

**KEY TO LARVAL TORTRICIDAE INTERCEPTED, OR POTENTIALLY ENCOUNTERED,
AT U. S. PORTS OF ENTRY**

T. M. Gilligan, 2014 – Modified from Brown, 2011

Currently, the family Tortricidae includes three subfamilies: Tortricinae, Olethreutinae, and Chlidanotinae. Among the Tortricinae, most pest species are in the Archipini, usually as external feeders (leaf rollers). The Olethreutinae contain many pest species in the Grapholitini that feed internally in fruits or stems. Chlidanotinae larvae are poorly known; most bore in twigs, fruits or seeds. “Cochylidae,” used in many older keys, is a tribe of the Tortricinae and is no longer recognized as a separate family.

Key to types (as defined by Brown 2011):

- 1. D1 and SD1 of A9 on the same pinaculum; anal comb present or absent 2
- 1.' D1 and SD1 of A9 on separate pinacula; anal comb almost always present “Tortricinae” type

- 2. L pinaculum on T1 enlarged, extending beneath and beyond (posterad of) spiracle
..... “*Cryptophlebia*” type
- 2.' L pinaculum on T1 variously shaped, but not extending beneath spiracle..... 3

- 3. Anal comb absent “*Cydia*” type
- 3'. Anal comb present..... “Olethreutinae” type

“Tortricinae” type:

- 1.' SV group on A1,2,7,8,9 usually 3:3:2:2:2 or 2:3:2:2:2 Tortricini (*Acleris* or *Tortrix*)
(Effectively a bisetose SV on A7 vs. a trisetose SV on A7 below)
- 1. SV group on A1,2,7,8,9 usually 3:3:3:2:2 2
(This is the most common arrangement in the Tortricinae)

- 2. SD1 setae of anal shield moderate in length; D pinacula on mesothorax not elongated posteriorly;
Europe 3 (Archipini)
(Archipini larvae in the genera *Adoxophyes*, *Clepsis*, *Choristoneura*, *Archips*, etc. from Europe are
very difficult to separate using only morphology)
- 2.' SD1 setae of anal shield extremely long; D pinacula on mesothorax elongated posteriorly; New World
or Europe 5 (mostly Sparganothini)
(With the interception of *Platynota stultana* on Spanish peppers, we can no longer assume that
Sparganothini larvae only originate from the New World; note that MacKay (1962) and Brown
(2011) used “L1” seta, which should be SD1 seta according to Stehr (1987); also note that long
setae can easily be broken in preserved specimens)

- 3. On lilac (*Syringa*); abdominal crochets biordinal *Adoxophyes orana*
- 3.' On cut flowers or *Capsicum*; abdominal crochets triordinal or partially triordinal 4

“Tortricinae” type (cont.):

- 4. Prothoracic shield yellow or pale yellow, with a large, dark, irregular blotch at posterior angle *Cacoecimorpha pronubana*
- 4.' Prothoracic shield without large, dark, irregular blotch at posterior angle *Clepsis* spp.

- 5. Prothoracic shield with distinct dark lateral line; head with dark lateral line (= genal band); New World [Amorbia](#) spp.
- 5.' Prothoracic shield without distinct dark lateral line; head with or without dark lateral line (= genal band); New World or Europe..... 6

- 6. Head capsule dorsally flattened, body spinules long, slender, and spinelike; New World [Amorbia](#) spp.
- 6.' Head capsule rounded, body spinules appear as round or pointed granules, short and not spinelike; New World or Europe..... 7
(Passoa and Hodges (1995) used the form of the head capsule and body spinules to separate *Amorbia* from *Platynota*; they also used the spacing of the D1 and SD1 setae on the anal shield, but this character appears to overlap between the two genera and is not included here)

- 7. Europe (probably Spain) on *Capsicum*..... *Platynota stultana*
- 7.' New World *Platynota* spp.

“Cryptophlebia” type:

- 1. Anal comb present..... 2
- 1.' Anal comb absent 5
(The presence or absence of an anal comb is often used to separate *T. leucotreta* from *Cryptophlebia*; however it is quite common for *C. ombrodelta* larvae to have a rudimentary anal comb with 4-6 small teeth; it is not known if this character persists throughout the genus although we have observed that most intercepted *Cryptophlebia* lack an anal comb)

- 2. L-group on A9 bisetose (both setae on same pinaculum); pinacula usually moderate to large; Vs on A9 much further apart than those on A8; mostly New World..... 3
- 2.' L-group on A9 usually trisetose (all setae usually on same pinaculum); pinacula moderate; Vs on A9 slightly further apart than those on A8; Africa [Thaumatotibia leucotreta](#)
(Nearly half of all *T. leucotreta* interceptions come from South Africa on *Citrus*; this species is also one of the most commonly intercepted tortricids on pepper and eggplant; historical reports of several species in a *T. leucotreta* “complex” appear to be inaccurate as DNA sequencing of specimens from South Africa and Kenya has found no evidence of multiple species (Timm et al. 2010, Copeland et al. unpublished))

