Department of Primary Industries
and Regional Development

Primefact

Pasture mealybug and its role in pasture dieback

August 2024, Primefact PUB24/790, First edition
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Mealybugs are sap sucking insects that feed on plants. They are typically covered in a waxy coat of filaments which gives them a white, 'mealy' appearance. A number of these insects are recognised pests of grasses in Australia. Other mealybug species are also pests of crops including fruits, vegetables, sugar cane, cereal crops and cotton.

Pasture mealybug, *Heliococcus summervillei*, is the mealybug species causing pasture dieback (Figure 1), a condition that has damaged and killed summer-growing grass pastures across large areas of Queensland and northern NSW. In NSW, pasture dieback has been damaging pastures on the North Coast since early 2020 and in the North West since autumn 2024. Grass species susceptible to pasture dieback are widespread across all regions in northern NSW.

Figure 1 Pasture mealybugs on grass leaf blade. Photo: S. Baker

The history of pasture mealybug

Pasture mealybug was first identified on paspalum in the Cooroy district, Queensland in 1928 then again in Atherton in 1938. Internationally, it has been reported to damage rice crops in India, sugarcane in Pakistan, and pastures in New Caledonia.

Pasture mealybug re-emerged as a pest damaging grass pastures in Queensland in 2015 and has since spread from Far North Queensland into NSW. DNA testing has shown that the widespread dieback we have experienced since 2015 is due to a new variant of pasture mealybug. All summer growing grasses commonly sown in NSW are susceptible to this mealybug. These include paspalum, setaria, kikuyu, digit grass, Bambatsi and other panics and Rhodes grass. For a list of susceptible grasses, visit the NSW DPIRD pasture dieback webpage. The relative susceptibility of the grasses to pasture dieback, are provided in the MLA tolerant species factsheet.

Identification

Pasture mealybugs can be hard to find due to their small size (Figure 2). Often the first indication of their presence will be patches of susceptible grasses dying or if noticed early, foliage with red, yellow and/or purple discolouration. This discolouration is the plant response to juvenile mealybugs feeding.

Their lifecycle starts as juveniles which develop through several stages, maturing to adults in about 30 days. Adult females are easiest to find and can be seen with the naked eye. They are white or pink, up to 5 mm long and can move short distances by crawling. Adult male mealybugs are small (less than 1 mm), winged and present during the warmer months, sometimes most evident as swarms in early summer. Juveniles are very small, from 0.2 mm long and are difficult to see without a hand lens (Figure 2). Neither adult female nor nymph mealybugs can fly but they are readily dispersed by wind which is the main dispersal mechanism. They can also be dispersed by other means, such as water via runoff from infested paddocks and along drainage lines. Pasture mealybugs are active during the warmer months of the year from spring, through summer to autumn, especially following rainfall (Figure 3). They commonly complete around three generations over this period with population numbers peaking in late summer-autumn. During these times pasture mealybugs may be found on leaves, also the soil surface and among the plant roots. In some high rainfall, warmer environments, such as the North Coast of NSW, mealybugs can be found year-round with careful inspection.

During cool and/or dry periods when grasses are not actively growing or their leaves have dried off, pasture mealybugs retreat below ground, or under objects such as logs and cow pats and in dense grass thatch. They can survive on grass roots and deep in the soil profile and have been found to a depth of almost one metre. They reinfest plant leaves when conditions become more favourable and susceptible grasses are actively growing.

Figure 2 Nymph and adult pasture mealybugs on leaf blades of a setaria (left) and creeping bluegrass (right). Photos: N. Jennings, NC LLS and M. Miles, QDAF.

