): Larvae mine in the outer dry corky bark of *Quercus, Liriodendron, Acer, Castanea, Nyssa*; occasionally in numbers on a limited area of bark. Mature larvae overwinter in pupal cells in the bark, pupation in spring. Development period not given.

Distribution: Eastern North America.

Material: 3. 4. 1949, USA, Ohio, Wooster, 2/?, *Quercus*, lgt. J. S. Houser, coll. U.S. Natn. Mus., Washington, D.C. (Coll. No. 4226).

Encyclops olivaceus BATES, 1884

Differs from *caeruleus* as follows: Posterior cranial notch not very deep (Fig. 22I). Stemmata with distinct pigment. Second ant segment strongly reduced and nearly completely fused with first (i.e. ant almost one-segmented), all apical sensilla small. Mgch larger. Medial impressions of esp. daa 2–5 deep, smooth, entirely obliterating all ampullar structures. Largest available larva 11 mm.

Habits: Judging from CHEREPANOV (1979), bionomics similar to other species. Known only from *Quercus*-bark.

Distribution: South Kurile Islands (Kunashir), Japan.

Material: 26. 6. 1977, 6. 7. 1985, SU, Kunashir, 8/I (one series), *Quercus*, lgt. A. V. Kompantsev and D, coll. IS.

Encyclops sp. [?*macilentus* (KRAATZ, 1879)]

Extremely similar to *E. olivaceus*. Caudal protuberance smaller, not distinctly regularly longitudinally striate, ± irregularly rugose, although many rugae run longitudinally. Mtt poorly very shortly pigmented. Single available larva 8 mm.

Material: 10. 8. 1986, SU, Ussuri region, "Kedrovaya Pad'" Nat. Res., 1/?, "in the bark of *Quercus*, with larvae of *Scaphidema*, Tenebrionidae", lgt. T. Kompantseva, coll. IS.

The larva is determined as *E. ussuricus* CHEREPANOV. It is quite unclear how many species of *Encyclops* do really occur in the Ussuri region. Three species have been described from that region (LOBANOV, DANILEVSKY et MURZIN, 1981): *macilentus* (KRAATZ, 1879), *parallelus* (PIC, 1914) and *ussuricus* CHEREPANOV, 1975. It seems highly improbable that all are good species. Describing *E. parallelus*, PIC had no available material of *E. macilentus* (according to PLAVILSHCHIKOV, 1936, who treats both names as synonyms). This synonymy was perhaps accepted by CHEREPANOV et CHEREPANOVA (1975a) and CHEREPANOV (1979), since they did not mention the PIC's species [however, in the original description (1975a) they even did not mention *E. macilentus* (!), and compared the newly described species only with *E. olivaceus*]. Describing *E. ussuricus*, they had (judging from CHEREPANOV, l.c., p. 69) no available material of either *E. macilentus* or *E. parallelus*. Thus it may be well found that there is only one morphologically variable species in the region - *E. macilentus* (KRAATZ). The same opinion has been expressed by DANILEVSKY (1988).

Habits of *E. ussuricus* (CHEREPANOV, l.c.): Larvae in the bark of living oak trunks *(Quercus)*, in the cork layer, occasionally near to phloem tissue. Pupation in early spring in the bark in a vertical pupal chamber. Flight from late May to June. Three-year development.

Genus *Pidonia* MULSANT, 1863

Type species: *Leptura lurida* F., 1792 (SWAINE et HOPPING design., 1928)

Body white, elongate, distinctly depressed, with sparse moderately long ± fine reddish to almost unpigmented setae.

Head in natural position almost by half retracted (Fig. 23C). Cr (Figs 23E, F, G) transverse (about 1.4–1.6), fairly depressed (about 2.3–2.6), distinctly narrower than proth, relatively pale, yellow, widest about middle, some regions may be ± microreticulate. Ecr ± rugose along fl, otherwise smooth, with very sparse setae, one strong adfrontal seta lying very close to (or right in) fl. Sides ± convex, broadly rounded, both ecr halves fused along ± short line, hind cr notch angulate, about 90 degrees or slightly less.

Fl relatively narrow, less conspicuous (pale cr), slightly S-curved, in later instars ± ending in ant openings. Tfl in later instars present, broad, diffuse, indistinct. Pof feebly concave, distinctly obliquely rugose, with one pair of not very long setae slightly shifted anteriorly. Prf almost not darker than pof, very feebly convex, finely transversely rugose, setae 2,1,1, 1–2 small supplementary setae may be present at lateral tfl ends. Epmg broadly ± distinctly sclerotized, at most slightly emarginate, moderately obliquely declivous. Six eps close to cl border. Mfl in later instar larvae not reaching epmg (but vestiges of anterior fragment sometimes still present).

Cl broad, short, moderately convex, strongly tapering, basal half very finely sclerotized. Lbr broad, very short, strongly transverse, very narrowly sclerotized at base, anterior margin fringed with short moderately dense setae, usually one isolated discal pair present. Hind eph region broad, feebly raised, finely medially sclerotized, anterior transverse row composed of short tooth-shaped sensilla. Tormae moderately long, abruptly curved. Anterior region with setae restricted to front edge, and with two ± large paired areas of minute spine-like microtrichia (Fig. 23I).

Plst strongly sclerotized, esp. upper portion abruptly raised, swollen; smooth, sfp absent. Gena smooth, pale except for ± sharply delimited ± dark area around mstm (in young larvae may be absent). Mstm fused into an elongate-oval ± convex structure, never three separately convex mstm present; pigment spots distinct to very large, three on each side, usually subcontiguous or partly fusing (Fig. 23A). Dstm much less distinct, feebly convex, with small pigment spots. Vstm inconspicuous or absent.

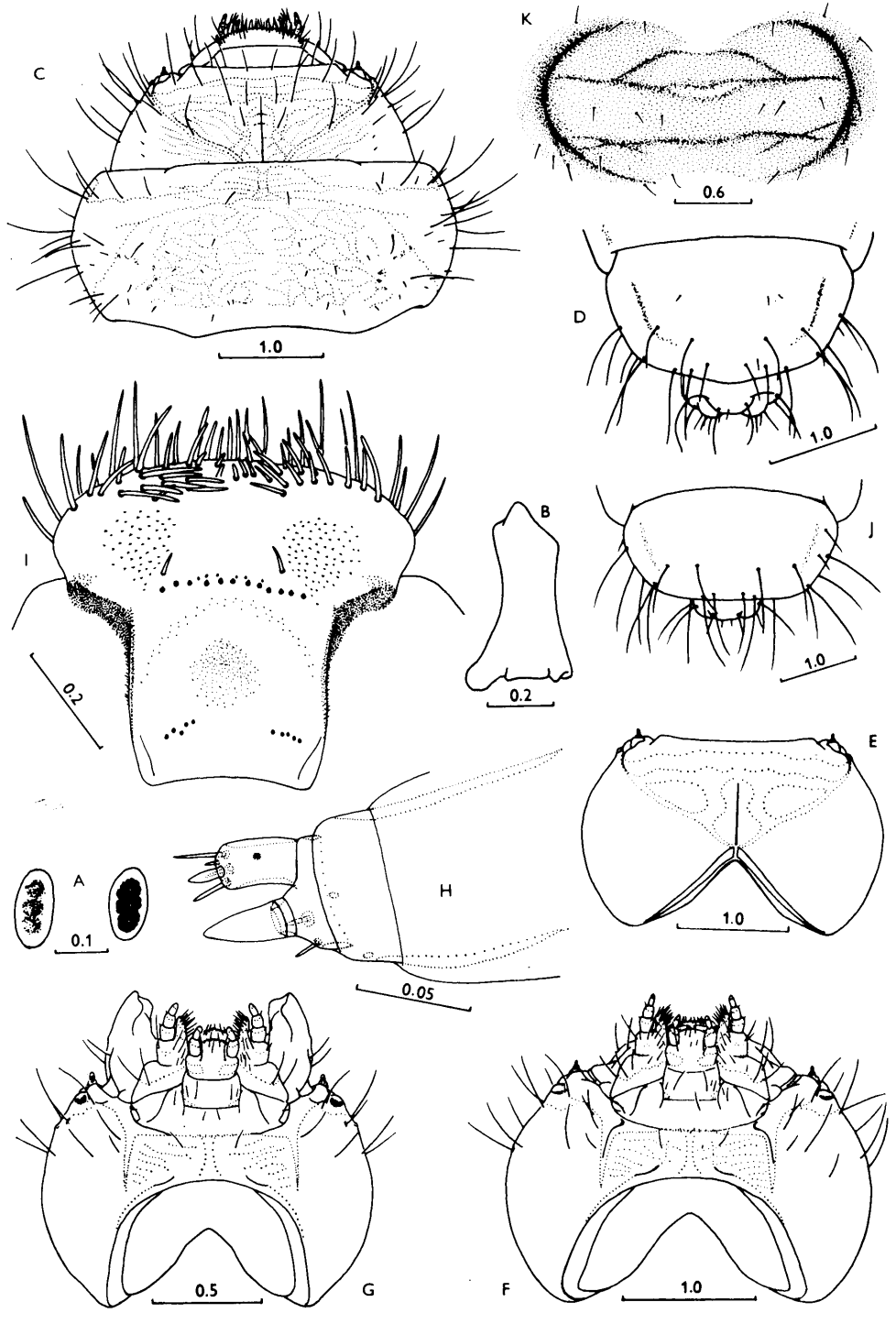
Vs short (about 3.5–4.5), almost flat, not darker than ecr, finely transversely rugose. Anterior margin flat, in gular region almost unsclerotized and poorly separate from lmx base, gently emarginate to almost straight. Hypl narrow, ± diverging, fail to reach pocl. Mtt narrow, very close to ± darkened hind margin. Gula not raised, may be shade darker, mgl diffuse, indistinct, ± reaching anterior margin. Usually one pair of stout setae at lateral gular margins.

Ant (Fig. 23H) short, three-segmented. Antennal ring sclerotized, slightly raised. Connecting membrane moderately large, ant rather deeply retractile. Segments very poorly sclerotized, second ± (occasionally very strongly) reduced, transverse, third segment very large, elongate, main sensillum extremely large, elongate, about as long as third segment.

Md type I, moderately long, variable. Border zone very finely striate, apex, dorsal angle and two broadly separate inner keels very blunt, apex usually at least in young larvae ± distinctly doubled (Fig. 23B). Basal part laterally ± steeply raised above border zone, ± smooth, 1 + 1 strong setae.

Lmx ± large, rather flat, with sparse setae. Base almost unsclerotized, submentum poorly separate from connecting lobes, cardo relatively small, with minute seta. Maxilla moderately long, pgmx large, with ventral pigmentation very pale, occasionally almost lacking, basal spot mostly absent, mala esp. in some species long and slender (Fig. 23F), with broad oblique pigmented band, bearing sparse very stout apical and dorsomedial setae. Pamx long, slender, segments ± shortening from 1 to 3, third elongate. Mt broad, very short, with indistinct transverse broadly separate basal spots. Prlb broad, basal apodeme mostly unpigmented, pglb pigmentation separate, palb long, separated at base by about twice their width, ligula broad, short, may be finely sclerotized ventrally, with extremely sparse ventral and dorsal setae separated by minute marginal microtrichia.

Proth moderately large, pale yellow dorsal band without distinct anterior notches, al finely sclerotized, yellowish. Pn at most very finely sclerotized, distinctly irre-


C
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K
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H
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0.5
G
F
1.0

gularly rugose, with two or at most very few scattered minute discal setae. Lfur ± absent. Lpst finely sclerotized anteriorly, each half with 4–5 stronger setae in a ± distinct transverse row, other setae absent or very few and small. Mpst with four stronger and 2–4 minute setae. Msp present on medial cxst and anterior stlf, often very fine and indistinct.

Pterothoracic nota non-granulate, largely mspte. Scutum very narrow at middle. Al poorly protuberant. Mesoth spir moderately large, oval, hind margin with up to about 10 (usually less) not very large mgch. Metath spir small yet discernible. Sterna non-granulate, mspte, transsternal lines esp. medially rather indistinct, bst divided by indistinct oblique impressions. Coxae relatively poorly defined anteriorly.

Legs moderately long, hind distal legs much shorter than one-half of their basal distance, setae sparse. Trch small, with at least one seta, basal ring medially incomplete. Femur at most slightly shorter than ti, both at most very finely sclerotized. Ptrs considerably shorter than ti, slender, non-compressed, claw needle-shaped, straight or gently curved, seta borne in proximal half.

Abd both dorsally and ventrally with only six non-granulate mspte aa. Daa with anterior transverse line broadly doubled. Abd spir small, oval, with up to about 8 ± small mgch. Plt small, oval, with 2–3 setae. Carm absent, ninth tergum somewhat cut posteriorly (Fig. 23D), atu relatively large, slightly posteroventral, visible from above, apl with very few short setae.

This Holarctic genus has a very distinct European-East Asiatic disjunction. One species in Central Europe, several tens (with some other related genera like *Macropidonia* and *Pseudosieversia*) occur in the Far East. The whole large area of Siberia, as far as known, lacks any species of this group.

The available larval material of this genus is very poor excepting the type species. Larvae of two Far East species available, but adults have not been reared.

Pidonia (s. str.) *lurida* (F., 1792)

Pigmentation darker, sclerotized cr regions in later instars dark brown. Some cr regions (most of frons, gena, vs) relatively distinctly microreticulate. Cr broader, sides more convex, cr/lmx width ratio about 2.2 (Fig. 23F). Mstm with pigment spots much smaller than stemma (Fig. 23A). Mature larvae with md apex simple. Length up to 19 mm.

Host plants: Larvae available from *Picea* and *Fagus*, probably polyphagous. They usually feed under bark of dead shallow roots, rarely above ground level (two larvae have been exceptionally found under bark of a very large *Fagus*-log). Probably two-year development, mature larvae

◀

Plate 23: A - Left main stemma of *Pidonia lurida* (left) and *P. ?quercus* (right). B - *P. ?quercus*, outline of left mandible, lateral view. C - *P. lurida*, head and prothorax, dorsal view. D - *P. lurida*, end of abdomen, dorsal view. E - *P. lurida*, shape of cranium, dorsal view. F - *P. lurida*, head, ventral view. G - *P. ?quercus*, dtto. H - *P. lurida*, right antenna, medial view. I - *P. lurida*, epipharynx. J - *Pseudosieversia rufa*, end of abdomen, dorsal view. K - *P. rufa*, fifth dorsal ambulatory ampulla.

overwinter in the soil, pupation in spring (not directly observed, but larvae in breedings leave the roots in autumn, subsequently entering diapause). Adults on flowers.

Distribution: Central Europe.

Material: 1977–1979, CS, Slovakia c., Donovaly, 19/–, *Picea* and *Fagus*, lgt. et coll. S (adults not reared, no doubt about determination).

Pidonia (s. str.) sp.

Similar to *lurida*. Pigmentation paler, mouthframe ferrugineous. Cr very poorly microreticulate. Available later instar larvae with simple md apex. Largest available larva 15 mm.

Material: 17. 9. 1974, SU, Ussuri region, "Kedrovaya Pad' " Nat. Res., 3/–, *Chosenia*, lgt. D, coll. IS. The larvae may belong to *Pidonia similis, P. gibbicollis, P. amurensis* or *P. alticollis* (see below).

Pidonia (?s. str.) *?quercus* (CHEREPANOV, 1975)

Distinctly differs from *P. lurida*. Pigmentation paler, cr poorly microreticulate, narrower (Fig. 23G), sides less convex, cr/lmx width ratio about 2. Mstm almost entirely filled with very large pigment spots (Fig. 23A). Available half-grown larvae with md apex broadly doubled (Fig. 23B). Largest available larva 10 mm.

Host plant: *Quercus*. Larvae in the bark of living oak trees. Pupation in the soil.

Distribution: Ussuri region.

Material: 1968–1986, SU, Ussuri region ("Kedrovaya Pad'" Nat. Res.; Sokolchi), 3/–, *Quercus*-bark, lgt. B. M. Mamaev, T. Kompantseva and S. V. Murzin, coll. IS. Adults not reared, but, judging from CHEREPANOV (1979), larvae of this species are rather distinctive both morphologically and bionomically.

CHEREPANOV (l.c.) described larvae of nine Far Eeast species of this genus. He brought the following key (with the present terminology employed):

1 (2) Hind margin of ninth abdominal sternum bearing six setae in a transverse row (sg. *Mumon* HAYASHI, 1968) ..... *debilis*
2 (1) Hind margin of ninth sternum with four setae.
3 (14) Ventral sclerite always with two broadly separate well developed setae (sg. *Pseudopidonia* PIC, 1900).
4 (13) Mediopraesternum apically with two setae, without a supplementary seta between them.
5 (8) Scutal plate of dorsal ampullae without setae.
6 (7) Pigment spots of main stemmata not fused, forming a transverse band of three black spots ..... *amentata*
7 (6) Pigment spots of main stemmata fused into single entire transverse band, their border lines visible only under great magnification ..... *quercus*
8 (5) Scutal plate of dorsal ampullae bearing setae.
9 (10) Pigment of main stemmata distinctly separate, consisting of three black spots ..... *similis*
10 (9) Pigment spots not separate, forming an oval entire black area, seem to be divided only in freshly moulted larvae.

11 (12) Scutal plates bearing long setae, those of posterior ampullae also supplementary short setae, on both sides of medial line ..... *gibbicollis*
12 (11) Only scutal plates of dorsal ampullae 4 – 6 bearing minute hardly visible setae ..... *amurensis*
13 (4) Mediopraesternum apically with three setae, a third supplementary short seta situated between long lateral setae close to anterior margin ..... *alticollis*
14 (3) Ventral sclerite without distinct setae, smooth (sg. *Omphalodera* SOLSKY, 1873) ... *puziloi*

Pseudopidonia PIC = *Pidonia* s. str. (HAYASHI, 1980; I fully agree with this synonymy). Only larvae of *Pidonia* s. str. at my disposal, they always have setae on the ventral sclerite and four strong setae on the hind margin of the ninth abdominal sternum, so the subgeneric characters of the above key seem to be hopeful. The key to species of *Pseudopidonia* (i.e. *Pidonia* s. str.) must be approached with greatest cautiousness. "Scutal plate without setae" must be interpreted as that the setae are small and hardly visible (they are practically invariably present in all Lepturinae, and are of course present in our supposed larvae of *Pidonia quercus*). Minute supplementary setae on mediopraesternum are highly variable and can be hardly used for determination purposes. I also cannot swear that all species from the above key would run down to *Pidonia* in the present generic key.

The following data are drawn from CHEREPANOV (l.c.).

Pidonia (Mumon) debilis (KRAATZ, 1879)

Host plants: *Acer, Fraxinus.* Larvae in branches, not in roots, pupation in the soil.
Distribution: Amur-Ussuri region, NE China, Korea, Sakhalin, Japan.

Pidonia (s. str.) *amentata* (BATES, 1884)

Host plants: In breedings, eggs were laid on conifers.
Distribution: South Kuriles (Kunashir), Japan.

Pidonia (s. str.) *similis* (KRAATZ, 1879)

Host plants: *Salix, Padus.* Habits similar to *P. lurida.*
Distribution: Ussuri region, NE China, Korea.

Pidonia (s. str.) *gibbicollis* (BLESSING, 1873)

Host plants: In breedings, eggs were laid on or around roots of *Fraxinus* and *Salix.*
Distribution: Amur-Ussuri region, NE China, Korea, Japan.

Pidonia (s. str.) *amurensis* (PIC, 1900)]

Host plants: *Salix, Padus, Alnus, Populus, Acer, Abies.* Habits similar to *P. lurida.*
Distribution: Ussuri region, Korea, Japan.

Pidonia (s. str.) *alticollis* (KRAATZ, 1879) [= *tristicula* (KRAATZ, 1879)]

Host plant: *Acer*, perhaps also others. Habits similar to *P. lurida*.
Distribution: Ussuri region, Korea.

Pidonia (Omphalodera) puziloi (SOLSKY, 1873)

Host plants: In breedings, eggs were laid on dead or dying branches of *Pirus, Padus, Fraxinus, Ulmus*. Pupation in soil.
Distribution: Amur-Ussuri region, NE China, Korea, Sakhalin, Japan.

Genus *Pseudosieversia* PIC, 1902

Type species: *Pidonia rufa* KRAATZ, 1879 (PLAVILSHCHIKOV design., 1936)

Rather similar to *Pidonia*, main differences and restrictions as follows (two praepupal larvae available).

Body apparently more robust. Setae relatively more numerous, stronger, bright ferrugineous.

Cr (Fig. 24A) narrow and therefore less transverse (about 1.4), on average probably less depressed. Hind cr notch very narrow. Fl more distinctly reach anterior cr margin. Tfl less distinct, slightly procurved. Prf more convex, epmg more strongly declivous. Tormae shorter, oblique. Anterior eph region with numerous setae reaching bases of tormae level. Gena and anterior ecr region may be distinctly transversely rugose. Mstm much reduced, small, incompletely fused, surrounding area almost not darkened. Other stemmata indistinct or absent. (Pigment of stemmata cannot be described since in praepupal larvae it is always absent.) Hypl almost not diverging, anterior vs margin ± straight, only laterally distinctly sclerotized. Vs with 3–6 setae on each side, at least two of them ± long and distinct.

Ant shorter, main sensillum short, stout, much shorter than third segment. Basal md part with several transverse grooves, apex broadly rounded, simple. Lmx relatively large due to narrow cr (about as in *Pidonia quercus*), with very stout intensively ferrugineous setae.

Pn with several short yet distinct scattered discal setae. Lpst and mpst with setae more distinct and slightly more numerous. Pterothoracic bst more distinctly divided. Daa with lateral impressions long, curved, reaching before and behind ampulla (Fig. 23K). Spir pale, feebly sclerotized, very broad, abd spir occasionally ± circular. Ninth abd tergum shorter and broader (Fig. 23J). Natural length of larger available larva about 20 mm.

Pseudosieversia rufa (KRAATZ, 1879)

Host plants and habits (CHEREPANOV, 1979): *Juglans, Fraxinus*. Larvae feed in the bark of

living or dying roots, later instar larvae live freely in the soil, eating out large areas on the surface of the roots' bark. At least two-year development. Pupation in the soil in spring/summer, flight in summer. Adults rarely on flowers, do not need food to attain sexual maturity. Males appear earlier, often can be found on the undergrowth on spots where the females are still in their soil pupal chambers.

Distribution: Ussuri region, NE China, Korea.

Material: 30. 5. 1980, SU, Ussuri region, Sokolchi, 2/I, in soil at dry *Juglans manshurica*, lgt. S. V. Murzin, coll. IS.

Genus *Macropidonia* PIC, 1901

Type species: *Macropidonia ruficollis* PIC, 1901 (monobasic). Japan, larvae unknown.

[= *Sivana* STRAND, 1942, nom. nov. for *Sieversia* GANGLBAUER, 1886, nom. praeocc. (nec. KOBELT, 1880, Mollusca); type species: *Sieversia bicolor* GANGLBAUER, 1886 (monobasic)]

Larvae of *Macropidonia bicolor* have been described (as *Sieversia bicolor*) by CHEREPANOV (1979). They are not at my disposal. Apparently very similar to *Pidonia* and particularly *Pseudosieversia*, and in the present generic key they would perhaps run down to one of these two genera. CHEREPANOV (l.c.) brought the following generic key for the Far East species (with the present terminology employed; references to drawings are mine):

22 (7) Ambulatory ampullae developed on six abdominal segments.

23 (26) Ninth abdominal tergum broadened, twice as broad as long, broadly rounded behind (Fig. 23J). Mandibles apically obliquely truncate or gently emarginate, with more prominent apex.

24 (25) Adfrontal setae shifted across frontal lines into postfrontal region. On roots and underground parts of stems of living trees of *Micromeles alnifolia* ..... *Sieversia* (i.e. *Macropidonia*)

25 (24) Adfrontal setae in epicranial region (from outer side of frontal lines) (Fig. 24A). On roots and underground stem parts of living and dying trees of *Fraxinus, Juglans manshurica* and other hardwoods ..... *Pseudosieversia*

26 (23) Ninth abdominal tergum not conspicuously broadened, not or hardly broader than long (Fig. 23D). Mandibles apically truncate, or sometimes double-emarginate (lower emargination narrow and deeper, upper one broad), then mandibles appear to be three--toothed. However, the teeth gradually disappear, mandibles becoming obliquely truncate apically. In and under bark of deciduous and coniferous trees ..... *Pidonia*

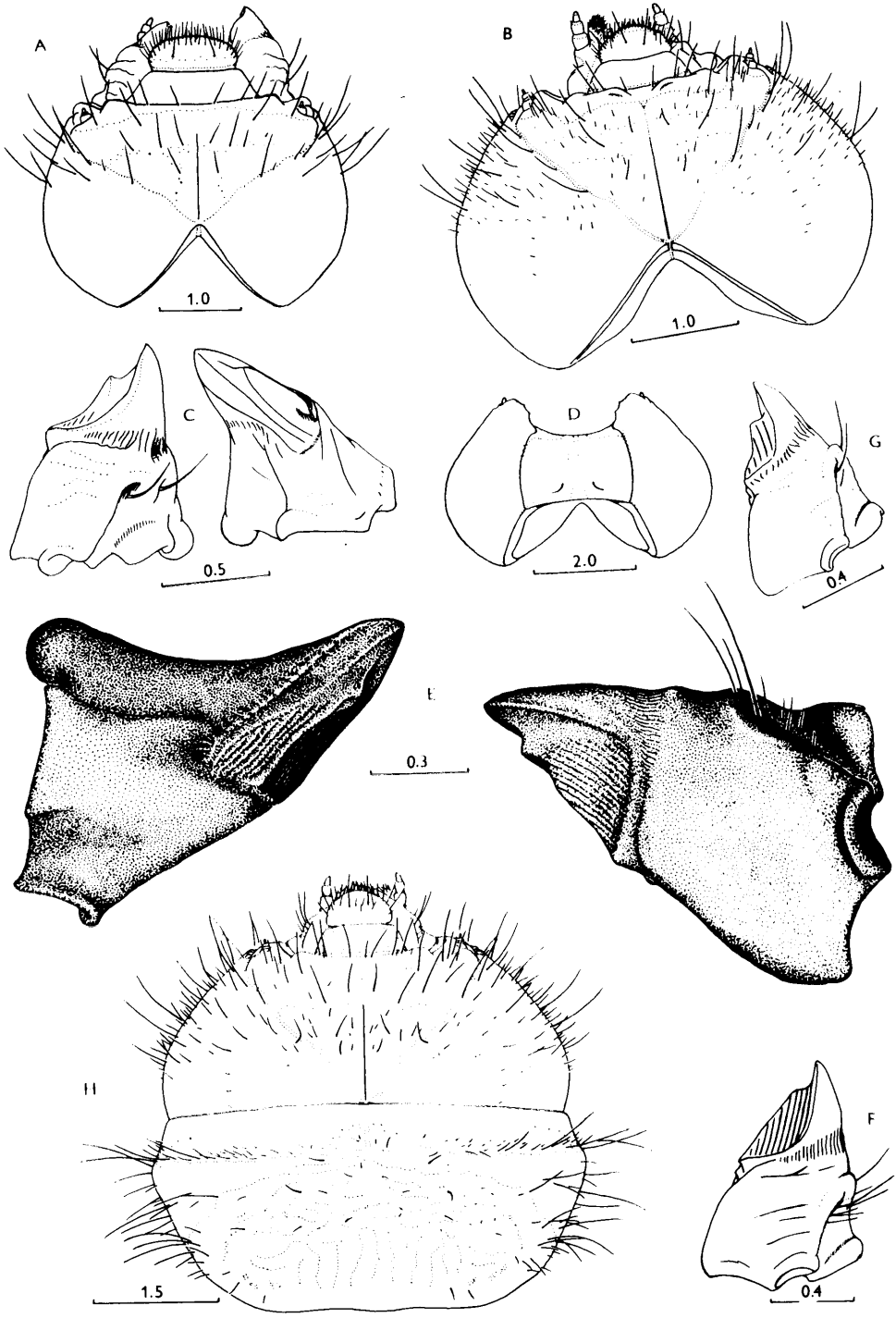
Macropidonia bicolor (GANGLBAUER, 1886)

Host plant: *Micromeles alnifolia*. Habits similar to *Pseudosieversia rufa*.

Distribution: Ussuri region, NE China, Korea.

Genus *Eustrangalis* BATES, 1884

Type species: *Eustrangalis distenoides* BATES, 1884 (monobasic)


A
1.0
B
1.0
C
0.5
D
2.0
G
0.4
E
0.3
H
1.5
F
0.4

Generally similar to *Pedostrangalia,* main differences and restrictions as follows.

Body white, distinctly more elongate and slender, with very short relatively sparse ferrugineous setae.

Head (Fig. 24B) large, slightly less than by half retracted. Cr slightly narrower than proth, widest about middle, yellow-orange, with pale lateral band. Ecr setae dense, most of them extremely short. Sides broadly rounded, not abruptly protuberant as in *Etorufus.* Epmg with paired transverse protuberances (they would be probably much reduced or absent in young larvae which are not at my disposal). Mfl somewhat transitional, in mature larvae mostly not reaching epmg, but some specimens with distinct vestiges of its anterior fragment. Cl with basal half relatively paler, without strongly sclerotized narrow basal rim. Lbr very slightly transverse, somewhat cordate, broadly rounded anteriorly, homogeneously sclerotized, basal half not darker. Vs intermediate between *Pedostrangalia* s. str. and *Etorufus* (about 2.2–2.3), anterior margin relatively narrowly sclerotized, hypl diverging, mgl ± distinct. Up to about 20–30 setae on each side.

Third ant segment distinctly longer than broad, main sensillum shorter. Slightly reduced md type II (Fig. 24C), dorsal and inner plates of type II-keel smaller, dorsal plate at hind margin with a few vestigial ridges. Basal md part with moderate lateral protuberance and two setae. Lmx about as large as in *Pedostrangalia* s. str. Mala narrow, ± cylindrical. Mt with basal spots narrowly connected, as often are also basal spots of prlb. Ligula usually with two ventral setae, microtrichia not extremely coarse.

Proth at most slightly broader than following body segments, moderately tapering towards base. Hind pn half more distinctly irregularly rugose. Dorsal proth pigmentation pale yellow, anterior margin with two narrow lateral notches and one broad medial emargination on each side. Cxst with ± large area of very distinct msp. Border lines between ventral regions not so deeply impressed.

Pterothoracic praescuta and scuta ± largely mspte. Mesoth spir with up to about 15 moderately large mgch. Coxae and lateral bst distinctly mspte, sterna with granules smaller. Legs not so remarkably close together, femur and ti ± unsclerotized.

Abd much more slender, elongate, not laterally compressed. Aa with granules smaller, at least several anterior aa usually with some msp at anterior angles. Seventh aa only very slightly reduced. Spir with up to about 10 moderately large mgch. Atu slightly more ventral. Length up to 24 mm.

An East Palaearctic genus. Only the type species at my disposal.

◀

Plate 24: A - *Pseudosieversia rufa,* head, dorsal view. B - *Eustrangalis distenoides,* head, dorsal wiew (left mandible removed). C — *E. distenoides,* right mandible, dorsolateral (left) and medial (right) views. D - *Pedostrangalia pubescens,* shape of cranium, ventral view. E - *P. pubescens,* right mandible, dorsal (right) and medial (left) views. F - *P. revestita,* right mandible, dorsal view. G - *P. ariadne,* dtto. H - *P. pubescens,* head and prothorax, dorsal view.

Eustrangalis distenoides BATES, 1884

Host plant: *Kalopanax septemlobum*. According to CHEREPANOV (1979), larvae bore in the wood of dead occasionally barkless stems. Larval galleries are partly free from frass (?expelled). Two- or three-year life cycle, pupation in the wood in August-September, adults overwinter in pupal cells. Flight July to August, adults visit flowers (e.g. of *Hydrangea*).

Distribution: South Kurile Islands (Kunashir), Japan.

Material: June 1977, SU, Kunashir, 11/I, *Kalopanax*, A. V. Kompantsev lgt., coll. IS and S.

Genus *Pedostrangalia* SOKOLOV, 1896

Type species: *Strangalia kassjanowi* SOKOLOV, 1896 = *Leptura imperbis* MÉNÉTRIÈS, 1832 (monobasic)

Body white or yellowish, robust, very deeply constricted between segments, not depressed (except in proth), bearing moderately to very dense short fine setae.

Head very large, very little retracted. Cr transverse (about 1.5–1.7), moderately depressed (about 2.0–2.2), very broad, slightly narrower than (in sg. *Etorufus* almost as broad as) proth (Fig. 24H), entirely pigmented, yellow to yellow-orange, widest behind middle, anterior region ± distinctly very finely microgranulate. Ecr smooth, with very numerous setae in anterior half, usually more than one adfrontal seta on each side (except for young larvae), main one longest; adfrontal setae may not be sharply separate from other ecr setae. Sides of ecr particularly in sg. *Etorufus* abruptly roundly convex (Figs 24D, 25G), both halves touching ± in one point, hind margin sharply angulate, about or slightly over 90 degrees.

Fl sharp, very narrow, at most gently S-curved, passing through ant openings, ± weakened reaching anterior cr margin. Pof flat or at most very slightly concave, main pair of setae discal in position, usually supplemented by ± numerous other setae. Tfl absent, or in mature larvae present as a diffuse transverse pale zone. Prf not darker than pof, gently convex, with greater number of setae, main four pairs ± distinguishable by greater length. Epmg very dark, obliquely declivous, usually very shallowly emarginate. Often more than six eps, main three pairs usually longest, and all somewhat distant from sharply impressed cl border. Mfl very narrow, in later instar larvae not reaching empg.

