

LepIntercept

An identification resource for intercepted Lepidoptera larvae



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CRAMBIDAE - *Diaphania hyalinata-indica* complex

Taxonomy

Pyraloidea: Crambidae: Spilomelinae: *Diaphania hyalinata-indica* complex

Common names: melonworm, cucumber moth, pumpkin caterpillar

Synonyms: [too many to list - see <http://www.pyraloidea.org> for complete taxonomy]

Larval diagnosis (Summary)

- No genal spot
- Outer tooth on the mandible
- Bisetose SV group on A1
- Abdominal crochets in a mesal penellipse
- Must be on cucurbits if *D. hyalinata*; *D. indica* has a wider host range but is often on *Momordica*; status of *D. hyalinata* on *Momordica* is unknown

Host/origin information

Larvae in the *D. hyalinata-indica* complex are most frequently intercepted from Mexico (33%) and the Caribbean (>60%). Common host/origin combinations are listed below:

Origin	Host(s)
Dominican Republic	<i>Luffa</i> , <i>Momordica</i>
Haiti	<i>Momordica</i>
Jamaica	<i>Momordica</i>
Mexico	<i>Cucurbita</i> , <i>Sechium</i>

Recorded distribution

Diaphania hyalinata occurs from Canada to Argentina. *Diaphania indica* occurs in Florida, tropical America, and the Old World tropics.

Identification authority (Summary)

Identification of larvae in the *D. hyalinata-indica* complex is based on the absence of a genal spot, presence of an outer tooth on the mandible, and the bisetose SV group on A1. None of these characters are very distinctive and numerous sibling species of *Diaphania* exist with unknown larvae. These uncertainties all suggest a need for caution; see the Detailed Information tab.

Pest characterization

(Based on Cavey 2001, Whittle and Ferguson 1987)

- Taxonomy: **Medium**. At least genus identification is usually possible.
- Distribution: **Medium**. *Diaphania indica* is present in Florida but is not widespread in the rest of the United States. *Diaphania hyalinata* is common wherever its hosts are grown. When one species is present in the U.S., but other species are not or of limited distribution, Cavey (2001) suggests using Medium for this situation.
- Potential Impact: **High**. Both species are pests.

This ranking characterizes the *D. hyalinata-indica* complex as quarantine significant for the U.S.

Larval diagnosis (Detailed)

Diaphania indica and *D. hyalinata* were placed in the *D. hyalinata* species group by Clavijo (1990); later called the *D. indica* complex by Solis (2011). These two species are treated together because the larvae are difficult to separate and there is evidence that both are intercepted at United States



Fig. 1: Late instar, lateral view



Fig. 2: Late instar, lateral view



Fig. 3: Head and thorax, lateral view

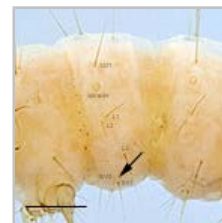


Fig. 4: SVs on A1

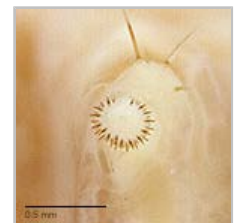


Fig. 5: Crochets



Fig. 6: Head



Fig. 7: Hypo. complex



ports. There are other species of *Diaphania* in Latin America that are similar to both *D. indica* and *D. hyalinata* in adult coloration (Arias and Clavijo 2001) and potentially part of this complex, but at present these other species do not appear to be pest species of concern to APHIS.

The larva of *D. hyalinata*, called the melonworm, was partially described by Smith (1911), Peterson (1962), Weisman (1986), Neunzig (1987), Solis (2011), and Schnitzler et al. (2011). Color photographs were published by King and Saunders (1984), Passoa (1985), Schmutterer et al. (1990), Sparks and Liu (2001), and Cranshaw (2004).

The larva of *D. indica*, called the pumpkin caterpillar (Whittle and Ferguson 1987), was described by Mathur and Singh (1963), Piao et al. (2008), and Singh (2012). Color photographs can be found in NBAII (2013). The life cycle was illustrated by Singh (2012).

Typically, larvae of the *D. hyalinata-indica* complex have no genal spot, an outer tooth on the mandible, a bisetose SV group on A1, and abdominal crochets in a mesal penellipse. The L1 seta on A8, at least in *D. hyalinata*, is separated from the spiracle by the vertical diameter of the spiracle (Peterson 1962: L51).

