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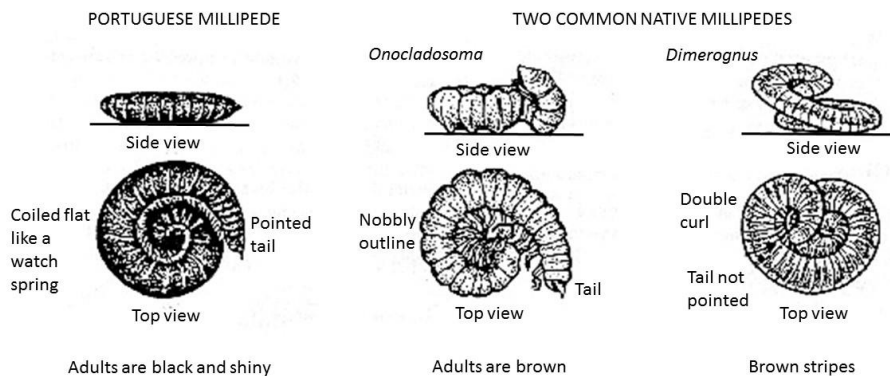
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Portuguese Millipedes

Portuguese millipedes (*Ommatoiulus moreleti* (Diplodia, Julida: Julidae) invade houses in a number of city and country areas in SA. These millipedes are now part of the environment. This fact sheet describes something of their life history, how the householder can minimise the impact of invasions, and how the Department of Primary Industries and Regions SA efforts at biological control may eventually reduce numbers below nuisance level.

DESCRIPTION

The Portuguese millipede belongs to a group of animals which have many body segments and two pairs of legs on most body segments. Millipedes are vegetarians, eating soft vegetation such as decaying leaf litter, mosses and pollen. Many species of millipedes occur in temperate and tropical parts of the world; Australia has numerous native species, some of which occur in SA.



BENEFITS

Millipedes are probably important in soil formation. They break down leaf litter and enrich the soil.

MILLIPEDES AS PESTS

Portuguese millipedes are pests because they invade houses. They are one of the few millipede species that are attracted to lights at night, and this behaviour explains why they invade houses. Once inside a house they usually die. They do not breed inside houses. Millipede invasions vary in intensity, depending on the environment surrounding a house. Where millipedes are dense, invasions of hundreds, or even thousands, may occur during several days.

MILLIPEDES AND HEALTH

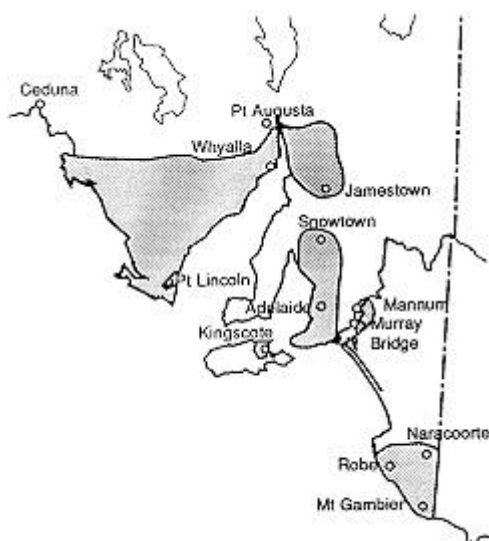
There is no evidence that Portuguese millipedes affect human health. Their bodies contain rows of glands that secrete a pungent yellowish secretion when the millipede is agitated. This secretion is composed of organic chemicals called quinones, which make the millipede distasteful to predators such as birds. Quinones quickly break down in water.

The shaded areas over the sites at which Portuguese millipede has been reported.

DISTRIBUTION

As their name suggests, Portuguese millipedes originated in Portugal and Spain, but have been accidentally introduced into several countries, including Australia. The species was first reported from Port Lincoln in 1953, and has since been recorded in WA, ACT, Victoria and Tasmania. In SA, millipedes have been reported as pests in a number of cities and towns, including Adelaide.

Millipedes have been recorded from most suburbs in Adelaide, but are especially numerous in the hills, foothills and in the southern suburbs, where conditions are favourable to reproduction and survival.