Cl small, trapezoidal, moderately tapering, convex, with strongly sclerotized narrow basal, band, basal half and ± also lateral margins yellowish. A lateral seta may be present. Lbr (Fig. 25C) small, feebly convex, very long, at most slightly shorter than broad, cordate to subcircular, almost entirely sclerotized except for narrow apical area (in *Pedostrangalia* s. str. basal half usually more strongly sclerotized than apical half). Sparse stout setae along apical and lateral margins, usually more than two discal setae in a ± distinct transverse row, main pair longest. Hind eph region narrow, raised (more so in sg. *Etorufus*), anteriorly between tormae with a very short tight transverse row of miniature sensilla. Tormae short, broad, ±

transverse with medial extremities curved somewhat backwards (*Pedostrangalia* s. str.), in sg. *Etorufus* very short, running somewhat obliquely forward (Fig. 25D). Anterior region with two large densely setose narrowly separate areas projecting far backwards between tormae.

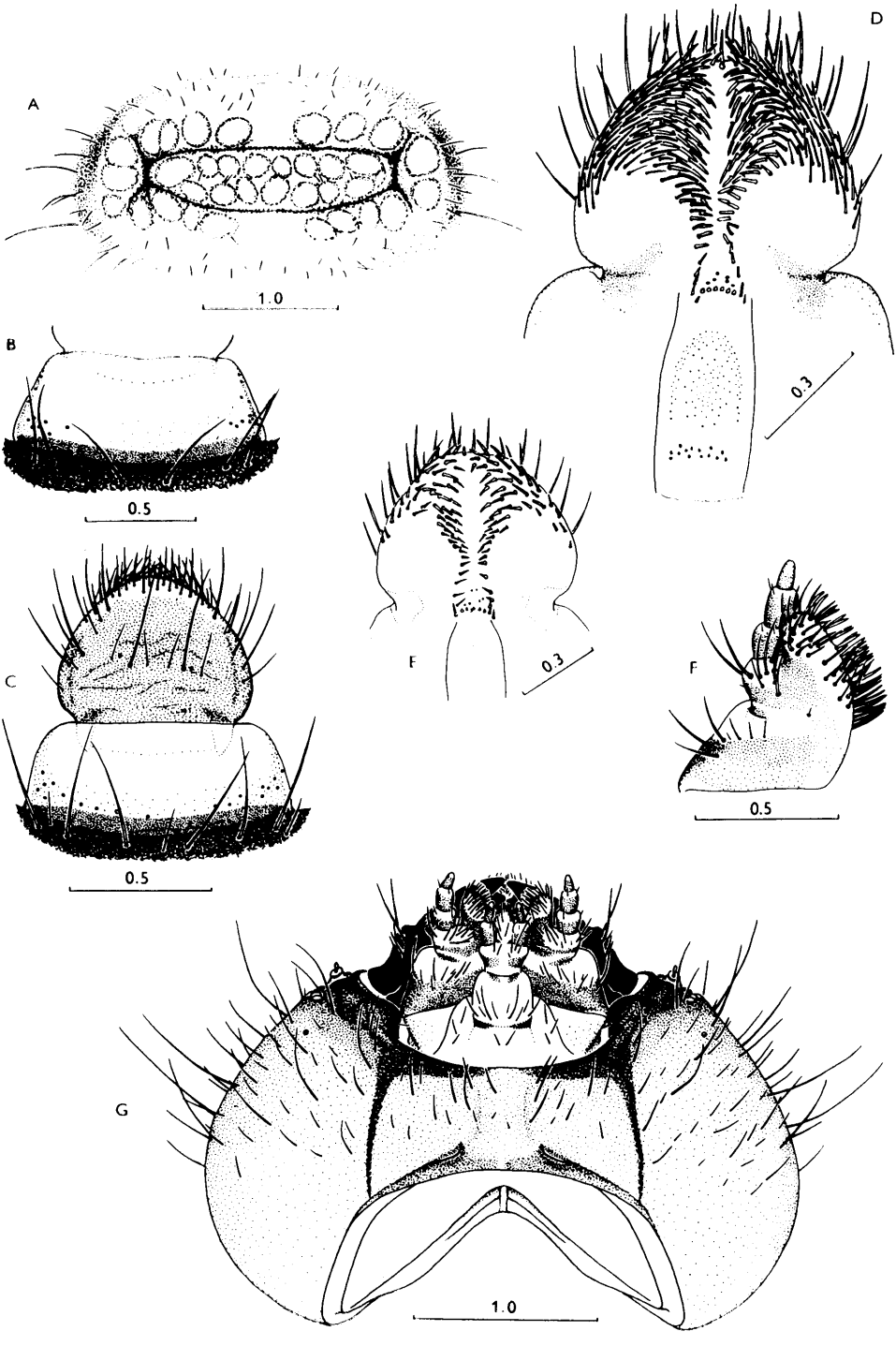
Plst feebly raised, deeply sclerotized, dark, usually ± rugose, sfp absent (or at most indistinct broad tubercle). Gena at most finely rugose, slightly darker than ecr, pigmentation about as wide as plst. Three mstm (rarely partial fusions occur), not very large, moderately convex, with ± distinct pigment spots. Dstm inconspicuous, often lying in a larger pale area, with at most very small pigment spots; vstm at most as a pale spot.

Vs long to extremely long (1.7–2.7, Figs 24D, 25G), convex, not darker than ecr. Anterior margin relatively deeply emarginate, distinctly declivous and separated by an abrupt impression from lmx base, narrow dark pigmentation of hyp portion disappears in gular region. Hypl very narrow, curved, initially diverging, esp. in sg. *Etorufus* subparallel or even converging posteriorly, almost always distinctly reaching pocl. Mtt distinct, pigmented, relatively close to hind margin (but in fact well separate from it due to great length of vs), medial extremities distinctly curved anteriorly (not or less distinctly so in most other Lepturini). Gula narrow, gl slightly raised, mgl ± diffuse, reaching anterior margin. More or less numerous setae present.

Ant short, moderately retractile, three-segmented, pointed distinctly obliquely ventrad. Ant ring sclerotized, medially raised. Segments sclerotized, second short, rarely almost as long as broad. Third segment slender, at least as long as broad, at most slightly longer than large ± elongate main sensillum.

Excellently developed md type II (Figs 24E, F, G), md short, robust, very stable in shape. Border zone distinctly striate. Apex prominent, very sharp, dorsal angle reduced. Large dorsal and inner striated plates. Two sharp inner keels present, running close together, small supplementary tooth may be present at their posterior extremities. Basal part without remarkable sculpture, in *Pedostrangalia* s. str. with abrupt lateral protuberance. Several (occasionally many) lateral setae.

Lmx (Fig. 25G) very small, similar in general appearance to such genera as *Oxymirus* or *Sachalinobia,* non-flattened. Basal components well separate, finely sclerotized, cardo extremely large, with one or even more setae. Distal maxilla (Fig. 25F) moderately robust, largely sclerotized. Pgmx large, with fine ventral pigmented band and large deeply sclerotized basal spot. Mala unusually broad, not cylindrical, inner side somewhat carinate, inserted slightly above labium when at rest; broad pigmented band connected with ventral pigmentation of pgmx. Pamx long, slender, first two segments subequal in length, third shorter. Labium somewhat step-like (submentum and prlb in different planes). Mt with large transverse narrowly separate (occasionally almost connected) basal spots. Prlb very narrow, with basal apodeme sclerotized, causing two large paired basal spots. Pglb pigmentation narrowly separate, palb long, separated by at most one their own width. Ligula and whole dorsal anterior labial portion extremely narrow, with several strong ventral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setae, apical and dorsal surface covered with extremely dense long distinct (occasionally very coarse) golden to ferrugineous microtrichia. Ligula in sg. *Etorufus* slightly ventrally sclerotized.

Proth broad, esp. in sg. *Etorufus* broadest of body segments (Fig. 24H), widest anteriorly, tapering towards base. Pn irregularly (in hind half ± longitudinally) grooved, with sparse scattered short setae. Anterior pigmentation distinct, yellow to orange, with one indistinct anterior notch on al which are almost entirely sclerotized. Protergal pigmentation with posterior border unusually sharply defined. Indistinct basal rudiments of lfur present. Venter unsclerotized except for mpst discally in later instar larvae. Lpst bearing greater number of setae (but with a distinct tendency to develop a transverse row of longer setae), mpst with four strong and several shorter setae. Msp absent, or restricted and very fine anteriorly on stlf. All border lines between ventral regions very deeply impressed.

Meso- and metanotum with several ± distinct granules, praescutum and scutum may be anteriorly mspte, scutum ± interrupted medially. Al moderately protuberant. Mesoth spir large, narrowly oval, upper half of hind margin with up to about 20(−30) small to very small mgch. Metath spir unusually well developed, but sometimes pale, poorly sclerotized. Transsternal lines distinct, sterna conspicuously granulate, granules large, moderately protuberant. Msp absent, or very much restricted, may be present on coxae, latter very poorly defined. Bst undivided (Fig. 26A).

Legs moderately long, slender, bearing sparse setae. Left and right leg relatively close together, therefore legs not much shorter than one-half of their basal distance. Trch well developed, with complete basal sclerotized ring and several setae. Femur and ti subequal in length, may be finely sclerotized, ptrs slightly shorter, slender, claw ± straight, needle-shaped, strongly sclerotized, stout seta borne in basal half.

Aa seven, granulate, narrow, abruptly protuberant, making abd laterally compressed rather than dorsoventrally depressed. Granules very large, moderately protuberant, msp much restricted to absent (may be present along anterior margin of some aa, and also along intersegmental borders). Seventh aa moderately to very strongly reduced. Daa with one lateral impression on each side, anterior transverse line simple (Fig. 25A). Spir much smaller than mesoth one (first abd spir about twice shorter), ± narrowly oval, with up to about 10−15(20) small mgch. Plt small, oval, with 2−3 longer and varying number of shorter setae. Carm absent, ninth tergum posteriorly rounded, may have a yellow spot at hind margin in place of urogomphi. Atu small, almost terminal, apl bearing very sparse short setae, devoid of msp.

◀

Plate 25: A - *Pedostrangalia pubescens*, first dorsal ambulatory ampulla. B - *P. vicaria*, epistomal margin and clypeus. C - *P. pubescens*, epistomal margin, clypeus and labrum. D - *P. pubescens*, epipharynx. E - *P. circaocularis*, anterior epipharyngeal setae and sensilla (setae may be denser than in this specimen). F - *P. pubescens*, right distal maxilla, ventromedial view. G - *P. revestita*, head, ventral view.

A Holarctic genus, the known larvae can be divided into two relatively sharply separate subgenera [but larvae of two interesting Palaearctic species, namely *P. emmipoda* (MULSANT, 1863) and *P. verticalis* (GERMAR, 1822), are unknown]. *Pedostrangalia* s. str. apparently restricted to Palaearctics, larvae develop in deciduous trees. The subgenus *Etorufus* (incl. *Nakanea*, see chapter on classification) being Holarctic, and known only from conifers. Seven Palaearctic species available.

1 (6) Ventral sclerite shorter (over 2, Fig. 25G). Mandible with abrupt lateral protuberance (Figs 24F, G) (*Pedostrangalia* s. str.).
2 (5) Pterothoracic praescutum and scutum anteriorly without well discernible microspines.
3 (4) Seventh ampullae extremely reduced, almost not protuberant, with dividing lines partly obliterated. Dorsal mandibular plate finely striate (more so than in *P. revestita*, cf. Fig. 24F). Far East ..... *femoralis*
4 (3) Seventh ampullae similar to preceding ones, slightly smaller, abruptly protuberant. Dorsal mandibular plate with several coarse ridges (Fig. 24G). Crete ..... *ariadne*
5 (2) Pterothoracic praescutum and scutum anteriorly distinctly largely microspiculate (not visible in contracted specimens!) ..... *imperbis, revestita*
6 (1) Ventral sclerite extremely long (2 and less, Fig. 24D). Mandible without abrupt lateral protuberance (Fig. 24E) (sgg. *Etorufus* MATSUSHITA, 1933 + *Nakanea* OHBAYASHI, 1963).
7 (8) Clypeus with sensilla not restricted to posterior angles (Fig. 25C). Epipharynx with ± numerous setae reaching far behind along lateral margins (Fig. 25D). Later instar larvae almost always with some supplementary smaller epistomal setae. West Palaearctics ... . *pubescens*
8 (7) Clypeus with sensilla ± restricted to posterior angles, usually no sensilla medially from middle pair of epistomal setae (Fig. 25B). Epipharynx with setae sparser esp. on lateral margins (*P. circaocularis*, Fig. 25E), or almost always only six epistomal setae (*P. vicaria*). Far East islands ..... *circaocularis, vicaria*

Pedostrangalia (s. str.) *ariadne* (K. DANIEL, 1904)

Similar to *P. revestita*. Pterothoracic nota without msp, or at most very few msp present along anterior margin of praescutum. Ligula with extremely coarse ferrugineous microtrichia. Md dorsal plate with few very coarse ridges (Fig. 24G). Mgl distinct. Metanotum with few indistinct granules. Seventh aa slightly reduced, abruptly protuberant, similar to others. Largest available larva 16 mm.

Host plant: *Platanus* (single known). Habits similar to *P. revestita* (M. Sláma, pers. comm.).
Distribution: Crete.
Material: 11. 6. 1981, Greece, Crete, Therison, 4/I, *Platanus orientalis*, M. Sláma lgt. et coll.

Pedostrangalia (s. str.) *imperbis* (MÉNÉTRIÈS, 1832)

Head not so extremely broad, cr more broadly rounded laterally, anterior cr opening broader, mouthparts relatively larger (cr/lmx width ratio up to about 2.9). Cr paler, yellow. Both head and body setae moderately dense. Tfl even in mature larvae very indistinct, almost absent. Lbr very slightly transverse, indistinctly cordate to subcircular, broadly rounded anteriorly, basal third much more strongly

sclerotized than remaining area. Vs shorter (about 2.5–2.9), with up to about 15 setae on each half. Mgl indistinct. Md with abrupt lateral protuberance, dorsal plate relatively coarsely striate, ventral inner keel with very distinct dense short impressions from ventral side.

Proth just slightly broader than following body segments, moderately tapering towards base. Pterothoracic praescuta and scuta anteriorly distinctly mspte, esp. metanotum bearing great number of relatively flat yet well discernible granules. Seventh aa strongly reduced, very small, feebly protuberant. Length up to 20 mm.

Host plant: Available larvae from *Juglans,* may develop also in other deciduous trees. Larvae bore in dead wood in contact with living tissue, habits apparently similar to *P. revestita.*

Distribution: South coast of Caspian Sea, from Talysh through North Iran to Kopet-Dag.

Material: 23. 5. 1971, SU, Turkmenia, Ipai-Kala, 7/I, *Juglans,* B. M. Mamaev lgt., coll. IS and S; May 1979, SU, Talysh, Avrora, 2/–, host not stated, lgt. S. Aksentev, coll. IS.

Pedostrangalia (s. str.) *revestita* (L., 1767)

Figs 24F, 25G. Extremely similar to *P. imperbis,* reliable morphological differences have not been found. Distribution will separate the two species. Ninth tergum in later instar larvae with ± sclerotized (sometimes ± paired) yellow spot at hind margin (not found in available larvae of *P. imperbis*). Length up to 20 mm.

Host plants: *Populus, Ulmus, Juglans, Acer, Betula, Quercus* - apparently polyphagous on deciduous trees. Larvae exclusively in died out parts of living trees, in contact with living tissue (dead barkless areas after wounds, dead wood at bases of dry branches etc.). The wound usually tends to heal over, and the wood decays in a very special way, turning gradually ± dark brown. Usually high moisture. These special conditions are difficult to maintain in the laboratory. Two-, or perhaps three-year development, pupation in spring-summer in the food material, flight in summer.

Distribution: Europe except North, western Transcaucasia.

Material: 1977–85, CS, various spots, 23/I, (some series), *Quercus, Ulmus, Juglans, Acer, Betula,* lgt. M. Nikodým and S, coll. S.

Pedostrangalia (s. str.) *femoralis* (MOTSCHULSKY, 1860)

Similar to *P. imperbis,* main differences in the key. Both seventh daa and vaa even slightly more reduced. Dorsal md plate with somewhat more numerous finer grooves. Vs on average longer, although the ratio never as low as 2. Largest available larva 23 mm.

Habits (judging from CHEREPANOV, 1979) similar to *P. revestita.* Larvae found in *Acer* and *Pirus* (our larvae from *Ulmus* and *Sorbus*). Two-year development.

Distribution: Far East (Amur-Ussuri region, NE China, Korea, Sakhalin, South Kuriles, Japan).

Material: 20. 9. 1964, SU, Ussuri region, Suputinka Nat. Res., 2/–, *Ulmus,* B. M. Mamaev lgt., coll. IS; 7. 6. 1985, SU, Sakhalin, Kuznetsovo, 3/I, *Sorbus,* lgt. D, coll. IS.

Pedostrangalia (Etorufus) pubescens (F., 1787)

Head extremely broad (Fig. 24H), cr laterally very strongly convex, anterior cr opening esp. in mature larvae extremely narrow (Fig. 24D), mouthparts very small (cr/lmx width ratio often over 3), cr in mature larvae more strongly sclerotized, yellow-orange with paler lateral longitudinal band. Setae very dense. Later instar larvae almost always with at least one-two shorter supplementary eps. Cl with sensilla not restricted to posterior angles (Fig. 25C). Lbr comparatively longer, about as long as broad, cordate, more acutely tapering towards apex, sclerotization ± homogeneous. Vs extremely long (below 2), in later instars almost always over 20 (not infrequently over 30) setae on each half, in young larvae at least 15–20 setae. Mgl distinct. Md without abrupt lateral protuberance, dorsal plate finely striate (Fig. 24E), ventral inner keel with indistinct sparse impressions on ventral side.

Proth very broad, distinctly broader than other body segments, strongly tapering towards base. Pterothoracic praescutum and scutum ± distinctly mspte. Seventh aa strongly reduced (slightly less than in *P. imperbis,* more than in *P. ariadne*). Length up to 30 mm.

Host plants: *Pinus* (single known). Larvae found in *Pinus*-stumps, in moist moderately decaying wood, do not require the special conditions of *Pedostrangalia* s. str. Occasionally together with *Corymbia rubra* and *Anastrangalia sanguinolenta.* Probably three-year development. Pupation in the wood in spring/summer, flight in summer, adults visit flowers.

Distribution: Europe except North, Asia Minor.

Material: 1975–78, CS, Slovakia, Lipt. Hrádok env., Kráľova Lehota, +/I, *Pinus,* lgt. et coll. S.

Pedostrangalia (Etorufus) circaocularis (PIC, 1934)

Note: This species was described as *Etorufus variicornis* by MATSUSHITA, 1933. Subsequently (GRESSITT, 1951) it was placed in the genus *Leptura,* thus becoming a junior secondary homonym of *Leptura variicornis* DALMAN, 1817; GRESSITT (l.c.) therefore used the name *circaocularis* PIC, 1934. Since this change was done before 1961, the name *variicornis* MATSUSHITA remains invalid, even if *variicornis* DALMAN is now usually classified under *Corymbia* (International Code of Zoological Nomenclature, 3rd Edition, 1985, Article 59b).

Extremely similar to *P. pubescens,* best distinguished geographically. Pubescence slightly sparser; mature larvae with setae about as numerous as in young larvae of *P. pubescens,* and distinctly stronger. Up to about 15–20(25) setae on each half of vs, about 8–15 of them larger. Ligula bearing about 4–8 ventral setae. Eph setae sparser, esp. laterally (Fig. 25E). Supplementary eps in mature larvae mostly present, but less numerous. Cl often with a lateral seta, sensilla restricted to hind angles. Pigment spots of mstm black, distinct, rather compact. Length up to 30 mm.

Habits (CHEREPANOV, 1979): Apparently similar to *P. pubescens.* Larvae in *Picea* and *Abies,* in decaying wood of greater diameter, occasionally together with *P. vicaria, Corymbia succedanea,*

Leptura regalis. Pupation in June-July in the wood, adults July to September on flowers. Two- or three-year development.

Distribution: Sakhalin, South Kurile Islands, Japan.

Material: 3. 6. 1985, SU, Sakhalin, Kuznetsovo, cca. 20/I, indet. coniferous tree, lgt. D, coll. IS.

Pedostrangalia (Nakanea) vicaria (BATES, 1884), comb. n.

Extremely similar to *P. pubescens* and *P. circaocularis*, no absolutely reliable distinguishing characters have been found. Setae about as in *P. circaocularis* (not so strong), but almost always only six eps. Eph intermediate. Cl devoid of setae, sensilla ± restricted to hind angles. Pigment spots of mstm less conscpicuous than in *P. circaocularis*. Length up to 30 mm.

Habits similar to *Etorufus*-species. *Picea, Abies*.

Distribution: South Kurile Islands, Sakhalin, Japan.

Material: 1972, 1977, SU, Kurile Islands, Kunashir, 14/I (some series), *Abies* and *Picea*, lgt. A. V. Kompantsev and D, coll. IS and S.

Genus *Neopiciella* SAMA, 1988

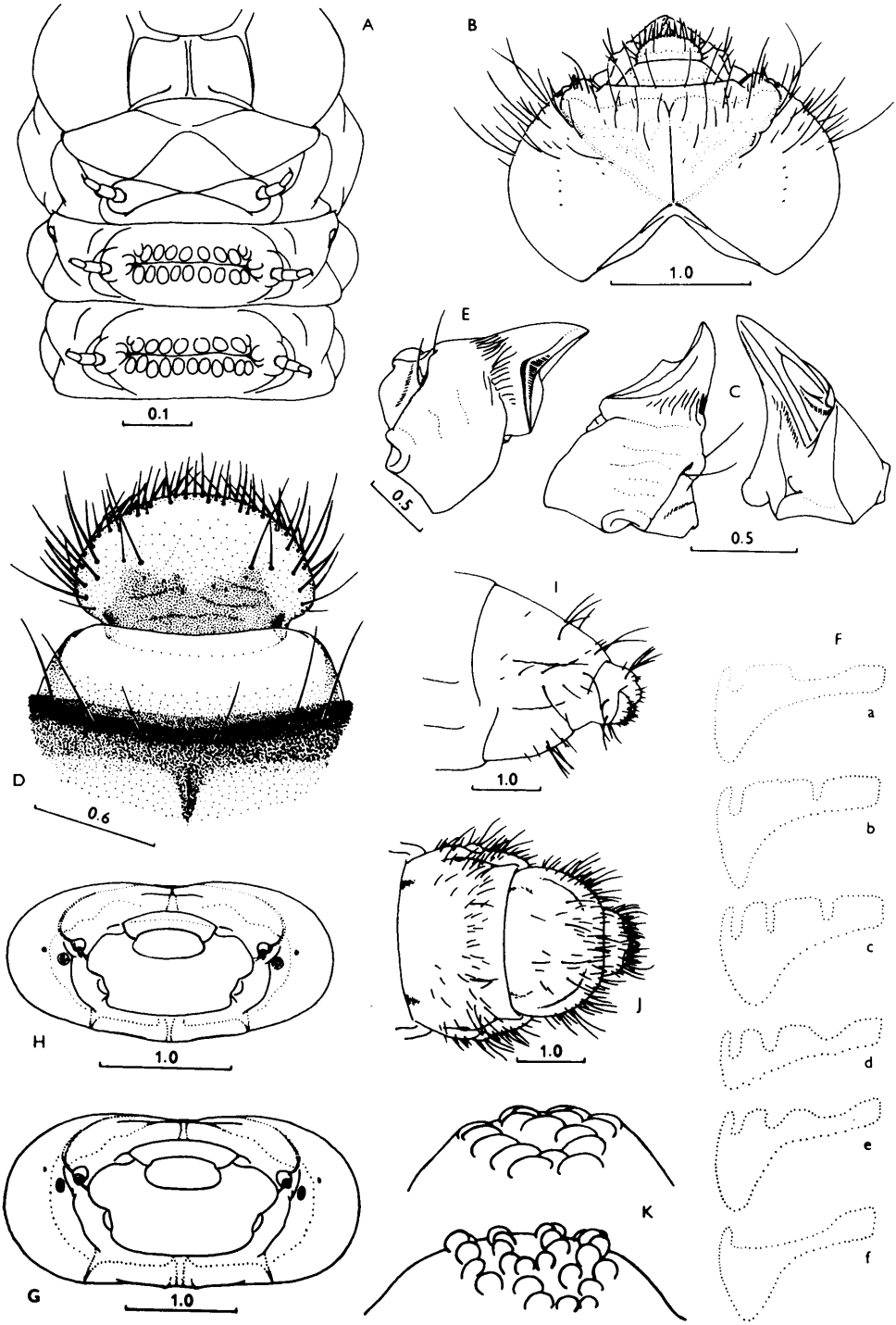
Type species: *Leptura sicula* GANGLBAUER, 1885 (orig. design.)

Note: This genus corresponds to *Piciella* VILLIERS, 1946 (described as a subgenus of *Leptura*), nomen nudum, nec *Piciella* BORCHMANN, 1936 (Tenebrionoidea) (cf. SAMA, 1988).

Similar to *Pedostrangalia* (particularly to *Pedostrangalia* s. str.), main differences and restrictions as follows.

Body and head setae moderately dense. Cr (Fig. 26B) of similar proportions, transverse (1.62), moderately depressed (2.18; one specimen measured), very pale yellow, almost not microgranulate. At most miniature supplementary adfrontal setae, main pair well separated from other ecr setae. Fl very narrowly and indistinctly bisecting strongly raised ant ring and ± ending in ant openings. Main pair of pof setae slightly shifted anteriorly, pof with at most small supplementary setae. Six eps closer to cl border. Mfl in later instars may be interrupted (i.e. anterior fragment present; it may be very indistinctly preserved also in some specimens of *Pedostrangalia*). Cl pigmentation very indistinct. Lbr moderately transverse (nearly twice as broad as long), ± oval, broad anterior region unsclerotized, two discal setae. Tormae transverse, medial extremities slightly curved caudad. Gena uneven, broadly pigmented, darker pigmentation about twice as broad as plst, and not sharply delimited posteriorly. Stemmata better developed, vstm ± visible, mstm with large black spots (one available specimen with only two mstm on right side). Vs slightly shorter (about 3), mgl diffuse, indistinct, about 5–10 setae on each side, hind margin and mtt very poorly pigmented.

Modified md type II (Fig. 26C), basal part with moderate lateral protuberance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and two setae. Lmx about as large as in *Pedostrangalia* s. str. (cf. Fig. 25 G). First two pamx segments shorter. Basal mt spots broadly separate, those of prlb small, indistinct. Ligula with setae extended also on apex and sides, microtrichia restricted to dorsal face, almost invisible in ventral view.

Proth pigmentation pale yellow. Mpst unsclerotized. Meso- and metanotum anteriorly mspte. All granules smaller. Mgch of all spir slightly larger. Femur and ti almost unsclerotized. Abd segment 7 without aa. Natural length of largest (damaged) available larva about 9–10 mm.

Neopiciella sicula (GANGLBAUER, 1885)

Habits (G. Sama, in correspondence) similar to those of *Pedostrangalia revestita*; larvae have been found in *Acer campestre*, together with *Schurmannia sicula* (Spondylinae; Part 1: 140). According to SAMA et SCHURMANN (1980), this species develops also in *Fagus* and *Quercus*.

Distribution: Italy (Sicily).

Material: 1986–1987, Italy, Sicily, Madonie, Piano Zucchi, 3 + exuvia/l, *Acer campestre* (and ex ovo), lgt. G. Sama, coll. G. Sama and S.

Genus *Lepturobosca* REITTER, 1913

Type species: *Leptura virens* L., 1758 (monobasic)

Relatively similar to *Pedostrangalia*, in some characters slightly transitional towards the *Leptura*-group (other Japanese or North American pronouncedly transitional genera exist). Compared with *Pedostrangalia*, main differences and restrictions are as follows.

Body white, ± cylindrical, with relatively dense very short fine ferrugineous setae.

Cr slightly narrower than proth, widest very slightly behind middle, bright orange-ferrugineous, almost without microsculpture, smooth, shining. Sides strongly roundly convex (± intermediate between *Etorufus* and *Pedostrangalia* s. str.). Fl abruptly shortly S-curved at tfl level. Tfl relatively distinct for Lepturini, yet rather diffuse and often ± incontinuous. First two pairs of main prf setae arranged ± in a single transverse row (in preceding three genera, medial pair ± far before second one). Six eps present. Mfl reaching epmg, in later instars much weakened by tfl. Lateral cl

Plate 26: A - *Pedostrangalia circaocularis*, thorax, ventral view (setae omitted). B - *Neopiciella sicula*, head, dorsal view. C - *N. sicula*, right mandible, dorsal (left) and medial (right) views. D - *Lepturobosca virens*, epistomal margin, clypeus and labrum. E - *L. virens*, left mandible, dorsolateral view. F - Shape of left half of protergal pigmentation: *Cornumutila quadrivittata* (a), *Strangalia attenuata* (b), *Rutpela maculata* (c), *Anoplodera sexguttata* (d), *Stictoleptura erythroptera* (e), *Oedecnema*-group (f). G - *Lepturalia nigripes*, cranium, clypeus and labrum, anterior view. H - *Brachyleptura maculicornis*, dtto. I - *B. pallidipennis*, end of abdomen, lateral view. J - *Vadonia unipunctata*, end of abdomen, dorsal view. K - Diagrammatic illustration of flat (upper) and strongly protuberant (lower) granules of ambulatory ampullae (drawn from dorsal ampullae in lateral view of *Anoplodera sexguttata* and *Leptura aurulenta* respectively).

pigmentation narrow. Lbr (Fig. 26D) moderately transverse, distinctly convex, anterior half very pale, anterior margin unpigmented, with setae denser, one strong isolated discal pair present. Anterior eph region shorter. Genal pigmentation somewhat broader and darker. Mstm ± fused, abruptly protuberant, pigment spots small, indistinct (three original spots may be distinguishable). Dstm indistinct, vstm sometimes absent. Vs more convex, moderately long (about 2.8–3). Hypl diverging, mtt closer to distinctly pigmented hind margin, their medial extremities not curved anteriorly (cf. Figs 24D, 25G). Mgl relatively distinct, reaching anterior margin. Up to about 10–15 setae on each half of vs.

Ant slightly longer, segment 2 not much shorter than broad, main sensillum shorter. Md type II-keel smaller (Fig. 26E), dorsal and inner plates not striate. Basal md part more deeply impressed laterally at base, with two strong and very few small setae. Cardo slightly smaller, pgmx strongly sclerotized, mt with basal pigmentation narrowly connected, basal prlb apodeme pigmentation unpaired (or with two small lateral supplementary spots).

Proth with sides only moderately converging towards base, dorsal pigmentation not so sharply delimited posteriorly. Meso- and metath only slightly narrower than proth. Pterothoracic nota may or may not be mspte (msp present at least on scutum in larvae from USSR, in those from Sweden and particularly France, msp almost absent). Pterothoracic coxae with small mspte area (in French larva absent as well). Trch with basal ring very conspicuous, legs slightly more broadly separate.

Abd ± cylindrical, not laterally compressed. Aa 7 very slightly reduced. Two larvae from USSR with restricted msp along anterior and lateral margins of vaa, sometimes with small mspte spots at anterior angles of daa; in remaining two larvae, msp ± absent. All spir (incl. mesoth ones) broader and ± shorter, mgch very small, extremely numerous (up to over 40 in mesoth spir). Plt with two longer and about 2–6 shorter setae. Relatively distinct msp present around atu. Largest available larva 30 mm.

One species known, broadly distributed in Palaearctics where it has apparently no close relatives.

Lepturobosca virens (L., 1758)

Host plants: *Pinus, Picea*; *Betula* (PALM, 1959: 311). Larvae in old dead wood of greater diameter (stumps, fallen trunks etc.). Several-year development. Pupation spring/summer in the wood, flight in summer, adults visit flowers.

Distribution: Europe, Siberia, Far East incl. islands, in coniferous forests.

Material: 1. 6. 1967, SU, Ukrainian SSR, Rakhov, 2/I, *Picea*, B. M. Mamaev lgt., coll. IS; 20. 5. 1979, Sweden, Ragunda sn., 1/I, *Pinus*, T. Palm lgt., coll. S; 1981, France, Pyrenées occ., Oredon, 1/I, *Pinus*, lgt. et coll. M. Sláma.

The *Leptura*-group

This group, although might seem rather heterogeneous when comparing its most remote forms, contains genera whose species could join practically any two states (occurring in the group) of a character by a chain of transitional situations. The group (particularly certain its genera, e.g. *Anastrangalia*) has distinct relations to the genera around *Pedostrangalia,* and transitional forms do exist in the world fauna. Even after removal of some unrelated groups, distribution of species among genera and validity and relations of various genera created for regional faunas are far from being clear. Changes are to be expected, and the genera listed below are therefore treated as a single generic group. For some additional remarks see the general taxonomic chapter.

Genus *Anastrangalia* CASEY, 1924

Type species: *Leptura sanguinea* LECONTE, 1859 (orig. design.)

Genus *Anoplodera* MULSANT, 1839

Type species: *Leptura sexguttata* F., 1775 (THOMSON design., 1864)

Genus *Brachyleptura* CASEY, 1913

Type species: *Leptura vagans* OLIVIER, 1795 (orig. design.)

Genus *Corymbia* DES GOZIS, 1886

Type species: *Leptura rubra* L., 1758 (orig. design.)

