

Controlling small pointed snails before they lay eggs

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Key messages

- Snails will actively feed in summer if there is sufficient moisture, but they will not start to lay eggs until autumn. The albumen gland generally starts to develop in size from March to April indicating that snails are becoming sexually mature and need to be controlled at this time.
- Control measures using baiting alone need to be carefully considered. Small pointed snails feed on baits all year round however, the mortality rate caused by these baits is variable.
- Before baiting entire paddocks, check that baits are effective by 'patch baiting' and then observing dead snails after 24 hours.

Aims

- Predict when small pointed snails will start to lay eggs based on the size of the albumen gland.
- Determine if small pointed snails consume metaldehyde baits differently throughout the year with associated responses in mortality.

Introduction

Before snails lay eggs, the albumen gland starts to increase in size. The role of the albumen gland is to secrete a nutritive secretion onto the fertilised egg. Until this gland is developed, snails are not sexually mature and will not lay eggs. If the timing of the gland development is known, then control measures such as baiting can be implemented before egg laying occurs. If control measures are put in place before eggs are laid then there will be a reduction in the overall snail population.

The most commonly applied control measure for snails is baiting. Some growers have indicated that they would like to bait after a rain event during summer. Anecdotal reports of the success of baiting after summer rain have been mixed. Some growers report getting good kills with at least one dead snail observed per bait on the ground, whereas other growers have reported no dead snails observed in the vicinity of baits. To address these varied reports, a trial was done to determine if there was a time of year when snails are more likely to feed on baits.

Method

Albumen gland size

Snails were collected monthly for about three years. Each month at least 20 snails were collected from a single paddock from each location. In 2017-18 paddocks were located at Woogenellup, Condingup and Munglinup; in 2019 paddocks were located at Mt Barker, Gibson, Scadden and Dalyup. Snails were placed into a jar filled with water and drowned and kept in the water for 24 hours. The water was then drained and the jars filled with 70% ethanol to preserve snails. Using a dissecting microscope, the albumen gland from each snail was removed and its length measured.

Feeding trial

Small pointed snails were collected monthly for 13 months from Woogenellup. At each collection all snails were placed onto damp paper towel and 7-21 actively moving snails placed into 500mL round tubs with mesh lids. Each tub had a 10cm diameter of dampened cotton

material placed in the bottom with eight pellets of known weight on top. Tubs had pellets with 50g/kg of metaldehyde or placebo pellets and there were six replicates of each. The cotton material was re-dampened daily with water. After three days, pellets were removed, placed into a 40°C oven for four days and then weighed. After pellets were removed, snails were placed into the centre of each cotton disc in the tubs. After 48 hours, snails that had moved were scored as alive and those that had not were scored as dead. The humidity and ambient temperatures remained constant in the lab. ANOVA in Genstat was used for analysis.

Results and discussion

Time of egg lay based on albumen gland size

Gland size in snails generally increased the most in March or April regardless of whether there was a cumulative summer rainfall event >50mm (Figures 1-3). Observations of gut content indicated snails fed on green plant material in summer, however, their albumen glands were not increasing in size and consequently they were not laying eggs during January to March. The albumen gland reached peak size from May at most sites, indicating that at this time most snails were laying eggs. Therefore, snail control needs to occur before May (ideally from March to April) to ensure eggs have not been laid.

