TORTRICIDAE - *Cydia pomonella* (Linnaeus) *Non-Rep*

Taxonomy

Tortricoidea: Tortricidae: Olethreutinae: Grapholitini: *Cydia pomonella* (Linnaeus)

Common names: codling moth

Synonyms: *Tortrix aeneana*, *C. splendana glaphyrana*, *Pyralis pomana*, *Tortrix pomonana*, *C. pomonella simpsonii*

Cydia pomonella is often referred to as *Carpocapsa pomonella* or *Laspeyresia pomonella* in older literature. The correct generic name is *Cydia*; refer to Brown (2006) for more information.

Larval diagnosis (Summary)

- D2 setae on A9 on the same pinaculum
- D1 and SD1 setae on A9 on the same pinaculum
- Usually with distinct pattern/mottling on the anal and prothoracic shields in mid- to late instars
- A9 trisetose, often with the ventralmost L seta on a separate pinaculum
- Abdominal prolegs with 25-35 crochets
- Anal comb absent
- Larva an internal feeder on Rosaceae or Juglandaceae

Host/origin information

Due to its cosmopolitan distribution, larvae of *C. pomonella* are intercepted from origins throughout the world. Approximately 40% of all interceptions originate in Mexico; other common origins are listed below:

Origin	Host(s)
Armenia	(various)
Canada	(various)
Mexico	*Cydonia*, *Malus*, *Prunus*, *Pyrus*
Russia	(various)
Ukraine	(various)

Recorded distribution

Cydia pomonella is found in nearly all temperate pome fruit-growing regions of the world. It is notably absent from Japan and Korea (Barnes 1991).

Identification authority (Summary)

Morphological variaton makes a species-level diagnosis difficult in some instances. It is safest to restrict positive identifications to larvae intercepted on Rosaceae or Juglandaceae that exhibit a combination of the "typical" *C. pomonella* characters listed above.

Pest characterization

- Taxonomy: **High.** Species-level identification is usually possible.
- Low: **Low.** *Cydia pomonella* is present (and common) throughout the U.S.
- Potential Impact: **High.** *Cydia pomonella* is a pest.

This ranking characterizes *C. pomonella* as not quarantine significant for the U.S.

Larval diagnosis (Detailed)

Brown (2011) divided intercepted tortricid larvae into four "types." Larvae of *C. pomonella* are grouped under the "*Cydia* type" with D1 and SD1 on the same pinaculum on A9, the L group on


Fig. 1: Late instar, lateral view


Fig. 2: Late instar, lateral view

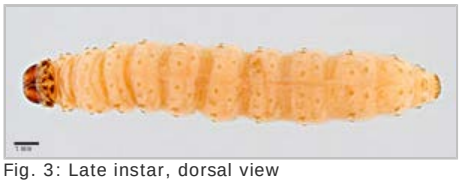


Fig. 3: Late instar, dorsal view


Fig. 4: Head and prothoracic shield, dorsal view


Fig. 5: L group on A9


Fig. 6: L group on A9


Fig. 7: A9, anal shield


Fig. 8: A9, anal shield


Fig. 9: Crochets


Fig. 10: Head


Fig. 11: Hypo. complex


Fig. 12: Mandible

T1 not extending beneath the spiracle, and an anal comb absent. He used the following characters to identify larvae of *C. pomonella*: D2s on A9 always on same pinaculum; SV group counts usually 3:3:2:2:1; usually (but not always) with distinct pattern on anal and prothoracic shields; A9 with ventralmost L seta on a separate pinaculum; 30-35 crochets; mostly on Rosaceae.

MacKay (1959) included *C. pomonella* as the only member of her "*Carpocapsa*, Group 5." She listed the following characters as the most important: head with a rounded ocellar area and acute vertical angle; spinneret slender and tapered; basal segment of labial palp stout; pinacula moderately large; SD1 on A8 anterior or slightly anteroventral to the spiracle; anal fork [comb] absent.

Kolmakova (1958) described the larva of *C. pomonella* as being whitish, cream or slightly pink. In addition, the codling moth does not have a very deep notch on the head compared to *Grapholita*. This is correlated with MacKay's (1959) comments on the vertical angle. Both Okumura (1965) and Weisman (1987) gave characters to separate *C. pomonella* from the very similar *C. latiferreana* that may be intercepted from Canada or Mexico. The mandible of *C. pomonella* tends to be more square than rectangular; the opposite is true for *C. latiferreana*. Spacing of the metathoracic coxae and V setae are also different. The codling moth has the metathoracic coxa separated by about the diameter of each coxa and the V1 seta almost touches the coxal base. The separation of the coxae is approximately 1.5 times the diameter of each coxa for *C. latiferreana* and the V1 seta is well seperated from the coxal base. Weisman (1987: fig 33a, b) illustrated these characters.

Unfortunately, many of the characters traditionally used to diagnose larvae of *C. pomonella* are extremely variable. Internal feeders tend to have pinacula that are weakly sclerotized, thus it may be difficult to distinguish if the D2 setae on A9 are on the same pinaculum. Brown (2011) handled this problem by including another couplet leading to *C. pomonella* that stated: "D2s on A9 on separate or same pinacula." SV group counts are also variable, with 3:3:2:2:1 being the usual state (Brown 2011), but the combinations 3:3:2(1):1:1, 2:3:2:2:1, or 3:3:2:2:2 have also been observed (Gilligan and Epstein 2012, MacKay 1959). Many "typical" larvae have a distinct mottled pattern on the anal and prothoracic shields, but some individuals have no markings on either shield. The trisetose L group on A9 is a useful character, especially when the ventralmost L seta is on a separate pinaculum; however, all three setae can be routinely found on the same pinaculum. The most reliable larval character may be the crochets on the abdominal prolegs, which range in number from 25 to 35 (Wearing et al. 2001). Because of the morphological variation within *C. pomonella*, identification of larvae that do not exhibit a combination of the "typical" character states may be difficult or impossible to positively identify without other evidence (such as molecular diagnostics). A young larva with a dark head, dark prothoracic shield without a pattern, and pink body was illustrated by Passoa (2008).