Genus *Dokhtouroffia* GANGLBAUER, 1886

Type species: *Dokhtouroffia turkestanica* GANGLBAUER, 1886 = *Leptura nebulosa* GEBLER, 1845 (?monobasic)

Genus *Leptura* L., 1758

Type species: *Leptura quadrifasciata* L., 1758 (WESTWOOD design., 1840)

Genus *Lepturalia* REITTER, 1912

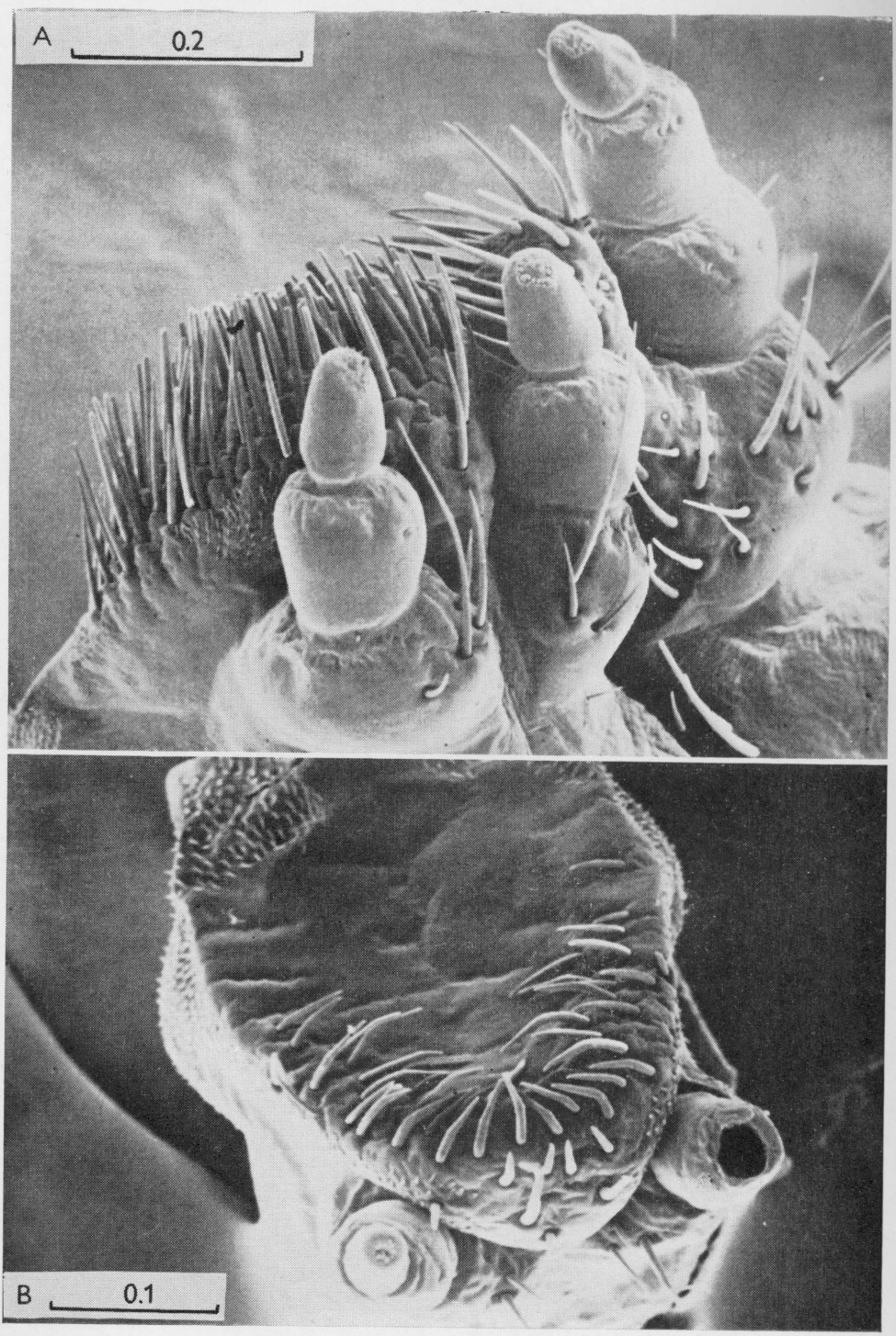
Type species: *Leptura nigripes* DEGEER, 1775 (monobasic)

Genus *Stictoleptura* CASEY, 1924

Type species: *Leptura cribripennis* LECONTE, 1859 (orig. design.)

Genus *Vadonia* MULSANT, 1863

Type species: *Leptura unipunctata* F., 1787 (FAIRMAIRE design., 1864)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Body white to yellowish, moderately robust to elongate, non-depressed, covered with short sparse to relatively dense setae.

Head about by half retracted. Cr moderately transverse (about 1.3–1.5), not much depressed (usually slightly below 2, seldom above 2), ± narrower than proth, relatively pale (at most yellow-orange, occasionally almost unpigmented), often partly distinctly microgranulate, widest usually slightly behind middle. Ecr ± smooth, with sparse to rather dense anterior setae, main adfrontal seta of varying position, may be accompanied by other minute setae. Sides roundly convex, both ecr halves shortly fused (about one-fourth to one-half of medial frontal length), hind cr notch angulate, narrow, less than 90 degrees.

Fl sharp, narrow, ± distinct, ± straight, entering ant openings, weakened ± reaching anterior cr margin. Frons triangular. Pof flat to broadly concave, relatively smooth, main pair of pof setae moved ± anteriorly, occasionally almost indistinguishable from prf setae. Tfl extremely indistinct, diffuse, or absent. Prf at most gently convex, usually darker than pof, at most finely transversely striate, always with more than four pairs of setae. Epmg dark, strongly sclerotized, straight or shallowly emarginate, ± abruptly obliquely to almost perpendicularly declivous, six eps close to cl border. Mfl ± distinctly reaching epmg, in later instars ± weakened at tfl level.

Cl usually relatively narrow, trapezoidal, ± convex, basal half usually finely sclerotized. Lbr slightly to distinctly transverse, usually ± convex, at least basal half sclerotized. Sparse to rather dense setae along anterior margin, discal setae isolated, two or more, then arranged in a ± distinct transverse row. Hind eph region narrow to moderately broad, distinctly to moderately raised, medial sensilla hair-like to short and tooth-shaped, usually arranged in a ± distinct transverse row. Tormae short to moderately long, oblique to almost transverse, abruptly curved to angulate in *Leptura*. Anterior region always with two setose areas, setae may or may not reach medial group of sensilla (Figs 29A, B, C), occasionally surounding it, making it hardly visible. Eph microtrichia never too widespread.

Plst strongly sclerotized, raised, in mature larvae sometimes with rough macrosculpture. Sfp moderately large to absent. Genal pigmentation about 1–3 times as broad as plst, gena in mature larvae may be finely rugose. One variably developed mstm facing anteriorly to anterolaterally. Other stemmata mostly indistinct or absent.

Vs long to rather short (Figs 28B, C), distinctly (often strongly) convex, in later instars often darker than ecr. Anterior margin ± emarginate, dark except for middle of gula, sharply separate from lmx base. Hypl diverging, reaching pocl. Mtt short,

◀

Plate 27 (scanning electron micrographs): A - *Leptura quadrifasciata*, praelabium and apical part of left maxilla, lateroventral and slightly apical view (note dense setae and restricted short lateral microtrichia on ligula). B - *Vadonia unipunctata*, labium, apical view (terminal segment of left labial palp broken).

close to ± darkened hind margin. Gl may be raised, mgl not very broad, reaching anterior margin.

Ant moderately to very long, three-segmented (rarely segment 3 completely reduced), pointed obliquely ventrad, very deeply retractile, connecting membrane large, prominent. Ant ring moderately raised except dorsally. Segments sclerotized, cylindrical, second slightly shorter to distinctly longer than broad, third of variable length, main sensillum small to moderately large.

Md type I or II (Figs 28F to I), short, robust, apex and dorsal angle prominent, two distinct inner keels present. Basal part may be transversely striate, bearing varying number of setae.

Lmx small (particularly in *Anastrangalia*) to moderately large, not flattened. Basal components well separate, at most finely sclerotized, cardo large, bearing short seta. Distal maxilla moderately robust, pgmx large, ventral pigmented band present, basal spot present or absent. Pamx relatively long, segments usually progressively shortening from 1 to 3, or subequal. Mala cylindrical, moderately robust to relatively slender, with broad pigmented band. Labium in some groups (esp. *Anastrangalia)* slightly step-like. Mt with large (occasionally connected) basal spots. Prlb basal apodeme usually pigmented (except for *Anoplodera*). Palb rather long, separated at base by 1–3 times their width. Ligula narrow to rather broad, rarely with distinct ventral pigmentation, bearing ± dense setae (Figs 27A, B), ± no microtrichia visible from ventral view except for *Vadonia moesiaca.*

Proth relatively long, only moderately transverse. Protergal pigmentation yellow to orange, with three anterior notches on each side (medial pair may be broad and shallow; Fig. 26F–d, e). Al usually sclerotized posteriorly. Pn distinctly (often very roughly) rugose, bearing usually greater number of discal setae except for some sparsely pubescent species. Indistinct vestigial lfur ± present. Praesternum in some species yellowish anteriorly. Lpst with numerous setae, at least about 8–10 (often much more) setae on mpst. Msp in variable extent, at least on stlf.

Pterothoracic nota microspiculate, non-granulate, or rarely metanotum with several small granules in middle (exception: *Stictoleptura erythroptera*). Al moderately protuberant. Mesoth spir moderately large (at most as long as pamx), broadly oval, bearing small to rather large (Fig. 28D) mgch. Metath spir well discernible. Sterna granulate, usually only metath bst ± distinctly divided. Coxae not very sharply defined. Msp in variable extent.

Legs short, hind femur and ti combined at least slightly shorter than one-fourth of hind legs' basal distance (measured between trch); moderately to very robust, occasionally with very dense setae (Fig. 30A). Trch with distinct basal ring, bearing several setae. Femur and ti subequal in length, ± unsclerotized. Ptrs short, stout, at most slightly compressed (distinctly so in some *Brachyleptura*), claw usually ± curved, seta borne about or before middle.

Abd with well protuberant granulate aa on segments 1 to 7, seventh aa may be very strongly reduced, seventh daa in some species absent. Msp in variable extent

(occasionally absent), but always absent from granules. Daa divided by two transverse lines, anterior one not distinctly doubled. Abd spir much smaller than mesoth ones. Plt small, oval, with about 2–10 setae. Carm absent, later instar larvae of *Lepturalia* mostly with a slightly sclerotized spot in place of urogomphi. Atu small (Fig. 26I), almost terminal, apl bearing short thin setae.

Key to genera and species of the *Leptura*-group

1 (60) Pronotum not microspiculate.

2 (59) Mesothoracic spiracle with relatively small marginal chambers rarely extended along whole hind margin. Ligula longer, rounded, with dense setae (Figs 27A, 29J). Ventral sclerite rarely *(Stictoleptura scutellata)* as short as in Fig. 28C (4 or more). Wood feeders.

3 (28) Prothoracic mediopraesternum with ± large microspiculate areas (Figs 29E, F, G).

4 (9) Mandible with relatively large type II-keel present (Fig. 28H).

5 (6) Maxillary palpiger without basal spot. Ventral sclerite bearing about 14–22 setae on each side, in later instar larvae distinctly darker than epicranium. Tibiotarsus (except for very young larvae) with more than 4 setae. Central Asia (*Dokhtouroffia* GANGLBAUER, 1886) ..... *Dokht. baeckmanni*

6 (5) Maxillary palpiger (except for very young larvae) with large basal spot. Ventral sclerite not darker than epicranium, bearing about 7–14 setae on each side. Legs with sparse setae, tibiotarsus bearing about 3–4 subapical setae. Not in Central Asia (*Corymbia* DES GOZIS, 1886).

7 (8) From lake Baikal westwards ..... *Corymbia rubra*

8 (7) From lake Baikal eastwards ..... *Corymbia succedanea*

9 (4) Mandibular type I, type II-keel at most vestigial, ± invisible in dorsal view.

10 (23) Mandible with at least 1–2 supplementary setae. Basal spots of mentum connected or at most narrowly separate. Tormae broad, abruptly curved, hind epipharyngeal region with a distinct sclerite (Fig. 29A) (*Leptura* L., 1758).

11 (22) Mediopraesternum with broad transverse microspiculate band (Figs 29F, G), very rarely narrowly interrupted. Distinct dark pigmentation of gena narrower than two widths of pleurostoma (although fine pigmentation may be broader). Ventral sclerite in young larvae not, in mature ones slightly darker than epicranium. Legs bearing sparse setae (*Leptura* s. str.).

12 (13) Seventh dorsal ampulla completely absent (no granules, at most small spots of microspines) ..... *Leptura* (s. str.) *quadrifasciata*

13 (12) Seventh dorsal ampulla very much reduced, but distinct granulate vestiges always present.

14 (15)! Ventral sclerite shorter, dark pigmentation of anterior margin and hypostomal lines relatively broader (Fig. 29D). Metanotum without granules. Europe, North Africa ... . *Leptura* (s. str.) *aurulenta*

15 (14)! Ventral sclerite slightly longer, pigmentation relatively narrower (Fig. 29D). Metanotum mostly with several smooth granules. If larvae more similar to *L. aurulenta*, then they are from Siberia or Far East.

16 (21)! Metanotum without granules except for some mature or submature specimens of *L. ochraceofasciata*, then they are usually very large (cranial width about 4.5–5 mm). Setae denser, ventral sclerite nearly always with 10 or more setae on each side (up to

about 20). Genal pigmentation (very fine in *L. duodecimguttata*) usually at least twice as broad as pleurostoma*).

17 (18)! Prothoracic episternum even in mature larvae ± without yellow spot on posterior angle. Seventh dorsal ampulla extremely reduced, entirely flat, with rows of granules incomplete, usually only very few scattered granules present. Genal pigmentation behind ventral mandibular articulation pale, yellow-brown, slowly fading posteriorly, in very young larvae gena only shade darker than epicranium. Smaller (cranial width up to 3.5 mm) ..... *Leptura* (s. str.) *duodecimguttata*

18 (17)! Prothoracic episternum with ± distinct yellow spot on posterior angle and/or seventh dorsal ampulla more distinct, often somewhat protuberant, with ± complete (only medially interrupted) two rows of granules. Genal pigmentation behind ventral mandibular articulation bright orange-ferrugineous (rather distinct even in young larvae), rapidly fading posteriorly. Large species. Only Far East.

19 (20)! Mediopraesternum with ± large smooth apical area, often with only moderately broad (rarely narrowly interrupted) transverse microspiculate band across middle (Fig. 29F). Scutal plate ± devoid of microspines, or they are restricted to several small spots, only in young larvae scutal plate often distinctly microspiculate medially (Fig. 30B) .... *Leptura* (s. str.) *ochraceofasciata*

20 (19)! Mediopraesternum with at most very small smooth apical area (Fig. 29G). Scutal plate particularly in younger larvae always distinctly ± continuously microspiculate along whole width (Fig. 30C) ..... *Leptura* (s. str.) *latipennis*

21 (16)! Metanotum almost always with at least one-two central protuberant smooth granules (often small and poorly visible!); cranial width up to 4 mm, usually less. Setae sparser, ventral sclerite with up to about 12 (as a great exception 14 – 15) setae on each side, usual number about 5 – 11. Genal pigmentation distinct, often not broader than 1 – 1.5 times the width of pleurostoma ..... *Leptura* (s. str.) *mimica, aethiops*

22 (11) Mediopraesternum with two separate microspiculate areas (Fig. 29E). Gena very broadly and strongly sclerotized, very dark, ventral sclerite even in young larvae slightly darker than epicranium, in mature larvae dark ferrugineous. Legs in later instars bearing dense setae (Fig. 30A) (*Leptura* sg. *Macroleptura* NAKANE et OHBAYASHI, 1957) .... *Leptura (Macrol.) thoracica*

23 (10) Two mandibular setae. Basal spots of mentum always ± broadly separate. Tormae slender, moderately oblique, hind epipharyngeal region at most finely diffusely sclerotized, without a well defined sclerite (Fig. 29C) (*Anoplodera* MULSANT, 1839).

24 (25) Mediopraesternum with a pair of narrow microspiculate areas running from hind angles obliquely towards centre. Granules of ampullae relatively small, separate .... *Anoplodera rufiventris*

25 (24) Mediopraesternum with ± broad uninterrupted transverse microspiculate band, occasionally almost entirely covered with microspines. Granules of ampullae large, flat, contiguous (Fig. 26K).

26 (27) Ventral sclerite longer (about 3 – 3.3), bearing about 2 – 5(7) setae on each side. West Palaearctics ..... *Anoplodera sexguttata*

27 (26) Ventral sclerite shorter (about 3.5), bearing about 10 setae on each side. Far East .... *Anoplodera cyanea*

28 (3) Prothoracic mediopraesternum devoid of microspines, or (very rarely, only a few specimens found in large series) they are extremely restricted (Fig. 29H).

29 (30) Epipharyngeal setae not reaching medial group of sensilla (Fig. 29B). Dorsal ampulla

*) The key couplets 16 to 21 are not much reliable. Determination of very young and/or single larvae should be avoided, or not relied upon.

7 absent (or entirely vestigial), main stemma smaller and remarkably broadly separated from pleurostoma (touching only its part forming antennal ring, Fig. 26G), and labrum always with more than two discal setae (*Lepturalia* REITTER, 1912) .... *Lepturalia nigripes*

30 (29) Epipharyngeal setae reaching medial group of sensilla. Dorsal ampulla 7 present, if vestigial or absent *(Brachyleptura)*, then main stemma very large and touching (or almost touching) pleurostoma (Fig. 26H), and labrum almost always with only two discal setae.

31 (36) Ventral sclerite very long; anterior cranial opening width/medial gular length ratio (usually much) below 2.7 (Fig. 28B). Seventh dorsal ampulla much reduced yet distinctly present (*Anastrangalia* CASEY, 1924).

32 (35) Large dorsally striate mandibular type II-keel present (Fig. 28F). Labrum longer (Fig. 29K) except for one West Palaearctic species.

33 (34)! Labrum relatively longer (Fig. 29K). Main stemma with pigment rather indistinct, occasionally almost absent. Ventral sclerite in later instars ± distinctly darker than epicranium, bearing rarely less than 15 (not infrequently about 20) setae on each side ..... *Anastr. dubia, reyi, sequensi*

34 (33)! Labrum mostly shorter, transversely elliptical. Main stemma with pigment spot rather distinct, that of dorsal stemma usually well visible. Ventral sclerite not or at most very slightly darker than epicranium, bearing rarely more than 15 setae on each side (maximum 19 in one available specimen, usually about 10–13) .... *Anastr. sanguinolenta*

35 (32) Mandible with type II-keel small, dorsal face not striate (Fig. 28G). Labrum more transverse (Fig. 29L). Far East ..... *Anastr. scotodes*

36 (31) Ventral sclerite shorter; anterior cranial opening width/medial gular length ratio above 2.7, if close to that value, then seventh dorsal ampulla rudimentary or absent*).

37 (50) Seventh dorsal ampulla present, usually about half as large as ampulla 6 or slightly smaller, with at least two ± complete rows of granules. Main stemma not remarkably large and convex, usually with only moderate pigment spot, dorsal stemmata usually without pigment (*Stictoleptura* CASEY, 1924).

38 (49) Metanotum without medial smooth granules, or they are very few, small, indistinct. Other combination of characters than that given under 49.

39 (40) Hypostomal region of ventral sclerite entirely distinctly very finely microgranulate,

*) Note added in proof: Here also the larvae of ?*Brachyleptura tesserula* (CHARPENTIER, 1825), obtained after finishing the manuscript. The larvae of this important species represent an expected (see p. 19) transitional form between *Stictoleptura* and *Brachyleptura* (dorsal ampulla 7 present, about half-reduced, main stemmata large, with very conspicuous pigment spots, although less convex than in typical *Brachyleptura*, also dorsal stemmata with distinct pigment). Some additional characters (also a mixture of characters typical for *Brachyleptura* and *Stictoleptura*): Adfrontal seta moved into frontal region. Labrum transverse, half-oval, bearing two discal setae. Small subfossal tubercle present. Darker genal pigmentation about twice as broad as pleurostoma. Ventral sclerite moderately long (about 2.8–2.9), poorly microgranulate, somewhat darker than epicranium except for very young larvae, about 5–8 setae on each side. Antennae short. Mandibular type I with two long and usually 1–2 minute setae. Maxillary palpiger with distinct basal spot, basal pigmentation of mentum interrupted, ligula broad, rounded, palps separated by about 1.5 times their width (perhaps more in mature larvae). Metanotum with at most a few small indistinct central granules. Microspines on ambulatory ampullae much restricted, granules relatively large, well protuberant. Spiracles with less than 10 moderately large marginal chambers. Praetarsus distinctly compressed. Largest available larva (half-grown) 11 mm.

Habits unknown, larvae reared from eggs. Material: Adults 14. 7. 1988, CS, Slovakia or., Stužica, on flowers of Daucaceae, lgt. et coll. S. Larvae reared without problems on rotten beach wood ("white rot"), growing relatively rapidly. A number of non-mature larvae available at the moment (December 1988), mostly still living. Distribution: Central and SE Europe, Caucasus, Transcaucasia, North Iran Asia Minor.

dull. Microspines much restricted, almost absent from ambulatory ampullae. Canary Islands ..... *Stictol. palmi*

40 (39) Hypostomal region of ventral sclerite at least partly ± shining. Particularly ventral ampullae always with relatively large microspiculate areas. Not from Canary Islands.

41 (48)! Ligula without pigment spot except for Transcaspian *S. cardinalis*. Labrum usually with two discal setae, or at most 1–2 small supplementary setae present. Ventral sclerite at most shade darker than epicranium. Maxillary palpiger often with basal spot. Mandible mostly bearing some small supplementary setae.

42 (43) Adfrontal seta not or at most very shortly shifted into postfrontal region. Maxillary palpiger with ± large basal spot (indistinct in very young larvae). Ventral sclerite bearing about 9–14 setae on each side, rarely less. NE Europe, Siberia, Far East .... *Stictol. variicornis*

43 (42) Adfrontal seta moved deep into postfrontal region (as in *S. scutellata*, Fig. 28A). Maxillary palpiger with basal spot mostly very small, occasionally lacking. Ventral sclerite bearing 3–10 (usually 4–8) setae on each side. South (rarely Central) Europe and North Africa to Central Asia.

44 (45) Mountains of Central Asia. Available larvae with very distinct ± compact black pigment spots of main stemmata ..... *Stictol. cardinalis*

45 (44) From Caucasus, Transcaucasia and North Iran westwards. Pigment of main stemmata usually less distinct, broken into small granules.

46 (47)! Available larvae with 6–10 setae on each side of ventral sclerite, gula with a pair of strong setae. Pigmentation of gena at its broadest point nearly twice as broad as pleurostoma. Compare with distribution ..... *Stictol. fontenayi*

47 (46)! Available larvae with 3–6 setae on each side of ventral sclerite, gula without setae. Darker genal pigmentation about 1.5 times as broad as pleurostoma. Compare with distribution ..... *Stictol. cordigera*

48 (41)! Ligula with distinct paired or V-shaped pigmented spot (Fig. 29J), often visible even in young larvae. Labrum with several discal setae in a transverse row. Ventral sclerite very short, in mature larvae much darker than epicranium (Fig. 28A). Maxillary palpiger without basal spot. Two mandibular setae ..... *Stictol. scutellata*

49 (38) Metanotum with relatively large medial area devoid of microspines and divided into large flat granules (Fig. 30D). Ventral sclerite bearing more than 10 setae on each side, ambulatory ampullae with microspines restricted to small spots at anterior angles or absent, granules large, flat, contiguous ..... *Stictol. erythroptera*

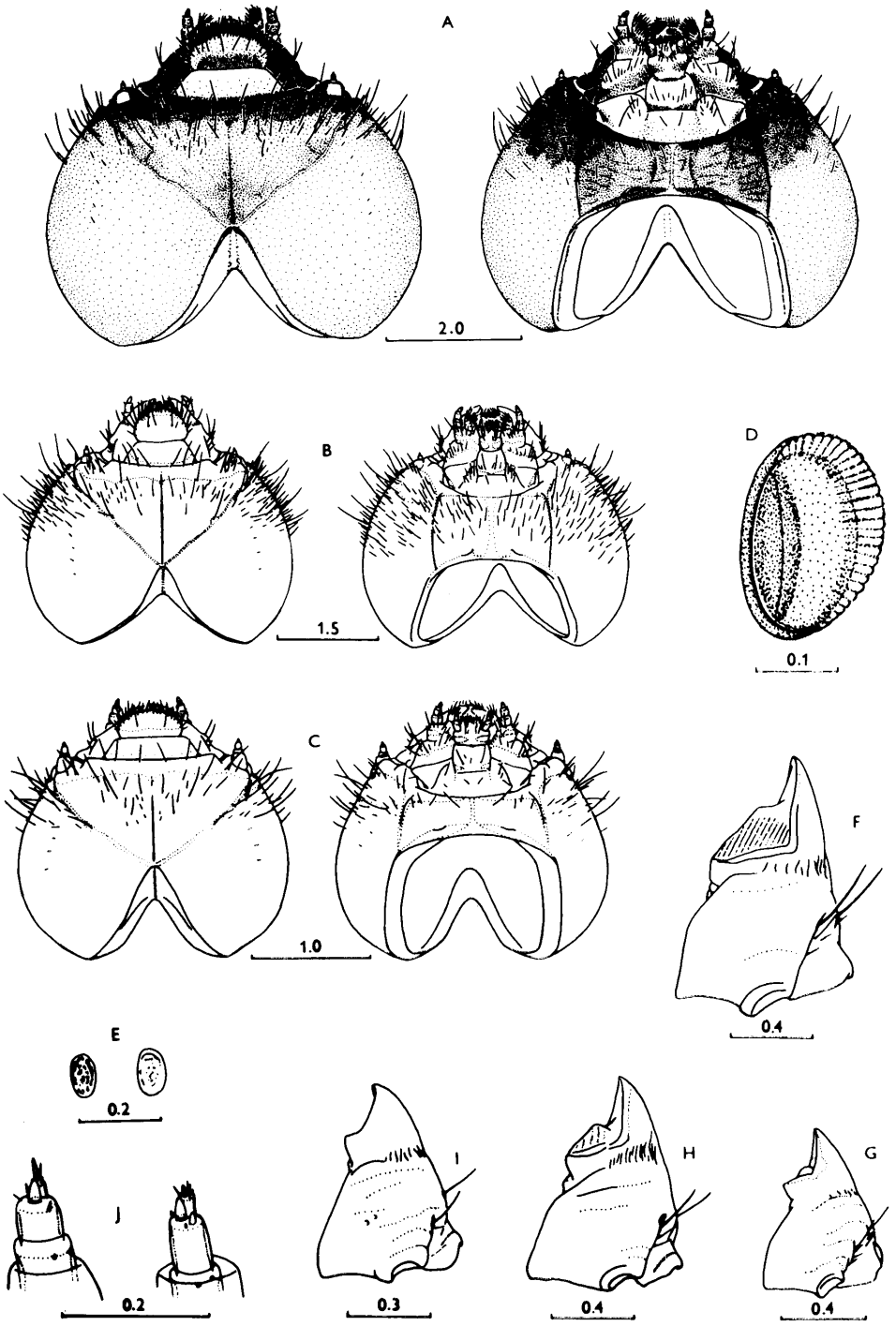
50 (37) Seventh dorsal ampulla vestigial (entirely flat, at most a transverse impression with several granules), or absent. Main stemma large, subcircular, strongly convex, with distinct pigment spot (Fig. 26H), pigment of dorsal stemmata ± distinct as well (*Brachyleptura* CASEY, 1913).

51 (52) Large mandibular type II-keel present (nearly as large as in *Corymbia rubra*, Fig. 28H). At least anterior ampullae with distinct microspines along periphery. Mesothoracic spiracle with up to about 25–30 moderately large marginal chambers. Ventral sclerite not remarkably roughly microgranulate ..... *Brachyl. stragulata*

52 (51) Mandibular type II-keel vestigial or absent. Ampullae almost devoid of microspines. Mesothoracic spiracle with up to about 10–15 small marginal chambers. Ventral scle

▶

Plate 28: A - *Stictoleptura scutellata*, head, dorsal (left) and ventral (right) views. B - *Anastrangalia dubia*, dtto. C - *Vadonia unipunctata*, dtto. D - *V. unipunctata*, left mesothoracic spiracle. E - Left main stemma, typical extent of pigment: *Leptura aethiops* (left), *L. mimica* (right). F - *Anastrangalia dubia*, right mandible, dorsal view. G - *A. scotodes*, dtto. H - *Corymbia rubra*, dtto. I - *Vadonia unipunctata*, dtto. J - Diagrammatic illustration of left antenna in ventral view: *Vadonia unipunctata* (left; note a very large sensillum on segment 3), *Anoplodera sexguttata* (right).


A
2.0
B
1.5
D
0.1
C
1.0
F
0.4
E
0.2
J
0.2
I
0.3
H
0.4
G
0.4

rite roughly distinctly microgranulate, diameter of one structural element approximately equals to diameter of strongest setae on ventral sclerite.

53 (54)! Anterior cranial opening and mouthparts relatively smaller (cranial width/anterior cranial opening width ratio in mature larvae about 1.9). Ventral sclerite extremely roughly microgranulate, one structural element (not only its darker central area!) ± distinctly larger than cross-section of strongest hypostomal setae. Seventh dorsal ampulla absent, metanotum without medial smooth granules, mandible with two setae ..... *Brachyl. maculicornis*

54 (53)! Cranial width/anterior cranial opening width ratio about 1.7–1.8. Ventral sclerite not so roughly and distinctly microgranulate, one structural element about as large as cross-section of strongest hypostomal setae. Distinct rudiments of seventh dorsal ampulla present, and/or metanotum with smooth medial granules, and/or mandible with 1–2 minute supplementary setae.

55 (56)! Setae sparse, pronotum with 2–4 discal setae. Mandible with two lateral setae. Rather distinct rudiments of seventh dorsal ampulla present. Greece, Crete ..... *Brachyl. picticornis*

56 (55)! Setae denser, pronotum with 6 or more discal setae. Mandible with 1–2 minute supplementary setae at dorsal main seta. Seventh dorsal ampulla extremely reduced, with at most very few lateral granules, occasionally almost absent.

57 (58)! Maxillary palpiger in mature larvae with distinct basal spot. Caucasus, Transcaucasia ..... *Brachyl. pallidipennis*

58 (57)! Palpiger practically without basal spot. Europe ..... *Brachyl. ??fulva*

59 (2) Mesothoracic spiracle with very large marginal chambers along whole hind margin (Fig. 28D). Ligula broad, short, feebly rounded or usually somewhat cut anteriorly, bearing sparser setae (Fig. 27B). Ventral sclerite extremely short (4 and more, Fig. 28C). Larvae in herbaceous plants (*Vadonia* MULSANT, 1863, pars) ..... *Vadonia unipunctata*

60 (1) Whole hind half of pronotum distinctly microspiculate, with several inclosed smooth spots (*Vadonia* MULSANT, 1863, pars)..... *Vadonia meosiaca*

Leptura (Macroleptura) thoracica CREUTZER, 1799

Differs from *L. quadrifasciata* mainly as follows: Setae denser. Cr less distinctly microgranulate. Adfrontal setae not or very shortly shifted into pof region. Both eph setal rows in mature larvae broadly connected posteriorly behind medial group of sensilla (not or only by a single row of setae in *Leptura* s. str.). Tormae less abruptly curved. Mstm flat, very much reduced, pigment in later instars absent. Gena even in young larvae with very dark broad pigmentation, in later instars very broadly strongly pigmented. Vs slightly shorter, in young larvae slightly darker than ecr, in later instars largely to almost entirely dark ferrugineous; usually at least 15–20 setae on each side.

Mpst with two separate ± compact mspte areas (Fig. 29E). Spir with very few extremely small mgch. Legs in later instars bearing dense setae (Fig. 30A). Seventh daa present, much reduced yet better developed than in any *Leptura* s. str., usually with three rows of granules. Length up to 50 mm.

Habits: Polyphagous on deciduous trees. Larvae in dead wood of greater diameter. Several-

-year development. Pupae in early summer, flight in summer. Adults occasionally on flowers.

Distribution: Europe (from southern Finland, Poland, Czechoslovakia and Yugoslavia eastwards), Caucasus, Siberia, Far East incl. Sakhalin and Japan.

Material: 28. 5. 1985, SU, Sakhalin, Nevel'sk, 1/–, *Salix*, lgt. D, coll. IS; 1967–1975, SU, Amur-Ussuri region, 22/I (some series), *Populus, Betula, Padus, Juglans, Ulmus, Tilia*, lgt. B. M. Mamaev, A. V. Kompantsev and D, coll. IS; 8. 6. 1972, SU, Tuva region, Ishtii-Khem, 3/I, *Betula*, lgt. D, coll. IS; 9. 6. 1958, SU, Tula region, 2/–, *Tilia* or *Acer*, collector not stated, coll. IS; August 1965, CS, Slovakia or., Uličˇ, 2/I, *Fagus*, lgt. et coll. M. Sláma.

Leptura (Macroleptura) regalis (BATES, 1884)

Larvae not available. Described by CHEREPANOV (1979). Apparently very similar to *L. thoracica* (two mspte areas on mpst). They should differ from that species by a distinct dark pigmentation of posterior frontal angle (projecting somewhat forward along fl and mfl). Length up to 55 mm.

Habits: Larvae found in Kunashir in dead wood of two logs of *Picea glenni* on the sea shore (within reach of the high tide).

Distribution: Sakhalin, Kunashir, Japan.

Leptura (s. str.) *quadrifasciata* L., 1758

Body moderately robust, with relatively dense short setae. Cr moderately broad, yellow, sides strongly roundly convex, ventral face anteriorly ± distinctly very finely microgranulate. Adfrontal setae usually ± distinctly inside pof region. Cl narrow, lbr small, transversely oval, basal half pigmented (anterior one not or poorly so), usually several discal setae. Hind eph region relatively narrow, finely sclerotized and with a very distinct ferrugineous sclerite (Fig. 29A). Setae reaching medial group of sensilla. Tormae broad, abruptly curved. Short sfp may be present. Mstm mostly abruptly convex to almost constricted at base, moderately large, pigment often indistinct. Other stemmata inconspicuous or absent. Gena only slightly protuberant behind mstm, distinct pigmentation about as broad as plst (finer pigmentation broader ventrally). Vs moderately long (on average about 3.4), not (or in mature larvae slightly) darker than ecr, bearing from 12 to far over 30 setae on each half. Gl often distinctly raised.

Ant moderately long, segment 2 in later instars at most slightly longer than broad, segment 3 short yet usually at least as long as relatively small main sensillum. Md type I, but cutting edge ± angulate, vestigial type II-keel ± present. Several md setae. Lmx small, pgmx usually without basal spot, mt with basal pigmentation connected or narrowly interrupted, basal prlb apodeme ± distinctly pigmented, ligula moderately large, rounded, palb separated by up to 1.5 times their width.

