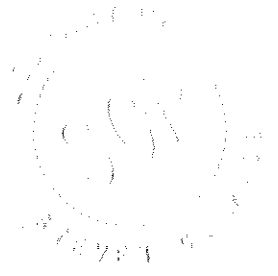


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SOME LEPIDOPTEROUS LARVAE OF PLANT QUARANTINE SIGNIFICANCE

Donald Weisman

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NOCTUIDAE

Prespiracular group bisetose on prothorax. On prothorax, seta *iia* is closer to the meson than is *ia*; *ic* is associated with *iic* below *iib*. On abdominal segments I-6 and 8, seta *iv* is behind spiracle and remote *v* which is below spiracle. On A7, *iv* is lower and closer to *v*. Crochets in a uniordinal or biordinal mesoserries. On AI-8, seta *i* is closer to meson than is *ii*; *iii* is dorsad of the spiracle and *iiia* if present is cephalodorsad. Prolegs may be reduced on A3, A4 and A5 or missing on A3 and A4. Most noctuids have primary setae only but a few have verrucae in place of the primary setae and a few have the verrucae obscured by secondary setae.

ACRONYCTINAE

Noctuids with secondary setae, at least on the prolegs and sometimes bearing verrucae. Setae of the verrucae in Acronyctinae smooth; in the Arctiidae and the Ctenuchidae the setae are finely barbed. The crochets on the abdominal prolegs of Acronyctinae are arranged in a homoideous mesoserries; in the arctiids and ctenuchids in a heteroideous mesoserries. The head is usually without secondary setae. The position of seta *iv* or verruca *iv* on A7 will always separate Acronyctinae from the Arctiidae.

Simyra henrici Grote

Secondary setae on legs and prolegs. Verrucae in place of primary setae. Small and large spinules interspersed over body. Pale yellow with dorsal bluish-black stripe; sides and venter reticulated with black. Verrucae orange. Cattails, willow, sometimes wheat, rye and other grasses. U.S. and Canada.

Simyra albovenose Goeze

Similar to henrici but not as heavily marked. Phragmites, Carex, Typha, etc. Europe.

WESTERMANNIINAE

An Old World subfamily which includes the following genus.

Earias spp. (Spotted or spiny bollworms).

Prespiracular group of TI with 2 setae, seta *v* minute, directly under seta *iv*; setae *ic* and *iic* on separate pinacula well below lower margin of prothoracic shield. Abdominal segments A3-6 with seta *iv* posterior to spiracle, seta *v* remote from *iv* and under spiracle; A9 with seta *i* anterior to line joining bases of *ii* and

iii, each on separate pinaculum, only seta vi of lateral group on A9 present. Seta iv above spiracle on A1, on level with or slightly below spiracle on A2-8. On A8, seta iv closer to v than on A7, also farther below spiracle. Group vii setal pattern: 1,2,3,1,1,1. Crochets in uniordinal homoideous mesoserries, all with hooks. Setae ia, ii and iv usually borne apically from soft projections which may be long and slender or short and round, according to species; projections always conspicuous on T2, T3 and A8. Seta vi may be on smaller projection; setae i and iii not raised basally. Body skin densely covered with minute spinules, longer and stronger on projections. Head reticulated brown or blackish with transverse whitish band. Mandible with 3 distinct teeth or angulations. Spinneret slender. Spiracles oval, black, that of A8 but little larger than that of A7. Larvae all malvaceous except one (luteolaria) which feeds in Grewia hirsuta, Tiliaceae. Feed in buds or fruits. Africa, Asia and Australia. A key to the Indian species of Earias is found in Gardner, Trans. R. E. S. London 98 (4): 87-88, 1947.

Earias fabia (Stoll)

Seta iia on T2 and T3 on a rounded projection, projections height = width on A2-6. Seta ii weakly or not raised basally.

Earias insulana Bdv.

Seta iia on T2 and T3 and on most abdominal segments on elongate, more or less finger shaped projection. Projection at base of seta ii on A8 rather short and stout, only slightly longer than wide.

AMPHIPYRINAE

Primary setae only. Five pairs of prolegs present; crochets uniordinal. Seta viic absent on abdominal segment 1: seta v absent on abdominal segment 9. Spinneret with a distinct apical silk pore.

Mamestra brassicae (L.)

Has setal pattern of typical noctuid. Prothoracic shield and body above spiracles reticulate. Pinacula absent. Spiracles with black rims and pale centers. Body setae whitish, moderate size. Seta iia about level of dorsal margin of spiracle on A1, about level of middle of spiracle on A2-8. Coxae of thoracic legs contiguous or nearly so: tarsal claws but slightly angulate. Head coloration reticulate. Frons about 1/2 height of head. Head setae P1, P2, Adf1 and F1 almost in straight line. Spinneret slender and pointed, long, extending beyond labial palpi. Mandible with strong plate-like projection on oral surface; distal margin of plate distinctly concave. Cabbage, cauliflower and lettuce. Europe.

Sesamia spp.

This genus includes 17 species in the Old World, all of which are borers. Only the following 2 species are intercepted frequently.

Sesamia cretica Led.

Head pale amber, weakly reticulate. Pinacula of body setae minute, indistinct. Seta iii on A8 on or slightly above dorsal margin of spiracle. On A9, seta i but little closer to seta iii than to seta ii; seta i much shorter than seta iii, seta iii normal. On T1, there is only 1 seta in the prespiracular group. Maize and sorghum. Southern Europe.

Sesamia nonagrioides (Lef.)

Head brownish, reticulation distinct. Pinacula at bases of body setae distinct. On A8, seta iii distinctly below dorsal margin of spiracle. On A9, seta i much closer to seta iii than to seta ii and often on the same pinaculum with seta iii; seta i longer than seta iii, seta iii modified. Maize, sorghum and chestnuts. Southern Europe and Azores.

Busseola fusca (Fuller)

Prespiracular shield of T1 with only 1 seta discernible. Seta v small or obsolescent. Head pale amber, weakly reticulate. Body pinacula conspicuous, strongly pigmented. Seta iii above level of spiracle on A1-7. A9 with seta i approximately equidistant from setae ii and iii; seta iii modified, much shorter than seta i. Maize, sorghum, sugarcane and millet. East Africa.