- 3. SV-group usually 2:2:2:2:1; pinacula large; on *Capsicum* from Mexico or Central America [Lorita scarificata](#)
(Pogue (1986) reports that this species also occurs as far south as Brazil and has been introduced to Hawaii; we have not seen intercepted larvae from those locations)
- 3.' SV group 3:3:2:2:2(1); pinacula moderate to large 4

“Cryptophlebia” type (cont.):

- 4. On *Opuntia*, Asteraceae..... Cochylini
- 4.' On *Pithecellobium dulce* from Mexico..... *Rudenia leguminana*
(Numerous interceptions of this species from Mexico have been confirmed using DNA barcoding)

- 5. From Mexico, Central America, South America, or the Caribbean 6
- 5.' From the Old World (including Australia), Hawaii, or other Pacific Islands..... 7

- 5.' SV-group usually 3:3:2:2(1):1; L-group on A9 uni-, bi-, or trisetose; abdominal prolegs with 20-30 crochets *Ecdytolopha fabivora*
(Razowski (2011) moved *fabivora* into *Ecdytolopha*, although this species is still placed in *Cydia* in most publications and databases; larvae are occasionally intercepted on *Phaseolus* or *Glycine max* from Mexico, Central America, South America, and the Caribbean; it is possible that other species of *Ecdytolopha* may fall out in this couplet if found feeding on the same hosts)
- 6. SV-group usually 3:3:3(2):2:1; L-group on A9 usually trisetose; abdominal prolegs with 40-60 crochets. *Gymnandrosoma aurantium*
(Larvae of many *Gymnandrosoma* can be separated from those of *Ecdytolopha* by the distance between the V setae on A9: approximately the same as the distance between Vs on A8 in *Ecdytolopha* and 1.2-2.0 times the distance between Vs on A8 in *Gymnandrosoma* (Adamski and Brown 2001); we have observed both states in larvae of *E. fabivora*, so this character is not included in the couplet)

- 7. Abdominal crochets uniordinal; from Hawaii on macadamia, litchi, mango, or koa
..... *Cryptophlebia illepida*
- 7.' Abdominal crochets biordinal or triordinal; from Hawaii, Asia, Australia, Africa, or Pacific Islands..... 8

- 8. From Australia, Japan, India, Southeast Asia, or Hawaii; on macadamia, monkeypod, litchi, longan fruit, or others..... *Cryptophlebia ombrodelta*
- 8.' From Africa, Seychelles, Mauritius; usually on litchi or macadamia *Cryptophlebia peltastica*
- 8." From Guam..... *Cryptophlebia* spp.
(Both *C. ombrodelta* and *C. peltastica* occur in Guam and other *Cryptophlebia* occur in the region; it is not known how larvae of these species can be reliably separated using morphology)

“Cydia” type:

- 1. D1, D2, and SD1 setae on A9 all on same enlarged (ill-defined) pinaculum 2
- 1.' D2 setae on pinacula separate from D1 and SD2 setae (D2 shared pinaculum sometimes very weakly developed) 3

- 2. On *Annona* or *Mammea*; Mexico, Central America, Caribbean..... *Talponia batesi*
- 2.' On *Persea americana*; Mexico, Central America, South America, Caribbean..... *Cryptasasma* spp.
(The most frequently encountered *Cryptasasma* on avocado in Mexico or Guatemala is *C. perseana* (Gilligan et al. 2011); however, other *Cryptasasma* have been reared from avocado in Central and South America; no members of this genus have ever been reported in PestID, but it is unlikely they would have been recognized as the larva of *Cryptasasma* was just recently described)

“Cydia” type (cont.):

- 3. On *Castanea* 4
- 3.' On other hosts 5

- 4. From Europe [Cydia spp.](#), usually [C. splendana](#)
- 4.' From Asia [Cydia spp.](#) or [Fibuloides aestuosa](#)
(Brown and Komai (2008) provide a key to separating the various species of *Castanea*-feeding Olethreutinae; here we group them by region because of the difficulty in separating preserved specimens; the most frequently reported intercepted tortricid is *C. splendana* from Europe)