Mpst with ± broad transverse mspte band, occasionally somewhat reticulate or rarely narrowly interrupted in middle; up to 20–30 setae. Metanotum lacking granules. Mesoth spir with up to about 20(25) ± small mgch. Legs stout, ptrs ± not

compressed, setae not remarkably numerous. Msp widespread; along anterior and lateral margins of pterothoracic sterna and aa, usually on scutal plates, often (inconstantly) also along hind margins of particularly vaa. Granules small, sharply protuberant. Seventh daa absent (at most small mspte spots). Length up to 32 mm.

Habits: Polyphagous on deciduous trees, no reliable record from conifers known to me. Larvae in rotten ± moist wood, usually of greater diameter. Several-year development, pupation spring/summer in the food material, flight June–August, adults only occasionally on flowers.

Distribution: Europe, Caucasus, Transcaucasia, Asia Minor, North Iran, Siberia, Far East incl. Japan.

Material: 1959–1987, CS, SU (Moscow region, Caucasus, SW Georgia, Altai Mts., lake Baikal), many larvae from various deciduous trees, coll. IS and S.

Leptura (s. str.) *duodecimguttata* F., 1801

Main characters in the key. Additional differences from *L. quadrifasciata* as follows: Adfrontal setae usually deep inside pof region. Sfp at most very indistinct. Genal pigmentation dull, pale. Vs bearing about (8)10–20 setae on each side. Mt with basal pigmentation usually distinctly interrupted. Basal prlb apodeme pigmentation usually poor and broken into several spots. Mpst usually largely mspte. Mesoth spir with up to 10 mgch. Length up to 23 mm.

Habits similar to *L. quadrifasciata*. *Betula* seems to be a very frequent host. According to CHEREPANOV (1979), this species has only two-year development. Adults June–July on flowers.

Distribution: Siberia from Altai Mts. eastwards, Amur-Ussuri region, NE China, Korea, Sakhalin, Japan.

Material: 1967–1979, SU (Tuva region, lake Baikal, Amur-Ussuri region), 24/I (some series), *Betula, Tilia, Chosenia,* lgt. B. M. Mamaev, A. V. Kompantsev, A. Zaitsev, S. Korolëv, D and S, coll. IS and S.

Leptura (s. str.) *aurulenta* F., 1792

Differs from *L. quadrifasciata* as follows: Adfrontal setae almost always deep inside pof region. Mstm moderately convex. Vs shorter than in most other species (about 3.6, Fig. 29D), 7–13 setae on each side. Ligula somewhat broader. Mpst largely mspte, anteriorly with only small smooth area (almost all setae usually lying inside mspte region). Seventh daa present, slightly protuberant, with two rows of granules. Length up to 34 mm.

Habits: Similar to *L. quadrifasciata*. One available larva (according to the label) taken from *Pinus,* but the host tree might have been confused or misidentified.

Distribution: Central and South Europe, North Africa.

Material: 1976–1981, CS, Slovakia m. (Štúrovo; Žiar n/Hr.; Plešivec), 34/I, *Quercus,* lgt. et coll. S; 13. 9. 1977, SU, Transcarpathian Ukraine, Khust, 1/–, *Pinus* (!?), lgt. Gusakova, coll. IS; 5. 10. 1958, SU, Voronezh region, Tellerman For., 3/–, *Quercus,* collector not stated, coll. IS; 27. 4. 1987, Algeria, Tizi Ouzou, Akfadou, 1/I, *Alnus,* lgt. G. Sama, coll. S.

Leptura (s. str.) *ochraceofasciata* (MOTSCHULSKY, 1861)

Main characters in the key. Additional differences from *L. quadrifasciata* as follows: Main stemma on average less convex. Vs bearing about 10–20 setae on each side (very rarely less, but single specimens may be found with as few as 7 setae). Mt with basal pigmentation usually interrupted. Proth episternum posteriorly with very distinct yellow spot (discernible as a very fine yellowish pigmentation even in young larvae). Msp generally more restricted. Vestigial seventh daa present, but sometimes extremely reduced (as in *L. duodecimguttata*). Length up to 35 mm.

Habits: Judging from CHEREPANOV (1979), they are similar to *L. quadrifasciata*. Adults apparently frequently on flowers. One available larva (adult not reared, determined by comparison) labelled as taken from *Abies* (but see note under *L. latipennis*).

Distribution: NE China, Korea, Sakhalin, S Kurile Islands, Japan.

Material: 1972–1977, SU, Kurile Islands, Kunashir, 32/I (some series), *Betula, Alnus, Ulmus, Salix, Abies* (!), lgt. B. M. Mamaev, A. V. Kompantsev and D, coll. IS and S.

Leptura (s. str.) *latipennis* MATSUSHITA, 1933

Main characters in the key. Additional differences from *L. quadrifasciata* as follows: Adfrontal setae always deep inside pof region. Mstm almost always very poorly convex, occasionally almost flat. Vs with about 10–20 setae on each side. Basal mt pigmentation almost always connected. Mesoth spir seldom with more than 15 mgch. Vestigial seventh daa present. Length up to 32 mm.

Habits (judging from CHEREPANOV, 1979) similar to other species. Adults frequently on flowers, can be found as late as in September.

Distribution: Sakhalin, Kunashir, Japan.

Material: 1972–1977, SU, Kunashir, 20/I (some series), *Alnus, Betula, Ulmus, Acer, Abies* (!), lgt. B. M. Mamaev, A. V. Kompantsev and D, coll. IS. (The larva from *Abies* has been found in the same vial as that of *L. ochraceofasciata*, so that a single error in host plant determination may explain both.)

Leptura (s. str.) *mimica* BATES, 1884

Note: This species has been usually known under the name *Leptura arcuata* PANZER, 1793, nom. praeocc. (nec LINNÉ, 1758, now *Plagionotus*). However, the name *mimica* (the oldest available synonym according to SILFVERBERG, 1977) applies to a rather distinct Far East island subspecies (?species), so it may be found incorrect to use this name for the mainland Eurasian populations. If the name *annularis* FABRICIUS, 1801 (usually cited in synonymy) is not available (which must be inferred from the action by SILFVERBERG, l. c.), then there is perhaps no available name for these populations.

Differs from *L. quadrifasciata* as follows: Setae sparser. Adfrontal setae deep inside pof region. Tormae less abruptly curved. Sfp ± absent. Mstm slightly less convex, pigment very indistinct to almost absent. Even fine darker genal pigmentation often not exceeding 1–1.5 times plst width. About 5–12 (usually 7–11, very

rarely as many as 14–15) setae on each vs half. Gl not raised. Basal mt pigmentation seldom disconnected. Mpst usually largely mspte. Mesoth spir with up to 15–20 mgch. Great majority of specimens with some smooth central granules on metanotum. Vestigial seventh daa present. Length up to 28 mm.

Habits similar to other *Leptura*-species, but occasionally also in conifers. Larvae more frequently also in thinner stems and thicker branches. Adults on flowers.

Distribution: Temperate Palaearctics from Europe to Japan.

Material: April–May 1975, SU, Amur region, Kundur, 3/I, *Salix, Alnus, Populus tremula,* lgt. D, coll. IS; 9. 7. 1979, SU, lake Baikal, Baikalsk, 5/I, *Picea, Sorbus,* lgt. et coll. S; 13. 6. 1981, CS, Bohemia m., Třeboň, 5/I, *Salix,* lgt. et coll. S; abundant indetermined material from USSR, coll. IS.

Leptura (s. str.) *aethiops* PODA, 1761

Extremely similar to *L. mimica,* no reliable differences found. Reliably determined available larvae have setae slightly sparser (on average about 5–8 on each vs half), mstm always with relatively distinct pigment spot (Fig. 28E), and genal pigmentation often not broader than plst width. However, in the large indetermined material available, I am unable to draw an exact border line between the two species.

Habits similar to *L. mimica,* often in material of small diameter.

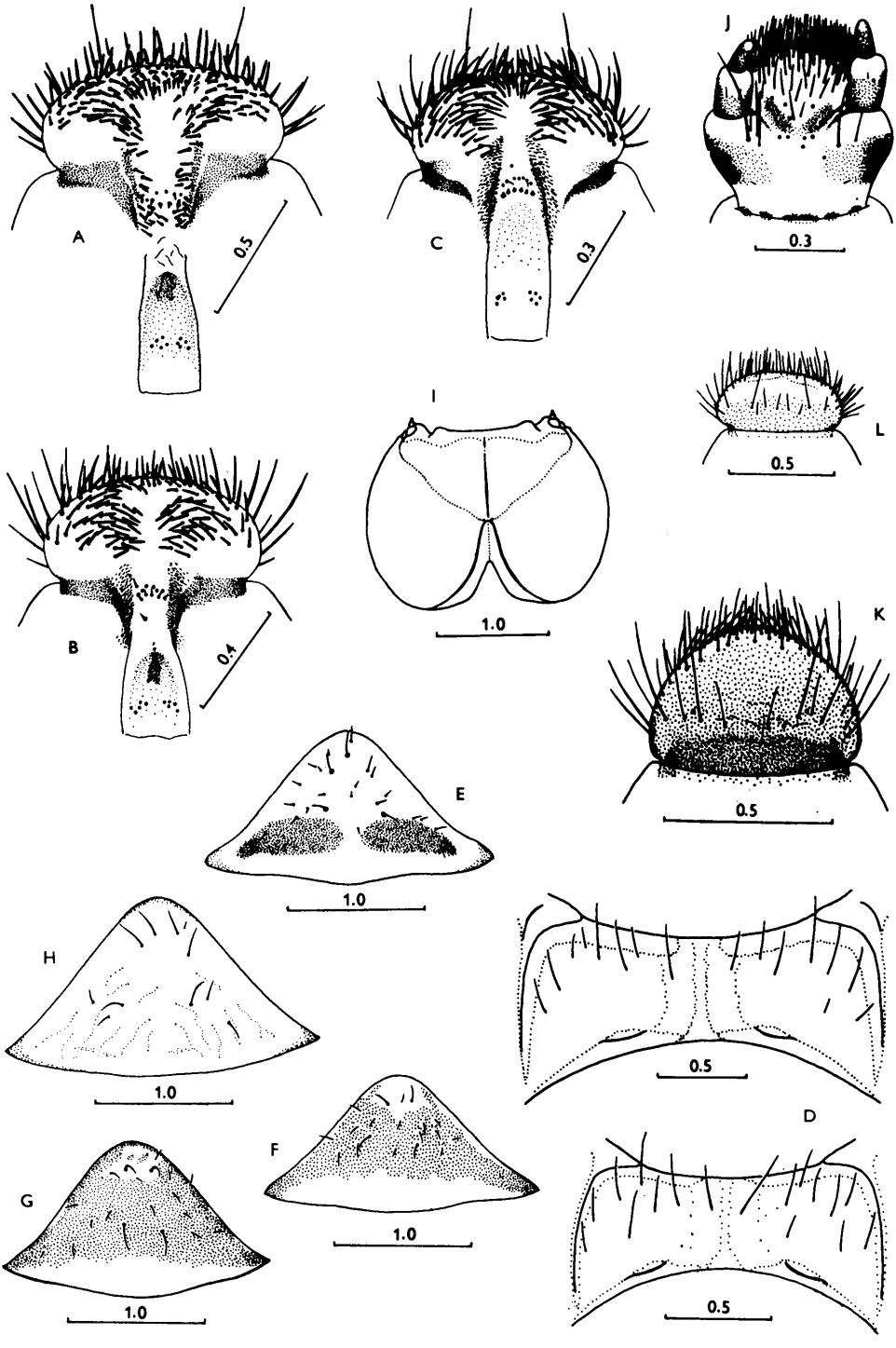
Distribution: Europe, Caucasus, Transcaucasia, North Iran, Asia Minor, Siberia, Far East incl. Sakhalin and Japan.

Material: 21. 4. 1973, CS, Moravia m., Hustopeče, 1/I, *Alnus,* lgt. et coll. M. Sláma; 1976–1977, CS, Bohemia c., Stará Boleslav, 3/I, *Salix, Tilia,* lgt. et coll. S; 28. 5. 1976, SU, Khabarovsk region, Bychikha, exuvia/I, *Corylus,* lgt. A. V. Kompantsev, coll. IS; one dead adult found in *Pinus*-stump by the author (1979, SU, lake Baikal env.).

Lepturalia nigripes (DEGEER, 1775)

Body robust, with relatively dense short setae. Cr yellow to yellow-orange, relatively strongly roundly convex laterally, not remarkably microsculptured. Adfrontal setae ± in fl, pof setae only moderately moved anteriorly. Pof in later instars very deeply concave from both sides of mfl. Cl narrow, strongly tapering. Lbr small, transversely oval, convex, only basal half distinctly pigmented, in later instars ± always more than two discal setae. Hind eph region narrow, raised, tormae broad, oblique, setae not reaching medial group of sensilla (Fig. 29B). Low indistinct subfossal tubercles present. Mstm moderately large, abruptly convex, relatively broadly separate from

Plate 29: A - *Leptura quadrifasciata,* epipharynx. B - *Lepturalia nigripes,* dtto. C - *Anoplodera sexguttata,* dtto. D - Diagrammatic illustration of shape and pigmentation of ventral sclerite: *Leptura aurulenta* (upper), *L. mimica* (lower). E - *Leptura thoracica,* prothoracic mediopraesternum. F - *L. ochraceofasciata,* dtto. G - *L. latipennis,* dtto. H - *Stictoleptura scutellata,* dtto. I - *Anoplodera sexguttata,* shape of cranium, dorsal view. J - *Stictoleptura scutellata,* praelabium, ventral view. K - *Anastrangalia dubia,* labrum. L - *A. scotodes,* dtto.


A
0.5
C
0.3
J
0.3
I
1.0
L
0.5
B
0.4
K
0.5
E
1.0
H
1.0
0.5
F
1.0
D
G
1.0
0.5

plst (Fig. 26G), pigment rather indistinct. Other stemmata inconspicuous or absent. Gena not much protuberant behind mstm, relatively broadly pigmented (1.5–2 plst widths), pigmentation diffuse posteriorly. Vs moderately long (about 3–3.5), in mature larvae slightly darker than ecr, bearing about 10–20 setae on each half. Gl raised.

Ant moderately long, segment 2 in later instars about as long as broad, segment 3 about as long as small main sensillum. Md type I, but cutting edge angulate, rudimentary type II-keel present. A few supplementary md setae. Lmx small, robust. Pgmx without basal spot. Basal mt pigmentation connected or narrowly interrupted. Prlb moderately broad, basal apodeme pigmented, palb separated at base by slightly more than their width.

Mpst devoid of msp, bearing about 12–20 setae. Metanotum without granules. Mesoth spir with up to about 10 small mgch. Legs stout, ptrs not compressed. Daa with msp at least at anterior angles, pterothoracic sterna and vaa mspte along anterior margin and ± on coxae (coxal lobes). Granules small, sharply protuberant. Seventh daa absent (seldom rudiments present, but usually without granules). Later instar larvae with ± distinct yellow spot in place of urogomphi (not found in other *Leptura*-group species). Length up to 32 mm.

Habits: *Betula* much preferred, rarely in other deciduous trees (e.g. *Populus tremula*). Larvae in decaying wood ("white rot") of varying (generally greater) diameter, often in standing dead trees or higher stumps. Three-year development according to CHEREPANOV (1979), pupation in May–June in the wood, flight mainly June–July, adults often on flowers.

Distribution: Temperate Palaearctics from Europe to Far East, absent from Japan.

Material: 1958–1979, SU (Tula region; lake Baikal; Tuva region), 28/I (some series), lgt. B. M. Mamaev, D and S, coll. IS and S.

Dokhtouroffia baeckmanni JANKOVSKY, 1934

Differs from *Anastrangalia dubia* as follows: Pof setae pushed further forward, lying ± far before adfrontal setae. Labrum about as in *Corymbia*. Very low blunt subfossal tubercle may be present. Vs much shorter (about 2.8, never below 2.6), bearing 14–22 setae on each half, hypl remarkably diverging posteriorly. Md type II-keel much smaller (hardly as large as in *Corymbia rubra*), usually not striate. Both palps shorter, pgmx always lacking basal spot, mala stout, prlb not so narrow and gracile, with basal spot often rather reduced.

Mpst with greater number of setae and two mspte areas at hind angles. Metanotum usually without granules. Daa 2 to 7 usually poorly mspte, seventh aa more reduced, all granules smaller. Legs in later instar larvae bearing dense setae (about as in *Leptura thoracica*, Fig. 30A). Length up to 32 mm, males much smaller than females.

Host plants: Larvae known from *Picea*, *Abies* and *Juglans*, probably polyphagous. Development in dead rotting wood, at least two- or three-year life cycle. Pupation in the wood in early summer.

Distribution: Mountain forests of Central Asia.

Material: May 1978, SU, Kirgizia, Sary-Chelek, 10/I, *Juglans*, A. V. Kompantsev lgt., coll. IS and S.

Anastrangalia dubia (SCOPOLI, 1763)

Setae relatively dense. Cr broad, just slightly narrower than proth, pale yellowish, indistinctly microreticulate, sides strongly roundly convex. Adfrontal setae lying ± in fl. Main pof setae only moderately moved forward, well distinguishable from prf setae. Epmg obliquely declivous. Cl narrow, lbr long, very slightly transverse, often somewhat cordate, largely sclerotized except for narrow anterior pale area, usually with several discal setae (Fig. 29K). Hind eph region narrow, distinctly raised, medial transverse row short, composed of minute trichoid sensilla. Eph setae very dense, reaching that row. Tormae short, almost transverse. Sfp absent. Mstm ± convex, oval, facing anterolaterally (gena not protuberant), pigment very indistinct. Darker genal pigmentation at most twice as wide as plst. Vs extremely long (Fig. 28B), in later instars slightly to rather distinctly darker than ecr, bearing numerous setae. Gl usually raised, mgl very distinct.

Ant moderately long, segment 2 at most as long as broad, main sensillum relatively large. Md type II (Fig. 28F), with large dorsal and small inner striated plates; several lateral setae. Lmx small, somewhat similar to *Pedostrangalia*-type (labium distinctly step-like). Pamx relatively long and slender. Pgmx usually lacking basal spot. Basal mt pigmentation connected or very narrowly interrupted, prlb narrow, basal apodeme pigmented, palb long, separated at base by hardly more than their width, ligula very narrow.

Mpst devoid of msp, bearing about 8–14 setae. Metanotum sometimes with a few small smooth medial granules. Metath spir with up to about 15(20) small mgch. Pterothoracic sterna and aa always with some distinct msp (seldom almost absent from posterior aa). Granules moderately large, protuberant. Seventh daa present, about half reduced. Legs relatively long and close together. Length up to 24 mm.

Host plants: *Picea, Abies, Pinus*. Larvae in dead not very moist wood (mostly in standing trees well above ground level, more rarely in stumps, fallen stems etc.). Pupation spring/summer in the wood, flight in summer, at least two-year development. Adults on flowers.

Distribution: Europe, Caucasus, Transcaucasia, North Iran, Asia Minor, Algeria.

Material: 1976–1981, CS, Slovakia c. (various localities), +/I, *Abies*, lgt. et coll. S; 1970–1979, SU, Caucasus (Krasnodar region - Guzeripl'; Terskol), +/I, *Pinus* and *Abies*, lgt. D. and S, coll. IS and S.

Anastrangalia reyi (HEYDEN, 1889)

Extremely similar to *A. dubia*, reliable differences not found. Msp usually more restricted, occasionally almost absent from aa.

Host plants: *Pinus, Picea*. Habits similar to *A. dubia*.

Distribution: Not well known, since the species has been often misidentified or not recognized. Europe except South.

Material: August 1978, CS, Bohemia m. (Suchdol n/Luž; Lenora), +/I, *Pinus*, lgt. et coll. S; 1973, CS, Slovakia, Lipt. Hrádok, 4/I, *Picea*, lgt. et coll. M. Sláma.

Anastrangalia sequensi (REITTER, 1898)

No reliable differences found from *A. dubia* and *A. reyi*.

Host plants: *Pinus, Abies, Larix, Picea*, Habits similar to *A. dubia*.

Distribution: Siberia, Far East.

Material: 8. 7. 1974, SU, Tuva region, Ishtii-Khem, 2/I, *Picea*, lgt. D, coll. IS; 1976 and 1979, SU, env. of lake Baikal, 20/I, *Pinus, Larix, Abies, Picea*, lgt. B. M. Mamaev, A. V. Kompantsev and S, coll. IS and S.

Anastrangalia sanguinolenta (L., 1761)

Very similar to *A. dubia*, main differences in the key. Type II md keel slightly smaller. Metanotum always bearing several smooth medial granules. No single difference absolute, but relatively reliable when combined.

Host plants: *Pinus, Picea*. Usually in material with higher moisture (stumps, fallen thicker branches or stems), otherwise habits similar to *A. dubia*.

Distribution: Europe, West Siberia [exact eastern border unclear, GRESSITT (1951) lists this species even from NE China], Caucasus, Transcaucasia, Asia Minor.

Material: 6. 7. 1970, SU, Krasnodar region, Ubinskaya, 1/I, *Pinus*, lgt. B. M. Mamaev, coll. IS; July 1979, SU, Caucasus, Terskol, 4/I, *Pinus*, lgt. et coll. S; 1977–1978, CS, Slovakia, Lipt. Hrádok, +/I, *Pinus*, lgt. et coll. S; 11. 5. 1978, Hungaria, Villányi hegység, Máriagyüd, 4/I, *Pinus*, lgt. et coll. S.

Anastrangalia scotodes (BATES, 1873)

Main characters in the key. Additional differences from *A. dubia* as follows: Mstm with pigment usually slightly more distinct, composed of small black granules. Vs slightly shorter (about 2.5, up to 2.6–2.7), bearing about 10–20 (average 13–15) setae on each side, even in mature larvae almost not darker than ecr. Ant short, segment 2 pronouncedly transverse. Legs shorter. Length up to 20 mm.

Host plants and habits (CHEREPANOV, 1979): *Abies, Pinus, Picea, Juniperus*. Larvae in dead branches or thin stems of undergrowth, then usually in their rotting lower parts. Pupation in the wood in late May–June, flight in summer, adults on flowers.

Distribution: South Kurile Islands, Japan, Sakhalin, Ussuri region, NE China.

Material: 1972 and 1977, SU, Kunashir, 18/I (one series), *Abies*, lgt. B. M. Mamaev, A. V. Kompantsev, S. Korolëv and D, coll. IS.

Anastrangalia renardi (GEBLER, 1848)

Larvae not available, described by CHEREPANOV (1979). Apparently similar to

other *Anastrangalia*-species. Distributionally separated from *A. dubia, reyi* and *?sanguinolenta.* CHEREPANOV gives the following key (with the present terminology employed):

12 (15) Ventral sclerite flat or very slightly convex. Frons in posterior half impressed along medial frontal line.
13 (14) Head comparatively broad, about 2.5–3 times as broad as frontal length along medial frontal line ..... *scotodes*
14 (13) Head narrower, twice as broad as medial frontal length ..... *renardi*
15 (12) Ventral sclerite strongly convex, appears transversely inflated. Frons not impressed, convex or at most flat ..... *sequensi*

In addition, the larva of *A. renardi,* according to the description, should differ from *A. sequensi* by very much reduced poorly granulate seventh daa and by about 12 setae on each vs half. Length up to 18 mm.

Host plant: *Abies*. Larvae found in dead thin stems of undergrowth. Otherwise habits apparently similar to other *Anastrangalia*-species.

Distribution: Siberia from Altai eastwards, Amur-Ussuri region, Mongolia, N China, Korea. CHEREPANOV (l. c.) cited this species also from Kunashir (S Kuriles) and Sakhalin, but apparently had no material from those islands. Presence of *A. renardi* in Kunashir is highly improbable.

Corymbia rubra (L., 1758)

Differs from *Anastrangalia dubia* as follows: Both head and body setae slightly sparser. Cr slightly narrower, yellow. Pof setae shifted more forward. Lbr about twice as broad as long, often only two discal setae. More or less distinct subfossal tubercle present. Mstm rounded, abruptly convex, half-spherical, pigment spot slightly more distinct, gena may be somewhat protuberant behind mstm. Vs much shorter (about 2.8), more flat, not darker than ecr, bearing about 8–12 setae on each side. Md with type II-keel smaller, not very distinctly striate (Fig. 28H), supplementary lateral setae few and very small. Both palps shorter, pgmx with large basal spot. Basal mt pigmentation mostly interrupted.

Mpst with two large finely mspte areas at hind angles. Mesoth spir with up to about 25 mgch. Metanotum lacking granules. Pterothoracic sterna and aa always largely mspte; aa with msp along periphery (esp. at anterior margin) and often on scutal plate. Seventh aa slightly more reduced. Length up to 32 mm, males smaller.

Host plants: *Pinus, Picea, Larix, Abies*. Not a single record known to me from deciduous trees, except for the notes in PALM (1959: 311) and HEYROVSKÝ (1967: 587) - *Quercus*. Larvae bore in dead, often decaying, usually relatively moist wood of greater diameter (fallen trunks, stumps, lower parts of dead standing trees, often in root bases). Several-year life cycle, pupation in the wood in early summer, flight in summer till early September. Particularly males occasionally on flowers.

Distribution: Europe, North Africa, Siberia westwards from lake Baikal.

Material: Many larvae from CS, SU (Ukraine), France, coll. M. Sláma, IS, S.

Corymbia succedanea (LEWIS, 1873)

No differences found from *C. rubra,* those mentioned by CHEREPANOV (1979) invalid.

Host plants: *Pinus, Picea, Abies.* Habits apparently similar to *C. rubra.*

Distribution: Transbaikalia up to Far East islands.

Material: 3. 9. 1972, SU, Kurile Islands, Kunashir, Mendeleevo, 1/I, *Abies,* lgt. D, coll. S; 5. 5. 1977, same locality, 5/I, *Pinus,* A. V. Kompantsev lgt., coll. IS.

Stictoleptura variicornis (DALMAN, 1817), comb. n.

Setae moderately dense. Cr not so broad as in *Anastrangalia,* distinctly narrower than proth, yellow, almost without microsculpture, shining. Adfrontal setae lying ± in fl, or only very shortly moved into pof region (never losing contact with fl). Main pof setae shifted forward yet usually distinguishable from prf setae. Epmg relatively abruptly obliquely declivous. Lbr transversely oval, with only basal half distinctly sclerotized, usually two discal setae. Eph generally similar to *Anastrangalia dubia*; setae slightly sparser, hind region broader. Short sfp often present. Mstm small, not much convex, pigment indistinct. Gena not conspicuously rugose, ± protuberant behind mstm, pigmentation slightly wider than plst. Vs moderately long (about 3–3.3), even in mature larvae almost not darker than ecr. Gula usually uneven, feebly raised.

Ant moderately long, second segment at most about as long as broad, main sensillum moderately large. Md type I, type II-keel rudimentary and invisible in dorsal view, cutting edge usually still angulate. Two long and several small md setae. Lmx not very large, resemblance to *Pedostrangalia*-type disappears. Pgmx in later instars with distinct basal spot (in young larvae often almost absent), basal mt pigmentation interrupted, prlb with basal apodeme pigmented, ligula broad, with at most very indistinct pigmentation in largest larvae, palb separated by up to twice their width.

Protergal band yellow-orange, medial notches distinct. Mpst devoid of msp, with about 10–12 setae. Metanotum lacking granules. Mesoth spir large (about as long as pamx), with up to several tens of small mgch which may extend along almost whole hind margin. Msp on pterothoracic sterna and aa present at least along anterior margins, but gradually disappear from posterior daa. Seventh aa about half-reduced. Granules relatively large, subcontiguous, moderately protuberant. Length up to 34 mm.

Habits: Polyphagous on both conifers and hardwoods, but conifers seem to be preferred at least in the western part of its range. Larvae in rotting wood of greater diameter, several-year generation period (apparently at least three years). Pupation in the wood in early summer, flight in summer, adults often on flowers.

Distribution: NE Europe, Siberia through Japan.

Material: 9. 6. 1974, SU, Tuva ASSR, Ishtii-Khem, 6/I, *Larix*, lgt. D, coll. IS; 13.–16. 7. 1979, SU, western coast of lake Baikal, 11/I, *Pinus* and *Larix*, lgt. et coll. S.

Stictoleptura palmi (DEMELT, 1972), comb. n.

Differs from *S. variicornis* as follows: Cr anteriorly (notably gena and hyp) distinctly very finely microgranulate, dull. Adfrontal setae moved deeply into pof region. Epmg abruptly almost perpendicularly declivous. Sfp more distinct. Genal pigmentation more distinct, about twice as broad as plst. Vs slightly shorter, lateral halves of hyp plates in available later instar larvae distinctly darker than ecr; 5–10 setae on each side. Md cutting edge ± roundly emarginate. Pgmx with small basal spot. Metanotum in one available larva with single small granule at middle. Mesoth spir distinctly smaller, about as long as first two pamx segments combined, with up to about 30 mgch. Msp much more restricted. Granules smaller, separate. Largest available larva 40 mm.

Host plants: *Laurus, Pinus canariensis, Erica arborea, Myrica faya, Eucalyptus.* Larvae in dead ± decaying wood, from dead standing or fallen stems deep down to roots. At least two- or three-year development, pupation late spring-summer in the wood, flight in summer, adults not found on flowers (PALM, 1977).

Distribution: Canary Islands (known from Tenerife).

Material: 3. 1. 1971, Canary Islands, Tenerife, Las Mercedes, 2/I, host not stated, lgt. T. Palm, coll. S; same locality, 3/I, *Laurus canariensis*, lgt. P. Schurmann, coll. M. Sláma and S.

Stictoleptura fontenayi (MULSANT, 1839), comb. n.

Main characters in the key. Additional differences from *S. variicornis* as follows: Small sfp present. Vs slightly shorter. Main ant sensillum very small. Md cutting edge roundly emarginate. Pgmx with or without basal spot. Mesoth spir slightly smaller, with up to 35 mgch in available larvae. Granules smaller, separate. Length may surely exceed 30 mm.

Host plants: Available larvae collected from *Cedrus, Quercus* and *Salix*, apparently polyphagous. Larvae in dead wood.

Distribution: West of Mediterranean area (southern France, Iberian Peninsula, West of N Africa).

Material: 15. 6. 1982, Algeria, Azazga, 1/I, *Quercus*, lgt. G. Sama, coll. S; 21. 4. 1987, Algeria, Blida, Chrea, 2/I, *Cedrus*, lgt. G. Sama, coll. S; 5. 6. 1981, Spain, Tarragona, Capcanes, exuvia of mature larva, *Salix*, lgt. E. Vives, coll. S.

Stictoleptura cardinalis (J. et K. DANIEL, 1899), comb. n.

Main characters in the key. Additional differences from *S. variicornis* as follows: Epmg very abruptly declivous. Vs somewhat shorter, in later instars shade darker than ecr, with 3–7(8) setae on each side; gula smooth. Md cutting edge usually not

angulate, at most 1 – 2 supplementary setae found. Ligula may bear distinct pigmented spots. Mpst with about 12 – 20 setae. Mesoth spir slightly smaller. Seventh aa more reduced. All granules slightly smaller. Length up to 35 mm.

Habits: Available larvae taken from *Betula* and *Juglans*; in rotten wood ("white rot"). Apparently three-year development period. Pupation in early summer in the wood.

Distribution: Certain mountains of Central Asia.

Material: June 1978, SU, Tadzhikistan, Ramit, 15/I, *Betula*, lgt. D, coll. IS and S; 29. 4. 1978, Tadzhikistan, Kondara, 5/ –, *Juglans*, lgt. D, coll. IS.

Stictoleptura cordigera (FÜSSLINS, 1775), comb. n.

Extremely similar to *S. fontenayi* and particularly *S. cardinalis*. Main stemma may have relatively distinct small pigment spot. Mpst with about 10 setae, mesoth spir with up to 20 mgch. Natural length of largest available larva about 27 mm.

Host plants: Uncertain (?*Pinus*). No found of larvae known to me in any particular tree (the available larvae perhaps reared ex ovo in *Pinus*, see below). Literature gives various deciduous trees, mainly *Quercus*, but the origin of that information not known to me.

Distribution: South Europe (rarely in Central Europe), Caucasus, Transcaucasia, North Iran, Asia Minor, Syria.

Material: Five larvae bearing a determination label by E. A. J. Duffy (ex coll. British Museum) with the following data: "Pinus brutua, rotten stump, E. Zetim, 3. 12. 77, reared from adult, Israel (B. M. No. 1977 – 1)".

Stictoleptura scutellata (F., 1781)

Main characters in the key. Additional differences from *S. variicornis* as follows, Adfrontal setae pushed deeply into pof region. Pof setae moved strongly forward: esp. in later instars often indistinguishable from prf setae. Anterior cr setae rather dense. Hind eph region with small very distinct sclerite. Gena in later instars broadly strongly sclerotized (about twice as broad as plst), in mature larvae may be distinctly rugose. Vs very short medially (about or over 4), in advanced larvae much darker than ecr (Fig. 28A), usually bearing about 7 – 14 setae on each side. Gl raised. Second ant segment may be slightly longer than broad, main sensillum very short, stoutly conical, hardly longer than broad. Md cutting edge roundly emarginate. Ligula very broad, palb separated by up to three times their width.

Mpst bearing up to about 18 setae, two larvae found with extremely small mspte spots at base (Fig. 29H). Aa with msp usually ± continuously along whole periphery and on scutal plate of daa. Length up to 38 mm.

Host plants: Polyphagous on hardwoods (*Fagus*, *Carpinus*, *Quercus*, literature gives also *Betula*, *Alnus*, *Corylus*, *Castanea*). Single record from *Larix* (KRÓL et SKRZYPCZYNSKA, 1974). Larvae in dead usually rotting wood ("white rots") of greater diameter. Several-year life cycle, pupation spring/summer in the wood, adults in summer, rarely on flowers.

Distribution: Europe except North, Asia Minor, North Iran, Transcaucasia, Caucasus.