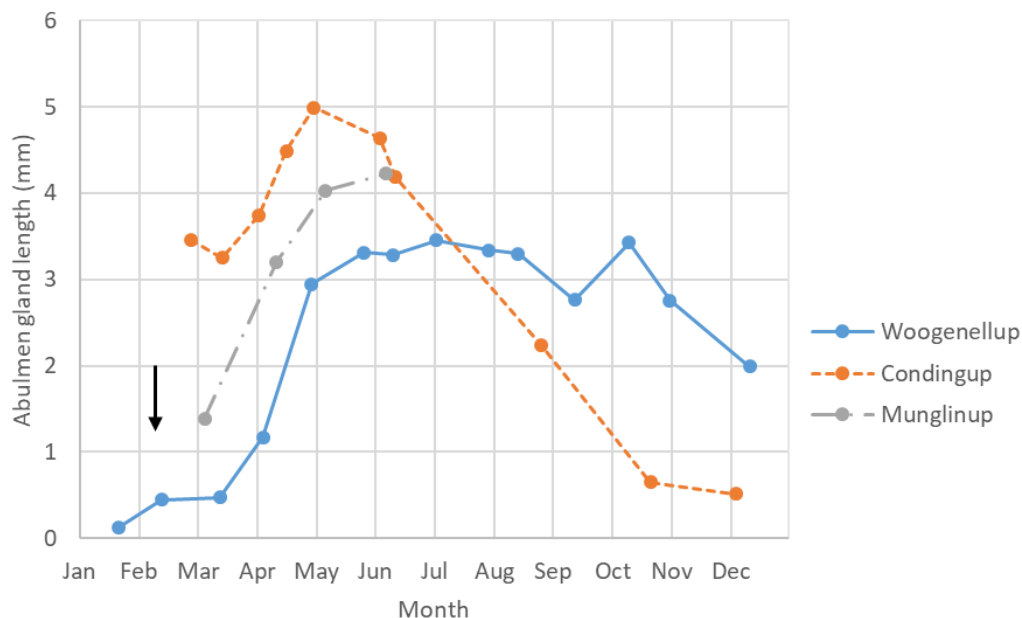


Figure 1. Albumen gland size of snails collected in 2017. Note: arrow indicates monthly total of summer rainfall (mm) >50mm for all sites not the timing of rain event

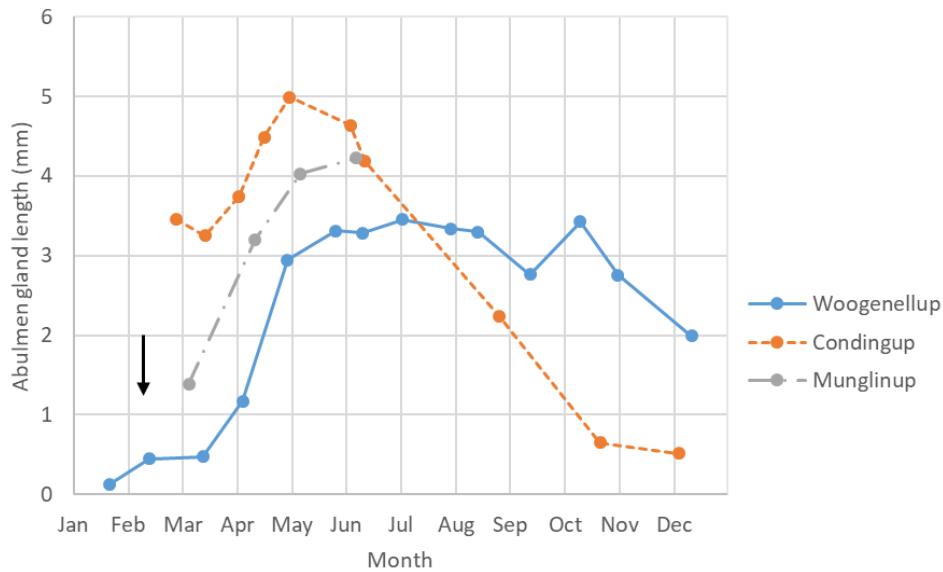


Figure 2. Albumen gland size of snails collected in 2018. Note: arrow indicates total summer monthly rainfall (mm) >50mm; for Munglinup and Condingup only. Woogenellup did not have monthly summer rainfall >50mm.