- 5. On *Aracauria*; from South America (Brazil, Argentina, and Chile) *Cydia araucariae*
- 5.' On *Saccharum officinarum*; from Asia *Tetramoera schistaceana*
- 5." On spruce cones (*Picea*); from Europe *Cydia strobilella*
- 5.'" On various other hosts (usually Rosaceae or Juglandaceae); mostly from Europe or Mexico 7
(Because of the variability in *Cydia* larval morphology, most species in this group are better identified with a host/origin association)

- 6. With distinct pattern on anal and prothoracic shields; A9 L-group trisetose with ventralmost seta on a separate pinaculum (two pinacula total); 25-35 abdominal crochets; cosmopolitan [Cydia pomonella](#)
- 6.' Without distinct pattern on anal and prothoracic shields; A9 L-group variable (often trisetose); 15-40 abdominal crochets [Cydia spp.](#) (including [C. pomonella](#))
(*Cydia* larvae including *C. pomonella* are extremely variable; there is a “typical” look for *C. pomonella* where the A9 L-group is trisetose and the ventralmost seta is on a separate pinaculum from the other two setae, but any arrangement can be found ranging from each seta on three separate pinacula to all setae on the same pinaculum; the mottling on the anal shield and T1 shield is also quite variable and is often faint or absent)

“Olethreutinae” type:

- 1. On *Quercus*; from Europe; integument spiny *Tortrix viridana*
- 1.' On other hosts; from any region; integument variable 2
(The SV-group counts in *T. viridana* vary from 3:3:3:2:2 to 2(3):3:2:2:2, so this species will not always key out correctly in Brown 2011; it should be easily distinguished by host/origin)

- 2. SV-group on A7 trisetose 3
- 2.' SV-group on A7 bisetose 4

- 3. V setae on A9 ca. 2 times distance between Vs on A8; on *Vitis*; from Europe, Asia, Africa, parts of South America (Chile, Argentina) *Lobesia botrana*
- 3.' V setae on A9 not further apart than Vs on A8; on *Vitis*, *Citrus*, *Prunus*, kiwi, and other fruits; from Chile and Argentina *Proeulia* spp.
(Note that in some *Proeulia* the D1 and SD1 setae are on separate pinacula on A9; these larvae would key out as “Tortricinae” type and are not treated here or in Brown 2011)

“Olethreutinae” type (cont.):

4. Pinacula large and brown; prothoracic and anal shields distinctly patterned; on *Castanea* (Europe)
.....*Pammene fasciana*
- 4.' Pinacula small or moderate, pale or tan; prothoracic and anal shields with or without distinct pattern;
various hosts 5
5. Head with black band extending from postgenal suture to seta O2; primarily on Fabaceae or
Malvaceae; from Mexico, Central and South America, Caribbean 6
- 5.' Head usually without genal band extending to O2; from other hosts and various locations 7
6. With 30-40 crochets on abdominal prolegs; on Fabaceae [Crociosema aporema](#)
- 6.' With 13-20 crochets on abdominal prolegs; primarily on Malvaceae but also other hosts
.....*Crociosema plebejana*
(Although *C. plebejana* is not listed as an intercepted species in PestID, we have examined
numerous larvae identified as *C. aporema* and determined them to be *C. plebejana*; larvae of
the two species are nearly identical with the exception of the abdominal crochet counts as listed
above; *Crociosema plebejana* is a common cosmopolitan species that feeds primarily on
Malvaceae, but it is recorded on a variety of other plants, including those in the Fabaceae; it
could be intercepted from nearly any location, but is included here from the New World to avoid
confusion with *C. aporema*; note that MacKay (1959) described *C. aporema* larvae under
Epinotia opposita and illustrated 30-40 crochets for that species)
7. Crochets few (16-20), uniordinal; SV-group 2:3:2:1:1; on various hosts; from Europe
.....*Cnephasia longana*
(Other characters include: L group in horizontal line on T1; distance between Vs on A9 ca. 2-3
times distance between Vs on A7-8)
- 7.' Crochets numerous (>25), uniordinal or biordinal; SV group variable, usually 3:3:2:2:2 or 3:3:2:2:1; on
Rosaceae and Ericaceae; cosmopolitan..... [Grapholita spp.](#)

For John Brown’s full key to identifying tortricid larvae intercepted at U.S. ports of entry, click on the following link
(Brown 2011): http://www.lepintercept.org/Brown_2011_Tortricidae.pdf

For more information on intercepted tortricid pests and non-targets (both adults and larvae), visit **TortAI**,
Tortricids of Agricultural Importance (Gilligan & Epstein 2012): <http://idtools.org/id/leps/tortai/index.html>

The following is a partial list of tortricid pests referenced above that have been sequenced (DNA barcoded) for the
TortAI project: http://idtools.org/id/leps/tortai/TortAI_DNA_sequence_search_tool_log.pdf

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