Material: 1965–1983, CS, various spots, 31/I, *Fagus* and *Quercus*, lgt. et coll. M. Sláma and S; April 1979, SU, Azerbaidzhan, Avrora, 11/I, *Quercus* and *Carpinus*, lgt. D, coll. IS.

Stictoleptura erythroptera (HAGENBACH, 1822), comb. n.

Main characters in the key. Additional differences from *S. variicornis* as follows: Particularly hind cr region extremely pale, almost unpigmented. Adfrontal and pof setae as in *S. scutellata*. Lbr often with more than two discal setae. Sfp rather distinct. Gena strongly sclerotized, almost twice as broad as plst. Vs slightly shorter (about 3.5), in later instars ± ferrugineous, much darker than ecr, with about 10–20 setae on each side. Gl almost not raised. Ant long, very deeply retractile, segment 2 in later instars usually longer than broad, main sensillum long, often overreaching third segment. Md cutting edge not angulate. Pgmx with basal spot small or absent.

Protergal band paler, medial notch shallow and broad. Mpst with up to about 20 setae. Msp on pterothoracic nota extremely fine and dense, individual spines hardly distinguishable even under 100× magnification, forming a yellowish dull area. Seventh ampulla relativelly little reduced. Length up to 32 mm.

Host plant: *Fagus*. Larvae in dead dark brown relatively dry inner wood of hollows of stems and thick branches. Apparently at least three-year development, pupation spring/summer in the wood, flight June–July. Adults occasionally on flowers.

Distribution: Central and SE Europe (according to HORION, 1974, not known from Iberian and Apennine Peninsulas and Greece), Asia Minor, Caucasus, Transcaucasia, North Iran.

Material: 1979–1983, CS, Bohemia c., Dobříš, 9/I, *Fagus*, lgt. et coll. S; 25. 6. 1981, SU, Krasnodar region, Goryachii Klyuch, 4/I, *Fagus*, A. I. Miroshnikov lgt., coll. IS.

Brachyleptura stragulata (GERMAR, 1824)

Main characters in the key. Additional differences from *B. maculicornis* as follows: Setae slightly denser, ferrugineous. Adfrontal setae lying ± in fl. Vs longer (about 2.6–2.8), finely microreticulate, bearing about 7–11 setae on each half. Ant segment 2 up to about as long as broad. Usually 1–2 minute supplementary md setae. Pgmx usually with basal spot, basal mt pigmentation connected or narrowly interrupted. Available larvae about 22 mm.

Habits (M. G. de Viedma, pers. comm.): Larvae have been found in dead wood of *Pinus pinaster*-stumps. Apparently two-year development. Adults on flowers.

Distribution: Iberian Peninsula up to Pyrenees.

Material: 1984–1985, Spain, Madrid prov., Parque Natural de Manzanares, 3+exuviae/I, *Pinus pinaster* (and subsequently reared on artificial diet - see VIEDMA, NOTARIO et BARAGANO, 1985), M. G. de Viedma lgt., coll. S.

Brachyleptura maculicornis (DEGEER, 1775)

Setae sparse, pn usually with up to 6–8 discal setae. Head moderately broad, distinctly narrower than proth. Cr yellow to yellow-orange, anterior region parti-

cularly ventrally very distinctly roughly microgranulate, sides moderately roundly convex. Adfrontal setae at most shortly inside pof region, usually not losing contact with fl. Pof setae moved only moderately forward. Epmg obliquely declivous. Cl narrow, lbr transversely oval, broad anterior margin unpigmented, usually two discal setae. Hind eph region relatively low and broad, eph setae reaching medial transverse row of sensilla. Tormae short, oblique. Sfp ± absent. Mstm very large, convex, subcircular, almost touching plst (Fig. 26H), and with large distinct pigment spot; at least dstm with small pigment spot as well. Gena moderately protuberant, mstm facing ± forward. Dark genal pigmentation about as broad as plst. Vs moderately long (about 3.1), even in mature larvae almost not darker than ecr, with about 2–7 setae on each half. Gl at most slightly raised, mgl distinct.

Ant moderately long, segment 2 usually slightly transverse, main sensillum large, slender, about as long as or longer than segment 3. Md type I, type II-keel absent or rudimentary, two setae. Lmx moderately large, palps moderately robust, pgmx lacking basal spot, basal mt spots well separate. Prlb moderately broad, basal apodeme pigmented, palb separated by about 1–1.5 times their width, ligula rounded, unpigmented.

Mpst lacking msp, bearing about 10–12 setae. Metanotum without granules. Mesoth spir with up to about 10 small mgch. Legs very robust, ptrs slightly compressed. Msp restricted, ± absent from aa. Seventh daa absent. Granules small, distinctly protuberant. Length up to 17 mm.

Host plants: *Pinus, Abies*; *Picea, Betula, Quercus, Fagus* (PALM, 1951, 1959). Conifers perhaps preferred. Larvae in dead ± decayed not very moist wood of smaller diameter - dead branches (both fallen and on the tree), exposed roots of uprooten trees etc.; often rather scattered and not easily found. Apparently at least two-year development, pupation in the wood, adults in summer on flowers.

Distribution: Europe (but absent from some southern regions, e.g. from the whole Iberian Peninsula), North Caucasus.

Material: 1977–1983, CS, Bohemia c., Neveklov env., 6/I, *Pinus*, lgt. et coll. S; 31. 7. 1981, CS, Slovakia or., Stužica, 5/–, *Abies*, lgt. et coll. S.

Brachyleptura picticornis (REITTER, 1885)

Main characters in the key. Additional differences from *B. maculicornis* as follows: Setae sparser, mpst with 6–8 setae. Adfrontal setae apparently on average more distinctly shifted into pof region. Vs very slightly shorter, available specimens with 2–4 setae on each side. Ant shorter, segment 2 strongly transverse, main sensillum shorter. Pgmx sometimes with vestigial basal spot. Ligula broader, palb separated by at least 1.5 times their width. Metanotum with about two medial smooth granules. Mesoth spir with up to about 15 mgch. Legs not so robust. Distinct rudiments of seventh daa present (a transverse impression with several granules on each side). Largest available larva 16 mm.

Host plants: *Quercus, Acer*. Larvae in dead dry wood of smaller diameter [e.g. the larva

from *Quercus* was found in a dry branch (diam. about 4–5 cm) in the crown of a great oak tree]. Apparently two-year development.

Distribution: Greece, Crete.

Material: 26. 6. 1984, Crete, Omalos, Lefka Ora, 1/–, *Quercus*, J. Kratochvíl lgt., coll. S; June 1984, Crete, Omalos, 1/–, *Acer*, lgt. et coll. M. Sláma. Adults not reared. Until recently, *B. picticornis* had been the only species of *Brachyleptura* (in the present sense) known from Crete, and it still is as far as Omalos is concerned.

Brachyleptura pallidipennis (TOURNIER, 1872)

Main characters in the key. Additional differences from *B. maculicornis* as follows: Cr always brightly pigmented, yellow-orange. Adfrontal setae always deeply inside pof region. Ligula broad, palb separated by 1.5–2 times their width. Metanotum always with several smooth granules in middle. Length up to 23 mm.

Habits: One larva and two adults (one living, just about to emerge, the other dead) were found in bases of dead moderately thick (diam. 2–3 cm) *Vitis*-stems in contact with the ground. Apparently two-year development. Additional adults were taken on flowers (mostly Daucaceae), and several larvae have been succesfully reared ex ovo both in the original material and in decaying oak sapwood ("white rot").

Distribution: Caucasus, Transcaucasia, Asia Minor? (DEMELT, 1963, who records also *B. fulva* from that region; another record of *B. fulva* from Asia Minor by SAMA, 1982). Since the classification of the *fulva-tonsa-pallidipennis* group is far from being clear, and the characters used for determination of these species are unreliable (e.g. the above series of adults collected by me, and conspecific beyond any doubt, has all transitions between black-tipped and all-yellow elytra), it remains to be investigated how many species does the group really contain, and what is their distribution. LOBANOV, DANILEVSKY et MURZIN (1981) list *Brachyleptura tonsa* (J. et K. DANIEL, 1891) as a single species occurring in the Near East, but this may be what DEMELT and SAMA call *B. fulva*.

Material: 3. 7. 1983, SU, Azerbaidzhan, Caspian coast, Nabran, 8/I, *Vitis* (and ex ovo), lgt. et coll. S.

Brachyleptura ??*fulva* (DEGEER, 1775)

Main characters in the key. Additional differences from *B. maculicornis* as follows: Adfrontal setae distinctly inside pof region. Sfp may be relatively distinct. Vs slightly shorter. Metanotum may have indistinct smooth granules. Largest available larva 18 mm.

Material: 11. 5. 1975, France, Le Luberon, 3/–, *Quercus*-stump, collector not stated, coll. M. Sláma. The larvae may belong to *B. fulva*, or perhaps to *B. hybrida* (REY, 1885). For various reasons, the former alternative is more probable.

Anoplodera rufiventris (GEBLER, 1830)

Main characters in the key. Additional differences from *A. sexguttata* as follows: Ecr halves shortly fused (hardly one-third of medial frontal length). Adfrontal setae

at most very shortly inside pof region, ± touching fl. Single eph setae reaching medial row of sensilla. Mstm larger, distinctly convex. About 8–9 setae on each vs half. Ant much shorter and stouter, segment 2 not longer than broad, segment 3 small. Md cutting edge somewhat angulate, vestigial type II-keel present (± invisible dorsally). Ligula narrower, palb separated by up to 1.5 times their width. Mpst with setae more numerous. Granules on metanotum not found. Mgch slightly larger and more numerous. Largest available larva 20 mm.

Habits (CHEREPANOV, 1979): Eggs are laid mainly on old fallen occasionally barkless stems of coniferous trees *(Pinus, Abies*; our larvae from *Larix)*. Larvae tunnel in outer wood, or in deeper layers if the surface wood is strongly infested with fungi. Pupation June–July in the wood, flight July–August, adults rarely on flowers.

Distribution: South of Central Siberia (from Altai to Transbaikalia), Mongolia, ?North China.

Material: 22. 6. 1974, SU, Tuva ASSR, Ishtii-Khem, 5/I, *Larix*, lgt. D, coll. IS and S.

Anoplodera sexguttata (F., 1775)

Body slender, with sparse fine setae. Cr (Fig. 29I) pale yellow, sparsely setose, not remarkably microsculptured, sides broadly rounded. Both ecr halves more broadly fused than in other species (about one-half of medial frontal length), hind cr notch relatively narrow. Adfrontal setae far inside pof region. Pof setae distinctly moved anteriorly. Cl narrow, at most very finely pigmented at base. Lbr transverse, subelliptical, rather flat, only basal half sclerotized, usually two discal setae. Hind eph region moderately broad, tormae slender, slightly oblique. Eph setae not reaching medial transverse row of sensilla (which are very short, blunt, peg-shaped) (Fig. 29C). Sfp absent. Mstm small, rather flat, occasionally incompletely fused, pigment very indistinct or absent. Other stemmata ± indiscernible. Gena almost not protuberant, darker pigmentation about as broad as plst. Vs moderately long (about 3–3.3), not darker than ecr, about 2–6(7) setae on each side.

Ant long, deeply retractile, segment 2 in later instars ± longer than broad, main sensilum large, elongate, about as long as segment 3. Md type I with two setae. Lmx relatively small, pgmx without basal spot, basal mt spots broadly separate, basal prlb apodeme unpigmented, ligula broad, rounded, palps separated by about 1.5–2 times their width.

Mpst with broad transverse mspte band, often almost entirely mspte, bearing about 10–14 setae. Metanotum may have a few small medial smooth granules. Mesoth spir with up to 10 small to moderately large mgch. Pterothoracic sterna and aa with poorly sclerotized msp usually along anterior and lateral margins (on coxae), inconstantly along posterior margin and on scutal plate. Granules large, flat (Fig. 26K). Seventh daa strongly reduced yet distinctly protuberant. Legs moderately robust, ptrs not compressed. Length up to 20 mm.

Habits: Larvae found in dark brown heartwood of very old *Quercus*-stumps and pieces of

wood (with the sapwood completely decayed and ± lost). At least two-year development. Pupation in spring in the food material, flight in late spring and summer, adults visit flowers.

Distribution: Europe except North, North Africa.

Material: 1978 and 1981, CS, Slovakia m., Plešivec, 20/I, *Quercus*, lgt. et coll. S; 29. 6. 1986, CS, Moravia m., Velká n/Vel., 2/I, *Quercus*, lgt. et coll. S.

Anoplodera cyanea (GEBLER, 1832)

Main characters in the key. Additional differences from *A. sexguttata* as follows: Cr setae slightly denser. Ecr halves not so broadly fused (hardly more than one-third of medial frontal length). Adfrontal setae only shortly inside pof region. Often more than two discal lbr setae. Low subfossal tubercle may be present. Pgmx with indistinct basal spot. Mpst ± entirely mspte. Mesonotum in available larvae without granules. Mgch slightly larger and more numerous. Largest available larva 19 mm.

Habits (CHEREPANOV, 1979): Eggs laid on the bark of dead trees (*Ulmus, Acer, Quercus* and others). Larvae bore in dead wood where also pupation occurs in June. Adults June–July on flowers.

Distribution: East Siberia, Amur-Ussuri region, NE China, Korea, Far East islands incl. Japan.

Material: 2. 7. 1975, SU, Khabarovsk region, Bychikha, 4/I, *Betula*, lgt. D, coll. IS and S.

Vadonia unipunctata (F., 1787)

Setae relatively dense (particularly on posterior abd segments), short, stout (Fig. 26J), ferrugineous. Cr relatively narrow, yellow to yellow-orange, not remarkably microsculptured, shining, sides not much convex and very abruptly receding immediately behind plst (Fig. 28C). Adfrontal setae not or shortly moved into pof region. Anterior cr opening and all mouthparts relatively large. Pof setae distinctly moved anteriorly. Epmg gently obliquely sloping. Cl broad, lbr flat, strongly transverse, at least twice as broad as long, only basal half sclerotized, usually two discal setae. Hind eph region broad, flat, tormae moderately long, strongly oblique; eph setae very sparse yet reaching medial transverse row of sensilla. Sfp may be relatively well developed. Mstm poorly convex, ± oval, occasionally not completely fused, facing obliquely laterad (gena not protuberant), with ± distinct pigment spot; other stemmata at most poorly developed. Darker genal pigmentation up to about twice as broad as plst. Vs extremely short (4 or more), in later instars somewhat darker than ecr, with 3–6 setae on each side. Mgl narrow, distinct. Anterior margin only very shallowly emarginate.

Ant very large and long, very deeply retractile, segment 2 in later instars usually longer than broad, main sensillum large, elongate, segment 3 remarkably variable (from longer than broad to practically absent), with one particularly large very long sensillum (Fig. 28J; preserved on second segment when third one reduced; never of this length in other *Leptura*-group genera). Md type I, apex slightly more blunt

than in most other genera (Fig. 28I), two strong and usually 1–2 minute lateral setae present. Lmx short, robust, labium not step-like. Pgmx with basal spot small to lacking. Mt with basal spots broadly separate. Prlb broad, basal apodeme inconstantly (never too distinctly) pigmented, palb separated by about twice their width, ligula short, ± cut anteriorly, with relatively sparse setae (Fig. 27B).

Proth mpst with up to about 25 setae, with or (usually) without msp. Metanotum lacking granules. Mesoth and abd spir with numerous very large mgch ± along whole hind margin (Fig. 28D). Granules moderately large, not much protuberant, somewhat reduced on mesosternum. Legs moderately robust, ptrs not distinctly compressed. Msp in very large extent, present around all aa and on scutal plates, ± interrupting medially vaa granulation. Seventh daa strongly reduced. Length up to 20 mm.

Habits: Larvae in underground parts of living plants of *Knautia arvensis* (one larva found in *Scabiosa*). At least two-year development. Pupation unobserved. Adults in June–July, usually on flowers of the host plant. In stems of the same plants occasionally found larvae of *Agapanthia intermedia* (Lamiinae).

Distribution: Central and South Europe, Caucasus, Transcaucasia, North Iran, Asia Minor, North Africa.

Material: 1979–1986, CS, Slovakia m., Štúrovo, 28/I (and one larva ex ovo), *Knautia, Scabiosa,* lgt. et coll. S.

Vadonia bipunctata (F., 1781)

Larvae not available. Described by CHEREPANOV (1984: 205). Apparently similar to *V. unipunctata,* but many important characters are not described.

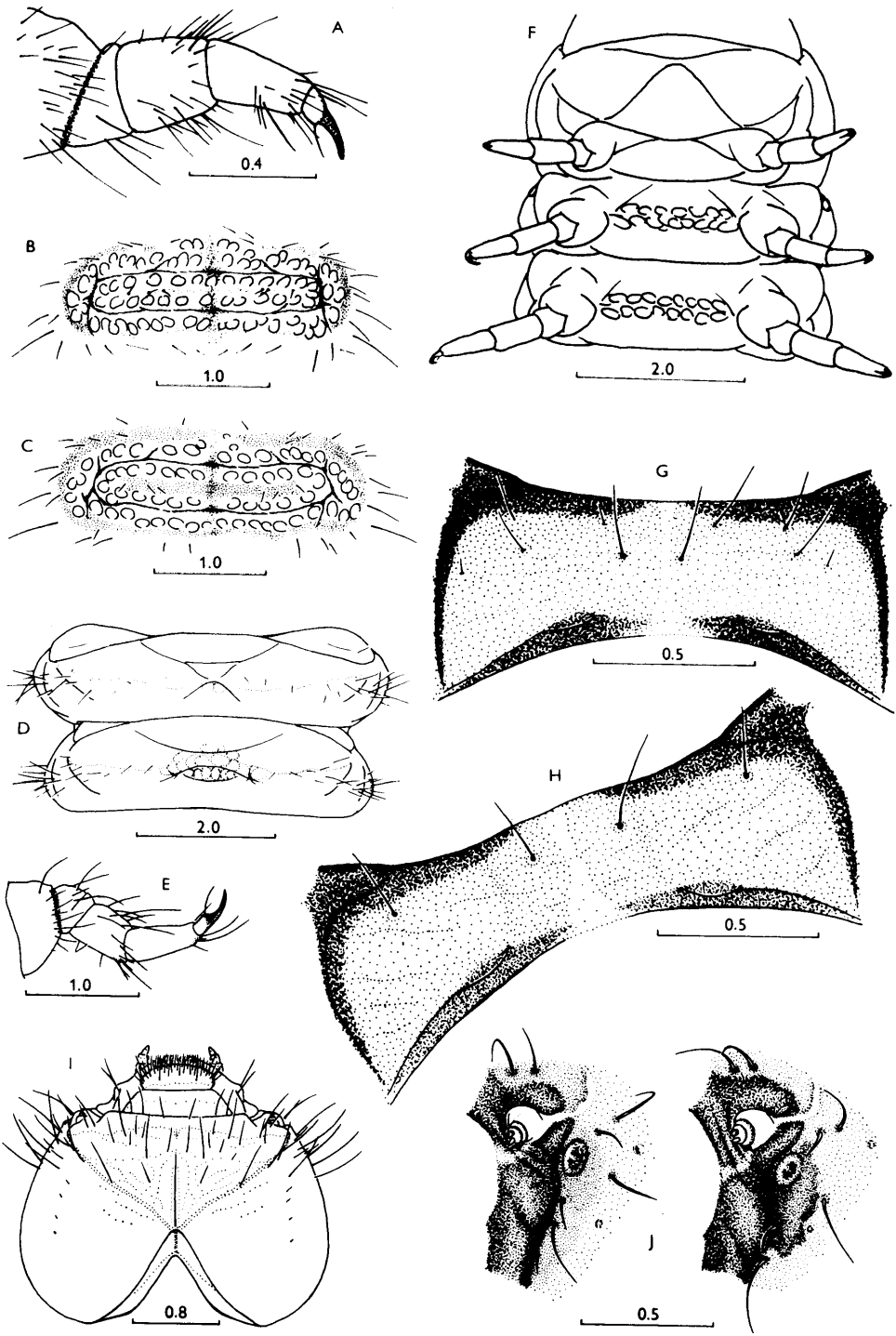
Habits: Larvae in *Knautia arvensis* and *Scabiosa ochroleuca.* Eggs laid in soil at base of the host plant. Larvae penetrate into underground parts of the plant; after exhausting the food source, they are capable of tunnelling through the soil to another plant. They can also feed on the roots externally. Two-year development, pupation May–June in a ± vertical pupal chamber in the soil, or (more rarely) in the host plant. Adults in June–July.

Distribution: South of European part of USSR, Caucasus, Transcaucasia, North Iran.

Vadonia moesiaca (J. et K. DANIEL, 1891)

Generally similar to *V. unipunctata,* but differs by some remarkable characters, of which the microspiculate pronotum is unique not only in the *Leptura*-group, but also in the whole tribe Lepturini in the present sense.

Plate 30: A - *Leptura thoracica,* left hind leg, anterior view. B - *L. ochraceofasciata* (non-mature), second dorsal ambulatory ampulla. C - *L. latipennis* (submature), dtto. D - *Stictoleptura erythroptera,* meso- and metathorax, dorsal view. E - *Judolia sexmaculata,* right hind leg, anterior view (drawn from a specimen from Siberia with moderately long legs). F - *J. sexmaculata,* thorax, ventral view (setae omitted; drawn from a specimen from Czechoslovakia with very long legs). G - *Pachytodes cerambyciformis,* ventral sclerite. H - *P. erraticus,* dtto. I - *P. cerambyciformis,* head, dorsal view. J - Left upper pleurostoma, antenna and genal region, anterolateral view: *Pachytodes longipes* (left), *P. cerambyciformis* (right).


A
0.4
B
1.0
C
1.0
D
2.0
E
1.0
F
2.0
G
0.5
H
0.5
I
0.8
J
0.5

Single available larva differs from *V. unipunctata* as follows: Cr paler, yellow. Adfrontal setae deep inside pof region. Head setae denser; lbr with a transverse row of 7 ± stout setae, md with several very distinct supplementary setae, vs with 6+8 setae. Eph setae denser, tormae more transverse. Mstm very small, but with distinct black pigment spot. Third ant segment absent. Lmx slightly less "compressed" longitudinally. Pgmx without basal spot. Ligula slightly narrower, longer, rounded, setae denser, but dense dorsal setae separated from a few ventral ones by a narrow band of short microtrichia across apex (reliability of this character in particular needs to be examined on a larger material).

Hind pn half completely distinctly mspte, with several small inclosed spots (should be checked on mature larvae). Mpst entirely mspte except for apex. Mgch smaller. Mspte areas on aa, pterothoracic sterna etc. even broader and more distinct. Single larva 15 mm.

Habits: The larva has been found in June in roots of *Euphorbia niciciana*; i.e. apparently with two-year development period.

Distribution: Balkan Peninsula.

Material: 16. 6. 1985, Bulgaria, Burgas env., Veselje, 1/–, *Euphorbia*, lgt. J. Kratochvíl, coll. S. Adults not reared; determined by comparison; adults of *V. moesiaca* on the same plants. In my opinion, there is very little probability of a determination error.

The *Oedecnema*-group

Larvae of the following three genera are very similar (*Oedecnema* being in most respects closer to *Pachytodes* than *Judolia*), and, moreover, extremely variable, which makes their identification rather difficult. For practical reason, they are treated as a single generic group.

Genus *Judolia* MULSANT, 1863

Type species: *Leptura sexmaculata* L., 1758 (CASEY design., 1913)

Genus *Oedecnema* DEJEAN, 1835

Type species: *Leptura dubia* F., 1781, nom. praeocc. (non SCOPOLI, 1763) = *Leptura gebleri* GANGLBAUER, 1889 (monobasic)

Genus *Pachytodes* PIC, 1891

Type species: *Leptura cerambyciformis* SCHRANK, 1781 (GRESSITT design., 1951)

Body white or yellowish, moderately elongate, very slightly depressed, bearing short ± stout ferrugineous setae.

Head (Figs 30I, 31A) about by half retracted. Cr transverse (about 1.4), depressed (about 2.1, never below 2), considerably narrower than proth, yellow to orange,

not microgranulate, widest usually behind middle. Ecr with moderately numerous short anterior setae, main adfrontal seta lying ± right in fl, sides moderately roundyl convex, both halves shortly fused (one-fifth to one-third of medial frontal length), hind cr notch less than 90 degrees.

Fl narrow, distinct, ± straight, meeting posteriorly at slightly more than 90 degrees, anteriorly passing through ant openings and ± weakened reaching anterior cr margin. Pof relatively pale, ± concave, usually distinctly rugose, main pair of setae at most slightly moved forward, at most very few small supplementary setae. Tfl even in mature larvae very indistinct, diffuse, usually incomplete. Prf almost not darker than pof, feebly convex, ± transversely rugose, main four pairs of setae accompanied by ± numerous shorter setae, first two main pairs lying in paler area. Epmg broadly deeply sclerotized, very dark, ± straight, abruptly obliquely declivous, six strong eps very close to cl border. Mfl indistinctly reaching epmg, in later instars weakened to interrupted at tfl region.

Cl moderately broad, feebly convex, trapezoidal, basal half usually finely sclerotized. Lbr strongly transverse, ± oval, very gently convex, basal half sclerotized, anterior margin (occasionally whole anterior half) bearing ± dense setae, two stronger discal setae may or may not be isolated. Hind eph region relatively broad, moderately raised, medial transverse row composed of very short stout yet not distinctly tooth-shaped sensilla (medial pair shortest). Tormae oblique, in some species curved backwards and running ± far behind along sides of hind eph region. Anterior region with setae restricted to relatively small paired areas at anterior magrin, always by far not reaching medial transverse row. Microtrichia spread from sides of hind region ± far onto anterior region, but left and right areas not fusing.

Plst broad, abruptly raised, deeply sclerotized, sfp absent. Genal pigmentation at most as broad as plst, usually restricted to dark often ± protuberant area below mstm (Fig. 30J). One mstm on each side (very rarely partly divided in two), three original pigment spots may be ± separated in young larvae. Other stemmata indistinct or absent.

Vs relatively short (about 3 to far over 4), moderately convex, not darker than ecr. Anterior margin sharply separate from lmx base, gently emarginate to almost straight, dark except for middle of gula. Hypl broad, dark, at most slightly diverging, may or may not reach pocl. Mtt short, relatively close to darkened hind margin. Gl at most very slightly raised, mgl narrow, reaching anterior margin. Up to about 10–12 setae on each side, usually less.

Ant moderately long (shorter than in most species of *Leptura*-group), three-segmented, moderately retractile. Ant ring strongly sclerotized, slightly raised. Segments sclerotized, second at least slightly shorter than broad, third cylindrical, at most very slightly longer than moderately large main sensillum.

Md type I, somewhat variable, short to moderately long, robust. Border zone distinctly striate. Apex and dorsal angle ± acute, cutting edge emarginate, two

distinct inner keels present. Basal part often ± transversely rugose, lateral face (best observed in dorsal view) distinctly gibbose (very poorly in *Judolia*), bearing 1(2)+1 setae.

Lmx moderately large, not much flattened, bearing moderately dense setae. Base at most finely sclerotized, cardo with one seta. Distal maxilla relatively robust, pgmx large, broad ventral pigmented band present, basal spot absent. Mala cylindrical, short, robust, with very broad oblique pigmented band. Pamx moderately long, segments' lengths subequal. Mt with broadly separate basal spots. Prlb relatively broad, basal apodeme unpigmented, palb separated usually by 1.5–2 times their width, pglb pigmentation broadly separate, ligula similar to *Leptura*-type, with relatively dense stout setae.

Proth moderately broad, pn finely rugose, with greater number of scattered discal setae. Protergal band ± distinct, al broadly sclerotized, anterior margin on each side broadly emarginate, without notches (Fig. 26F-f). Lfur almost absent. Lpst in later instars with yellow spotted anterior pigmentation, bearing greater number of setae, mpst usually with four strong and ± numerous short setae. Msp present on stlf and usually also on cxst, larger or smaller (extremely variable) mspte areas usually also at hind mpst angles; ± distinct msp may occur also on episternum and epl.

Meso- and metanotum non-granulate, mspte (msp extremely reduced in two available specimens of *Pachytodes longipes,* probably could lack entirely). Al not much protuberant, mesoth spir about as long as pamx, broadly oval, with up to about 15(20) distinct moderately large mgch along upper hind margin (up to 30 along most of hind margin in *Pachytodes cometes*). Metath spir well discernible. Sterna ± granulate (mesosternum poorly so in *Pachytodes erraticus*), only mesoth bst ± distinctly divided. Coxae well defined, prominent, functioning to a certain degree as a leg segment. Msp in varying extent.

Legs long to extremely long, with sparse setae, esp. in some species with clasping function (Fig. 30F). Trch well developed, with distinct basal ring, bearing several setae. Femur slightly shorter than ti, both at most finely sclerotized. Ptrs usually ± shorter than ti, at least slightly compressed, claw ± curved, strongly sclerotized, often very long and sickle-shaped (Fig. 30E), seta borne before middle, occasionally very close to basal margin.

Seven aa present, ± completely granulate (poorly so in many specimens of *Pachytodes erraticus*), granules never strongly protuberant, msp in varying extent. Seventh aa (particularly seventh daa) strongly reduced. Daa with two transverse lines and one pair of lateral impressions, anterior transverse line at most indistinctly doubled. Abd spir much smaller than mesoth ones (first abd spir about twice shorter), with up to about 10(15) moderately large mgch. Plt oval, moderately large, with 2–3 longer and 2–5 short setae. Carm absent, ninth tergum broadly rounded posteriorly, usually with indistinct medial caudal-spine-base-like prominence. Atu small (as in *Leptura*-group), very slightly posteroventral, apl with numerous setae.

A Holarctic group. Larvae of six species at my disposal.

1 (2)! Legs very long, hind femur and tibiotarsus combined always ± distinctly longer than half of ventral sclerite width (in young larvae at most slightly longer, extremely long in some mature larvae, Fig. 30F). Clypeus narrow (cranial/clypeal width ratio 2.9 and more), gently tapering; ventral sclerite long (about 3–3.4) (Fig. 31A) (*Judolia* MULSANT, 1863) ..... *J. sexmaculata*

2 (1)! Legs shorter, if hind femur and tibiotarsus combined as long as, or longer than half of ventral sclerite width (*Oedecnema,* rarely *Pachytodes cerambyciformis*), then clypeus broader (cranial/clypeal width ratio less than 2.9, usually about 2.5–2.8) and more strongly tapering (Fig. 30I). Ventral sclerite mostly shorter (Figs 30G, H) except for *Pachytodes cometes.*

3 (4)! Legs longer, hind femur and tibiotarsus combined are as long as, or somewhat longer than half of ventral sclerite width. NE Europe, Siberia, Far East (*Oedecnema* DEJEAN, 1835) ..... *O. gebleri*

4 (3)! Legs shorter (several specimens of *Pachytodes cerambyciformis* have been found with legs about as long as in *Oedecnema,* but this species can be excluded by its distribution) (*Pachytodes* PIC, 1891).

5 (6) Ligula with large ventral yellow-orange spot (Fig. 31F). Ventral sclerite longer (about 3). Far East islands ..... *P. cometes*

6 (5) Ligula with pigmented spot absent or minute. Ventral sclerite usually shorter.

7 (10)! Main stemma at least as large as first antennal segment's cross-section, ± sharply defined, convex. Ventral sclerite not extremely short (Fig. 30G).

8 (9) From Altai Mts. eastwards. Setae in corresponding instars denser, anterior halves of eighth abdominal tergum and sternum almost always bearing some (often minute) setae (Fig. 31C). Pigmented area below main stemma relatively pale, with ± diffuse margins (Fig. 30J), in young larvae almost absent ..... *P. longipes*

9 (8) West Palaearctics (absent eastwards from Ural Mts.). Setae in corresponding instars sparser, anterior halves of eighth tergum and sternum in young larvae glabrous, in later instars occasionally with one-two short setae (Fig. 31B). Pigmented area below main stemma darker, more sharply delimited (Fig. 30J), present even in very young larvae ..... *P. cerambyciformis*

10 (7)! Main stemma strongly reduced, feebly convex, poorly separate from dark protuberant area below it, often of irregular shape, much smaller than first antennal segment's cross-section, with small pigment spot. Ventral sclerite broad, very short (Fig. 30H) ..... *P. erraticus*

Judolia sexmaculata (L., 1758)

Cr pale yellow, widest about or slightly behind middle, sides distinctly convex (Fig. 31A). Cl relatively narrow, moderately tapering. Lbr usually distinctly cut anteriorly, discal pair of setae mostly isolated. Mstm large, convex, with distinct pigment spot. Vs relatively longer (about 3–3.4), with prominent hind angles, bearing about 5–12 setae on each side. Md with basal part at most feebly gibbose laterally, third seta relatively frequently present. Lmx relatively smaller, palb separated by at most 1.5 times their width.

Pn with anterior pigmentation usually distinct. Meso- and metath sterna and aa always distinctly completely granulate. Msp in mature larvae usually rather restricted,

occasionally almost absent from aa. Legs very long and strong (Fig. 30F; but in young larvae converging towards other species), length somewhat variable (available larvae from Asia have legs on average distinctly shorter than those from Central Europe). Claw very large, sharp, sickle-shaped (Fig. 30E). Length up to 20–22 mm.

Host plants: *Picea, Pinus, Larix, Abies, Populus, Tilia.* Apparently widely polyphagous (at least in its optimum in Siberia), conifers perhaps preferred. Larvae bore in dead decaying wood, initial instars often under bark. Not strictly subterranean, but showing great affinity for stem or stump bases, exposed roots of uprooten trees etc. Apparently two-year development, pupation occurs mostly in the food material (although some specimens may possibly pupate in the soil). Adults on flowers.

Distribution: Europe (North and mountains), Siberia, Far East incl. islands. A typical taiga forest species.

Material: 19. 5. 1975, SU, Amur region, Kundur, 1/I, *Tilia,* lgt. D, coll. IS; July 1979, SU, lake Baikal env., 6/I, *Picea, Larix* and *Populus tremula,* lgt. et coll. S; 17. 8. 1978, CS, Bohemia m., Lenora, +/I, *Picea,* lgt. et coll. S.

