Landcare Notes

Biological Control of Gorse with the Gorse Seed Weevil

April 2008
LC0432
ISSN 1329-833X

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This Landcare Note provides a summary of the biology and impacts of the gorse seed weevil, a biological control agent for gorse, Ulex europaeus.

Common and scientific names

Gorse seed weevil, *Exapion ulicis* Forster
Order Coleoptera, Superfamily Curculionoidea (Weevils), Family Brentidae.

Background

Gorse (furze) *Ulex europaeus* L. is native to central and western Europe. It was introduced to Australia in the early 1800s and now occurs in Victoria, Tasmania, South Australia, Western Australia, NSW and the ACT. Gorse is listed as a Weed of National Significance as it is such an invasive environmental and agricultural weed, particularly Victoria and Tasmania. It invades bushland, reducing access and conservation values and threatens the survival of rare and endangered plant species. On pastoral land gorse significantly reduces pasture and animal productivity. Gorse also provides habitat and shelter for vertebrate pests, such as rabbits and foxes, and increases fire hazards.

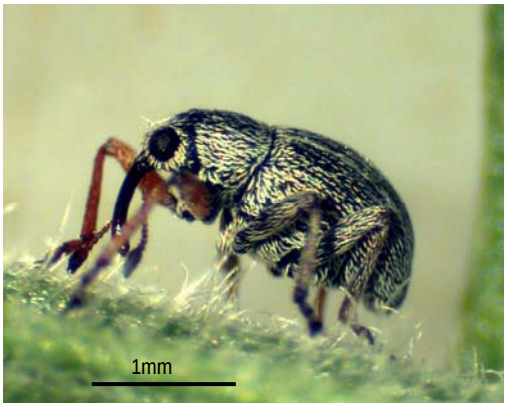

Figure 1. Adult gorse seed weevil.

The gorse seed weevil is native to Europe and was the first biological control agent to be introduced to Australia for gorse control. It was introduced in 1939 and is now widely established in all areas where gorse occurs in Australia except Western Australia.

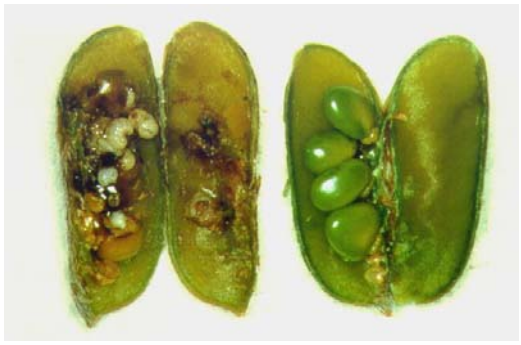

Figure 2. Gorse pod infested with gorse seed weevil larvae (left) compared to uninfested pod (right).

Description

Adults (Fig. 1) are greyish in colour with a body length between 1.8-2.5 mm. They have a long curved snout (rostrum) which is characteristic of weevils. Females are generally larger than males with longer rostrums.

Eggs are yellow and the larvae (Fig. 2) are white, legless grubs approximately 1-2 mm long with brown head capsules. The pupae (Fig. 3) are white when newly formed but darken as they develop.

Figure 3. Gorse seed weevil pupae within gorse pod

Victoria
The Place To Be

		Winter			Spring			Summer			Autumn		
		Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Gorse seed weevil	Eggs												
	Larvae												
	Pupae												
	Adults[1]							E	E	E	E		
Gorse seed production[4]	Cooler sites[2]												
	Warmer sites[3]												

Figure 4. Main periods of gorse seed weevil activity in relation to gorse seed production patterns. [1] *E = Emergence of adult weevils from pods.* [2] *Cooler sites are generally at high altitude and/or inland.* [3] *Warmer sites are generally at low altitude and/or near the coast* [4] = *main periods of seed production*; = *minor and/or sporadic periods of seed production*.

Life cycle

The gorse seed weevil has one generation per year. Adult weevils are present on gorse all year round. Adults over-winter then mate and commence egg-laying in spring. Females bore a hole in young pods then lay approximately 9 eggs within each pod, although this can vary considerably. Eggs can be laid from early spring to summer with peak egg production occurring in mid to late spring. Eggs take about 4 weeks to hatch. Larvae feed on the seeds and are usually active from spring through summer, with maximum numbers occurring in late spring to early summer. Each larva takes about 6 weeks to develop into the pupal stage. Pupation occurs inside pods and takes about four weeks during late spring and summer. Adults emerge in summer when pods ripen and dehisce.

Impact

Adult weevils feed on gorse flowers and foliage but the damage is usually insignificant. The main damage results from the larvae feeding on the developing seeds within the pods (Figs. 2 and 3). However, the impact of the larvae on seed production is not high enough to significantly affect plant densities. A study in Tasmania showed that the percentage of mature seed destroyed annually ranged from 12-55%. This is much lower than the estimated levels of seed destruction of around 75-85% that New Zealand modelling studies have indicated would be necessary to cause a decline in gorse densities.

Flowering and pod production of gorse varies considerably not only between sites but on individual bushes within sites. However, weevil activity is similar at all sites (Fig. 4). At sites situated in cooler microclimates, most gorse bushes flower in late winter/spring. At sites situated in warmer microclimates, flowering occurs in autumn and winter as well as in spring. The larvae of the weevil only feed on a proportion of seed produced in spring and summer. As a result, a large proportion of the annual seed crop escapes attack at all sites, especially those that produce seed during the autumn/winter period. The introduction of an additional seed-feeding agent to act in combination with the weevil would further reduce seed production levels.

Integrated control

Biological control cannot eradicate a weed but can reduce the spread and density of infestations. In some cases control is achieved to the level where the weed is no longer of concern and no other control is necessary. More commonly, other methods are still required to achieve the desired level of control. Biological control should not be considered the complete answer to a gorse problem. It is a technique that should be used in conjunction with other control measures in an integrated management program.

Biological control of gorse may be more effective if a suite of natural enemies are introduced. Other biological control agents established in Australia are the gorse thrips, *Sericothrips staphylinus* (introduced in 2001, see Landcare Note LC0170) and the gorse spider mite, *Tetranychus lintearius* (introduced in 1998, see Landcare Note LC0167). The gorse soft shoot moth, *Agonopterix umbellana* (see Landcare Note LC0435), was introduced into Victoria and Tasmania in 2007 and investigations into future agents are continuing.

Further information

If you would like to be part of the gorse biological control program please contact DPI Frankston, PO Box 48, Frankston, Vic., 3199, ph. 03 9785 0111.

Acknowledgments

The gorse biological control program is a collaborative project between DPI Victoria and the Tasmanian Institute of Agricultural Research (TIAR). Federal funding was provided by the Defeating the Weeds Menace program, Department of Agriculture Fisheries and Forestry.

Reviewed by: John Ireson, TIAR.

Figure 1: Wade Chatterton, TIAR; Figure 2: Landcare Research, New Zealand; Figure 3: TIAR