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Snails and Slugs

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INSECT *Pests*

AND THEIR CONTROL

by C. F. H. JENKINS, M.A. (*Government Entomologist*).

SNAILS AND SLUGS

BEFORE giving any details concerning these pests, it will be well to explain that slugs and snails are, of course, not insects. They have been included in this series of articles, however, because the damage they do resembles very much that done by various insects and because the lot of recommending control measures usually falls to an entomologist. The snail could more correctly be called a shellfish than an insect as it is a true mollusc, but one which has become adapted to a life on land instead of in the water.

DISTRIBUTION AND GENERAL DESCRIPTION

Two species of snails are common in this State, the Brown or English snail (*Helix aspersa* Müller), and the White or Italian snail (*Theba pisana* [Müller]). Slugs may be roughly described as snails without shells and as the habits and control measures described for snails will apply in the main essentials to slugs, they need receive no further mention.

The European snail reached this country many years ago, and is now practically world-wide in its distribution. The first record for Australia came from New South Wales in 1888, but the exact date of its arrival in Western Australia is not known. The White snail is a later arrival in this State and is believed to have been transported in ships' ballast from South Africa, where it is a well-known pest. Bunbury and Albany contend for the doubtful honour of being the first site where this snail was established locally. Its distribution at present is essentially coastal, and in

situations where it is firmly established it far outnumbers the larger brown snail. So alarming was the rate of increase of this snail in portions of California that an extermination campaign was undertaken in 1922 and the results were eminently successful.

The Brown snail is the larger of the two species, the full-grown shell being formed of from four to four and a half whorls or coils and measuring an inch or more in diameter. The shell of the White snail may attain a diameter of from a half to three-quarters of an inch.

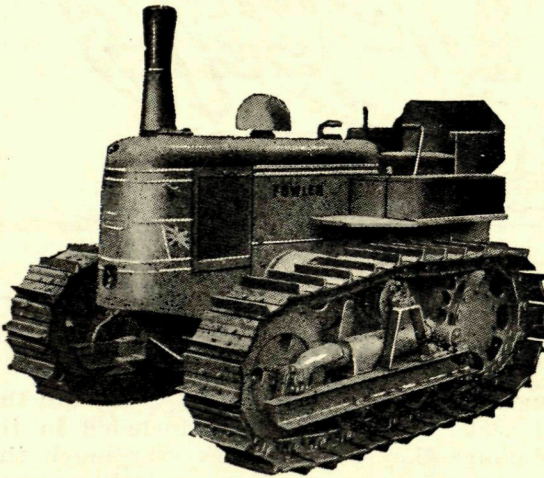
The food of the small snail consists both of living plants and dead or decayed vegetation, and they also show cannibalistic tendencies if any of their squashed brethren are available. The snail has no true jaws, but rasps its food by means of a tongue-like structure or radula covered with teeth like a file, the suitability of which for disposing of vegetable material few gardeners will question.

