

Persimmon Clearwing Borer (*Ichneumenoptera chrysophanes*) (*Carmenta chrysophanes*)

Mating disruption, monitoring and management.

The Persimmon Clearwing Borer (*Ichneumenoptera chrysophanes*) (PCWB) is a moth of the Sesiidae family. It is found from Cairns in Queensland to Canberra in the Australian Capital Territory and as far south as Melbourne.

The borer is the larval stage of the clearwing moth.

Sesiid moths are most distinctive. They look like wasps with narrow clear wings and a large banded body.

They are diurnal (fly during the day) and will visit flowers but are rarely seen. Most Australian species inhabit rainforest, but they are very seldom collected.

Overseas studies have been advanced enormously by using sex pheromones to attract the adults and many more species may be discovered in Australia.

There are more than 1000 species worldwide; 16 are known from Australia.

The length of the forewings is 7-8 mm for males and 7-10 mm for females. Adults are brown with large transparent areas on each wing. The body is sparsely covered in yellow hairs, and there is a large tuft of dark brown hairs on the tip of the abdomen.



(Male)

Tony Eales Whyevolutionistrue.wordpress.com



(Female)

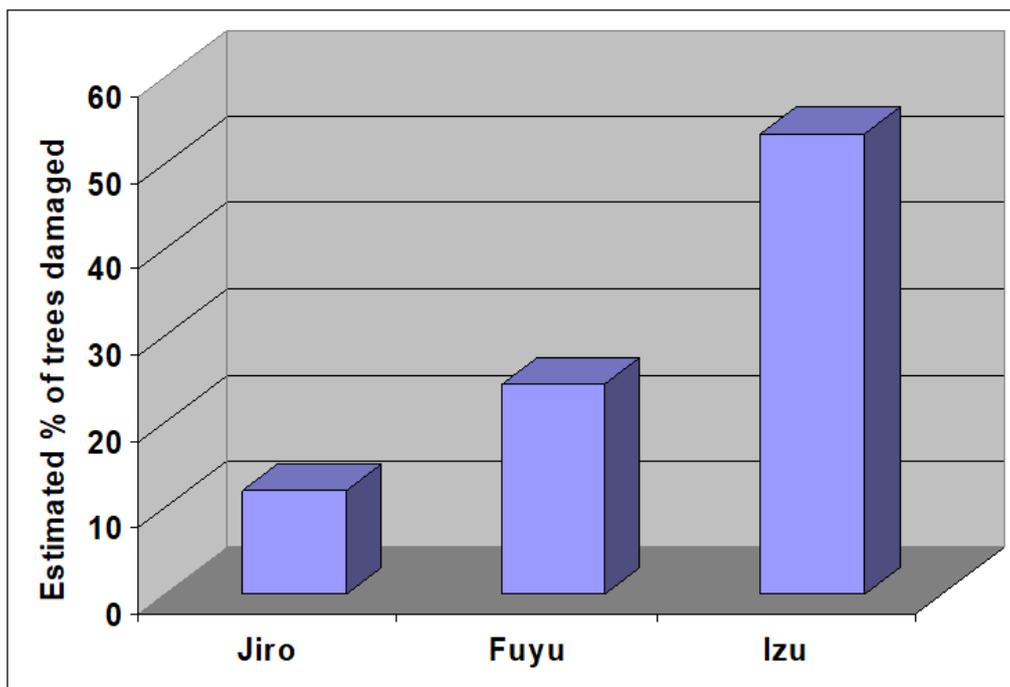
Leanne Gardner, Project Noah

Persimmon Clearwing Moth

LIFE CYCLE

Clearwing moths develop through four life stages: egg, larva, pupa, and adult. Adults do not directly damage plants and live only about one week. Soon after emerging from the pupal case, female moths emit a pheromone that attracts males. After mating, the female deposits her tiny reddish to pale pink eggs in cracks, crevices, and rough or wounded areas on bark. Eggs hatch in about one to four weeks. The newly emerged larvae bore into the bark, cambium, or heartwood of the host tree. Mature larvae pupate beneath bark. After the adults emerge, their offspring re-infest susceptible trees. PCWB moths have two generations per year.

'Izu' is highly susceptible to clearwing moth, 'Fuyu' moderately susceptible and 'Jiro' mildly susceptible (Figure 1). Izu may be more susceptible because of its rough bark.



When highly susceptible cultivars, such as 'Izu', are grown in the same orchard as less susceptible cultivars, the incidence and severity of clearwing moth damage increases in the less susceptible cultivar by two- to three-fold.

MONITORING WITH TRAPS

Pheromone traps are used to monitor and alert to the presence and activity of moths.