Oedecnema gebleri (GANGLBAUER, 1889)

Differs from *Pachytodes cerambyciformis* as follows: Setae relatively denser (about as in *P. longipes*). Vs in available larvae with 6–11 setae on each side. Msp in mature larvae much restricted, often almost absent from aa. Legs longer (see key). Largest available larva 25 mm, may be undoubtedly larger (probably up to about 30 mm).

Bionomics (CHEREPANOV, 1979): Polyphagous *(Quercus, Betula, Tilia, Salix, Padus, Abies Pinus).* Eggs are laid at bases of dead trees and stumps. Larvae initially under bark, later in wood of the roots and stem bases. Two- or three-year development. Pupation in the wood (usual in uprooten trees), larvae from underground tree parts usually pupate in the soil, then leaving the wood usually before the last overwintering. Pupation May–June, adults from late May to early August, usually found on flowers.

Distribution: NE Europe, Siberia, Far East incl. islands.

Material: 5. 8. 1975, SU, Amur region, Zeya, 5/I, *Betula,* lgt. D, coll. IS and S.

Pachytodes longipes (GEBLER, 1832)

Very similar to *P. cerambyciformis,* differs by unstable details. Main characters in the key. Lbr not infrequently cut anteriorly. Cl narrower, with basal half distinctly sclerotized. Vs on average slightly longer. Anterior pn pigmentation at least in later instars always bright yellow to orange. Length up to 24 mm.

Host plants: *Hippophaë, Rhododendron dahuricum, ?Betula.* The present author found larvae in dead rotting underground parts of *Rhododendron*-undergrowth under forest cover. At least two-year development. Pupation unobserved, according to CHEREPANOV (1979) in spring/summer in the host plant. Adults apparently do not need food, and only occasionally occur on flowers.

Distribution: Siberia from Altai Mts. eastwards, Far East incl. NE China, Korea, Sakhalin.

Material: 16.–17. 7. 1979, SU, western coast of lake Baikal, 16/I, *Rhododendron,* lgt. et coll. S; 7. 9. 1975, SU, Khabarovsk region, Gur, 1/–, *Betula,* lgt. D, coll. IS (adult not reared, determination based on the locality and comparison with reared larvae).

Pachytodes cometes (BATES, 1884)

Differs from *P. cerambyciformis* as follows: Cr proportions often somewhat shifted towards *Judolia* (vs longer, cr often broader and consequently cl and mouthparts often relatively narrower), yet cl strongly tapering. Gena about as in *P. longipes.* Available larvae with 3–8 setae on each vs half. Md only moderately gibbose laterally. Proth pigmentation distinct. Available larvae differ distinctly from all other species by large pigmented spot on ligula (Fig. 31F). Aa always largely mspte, occasionally with granules rather restricted. Spir with numerous mgch (up to 30 in mesoth spir). Setae in mature larvae denser, about as in *P. longipes.* Larger than other species except for *Oedecnema,* largest available larva 29 mm.

Habits (CHEREPANOV, 1979): Larvae in *Abies sachalinensis* (our larvae also from *Alnus, Betula* and *Rhus,* suggesting that the species is polyphagous like most other species of the group). Eggs laid at root bases of dead and dying trees, both large and small ones. Larvae under bark and later in wood of the roots. Pupation June-early July in the soil, adults July – September on flowers.

Distribution: Sakhalin, South Kuriles (Kunashir), Japan.

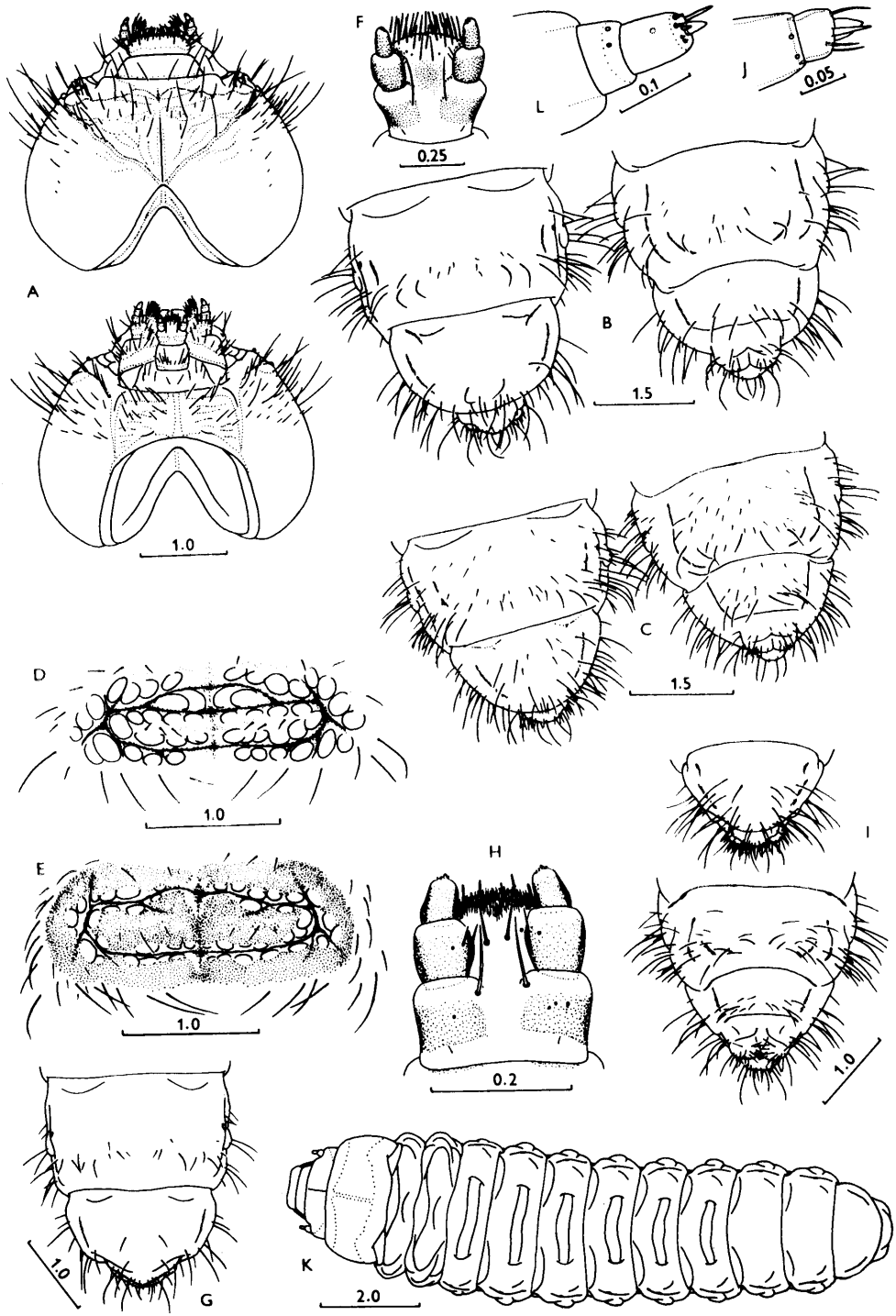
Material: 1972 and 1977, SU, Kunashir, 8/–, *Abies, Alnus, Betula, Rhus,* lgt. A. V. Kompantsev, S. Korolëv and D, coll. IS. Adults not reared, determination based on the locality, and comparison with other species.

Pachytodes cerambyciformis (SCHRANK, 1781)

Cr in later instars darker, yellow-orange, widest ± far behind middle (Fig. 30I), sides usually less convex. Cl broader and more strongly tapering, very finely sclerotized. Labrum usually not pronouncedly cut anteriorly, ± numerous setae often present in whole anterior half, discal pair may be poorly separated from other setae. Mstm large, sharply defined, convex, gena below it distinctly darkened, dark area relatively sharply delimited (Fig. 30J). Vs (Fig. 30G) moderately long (about 3.4–4), bearing about 3–8 setae on each side. Md distinctly gibbose laterally, mostly with two setae. Lmx on average slightly larger than in *Judolia,* palb separated by about 1.5 times their width.

Pn with anterior pigmentation mostly very pale yellowish. Pterothoracic sterna and aa granulate (mesosternum occasionally very poorly so), msp in larger extent, aa mostly largely mspte along periphery and on scutal plates, rarely msp restricted, never absent. Legs shorter, hind femur and ti combined mostly shorter than one-half of vs width, ptrs and claw adequately smaller. Seventh daa with or without msp. Setae relatively sparse (see key). Length up to 20–22 mm.

Habits: Polyphagous on both hardwoods and conifers. Larvae can be rarely found above ground level, and then usually in uprooten trees, in those roots which have remained packed


A
1.0
F
0.25
L
0.1
J
0.05
B
1.5
C
1.5
D
1.0
E
1.0
H
0.2
I
1.0
G
1.0
K
2.0

with soil. Most of individuals (particularly those living underground) pupating in the soil in spring. Adults in late spring and summer on flowers.

Distribution: Europe except North, Caucasus, Transcaucasia, Asia Minor.

Material: 1976–1981, CS, Bohemia (various spots), +/I, *Quercus, Carpinus, ?Populus* (indet. stump remains), *Picea, Pinus,* lgt. et coll. S; 8. 4. 1982, CS, Slovakia m., Modra env., 4/I, *Quercus,* E. Jendek lgt., coll. S.

Pachytodes erraticus (DALMAN, 1817)

Similar to *P. cerambyciformis,* differs as follows: Mouthframe, cl and lmx on average even broader, relatively larger. Lbr rounded anteriorly, whole anterior half covered with setae. Mstm small, reduced (see key). Vs (Fig. 30H) short (over 4), bearing about 2–5 setae on each side. Ligula broader, palb separated by about twice their width. Pn with anterior pigmentation always very pale, al only finely sclerotized posteriorly. Msp always present in large extent, often ± reducing granulation (in extreme cases, mesosternum almost non-granulate, metasternum and vaa almost lacking posterior row of granules, daa with very few granules - Fig. 31E). Seventh daa always largely mspte. Length up to 20–22 mm.

Host plants: *Quercus, Acer campestre, Betula, Corylus, Crataegus, Prunus,* undoubtedly polyphagous. Habits similar to *P. cerambyciformis,* apparently still more strictly subterranean. Much more warm- and dry-loving than *P. cerambyciformis.*

Distribution: Central and South Europe, southern West Siberia, Caucasus, Transcaucasia, North Iran, Asia Minor.

Material: 15. 9. 1979, CS, Slovakia m., Plešivec, 2/–, *Acer campestre,* lgt. et coll. S; 8. 9. 1980 and 28. 8. 1983, CS, Slovakia m., Kamenica n/Hr., 8/–, *Crataegus* and *Prunus,* lgt. et coll. S. Adults not reared (but collected in numbers on both localities), larvae determined by elimination, compared with data from CHEREPANOV (1979).

Pachytodes orthotrichus (PLAVILSHCHIKOV, 1936)

Larvae not at my disposal. Described by CHEREPANOV (1979), but unfortunately not illustrated - under "*Judolia*" *orthotricha* has been by mistake reproduced once more the drawing of the larva of *Anoplodera rufiventris* (compare with p. 274 of the same book). The larvae probably similar to other *Pachytodes*-species. Daa largely mspte (as in *P. erraticus,* but ninth abd tergum more hairy). The key characters have not been confirmed on my specimens of *P. longipes* and *P. erraticus.* Length up to 18 mm.

Plate 31: A - *Judolia sexmaculata,* head, dorsal (upper) and ventral (lower) views. B - *Pachytodes cerambyciformis,* end of abdomen, dorsal (left) and ventral (right) views. C - *P. longipes,* dtto. D - *Judolia sexmaculata,* third dorsal ambulatory ampulla. E - *Pachytodes erraticus,* dtto. F - *P. cometes,* praelabium, ventral view. G - *Judolidia bangi,* end of abdomen with caudal spine, dorsal view. H - *J. bangi,* praelabium, ventral view. I - *Alosterna tabacicolor,* abdominal segments 9 and 10 in posterodorsal view (upper), and segments 8 to 10 in ventral view (lower). J - *A. tabacicolor,* apical part of antenna (after DUFFY, 1953). K - *Pseudovadonia livida,* body shape, dorsal view. L - *P. livida,* right antenna, ventral view (after BURAKOWSKI, 1979, slightly modified).

Host plant: *Caragana*. Larvae found in died out lower parts and roots of living shrubs. Pupation in June in the roots. Occurs sporadically, local, in steppe regions.

Distribution: South of Central Siberia (Krasnoyarsk, Kansk, Tuva), Mongolia.

Genus *Judolidia* PLAVILSHCHIKOV, 1936

Type species: *Judolidia znojkoi* PLAVILSHCHIKOV, 1936 = *Leptura bangi* PIC, 1901 (orig. design., monobasic)

Similar to *Oedecnema*-group, main differences and restrictions as follows.

Setae very sparse (Fig. 31G), finely pigmented. Cr extremely pale yellowish, some regions completely unpigmented; fl therefore very indistinct, but anteriorly very distinctly bisecting heavily sclerotized mouthframe and reaching anterior cr margin. Hind frontal angle slightly darkened, otherwise frons nearly unpigmented, consequently tfl invisible. Cl and lbr similar to *Judolia sexmaculata*. Mstm small, smaller than first ant segment's cross-section. Gena very intensively but very narrowly pigmented along whole plst length. Vs relatively short (about 4), moderately convex, with prominent hind angles, hypl diverging, reaching pocl. Mgl diffuse, indistinct due to poor vs pigmentation. Available larvae with 2–5 setae on each side of vs.

Ant apparently similar (in one available larva, segment 3 rudimentary and fused with segment 2, but antennae in this specimen apparently aberrant). Md short, basal part only slightly gibbose laterally, bearing two setae. Lmx relatively small (about as large as in *Judolia* or *Pachytodes longipes*). Palb separated by hardly more than their own width, ligula of transitional type (Fig. 31H), with very sparse dorsal setae separated from two strong ventral setae by distinct long apical and dorsolateral microtrichia.

Protergal band very narrow, extremely pale, al posteriorly ± unpigmented, venter lacking pigmentation. Lpst with sparse setae, mpst bearing about six setae, and with two large mspte areas in hind half. Spir very small. Pterothoracic terga and sterna and aa very distinctly largely mspte, granulation much restricted (granules absent from mesosternum, very much reduced on metasternum, only anterior row present on vaa, very much reduced or absent on daa). Coxae less prominent, legs shorter than in *Pachytodes*, hind legs much shorter than one-half of their basal distance, setae very sparse, ptrs not much compressed, claw not remarkably long. Plt bearing about 3 setae. Small caudal spine on broad ± prominent base present (Fig. 31G). Apl with only a few marginal short setae. Largest available larva 13 mm.

Apparently single species known.

Judolidia bangi (PIC, 1901)

Host plants: Scarce records available, suggesting polyphagy. *Lonicera* (CHEREPANOV, 1979), *Larix* (NAKAMURA, 1981). According to the former, the eggs are laid in soil around dead or dying

Lonicera-roots, larvae feeding under bark and in wood, progressing towards root base. Pupation after the second overwintering in the host plant, adults fly in June–July, visiting flowers.

Another larval description and probably bionomical data have been presented (unfortunately in Japanese) by GOH (1978).

Distribution: Ussuri region, NE China, Korea, Japan.

Material: 13. 6. 1978, Japan, Fukushima Pref., Kawakami-mura, 2/?, host not stated, coll. S. Nakamura.

Genus *Alosterna* MULSANT, 1863

Type species: *Leptura tabacicolor* DEGEER, 1775 (monobasic)

Body white, robust, ± parallel-sided, cylindrical, with moderately long fine at most finely pigmented ± dense setae.

Head (Figs 32A, B) in natural position very deeply retracted (more than by half, which is unusual in Lepturinae). Cr transverse (about 1.3), moderately depressed (about 2–2.2), much narrower than proth, ± quadrangular, with sides feebly convex, shape somewhat variable; yellow to yellow-orange (except for ± unpigmented areas behind gena and along tfl, fl and dorsal duplicate region), not microsculptured. Ecr with sparse to moderately dense anterior setae, main adfrontal seta lying ± in fl, several supplementary setae often present. Both ecr halves unusually broadly fused, length of dorsal duplicate region mostly exceeds two-thirds of medial frontal length, hind cr notch short and usually narrower than in the specimen figured in 32A.

Cr cuticle along fl and tfl broadly depigmented (fl slightly more sharp in *A. perpera*). Frons short, broadly triangular, with rounded posterior angle, fl touching ant opening from below and ± reaching anterior cr margin. Pof distinctly concave, ± obliquely rugose, very pale, main pair of setae shifted anteriorly, supplementary setae usually present (esp. in *A. perpera*). Prf very dark, strongly sclerotized, moderately convex, bearing greater number of setae, main four pairs ± longest. Epmg dark, abruptly declivous, six strong eps close to cl border. Mfl reaching epmg, in later instars much weakened by tfl.

Cl moderately broad, trapezoidal, relatively flat, almost unsclerotized. Lbr flat, transverse (about 2–2.5 times as wide as long), narrowly sclerotized along basal margin, two or several discal setae, moderately dense comparatively fine setae along anterior margin. Hind eph region moderately broad, not much raised, medial transverse row composed of minute peg-shaped sensilla. Tormae of medium length, moderately oblique. Anterior region with moderately numerous setae not reaching medial transverse row of sensilla.

Plst not very broad, moderately raised, strongly sclerotized, sfp absent. Genal pigmentation about as broad as plst, then ± all pigmentation abruptly disappears, ecr pigmentation separated from gena by a broad pale area (lacking in young larvae). One ± distinct mstm, dstm and vstm indistinct or absent.

Vs extremely short (about 5–6.5), gently convex, not darker than ecr. Anterior margin medially straight, sharply separated from lmx base, dark except for middle of gula. Hypl broad, dark, ± distinctly reaching pocl. Mtt very close to narrowly intensively pigmented posterior margin. Gula almost not differentiated, mgl ± diffuse, broadly reaching anterior margin. Setae absent, or 1–2 setae may be inconstantly present.

Ant (Fig. 31J) two-segmented, relatively long, pointed obliquely ventrad, very deeply retractile, connecting membrane large, prominent, ant ring esp. dorsally not raised, connecting membrane smoothly passing into cr cuticle. Segments poorly sclerotized, segment 2 usually slightly shorter than broad, main sensillum large, robust.

Md type I, moderately long, relatively robust. Border zone usually indistinctly striate. Apex and dorsal angle usually prominent, ± sharp, broadly separate, cutting edge emarginate, two long distinct inner keels present. Basal part relatively smooth, with two lateral setae.

Lmx relatively large, very robust, non-flattened, with sparse setae (Fig. 32B). Base unsclerotized, cardo moderately large, bearing short seta. Maxilla short, robust, pgmx very small, ventrally unpigmented, basal spot absent, mala short, robust, cylindrical, with broad sclerotized band. Pamx short, conical, third segment large, often longer than others. Mt with broadly separate yet distinct basal spots. Prlb large, broad, basal apodeme unpigmented, pglb pigmentation well separate, ligula large, broadly rounded, with a few (usually 2–4) ventral setae, apical and dorsolateral margins covered with distinct long pale microtrichia. Palb separated by about 1.5–2.5 times their width.

Proth relatively small and narrow, usually somewhat narrower than pterothoracic segments. Protergal band pale, al finely sclerotized (in *A. perpera* all pigmentation nearly absent), anterior margin broadly emarginate on each side, without notches. Pn finely rugose, with a few scattered setae. Lfur absent. Venter unsclerotized, lpst with dense setae, mpst bearing at lest about 10 setae. Msp absent.

Meso- and metanotum non-granulate, very finely mspte, other pterothoracic regions devoid of msp. Al almost not protuberant. Mesoth spir small (much shorter than pamx), broadly oval, feebly sclerotized, with up to about 15 small mgch. Metath spir weakly sclerotized, poorly visible. Sterna distinctly finely granulate, bst divided, coxae well defined.

Legs moderately long, hind legs somewhat shorter than half of their basal distance; moderately robust. Trch small, with several setae, basal ring fine, sometimes incomplete. Femur slightly shorter than ti, both unsclerotized. Ptrs shorter, broad and compressed at base, claw abruptly tapering, curved, seta borne before middle.

Abd devoid of msp. Aa moderately protuberant, granulate, granules small, flat, yet very sharply defined, smooth. Six daa present, with one lateral impression on each side, anterior transverse line not doubled. Abd spir small, much smaller than mesoth ones, with up to about 10 small to moderately large mgch. Epl on anterior

abd segments relatively poorly protuberant, plt moderately large, elongate oval, bearing about 5–10 setae. Seven vaa present, seventh one distinctly reduced. Carm absent, ninth tergum conically projecting posteriorly over atu which is broad (Fig. 311), very short, subterminal. Apl bearing numerous relatively long setae.

Probably a Holarctic genus, although no North American species were classified in it by LINSLEY et CHEMSAK (1976). Larvae of three (?four) species available.

1 (4) Main stemma abruptly convex, ± rounded, with large ± compact pigment spot. Setae sparser (Fig. 32A).
2 (3)! Dark praefrontal pigmentation reaching, or almost reaching first two pairs of main praefrontal setae. Hypostomal region of ventral sclerite finely pigmented, not paler than epicranium, much darker than pale postgenal area of later instar larvae .... *tabacicolor, ?scapularis*
3 (2)! Dark praefrontal pigmentation by far not reaching first two pairs of main praefrontal setae. Hypostomal region practically unpigmented, much paler than epicranium, as pale as postgenal area of later instar larvae ..... *chalybeela*
4 (1) Main stemma poorly convex, with indistinct often incompletely fused pigment spot. Setae dense (Fig. 32B, but particularly body setae) ..... *perpera*

Alosterna tabacicolor (DEGEER, 1775)

Main characters in the key. Fl in later instar larvae very broad and diffuse, md usually abruptly gibbose laterally. Protergal pigmentation pale yet in later instars distinct. Length up to 15 mm.

Habits: Polyphagous, the larvae feed indiscriminately in or under bark and in wood of both conifers and hardwoods, usually in extremely decayed material of minimal specific weight. The larvae must be capable of digesting of various material of very poor nutritional value, and are apparently in some connection with fungi (a detailed study of digestion in *Alosterna* and *Pseudalosterna*-group might yield very interesting results). Apparently at least two-year development, pupation in spring/summer in the food material, adults in summer on flowers.

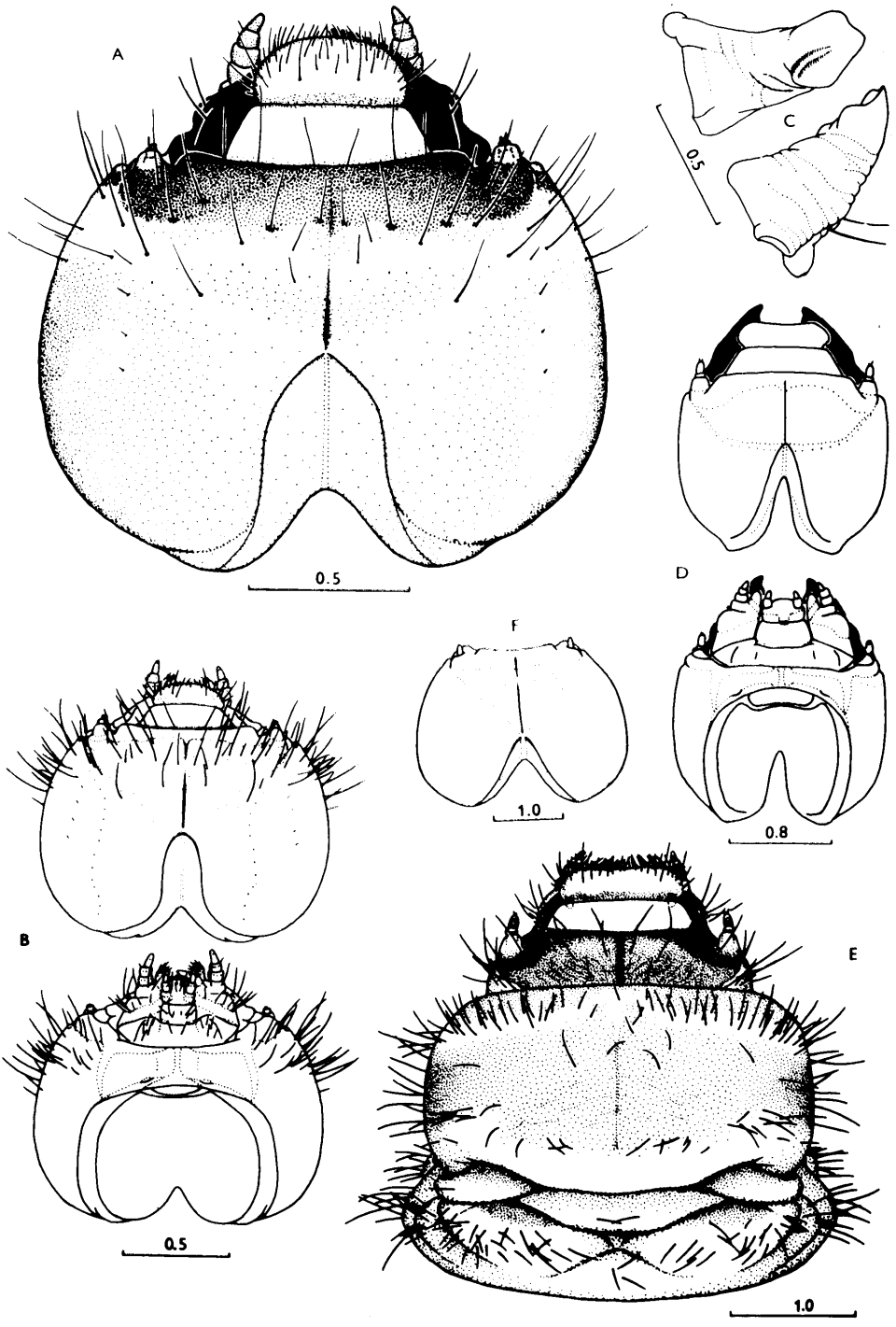
Distribution: Europe, Caucasus, Transcaucasia, North Iran, Asia Minor, Siberia, Far East incl. islands.

Material: 1964–1987, CS (various localities), 36/I, *Quercus, Betula, Salix, Carpinus, Picea,* lgt. et coll. M. Sláma, J. Tomčík and S; 9. 5. 1978, Hungaria, Pécs env., 1/–, *Quercus,* lgt. et coll. S; 6. 8. 1977, SU, Kurile Islands, Kunashir, 3/I [ssp. *bivittis* (MOTSCHULSKY, 1860) = *elegantula* (KRAATZ, 1879)], indet. liana, lgt. S. Korolëv, coll. IS.

Alosterna ??*scapularis* (HEYDEN, 1878)

No reliably determined (reared) larvae at my disposal. Two larvae are available which might probably belong to this species, but no reliable differences found from *A. tabacicolor.*

Host plant: *Quercus.* No further data available.
Distribution: Talysh (SE corner of the Soviet Transcaucasia), North Iran.
Material: 19. 4. 1985, SU, Talysh, Astara, 2/–, *Quercus,* lgt. A. Esenin, coll. IS.


A
0.5
C
0.5
D
F
1.0
0.8
B
0.5
E
1.0

Alosterna chalybeela (BATES, 1884) (= *elegantula* auctt. non KRAATZ, 1879)

Very similar to *A. tabacicolor*, main differences in the key. Md laterally almost not gibbose. Cr slightly more depressed. Largest available larva 9 mm.

Host plants: Available larvae taken from the bark of *Kalopanax*. CHEREPANOV (1979) found them in the bark of a living liana of the genus *Actinidia*. Larvae fed in the outer bark, not touching the phloem, pupation observed in the bark in May–June.

Distribution: Sakhalin, Kunashir, Japan.

Material: 9. 6. 1977, SU, Kurile Islands, Kunashir, Mendeleevo, 4/I, *Kalopanax*, A. V. Kompantsev lgt., coll. IS.

Alosterna perpera DANILEVSKY, 1988 (= *chalybeela* auctt. non BATES, 1884)

Main characters in the key. Both head and body setae longer, denser, very pale. Fl not so broad and diffuse. Prf pigmentation broad, not so dark. Hyp region of vs pigmented. Basal md part not gibbose laterally. Protergal pigmentation nearly absent. Largest available larva 9 mm.

Host plants: Known from *Juglans*, *Acer*, *Quercus*, *Populus*, *Picea*, *Abies*. Apparently the same is true what has been said about *A. tabacicolor*. Larvae in highly decayed sapwood.

Distribution: Amur-Ussuri region, NE China, Korea, Sakhalin.

Material: May 1976, SU, Khabarovsk region, Bychikha, 8/I, *Populus* and *Abies*, lgt. A. V. Kompantsev, coll. IS and S.

The *Pseudalosterna*-group

Descriptions of the following two closely related genera have been joined.

Genus *Pseudalosterna* PLAVILSHCHIKOV, 1934

Type species: *Pseudalosterna orientalis* PLAVILSHCHIKOV, 1934 = *Leptura misella* BATES, 1884 (orig. design., monobasic)

Genus *Pseudovadonia* LOBANOV, DANILEVSKY et MURZIN, 1981

Type species: *Leptura livida* F., 1776 (orig. design., monobasic)

Body white, robust, parallel, cylindrical, bearing short ± sparse relatively stiff setae.

Head (Figs 32D, E, 33A) small, in natural position very deeply retracted. Cr rather variable in shape, slightly transverse (about 1.2–1.3), not much depressed

Plate 32: A - *Alosterna tabacicolor*, head, dorsal view. B - *A. perpera*, head, dorsal (upper) and ventral (lower) views. C - *Pseudovadonia livida*, right mandible, dorsal (lower) and medial (upper) views. D - *P. livida*, head, dorsal (upper) and ventral (lower) views (setae omitted). E - *P. livida*, head, pro- and mesothorax, dorsal view. F - *Nivellia sanguinosa*, shape of cranium, dorsal view.

(1.9–2.2), much narrower than proth, yellow to yellow-orange, not microsculptured. Ecr ± smooth, with very sparse setae restricted to anterior margin, adfrontal seta moved far into frontal region, often accompanied by one shorter seta. Sides very feebly convex to parallel, both ecr halves shortly fused (one-third to almost one-half of medial frontal length, but frons very short), hind cr notch very narrow, at most about 45 degrees.

Fl distinct, moderately sharp (somewhat diffuse from outer side), broadly curved (medial section may be shortly S-curved), meeting at 180 degrees, making frons half-oval; reaching anterior cr margin. Frons very short, tfl ± absent. Pof region concave, distinctly obliquely rugose, usually with single pair of setae shifted far forward. Prf region darker, usually smooth, rather abruptly convex, mostly with four pairs of setae arranged in a single transverse row. Epmg narrowly sclerotized, abruptly obliquely declivous, ± straight. Six stout eps very close to cl border. Mfl broad, in all instars reaching epmg, neither shortened nor interrupted.

Cl broad, ± flat, moderately tapering, unsclerotized. Lbr flat, very broad and short, anterior margin straight to slightly emarginate (!), anterior half with sparse short setae, main discal pair not distinctly isolated, very narrow sclerotized band along basal margin. Hind eph region broad, feebly raised, transverse row composed of minute peg-shaped sensilla. Tormae oblique, moderately long. Anterior region with at least sparse setae.

Plst extremely narrow, feebly raised, sfp absent. Gena practically not differentiated from ecr. One mstm, distinct to almost absent. Other stemmata absent.

Vs extremely short (about 7–10), setae absent, otherwise similar to *Alosterna*.

Ant two-segmented (Fig. 31L), long, in later instar larvae exceptionally long, extremely retractile, connecting membrane very large, smoothly passing into cr cuticle, ant ring almost absent. Ant shifted very strongly towards anterior cr margin, and only extremely narrow sclerotized bridge (hardly visible without removing ant) remains between ant opening and md articulating membrane. Ant segments sclerotized, segment 2 in later instars longer than broad, main sensillum moderately large, elongate, one of remaining sensilla very long, longer than main sensillum.

Md type I, much variable in shape. Border zone at most indistinctly striate, apical part relatively small, both apex and dorsal angle very blunt, former ± distinctly doubled (Fig. 32C), inner keels almost absent. Basal part large, with two strong lateral setae.

Lmx relatively very large (Figs 32D, 33A), very robust, non-flattened. Base unsclerotized, cardo moderately large, lacking seta. Distal maxilla short, very robust, pgmx very small, unpigmented, at most small basal spot present. Mala very short and robust, with distinct pigmented band. Pamx short, robust, conical, segments subequal, or third longest. Distal labium extremely broad, short, compressed longitudinally. Mt with very small lateral spots at base, prlb with large basal spot pushed almost between pglb pigmentation. Palb separated by about twice their width, ligula broad, very short, bearing at most very sparse setae.

Proth small, in mature larvae distinctly narrower than several following body segments (Fig. 31K). Pn differs in both genera, with very sparse setae (often only two discal setae present), lfur absent. Al finely sclerotized, venter ± unsclerotized. Lpst esp. in *Pseudovadonia* bearing greater number of setae, mpst with about 3–5 pairs. Msp (except for those along anterior proth margin) almost absent.

Meso- and metanotum non-granulate, msp restricted and hardly discernible, present anteriorly on praescutum and scutum. Al feebly protuberant. Mesoth spir slightly protruding into proth, small, shorter than pamx, oval, with small mgch (in *Pseudovadonia* often along both posterior and anterior margins). Rudimentary metath spir distinct. Sterna with small flat granules along transsternal lines (posterior row of granules esp. on mesosternum nearly absent, occasionally mesosternum lacking granules). Bst deeply divided. Coxae relatively well defined. Indistinct msp present usually on lateral bst and (in a variable extent) on sternellum posterior to transsternal line.

Legs in *Pseudalosterna* similar to *Alosterna,* in *Pseudovadonia* they are extremely short (hind distal legs about four times shorter than their basal distance), trch mostly with one seta, femur stout, much shorter than ti, ptrs almost not compressed, claw very sharp, seta borne very close to base.