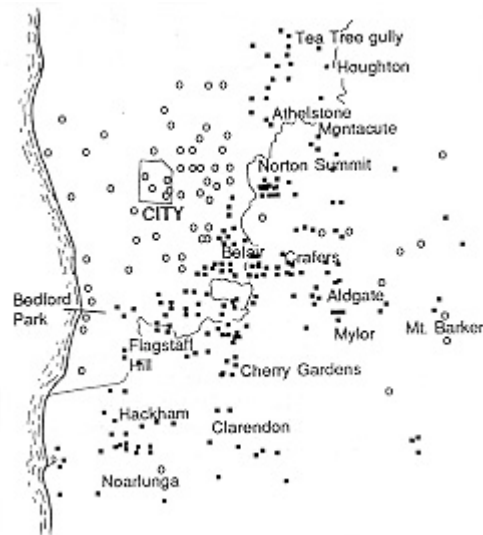
The shaded areas over the sites at which Portuguese millipede have been reported.

MOVEMENTS

Millipedes do not walk far; adults probably move a maximum of several hundred metres a year. Movement over longer distances is through soil or woodchips being transported from millipede infested areas.

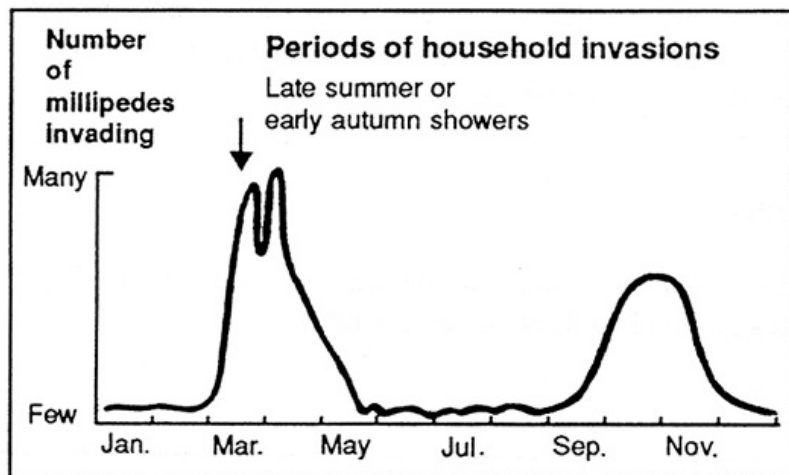
INVASIONS

Invasions of houses occur in spring and again in autumn; the autumn invasion is usually more intense and goes on longer. During autumn, adults move on the surface, and mate and disperse. The millipedes that invade a house have probably bred within a short distance (say 100m) from the house.



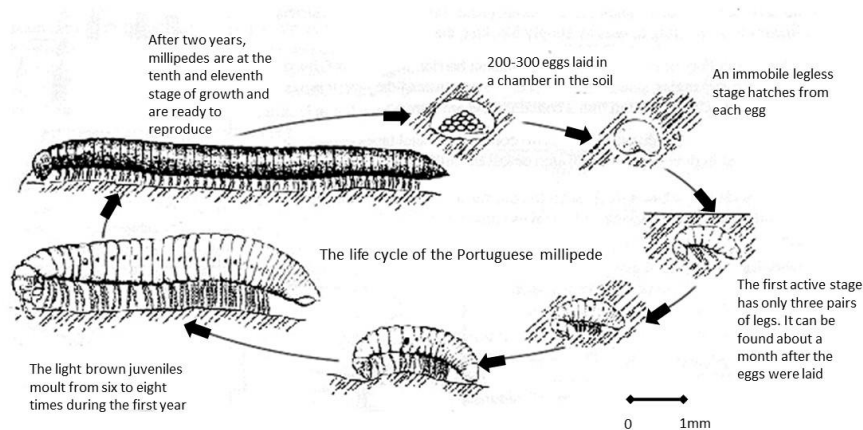
(Left) Records of areas of dense millipede concentrations (n), and isolated occurrences (i), in the Adelaide metropolitan areas.

(Below) Intense millipede invasions start after early autumn rain, and may continue for several months. A period of less intense invasions occurs in spring.



LIFE CYCLE

The adult millipedes that invade houses are about two years old. Before invading houses, they develop in the surrounding soil and litter. During the first year of life millipedes are small, and easily overlooked.



Life cycle of Portuguese millipede.

FAVOURABLE HABITATS

Millipedes occur in greatest numbers in areas of undisturbed leaf litter and organic mulch as occurs in many gardens in the Adelaide Hills, and also in areas where winter weeds (for example soursobs and salvation jane) form a more or less continuous ground cover. Millipedes generally are not numerous in lawns, cultivated areas or bare ground. Millipedes are attracted to visible lights from houses and are often found in well mulched garden beds near houses

CONTROL

The most practical strategy to prevent millipedes from invading houses is to form a barrier around the house or use a light-trap to intercept them before they enter the house. Large-scale suppression of millipedes away from houses is probably practicable only by biological control.

