Screening Aid

Nettle Caterpillar
Darna pallivitta (Moore)

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The nettle caterpillar, *Darna pallivitta*, is well-known as a painful pest throughout much of Asia. It was first discovered in Hawaii in 2001 and, as of 2010, it has been reported from three Hawaiian Islands and intercepted as larvae and pupae in cargo en route to California. Larvae are highly polyphagous feeders, with at least 45 recorded hosts plants, and can cause extensive defoliation. The nettle caterpillar seems to prefer those plants in the palm (Arecaceae) and grasses (Poaceae) families but has been recorded feeding on many different weedy and ornamental plants in nurseries and at residences. In addition to plant damage, these larvae can cause extreme irritation to people who come into contact with its toxin-producing spines. Should it become established on the mainland, suitable habitat in the U.S. would likely be limited to the very southern states as *D. pallivitta* does not tolerate cooler temperatures.

Fig. 1. Dorsal view of late instar larva with characteristic 4 orange spines (Photo by Walter T. Nagamine, Hawaii Deptartment of Agriculture).

Fig. 2. Lorsal view of late instar larva (Photo by Hawaii Department of Agriculture).

Fig. 3. Larval damage on palm frond (Photo by Hawaii Department of Agriculture).

Darna pallivitta is a member of the Limacodidae, the slug caterpillar moths. Larval stages of this family often have stinging spines. Adults of *D. pallivitta* are different in size, females usually several millimeters larger than males. Males and females can also be distinguished by their bipectinate antennae in males and filiform antennae in females. The forewing of the nettle caterpillar moth is divided by a very conspicuous diagonal white line running from the apex down to the inner margin. The basal half of the divided forewing is rust-colored while the distal half is generally brown. Hindwings are lighter brown. Others species in the Limacodidae have similar lined markings on their forewings but all are quite distinct if observed closely. When resting, adult wings have a tulip shape; the wing shape might be difficult to observe in trapped specimens. While forewing pattern is a useful tool for identifying suspects, genitalic dissection should be performed for final identification.

This aid is designed to assist in the sorting and screening *D. pallivitta* suspect adults collected from CAPS pheromone traps in the continental United States. It covers basic sorting of traps and first and second level screening, all based on morphological characters. Basic knowledge of Lepidoptera morphology is necessary to screen for *D. pallivitta* suspects.

Darna pallivitta 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 have a forewing length of 8.0-12.0 mm (0.31-0.48 inches) with females being larger than males.

2) Moths have an overall shape that is similar to the outline depicted in Fig. 3, but be aware that moths often do not die in a natural position when captured in traps.

3) Moth forewings are a rusty-brown, tulip-shaped, and have one or more lines running from the apex.

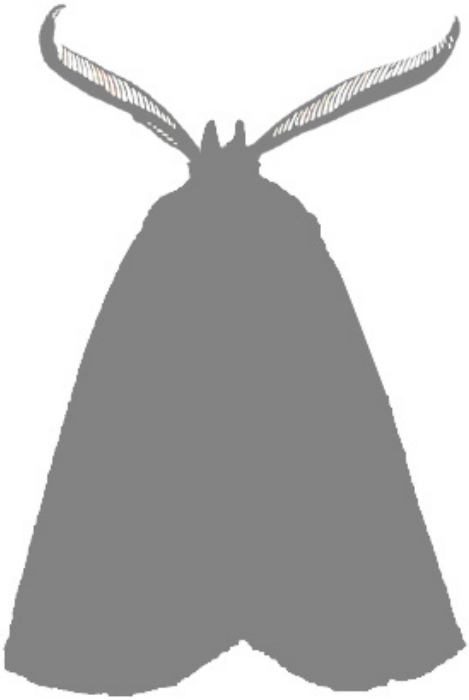

Fig. 3. Shape of resting adult male

Actual size

Fig. 4. Adult male

Fig. 5. Adult male

Fig. 6. Adult female

(Wing patterns of adult *D. pallivitta* are consistent between individuals and sex)

Level 1 Screening

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Commonly encountered North American non-targets for *D. pallivitta* likely include representatives from the family Limacodidae (slug caterpillar moths).

Moths that meet the sorting requirements should be screened for suspect limacodids. Level 1 Screening is difficult for small moths and may need to be performed by a trained Lepidopterist. When in doubt distinguishing or evaluating first-level screening characters, forward traps that have passed the sorting requirements to a trained taxonomist. Suspect moths in traps should not be manipulated or removed for screening unless expertise is available.