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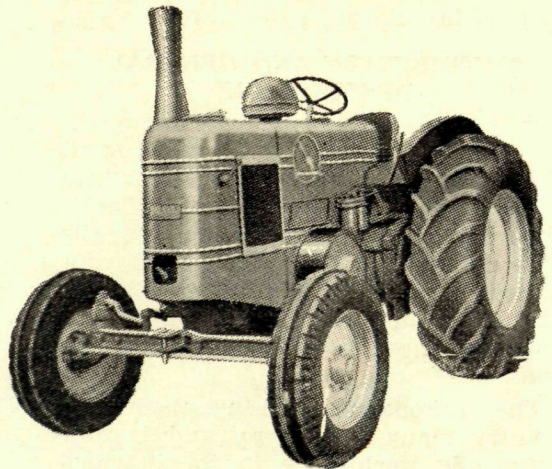
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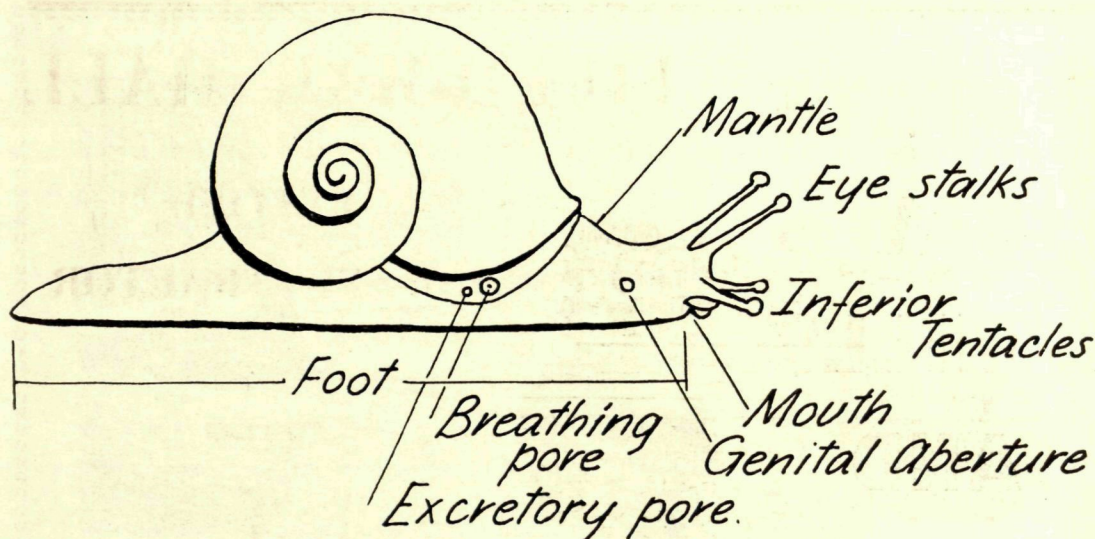


Fig. 1.—Diagram of a snail.

HABITS

The nocturnal habits of the Brown snails are well-known to all who have surveyed with dismay their surviving seedlings on "the morning after the night before." The White snail is not so retiring in its habits and may be found feeding in the day time.

The liking of snails for moisture and shelter is also general knowledge, and

should be remembered when attempting control measures. Masses of weeds and tangles of creepers against walls and fences often provide harbourage for snails.

During adverse weather conditions, either dry or cold, the snail becomes inactive and seals off the entrance of its shell with a kind of diaphragm. Under our summer conditions this prevents excessive loss of moisture and enables the creature to survive even when exposed in clusters on twigs and fences.

When this feature of the snails' habits is remembered there need be no astonishment at the sudden appearance, apparently from nowhere, of armies of snails immediately following the first autumn rains.

Experiments in South Africa showed that out of 50 snails of both species collected in January, 1919, and placed in jars of soil without food or artificial moisture six Brown and three White snails revived and fed on cabbage leaves at the end of March, 1921. That is after a dormant period of over two years.

When the shell of the snail becomes injured it can be repaired to a remarkable degree. New shell will be built over

