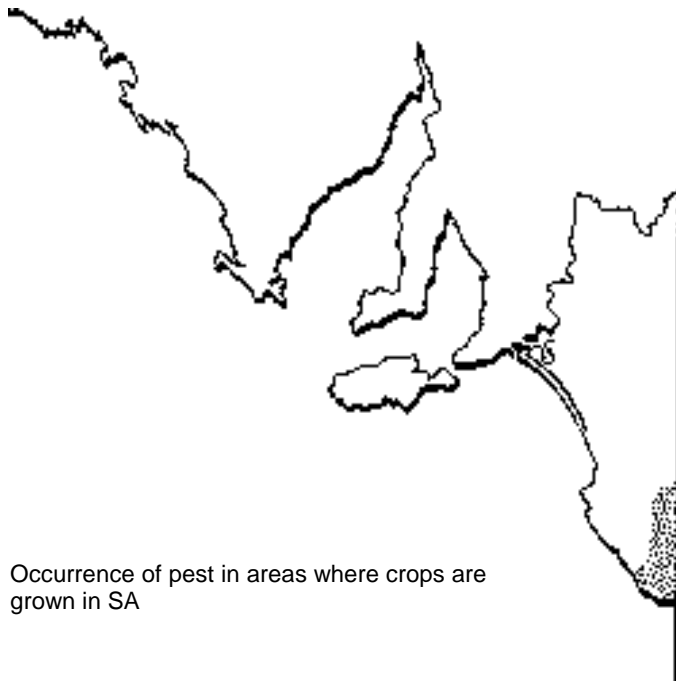


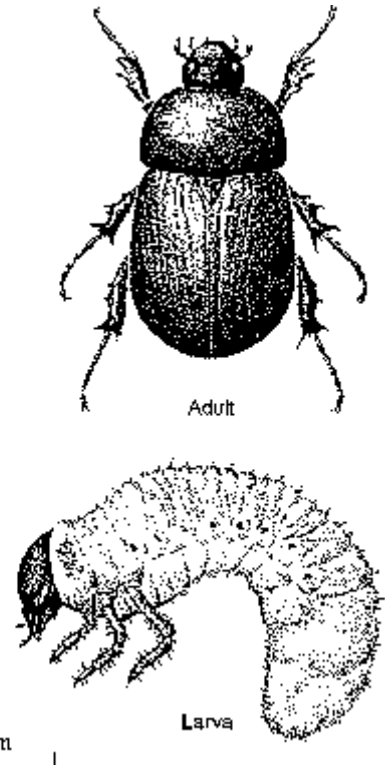


Redheaded pasture cockchafer

The redheaded pasture cockchafer is an indigenous pest of semi-improved and improved pastures in the lower South East of SA, particularly of pastures grown on meadow podsollic and terra rosa soils. This insect is native to south-eastern Australia; its emergence as a pest is probably caused by the increased levels of soil organic matter associated with pasture improvement and the use of shallow-rooting species.



Occurrence of pest in areas where crops are grown in SA



Identification

The adult is a chunky, reddish brown to black beetle about 13 mm long and 8 mm wide. The larvae are six-legged grubs with a red-brown head capsule; they grow to about 25 mm long. The body colour of larvae is white-grey when they are feeding and changes to cream when they are mature. Larvae curl to a C-shape when disturbed or handled.

Damage

Damage mainly occurs to pastures that are three or more years old and that contain subterranean clovers, annual volunteer grasses and, sometimes, a low level of perennial grasses. Redheaded pasture cockchafer can severely reduce the amount of pasture available for livestock during autumn, winter and sometimes during spring because the soil-dwelling larvae either prune or completely cut off the roots of pasture plants; damaged plants either have reduced growth or die. Where there are high numbers of larvae, the damaged pasture can be rolled back like a carpet. Persistence of sown perennial grasses is reduced and weeds invade more aggressively in severely affected pastures. Perennial ryegrass is more susceptible to attack than phalaris or cocksfoot. The damage to heavily infested pastures is accentuated when birds, especially ibises and crows, dig it up to feed on larvae, and when grazing livestock pull up damaged plants.

