

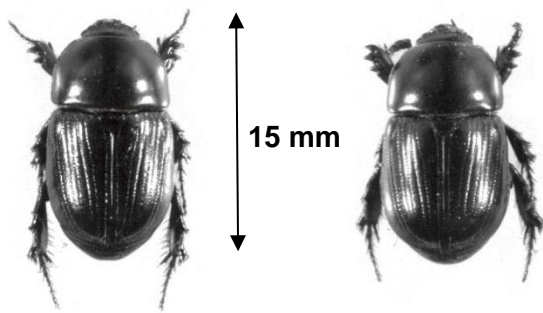
## Black beetle (1-29)

### Introduction

Black beetle is a chronic pasture pest in Northland, Waikato, Bay of Plenty, Hawkes Bay and coastal Taranaki. Larvae feed on grass roots over summer and early autumn, often leading to plant death and pulling. Adults cause damage to grass, maize and young cereal crops throughout spring and autumn by feeding at the base of the shoots which destroys the plants' growing points. Clovers are not affected by black beetle.

### Distribution

Black beetle is a subtropical pest and is found only in areas with an average annual air temperature of 12.8°C or above. The amount they eat, the number of eggs laid, and larval survival and growth rate are all promoted by temperatures over 20°C.



*Black beetle adults, female and male*



*Mature black beetle larvae*

### Population Changes

The abundance of adult beetles varies widely from year to year.

#### Populations are encouraged by:

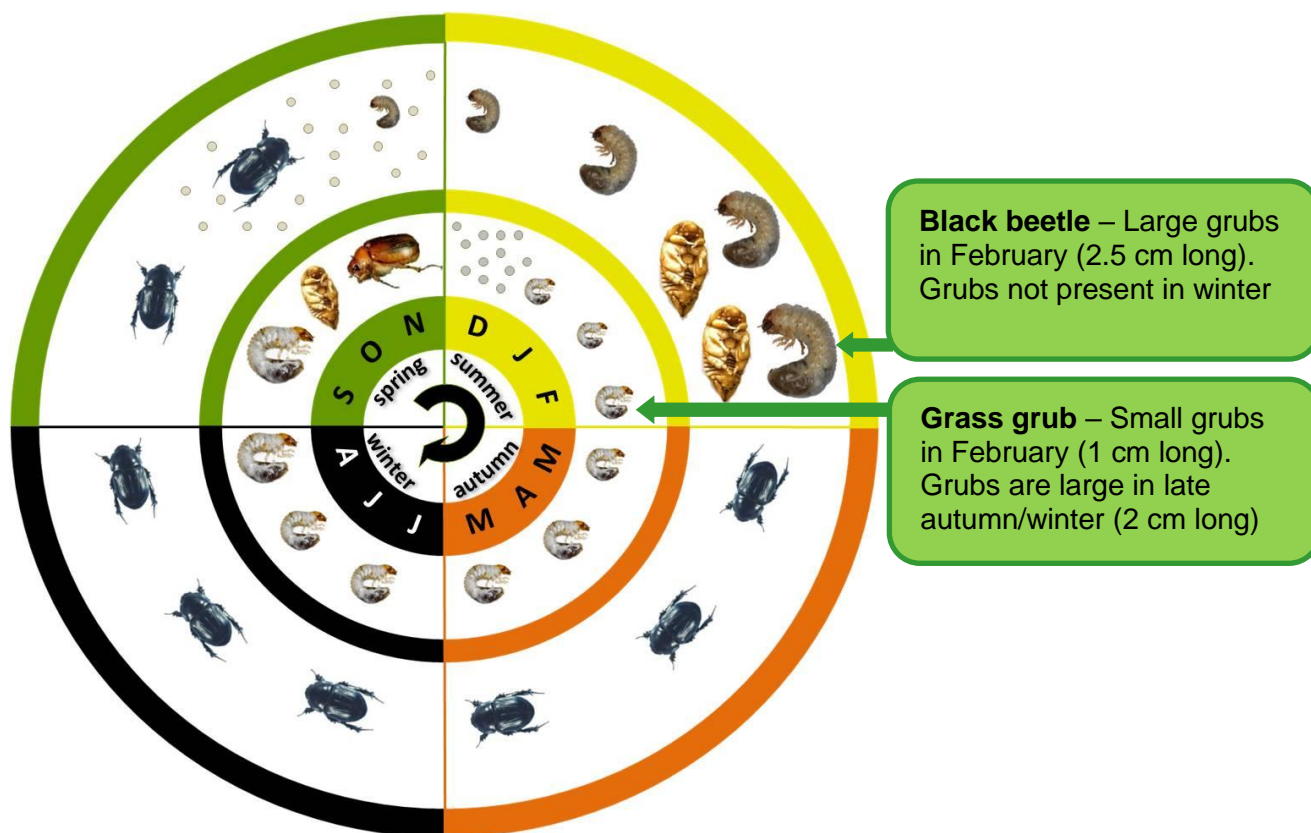
- La Niña weather patterns. Outbreaks are associated with warmer than average conditions.
- Warm temperatures in early spring. Beetles start reproduction earlier and lay more eggs.
- Hot, dry summers. This increases larval survival and speeds up development. Early beetle emergence allows adults to feed longer before winter, increasing their chance of survival.
- Ryegrasses without black beetle-active endophytes.
- Subtropical grasses (e.g. paspalum, summer grass, kikuyu).
- Light, free draining ash and peat soils.