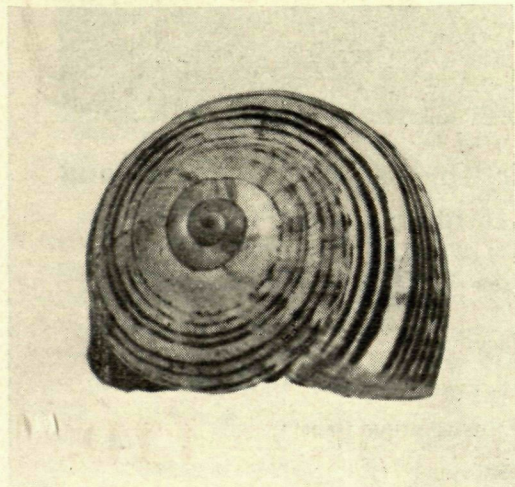
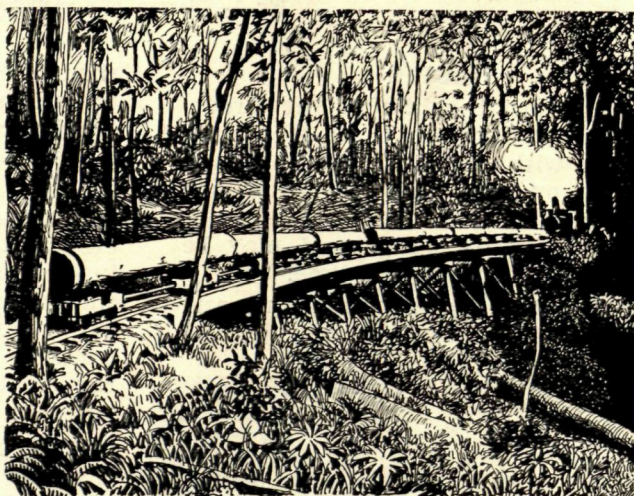


Fig. 2.—White or Italian Snail (about $2\frac{1}{2}$ times natural size).

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the places where sections have become detached, but the original markings are not reproduced, so that the repair work will always remain apparent.

At this stage perhaps it is appropriate to mention that, contrary to a rather popular belief, when a snail has been thoroughly squashed it is not able to survive, neither can any eggs it may contain continue to develop.

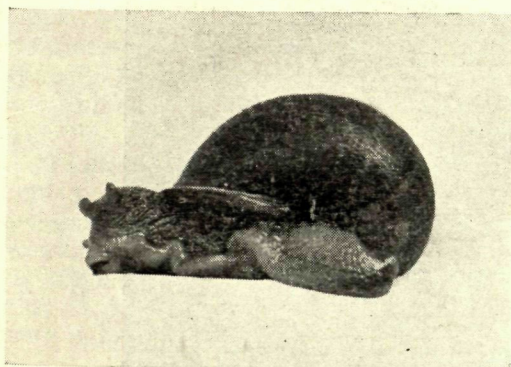


Fig. 3.—Brown or English Snail (natural size).

LIFE HISTORY

There is no differentiation of the sexes in snails, as each individual possesses the male and female organs, and so may be referred to as an hermaphrodite. During mating, mutual fertilisation takes place and both individuals may lay eggs. A suitable spot is selected in a damp, sheltered situation, and a hole about an inch or more in depth is dug. The eggs are coated with a slimy mucilage which causes them to cling together and swell when moistened. A single snail may lay a number of times and produce several hundred eggs. On hatching, the young snails are furnished with tiny white shells, and feed gregariously for some time, but when a few months old they lead a more individualistic life. The period required for the eggs to hatch is about a fortnight under good conditions, but this period may be greatly increased by dryness or excessive cold. The rate of growth is relatively slow, for it takes over a year for the full size to be reached.

CONTROL

Baits.—Metaldehyde mixed with bran has proved one of the most effective slug and snail baits yet devised. The poison may be obtained as a powder and sometimes also in the form of tablets sold under the name of "meta" fuel. Calcium arsenate is frequently recommended as an addition to snail bait to ensure that no individuals recover from the paralysing effect of the metaldehyde.

Recent investigations by New South Wales entomologists have shown that 10% BHC (Benzene-hexachloride) may also be used for this purpose.

The recommended formulas are:—

Small Quantity.

Metaldehyde	.....	.....	1/2 oz.
Bran or Pollard	.....	.....	1 lb.
Calcium Arsenate	.....	.....	1 oz.
or			
10% BHC	.....	.....	1/2 oz.

Large Quantity.

Metaldehyde	.....	.....	1 lb.
Bran or Pollard	.....	.....	30 lb.
Calcium Arsenate	.....	.....	2 lb.
or			
10% BHC	.....	.....	1 lb.