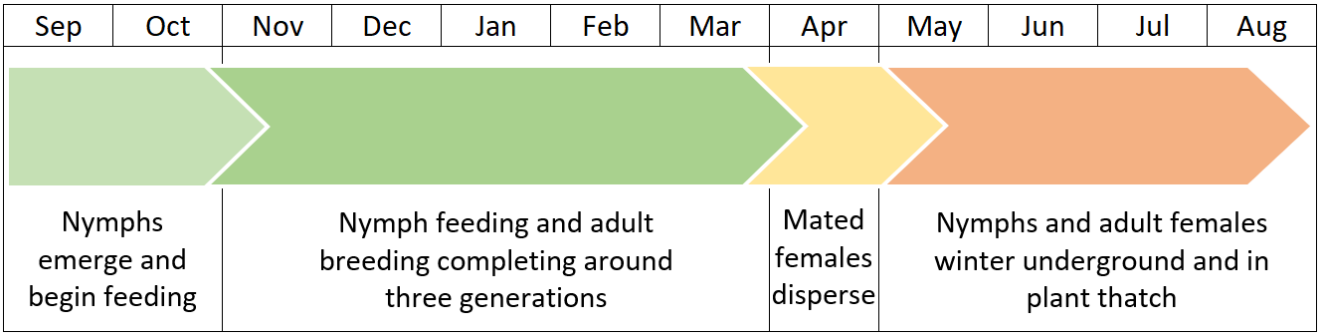


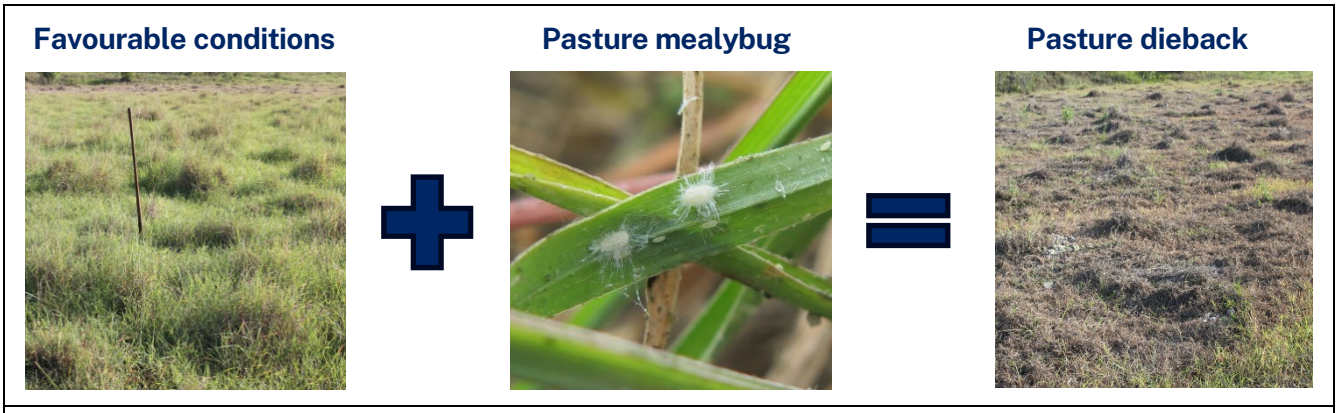
Figure 3 Seasonal activity of pasture mealybug (modified from Hauxwell, 2022).

Pasture mealybug and pasture dieback

Pasture dieback is a complex condition. While pasture mealybug causes dieback, environmental conditions and pasture management practices influence the prevalence and severity of the condition.

Hot, wet and humid conditions favourable for high pasture growth are also favour rapid mealybug population increase. At these times, a susceptible pasture that has high biomass and is stressed from factors such as nutrient deficiency, other pathogens and insects or drought, may succumb to pasture dieback faster, and with greater severity (Figure 4).

There are currently no strategies that can reliably prevent pasture dieback. However, monitoring your pastures regularly and managing your pasture biomass so that it does not have continuous high biomass can reduce the prevalence and severity.



Increased prevalence and severity

- Hot/humid weather
- Highly susceptible grasses
- High biomass
- Active grass growth
- Nutrient stress
- Secondary plant diseases

Decreased prevalence and severity

- Cool/dry weather
- Less susceptible (more tolerant) grasses
- Legumes and/or herbs present
- Low biomass
- Slow/dormant grass growth
- Presence of beneficial insects

Figure 4 Pasture dieback occurs when environmental and pasture conditions are favourable and mealybugs are present (modified from DAF Queensland, 2024).

Controlling pasture mealybug

A range of strategies have been developed to manage pasture dieback in Queensland. Recommendations have also been developed for the NSW North Coast. These include managing for recovery, improving the pasture, sowing a break crop and controlling pasture mealybug. The methods to control pasture mealybug include burning and spraying with pesticide, but both have limitations and provide inconsistent results.