Xanthoecia flavago (Schiff.)

Noctuid setal pattern. Head pale amber. Body pinacula dark fuscous, large, the pinacula larger than spiracles. Seta iv minute on prespiracular shield of T1. On A9, pinacula of setae i, ii and iii contiguous or fused. Body setae whitish. Artichokes. England, France, Italy and Greece.

Hydroecia xanthenes Germ.

Similar to Xanthoecia flavago. On A9, in flavago setae i, ii and iii are on one sclerotized plate and seta iv is on a separate plate. In xanthenes setae i, ii, iii and iv are all on one plate. Artichokes. Algeria and Tunisia.

Spodoptera spp.

All of the Old World species of Prodenia, Laphygma and Spodoptera are now placed in Spodoptera. We are still using Prodenia for the New World Prodenia until new name combinations are published. This is a world-wide group of general feeders.

Spinneret broad and flat with a middorsal groove and two small projections at the apex. Spinneret and labial palpus subequal in length. On T1, iic not on cervical shield. On T2, iib with sclerotized bar connecting to muscle attachment. Oral face of mandible without a basal tooth.

Prodenia group

Fuscous patch between setae i and iii on A1. Muscle attachments between the prolegs on A3-6 are in a straight line. Includes the following species.

<u>Prodenia</u> <u>ornithogalli</u> Guen.	U.S., Mexico and W. Indies
" <u>eridania</u> (Cram.)	North and South America
" <u>dolichos</u> (Fab.)	e. U.S., C. Amer., W. Indies
" <u>praefica</u> Grote	s.w. U.S. into Mexico
" <u>tatfascia</u> (Wlk.)	Texas, C. Amer., W. Indies
" <u>sunia</u> (Guen.)	Florida, C. Amer., W. Indies
<u>Spodoptera</u> <u>litura</u> (Fab.)	India, Australia, Pacific Islands
" <u>littoralis</u> (Bdv.)	Europe, Middle East, Africa

Spodoptera group

Fuscous patch at seta iib on T2. No fuscous path on A1 between setae i and iii. Muscle attachments between the prolegs on A3-6 form a Y. Includes the following species.

<u>Spodoptera</u> <u>exigua</u> (Hbn.)	practically world-wide
" <u>exempta</u> (Wlk.)	Africa, Philippines, Hawaii
" <u>mauritica</u> (Bdv.)	Africa to Hawaii

PLUSIINAE

Primary setae only. Three pairs of prolegs normally present (those on A3 and A4 missing); crochets biordinal. Seta viic present or absent on A1 (absent on the species included); seta v absent on A9. Spinneret with a distinct apical silk pore. Larvae of this group are sometimes confused with Geometridae (Alsophila and Ellopiia). The presence of seta vib on A7 will distinguish the Geometridae from the Plusiinae. General feeders.

The species most frequently seen in Quarantine have in the past been called Plusia sp. or Autographa sp. Those generic names are now more restricted in usage. Following is a key to four species of Plusiinae commonly found in Quarantine.

1. Setae viib and viic closely associated on segments A2-4, well separated from seta viii.....Autographa spp.
Old and New World

Setae viib, viic and viii grouped closely on segments A3 + A4.
.....2
2. Ribs on oral face of the mandible continue to the cutting edge
.....Trichoplusia ni (Hbn.)
Old and New World

Two ventral ribs on oral face of the mandible end in a slight pocket before reaching the cutting edge.....3
3. A dusky line through setigerous tubercle iii on abdomen.....
Pseudoplusia includens (Wlk.)
North and South America, Hawaii

No dusky line through setigerous tubercle iii on abdomen.....
Chrysodeixis chalcites (Esp.)
Old World and Hawaii

PYRALIDAE

This is a very large family with a number of subfamilies. These subfamilies were given family rank by Heinrich and others in this country and Capps also followed this system. Ferguson prefers to follow the classification that entomologists in all the other countries use. All of the families in Pyraloidea now become subfamilies of Pyralidae with the exception of Pterophoridae, Hyblaeidae and Thyrididae.

Primary setae only. Prespiracular group of prothorax bisetose except in some aquatic species where it is unisetose. Group vi on mesothorax and metathorax usually unisetose except for some Galleriinae and Crambinae. Prolegs short with uniordinal, biordinal or triordinal crochets arranged in complete circles, mesopenellipses or two transverse bands.

PYRALINAE

T1 with 2 setae in prespiracular group, the 2 setae usually in a vertical line. T2 and T3 with vi unisetose. A1 with group vii trisetose. A3-6 with iv and v close and on same pinaculum; vi unisetose and vii trisetose. A9 with iv, v and vi all present; with seta i approximately equidistant from setae ii and iii, i never closely associated with iii. Crochets in a complete ring and either biordinal or triordinal. Pigmented ring-like sclerotizations bordering membranous area at base of seta iii on A8. Body and head without conspicuous stripes or mottling. Ocelli 6, except Pyralis.

Pyralis farinalis (L.)

Head brown, thorax stippled gray and abdomen dirty white. Front half length of head to vertex. Group vii on A9 unisetose. Only 4 ocelli apparently present (Ocelli i and ii are fused and v is obsolescent). Dried vegetable products. Cosmopolitan.

EPIPASCHIINAE

T1 with prespiracular group bisetose. T2 and T3 with vi unisetose. A1 with group vii trisetose. A3-6 with seta iv close to v below spiracle, usually on same pinaculum. A9 with iv, v and vi all present; seta i equidistant to ii and iii, i never closely associated with iii. Crochets biordinal in a complete circle. Pigmented ring-like sclerotization at base of seta iii on A8. Body usually with distinct longitudinal stripes or pale spots. Head reticulated, mottled or with irregular color pattern. Ocelli 6 in number.

Pococera atrimentalis Led.

Head yellow with irregular brown color pattern. Body greenish yellow with pale brown stripes; a narrow broken stripe middorsally, a narrow solid stripe through setae iii and a wider stripe between these. Pigeon peas, corn, etc.. North and South America, W. Indies.

