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Improved on-farm management of Waratah bud and stem borer

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The problem

Waratah bud and stem borer causes serious damage to commercially cultivated Waratah bushes (*Telopea speciosissima).* The larval stage of the insect generally bores into the buds and stems of the plant. Eggs are laid at the axillary region where the bracts are found when the new growth flush appears in early spring.

Axillary region

Basal region of the flower bud

After hatching, the first instar (stage) larva bores into the stem in this region while the stem is still tender. The larva remains in the tunnel and feeds from the inside, making the stem in this area hollow and weak. As a result, the shoot can break at this point and a potential flower is lost.

Later in the season when the flower buds start to appear at the tip of the new growth, moths lay their eggs at the base of the flower buds where the bracts are. Hatching larvae bore into the bud and destroy the bud by feeding from the inside.

Therefore to achieve effective chemical control of this insect, growers need to know the life cycle and habit of the insect so that insecticide applications can target the vulnerable stages of the insect. This is when the young larvae are found exposed on the surface of the plant tissue before they bore into the tissue. Any spraying outside these 'windows' will be useless and a waste of resources.

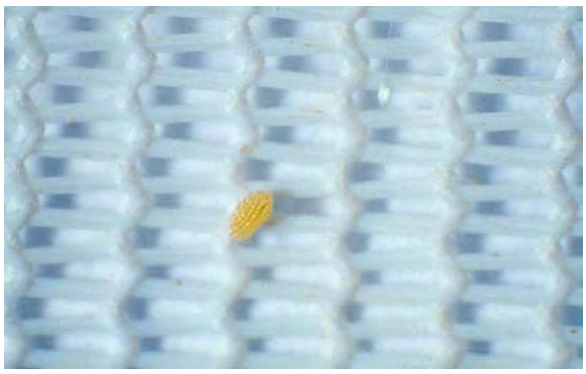
The pest

Waratah bud and stem borer (*Xylorycta luteotactella* – Lepidoptera: Oecophoridae) is also known as macadamia twig girdler because it is also a pest on macadamia trees. In macadamias it only feeds on young foliage and the larvae are always exposed and therefore easy to control by spraying.

The adult is a white moth with golden wing margins and legs. When the moth is at rest the wings are folded like a roof on its back.

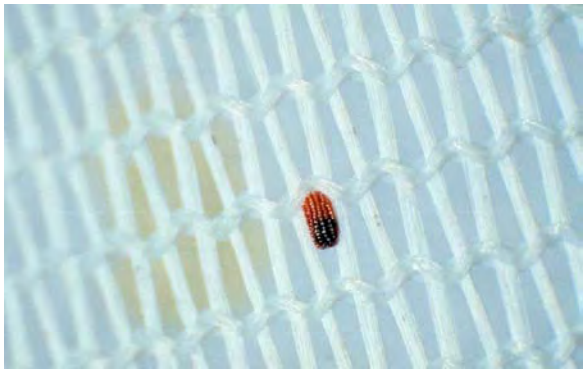
A waratah bud and stem borer moth

In Waratahs, females lay tiny amber coloured eggs singly on the surface of the plant tissue and these are very difficult to see without the help of a magnifying glass. The egg shell is ornamented and appears like a corn cob.



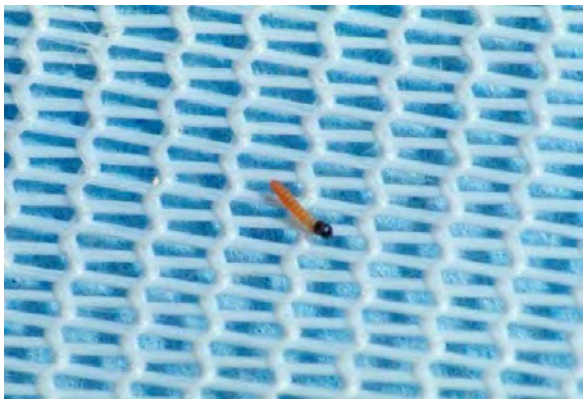
A freshly laid egg

As the larva develops inside the egg, the egg assumes a reddish-pink colour, probably to camouflage it so it blends with the colour of the bracts.



An egg with developing larva inside

The tiny neonate (just hatched) larva is reddish-pink with a black head.



A neonate larva

The young larva first feeds on the surface of the plant tissue, protected under the webbing spun by the larva and the frass that becomes entrapped in the webbing, then bores through the tissue and enters the stem or the bud.

A young larva feeding on the surface covered by webbing and frass

Once inside, the larva feeds and moults several times to reach 1.5 – 2 cm in length.

A fully matured larva

When fully matured, the larva goes into a resting pre-pupal stage.

A pre-pupa inside the stem

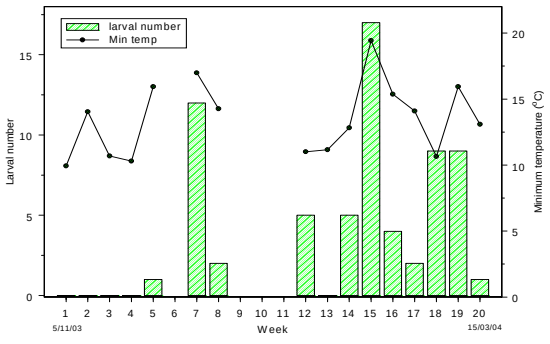
The pupa is brown and found in a silken cocoon. The moth emerges from this cocoon.

A pupa inside the silken cocoon

The life cycle of this insect takes from 62 to 84 days to complete, depending on the environmental temperature.

Egg-laying

Based on our investigation during 2003/2004 in Oakdale, in New South Wales, larvae appeared when the temperature was above 10°C. There were two peaks of egg laying activity by the moth. The first peak was in mid December when the plants put out the new flushes, and the eggs were laid in the bract area of the new growth flush at this time. The second peak was in February. This was more spread out as flower buds were produced over a longer period than the new growth flushes. Therefore any insecticide spraying outside these two windows will not have any effect on the tunnelling larvae, because they are well protected inside the plant tissue.



Fluctuation in neonate larval numbers

A number of insecticides, including widely used broad-spectrum insecticides, have shown good efficacy against this pest. It appears that application timing is more critical than what is being sprayed. However, as there are naturally occurring predatory and parasitic insects in most plantations, it is preferable to avoid using broad-spectrum insecticides, which will also kill these beneficial insects. Of the insecticides tested, *Bacillus thuringiensis* (commonly known as Bt) and spinosad are currently registered for ornamentals and can be used to control Waratah bud and stem borer. These two are less harmful to beneficial insects than broad-spectrum products.

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