



Scarab beetle infestation causing slow tree decline

Industry help is required to understand the extent of this problem

Introduction

Scarab beetles are present in all macadamia growing regions of Australia. Reports of scarab beetles in the 2013–14 macadamia season and again in 2017 and now 2020 suggest that they appear to be a dry weather pest or at least a pest that is seen most when dry conditions prevail.

There are several scarabs that could infest macadamia but the two most likely candidates are the Argentinian scarab (*Cyclocephala signaticollis*) and the African black beetle (*Heteronychus arator*). Both will do similar damage.

Identification

Scarab beetle larvae are usually cream, white or light brown (Figure 1). Most scarab beetles are approximately 8–20 mm long. Digging just below the soil surface near roots will reveal curled up larvae in a characteristic C-shape when disturbed or at rest (Figure 2). Growers will notice the three pairs of well-developed legs and usually a hard, brown, dark red or black head. They will survive as larvae in the soil under the trees for up to 1 year, including 10–11 months as larvae in the ground.

Risk period

Risk periods for scarab beetles include summer and early autumn, especially those with dry springs and summers as this is when populations build up.

Damage

Scarab beetles are seasonally specific pests, similar to bark beetle and *Leptocoris* spp., preferring dry seasons. Most damage is caused by the larvae feeding on the underground roots of plants. Scarab beetles consume the roots of turf and grasses such as sweet smother grass, which is the macadamia industry's preferred ground cover because of its persistence in semi-shade environments. Symptoms of infestation will appear as moisture stress of the grass, which will

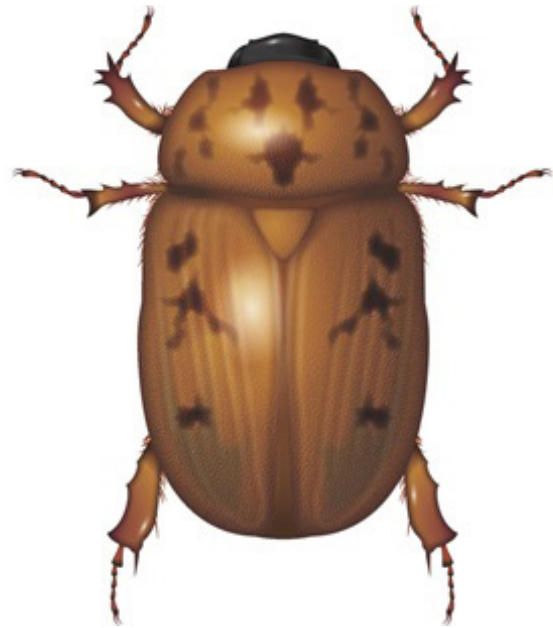


Figure 1. Argentinian scarab adult.



Figure 2. Argentinian scarab larvae.

be hidden by the fact that these beetles are active in dry periods when the grass will usually display these signs. In extreme cases the grass will die from heavy infestations.

The flights are the most obvious sign of activity as scarab beetles tend to swarm. They will be noticed especially at night when they are attracted to lights. Christmas beetles belong to the scarab beetle family and are an example of this.

Management

We know from experience that this root-feeding pest prefers sweet smother grass. In dry times it now also appears that the beetles will predate on compost and roots under heavily applied organic matter. It should be noted that as this is usually a dry season pest, the benefits of compost far outweigh the effects the scarab beetles may have on productivity.

Biological

The entomopathogenic nematode *Heterorhabditis zealandica* can be applied to scarab beetle larvae and is commercially available through retail outlets such as Ecogrow EN. These nematodes require warm (> 15 °C) moist soil to be effective. It is recommended to apply this to populations of small larvae.

Pathogenic fungi such as *Metarhizium* sp., *Beauveria* sp. and *Verticillium* sp. are also commercially available e.g. Nutri-Life Myco-Force™ and require warm moist soil conditions.

Damaged areas will require replanting of grass to prevent future soil erosion. In heavily affected areas it is best to sow a fast germinating and growing grass such as millet or ryegrass. This will give immediate cover and longer-term, a permanent cover-crop can be established.

Cultural

Watering and cultivation will suppress scarab numbers. Targeting beetles in flight to interrupt mating and further infestations is also recommended. **This can be done with light traps etc.**

Chemical

At the time of writing there are no registered chemicals for the Australian macadamia industry to control scarab beetle larvae.

Growers' help required

The macadamia industry is calling for growers'

assistance with scarab beetle. We need to know the extent of the damage throughout all growing regions. We are asking growers to check their orchard for the presence of scarab beetle and report your findings.

We are also asking for growers to look out for the grubs with *Metarhizium* infection as well; these will appear 'fluffy'. We can use them to identify the pathotype and possibly use it for future biocontrol.

What to do:

1. go to likely host trees, yellow sickly-looking phytophthora-looking trees
2. dig around the base of the trunk to about 10 cm
3. sift the dug up soil through a sieve (Figure 3)
4. record presence or absence of scarab larvae
5. report results back to NSW DPI to:

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Figure 3. Dr Ruth Huwer sieving the soil for scarab beetles.

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