CHRYSAUGINAE

T1 with prespiracular group bisetose. T2 and T3 with vi unisetose. A1-8 with setae iv and v approximate and usually on same pinaculum. A9 with iv, v and vi all present except in Pelagis which has seta vi missing. On A9, seta i closer to iii than to ii. Crochets usually in a biordinal or triordinal circle. In Clydonopteron, the crochets are uniordinal and in 2 transverse bands. Metathorax with a pigmented sclerotized ring around base of ib and a similar structure around seta iii on A8 (not all chrysaugines have these rings).

Potosa rufofascialis Capps

Head reddish brown with darker irregular color pattern. Body also reddish brown with pinacula on the abdomen lighter in color. Head and thoracic shield finely alutaceous. Head also sculptured with shallow crater-like pits. Orchids and bromeliads. Central America.

PHYCITINAE

T1 with 2 setae in prespiracular group, the 2 setae, iv and v are usually in a vertical or nearly vertical line (in Etiella iv and v are in a horizontal line). A1-8 with setae iv and v adjacent and below spiracle. On A9 at least 2 and usually 3 setae present in lateral group (iv, v and vi). On A9, seta i equidistant from ii and iii or closer to iii, often on the same pinaculum with iii. Crochets in a uniordinal or biordinal circle (usually biordinal). Pigmented sclerotized ring or partial ring around seta iib on mesothorax and around seta iii on A8 (except Etiella, Eumysia and some cactus-feeding genera).

Cryptoblabes gnidiella (Mill.)

With characters of a typical phycitine. Later stage larvae easily recognized by the fusion of prespiracular shield with the prothoracic shield. Height of frons about one-half that of the head. A3-6 with seta ii on a level with seta i. A line connecting seta iii and seta v is anterior to or tangent to the anterior margin of the spiracle. On A9, seta i is closer to seta iii than to seta ii but on a separate pinaculum. Group vii formula is: 3,3,3,2,2,1. Coloration of body above spiracles reticulate, dorsal area paler. In earlier stage larvae, on T1 the prespiracular shield is not fused with the prothoracic shield but the other characters given should enable recognition. C. aliena Swezey from Hawaii is probably conspecific with gnidiella. Chiefly a semiscavenger but feeds on various flowers and citrus causing drop of fruit. Europe, West Indies, Florida, Bermuda and probably Brazil.

Ribua spp.

Has typical phycitine characters with body skin distinctly granulose. Body pigmented pale brown with a group of conspicuous non-pigmented muscle attachments between seta iii and setae i and ii on A1-8. Ribua larvae are sometimes confused with the Ephestia-Cadra group but the above characters should separate them. Ribua on pineapples from Cuba are identified as R. innoxia Hein. Larvae from other hosts or other localities should be identified only to genus.

Paramyelois transitella (Wlk.)

With typical phycitine characters. Coronal suture absent. A1-7 without crescents or rings around seta iii, sometimes with a slight smudge above the seta. Without distinct sclerotized pinacula at the base of the setae. On A8, seta iii separated from the spiracle by about 1+1/2 the diameter of the spiracle. Mesothorax with incomplete ring around iib. Incomplete ring around seta iii on A8. Oranges, walnuts and many other fruits and pods. North and South America, West Indies.

Ectomyelois ceratoniae (Zell.)

With typical phycitine characters. Coronal suture absent. A1-7 with small crescent-shaped patches above seta iii. Pinacula often absent or at most, pale and ill-defined. On A8, seta iii separated from the spiracle by 2-3 times the diameter of the spiracle. Complete ring around seta iii on A8. Dorsal sclerite of A10 pale. Dates, figs, raisins, nuts but primarily legumes. Mediterranean area, Florida, West Indies and Argentina.

Ectomyelois decolor (Zell.)

With typical phycitine characters. Coronal suture absent. A1-7 with dark brown half rings around seta iii. Pinacula, though often small, dark in color. On A8, seta iii separated from the spiracle by 3-4 times the diameter of the spiracle. Complete ring around seta iii on A8. Dorsal sclerite of A10 dark. Annona, Ceratonia, etc. West Indies, Central and South America.

GALLERIINAE

T1 with 2 setae in the prespiracular group. T2 and T3 with group vi unisetose or bisetose (Galleria and Achroia). A1 with group vii trisetose. A1-8 with iv and v adjacent and below the spiracle. A9 with setae iv, v and all present, except in Galleria and Achroia. A9 with seta i equidistant from ii and iii or closer to iii, usually on the same pinaculum with iii. Crochets in a complete circle, biordinal or triordinal. Small pigmented ring or partial ring around base of seta iii on A1 and A8 in many genera. In Alpheias and Genopaschia the prespiracular plate is fused with the prothoracic shield.

Corcyra cephalonica (Staint.)

T2 and T3 with group vi unisetose. A9 with 3 setae in the lateral group. Spiracles with caudal part of peritreme 1 and 1/2 to 2 times as thick as the anterior part. Partial rings around seta iii on A1 and A8. No pigmented pinacula at base of abdominal setae. Wide range of stored vegetable products. Cosmopolitan.

SCHOENOBIINAE

The setal pattern is not very helpful in recognizing schoenobine larvae. The larvae are usually recognizable by habitus. They are somewhat slender, with the setae very small, often not discernible except when treated with caustic. A3-6 often with only 2 setae discernible in group vii. A9 with only 1 seta in the lateral group. Abdominal prolegs are very short with the crochets in a complete circle, the circle usually very small. Crochets may be uniordinal, biordinal or triordinal; when biordinal or triordinal, the anterior crochets are stronger than the posterior crochets. Anal prolegs somewhat modified and produced posteriorly.

Tryporyza incertulas (Wlk.)

Head pale yellow. Body creamy white. Crochets uniordinal. Setae very small. Spiracles slit-like. Most important rice pest in the Orient. India to Japan.