The use of monitoring traps in areas treated with pheromones will not be effective as the pheromone plume will not allow male moths to find the trap, as traps use the same pheromone as attractants. Traps are more effective when placed in surrounding vegetation where pheromone concentrations are lower.

Traps can attract moths from a distance, you don't need to place the traps in infested trees. Place traps in locations that will be convenient to monitor, check the traps once a week for moths.

CLIMATIC FACTORS & PCWB DEVELOPMENT & TIMING

Temperature appears the controlling factor affecting rate and timing of development stages of the moth. Compared with temperate fruits and plantation trees such as ash, where there is only one distinct peak in moth numbers in spring-early summer, it appears with persimmon clearwing moth that there are at least four major peaks in moth numbers occurring in about the same time periods each year in south-east Queensland:

- ◆ Mid spring (mid September – mid October)
- ◆ Mid summer (early January – late January)
- ◆ Early autumn (mid-February - early March)
- ◆ Early winter (mid-May - early June)

MATING DISRUPTION: CLEARWING BORER MATING DISRUPTION AGENT



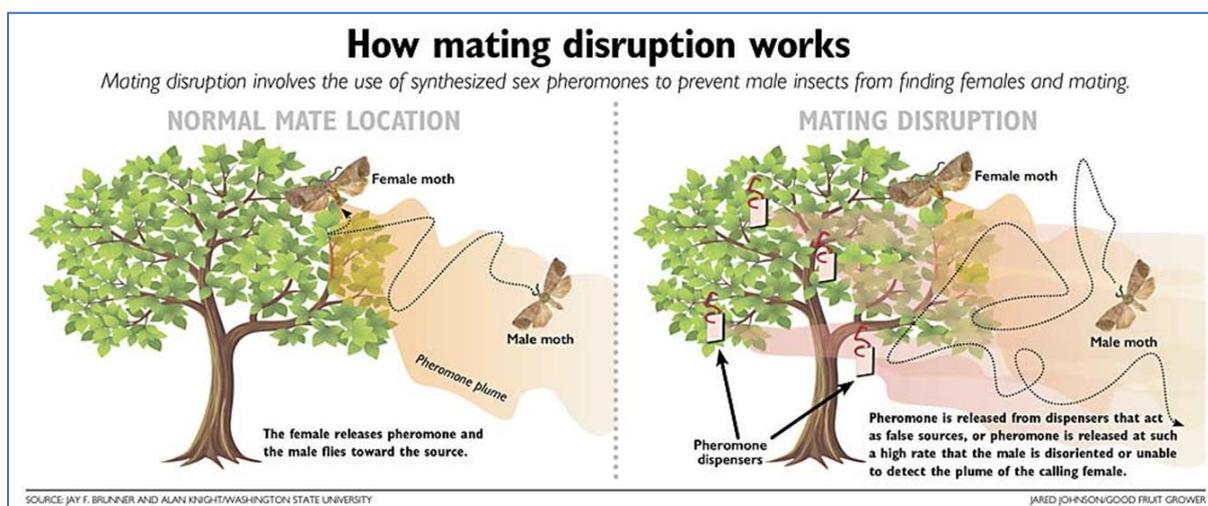
Clearwing Borer Mating Disruption Agent

Mating disruption relies upon the release of large quantities of synthetic sex pheromones to prevent males from finding females, and delaying mating that results in unmated females laying infertile eggs and mated females the delay in mating results in reduced fertile eggs being laid or none at all.

Clearwing moths have been shown to be quite susceptible to mating disruption using pheromone dispensers.

Significant reductions in both male moths and larvae were demonstrated in treated orchards with pheromone dispensers compared with the untreated (Vickers, 1997-2000).

Efficacy of pheromones on borer species present in South Australia and Victoria is not known. Further studies are needed to correctly identify the species of these regions. Many growers found that a single application of pheromone was ineffective in reducing infestations of clearwing moth compared with no applications. In contrast, growers who applied the pheromones twice during the season achieved near 100% control (Figure 6). They applied the first dose in September and the second in January. It is advisable to replace the pheromone dispensers (Shin-Etsu Carmenta MD Pheromone) after 90 days, and particularly where trap counts indicate continued clearwing moth activity in the orchard. Placing pheromone dispensers at the edge of native bush adjacent orchards is likely to enhance the mating disruption effect within the orchard, particularly for orchards less than three hectares in size.



Male moths attracted by the female pheromone become tired, confused and overwhelmed when they can't locate the 'female' moth. Mating may occur but is significantly delayed resulting in reduce viability of eggs

PCWB MATING DISRUPTION AGENT PROGRAM

Place pheromone dispensers in every tree for 'Izu' and 'Fuyu' and every second tree, staggered down each row for 'Jiro'. The number per hectare will depend on tree and row spacings, but it is recommended that between 1,000-1,500 dispensers be used per hectare.

