Through a GRDC-funded project various approaches to controlling slugs are now being tested. There is now information on pest levels, relative damage caused by different species, monitoring methods, control options, potential biological control agents, pest distribution, cultural controls and more. This information will be delivered to the grains industry once the hypotheses are confirmed.

Slugs have become a more serious pest in recent years as stubble retention and minimal tillage provide a suitable habitat for them. Crops such as canola are particularly vulnerable to slug damage and yet in most areas not even the species causing damage is known. The recent drought has suppressed problems in many areas, but there is no doubt that their pest status will increase again. All pest slugs in Australian cropping systems originate from overseas, especially Europe. There they have different seasonality (eg summertime-active and winter-dormant) compared to Australia, and of course in their native countries they have a range of natural enemies such as predatory beetles and earwigs. The range of species that have found their way to Australia presents us with a unique problem and we need to find out more about how they have adapted and the differences in their seasonal activity and biology.

**Life Cycle**

All of these slugs are hermaphrodites, which means that they have both male and female reproductive organs and so each individual has the potential to produce offspring. Eggs are typically laid in either small or large clusters in sheltered, moist situations. After several weeks or longer, depending on temperature, small juveniles hatch. These look just like small versions of the adults. The slugs grow and can mature after a month or more, depending on species, location and temperature. Deroceras reticulatum will reproduce at any time of year if conditions, especially moisture, are suitable but most other species are more seasonal. Other species such as a burrowing species than most and is relatively more important in drier areas (most of South Australia, Western Australia and western Victoria).

This guide assists the grower in recognising the most important species of slugs in Australian crops.

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All photographs of slugs were taken by Denis Crawford of Graphic Science.

**Limax maximus**

This is a large species with obvious spots. Limax maximus is not an agricultural pest, but is a large slug that may be found near houses, and so is included here for reference.

Length: Up to 200mm.

**Arion intermedius**

Arion is distinguished by having the breathing pore at the front of the mantle (not towards the back). The foot is yellow and when disturbed the body becomes covered in raised bumps. This species has an annual life-cycle and the eggs are opaque.

It is not a serious pest in SE Australia and is most common in undisturbed areas (where there has been full stubble retention and minimum tillage). Length: up to 25mm.

**Arion ater**

This slug can be distinguished by the breathing pore at the front of the mantle and its large size (100mm) and colour (jet black), with obvious raised ridges on the back. No other slug is as large. When disturbed they may rock from side to side. This species has not been officially recorded as breeding in Australia, but small populations have been found near Melbourne and Adelaide. It is therefore quite possible that this species could occur in other localities. Practically nothing is known of its life-cycle in Australian conditions.

Length: 100mm plus
**Milax gagates**

This slug is usually black with a sharp ridge or keel down its back. This is more obvious when the slug is disturbed and its body contracts. *M. gagates* is found in crops throughout SE Australia and Western Australia, but is of relatively greater importance in drier areas (South Australia). It has a biennial life-cycle and lays milky coloured eggs in chambers up to 50mm deep. This species burrows, and feeds on the soil surface and below the ground. (It is a pest of crops including potatoes).

Length: 40–60mm

**Deroceras reticulatum**

The most distinctive feature of this slug is that it secretes milky-white mucus when disturbed. The body is often covered in a reticulated pattern, but it can be very pale or very dark. This species can breed whenever conditions are suitable, but in SE Australia and Western Australia there is usually a Spring and an Autumn generation. *D. reticulatum* is mainly surface active but can move through cracked or loose soil. It is a major pest of crops and pastures in many parts of the world.

Length: Up to 50mm

**Deroceras panormitanum**

This slug has no distinctive markings, and is usually brown all over. It secretes clear mucus when disturbed. It is small compared to the other species of pest slugs. *D. panormitanum* is mainly surface active but is also a shallow burrower. It can breed whenever conditions are suitable but has an annual life-cycle. This species is more common when pasture is a frequent part of the crop rotation.

Length: Up to 35mm.

**Lehmannia flava**

This species can be very large (up to 16 cm). It has pale spots and when disturbed will secrete a yellow-orange mucus. This species is not a pest in cropping in SE Australia.

Length: Up to 160mm.

**Lehmannia nyctelia**

This slug has black stripes that make it immediately recognizable but the stripes can be pale. There are three stripes on the mantle and two stripes towards the tail. This species is not found in many arable crops but when present it can be in very high numbers. Individuals aggregate together under rocks etc. over summer. This species is not known to burrow. The life-cycle in Australia is not known, but individuals probably live for more than one year. Eggs are clear.

Length: 40–60mm.