Aa feebly protuberant, with relatively few loose small flat smooth granules (more numerous laterally, almost absent medially). Daa divided by two simple transverse lines and one lateral impression on each side, fine sparse msp along anterior and posterior margins and ± on scutal plate. Seventh daa very strongly reduced or absent. Abd spir ± smaller than mesoth one, with up to about 10–15 small mgch along posterior margin. Epl not much protuberant, plt moderately large, oval, bearing two strong and up to about 5 short setae. First plt distinctly smaller than others. Vaa with msp predominantly along hind (!) margin, seventh vaa strongly reduced. Carm absent, ninth tergum posteriorly rounded, slightly projecting over very short broad subterminal atu. Apl large, almost not separate from atu, bearing numerous relatively long strong setae.

The two genera are apparently somewhat related to *Alosterna.* Taxonomic position of all these genera is not very clear.

Species of *Pseudalosterna* occur in the Far East. *Pseudovadonia* restricted to western Palaearctics, at present with one species, although some its forms apparently require species rank as well.

1 (2) Main stemma moderately convex, with large dark pigment spot. Frontal lines passing through antennal openings. Seventh dorsal ampulla much reduced yet present .... *Pseudalosterna misella*

2 (1) Main stemma flat, without pigment, in mature larvae very indistinct. Frontal lines passing below antennal openings. Seventh dorsal ampulla absent ..... *Pseudovadonia livida*

Pseudalosterna misella (BATES, 1884)

Main characters in the key. Setae extremely sparse (plt with 2–3 setae, ninth

abd sternum with about 2–3 pairs of setae along hind margin). Cr with sides feebly roundly convex (Fig. 33A). Lbr with anterior margin straight. Anterior eph region with only a few setae at front margin. Vs slightly longer. Md base not remarkably rugose. Ligula with two ventral setae, apical and dorsolateral margins narrowly fringed with distinct microtrichia. Protergal disc not remarkably sclerotized, finely rugose. Spir with mgch slightly larger and less numerous. First abd spir much smaller than mesoth one. Legs longer, similar to *Alosterna*. Largest available (non-mature) larva 7 mm.

Host plants: The available larvae have been taken from dead *Abies*-bark. CHEREPANOV (1979) reared this species from *Salix*-stump [however, the single larva which served for the descriptions and drawing in CHEREPANOV et CHEREPANOVA (1975b) and CHEREPANOV (l.c.) was undoubtedly misidentified, and does not belong to this species]. Very little is known about bionomics - perhaps similar to *Alosterna*-species.

Distribution: Amur-Ussuri region, Korea, Japan.

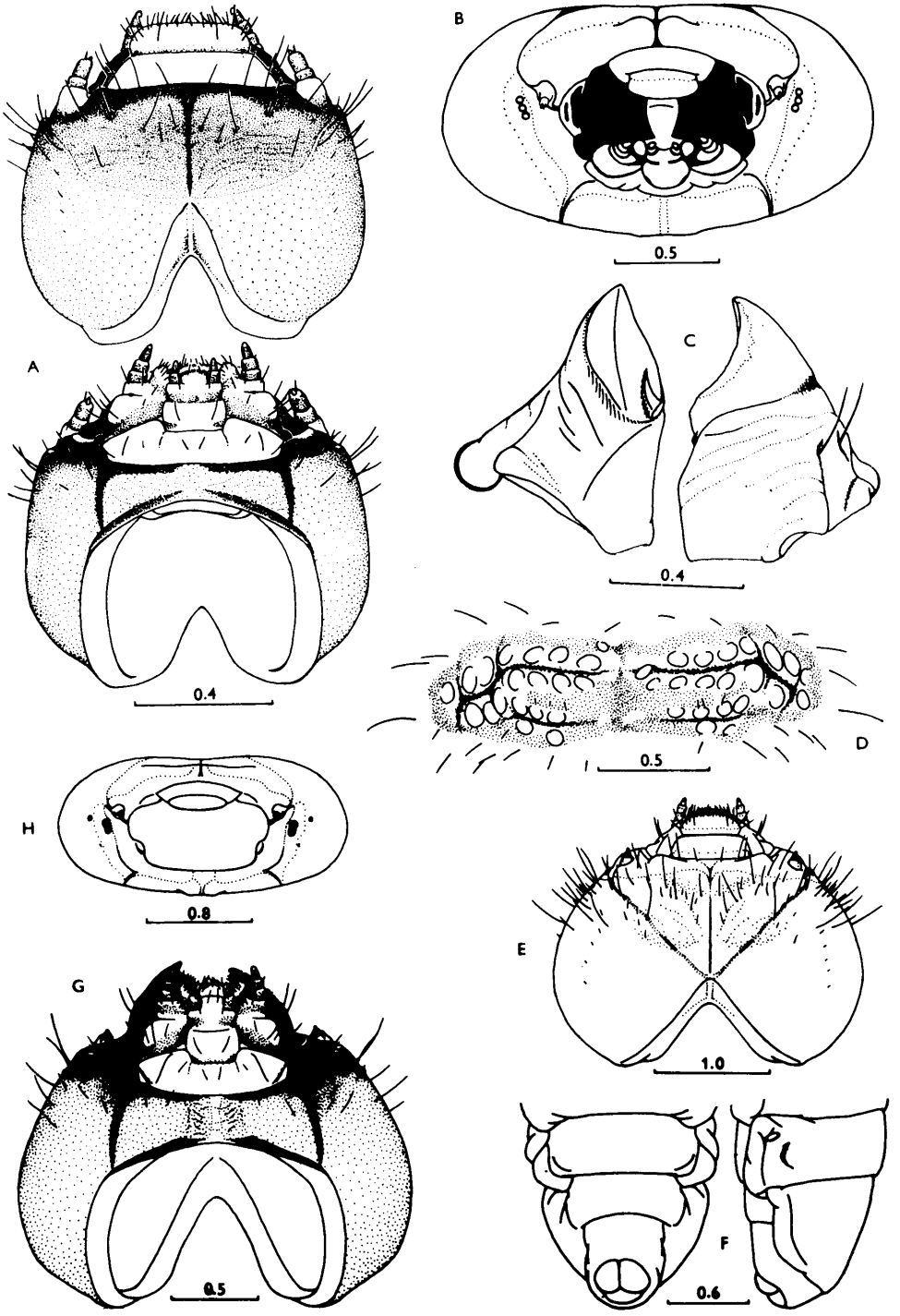
Material: April–May 1969, SU, Ussuri-region, Suputinka Nat. Res., 2/I, *Abies*, collector not stated, coll. IS.

Pseudovadonia livida (F., 1776)

Main characters in the key. Setae stronger, much denser (plt bearing about 4–7 setae, ninth abd sternum with setae much more numerous). Cr esp. in later instar larvae very narrow, ± parallel-sided (Fig. 32D). Lbr mostly with anterior margin shallowly emarginate. Eph setae numerous, reaching transverse row of sensilla. Vs extremely short along whole width. Md base mostly distinctly rugose. Ligula bearing sparse stout setae, microtichia restricted to dorsolateral margins, ± invisible from ventral view. Protergum strongly sclerotized discally, anterior pigmented band incorporated in that sclerotization (Fig. 32E). Mgch small, may be present almost along whole perimeter of mesoth spir. First abd spir often only slightly smaller than mesoth ones. Legs very short (see generic description). Length up to 15 mm.

Bionomics: These larvae have the exceptional habit of tunnelling freely in the soil infested with mycelium of the fungus *Marasmius oreades*, which probably constitutes an indispensable component of their food. BURAKOWSKI (1979) examined the alimentary canal, and found it filled with particles of humus, roots, fungus hyphae and sand. Two-year life cycle, BURAKOWSKI (l.c.) mentions 4 or 5 moults (i.e. 5–6 larval instars). Pupation in late spring or early summer n the soil in a more or less complete oval cocoon (!) constructed from pale fibrous paper-like

Plate 33: A - *Pseudalosterna misella*, head, dorsal (upper) and ventral (lower) views. B - *Nivellia sanguinosa*, diagrammatic illustration of head in anterior view (setae omitted). C - *N. sanguinosa*, right mandible, dorsal (right) and medial (left) views. D - *N. sanguinosa*, third dorsal ambulatory ampulla. E - *Cornumutila quadrivittata*, head, dorsal view. F - *C. quadrivittata*, end of abdomen, ventral (left) and lateral (right) views (setae omitted; note large conical anal tube; however, segment 9 in this specimen slightly retracted, and the anal tube appears therefore relatively larger). G - *Nustera distigma*, head, ventral view. H - *N. distigma*, cranium, clypeus and labrum, anterior view.


A
B
C
D
E
F
G
H
0.4
0.5
0.4
0.5
1.0
0.6
0.5
0.8

material (?regurgitated by the larva). The nature and origin of this substance remain unknown, no signs of presence of calcium carbonate have been found (cf. "calcareous cocoons" of some Cerambycinae - e.g. DUFFY, 1953: 44). Unfortunately, no mature larvae shortly before pupation are available for dissection.

Distribution: Europe except North, western Siberia, Caucasus, Transcaucasia, North Iran, Asia Minor.

Material: 27. 5. 1974, SU, Moscow region, Malinki, 1/I, in soil, lgt. N. B. Nikitsky, coll. S; 1981–1983, CS, Bohemia c., Neveklov env., +/I, in soil with mycelium of *Marasmius*, lgt. et coll. S.

Genus *Nivellia* MULSANT, 1863

Type species: *Leptura sanguinosa* GYLLENHAL, 1827 (monobasic)

Body white, moderately elongate, non-depressed, with moderately dense very short thin finely pigmented setae.

Head about by half retracted. Cr moderately transverse (about 1.3), very little depressed (about 1.8–1.9), narrower than proth, widest ± far behind middle (Fig. 32F), pale yellow, anterior exposed region very distinctly microgranulate. Ecr ± smooth, with moderately numerous very short anterior setae, one long adfrontal seta very close to fl, at most few very short supplementary setae. Sides moderately convex, broadly rounded, both ecr halves shortly fused, duplicate region hardly as long as one-third of medial frontal length. Hind notch angulate, less than 90 degrees.

Fl narrow, not very conspicuous due to poor cr pigmentation, finely S-curved in posterior half, through ant openings ± distinctly reaching anterior cr margin. Pof shallowly broadly concave posteriorly, smooth, main pair of setae shifted forward towards tfl region, at most very few short supplementary setae. Tfl as an indistinct diffuse paler zone. Prf particularly in mature larvae very dark, much darker than pof, strongly convex, in later instar larvae ± abruptly protuberant on both sides of mfl (Fig. 33B). Setae 2, 1, 1 and usually some short supplementary ones, esp. at lateral main pair. Epmg broadly deeply sclerotized, abruptly obliquely declivous. Six eps, moderately distant from cl border. Mfl distinctly broadly reaching epmg, in later instars weakened to almost interrupted by tfl.

Cl small, trapezoidal, moderately convex, gently tapering, narrowly sclerotized along basal margin. Lbr transversely oval, usually somewhat cut anteriorly, ± flat, basal half sclerotized, two long isolated discal setae, moderately dense stout setae along anterior margin. Hind eph region narrow, strongly raised, anteriorly with six minute tooth-shaped sensilla of which two medial ones are pushed somewhat forward. Tormae broad, strongly sclerotized, transverse, medial extremities slightly curved backwards. Two anterior setose areas do not reach tormae bases level.

Plst broad, moderately raised, dark, may be finely rugose, sfp absent or minute tubercle. Gena ± smooth, moderately darkened, pigmentation about as wide as

plst. Three mstm on each side (Fig. 33B), touching yet distinctly defined, not fusing, moderately convex, relatively small (one stemma at most as large as cross-section of second ant segment), with moderate, usually ± crumbled pigment spots. Other stemmata extremely indistinct.

Vs relatively long (about 2.5–2.9), strongly convex, in mature larvae may be remarkably darker than ecr. Anterior margin deeply emarginate, well separate from lmx base, in hyp region dark, strongly sclerotized. Hypl narrow, at most gently curved, ± diverging, reaching or almost reaching pocl. Mtt very short, pigmented, close to hind margin. Gl at most very slightly raised, mgl narrow, not very distinct, reaching anterior margin. About 8–14 setae on each half.

Ant three-segmented, moderately long, pointed distinctly ventrad, deeply retractile. Ant ring sclerotized, feebly raised. Segments ± pigmented, second shorter than broad, third robust, usually slightly longer than broad, main sensillum slender, at most as long as third segment, mostly shorter.

Md type I (Fig. 33C), only small rudiments of type II-keel present below dorsal angle, often invisible in dorsal view. Md short, small, border zone indistinctly striate, apex relatively sharp (md, however, rather variable), cutting edge emarginate, occasionally somewhat angulate. Two moderately broadly distant inner keels. Basal part with two lateral setae.

Lmx small, non-flattened. Base almost unsclerotized, cardo large, with a short seta. Maxilla moderately robust, pgmx large, ventral pigmented band present, basal spot absent. Mala cylindrical, robust, with broad oblique sclerotized band often connected with ventral pigmentation of pgmx. Pamx moderately long, robust, segment 2 shortest, 3 slender. Mt with basal pigmentation not interrupted. Prlb narrow, basal apodeme ± unpigmented, pigmentation of pglb separate, palb moderately long, stout, separated at base by less than 1.5 times their width. Ligula moderately broad, rounded, with usually two ventral setae, apical and dorsal margins with dense golden microtrichia.

Proth (in dorsal view) large, sides almost straight, moderately converging towards base, general shape ± quadrangular. Pn finely rugose, with very few scattered short setae. Anterior pigmented band broad, esp. in young larvae pale, more distinct on al which are broadly sclerotized. Two pairs of anterior notches, those on al narrower. Indistinct basal rudiments of lfur present. Venter even in mature larvae almost unsclerotized. Lpst with dense short setae, about 10–20 setae on mpst. Large proth areas covered with fine yet well discernible msp (stlf, cxst, episternum, epl fold, broad transverse sometimes interrupted band on mpst).

Meso- and metanotum non-granulate, mspte, scutum not interrupted. Al poorly protuberant. Mesoth spir large, in later instar larvae longer than pamx, narrowly obtusely oval, with up to about 10–15 not very large mgch. Rudimentary metath spir distinct. Transsternal lines distinct, sterna granulate, granules sharp, not very large, smooth, granulate area surrounded with msp. Only mesobst poorly divided. Coxae poorly defined anteriorly.

Legs short (much shorter than half of their basal distance), relatively stout, bearing sparse setae. Trch with distinct basal ring and several setae. Femur and ti subequal in length, ± unsclerotized. Ptrs shorter, slender, almost not compressed, claw needle-shaped, strongly sclerotized, seta borne shortly before middle.

Aa seven, sharply granulate, seventh aa distinctly reduced. Daa (Fig. 33D) with msp on scutal plate, ± broadly along medial impression, and variably around whole granulate region. Dividing pattern rather inconspicuous, anterior transverse line at most indistinctly doubled. First (i.e. largest) abd spir hardly half as long as mesoth one, up to about 10 moderately large mgch. Plt small, oval, bearing two longer and about 2–4 short setae. Vaa around granulate area ± continuously narrowly mspte. Abd tapering posteriorly, ninth tergum rounded, carm absent. Atu large, long, almost terminal, apl with ± numerous short setae.

A Palaearctic genus. However, with a few insignificant modifications (cranium slightly more transverse, praefrontal protuberances almost absent, shorter 3rd antennal segment, apparently smaller marginal chambers) the above description fully covers the North American *Trachysida aspera* (LECONTE, 1873), and perhaps also *T. mutabilis* (NEWMAN, 1841) which is not at my disposal, but should be extremely similar to *T. aspera* (according to CRAIGHEAD, 1923).

Only larvae of the type species available.

Nivellia sanguinosa (GYLLENHAL, 1827)

Habits: Polyphagous on deciduous trees. Larvae in dead branches or thinner stems of undergrowth, very young larvae under bark, later in wood where also pupation occurs in spring/summer. Apparently only moderate moisture is required. At least two-year development. Flight in summer, adults mostly on flowers.

Distribution: North and Central Europe, Siberia, Far East incl. most islands (Hokkaido of Japan).

Material: 22. 4. 1969, SU, Ussuri region, Suputinka Nature Reserve, 1/I, *Padus*, B. M. Mamaev lgt., coll. S; 25. 4. 1975, SU, Amur region, Kundur, 3/I, *Betula*, lgt. D, coll. IS; 15. 7. 1979, SU, Baikal occ., Bukhta Peschannaya, 4/I, *Populus tremula*, lgt. et coll. S.

Nivellia extensa (GEBLER, 1841)

Larvae not at my disposal, described by CHEREPANOV et CHEREPANOVA (1977) and CHEREPANOV (1979). Apparently very similar to *N. sanguinosa*. Some distinguishing characters mentioned in the former paper are not repeated in the latter monograph, so they are probably invalid. CHEREPANOV (l.c.) brings the following key (with the present terminology employed):

1 (2) Submentum with 3 setae, ventral sclerite without longitudinal impressions. On deciduous trees ..... *sanguinosa*

2 (1) Submentum with 2 setae, ventral sclerite with longitudinal impressions about middle. In *Abies* ..... *extensa*

It seems probable that the "longitudinal impressions" correspond to raised gular lines.

Habits: Larvae in *Abies,* two adults reared from *Larix*. Usually in lower parts of thin dead stems of undergrowth. Bionomics apparently similar to *N. sanguinosa*. Two-year development. Adults rarely visit flowers.

Distribution: Not very clear, since the species has been often treated as a mere colour form of *N. sanguinosa.* Siberia, Far East incl. Sakhalin and Japan. The data about presence of this species in North Europe (see SILFVERBERG et BISTRÖM, 1981) require confirmation. CHEREPANOV (l.c.) brings the Altai as the westernmost point of occurrence known to him.

Genus *Cornumutila* LETZNER, 1843

Type species: *Cornumutila lineata* LETZNER, 1843 = *Leptura quadrivittata* GEBLER, 1830 (monobasic)

Body white, elongate, almost not depressed, tapering posteriorly, bearing short sparse finely pigmented setae.

Head (Fig. 33E) broad, slightly less than by half retracted. Cr distinctly transverse (about 1.4), moderately depressed (about 2), narrower than proth, widest slightly behind middle, pale yellow, anterior region not very distinctly microreticulate (sometimes only ventrally so). Ecr about as in *Nivellia,* sides more convex, both halves shortly fused (length of duplicated region about one-fourth of medial frontal length).

Fl, pof and tfl similar to *Nivellia,* fl almost straight, pof relatively shorter. Prf less abruptly convex, without protuberances, slightly darker than pof, supplementary setae apparently slightly more numerous. Epmg dark, obliquely sloping, at most gently emarginate, six eps very narrowly separate from cl border. Mfl as in *Nivellia.*

Cl, lbr and eph similar to *Nivellia.* Hind eph region broader, less raised, transverse row of sensilla ± simple. Plst and gena as in *Nivellia,* sfp absent. Mstm fused into one large oval moderately convex structure, pigment very fine, three original spots ± separate and broken into small dots. Dstm and vstm inconspicuous, ± without pigment. Vs slightly shorter than in *Nivellia* (about 3), at most shade darker than ecr, hypl may be distinctly curved, up to about 10 setae on each side.

Ant similar to *Nivellia,* segment 2 much shorter than broad, segment 3 hardly longer than broad, about as long as main sensillum. Md and lmx generally similar to *Nivellia,* lmx with setae sparse, all parts of maxilla shorter and more robust, mt with basal spots large yet broadly separate, prlb very small, palb separated by about their own width.

Proth similar to *Nivellia.* Dorsal pigmented band in young larvae rather indistinct, medial notches very broad (Fig. 26F–a). Mpst without msp, in available (non-mature) larvae with about 8–10 setae.

Meso- and metath as in *Nivellia.*

Legs slightly stronger than in *Nivellia*. Ptrs occasionally almost as long as ti, very slightly compressed, claw curved, somewhat sickle-shaped, very long.

Abd similar to *Nivellia*. Aa less sharply granulate. Daa with msp on scutal plate not connected with those along posterior margin. All body msp sparser and larger, very poorly sclerotized (and therefore not well visible). Plt with 2 longer and 1–3 short setae. Spir with mgch smaller. Atu very large (Fig. 33F), apl with few short setae restricted to outer margin. Length up to 20 mm according to CHEREPANOV (1979).

A monotypic genus (*C. semenovi* PLAVILSHCHIKOV, 1936 has been placed in synonymy with *C. quadrivittata* - CHEREPANOV, 1979, LOBANOV, DANILEVSKY et MURZIN, 1981).

Cornumutila quadrivittata (GEBLER, 1830)

Habits (CHEREPANOV, 1979): Larvae in *Picea, Pinus, Larix, Abies,* in dead, usually barkless wood of various diameter (above 7 cm), up to about 5 cm deep, in standing or fallen trees, occasionally even in exposed root bases. Pupation in the wood, mostly three-year development period. Flight in July – August, adults do not need food to attain sexual maturity, rarely occur on flowers.

Distribution: From the Alps to East Siberia, but rare and local, in mountain coniferous forests, or in the northern taiga.

Material: 1968, CS, Moravia, Jeseníky Mts., 2/I, *Picea,* J. Sekera lgt., coll. M. Sláma; SU, Siberia, ?Irkutsk, 1/–, *Picea,* collector not stated, coll. IS.

Genus *Nustera* VILLIERS, 1974

Type species: *Leptura distigma* CHARPENTIER, 1825 (orig. design.)

Note: The description is based on single half-grown larva. The degree of individual and growth variability is therefore unknown.

Body white, moderately elongate, almost not depressed, with short sparse finely pigmented setae.

Head about by half retracted. Cr transverse (1.48), distinctly depressed (2.13), narrower than proth, widest behind middle, yellow, not microgranulate. Ecr smooth, with extremely few setae, adfrontal setae moved far into anterior pof angles which are slightly darkened. Sides strongly roundly convex. Duplicate cr region about three times shorter than medial frontal length, hind margin angulate, less than 90 degrees.

Fl narrow, almost straight, not very distinct, through ant openings reaching anterior cr margin. Pof deeply broadly obliquely impressed on each side (more so than in *Nivellia* or *Cornumutila*), main pair of setae pushed far forward, touching extremely indistinct diffuse tfl, other setae very few, miniaure. Prf distinctly convex, without *Nivellia*-like protuberances, slightly darker than ecr, setae 2, 1, 1, other setae practically absent. Epmg and eps as in *Cornumutila*. Mfl as in *Nivellia*.

Cl and lbr very similar to *Nivellia,* cl slightly broader (all mouthparts relatively

somewhat larger). Hind eph region moderately broad, with small medial sclerite, anterior transverse row composed of very short yet distinctly hair-like (not tooth--shaped) sensilla. Tormae short, transverse. Anterior region with very sparse setae at anterior margin.

Plst and gena as in *Nivellia.* Two large abruptly convex mstm on each side, with large compact pigment spots (Fig. 33H); upper stemma larger, resulted from fusion of original two upper mstm, pigment not yet completely fused. Dstm fused, both dstm and vstm distinct, convex, with smaller, crumbled yet very distinct pigment spots.

Vs (Fig. 33G) short (4.3) yet distinctly convex; not darker than ecr. Anterior margin shallowly emarginate, sharply separate from lmx base, in hyp region narrowly sclerotized, in gular region paler. Hypl narrow, gently curved, diverging, reaching pocl. Hind margin slightly darkened, mtt long, almost unpigmented, very close to hind margin. Gula very slightly raised, mgl diffuse, reaching anterior margin. Two setae on each side in hyp region.

Ant as in *Cornumutila.* Md similar to *Nivellia,* sharp, cutting edge angulate, dorsal angle prominent, very distinct supplementary tooth present. Lmx generally similar to *Nivellia* and *Cornumutila,* differs as follows: Slightly larger (cr/lmx width ratio 2.5), moderately depressed, with very sparse setae. Cardo slightly smaller, without seta. Mt short, with small indistinctly connected basal spots, prlb much broader, palb shorter, separated at base by about 1.5 times their own width, ligula broad, somewhat cut apically, microtrichia finer.

Proth similar to *Nivellia* and *Cornumutila,* medial notches of dorsal pigmented band very broad (as in *Cornumutila*), setae sparser (lpst with relatively sparse setae, 7 setae on mpst), distinct msp present on stlf anteriorly and cxst, absent from mpst, those on episternum and epl extremely few and indistinct.

Pterothorax similar to *Nivellia.* Mesoth spir small, shorter than pamx, with about five small poorly visible mgch (undoubtedly more in mature larvae). Metath spir extremely indistinct. Msp ventrally restricted to small areas before leg bases, some present also medially posterior to transsternal line.

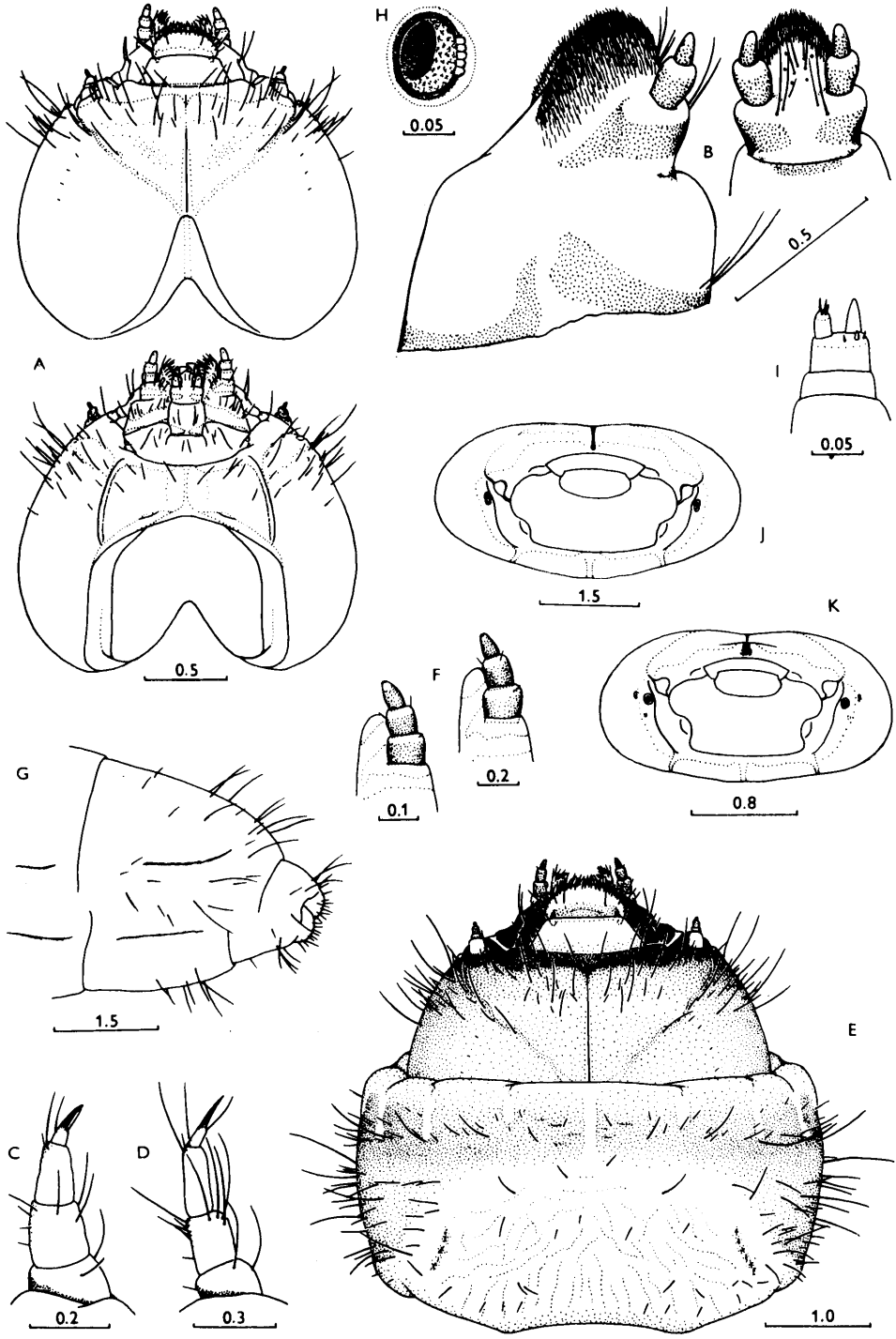
Legs as in *Nivellia,* with very sparse setae.

Abd similar to *Nivellia,* but aa practically devoid of msp. Spir extremely small, about three moderately large mgch. Plt with two long and 1–2 short setae. Length of available larva 11 mm.

A West Mediterranean genus comprising two species, one of them (the type species) occurs in Europe. Single larva available.

Nustera distigma (CHARPENTIER, 1825)

Host plant: *Pinus*. Nothing is known about habits. The larva has been found among larvae of *Ergates faber* (Prioninae) in collection of M. Sláma with the following data: 8. 5. 1975, France, Le Muy, Draguignan, in fallen stems of *Pinus pinea,* P. Hozman lgt. Thus it seems probable that


A
0.5
B
0.5
C
0.2
D
0.3
E
1.0
F
0.2
G
1.5
H
0.05
I
0.05
J
1.5
K
0.8
0.1

the larva feeds in dead wood. Judging from the non-mature larva collected in May, the development period must be at least two years. The larva has been identified by elimination, but in my opinion there is very little doubt about the identification. All important characters are present which might have been expected, and the larva simply cannot belong to any other of the Lepturinae with unknown larvae which might occur in southern France.

Distribution: Southern France, Iberian Peninsula, Tunis, Algeria, Morocco.

Genus *Strangalomorpha* SOLSKY, 1873

Type species: *Strangalomorpha tenuis* SOLSKY, 1873 (monobasic)

Similar to the *Strangalia*-group, with the following differences and specifications: Cr on average slightly less depressed (about 1.9), yellow, widest distinctly behind middle, only anterior region moderately microgranulate. Anterior ecr setae short, slightly more numerous. Both adfrontal and pof setae moved anteriorly, former shifted across fl into pof region. Ecr halves very broadly fused (Fig. 34A), duplicate region narrow, half as long as frons medially, hind cranial notch narrow. Mature larvae with indistinct diffuse paler tfl.

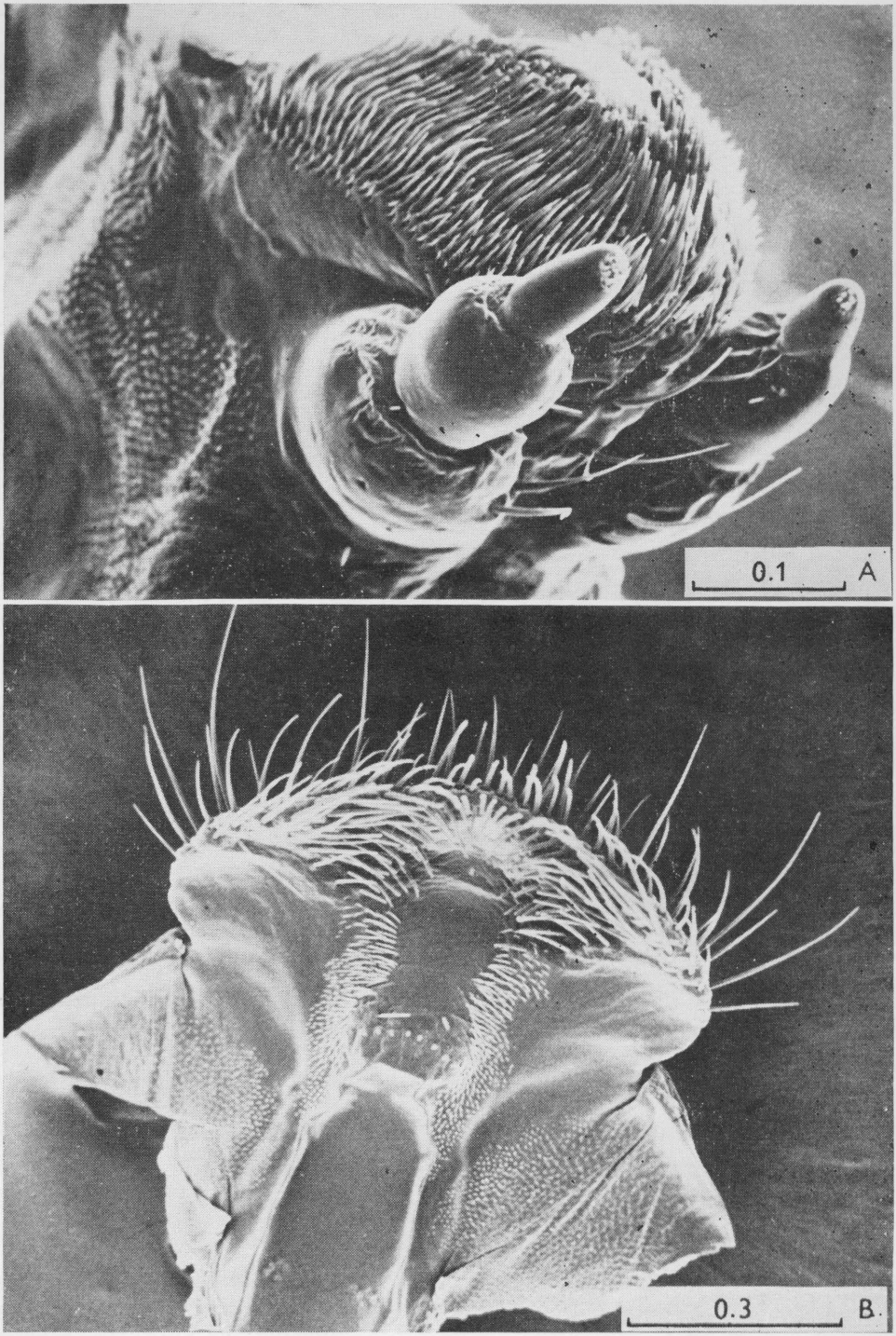
Cl and lbr smaller, latter somewhat cut anteriorly. Sfp absent. One elongate-oval poorly convex mstm with three very poorly visible pigment spots. Dstm and vstm ± indiscernible. Vs (Fig. 34A) relatively short in middle (3.4 and 3.9 in two available specimens), hind angles remarkably projecting, hind margin angulate. Hypl more diverging, reaching pocl. Four to seven setae on each half.