CHEMICAL BARRIERS

The aim of chemical application is to prevent millipedes with a treated surface wide enough to kill them before they enter a house. Carbaryl is a chemical registered for use against millipedes. Mix according to the directions on the label. Carbaryl belongs to the

carbamate group of insecticides, which are toxic to humans if inhaled or ingested. Prolonged skin exposure may also be dangerous. However, if carbaryl is applied according to instructions on the label, it is safe to humans and does not persist in the environment. Carbaryl applied to brick or cement surfaces remains active against millipedes for several weeks if the surface remains dry. Rainfall reduces its life, and it may be necessary to reapply carbaryl several times in a season. Form a barrier of carbaryl 1 m wide around the house, and 0.5 – 1 m up the wall.\

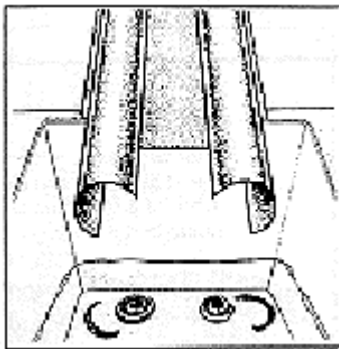
Remember to STOP! READ! HEED! The label.

When mixing powder – use a respirator, wear overalls and gloves.

PHYSICAL BARRIERS

Millipedes move by crawling and cannot cross smooth, clean vertical surfaces. Barriers can stop millipedes from entering houses by simply blocking their path.

A moat and trap system may be constructed as a permanent barrier. Millipedes fall into the moat, which has overhanging sides, and cannot climb out. Instead they must move to the ends of the channel, where they fall into a container and are trapped.



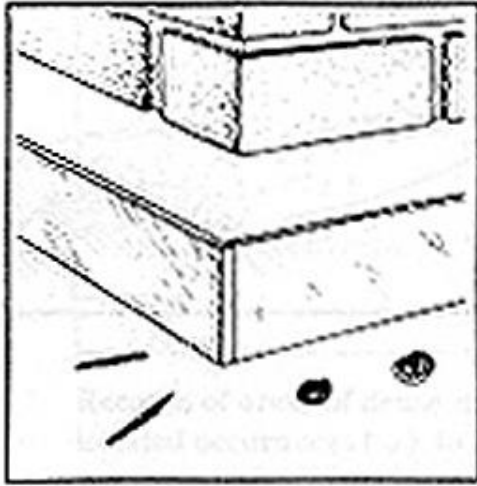
Moat and trap system set in the ground to completely surround the house.

An electric barrier for vertical surfaces includes two conductive metal tapes carrying a small electric current at high voltage that will stun or skill the millipedes.

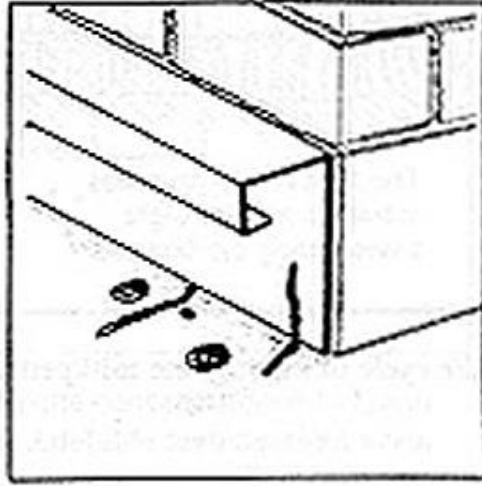
Plate glass, 7.5cm wide and 4.5mm thick, set into concrete around the base of the house prevents millipedes from entering because they cannot gain a foothold on the smooth surface.

A less permanent barrier is formed using a wide (48mm at least) smooth vinyl, polypropylene or polythene tape. Contact adhesive is needed to fix the tape to the wall.