Burning

Burning dieback affected pastures has produced inconsistent results and any positive effect is generally limited and temporary. Burning can destroy mealybugs on the leaves and litter, however many will survive in the soil to reinfest the pasture again. Additionally, the dead pasture will burn more readily and hotter than the green pasture where the mealybugs shelter, reducing the level of control. The timing of the burn relative to the level of dieback and tolerance of the species present will have a large influence on the success of burning.

Insecticides

Insecticides are not recommended to control pasture mealybug in commercial operations as they generally provide only short-term control and may have long grazing withholding periods. As mealybugs tend to live among the foliage, crown, roots and soil, it is difficult to effectively apply a contact insecticide, and control the entire population. The length of control may also be limited as mealybugs are readily dispersed by wind and reinfestation is likely. Insecticides are not selective and will kill beneficial insect populations as well.

There are no insecticides registered for control of pasture mealybug at the time of writing. Some pesticides previously permitted under minor use permits by the Australian Pesticides and Veterinary Medicines Authority (APVMA) have expired. Check the APVMA database for current permits. However, in **NSW**, under Section 57 of the NSW Pesticides Regulation 2017, a chemical registered in a pasture may legally be applied to manage a pest that is not listed on label (e.g. pasture mealybug), although the use pattern must not exceed the maximum label rate specified for that pasture. Note; the legislation for the use of pesticides is different in each state. Seek advice on the legislation relevant for your state or territory.

Insecticides registered to control sap sucking insects in pastures in NSW, including different species of mealybug may be useful, but their effectiveness for controlling pasture mealybug is not known. Care must be taken to ensure appropriate use of insecticides to reduce selection for resistance and grazing withhold periods are adhered to. Before using an insecticide, users should seek guidance from their local agronomist or the chemical manufacturer.

Natural enemies

Beneficial insects that are natural predators or parasitoids of pasture mealybug can contribute to their control. The populations of beneficial insects naturally increase where large populations of mealybugs are present, although, pasture damage has often already occurred by the time population numbers are sufficient to provide effective control. A limitation of insecticides is that most are not selective and will typically affect beneficial insects as well. This reduces the capacity of populations of natural enemies to increase and be more effective.

The chalcid wasp (*Callipteroma sexguttata*), a natural enemy of many insect pests, can parasitise pasture mealybug (Figure 5). Lacewings are generalist predators that prey on pasture mealybug. Another generalist predator are ladybird beetles (Figure 5). Both the larva and adults of the native mealybug ladybird (*Cryptolaemus montrouzieri*), also known as mealybug destroyer, feed on scale insects such as mealybugs. They have been observed in large numbers in some pasture dieback affected areas (Figure 6). The white insect larva of the mealybug ladybird can be mistaken for pasture mealybug.