Second ant segment about half as long as broad, third very long, about twice as long as broad, up to twice as long as moderately elongate main sensillum. Md with two lateral setae. Pgmx without basal spot, third pamx segment slender. Basal apodeme of prlb unpigmented.

Besides pterothoracic terga, very distinct msp present on prothoracic stlf, cxst, episternum, epl and some other areas, on pterothoracic sterna and coxae (around granulate areas) and epl (less distinct), and around aa and on scutal plates (joined with posterior peripheral msp as in *Nivellia,* Fig. 33D).

Anterior proth pigmentation broad, yellow, with two narrow anterior notches on each side. Mesoth spir in available larvae with up to about 10 moderately large mgch. Legs about as in *Strangalia* (Fig. 34D), more slender than in *Rutpela.* Ptrs slender, not compressed.

Plate 34: A - *Strangalomorpha tenuis,* head, dorsal (upper) and ventral (lower) views. B - *Rutpela maculata,* mentum, praelabium and hypopharyngeal part in lateral view (left), and praelabium in ventral view (right). C - *R. inermis,* left hind leg, anterior view. D - *Strangalia attenuata,* dtto. E - *Rutpela maculata,* head and prothorax, dorsal view. F - Left maxillary palp, lateroventral view: *Rutpela inermis* (left) and *R. maculata* (right). G - *R. maculata,* end of abdomen, lateral view (showing larger conical anal tube, cf. Fig. 26I). H - *Stenurella nigra,* fourth left abdominal spiracle. I - *S. melanura,* diagrammatic illustration of right antenna, lateral view. J - *Rutpela maculata,* cranium, clypeus and labrum, anterior view. K - *Stenurella melanura,* dtto.


0.1
A
0.3
B

Seventh aa moderately reduced, granules small. Abd spir with up to about 6 moderately large mgch. Plt even smaller. Largest available larva 15 mm.

Single species in the region.

Strangalomorpha tenuis SOLSKY, 1873

Habits (CHEREPANOV, 1979): Larvae in *Salix, Padus, Acer, Juglans, Quercus, Ulmus, Betula, Alnus, Corylus* and other hardwoods, in stems of thinner (usually 3–8 cm diam.) dead trees. Young larvae under the bark, later instars in the wood. Two-year development, pupation in spring in the wood, flight June–July, adults visit flowers.

Distribution: Amur-Ussuri region, NE China, Korea, Sakhalin, Japan.

Material: 10. 5. 1976, SU, Khabarovsk region, Bychikha, exuvia/I, *Acer*, A. V. Kompantsev lgt., coll. IS; 31. 8. and 3. 9. 1975, SU, Khabarovsk region, Gur, 2/–, *Acer*, lgt. D, coll. IS.

The *Strangalia*-group

For convenience, the following three related genera have been treated together.

Genus *Strangalia* SERVILLE, 1835

Type species: *Leptura luteicornis* F., 1775 (THOMSON design., 1864). North America; larvae unknown (see general taxonomic chapter).

Genus *Rutpela* NAKANE et OHBAYASHI, 1957

Type species: *Leptura maculata* PODA, 1761 (monobasic, orig. design.)

Genus *Stenurella* VILLIERS, 1974

Type species: *Leptura melanura* L., 1758 (orig. design.)

Body white, ± slender, elongate, tapering posteriorly, not depressed, with relatively sparse short fine setae.

Head about by half retracted (Fig. 34E). Cr transverse (about 1.4), moderately depressed (about 2), narrower than proth, yellow to yellow-orange, widest about or slightly behind middle, some regions finely to extremely roughly microgranulate. Ecr smooth, with ± sparse anterior setae, main adfrontal seta lying ± in fl except for *Strangalia,* at most very few minute supplementary setae present. Sides moderately roundly convex, both halves shortly fused (duplicate region about 2.5–4 times shorter than frons medially), hind margins usually diverging at less than 90 degrees.

Plate 35 (scanning electron micrographs): A - *Rutpela maculata,* praelabium, lateroventral and slightly apical view (note absence of apical and dorsal setae on the ligula, which are substituted by long dense microtrichia; cf. Figs 27A, B). B - *R. maculata,* epipharynx.

Fl narrow, ± distinct, almost straight, passing through ant openings, reaching anterior cr margin. Pof ± flat, main pair of setae moved far forward, close to tfl, other setae absent or very few and short. Tfl from almost absent to ± distinct diffuse transverse pale zone. Prf moderately convex to almost flat, at most slightly darker than pof, main four pairs of setae at least in later instars supplemented by other shorter ones. Epmg dark, obliquely sloping, at most slightly emarginate. Six eps narrowly separate from cl border. Mfl reaching epmg, in later instars ± weakened at tfl level.

Cl moderately large, trapezoidal, slightly convex, finely sclerotized along basal margin. Lbr relatively large, transverse, elliptical to half-oval, gently convex, basal half sclerotized, anterior margin fringed with moderately dense short setae, two long strong isolated discal setae. Hind eph region relatively narrow, moderately to distinctly raised, anterior transverse row composed of minute peg-shaped sensilla (medial pair may be pushed forward as in *Nivellia*). Tormae moderately long, oblique (occasionally almost transverse), with medial extremities curved backwards. Anterior region with two densely setose areas which, however, do not reach transverse row of sensilla; microtrichia may reach distinctly onto anterior region (Fig. 35B).

Plst relatively broad, moderately raised, deeply sclerotized, ± smooth, small sfp may be present. Darker genal pigmentation at most as wide as plst, occasionally gena almost not differentiated from ecr. One large oval to subcircular moderately to abruptly convex mstm, rarely lower one of original three mstm partly separate. Pigment spot fine to very large, often three original spots ± distinguishable. Dstm and vstm variable.

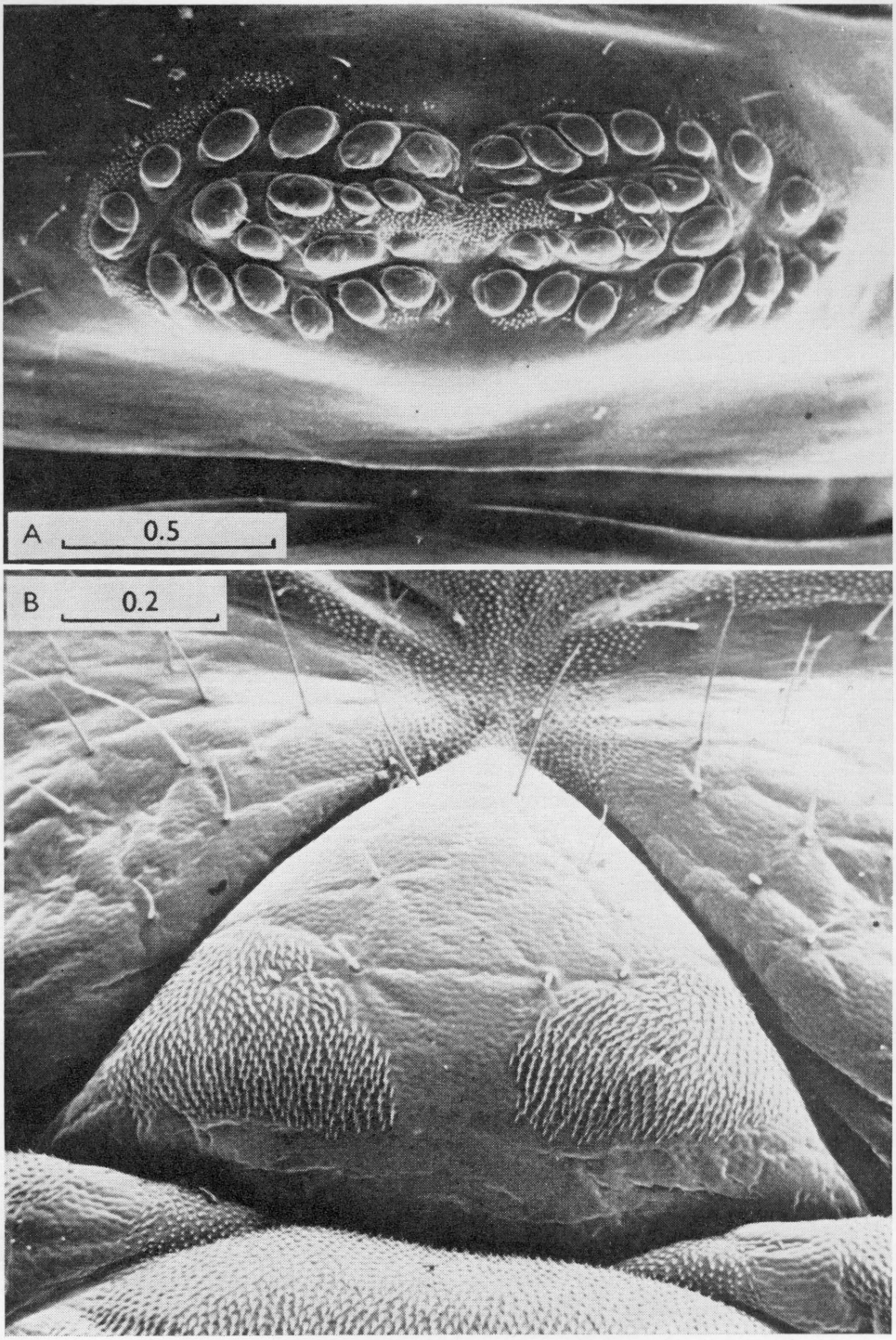
Vs (Fig. 37A) moderately long (about 2.7—3.5, more rarely approaching 4), ± convex, at most shade darker than ecr, anteriorly broadly emarginate, distinctly separate from lmx base, and sclerotized except for middle of gula. Hypl slightly diverging or subparallel, at most slightly curved, may or may not reach pocl. Mtt short, almost unpigmented, very close to somewhat darkened roundly recurved hind margin. Posterior vs angles not remarkably projecting. Gula at most very poorly raised, mgl distinct, broadly reaching anterior margin. Setae present in varying number.

Ant (Fig. 38D) moderately long, three-segmented, very deeply retractile, connecting membrane very large. Basal ring sclerotized, slightly raised except dorsally. Segments ± sclerotized, second rarely slightly longer than broad, usually shorter, third segment cylindrical, as long as or longer than broad (but never twice as long), main sensillum ± long and slender.

Md type I, generally similar to *Nivellia,* border zone at most feebly striate, apex and dorsal angle usually prominent, ± sharp, cutting edge roundly emarginate, type II-keel almost absent, two distinct inner keels well separate from each other.

▶

Plate 36 (scanning electron micrographs): A - *Rutpela maculata,* dorsal ambulatory ampulla. B - *R. maculata,* prothoracic mediopraesternum.


A
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B
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Basal part without remarkable sculpture, with two strong lateral setae, in *Rutpela* about 1–3 small supplementary setae at dorsal main seta.

Lmx moderately large, relatively robust, not remarkably flattened, with sparse to moderately dense setae. Basal components ± well separate, ventral side almost unsclerotized, cardo large, bearing short seta. Maxilla similar to *Nivellia,* pgmx in *Strangalia* with ± distinct basal spot, second pamx segment not necessarily shortest, third may be more robust. Mt with not very broadly separate large basal spots, prlb (Fig. 34B) not very large, basal apodeme usually pigmented, pglb pigmentation separate, palb separated by 1–1.5 times their width. Ligula moderately large, rounded, with usually two ventral setae, broadly covered with long distinct microtrichia (Fig. 35A).

Proth (Fig. 34E) not very broad, only moderately transverse, similar in shape to four preceding genera. Protergal band yellow to orange, with two or three anterior notches (Fig. 26F–b, c), al finely to strongly sclerotized posteriorly. Pn finely rugose, with two or a few scattered discal setae, lfur almost absent. Venter ± unsclerotized, setae numerous on lpst, about 3–5 pairs on mpst. Msp in varying extent.

Meso- and metanotum mspte, without granules, scutum very narrow medially. Al moderately protuberant. Mesoth spir broadly oval, moderately large, usually slightly shorter than pamx, not much sclerotized, with small to moderately large mgch. Metath spir ± well discernible. Sterna granulate, with or without msp. At most mesoth bst poorly divided, coxae not very sharply defined anteriorly.

Legs (Figs 34C, D, 38A) shorter than half of their basal distance, moderately to very stout, with ± sparse setae. Trch large, bearing several setae, basal ring often distinct, incomplete medially. Femur and ti subequal (or femur slightly shorter), both ± unsclerotized. Ptrs shorter, at most slightly compressed, slender to rather stout, seta borne somewhat before middle.

Seven aa, seventh ones may be very strongly reduced, but never absent; granulate, with or without msp (Fig. 36A). Abd spir slightly to considerably smaller than mesoth ones, with moderately large mgch (Fig. 38C). Plt comparatively small, oval, with two long and about 2–6 short setae. Carm absent, ninth tergum rounded posteriorly. Atu large, long (Fig. 34G; but may be largely retracted), very slightly posteroventral, apl with short setae (very few in *Strangalia*).

A Holarctic group, *Strangalia* penetrating into Oriental and Neotropical Regions. Seven species at my disposal.

1 (6) Mediopraesternum with large distinct microspiculate areas (Fig. 36B). Pigment of main stemmata poorly developed, dorsal and ventral stemmata ± lacking pigment (Fig. 34J). (Caution! Cuticle of stemmata may be greyish - this should not be mistaken for pigment spots which are distinctly subcuticular.)

2 (3) Protergal band with two notches on each side, middle pair absent or vestigial (Fig. 26F–b). Mandible with two setae. Maxillary palpiger with basal spot ± distinct. Ambulatory ampullae in mature larvae almost devoid of microspines (*Strangalia* SERVILLE, 1835) ..... *Str. attenuata*

3 (2) Protergal band with three notches on each side (Fig. 26F–c). Mandible with about 1–3 minute supplementary setae at dorsal main seta. Maxillary palpiger without basal spot. Microspines on ambulatory ampullae ± widespread (Fig. 36A) (*Rutpela* NAKANE et OHBAYASHI, 1957).

4 (5)! Length up to 30 mm. Legs slightly more slender (Fig. 38A), femur distinctly longer than broad ..... *R. maculata*

5 (4)! Length up to 20 mm. Legs stout (Fig. 34C), femur (particularly if viewed laterally) very slightly longer than broad. Restricted to southern environments of Caspian Sea .... *R. inermis*

6 (1) Mediopraesternum not microspiculate. Main stemma with large pigment spot, at least dorsal stemma with distinct pigment spot as well (Fig. 34K) (*Stenurella* VILLIERS, 1974).

7 (10) Seventh dorsal ampulla well developed, about half as large as ampulla 6. Ampullae practically devoid of microspines.

8 (9) Ventral sclerite very distinctly roughly microgranulate (Fig. 37B) ..... *Sten. nigra*

9 (8) Ventral sclerite much less distinctly more finely microgranulate ... *Sten. septempunctata*

10 (7) Seventh dorsal ampulla extremely reduced (a small narrow transverse protuberance with several granules). Ampullae largely microspiculate ..... *Sten. melanura, bifasciata*

Strangalia attenuata (L., 1758)

Main differences from *Rutpela* in the key. Adfrontal seta moved ± deep into pof region. Tfl in mature larvae more distinct, moderately diffuse. Supplementary prf setae sparser, in young larvae may be entirely lacking. Second ant segment not longer than broad. Sfp poorly developed or absent. Vs with about 6–10 setae on each side, hypl not reaching pocl. Mpst with mspte areas very broad, narrowly separate, occasionally narrowly fused. Other body msp, however, more restricted. Legs more slender (Fig. 34D). Mgch fewer. Apl with very few marginal setae. Length up to 25 mm.

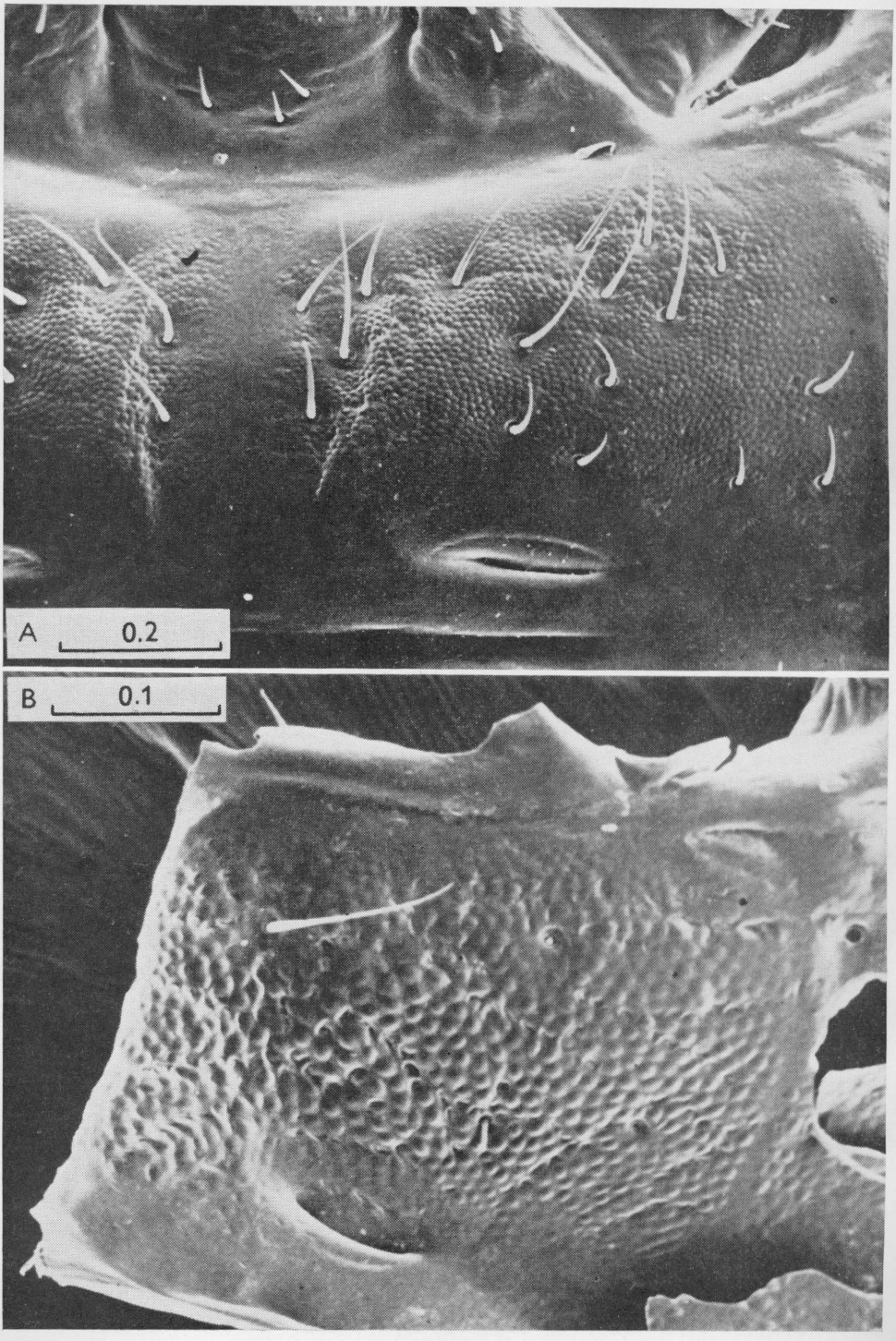
Host plants: *Quercus, Tilia, Betula, Pinus*; probably polyphagous, deciduous trees seem to be preferred. Larvae in dead ± decaying wood of varying quality and diameter. At least two-year development, pupation spring/summer in the wood, flight in summer, adults on flowers.

Distribution: Broadly distributed in Palaearctics. Temperate forests from Europe to Japan, Caucasus, Transcaucasia, North Iran.

Material: 16. 8. 1966, SU, Stavropol, 2/–, *Quercus*, collector not stated, coll. IS; 15.–18. 7. 1978, CS, Slovakia m., Plešivec, 4/I, *Quercus*, lgt. et coll. S; 1977–1979, CS, Bohemia c., Stará Boleslav, 15 larvae ex ovo, adults reared from *Tilia*, lgt. et coll. S.

Rutpela maculata (PODA, 1761)

Cr brightly pigmented, yellow-orange, anterior region ± distinctly finely microgranulate (ventral side more distinctly so). Adfrontal seta not shifted across fl. Tfl in later instar larvae present, a broad diffuse transverse zone. Prf with greater number of supplementary setae. Lbr broadly rounded in front. Second ant segment may be in later instars slightly longer than broad. Mstm oval, slightly convex, lower one of original three mstm may still be partly separate, pigment fine, three spots often


A
0.2
B
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distinguishable. Dstm much reduced, ± without pigment, vstm usually indiscernible. Relatively distinct sfp may be present. About 8–13 setae on each vs half, hypl ± reaching pocl. About 1–3 small supplementary setae at upper main md seta. Pgmx without basal spot. Second pamx segment ± longer than third (except for young larvae), palb separated by about 1–1.5 times their width.

Protergal pigmentation in later instars yellow-orange, with three narrow notches on each side (Fig. 26F–c). Mpst with two large separate mspte areas (Fig. 36B), usually bearing about 10 setae. Stlf, cxst, proepisternum and proepl distinctly mspte. Spir with up to about 15–20 mgch. Pterothoracic sterna and aa with distinct msp along anterior and lateral margins (on pterothoracic coxae), inconstantly along posterior margin, daa with msp on scutal plate (Fig. 36A). Legs (Fig. 38A) moderately robust, claw needle-shaped. Aa with granules relatively flat, seventh aa moderately reduced, similar to others. Abd spir much smaller than mesoth ones, first abd spir about twice shorter. Apl in later instars covered with short setae. Body large, length up to 30 mm, cr width up to about 4.8 mm.

Habits: Polyphagous, however, rarely found in conifers. Larvae in decaying wood with "white-rot" fungi. Two- or three-year development, pupation spring/summer in the wood, flight in summer, adults are typical flower-visitors.

Distribution: Europe except North, Caucasus, Transcaucasia, North Iran, Asia Minor.

Material: CS, many larvae from various deciduous trees, and several larvae from *Pinus* and *Abies*, lgt. et coll. S; 10. 5. 1978, Hungaria, Mecsek, Kövágótöttös, 2/–, *Quercus*, lgt. et coll. S; 1. 7. 1983, SU, Azerbaidzhan, Caspian coast, Nabran, 2/–, *Quercus*, lgt. et coll. S; 19. 7. 1970, SU, Krasnodar region, Ubinskaya, 1/I, *Carpinus*, lgt. D, coll. IS.

Rutpela inermis (J. et K. DANIEL, 1898), comb. n.

Extremely similar to *R. maculata*, hardly distinguishable. In addition to the key differences, pamx more robust (Fig. 34F), second segment about as long as third. Second ant segment never longer than broad. Protergal pigmentation paler, yellow.

Host plants: Larvae known from *Quercus* and *Carpinus*; in dead branches with "white-rot" fungi, habits similar to *R. maculata*.

Distribution: South of Caspian region: Talysh, North Iran, Turkmenia (Kopet Dag).

Material: 1979, SU, Talysh, Avrora, 5/I, *Carpinus*, lgt. D, coll. IS and S; 20. 5. 1976, SU, Talysh, Alekseevka, 1/–, *Carpinus*, lgt. Kravchenko, coll. IS.

Stenurella melanura (L., 1758)

Setae sparser than in *Rutpela maculata*. Cr pale, yellow, ± distinctly microgranulate ventrally, relatively more coarsely so than in all preceding species. Adfrontal

Plate 37 (scanning electron micrographs): A - *Rutpela maculata*, left half of ventral sclerite. B - *Stenurella nigra*, left half of ventral sclerite of an exuvia, showing very roughly microgranulate surface.

seta ± right in fl. Frons slightly more convex than in *R. maculata,* tfl nearly absent. Lbr somewhat cut anteriorly. Second ant segment at most as long as broad, main sensillum very large, at least as long as third segment, about twice as long as broad (Fig. 34I). Mstm subcircular, ± abruptly convex, with large compact pigment spot. Dstm ± fused, with ± large (but always distinct) pigment spot; pigment of vstm usually ± visible, too. Sfp absent. About 3–7 setae on each vs half. Mostly no supplementary md setae. Pgmx without basal spot, second pamx segment at most as long as third, palb separated by about 1–1.5 times their width.

Proth pigmentation yellow, with three anterior notches broader than in *R. maculata.* Mpst lacking msp, otherwise msp in an extent similar to *R. maculata,* but often very finely sclerotized and poorly visible. Up to about 15–20 relatively large mgch present. Legs very robust, ptrs somewhat compressed. Ampullae granulate (a partial exception see below), granules strongly protuberant. Seventh aa very strongly reduced, dorsal one rudimentary (not absent despite DUFFY, 1953; I have seen part of his larvae), a transverse poorly raised fold with two ± complete rows of granules and with some msp. Abd spir relatively larger, first one far exceeding half of mesoth spir length. Body small, length up to about 17 mm.

An unparalleled variability of ambulatory ampullae has been revealed in one of the available series (Lipt. Hrádok). Specimens can be found with esp. dorsal ampullae completely microspiculate and lacking granules. Ampullae are always granulate in other series, and DUFFY (1953) and CHEREPANOV (1979) have also described granulate ampullae, thus the above series probably belongs to a local aberrant population (or may even represent the brood of a single female, since all the aberrant larvae were taken from one stump).

Habits: Polyphagous. Larvae in dead ± moist decaying wood of usually smaller diameter, always in close contact with the ground (fallen often partly buried branches, shallow roots, stump bases etc.). Two-year development, pupation spring/summer in the wood, flight in summer, adults on flowers.

Distribution: Europe, Asia Minor, Caucasus, Transcaucasia, Siberia, Far East incl. Japan (recently discovered).

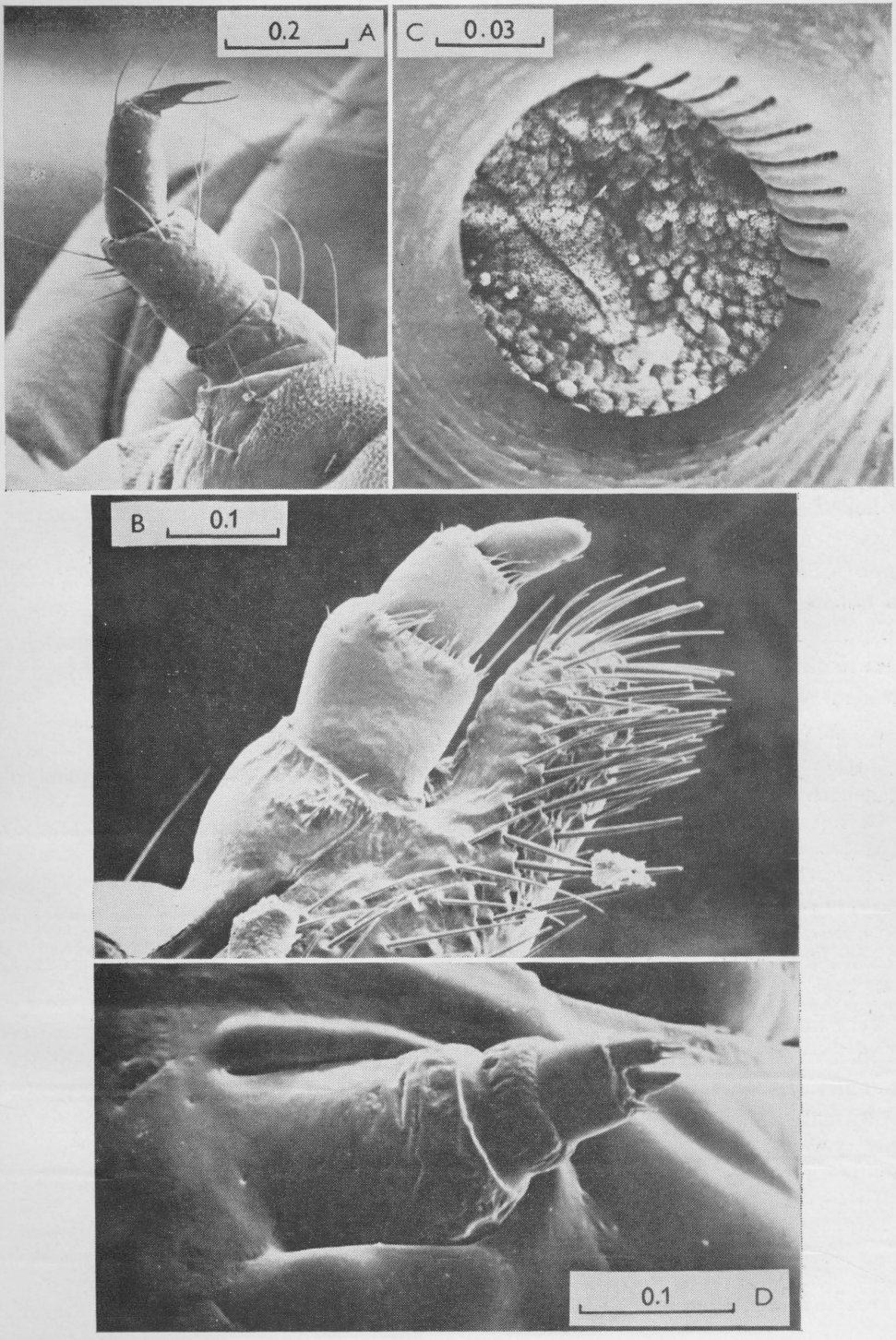
Material: 1977–1984, CS (various spots), +/I (some series), *Salix, Quercus, Crataegus, Picea, Pinus, Juniperus,* lgt. et coll. S; 10. 5. 1978, Hungaria, Mecsek, Kövágótöttös, exuvia/I, *Pinus,* lgt. et coll. S.

Stenurella bifasciata (MÜLLER, 1776)

Very poor material available, no hopeful differences from *S. melanura* have been found (those listed by CHEREPANOV, 1979 are unreliable). Setae perhaps on average slightly sparser. Mgch always rather large.

▶

Plate 38 (scanning electron micrographs): A - *Rutpela maculata,* left hind leg, anterior view. B - *R. maculata,* apical part of left maxilla, dorsal view. C - *R. maculata,* left abdominal spiracle. D - *R. maculata,* right antenna, laterodorsal view.


0.2
A
C
0.03
B
0.1
0.1
D

Host plants: The available bionomical information is very meagre. CHEREPANOV (l.c.) observed females laying eggs on *Pinus*-undergrowth at stem bases, under laboratory conditions he was succesful in rearing larvae ex ovo in *Betula* and *Abies*. I found two larvae in decaying underground part of a small *Ulmus*-stump. In addition, I have reared one adult female from a larva found in the root of an indetermined last-year remains of some annual herbaceous plant (!) (apparently accidental, no further larvae found in any herbaceous plants at this or other localities, despite a great effort), underlining the apparently extreme polyphagy of this and the preceding species. Some not yet determined larvae of one of these two species are also available from fallen spruce cones.

Distribution: Europe except North, Siberia, Caucasus, Transcaucasia, North Iran, Asia Minor.

Material: 16. 2. 1977, CS, Slovakia m., Kamenín, exuvia/I, indet. herb. plant, lgt. et coll. S; 23. 10. 1981, CS, Slovakia m., Štúrovo env., 1/I, *Ulmus*, lgt. et coll. S.

Stenurella septempunctata (F., 1792)

Main characters in the key. Additional differences from *S. melanura* as follows: Supplementary prf setae very few, in young larvae practically absent. Lbr broadly rounded, or at most indistinctly cut anteriorly. Stemmata on average even better developed. Second pamx segment shorter than third. Prlb with very small basal spot (usually larger in all other *Stenurella*-species). Protergal band with medial pair of notches broad and shallow. More or less distinct msp on proth stlf, episternum, epl, and on pterothoracic nota, otherwise msp practically absent, or extremely indistinct. Mgch small, spir very finely sclerotized. Apl with very sparse setae. Largest available larva 16 mm.

Host plants: *Carpinus*; *Corylus* (DEMELT, 1966). Larvae found by the author in fallen rotten branches ("white rot"). At least two-year development. Pupation unobserved. Adults in summer on flowers.

Distribution: Central and SE Europe, Caucasus, Transcaucasia, North Iran, Asia Minor.

Material: 19.–22. 7. 1981, CS, Slovakia m., Plešivec, 4/–, *Carpinus*, lgt. et coll. S. Adults not reared, larvae determined by elimination, but there is no other alternative; adults are abundant on the locality.

Stenurella nigra (L., 1758)

Very similar to *S. septempunctata*, main distinguishing character in the key; centre of each vs microgranule may be slightly darkened. Lbr usually less rounded, slightly cut anteriorly. Mstm extremely large, nearly as large as ant opening. Prlb with basal spot usually large. Msp even less conspicuous. Spir with very few mgch (up to about 5–6, Fig. 34H). Length up to about 13 mm.

Host plants: *Quercus, Carpinus, Ulmus, Frangula*, surely also others. Larvae in highly decayed usually relatively dry wood - in dry branches, thin stems etc. not lying tightly on the ground (then they are probably too moist). At least two-year development, pupation in spring in the wood, flight in late spring and summer, adults on flowers.

Distribution: Central and South Europe, Caucasus, Transcaucasia, North Iran, Asia Minor.

Material: 1978 and 1981, CS, Slovakia m., Plešivec, 1 + exuvia/I, *Quercus* and *Carpinus*, lgt. et coll. S; 30. 5. 1979, CS, Slovakia m., Štúrovo env., 10/I, *Ulmus*, lgt. et coll. S; 18. 3. 1987, CS, Bohemia m., Č. Budějovice env., 1/–, *Frangula*, J. Simandl lgt., coll. S.

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LIST OF TAXA DESCRIBED IN PART III

Species and genus marked with "*" (not numbered) are not available, but have been described by CHEREPANOV (1979, 1984). Nearctic taxa marked with "+". *Centrodera decolorata* (in square brackets, not numbered) is not formally described, but based on larvae of this species, the genus *Centrodera* has been included in the generic key. Numbers in round brackets indicate pages with descriptions of the taxa.

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