CRAMBINAE

T1 with 2 setae in the prespiracular group. T2 and T3 with group vi unisetose or bisetose, unisetose in Crambus, bisetose in Diatraea, unisetose or bisetose in Chilo. A1-8 with setae iv and v adjacent. A1 with group vii trisetose. A9 with seta i approximate to seta iii and usually on the same pinaculum. A9 with only 1 seta in the lateral group (iv, v and vi), except in Crambus murellus which has 2 setae. Crochets biordinal or triordinal in a complete circle. Crambines are restricted to grasses and a few other genera of monocots.

Diatraea saccharalis (Fab.)

T2 and T3 with group vi bisetose. Color creamy white, head light brown. On A3-6, pinacula of seta iii barely extends below level of top of the spiracle in front of the spiracle. On A3-6, seta iiii is at the level of the middle of the spiracle. Sugarcane. North and South America, West Indies.

Diatraea considerata Hein.

T2 and T3 with group vi bisetose. Color creamy white with diffuse purple coloring along the sides and with transverse bands of purple coloring on some segments. On A3-6, pinacula of seta iii barely extends below level of top of the spiracle in front of the spiracle. On A3-6, seta iiii is at the level of the middle of the spiracle. Sugarcane. Northwestern Mexico.

Diatraea grandiosella Dyar

T2 and T3 with group vi bisetose. Color creamy white, head light brown with darker freckles. On A3-6, pinacula of seta iii extends to level of the middle of the spiracle in front of the spiracle. On A3-6, seta iiii is at the level of the bottom of the spiracle or lower. Corn, sorghum. Southwestern U.S. and Mexico.

Chilo suppressalis (Wlk.)

T2 and T3 with group vi bisetose. Body with 5 pale longitudinal stripes. Crochets in a complete circle. Rice. India to Japan.

Chilo phragmitellus Hbn.

T2 and T3 with group vi bisetose. Body with 5 broad purple irregular stripes. Crochets in a mesopenellipse. Phragmites. Europe.

Chilo loftini Dyar

T2 and T3 with group vi unisetose. Body with 5 pale longitudinal stripes. Crochets in a complete circle. Corn and sugarcane. Southwestern U.S. and Mexico.

PYRAUSTINAE

T1 with prespiracular group bisetose. A3-6 with setae iv and v close and usually on the same pinaculum. A9 with only 1 seta of the lateral group present (seta vi). A3-6 with group vii trisetose. Crochets usually in a penellipse and triordinal. T2 and T3 with group vi unisetose, or, if bisetose, P2 not mesad of P1 or seta i of A9 is approximate to seta ii.

Dichocrocis punctiferalis (Guen.)

Typical pyraustine setal pattern but distinctive pinacula. A1-8 with pinacula of setae i and ii large and transversely elongate, with that of seta i the broader. T2 and T3 with 3 pairs of non-seta bearing plates, one behind setae ia and ib, one in front of setae iia and iib, one behind setae iv and v. A1-7 also with a non-seta bearing plate behind setae iv and v. Prespiracular shield extending under and posterior to spiracle on T1. Formula of group vii is: 3,3,3,2,1,1. A9 with seta iii modified, thread-like, postero-laterad of seta i and on the same pinaculum. Castor bean, peach, cherry, pine, etc. Japan, Korea, Formosa, India.

Evergestis rimosalis (Guen.)

Head pale amber, body creamy white. Large purplish lateral band through the spiracular area and several narrow transverse stripes on the dorsum of each segment. Typical pyraustine setal pattern. Ocellus 2 closer to ocellus 1 than to 3. A1-9 with tubercles of setae i, ii and iii distinctly conical. A9 with seta iii modified, thread-like, about equal in length to seta i. Cauliflower and cabbage. U.S.A.

Evergestis straminalis (Hbn.)

Similar to E. rimosalis. On A9, seta iii is directly below seta i in rimosalis, below and slightly posterior in straminalis. This species lacks the dorsal transverse banding. Bluish coloration from spiracles to setae i and ii with paler middorsal area in some specimens, in others bluish from spiracles over whole dorsum. Cauliflower. U.S. and Europe.

Evergestis forficalis (Fab.)

T2 and T3 with group vi bisetose (unisetose in rimosalis and straminalis). Other setal characters are typical pyraustine. Head pale yellow with darker freckles. Body creamy with brown or black spots at setae iia and iib on T2 and T3, also at seta iii on A1-8. Cruciferae. Europe.

Hedylepta indicata (Fab.)

Typical pyraustine setal characters. On A9, seta iii is directly posterior of seta i. Head pale and unicolorous except for pigmentation at ocelli; body completely pale. Frons is very conspicuously short representing about 1/3 the distance from clypeus to the vertex, about equal in length to the line joining the two sides of the adfrontal. Various legumes. U.S., West Indies, Venezuela.

Megastes spp. (plusialis and grandalis)

Typical pyraustine setal pattern and crochets. Group vii setal pattern is: 2,3,3,2,1,1. A1-8 with pinacula of setae i and ii large and transversely elongate. T2 and T3 with 4 pairs of non-seta bearing plates, a small one anterior to setal group i, a large one posterior to setal group i, one anterior to setal group ii, one below seta iii. A1-7 with three pairs of non-seta bearing plates, two directly behind the spiracle, one posterior to setae iv and v. Sweet potato. West Indies and South America, Hawaii.

Omphisa anastomosalis (Guen.)

Similar to Megastes but with fewer extra plates. T2 and T3 with 2 pairs of non-seta bearing plates, one posterior to setal group i, one anterior to setal group ii. A1-7 with one large non-seta bearing plate behind the spiracle. Omphisa and Megastes both have large prespiracular plates on T1 that go under and up behind the spiracle. Sweet potato. Hawaii, Formosa, Malaya, Java, India, Ceylon and New Guinea.

Neoleucinodes elegantalis (Guen.)