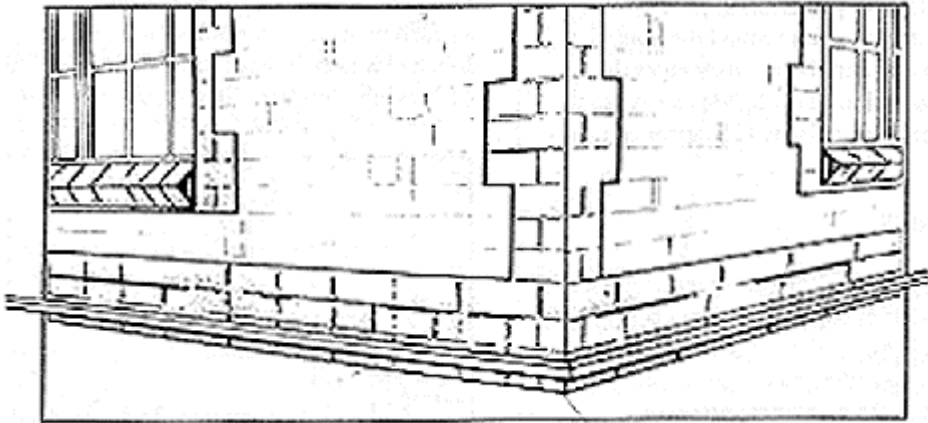
All barriers must be kept clean and free of bridging vegetation to remain effective.



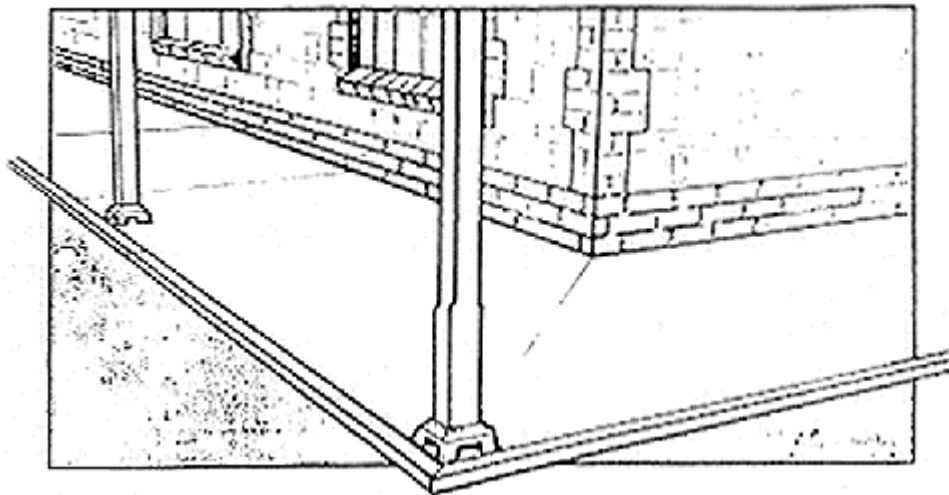
Glass set in concrete forms.



A galvanised barrier for a neat and effective vertical walls.



The "Millipede Barrier" is simply a barrier rail, fitted to the lower portion of house walls.



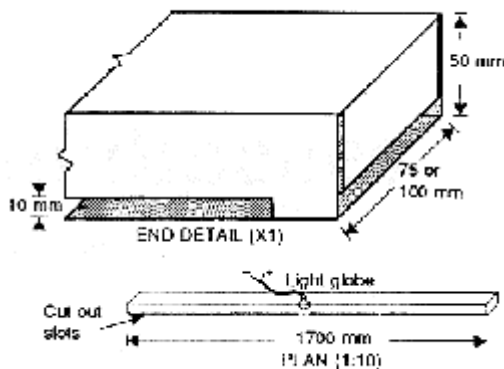
A millipede barrier can also be fitted around verandahs, carports, sheds, even garden beds!

LIGHT-TRAP

In some situations a light-trap may reduce by 90 per cent the number of millipedes entering a house. A light-trap can be made from galvanised iron downpipe and a 5-watt 12-volt globe powered by a battery or transformer. The trap is placed along a wall where millipedes enter the house. The floor of the trap can be treated with carbaryl and the dead millipedes emptied from the ends of the trap.

BIOLOGICAL CONTROL BY NEMATODES

Since the winter of 1988 large numbers of a parasitic nematode, *Rhabditis necromena*, have been released by the Primary Industries and Resources South Australia householders in more than 2,000 locations in SA in an attempt to suppress Portuguese millipedes over large areas. The nematode occurs naturally around Bridgewater. The Portuguese millipede ingests numerous nematodes, which then perforate the gut of the millipede. This nematode attacks only millipedes; it does not attack other animals or plants. The nematodes are active during late autumn and winter.



Plan for a simple light trap.

Once introduced into a millipede population, the nematodes appear to be effective in suppressing millipede populations for some years in many areas of South Australia. There may be seasons when conditions are unsuitable for nematodes and the millipede numbers temporarily increase. Nematodes take several years after introduction to reduce millipede numbers. Householders living next to large areas of bushland report that nematodes do not reduce the number of millipedes invading houses, probably because of the many millipedes living in the bushland litter nearby.

Control by Nematodes