Larvae of the *D. hyalinata-indica* complex are most likely to be confused with *D. nitidalis*. Unlike *D. hyalinata* and *D. indica*, *D. nitidalis* lacks an outer tooth on the mandible above the lateral setae and has a genal spot (see *D. nitidalis* fact sheet). There are also coloration differences between the two taxa (Smith 1911, Passoa 1985, Weisman 1986, Whittle and Ferguson 1987, Neunzig 1987, Solis 2011). Live larvae of *D. nitidalis* are green, becoming copper to pink at maturity, without the white subdorsal longitudinal stripes found on *D. hyalinata* and *D. indica*. Another difference is that early instars of *D. nitidalis* have dark pigmented body pinacula. All instars of larvae in the *D. hyalinata-indica* complex have pale pinacula, or at most two tiny black spots on the subdorsal pinaculum of the mesothorax and metathorax, and do not turn pink or copper before pupation. Of course the white subdorsal lines usually fade in preserved specimens. Sometimes the mandibles of *D. hyalinata* show through the transparent head before molting to superficially give the impression of a genal spot which could cause the larva to be wrongly identified as *D. nitidalis*.

According to Capps (1948), some *N. elegantalis* have a bisetose SV group on A1. These could potentially be confused with larvae of the *D. hyalinata-indica* complex. Among many differences, the mandible of the *D. hyalinata-indica* complex has an outer tooth lacking in *N. elegantalis*.

So far no characters have been found to separate *D. indica* from *D. hyalinata* although the position of the substemmatal and stemmatal setae may differ (Passoa 1985). SS2 and SS3 are spaced closer than SS3 and S3 in *D. indica*. The distance between SS2 and SS3 is subequal to that between SS3 and S3 in *D. hyalinata*. The drawing in Singh (2012) seems to fit this diagnosis but more material is needed to evaluate the variability of this character. The larval antenna of *D. indica* was described in CEIR (1958), but no comparisons were made to other species. Mathur and Singh (1963) used the height of the adfrontal area and position of AF1 to separate *D. indica* from other *Diaphania* species in India. This, and the pattern of pigmentation on the prothoracic and anal shields they illustrated (Mathur and Singh (1963: fig. 36, 37), potentially can help identify *D. indica*. Nevertheless, accurate morphological identifications are easily made by rearing because the genitalia of both sexes and pupal morphology are very different in *D. indica* and *D. hyalinata*.

Passoa (1985: figs. 173, 174) compared the pupal heads of *D. indica* and *D. hyalinata*. The pilifers of *D. hyalinata* are much longer than broad giving the head a long and slender appearance. The opposite is true for *D. indica*; the pilifers are broader than long causing the head to appear shorter and stouter. This difference is often visible on cast skins. Whittle and Ferguson (1987) added that maxillae extend to A8 or A9 in *D. hyalinata*, but only to A7 in *D. indica*. The pupal abdominal dorsum of *D. nitidalis* is roughened; this separates it from *D. hyalinata* (Passoa 1985: figs. 170, 171) and *D. indica* which have punctate abdomens.

Identification authority (Detailed)

Identification of larvae in the *D. hyalinata-indica* complex is based on the absence of a genal spot, presence of an outer tooth on the mandible, and the bisetose SV group on A1. None of these characters are very distinctive. Many species of crambids lack a genal spot. The presence of an outer tooth on the mandible is unusual but a similar outer tooth is also found on *Maruca vitrata*, for example. The bisetose SV group on A1 is helpful, but again not unique. A lack of characters for recognizing the *D. hyalinata-indica* complex is compounded by numerous sibling species of *Diaphania* and relatives (in both the New and Old World) with unknown larvae. Larvae of both the *D. hyalinata-indica* complex and *D. nitidalis* have a row of microspines at the base of the proleg but the distribution of this character in Crambidae has not been studied. These uncertainties all suggest a need for caution. Unless the specimen is clearly in the in the *D. hyalinata-indica* complex from the appropriate host, use Crambidae because no single character can separate the subfamilies Pyraustinae and Spilomelinae.

Origin and host are both helpful for identification of the *D. hyalinata-indica* complex. *Diaphania indica* occurs in Florida, tropical America, and the Old World tropics (Clavijo 1990). *Diaphania hyalinata* occurs from Canada to Argentina (Solis 2011). Therefore, Old World interceptions of the *D. hyalinata-indica* complex, especially on crops, are *D. indica* and not *D. hyalinata*.

The hosts of *D. hyalinata* are in the Cucurbitaceae, the one exception on Ipomea (Clavijo 1990) is probably atypical. *Diaphania indica* has a wider host range that includes Cucurbitaceae, legumes, cotton (Clavijo 1990) and eggplant (CEIR 1958). Thus, interceptions of the *D. hyalinata-indica* complex outside of the Cucurbitaceae are *D. indica* and not *D. hyalinata*. Larvae of the *D. hyalinata-indica* complex are most often foliage feeders, but do bore in fruit, stems and flowers, although this is not their typical biology (Clavijo 1990).