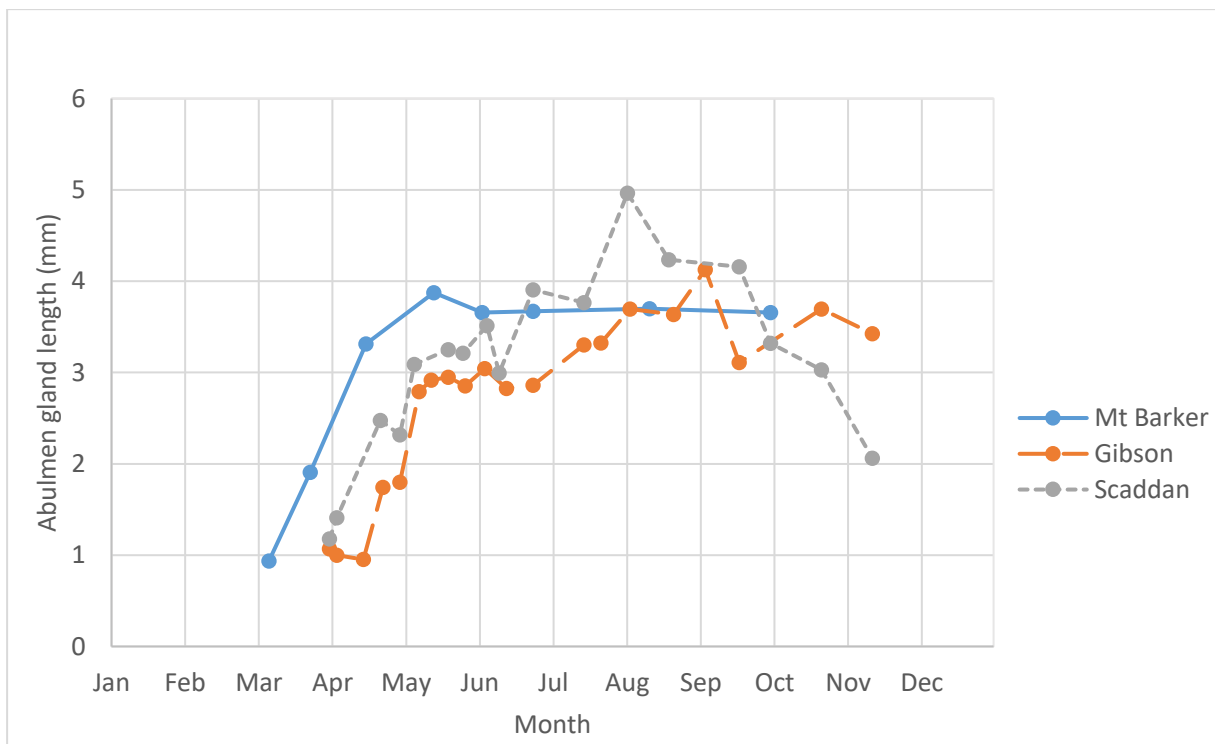


Figure 3. Albumen gland size of snails collected in 2019. Note: no site had monthly summer rainfall >50mm.

Generally, by October the albumen gland had decreased in size indicating that the gland was no longer functioning and that snails were not laying eggs (Figures 1-3). However, at this time of year snails were still observed to be feeding.

Time of feeding

Snails fed on bait pellets throughout the year. Mortality with placebo was low overall with fewer than 4% deaths except in June when mortality was 12%. Snails feeding on placebo baits between July to October 2018 and in February 2019 consumed almost all the baits, while in February and March 2018 about half were consumed.

While the amount of metaldehyde bait consumed by snails did not significantly differ from month to month (except for a lower amount consumed in March 2018), the mortality caused by the baiting differed from 20-90% between months. For instance, mortalities in February 2019 were more than four times those recorded for February 2018 (Figure 4). Similar results have been found in lab feeding trials by SARDI on the round snail, *Ceratomyxa virgata* (Brodie *et al.* 2020). Round snails collected monthly from two sites in South Australia and exposed to metaldehyde baits were killed more efficiently during periods coinciding with snail reproduction (approximately April to August). It is possible that metabolism is linked with the physiological condition of snails (e.g. reproductive status), but this requires investigation.

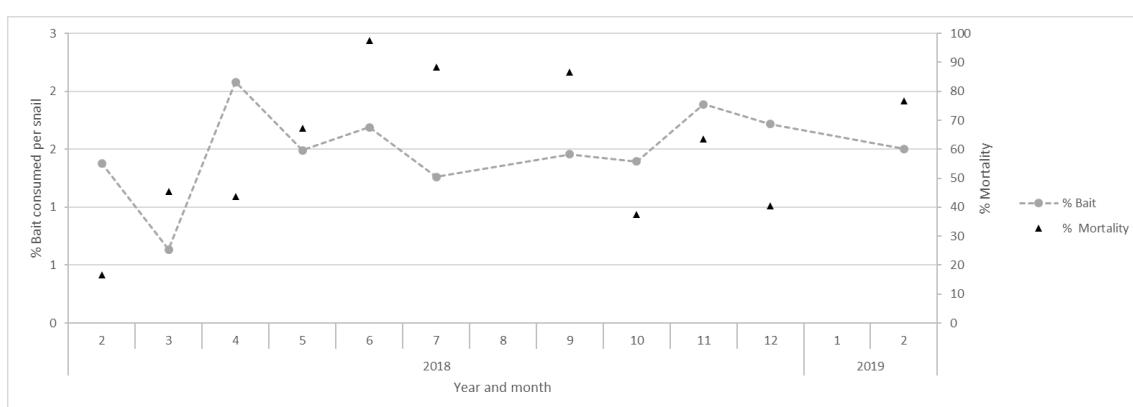


Figure 4. Percentage of baits consumed per snail and mortality. Least significant differences (LSDs) are 0.6% for baits consumed per snail and 16% for mortality.

Conclusion

Snails begin to actively lay eggs about May regardless of whether there has been a rainfall event in summer. To stop snails breeding, control measures such as baiting need to be done between March and April when the albumen gland in snails is beginning to develop.

In the absence of any other food source, snails will feed on baits at any time of year. However, the mortality arising from baiting varies. The increase in placebo bait consumption in April highlights the importance of ensuring that the timing of baiting occurs when snails are more likely to be actively feeding as this will increase the likelihood of snail mortality. Therefore, it is recommended that small test areas are baited, and the number of dead snails after 24 hours observed before baiting the whole paddock.

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