Late August: Place pheromone traps in orchard – at least two per orchard and placed at the edge of native bush adjacent the orchard.

Pay attention to borders. Moths congregate on borders and mated females will migrate into the orchard. Treat a buffer around the outside of the orchard

Early September: Place first lot of pheromone dispensers in orchard (1000-1500 per hectare)

January: Place second lot of pheromone dispensers in orchard, leave first lot in place
Check all trees in orchard for damage; mark those that have obvious damage.

PREVENTION IS THE KEY TO CONTROL

Control relies on preventing larval establishment underneath the bark.

Once under the bark, chemical control is usually ineffective.

Depending on clearwing moth levels, use of mating disruption pheromones alone may not be sufficient to achieve control. Size and location of orchards can influence the success of mating disruption. Native vegetation provides an untreated area from which mated females can fly into treated orchards to lay eggs. Proximity to these areas may limit the effectiveness of mating disruption pheromones. Border sprays with insecticides can reduce the build-up of clearwing moth in surrounding vegetation, which can also aid the effectiveness of mating disruption. Some growers treat surrounding vegetation with pheromones as an additional control measure.

Mating disruption aims to keep populations low rather than providing total control. Orchards with large background populations may need to use an integrated approach to reduce moth numbers to allow pheromones to be effective. Additional supportive insecticide sprays may particularly be required in the first year that mating disruption is employed to reduce numbers of moths to a level where control can be maintained by pheromones alone.

REFERENCES

<https://www.daf.qld.gov.au/business-priorities/agriculture/plants/fruit-vegetable/insect-pests/clearwing-borer>)

<https://www.daf.qld.gov.au/business-priorities/agriculture/plants/fruit-vegetable/insect-pests/clearwing-borer>

<https://www.vegkit.com.au/globalassets/hort-innovation/resource-assets/pr13007-integrated-pest-and-disease-mgmt-edition-2-pdf.pdf>

Control of *Ichneumonoptera chrysophanes* (Meyrick) (Lepidoptera: Sesiidae) by mating disruption in persimmons. Richard Vickers, CSIRO. Australian Journal of Entomology . Volume 41, Issue 4. 2002

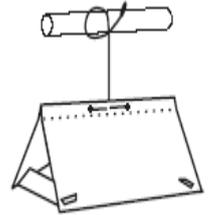
Factors influencing mating disruption for controlling clearwing moth by Grant Bignell. Persimmon Press. June 2014

Directions for Use of Traps & Lures for Insect Pest Monitoring

Delta Traps are specially designed open-ended traps. The moths are attracted to the pheromone from the lure. Once inside the trap the moths stay attracted to the lure and fly around until exhausted. The moths land onto the sticky insert where they are caught.

Assembling the Trap:

Fold the trap into a tent shape and secure the top of the trap with the wire hangar.
Peel the paper covering from the sticky pad. Open a foil pack of the lure.
Pick up the lure with tweezers or the foil pack and drop lure onto centre of the sticky pad.
Do Not touch the lure with your fingers as this may contaminate the pheromone scent of the lure
Insert the sticky pad into the trap. Fold the ends of the trap up and clip into slots in the sidewalls.
Twist the end of the wire hangar around a branch of the tree.



CAUTION: Adhesive on the sticky insert is extremely sticky. Handle with care.
Adhesive may be removed with vegetable or baby oil.

Storage: Spare lures should be stored in their unopened pack, in the refrigerator is ideal



Weekly - Monitoring & Maintenance

Check traps weekly.
Count and record the number of moths caught.
Remove all moths and any other stray insects with a scraper or twig.



Monthly - Monitoring & Maintenance

Replace the lure & sticky insert each month.
Do not handle the lure with your fingers.
Place the lure onto the centre of the sticky pad.
Dispose of the foil pack, old lure and sticky pad in household rubbish.
DO NOT leave in the orchard

Sticky pad should be replaced more often if dust or high moth catches reduce the stickiness of the pad.

Persimmon Clearwing Borer Specific Directions: Place the trap in the tree mid-August. Minimum two traps per orchard. Locate the traps in high pressure areas and edge of native forest areas. Place traps 1.5m from ground and where PCWB is active. Weekly & Monthly maintenance is required.

Light Brown Apple Moth Specific Directions: Place the traps in the trees late winter/ early spring. Position the trap 1.5 m above ground level. Weekly & Monthly maintenance is required

Keep out of reach of Children and Pets

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