Body setae are those of a typical pyraustine. Body robust, conspicuously tapered posteriorly (the 9th and 10th segments greatly reduced in size). Body color white or pinkish. Pinacula of the body setae not conspicuously sclerotized or pigmented, the pinacula concolorous with body area and slightly raised (Blister-like), particularly on T2 and T3. Prothoracic shield pale yellow, markings light brown and without a conspicuous, blackish reiform spot posterior to seta ib. Head wider than high, pale yellow, reticulation indistinct; in lateral view slightly rounded; dark fuscous pigmentation along the incision from the hind margin. Ocellus 2 much closer to ocellus 1 than to ocellus 3. Fuscous coloration in the ocellar area, weaker between ocelli 2 and 3. Seta ol is tangent to or anterior to a line joining the centers of ocelli 2 and 3. Setal formula of group vii is: 2,3,3,2,1,1. On A1, group vii is unstable and often has only 1 seta. Crochets are irregularly triordinal, often in a complete circle but usually weaker or interrupted outwardly. Eggplant and tomato. Central and South America, West Indies.

Leucinodes orbonalis Guen.

Similar to N. elegantalis. Body pinacula rather strongly sclerotized and with distinct ochreous or brown pigmentation. Seta 01 is distinctly posterior to a line joining the centers of ocelli 2 and 3. Setal formula of group vii is: 1,3,3,2,1,1. Crochets are arranged in a mesopenellipse. Eggplant and tomato. Africa, Oriental region.

PTEROPHORIDAE

This is a family that from the larval standpoint is difficult to characterize; there is a great diversity of form. Some larvae have only primary setae, others have verrucae and still others have numerous secondary setae. On T1, prespiracular group may be bisetose or trisetose. On T2 and T3, group vi usually has 3 setae. Most species have long, slender, stem-like prolegs (in some genera they are short). Crochets are uniorbital and arranged in mesoserries that may resemble a mesopenellipse.

Stenoptilia stigmatodactyla Zell.

Head with ocelli 3 and 4 larger than other ocelli. Prespiracular group of T1 trisetose. Setae iv and v approximate and on the same pinaculum, remote from and directly under the spiracle on A1-7. On A9, with 2 setae on same pinaculum in the normal position of seta ii; setae i and iii on the same pinaculum; only 2 setae in the lateral group. T1, T2 and T3 with group vi bisetose. Group vii setal formula is: 2,3,3,2,1,1. Abdominal prolegs long and slender. Body skin granulate, with rather sparse, short secondary setae (enlarged at tips). Gentians. Austria and Switzerland.

Platyptilia carduidactyla Riley

Head without ocelli 3 and 4 larger than other ocelli. Primary setae arranged as in Stenoptilia. On A8, both setae i are on one plate and both setae ii are on another plate. On A9, setae ii, spurious ii, i and iii of both sides are on one large plate. Prolegs of medium length. Body skin granulate, with sparse, short secondary setae (not enlarged at tips). Artichokes. U.S.A.

Platyptilia sp.

Head without ocelli 3 and 4 larger than other ocelli. Primary setae arranged as in Stenoptilia. A8 and A9 without the large plates as in P. carduidactyla; pinacula as in Stenoptilia. Prolegs long and slender. Body skin finely granulate, without secondary setae. Snapdragons. U.S.A.

Sphenarches caffer (Zell.)

Head without ocelli 3 and 4 larger than other ocelli. T1 with prespiracular group trisetose. On A1-7, setae i and ii on the same pinaculum, setae iii with a spurious seta iii on same pinaculum, setae iv and v on same pinaculum. A9 with spurious seta ii on same pinaculum as seta ii, setae i and iii on same pinaculum, setae iv and v on same pinaculum, seta vi missing. On A1-9, setae i, ii and iii are spatulate distally. Setae i, ii and iii are on conical plates on T2, T3 and A1-9. There are secondary setae of varying length, some nearly as long as the primary setae, near the primary setae. Prolegs long and slender. Pigeon peas. Africa and Puerto Rico.

OLETHREUTIDAE

T1 with 3 setae in the prespiracular group. T2 and T3 with group vi unisetose or bisetose. A1-8 with setae iv and v closely associated directly below the spiracle. A8 with seta iii cephalad of the spiracle. A9 with paired setae ii on a single pinacula, closer together than setae ii on A8. A9 with seta i closely associated with seta iii, usually on the same pinaculum. All 3 setae present in lateral group of A9. Adfrontal areas usually touching vertical triangle. Crochets uniordinal or biordinal. These characters describe a typical olethreutid but there are numerous exceptions to all of these characters. There are no good characters separating all olethreutids, tortricids and phaloniids.

Cryptophlebia

Typical olethreutid characters. Body rather stout. Pinacula all rather large. Prespiracular plate extends under the spiracle on T1. A9 with either 2 or 3 setae in lateral group, all setae on the same plate. Pinacula at the base of seta i, at least on proleg-bearing segments, with a conspicuous incision on anterior margin or with a pale non-pigmented spot near the anterior margin. Spiracle of A8 usually conspicuously dorsad. With or without anal fork. There are about 20 species of Cryptophlebia but only the following 3 are regularly intercepted.

Cryptophlebia leucotreta (Meyr.)

Head and pinacula yellow. Group vii formula: 3,3,3,3,2,1. A9 with 3 setae in lateral group. Anal fork present. Citrus and eggplant. South Africa.

Cryptophlebia ombrodelta (Lower)

Head and pinacula light brown, head with brown pattern. Group vii formula: 3,3,3,3,2,1. A9 with 3 setae in lateral group. No anal fork. Legume pods. India to Philippines and Australia, Guam and Hawaii.

Cryptophlebia illepida (Butler)

Head and pinacula yellow. Group vii formula: 3,3,3,3,1,1. A9 with 2 setae in lateral group. No anal fork. Legume pods. Hawaii.

Gymnandrosoma

This is a New World genus that is very similar to the Old World Cryptophlebia. Typical olethreutid characters. Body rather stout. Pinacula all rather large. Prespiracular plate extends under the spiracle on T1. A9 with 3 setae in lateral group, setae iv and v on one plate and seta vi separate (only character different from Cryptophlebia). Pinacula at the base of seta i, at least on proleg-bearing segments, with a conspicuous incision on anterior margin or with a pale non-pigmented spot near the anterior margin. Spiracle of A8 usually conspicuously dorsad. Without anal fork.

