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Version 2.5  
15 May 2017

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The stem borers, *Chilo* spp., are some of the most important pests of cereal crops throughout Asia. Larvae cause serious damage to rice, corn, sorghum, and sugar-cane by boring into the leaf funnels during the seedling growth stage (causing “dead-heart”) and later by feeding on internal stem tissue and inflorescences during the reproductive growth stage. Feeding by *Chilo* larvae can result in significant reduction in yields or destruction of the entire crop. *Chilo suppressalis* is one of the most important rice pests in East Asia, India, and Indonesia, and it has been introduced to Africa, Spain, and Hawaii. *Chilo partellus* is a pest of sorghum, corn, and rice in the Middle East, India, and parts of Africa. Several other species, such as *C. sacchariphagus* and *C. agamemnon*, are pests of corn and rice throughout Asia and Africa.

*Chilo* is a genus included in the Crambidae (Crambinae), a large group of moths formally placed in the Pyralidae that contains many pests. *Chilo* consists of more than 40 described species, but only four are present in North America. *Chilo* spp. are characterized by long, porrect (forward extending) labial palpi, ocelli present on the head (behind the antennae), and yellow or brown forewings. In many species, there is variable black scaling throughout the forewings. Species within *Chilo* are very similar to each other and to other species in closely related genera such as *Diatraea*. A genitalic dissection by a specialist is necessary for a species-level identification. *Diatraea* is separated from *Chilo* by the absence of ocelli on the head; this character can be used to eliminate *Diatraea* captured in *Chilo* sticky traps.

This aid is designed to assist in the sorting and screening *Chilo* suspect adults collected from CAPS pheromone (sticky) traps in the continental United States. It covers basic sorting of traps and first level screening, all based on morphological characters. Basic knowledge of Lepidoptera morphology is necessary to screen for *Chilo* suspects. Although USDA CAPS surveys target either *C. partellus* or *C. suppressalis*, any unknown *Chilo* should be forwarded for identification.



Fig. 1: *Chilo suppressalis* resting (Photo by International Rice Research Institute Archive, Bugwood.org).



Fig. 2: Male *C. suppressalis*.

*Chilo* pheromone traps should be sorted initially for the presence of moths of the appropriate size, color, and shape. Traps that contain moths meeting all of the following requirements should be moved to Level 1 Screening (Page 3):

- 1) Moths are approximately 10-18 mm (0.35-0.7 inches) long (Fig. 3).
- 2) Moths have an overall shape that is similar to the outline depicted in Fig. 3. Note that moths trapped on their side or back may have a different outline.
- 3) Moth forewings are pale brown to pale yellow with relatively few markings - see the comparison of forewing colors in Figs. 1-2 and 4-5.

Note that the appearance of moths caught in sticky traps can vary substantially depending on the amount of sticky glue on the moth (most individuals usually appear darker when covered in glue). For this reason, any small, crambidlike moth meeting the above criteria should be sent forward for screening.

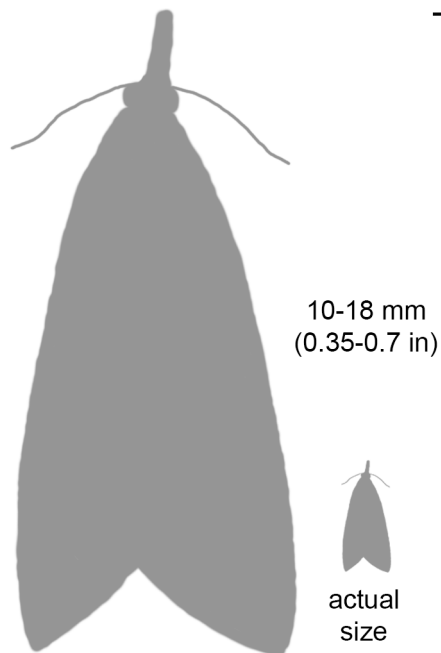


Fig. 3: Outline and size of a resting *C. suppressalis* male. Many crambid moths have a similar resting posture. This general shape can be used to separate crambids from other similar sized moths.



Fig. 5: Adult of *Chilo partellus* (Photo by Georg Goergen, IITA Insect Museum, Benin).