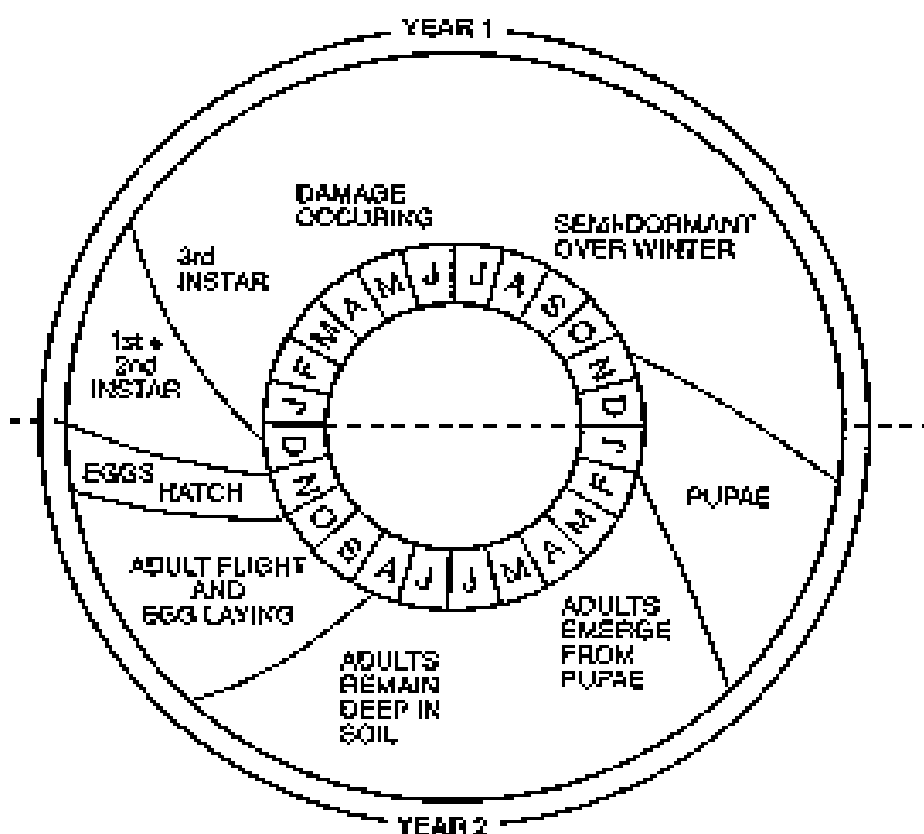
The extent and severity of damage vary greatly from year to year and from property to property. Usually, damage is expected to occur every other year, possibly because of the pest's two-year life cycle, and in pastures lightly grazed during the previous spring and summer.

Severe damage often occurs in years with a dry autumn following heavy spring rains. The spring rains provide good pasture cover during spring and summer, which is favourable for egg laying and survival of young larvae; the dry autumn stresses the plants and they cannot compensate for damage.

Life cycle

Redheaded pasture cockchafer has a two year life cycle. The adult beetles emerge from the soil in August to early October, fly and then lay eggs singly in the soil under pasture, preferably in pasture with a dense cover. The eggs hatch after about two weeks and the larvae spend their complete life in the soil. They feed on decaying organic matter and possibly on plant roots. They cut through plant roots, either when feeding on them or foraging for food. Larvae reach the third and final larval stage by early autumn and remain in this stage until early summer. The large, final-stage larvae cause the worst damage when they feed in autumn and winter.

When the larvae are about one year old in the next November, they become a creamy colour and move deeper into the soil where they pupate in December. The adults emerge from the pupae about the end of January. These adult beetles remain in the soil until the next August/October before emerging from the soil and laying eggs for the beginning of the next generation.



Two year life cycle of redheaded pasture cockchafer
(from McQuillan and Ireson 1987)

Control

Reliable control methods are not available. The following suggestions may lessen the problem on some properties.

Cultural control

Cultural practices, which may lessen damage, rely on pasture management and on strategies to compensate for loss of feed.

Pasture management

Removing dry pasture residue by grazing before the beginning of autumn may effectively reduce larval densities during that autumn and the next winter - the survival of young larvae during summer and spring appears to rely on a good pasture cover during that period. Cutting pastures for hay in spring may also have a similar effect.

Removing pasture residue from a whole property is not practical nor recommended. However, hard grazing could be used on those pastures that have been most susceptible in the past, especially in years of expected damage.

Annual pastures that are heavily grazed during spring and early summer are susceptible to black-headed pasture cockchafer damage in the following winter. However, while this pest can be controlled cheaply with insecticide before damage occurs - redheaded pasture cockchafer can not.

Damage may also be reduced by sowing perennial grasses that are more tolerant to damage that are the annual pasture plants.

Compensation for pasture loss

If there are more than 300 larvae per square metre of pasture in March, substantial losses of pasture dry matter are likely to occur during autumn and winter. Numbers can reach 1,100 per square metre. Strategies to compensate for these losses include:

- sowing oats for forage early in the year;
- buying supplementary stock feed for autumn and winter;
- reducing livestock numbers early in the year;
- growing cash crops, such as cereals, peas, oilseed crops, to compensate for expected losses in income from livestock;
- in extreme situations, arranging for agistment of livestock.

Biological control

Recently an indigenous fungus, *Metarhizium anisopliae*, has been commercialised as a biological control agent in a product called "Biogreen™ Granules". Good control has been recorded following field application of the granules to pastures, which can be direct-drilled into existing pastures, or sown with new pastures. For more information contact Bio-Care Technology Pty. Ltd, RMB 1084, Pacific Highway, Somersby NSW, 2250, ph. 02 4340 2246.

The use of a pathogenic nematode for the control of larvae has shown promise in trials in Victoria, but the commercial application of this nematode will not be available in the short term because of inadequate efficacy and high costs.

Chemical control

Redheaded pasture cockchafer larvae in pasture cannot be economically controlled with insecticide, mainly because the insecticide applied to the surface of undisturbed pasture does not penetrate the soil sufficiently to kill the larvae. There are no apparent prospects for chemical control in the foreseeable future.

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