Gymnandrosoma aurantianum Costa Lima .

Characters as given for the genus. A3-6 with 3 setae in group vii. Citrus, cacao and peaches. Central and South America, West Indies. There is some uncertainty as to the number of species represented under the name aurantianum. A species from Trinidad taken from guava fits this species rather than the guava feeding species from Puerto Rico.

Gymnandrosoma sp.

Characters as given for the genus. A3-6 with 4 setae in group vii. Guava. Puerto Rico.

Laspeyresia

Typical olethreutid characters. Pinacula may be large or small. Group vii on A9 always with 1 seta, on A8 with either 1 or 2 setae. Anal fork always absent. A very large diverse genus that is world-wide in distribution. The following species are commonly intercepted.

Laspeyresia strobilella (L.)

Head yellow, body and pinacula white. Skin smooth. Group vii formula: 3,3,3,2,1,1. Seta iii on A8 cephalodorsad of spiracle. On A9, paired setae ii on separate pinacula, i and iii on separate contiguous pinacula, iv and v on same pinacula, seta vi separate. Spruce cones. Germany, Sweden, Russia and Italy.

Laspeyresia splendana (Hbn.)

Head yellow, body and pinacula pale. Skin smooth. Group vii formula: 3,3,3,2,1,1. Seta iii on A8 cephalad of spiracle. On A9, paired setae ii on separate pinacula, i and iii on same pinaculum, iv and v on same pinaculum, vi separate. Chestnuts. Europe.

Laspeyresia sp.

Same setal pattern as splendana. Head yellow with some slightly darker pattern. Body with suffuse pink pigmentation. Chestnuts. Europe.

Laspeyresia fabivora Meyr.

Formerly identified as leguminus Hein. Head brown with darker pattern, pinacula brown. Skin scobinate. Group vii formula: 3,3,3,2,2,1. On A9, paired setae ii on same pinacula, i and iii on same pinacula, iv, v and vi usually on separate pinaculum. Beans. Central and South America.

Hemimene juliana (Curt.)

Typical olethreutid characters. Head yellow with slightly darker mottling. Body whitish with rather large brownish pinacula. Skin scobinate. Anal shield brown on anterior half and yellow on posterior half, with darker brown spots. Crochets irregularly biordinal. Group vii formula: 3,3,3,2,2,1. On A9, setae iv, v and vi on same pinacula, setae viii widely separated. Small extra pinacula visible anterior to seta i on T2-3 and A1-9. Anal fork present. Acorns and chestnuts. Europe.

Lobesia botrana (Schiff.)

Typical olethreutid characters. Head amber with dark pigmentation in ocellar area and at incision of hind margin. Prothoracic shield amber with some darker coloring along the lateral and posterior margins. Pinacula of body color. Coronal suture longer than the adfrontals are wide at apex of the frons. On A1-8, setae iv and v of nearly equal length. Group vii formula: 3,3,3,3,2,2. Crochets biordinal. On A2-7, the spiracles are hardly larger than the insertion of seta iii. Anal fork present. Grapes, Europe.

Paralobesia viteana (Clemens)

Similar to L. botrana. Differs as follows: prothoracic shield with broader dark coloring along the lateral and posterior margins. On A2-7, the spiracles are larger than the insertion of seta iii. Skin more strongly scobinate than in botrana. Grapes. U.S.A.

Matsumuraeses phaseoli (Mats.)

Typical olethreutid characters. Pinacula moderately large and brown. Head yellow with brown pigment in ocellar area and at incision of hind margin. Prothoracic shield yellow with brown lateral and posterior margins. Anal shield brown. Scobinate spines large and dark. Group vii formula: 3,3,3,2,2,1. Crochets biordinal to triordinal. Anal fork present. String beans. Japan.

TORTRICIDAE

T1 with 3 setae in the prespiracular group. T2 and T3 with group vi unisetose or bisetose. A1-8 with setae iv and v closely associated directly below the spiracle. A8 with seta iii cephalad of the spiracle. A9 with paired setae ii on a single pinacula, closer together than setae ii on A8. A9 with seta i anterior to and equidistant from setae ii and iii on its own pinaculum. All 3 setae present in lateral group of A9. Adfrontal areas usually touching vertical triangle. Crochets biordinal or triordinal. These are the characters of a typical tortricid.

Adoxophyes reticulana (Hbn.)

Typical tortricid setal pattern. Group vii setal formula: 3,3,3,3,2,2. On A9 setae viii are about 1 and 1/2 times as far apart as those on A8. Ocellus 2 much closer to ocellus 3 than to 1. Spiracles on A1-7 hardly any larger than insertion of seta iii. Crochets biordinal, weaker to outer side. Anal fork present. Head pale yellow with light brown pattern becoming darker toward posterior margin, dark brown pigment in ocellar area. Prothoracic shield yellow with several darker marks. Pinacula concolorous with body. This species is polyphagous but is normally taken on lilacs from Europe.

Cacoecimorpha pronubana (Hbn.)

Typical tortricid setal pattern. Group vii setal formula: 3,3,3,3,2,2. On A9 setae viii slightly farther apart than those on A8. Ocellus 2 slightly closer to ocellus 3 than to ocellus 1. Spiracles on A1-7 considerably larger than insertion of seta iii. Crochets triordinal. Anal fork present. Head pale yellow with light brown pattern; dark brown pigment in ocellar area and at posterior incision. Prothoracic shield yellow with a dark mark at the hind angles. Pinacula concolorous with body. General feeder. Europe.

Epichorista ionephala Meyr.

Typical tortricid setal pattern. Group vii setal formula: 3,3,3,3,2,2. On A9 setae viii distinctly farther apart than those on A8. Ocellus 2 much closer to ocellus 3 than to ocellus 1. Spiracles on A1-7 hardly any larger than insertion of seta iii. Crochets biordinal or irregularly triordinal on posterior margin. Anal fork present. Head yellow with brown pattern; dark pigmentation in ocellar area and dark bar at posterior incision. Prothoracic shield yellow with darker lateral and hind margins and darker spot in middle. Pinacula slightly darker than body. Spinules dark except for area through setae i and ii on abdomen and T2-3 giving appearance of two pale stripes. Chinchérinchee flowers. South Africa and Madagascar.