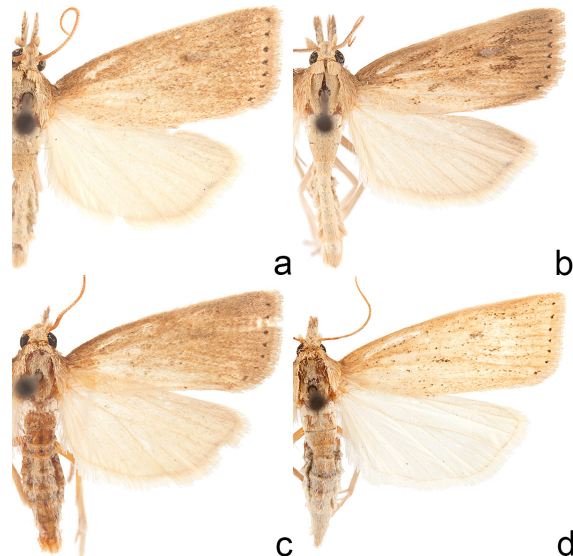


Fig. 4: Variation in wing pattern and coloration of *C. suppressalis* adults (a-c = males; d = female). Note the row of black dots along the termen of the forewing (although this character is not always present).



Fig. 6: Lateral view of *Chilo partellus* adults, top male, bottom female (Photos by James Hayden, FSCA, Gainesville, Florida).

# Level 1 & 2 Screening

## Stem Borers *Chilo* spp.

Moths that meet the sorting requirements should be screened for suspect *Chilo*. Level 1 & 2 Screening utilizes the same characters. Screeners should proceed through the characters listed here as far as their expertise allows and forward remaining suspect pyraloids for identification. Screening can be moderately difficult and may need to be performed by a trained Lepidopterist.

### Level 1 Screening

Suspect pyraloids have the following combination of characters:

- 1) Maxillary palpi conspicuous. The maxillary palpi are located above the labial palpi on the head (Figs. 7-8). The maxillary palpi are approximately 1/3 to 1/2 as long as the labial palpi in *Chilo*. Maxillary palpi are reduced and not visible in many other families like Tortricidae.
- 2) Labial palpi long, densely scaled, and projecting forwards (Figs. 7-8). Some families (especially in the Gelechioidea) have long labial palpi that curve upwards over the head. Other pyraloids have much shorter palpi.
- 3) Proboscis (tongue) scaled at the base. Members of the Gelechioidea and Pyraloidea have a scaled proboscis; the proboscis in many other families is unscaled.

Suspect pyraloids meeting the above conditions should be moved to level 2 screening. If traps are to be forwarded to another facility for further screening, follow the steps at the bottom of this page to ensure they are packed correctly. Only proceed to level 2 screening if expertise is available.

### Level 2 Screening

Suspect pyraloids should be cleaned to identify suspect *Chilo* individuals. Instructions on cleaning specimens caught in sticky traps can be found here: <http://idtools.org/id/leps/tortai/dissections.html>. Cleaned specimens should be properly pinned and labeled. Suspect *Chilo* have the following combination of characters:

- 4) Tympanum present at the base of the abdomen. Noctuoidea have a tympanum on the thorax near the junction with the abdomen. Other families (like Tortricidae) lack a tympanum. Although this is a family level character, the tympanum is difficult to see without cleaning and manipulating the specimen.
- 5) Ocelli present (Figs. 7-8). Ocelli are present on the head behind the antenna in *Chilo* and many other Crambidae. Ocelli are absent in some closely related genera like *Diatraea*.

Traps that are to be shipped should be carefully packed following the steps outlined in Fig. 9. Traps should be folded, with glue on the inside, making sure the two halves are not touching, secured loosely with a rubber band or a few small pieces of tape. Plastic bags can be used unless the traps have been in the field a long time or contain large numbers of possibly rotten insects. Insert 2-3 styrofoam packing peanuts on trap surfaces without moths to cushion and prevent the two sticky surfaces from sticking during shipment to taxonomists. DO NOT simply fold traps flat or cover traps with transparent plastic wrap (or other material), as this will guarantee specimens will be seriously damaged or pulled apart – making identification difficult or impossible.