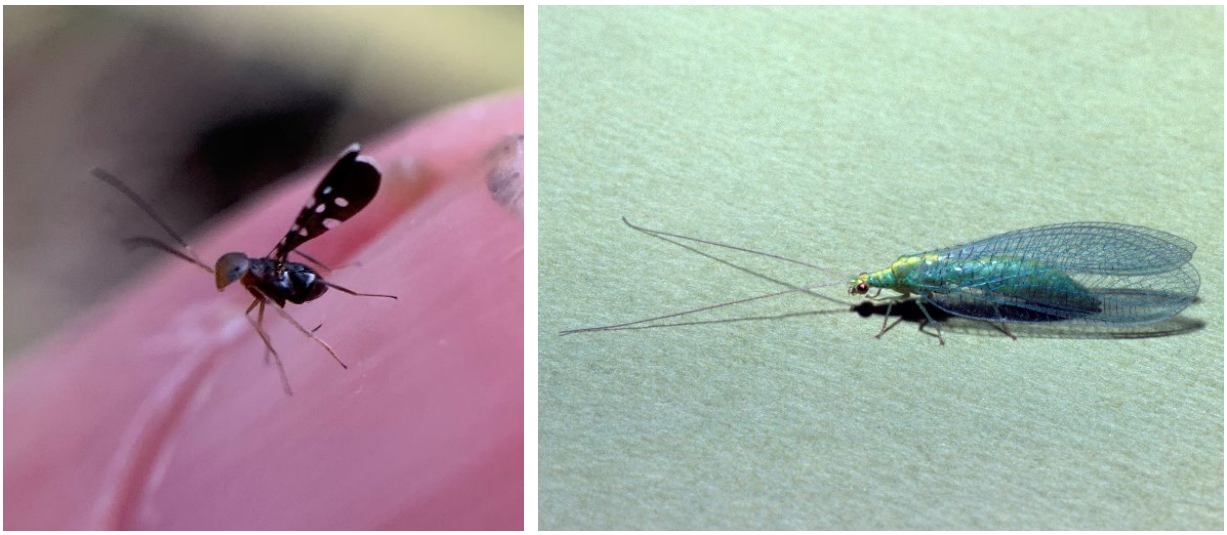


Figure 5 The chalcid wasp (*Callipteroma sexguttata*) (left) and green lacewing (*Chrysopa* spp) (right) are natural enemies of many insect pests including pasture mealybug. Photos: Miles, QDAF and NSW DPIRD.

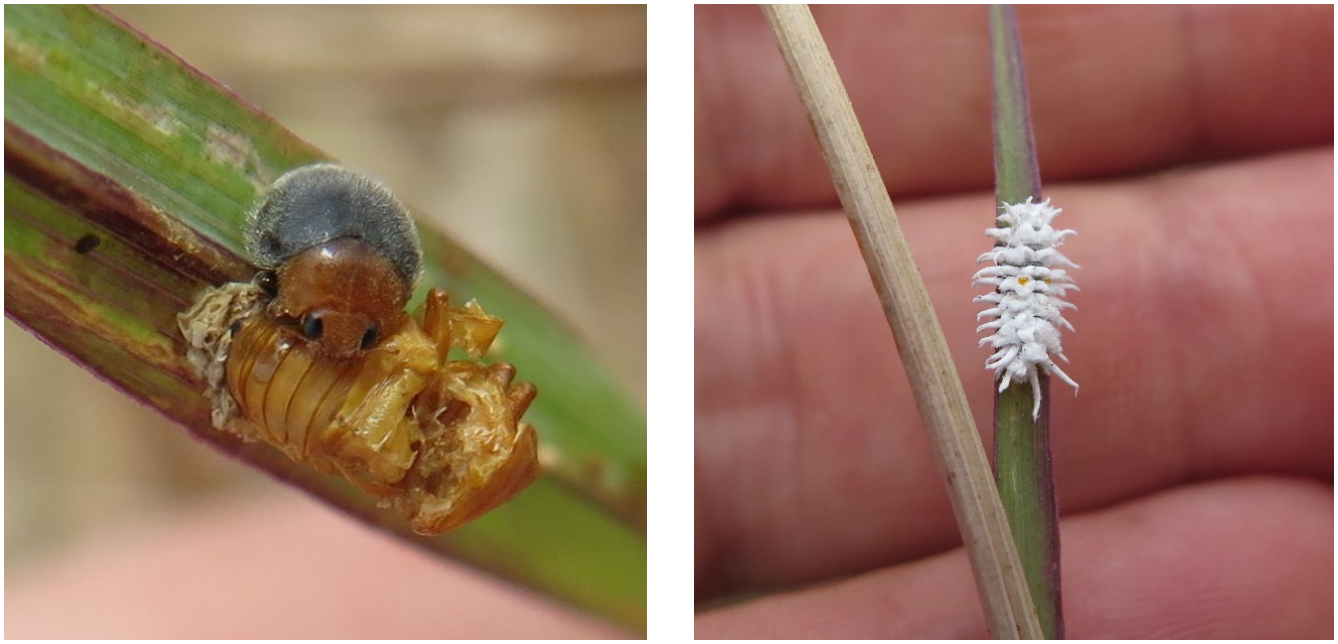


Figure 6 Mealybug ladybird destroyer (*Cryptolaemus montrouzieri*) adult (left) and larva (right). Larvae can be mistaken for a pasture mealybug. Photos: M. Miles, QDAF.

Further reading and references

Anon (2023). Pasture Dieback. Future Beef, Department of Agriculture and Fisheries Queensland.

Anon (2024) Choosing grass varieties tolerant to pasture dieback. Meat & Livestock Australia.

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Acknowledgements

We thank and Dr L Bird and M Evans for reviewing this document and Dr M Miles, Queensland Department of Agriculture and Fisheries, for use of some photographs.