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SNAILS AND SLUGS IN THE BUSH

by Shirley Slack Smith

A native snail, Bothryembrion sp., under wattle thicket at City Beach.

Native Snails

ALTHOUGH we realise that there is still a great deal to learn about the native snails of WA, we do know that there has been, and in many areas still is, a great diversity of species. But it is undeniable that, in certain areas, some species are close to extinction and some may even be beyond recovery.

Because our native snails are so well adapted to the environments in which they live, many people do not even suspect that they exist. Only by being in the right spot at the right time is it possible to see them out and about. They have developed the ability to withstand our dry, hot climate by burrowing into the ground or hiding deep within crevices to protect themselves from drying out. Such snails become active only when their surroundings become damp enough to allow them to emerge, feed, mate and lay eggs.

Because snail species, like all others, differ from one another in their requirements, some will have a much shorter period of activity than others and might even have to wait for more than a year before they can come out of aestivation. Even then, they might have only a couple of weeks before they have to retreat again. So it is no wonder that their presence can go undetected, and that information on them is so hard to come by and so scrappy. There are so many aspects of their lives about which we know nothing. How do the snails of the Kimberley plains, for instance, protect themselves from the floods which so often accompany the only heavy rainfalls of the year?

It is fortunate for us (and hopefully for the snails) that they leave behind their hard calcareous shells when they die. Even when we can't find any living snails, these shells may enable us to detect their previous presence and to gain some information on the habitat preferences of particular species. But the presence of dead shells does not necessarily mean that the snail species is still living in that place. Dead shells persist for long periods on calcareous soil, particularly if they are not burned. Conversely, a flourishing population in a moist area may go unsuspected because the acidic conditions cause the dead shells to disintegrate.

We find that some species are widespread, though their distribution might be spotty. Other species seem to be of much more restricted distribution and may even be confined, for instance, to single hills. In the absence of any more detailed information we can only guess, at present, that some widespread snail species are tolerant of a wide range of environmental conditions and/or that they have great powers of dispersal. It does also appear that some species, at least, are restricted to certain vegetation assemblages. As these assemblages are often reflections of the chemistry of the soils in which they grow, it is perhaps not unreasonable to wonder whether the snail species differ in their requirements for the minerals which they obtain from their food and so, ultimately, from the soil.

From the little that is known about the lifestyles of any of our native snail species, we can make a few tentative generalisations. Most do not seem to eat living plants but depend on damp leaf litter, or perhaps the fine threadlike mycelia of the fungi which decompose it, for their food supply. Because they are hermaphrodites, most snail species exchange sperm during mating. Then later, when the snails have built up their food reserves, they excavate some sort of depression into which a batch of eggs is laid. The laying of egg batches may proceed as long as the weather conditions remain favourable, or it may be very brief, and the snail may return to its state of aestivation even when it seems to us that conditions are still damp enough to be suitable. Perhaps this behaviour pattern prevents the wastage of eggs which would hatch, emerge and be vulnerable to desiccation after the weather has changed. Perhaps the snails are better than we are at detecting slight changes in the environment.

Alterations to the Environment

There are many ways in which the environment of an area can be changed by our activities, and this change is then reflected by changes in the animals and plants native to that area. The changes might be caused by the application of fertilisers which change the soil chemistry and so favour the survival of a flora different from that native to the area. They might also be due to a burning regime which may produce the same effect when severe. But even a moderate burn also causes long-term changes in the composition of the litter. Litter dependent animals such as snails are particularly vulnerable to the direct or the indirect effects of burning, and are even more so if the burning occurs during their period of activity.

Introduced Plants

The introduction, deliberate or not, of plants foreign to an area causes drastic or subtle changes to the environment of both plants and animals. Relatively sedentary animals such as snails are affected by changes in the composition of plants and their litter, either directly

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or through changes in the composition of the fungi growing in the decomposing litter. These changes can be rapid and severe when native bush is converted to pasture or cereal or other crops. The disappearance of most native snails from household gardens is probably due to the planting of foreign plants which cannot serve as food for native snails. The spread of such plants into national parks and reserves and into any areas of natural bush causes similar problems, as they compete with native plant species for space and so lessen the food supply of the native snails.

Introduced Vertebrates

Grazing mammals cause change through their selective consumption of plants, by affecting the pattern of litter accumulation and by the compaction of the soil so that the germination of native plants is inhibited.

Rodents are often active predators on native snails and their activities may be particularly significant in rocky areas where fire and flood do not cause high mortalities. Few birds native to WA seem to be important snail predators, but species such as the blackbird, introduced into south eastern Australia, seem to have had an important effect there.

Introduced Snails and Slugs

Many species of snails and slugs have been brought to WA from other areas, and a number of these have survived and flourished. Most of the successful introductions came originally from the Mediterranean countries (eg *Theba pisana*, the rounded Mediterranean white snail, and the tall conical species *Cochlicella acuta* and *Cochlicella barbara*). Others came from more northern European areas (eg the amber snail *Cochlicopa lubrica*) or are widespread throughout Europe (eg the brown garden snail *Helix aspersa).*

It is no wonder that *Helix aspersa*, which is largely confined to areas close to household gardens, is so successful. We cultivate plants introduced from Europe which are

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Mediterranean white snail aestivating at Dongara.

highly acceptable to European snails as food. *Theba pisana* has spread widely along the coastal areas from Shark Bay to Esperance (even in bushland), but has not penetrated very far inland. It is very resistant to desiccation but seems to prefer areas with calcareous soils, perhaps because it needs a high level of calcium in its diet. Similarly *Cochlicella acuta* is found only in calcium rich soils along the coast but the closely related *Cochlicella barbara* is more tolerant of soils further inland containing less calcium. Except in the cooler moister areas in the south-west of the state, *Cochlicopa lubrica* seems to be confined to shade houses or similarly sheltered habitats, as it seems to need a more humid environment.

However, it is the introduced slugs which have been so successful in their new land. All the slugs which are found in WA have been introduced from Europe except for some species now found in the north of the State which originated in more tropical areas.

Not only do they flourish in household and market gardens, but they are abundant in cereal crops, pastures and even in virtually unaltered bushland. These slugs seem to have been spread by man more efficiently, though unwittingly, than were snails. This might have been due to their ability to burrow into sand and to secrete themselves in small crevices such as those in the bases of flowerpots. Some species, such as the tropical vaginulid slugs now found in the Pilbara and Kimberley regions, seem to be aided by their remarkable ability to recover from severe dehydration, a useful attribute for a migrant species.

Introduced snails and slugs may affect native species by competing for food or some other environmental resource. Most of the introduced snails are herbivorous and some may eat living plants, preferring the tender, sweet growing tips. However these species mainly seem to eat the damaged leaves of some native as well as introduced living plants. Like the native snails, most introduced species generally seem to depend on leaf litter (or on the fungi that grow in it) for their main food source. In addition, some of the snails and many of the slug species have been found to be omnivorous or even entirely carnivorous, and are reported to eat snail eggs and juveniles as well as other small invertebrates. The level of their impact on native snail species has not yet been investigated.

As with native species the introduced snails and slugs have limits to the degree to which they can tolerate their adopted environment. These limitations, together with the historical contexts of their introductions, have determined which species have survived and spread. As with all such transplanted species, some have flourished to a degree undreamed of in their native land. Western Australia seems to have very few native animals which eat snails and slugs. This is probably one of the reasons why the Mediterranean white snail, *Theba pisana*, can reach such large numbers in the wheatfields around Eneabba that it gums up the harvesting machines and renders the wheat unsaleable.

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