

Hoplia - A New Pest in Strawberries

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Introduction:

As methyl bromide is phased out and growers search for a replacement, *Hoplia*, a new pest may be emerging. The problem arises when a grower skips a year between fumigations, or if the fumigation is in the beds only. Other fumigants such as metam sodium and soil solarization appear to control the pests, but only eggs or grubs in the area fumigated or solarized. There is the possibility of larvae surviving and/or migrating from untreated areas (between beds).

The first evidence of damage caused by this beetle was observed in 1997 in a strawberry field on Clovis Avenue in Fresno. Samples of the adult were sent to the California Department of Food and Agriculture and were initially identified as *Hoplia dispar*, a little known pest of strawberries and ornamental flowers. About 30% of the two acres were infested with the grubs (larvae of the adults), which either killed plants or resulted in stunted plants. Additional samples from strawberries and Calla lily were sent again in 2002 and 2003, and the insects from both years and sources were identified as *Hoplia callipyge*. The larvae are “C” shaped and similar to June beetle grubs found in turfgrass. The number of larvae found in affected plants ranged from 1-14, with an average of three to four per plant. *Hoplia oregona* is the species attacking grape vines in California. Adults have been observed in Merced County fields since 1999 and are sometimes observed feeding on flowers and later on green and red fruit. In 1999, one field in Merced was severely damaged by grubs destroying the root systems.

Range:

After the first infestation in Fresno in 1997, several more fields were found infested in 1998 on Shaw Ave. From 2000-2002, the two fields were abandoned, but new infestations were found on McKinley Avenue and Academy Avenue in Sanger. During this same time period larvae and adults were found in several fields in Merced County. In all cases, the variety affected was Chandler, which makes up 90% of the total acreage. It is unknown whether other varieties are affected but assumed they are equally susceptible.

Symptoms:

Symptoms of affected plants are first observed in October/November (from an August planting) and include reddening of the foliage, stunting, and plants that lift out of the soil easily. The grubs have probably been in the fields since planting and go unnoticed because of their small size. The grubs feed on the new strawberry roots, sometimes leaving only the older roots. Where numerous grubs attack individual plants, the result is death. The reddening symptoms can be confused with low temperature chilling in winter months.

Insect Biology:

There is still much to learn about the insect life cycle. However, it appears that the adults emerge from holes in the soil around the middle of April and complete their adult life cycle around the middle of May. During this time, they are mating and depositing eggs in the soil. The adults are attracted to the white strawberry flowers and feed on the petals and probably nectar around the flower stigma. It is not uncommon to see flowers and fruit developing without petals. It is uncertain whether there is any damage to the young developing fruit.

Adult Hoplia Emergence in Fresno County		
	Flights - Start	Flights - Finish
2002	April 16	May 16
2001	April 26	May 17
2000	April 14	
1999	April 16	

Detection and Control:

Control should be focused on the larvae in the soil ideally in the fall just after planting. Attempting to control adults is not practical or feasible.

A project was initiated in 2001 to evaluate various traps which might detect adult emergence. A Japanese beetle pheromone and food bait were placed in green funnel-shaped Japanese beetle traps and compared to a non-baited trap. Traps were placed in the field at the time adults were observed flying and rotated weekly to randomize the treatments. Only one adult was captured in the food trap though there were many adults flying in the field.

- Pheromone: Slow release patch: (R,Z) -5 (1-Decenyl) dihydro-2 (3H) - furanone, 1 mg.
- Food Lure: Hercon floral food bait: phenylethyl propionate (PEP) - 9.84%, Geraniol - 9.84%, and Eugenol - 23%.

In 2002, three Japanese beetle traps were covered with white paper to see if color was an attractant (the four white fins were covered), and three yellow sticky whitefly traps were stapled to two-foot stakes. The traps were set out April 22. Again, no adults were captured. On May 9, 2002, a black light trap was set in the field using a car battery for the power source. The trap was left in the field all day – from 4:00 a.m. to 9:00 p.m. No adults were captured, however, there were insects found in strawberry flowers.

Control: In 1997, a demonstration trial was initiated in the first field to evaluate an insecticide and two species of predatory nematodes (*Heterorhabditis* sp. and *Stienernema carpocapsae*). The treatments were made in December during a moderate rain. Plants were dug and dead grubs counted. A 50% liquid diazinon sprayed broadcast over the beds resulted in 40-50% control. The predatory nematodes were applied to the soil via watering cans in December but because of the cold winter temperatures did not provide control of the larvae. A nematode treatment earlier in the fall during warmer soil temperatures would be worth investigating.

In 1998, an infestation was observed in a methyl bromide alternatives trial. Treatments included solarization for four weeks, methyl bromide, metam sodium, combinations of the above, and an

untreated check. Beetle grubs were observed in all three check treatments, but in none of the other solarized or fumigated treatments.

Our recommendation to growers has been an application of diazinon through the buried drip system but growers should check with their PCA or chemical company representative for properly registered insecticides. Broadcast applications over the soil must be watered in to be effective; and, if the plastic mulch is applied at planting, this presents a problem in getting the material to the root area.

Hoplia Larva Feeding on Roots



Hoplia Adult



Infested field in Fresno



Plants wilt on warm days