There is a need to clarify the relative abundance of the *D. hyalinata-indica* complex on *Momordica* at United States ports and in the New World in general, especially in Florida (Clavijo 1990). One *D. indica* was reared from a larva intercepted from Jamaica on *Momordica* (adult det. A. Solis) in 1995. Several larvae were collected at Homestead, Florida, in 1983 by S. Passoa on *Momordica*. These were reared to the pupal stage and identified as *D. indica* by pupal characters. The Florida State Collection of Arthropods has a large series of *D. indica* immatures from *Momordica* in the D. Habeck collection (for example A-725). *Diaphania indica* has been intercepted in consignments of *Momordica* from Kenya and Surinam in 2005 by the National Plant Protection Organization, the

Netherlands (CSL 2005). Because of these records, it is tempting to say that *D. hyalinata* is very rare on *Momordica* and therefore *D. indica* is the name to use for this host. A rearing program was suggested for *D. indica* at U. S. ports many years ago (Passoa and Cavey 1992). It is only necessary to rear larvae to the pupal stage. Of course, modern methods like DNA barcoding would allow for more rapid identification.

Origin records

Members of the *Diaphania hyalinata-indica* complex have been intercepted from the following locations:

Antigua and Barbuda, Barbados, Cayman Islands, China, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Ghana, Grenada, Guatemala, Guyana, Haiti, Honduras, India, Israel, Jamaica, Liberia, Mexico, Morocco, Nigeria, Palestinian Territory, Puerto Rico, Somalia, St. Lucia, St. Maarten, Trinidad and Tobago, Turks and Caicos Islands, US Virgin Islands

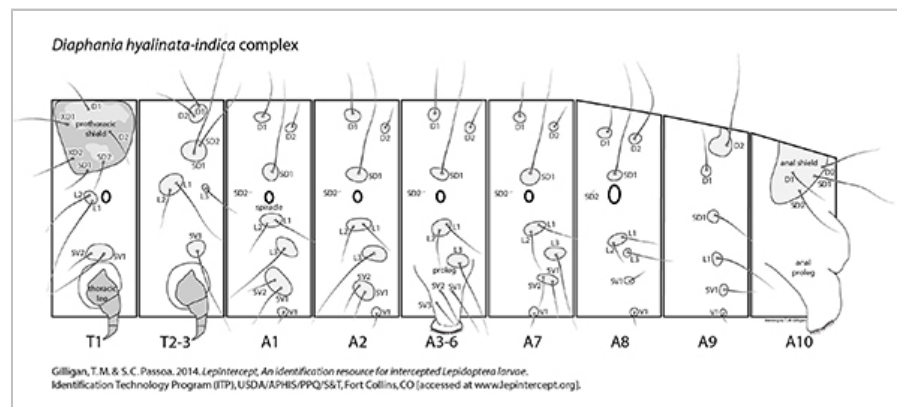
Host records

Members of the *Diaphania hyalinata-indica* complex have been intercepted on the following hosts:

Abelmoschus esculentus, *Abelmoschus* sp., *Alstroemeria* sp., *Amaranthus* sp., *Annona muricata**, *Antirrhinum* sp., *Apium graveolens*, *Artocarpus altilis*, *Cajanus cajan*, *Capsicum frutescens*, *Carica papaya*, *Cercis* sp., *Chenopodium berlandieri* ssp. *nuttalliae*, *Chenopodium* sp., *Chrysanthemum* sp., *Citrus* sp.*, *Coccinia grandis*, *Coccinia* sp., *Coccoloba uvifera**, *Cocos* sp., *Corchorus* sp., *Coriandrum sativum*, *Cucumis sativus*, *Cucumis* sp., *Cucurbita maxima*, *Cucurbita moschata*, *Cucurbita pepo*, *Cucurbita* sp., *Cucurbitaceae*, *Curcubita* sp., *Cymbopogon* sp., *Jatropha* sp., *Lagenaria siceraria*, *Limonium* sp., *Luffa acutangula*, *Luffa aegyptiaca*, *Luffa* sp., *Malvaceae*, *Mentha* sp., *Momordica balsamina*, *Momordica charantia*, *Momordica indica*, *Momordica* sp., *Moringa citrifolia*, *Opuntia* sp.*, *Origanum* sp., *Pachyrhizus erosus*, *Petroselinum crispum*, *Phaseolus* sp., *Physalis pubescens*, *Physalis* sp., *Phytolacca* sp., *Piper* sp., *Porophyllum ruderale*, *Portulaca oleracea*, *Salvia officinalis*, *Sechium edule*, *Sechium* sp., *Senna* sp., *Smilax* sp., *Solanum melongena**, *Solanum* sp.*, *Solanum torvum**, *Stachytarpheta jamaicensis*, *Thymus caespititius*, *Thymus vulgaris*, *Trichosanthes* sp., *Xanthosoma brasiliense*, *Zea mays**

Although *D. indica* has a wide host range, records on *Annona*, citrus, seagrape, *Opuntia*, *Solanum*, and corn are among those needing confirmation (indicated here with an *). The normal hosts of *D. indica* are in the Cucurbitaceae, Leguminosae, and Malvaceae (CSL 2005).

Setal map



Diaphania hyalinata-indica complex setal map



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