Fig. 7. Lateral view of densely-scaled head and forward-facing porrect labial palpi (note that males will have bipectinate antennae, not shown here).

Male limacodid moths can be identified by the following combination of characters (note that some characters may be difficult to see on specimens coated in sticky trap glue):

1) Body is stout, wings are rounded and densely scaled.

2) Maxillary palpi and proboscis are either vestigial or absent.

3) Labial palpi are are three-segmented and usually short and porrect.

4) Antennae are bipectinate.

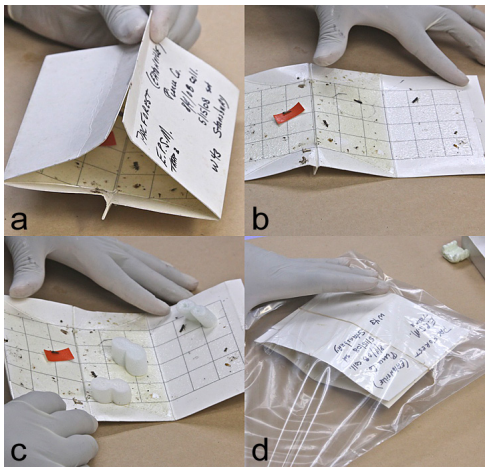

Fig. 8: Recommended packing method for shipment of sticky traps: a & b) open and unfold trap; c) place 2-3 packing peanuts in areas of trap with no moths; d) fold trap, secure with rubber band, and place in plastic bag (Photos by E. LaGasa, WSDA).

Moths meeting the above criteria should be moved to Level 2 Screening (Page 4). Traps to be forwarded to another facility for Level 2 Screening should be carefully packed following the steps outlined in Fig. 8. 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.

Suspect limacodids should be cleaned to identify suspect *D. pallivitta* 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 pinned and labeled. Level 2 Screening is based solely on forewing patten. While visual comparison should suffice to tentatively identify *D. pallivitta*, inspection of dissected genitalia by a specialist should be used for a more accurate species-level identification. Confusion is most likely to occur with other Limacodidae moths.

Forewing Pattern

The distinguishing feature of the forewings is the white or light-colored line that runs from the apex to the inner margin (Fig. 9). The basal half of the divided wing is rusty brown while the distal half is a duller brown color. Close comparison of forewings of other limacodids is important for identification as markings are similar. *Apoda rectilinea* (Fig. 11) also has a white line dividing the wing but this runs from the costa to the inner margin rather than starting at the apex as in *D. pallivitta* (Fig. 9). Other species have forewings with more than one line or more uniform coloring (Figs. 10 & 12).

Fig. 9. *Darna pallivitta*

Fig. 10. *Natada nasoni*

Fig. 11. *Apoda rectilinea*

Fig. 12. *Apoda y-inversa*

Fig. 13. *Apoda y-inversa*

Fig. 14. *Apoda y-inversa*

Fig. 15. *Adoneta spinuloides*

Fig. 16. *Apoda rectilinea*

Fig. 17. *Apoda rectilinea*

Fig. 18. *Packardia elegans*

Fig. 19. *Natada nasoni*

Fig. 20. *Natada nasoni*

Fig. 19. *Tortricidia testacea*

Figures 13-21 represent a variety of North American limacodid species that have similar forewing patterns or that might be encountered during *D. pallivitta* surveys. Non-targets will vary by region and these species have not been confirmed to be attracted to *D. pallivitta* pheromone lures.

Key to Sort and Screen *Darna pallivitta* Suspects in the United States

1. Moth forewings measure approximately 8-12 mm long; overall shape typical limacodid-like (Figs. 3-6); forewings brown with a white line 2
1'. Moth forewings are larger or smaller than 8-12 mm long; overall shape not typically limacodid-like; or forewing not brown and lacks lines ..... Not *D. pallivitta*

2. Antennae pectinate; labial palpi 3-segmented, short and porrect; proboscis and maxillary palpi absent 3
2'. Antennae filiform or not pectinate; labial palpi not short or porrect; or proboscis and maxillary palpi present ..... Not *D. pallivitta*

3. White line runs from apex to inner margin of forewing and divides forewing into a rust-colored basal half and a dull-brown distal half (Figs. 4-6, 9) ..... ***D. pallivitta* suspect**
3'. White line not present; or multiple lines present on forewing ..... Not *D. pallivitta*

Citation

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References for more information on *D. pallivitta*

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Acknowledgments

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