Other similar tortricid species include *Grapholita* and *Cydia splendana*. Larvae of *C. pomonella* can be distinguished from most *Grapholita* by the absence of an anal comb. Larvae of *C. splendana* have fewer crochets on the abdominal prolegs (15-20), lack the distinctive mottling on the anal and prothoracic shields, and are usually found on Fagaceae (especially *Castanea*) (Wearing et al. 2001).

Identification authority (Detailed)

Because *C. pomonella* is a common cosmopolitan species, origin information is not useful for identification. Host is much more helpful, although individuals have been reported from non-traditional hosts such as *Citrus* (and others listed in Wearing et al. 2001). We can confirm Rutaceae as a potential larval host based on *C. pomonella* larvae found on imported *Citrus* in 2009 and identified using DNA barcoding.

Morphological variaton makes a species-level diagnosis difficult in some instances. It is safest to restrict positive identifications to larvae intercepted on Rosaceae or Juglandaceae that exhibit a combination of the "typical" *C. pomonella* characters (D2s on A9 on the same pinaculum; distinct pattern/mottling on the anal and prothoracic shields; A9 trisetose, often with the ventralmost L seta on a separate pinaculum; abdominal prolegs with 25-35 crochets; anal comb absent). Individuals from Rosaceae that lack patterning on the anal and prothoracic shields but possess a combination of the other characters listed here are also likely *C. pomonella*. Individuals from non-traditional hosts or with non-typical morphology may need to be left at genus or confirmed using molecular methods. *Cydia pomonella* is an internal feeder, thus leaf rollers, other leaf feeders, or web makers can normally be eliminated as codling moth suspects.

Key to larval Tortricidae intercepted, or potentially encountered, at U.S. ports of entry

Origin records

Cydia pomonella has been intercepted from the following locations:

Albania, Argentina, Armenia, Austria, Azerbaijan, Azores, Belarus, Bolivia, Bosnia and Herzegovina, Brazil, Bulgaria, Cameroon, Canada, China, Costa Rica, Croatia, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, France, Germany, Greece, Guatemala, Hungary, India, Iran, Iraq, Israel, Italy, Jordan, Kazakhstan, Kyrgyzstan, Lebanon, Lithuania, Macedonia, Mexico, Moldova, Morocco, Netherlands, Peru, Poland, Portugal, Romania, Russia, Serbia, Serbia and Montenegro, Slovakia, Slovenia, Spain, Sweden, Switzerland, Syrian Arab Republic, Turkey, Ukraine, United Arab Emirates, United Kingdom of Great Britain and N. Ireland, Uzbekistan, Yugoslavia

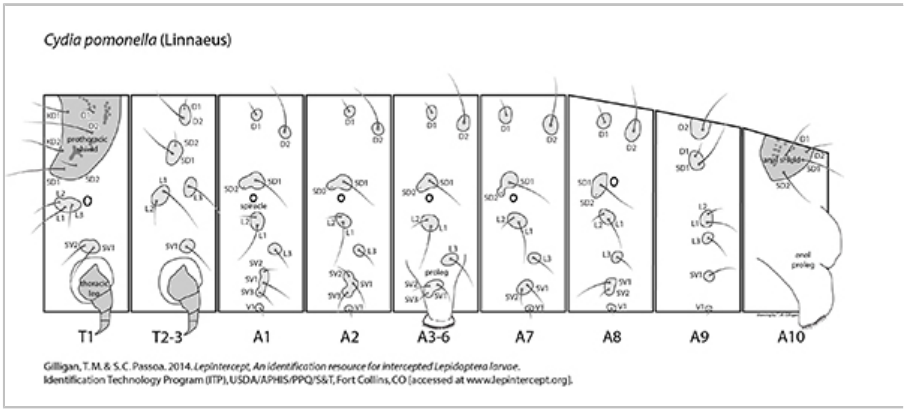
Host records

Cydia pomonella has been intercepted on the following hosts:

Ananas comosus, *Annona cherimola*, *Capsicum* sp., *Carya* sp., *Castanea sativa*, *Castanea* sp., *Cattleya* sp., *Chilopsis linearis*, *Corylus avellana*, *Crataegus monogyna*, *Crataegus* sp., *Cydonia oblonga*, *Cydonia* sp., *Juglans nigra*, *Juglans regia*, *Juglans* sp., *Malus domestica*, *Malus* sp., *Malus sylvestris*, *Opuntia* sp., *Passiflora* sp., *Pinus* sp., *Prunus americana*, *Prunus armeniaca*, *Prunus avium*, *Prunus domestica*, *Prunus persica*, *Prunus persica* var. *nucipersica*, *Prunus* sp., *Punica granatum*, *Pyrus communis*, *Pyrus pyrifolia*, *Pyrus* sp., *Pyrus ussuriensis*, *Quercus* sp., Rosaceae

Although not listed in PestID, larvae were intercepted on *Citrus* in 2009, confirming Rutaceae as a potential larval host.

Setal map



Cydia pomonella setal map

Click here to download a full-size printable PDF of this larval setal map