Pest Alert

Duponchelia fovealis

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Duponchelia fovealis Zeller (Figure 1) is classified as an A-rated pest in California, and the Animal Plant Health Inspection Service (APHIS) of the USDA considers it an actionable pest. The caterpillars easily avoid detection by feeding near the base of plants below the soil line and at times burrow into the stems.


Fig 1

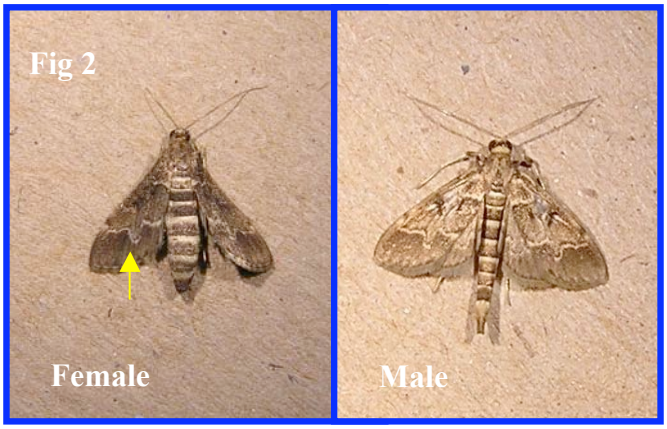
The moth originates in the Mediterranean area and is a significant pest of agricultural crops including peppers, squash, tomatoes, corn, etc.

Duponchelia was found on begonia in the San Marcos area of San Diego County back in 2004 and April and July of 2010. Current detection maps indicate that the moth is now widely distributed in San Diego County from south Chula Vista to the Riverside County border with heavy concentrations in the Vista/San Marcos areas. In addition, it has now been detected in 14 counties in California and in Arizona.

Biology and Description

There is little scientific literature from which to develop a life history, and much of what is known are anecdotal observations from lepidopterists and official records from invaded countries in Europe.

Development from egg to adult is as long as 47 days at 68ºF but will be much shorter in our warmer climates and especially in greenhouses. The adult life span is from 1-2 weeks, and a female can lay up to 200 eggs in her lifetime.



Eggs are small 0.5 x 0.7mm, whitish to green in color darkening as it ages.

Adult forewings are grey to brown with distinctive markings. The lowest lines on the outer wing have a tooth-like notch facing backward (Figure 2, arrow). The wingspan is 19-21 mm. Males have a longer slender abdomen.

Larvae are creamy white to brown with a dark head capsule and dark spots on

Larvae mature in about four weeks.

Pupae of this moth occupy a cocoon composed of webbing and soil particles (Figure 5). The pupa is usually attached to the undersides of leaves or the edge of the pot, and they take about 1-2 weeks to hatch.

The number of generations per year is variable, but is certain to be multiple generations in southern California and is likely to have multiple year-round generations in greenhouse production.

Damage

Duponchelia causes severe damage to main stems (Figure 5) and plant growth near the main stem of host plants (Table 1). However, they appear to prefer the lower leaves and tissues that are adjacent to the potting soil. They tend to create webbed tunnels (Figure 4) and protective coverings. Damaged leaves and frass are usually evident around the plant crown.


Fig 3

Larvae of this moth are difficult to contact with pesticides because they tend to feed on the undersides of leaves that are touching the soil and in later instars they can feed on the main stem (Figures 3, 4 & 6) and below the soil line in soft potted plant media.

Control

Control measures for adults include conventional registered pesticides applied where the adult into contact with them. In addition, aerosols or fogs applied just before adults begin to fly at night will be effective.


Fig 4

A preventative treatment of Bt or spinosad will kill early instar larvae as they hatch and begin to feed, but the pesticide has to be applied at the feeding site. Pyrethroids are also a good choice for larval control.

When larvae are more mature they are much more difficult to control because of the protection offered by webbing as described above. In addition, we observed larvae taking refuge deeper in the soil alongside the main stem. Preventative treatments of granular insecticides may protect plants from this type of infestation, but persistent applications of effective products using a heavy or large droplet size, wet application rather than a fine mist or small droplet size.

Recent Trial

We conducted a trial on a heavily infested group of Kalanchoe. The plants were mature and in color. They were in 4-inch pots and potted in Pindstrup. Only about 1% of the plants did not contain larvae or evidence of an infestation (webbing and damage). We treated the plants with several insecticides that we thought might help in an eradication effort (see Table 1). The Majority of the larvae were in late stages, and we observed that about 2% of the plants contained pupae. Very few plants contained more than one larva. The larvae were exceptionally well protected under leaves, in webbing, and between leaf and soil surface. Therefore, pesticide contact with larvae was difficult. Foliar applications were made using backpack sprayer and a large droplet size, and we made an effort to get the soil surface and main stem wet with treatment.

We assessed the presence of active larvae per plant at 24 and 72 hours after application. We selected 60 plants as a pre-treatment count and different set of 60 plants for each of the two post-treatment assessments. The percent reduction in the number of larvae per treatment was determined (Table 1). Bifenthrin, Orthene, and Bifenthrin+Orthene tank mix cause a 50-75% reduction in the number of live larvae per treatment.


Fig 5

This was a worst-case scenario, however, and preventative treatments with common worm products should be effective if treated on young plants and where the pesticide can contact areas of the plant that are being fed upon. An additional aide to effective treatment applications would be to trim off the leaves that lie on the soil surface. There will be less shelter for larvae and better pesticide coverage.


Fig 6

Table 1. Percent of plants infested wth live larvae following application of selected insecticides. Sixty Kalanchoe plants were selected at random and observed for live *Duponchelia fovealis* larvae at 24 and 72 hours after application. Products were tested on older, dense plants with late instar larvae, and the vast majority of the plants contained one larvae per pot.

Treatment	Rate/100gal	Pre-treatment	% Infested at 24hrs	% Reduction 24hrs	% infested 72hrs	% Reduction 72hrs
Bifenthrin	20oz	13.3	3.3	75.0	6.7	50.0
Bifenthrin+Orthene	20oz+8oz	16.7	8.3	50.0	5.0	70.0
Emamectin	4.8oz	11.7	11.7	0.0	6.7	42.9
Lambda-cyhalothrin	5oz	13.3	11.7	12.5	11.7	12.5
Chlorantraniliprole	16oz	11.7	15.0	-28.6	8.3	28.6
Spinosad	22oz	11.7	8.3	28.6	10.0	14.3
Orthene	8oz	13.3	8.3	37.5	6.7	50.0
UTC	na	15.0	10.0	33.3	20.0	-33.3

Percent reductions are the percent of change from the pretreatment count. Bigger numbers are better.
Negative numbers indicate an increase in the number of plants infested with live larvae from the pre-treatment count.
Products and rates tested are for experimental purposes only and may not be registered for the intended use.
It is your reponsibility to make sure you are using registered products and rates for control purposes.

Table 2. Hosts are found in 38 plant families and include ornamentals such as: alternanthera, daisy (Belis spp.), cineraria, gerbera, impatiens, begonia, elderberry, chenopodium, Kalanchoe, azalea, croton, poinsettia, geranium (pelargonium), eustoma, lilyturf, cuphia, coleus, mint, malva, calathea, oxalis, loosestrife, limonium, cyclamen, portulaca, rannunculus, rosa, bouvardia, heuchera, bacopa, capsicum, and elm.

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Web sites

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