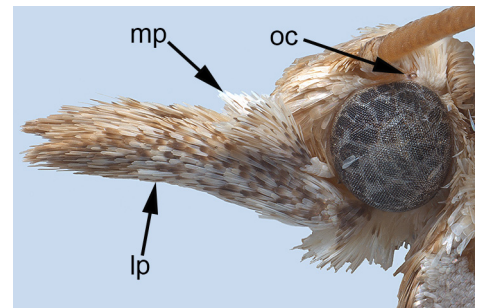


Fig. 7: *Chilo suppressalis* head; lp = labial palpi; mp = maxillary palpi; oc = ocellus (Photo by Christi Jaeger, Miss. State Univ.).

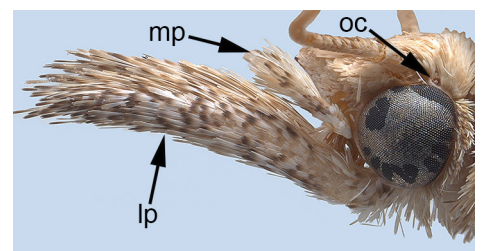


Fig. 8: *Chilo demotellus* head; lp = labial palpi; mp = maxillary palpi; oc = ocellus (Photo by Christi Jaeger, Miss. State Univ.).

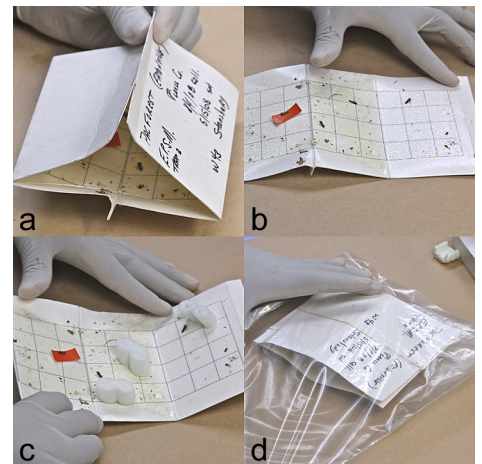


Fig. 9: Recommended packing method for shipment of sticky traps: a & b) open and unfold trap; c) place 2-3 packing peanuts in areas of trap with no moths; d) fold trap, secure with rubber band, and place in plastic bag (Photos by E. LaGasa, WSDA).



Fig. 10: *Chilo plejadellus*.



Fig. 11: *Chilo erianthalis*.



Fig. 12: *Chilo demotellus*.



Fig. 13: *Chilo demotellus*.



Fig. 14: *Diatraea saccharalis*.



Fig. 15: *Diatraea saccharalis*.



Fig. 16: *Diatraea evanescens*.



Fig. 17: *Diatraea grandiosella*.



Fig. 18: *Diatraea lisetta*.



Fig. 19: *Eoreuma densella*.



Fig. 20: *Xubida panalope*.

A sampling of *Chilo* spp. and non-targets in related genera that are present in North America. It is expected that other crambids will be attracted to *Chilo* pheromone traps; a sampling of non-target crambids is shown on this page. Note that these species have not been verified to be attracted to *Chilo* pheromone traps and that non-targets encountered during CAPS surveys will vary by region.

## Key to Sort and Screen *Chilo* Suspects in the United States

1. Moths approximately 10-18 mm long; overall shape typical pyraloid (Fig. 3); forewings pale brown to pale yellow with relatively few markings as in Figs. 4-6 and 10-13 ..... 2
- 1'. Moths larger or smaller than 10-18 mm long; overall shape not typically pyraloid; forewing color not pale brown to pale yellow; or forewings strongly marked .....Not *Chilo*
2. Maxillary palpi conspicuous and 1/3 to 1/2 as long as labial palpi; labial palpi long and projecting forwards; and proboscis scaled at the base as in Figs. 7-8..... 3
- 2'. Maxillary palpi absent or very short; labial palpi short or upcurved; or proboscis not scaled at the base .....Not *Chilo*
3. Ocelli present..... ***Chilo suspect***
- 3'. Ocelli absent.....Not *Chilo*

## Citation

Royals, H. R., T. M. Gilligan and S. Passoa. 2017. Screening aid: Stem borers, *Chilo* spp. Identification Technology Program (ITP), USDA-APHIS-PPQ-S&T, Fort Collins, CO. 5 pp.

## References for more information on *Chilo* and non-targets

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## Acknowledgments

We would like to thank USDA-APHIS-PPQ National Identification Services and the USDA-APHIS-PPQ-S&T Identification Technology Program for support of this work. Funding for this project was provided to H. Royals through section 10007 of the 2014 Farm Bill.