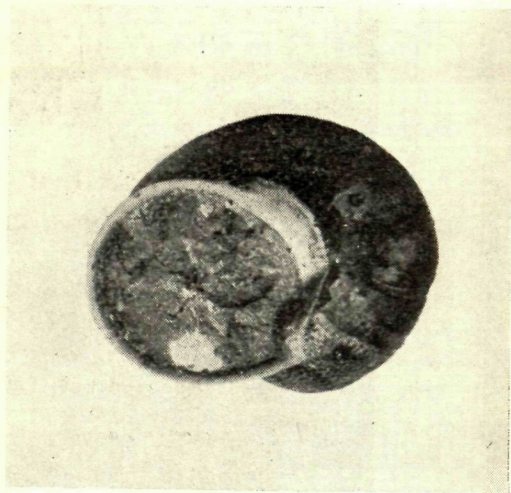


Fig. 4.—Brown Snail, showing seal across mouth of shell during the over-summering or aestivating period.

The baits should be thoroughly mixed and may be broadcast over the affected area or placed in small heaps near plants to be protected. The metaldehyde may burn some foliage and should not be liberally sprinkled on young seedlings. The addition of a small quantity of water to bran baits is some-

times adopted, but would be undesirable in pollard mixtures.

Where metaldehyde cannot be procured, the use of baits containing bran and calcium arsenate or even Paris green will give helpful results. The addition of two tablespoonsful of honey or treacle to the pound of bran is



Fig. 5.—Over-summering snails clustered on a bush at Spearwood.

recommended, and a small quantity of water should also be added to make a free crumbling mash.

Dusts.—Slaked lime is widely recommended for use against snails and slugs, but its efficiency leaves much to be desired. The addition of powdered copper sulphate (bluestone) or copper carbonate to the lime, however, makes a very toxic dust. This cannot be recommended for the actual treatment of plants, but where a plot of ground is endangered by invasions of snails from adjacent breeding grounds, a barrier of lime and copper dust will be found invaluable. Should the creatures succeed in crossing the barrier they will succumb very rapidly. The formula recommended is:—Copper sulphate or copper carbonate, 1 part; slaked lime, 12 parts. The efficiency of this mixture unfortunately deteriorates once the dust has become caked from wetting.

Sprays.—Copper sprays are particularly toxic to slugs and snails but as they may also burn plant foliage their use in a crude form can only be recommended on non-cultivated areas.

Bordeaux mixture on the other hand can be safely applied to most plants and a mixture widely favoured is 4 lb. of lime, 4 lb. of bluestone and 50 gallons of water. The addition of 1 gallon of white spraying oil and $\frac{1}{2}$ pint of Black

Leaf 40 or Nicotine Sulphate to the above mixture will increase the efficiency of the spray where quick results are required.

Home gardeners wishing to try sprays may, of course, make proportional reductions to the above amounts recommended for commercial growers.

Cultural Methods.—The importance of clean cultural methods cannot be over-emphasised in the control of slugs and snails. Weed growth, hedges and accumulations of litter are favourable to snail activity and should be dealt with appropriately.

In the case of the White snail particularly, action during the summer may considerably lessen the damage to be experienced the following winter. The fact that the snails cluster on grass, weeds and shrubs during the dry months renders them very susceptible to fire and judicious burning off in paddocks and along road-sides may almost eliminate the danger of invasions when autumn rains commence. Where wholesale burning is not possible a break between "snail country" and cultivated plants should be made either by burning or cultivating. This will establish a bare strip over which the invading snails must pass and one which may be periodically treated with bait or spray whenever snail activity is noted.

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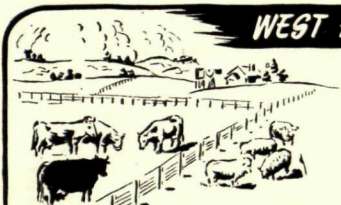


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