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## Portuguese millipedes (*Ommatoiulus moreletii*)

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Portuguese millipedes (*Ommatoiulus moreletii*) belong to a group of animals called Myriapoda (meaning many-legged), which also includes several native Australian millipedes and centipedes. Millipedes normally live outdoors where they feed on leaf litter, damp and decaying wood, fungus and vegetable matter like tender roots, mosses or green leaves on the ground. Their slow-crawling, rounded bodies have two pairs of legs on each body segment and rows of glands that secrete a pungent yellowish secretion when the millipede is agitated. This secretion is composed of organic chemicals called quinones, which make the millipedes distasteful to predators such as birds. There are well over 1,000 species of millipedes worldwide, and for many of these only a few experts can tell them apart.

### Distribution

The Portuguese millipede naturally occurs in southwest Europe. They were first recorded in Western Australia around Roleystone in 1986 and (since the late nineties) have been found in other areas in the southwest of Western Australia. They are also found in South Australia, ACT, Tasmania and Victoria.

### Description

The smooth, cylindrical body of the Portuguese millipede distinguishes it from the native species around Perth, which have a bumpy look. Native millipedes are usually

found in low numbers and are widespread. Portuguese millipedes congregate in large numbers and are quite mobile, especially after the first rains in autumn.

Portuguese millipedes will curl up into a tight spiral when disturbed, or try to escape with thrashing, snake-like movements. They are 20 - 45 mm long with 50 body segments when fully developed. The adults range in colour from slate-grey to black. The juveniles are light grey/brown, often with a darker stripe along each side.

### Life cycle

Portuguese millipedes reproduce in autumn and early winter. They would probably begin mating in March or April and lay most of their eggs in April and May. This would explain why they appear so mobile and so abundant after the first rains.

Mature females lay about 200 pinhead sized, yellowish white eggs in a small hole they have made in the soil. An immobile, legless stage hatches from each egg and develops into the first active stage of the life cycle after about one week. This first stage has only three pairs of legs, but each time the animal moults until it is mature, more legs and body segments are added.

Millipedes grow or develop through a series of moults. During moulting millipedes are very fragile because the new cuticle is soft and easily damaged when first formed. The millipede usually eats the old cuticle.

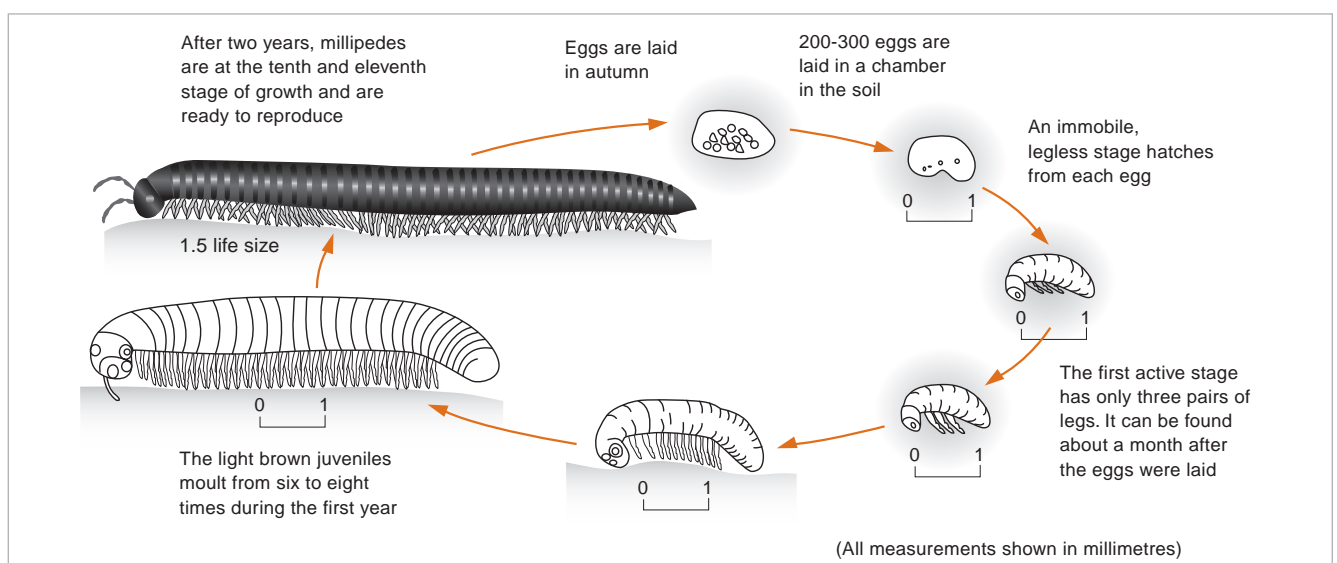


Figure 1. The life cycle of Portuguese millipedes

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Figure 2. Adult millipedes to scale using a standard match.

After the first year of life, juveniles have reached the seventh, eighth or ninth stage of development and will be about 1.5 cm long. After this stage they will moult only in spring and summer. Portuguese millipedes usually mature after two years when they are in the tenth or eleventh stage of growth and some can live for more than two years.

## Millipedes as pests

Although millipedes play a useful role in breaking down organic matter in the soil, Portuguese millipedes are pests when they reach high population levels.

Portuguese millipedes are not harmful to animals or humans, but they can be a significant domestic nuisance when they invade homes and gardens in their thousands each autumn and spring. They are one of the few millipede species that are attracted to lights at night, and this is presumably why they invade homes. They do not breed inside houses, and once inside a house will probably die. Millipedes can occasionally damage horticultural crops such as melons, strawberries, tomatoes and potatoes, yet in small numbers they do no harm. No damage to broadacre crops has been reported.