#### Populations do poorly in:

- Wet conditions
- Clay soils

## Black beetle life cycle

Black beetle adults lay eggs in spring and early summer, the larvae develop over summer, and pupate and emerge as adults in autumn. Black beetle larvae can be confused with grass grub. The diagram below compares the lifecycles of these two pests.



## Control

The primary way to protect pastures from black beetle is to use grass cultivars with an endophyte that protects against **adult** feeding at the base of the stems. There are no grass endophyte strains currently available that deter black beetle **larvae** from feeding on roots.

### Suitable endophytes:

- AR37, Endo5 and NEA2 provide strong protection against black beetle.
- MaxP™ in tall fescue provides strong protection against black beetle.
- **AR1 should not be used** as provides little protection against black beetle.
- The DairyNZ pasture renewal web pages have further information, including new endophytes as they are released.
- It is critical that any seed purchased has a current test for endophyte viability and the test be done within 3 months of purchase as endophyte viability declines with storage period.

### Coated seed:

- For the first six weeks after seedling emergence, endophytes in grass seed provide insufficient protection from pests.
- Seed must be treated with insecticide to provide seedling protection until the endophyte starts producing the chemicals that deter feeding.
- During black beetle outbreaks, autumn dispersal flights of adults may occur, so all newly sown pastures, even those established after a break crop, are at risk.

### Break crop

- Renewing a black beetle-damaged pasture will be more successful if insect numbers and endophyte-free grasses are reduced to low levels at pasture establishment.
- Use a crop that black beetle larvae do not feed on such as maize, brassicas, legumes or chicory. Coated maize seed must be used as seedlings are attacked by adults.

- Use herbicides to reduce the populations of weed grasses favoured by black beetle.
- Cultivation may reduce the black beetle populations by physically damaging some larvae and pupae, but has little effect on adult beetles.

### Soil pH

- Black beetle populations tend to decrease with increasing pH.
- The optimal soil pH for dairy pastures is 5.8-6.0.
- Farmers on black beetle-prone soils should target pH 6.0.
- Clovers do best at pH 6.0, providing added insurance that production can be maintained should an outbreak occur.

### Is black beetle the problem?

Late summer is when black beetle larvae cause the most damage. To confirm that black beetle is responsible for poor pasture persistence at this time:

- Dig 10 cubes of soil the width of a 20 cm spade and 10 -15 cm deep that are representative of the paddock.
- Break the cubes up and count both the black beetle larvae and adults in the 10 cubes.
- Multiply the number of black beetle found in the 10 cubes by 2.5 to obtain black beetle abundance/m<sup>2</sup>.
- In dry summers, if black beetle are 15-20/m<sup>2</sup>, it is likely they have caused the damage. In normal-wet summers, damage may not be noticed until populations exceed 40/m

### Further reading

Pasture pests and weeds <http://agpest.co.nz/>  
[Lime and soil acidity DairyNZ Farmfact 7-15](#)