Sparganthis sulphurana (Fab.)

Typical tortricid setal pattern. Group vii formula: 3,3,3,3,2,2. On A9 setae viii are about 1 and 1/2 times as far apart as those of A8. Ocellus 2 much closer to ocellus 3 than to ocellus 1. Spiracles of A1-7 much larger than insertion of seta iii; spiracle on A8 as large as pinaculum of seta iii. Crochets evenly triordinal. Anal fork present. Head yellow with dark pigmentation at ocelli 2-5. Prothoracic shield yellow suffously fuscous along lateral margin. Pinacula concolorous with body. Pinacula of setae ia and ib on T2 and T3 elongate. General feeder. U.S.A. and Bermuda.

Proeulia group

A heterogeneous group of larvae intercepted in grapes and stone fruits from Chile, Argentina and Uruguay have all been called Eulia in the past. None belong to that genus and most have now been moved to Proeulia and some other genera. Some of these tortricid larvae had setae i and iii of A9 on the same pinaculum as in a typical olethreutid. Following are 3 species formerly placed in Eulia.

Proeulia sphaleropa (Meyr.)

Setae i and iii on A9 on the same pinaculum. Head pale yellow with dark lateral bar and dark pigmentation in ocellar area. Prothoracic yellow with fuscous lateral margin. Pinacula pale except for those of setae ii on T2-3 and seta iii of A1-8; these have a darker margin. Anal fork present.

Proeulia sp.?

Setae i and iii of A9 on the same pinaculum. Head pale yellow with dark pigmentation in ocellar area. Prothoracic shield pale yellow with faintly darker spots. Body and pinacula pale. Anal fork present. Probably in Proeulia but not associated with an adult.

"Eulia" sp.

Setae i and iii on A9 on separate pinacula as in typical tortricids. Head pale yellow with dark pigmentation in ocellar area and at hind angle. Prothoracic shield pale yellow with a double longitudinal fuscous line on the meson. Body and pinacula pale. Anal fork present. Not in Proeulia but not associated with an adult.

Epiphyas postvittana (Wlk.)

With characters of typical tortricid. Ocelli 3 and 4 larger than others and contiguous. Spiracles considerably larger than setal insertion of seta iii on abdominal segments. Spiracle on A8 much larger than on other abdominal segments and as large as prothoracic spiracle. Group vii formula: 3,3,3,3,2,2. Setae viii on A9 about same distance apart as on A8. On A9 seta i is closer to iii than to ii but still well separated from iii and on a separate pinaculum. Crochets are biordinal or irregularly triordinal. Anal fork well developed. Head pale yellow with dark pigmentation in ocellar area and hind angle. Prothoracic shield and anal shield pale yellow. Pinacula concolorous with body. Apple, citrus and other fruits. Australia, Tasmania and New Zealand. Reported to be established in Hawaii but apparently not a pest there.

Planotortrix excessana (Wlk.)

Setal characters as in E. postvittana except with setae i and iii on the same pinaculum on A9. Looks like an even paler version of the former species. In postvittana the minute body spinulares are dusky except for 2 longitudinal stripes. In excessana the body is completely pale. Apples. New Zealand.

Ctenopseustis obliquana (Wlk.)

Setal characters as in E. postvittana except with setae i and iii on the same pinaculum on A9. Head yellow with light brown pattern and with dark pigmentation in ocellar area. Prothoracic shield pale with fuscous lateral and posterior margins. Pinacula pale; some with fuscous margins. Apples. New Zealand.

PHALONIIDAE

T1 with 3 setae in the prespiracular group. T2 and T3 with group vi unisetose. A1-8 with setae iv and v closely associated. A8 with seta iii cephalad of the spiracle. A9 with paired setae ii on same pinacula, setae i and iii closely associated on the same pinacula, setae iv and v on the same pinaculum, seta vi missing, except in Hysterosia. Adfrontal areas usually touching vertical triangle. Crochets uniordinal in the European species and uniordinal or triordinal in the American species. Skin granulate in the American species and with or without granules in the European species.

Eupoecilia ambiguella (Hbn.)

Typical phaloniid characters. A pair of non-seta bearing plates posterior to setae ia and ib on T2. On A9 the pinaculum bearing setae i and iii fused with pinaculum of paired setae ii. Spiracle on A1 not larger than those on A2-7. Spiracles on A1-7 small. Group vii formula: 3,3,3,2,2,2. Crochets in uniordinal circle.

Skin granules large and dark. Anal fork present. Head dark yellow with dark pigmentation in ocellar area and with dark lateral bar. Prothoracic shield brown. Pinacula darker than body. Feeds in flowers and fruits of several plants including grapes. Europe.

Aethes williana (Brahm)

Typical phaloniid characters. Spiracles all with a thick peritreme; spiracle on A1 as large as those on T1 and A8, larger than those on A2-7; spiracles on A2-7 about as large as distance from spiracle to seta iii. Group vii formula: 2(3), 3,3,3,2,1. Crochets in uniordinal circle. Skin granules of body color. Anal fork absent. Head dark yellow with dark pigmentation in ocellar area. Pale yellow prothoracic shield. Pinacula of body color. Carrot. Europe.

CARPOSINIDAE

T1 with 2 setae in the prespiracular group. A1-8 with setae iv and v closely associated directly below the spiracle. A9 with only 1 seta in the lateral group (seta 6). Spiracles on A8 more dorsad than usual. Group vii of A3-6 with 4 setae. Crochets in a uniordinal complete circle. Skin scobinate.

Carposina niponensis Wlsm.

Typical carposinid characters. On A9 seta i is very small, in a straight line with and equidistant from setae ii and iii on its own pinaculum. Body spinules pale. Head and prothoracic shield light brown with darker marks. Pinacula darker than body. Body often suffused with pink pigmentation. Apples. Japan.