## Millipede control

### Management

Portuguese millipedes are attracted to lights. Turn off external lights which are close to buildings and minimise the escape of light from buildings through use of curtains, blinds and weather-strips on doors. Effective door seals will prevent the entry of these unwanted pests.

### Clean up the area

Millipedes in the house and garden will probably have resulted from eggs laid within 100 metres from the house, and while compost is good for gardens, it also allows higher populations of millipedes to develop.

Reducing the area covered by organic matter such as compost, leaf litter and mulch, will help reduce millipede populations by diminishing food and areas of shelter.

### Biological control

Some spiders, beetles and scorpions will eat millipedes, but these predators do not significantly reduce millipede numbers. They are also parasitised by a nematode and a European fly. Work was under way to establish this fly in South Australia, but the flies were released and never seen again. In 1988 the parasitic nematode, *Rhabditis necromena*, was released by the Department of Agriculture South Australia in more than 2000 locations in that State. The pest status of the Portuguese millipede has decreased in many areas in South Australia since that time. *Rhabditis* has been found in millipede populations from the Perth area, and this seems to have provided relief in some areas but we can't bank on this for total control. These nematodes attack only millipedes and are active during late autumn and winter. Nematodes may take several years after introduction to reduce millipede numbers, especially in areas adjoining bushland which can support enormous populations of the pest.

### Physical barriers

- Smooth barriers can stop millipedes from entering houses because they cannot cross smooth, vertical or rounded surfaces (Figure 4). These can be fixed to walls, below doorsteps, window ledges and vent bricks - keep them clean and free of bridging vegetation. These barriers must be continuous with no breaks (unless placed under doorways), to allow millipedes to bypass.
- Plate glass, 7.5 cm wide and 4.5 mm thick, can be set around the base of the house. This prevents millipedes from entering because they cannot gain a foothold on the smooth surface.



Figure 3. Uncoiled millipede in motion.

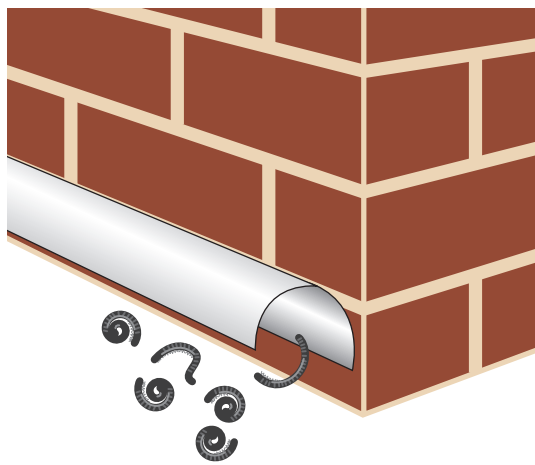


Figure 4. A galvanised half round barrier.

- A variation of the barrier for vertical surfaces is to include two adhesive aluminium tapes along the barrier, charged with a small electric current drawn from something like a 9 V battery. Connect the positive pole of the battery to one tape and the negative pole to the other. Space the tapes 10 mm apart at all points to avoid short circuits. Millipedes are stunned or killed when they touch both tapes.

**WARNING:** Do not connect these tapes to a mains electricity supply.

- A moat and trap system can also be installed around dwellings. 100 mm C-Purlin with return lip, buried flush with the surface of the ground may be used for this. Millipedes fall into the moat (wet or dry), and cannot escape the overhanging sides. The ends of the channel may also be modified to include a trap, but this is not necessary as the millipedes will die in the moat if it is clean and free of debris for them to feed on or dwell in.
- A less permanent barrier is formed using a wide smooth vinyl, polypropylene or polythene tape (48 mm at least). Teflon-coated tape can also be purchased. Fix the tape to the wall with contact adhesive.

- Light-traps have offered good control. One can be constructed using stormwater pipe or even a box with holes at ground level, using low voltage garden lights or a weather-proof fluorescent light to attract the millipedes at night. This should be placed along the outside wall near where the millipedes are entering and the floor of the trap treated with an insecticide such as carbaryl. Alternatively, a light trap can be set up away from the house. The trap-box should be buried flush with the surface of the ground and it must have smooth sides so the millipedes will fall in and not escape. A weather-proof light assembled above this will lure the millipedes to the trap at night.

## Chemical control

Chemical barriers at least one metre wide present millipedes with a treated surface wide enough to kill them before they enter a house. These pesticides have a limited active life and must be re-applied for ongoing control - especially during periods of rain. Chemicals can be applied to outside walls, paths and garden beds or other areas where millipedes are thought to breed. The following chemicals are currently registered for use against millipedes;

- Bendiocarb (Ficam®)
- Carbaryl (Carbaryl®) Agchem Carbaryl 800 WP Insecticide®, Agchem Carbaryl Insecticide Spray® or Agchem Carbaryl SC Liquid Insecticide®.
- Cyfluthrin (Baythroid®)
- Propoxur applied to doorsteps and window ledges, for example, Baygon Household Insecticide Surface Spray®.
- Pyrethroids have little residual effect and should be sprayed directly onto the millipedes. Many brands of domestic insect sprays contain Pyrethroids.

**Disclaimer:** Chemicals must be used in accordance with instructions on the label. Mention of trade names does not imply endorsement or preference of any company's product by the Department of Agriculture, and any omission of a trade name is unintentional. Recommendations were current at the time of preparation of this publication.