Carposina atlanticella Rebel

Typical carposinid characters. On A9 seta i is very small, close to and anteriorly dorsad of seta iii on the same pinaculum with seta iii. Head yellow; prothoracic shield yellow anteriorly and brown posteriorly. Body spinules dark. Pinacula darker than body. Myrica fruit. Madeira.

COSSIDAE

T1 with 3 setae in the prespiracular group. T2 and T3 with group vi unisetose. A1-8 with setae iv and v closely associated. A9 usually with paired setae ii on the same pinaculum and setae i and iii on the same pinaculum; all 3 setae of the lateral group present. Seta iii of A8 cephalad of the spiracle. Labrum small and mandible large. Spiracle of A8 often modified. Prothoracic shield often with armature. Crochets in a uniordinal or biordinal transversely elongate circle or in two transverse bands.

Dyspessa ulula (Bkh.)

Prothoracic shield unarmed. Spiracle of A8 normal; this spiracle and that of T1 hardly any larger than other spiracles. Group vii formula usually: 2,3,3,3,2,2(1). On A9 paired ii not on the same pinaculum; seta i cephalodorsad of seta iii on a separate pinaculum; setae iv, v and vi widely separated in a straight line. Crochets in two transverse bands. Head yellow. Body with pink pigmentation. A1-8 with 3 to 5 extra setae between the spiracle and seta ii. Garlic. Italy.

Dyspessa sp.

Similar to D. ulula but with only 1 or 2 extra setae between the spiracle and seta ii on A1-8. On A9 setae i and iii a little more closely associated. Both species seem to be quite variable in the setal pattern. Onions. Turkey.

STENOMIDAE

Head with 6 ocelli. No submental pit. Prespiracular shield with 3 setae, shield continuing below spiracle. Setae ib, ic and iic of prothoracic shield grouped and removed from other setae. A1-8 with setae iv and v on the same pinaculum. A8 usually with seta vi posterior to setae iv and v. All of the setae on A8 may be on the posterior portion. Seta iii of A9 strong and never associated with the lateral group. Anal fork absent. Crochets in an irregularly triordinal circle.

Stenoma catenifer Wlsm.

Seta vi of A8 posterodorsad of setae iv and v. On A1-8 seta iiii is on same pinaculum as seta iii. On A9 setae i and ii are on the same pinaculum, seta iii is separate; setae iv, v and vi on the same pinaculum. Group vii formula: 2,3,3,2,2,1. Spiracles very large and round. Head yellow brown; shields and pinacula brown. Body spinules dark. Avocado seed. Central and South America.

Cerconota anonella (Sepp)

Seta vi of A8 ventrad of setae iv and v. On A1-8 seta iiii on same pinaculum as seta iii. On A9 setae ii, i and iii are equidistant and on separate pinacula; setae iv, v and vi on the same pinaculum. Group vii formula: 2,3,3,2,2,1. Spiracles moderate in size and vertically elongate. Head orange brown; shields and pinacula brown. Body spinules light. Annona and Cherimoya. West Indies and Central America.

BLASTOBASIDAE

Head with 6 ocelli. Submental pit always present. Prespiracular group with 3 setae. A1-8 with setae iv and v on the same pinaculum. Group vii always with 3 setae on A1. On A8 seta iii never directly in front of the spiracle, usually dorsad or slightly dorsocaudad. On A9 paired setae ii never on same pinaculum; seta i is anterior to setae ii and iii, usually closer to ii and often on the same pinaculum with ii; setae iv, va and vi all present. Crochets are uniordinal, biordinal or irregularly triordinal in a complete circle. Anal fork never present. Sclerotized ring around the base of seta iii on A1-7 in many genera.

Holcocera gigantella Chamb.

Partial sclerotized rings around the base of seta iii on A1-7. A9 with setae ii, i and iii on separate pinacula; setae iv and v on the same pinaculum; seta vi separate, closer to iv and v than to seta vii. Head, prothoracic shield and pinacula brown. Anal shield yellow with brown marks. Body with very minute dark spinules. Agave. Southwestern U.S. and Mexico.

Valentinia glandulella (Riley)

No sclerotized rings around the base of seta iii on A1-7. A9 with setae i and ii on the same pinaculum; seta iii separate; setae iv and v on the same pinaculum; seta vi separate, closer to seta vii than to setae iv and v. Head, prothoracic shield and pinacula dark yellow. Body pale. Acorns. U.S. and Mexico.

Auximobasis sp.

Same setal arrangement as on V. glandulella. The 2 genera may be synonymous. Head, prothoracic shield and pinacula pale yellow. Looks like a smaller version of the former species. Garlic. Peru.

MOMPHIDAE

Head with 6 ocelli. No submental pit (Homaledra an exception). Prespiracular shield with 2 or 3 setae. A1-8 with setae iv and v on the same pinaculum. Seta iii on A8 never cephalad of spiracle. A9 with paired setae ii never close together and on same pinacula; seta i closer to seta iii than to seta ii; 1, 2 or 3 setae in the lateral group. Crochets in circle or penellipse. No anal fork. Some species with numerous secondary setae that obscure the primary setae (these were formerly in Blastodacnidae). This is a very heterogeneous group of genera which really can not be characterized.

Blastodacna atra (Haw.)

Body with numerous short secondary setae almost as long as the primary setae. Body also has very small spinules. Prespiracular group on T1 with 3 setae. A3-6 with 3 setae in group vii; these are easily distinguishable as there are very few secondary setae on the venter. A8 with a narrow sclerotized plate on the posterior margin; A9 with a broader plate extending as far as the spiracles on A8. Early stage larvae do not have the plates or the secondary setae. Head mostly brown, yellow in frontal area, on the vertex and the ventral posterior area. Crochets uniordinal in an abbreviated penellipse. Apple scions. Europe.

Blastodacna curvilineella Chamb.

Very similar to B. atra. A3-6 with numerous secondary setae in the group vii position but the 3 primary setae are distinguishable. Aronia. U.S.A.

sp. of Momphidae

This is a larva that looks like a very large Blastodacna. It differs in lacking the plates on A8 and A9. Crochets are in a triordinal circle. Has not been associated with adults. Protea flowers. South Africa.