

Biological Control of Gorse with the Gorse Thrips

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This Landcare Note describes the gorse thrips, a biological control agent for gorse, Ulex europaeus.

Common and scientific names

Gorse thrips, *Sericothrips staphylinus* Haliday
Order Thysanoptera, Family Thripidae.

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 in Australia, 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.

The gorse thrips is being used as a biological control agent for gorse in Australia. Native to Europe, the thrips has also been introduced into New Zealand and Hawaii where it has been established for over 15 years.

Description

Adult gorse thrips range in length from 0.7 - 1.2 mm and appear black except for the distinctive white rudimentary wing pads and a layer of shiny hairs on the abdomen. The antennae and legs are brown (Fig. 1).



Figure 1. Adult gorse thrips.



Figure 2. Juvenile (larva II) gorse thrips

Juvenile gorse thrips are pale after hatching (larva I), but develop into a more robust yellowish larva (larva II, Fig. 2), followed by a yellowish pre-pupa and pupa, which are both similar in form to the adult.

Eggs are extremely difficult to locate but are about 0.3 mm in length and white to pale yellow in colour. They are laid in slits cut into young gorse stems.

Life cycle

It has been shown in Tasmanian studies that the life cycle of gorse thrips is closely synchronized with the phenology of gorse. Adult gorse thrips can be found on gorse all year round, but populations are highest in summer. Over-wintering adults commence egg-laying towards the end of winter. Eggs begin hatching in spring to coincide with the availability of succulent new growth, which is a prime food source for developing juvenile thrips. Juvenile stages (larva I, larva II, pre-pupa, pupa) are present in spring and summer with two generations per season, which peak around mid spring and again in mid summer. Once new gorse shoots harden towards the end of summer, the adult population enters a reproductive diapause. This ends in late winter when adults resume egg laying for the next season.

The lower development threshold is around 9.3°C and egg to adult development requires 345 degree days above this temperature. At 20°C development from egg to adult takes about 32 days. Female thrips lay white to pale yellow eggs into plant tissue, which take about 16 days to hatch. Over another 16 days, the thrips pass through the two feeding

larval stages before moulting into the mobile but non-feeding pre-pupa and the immobile pupa before reaching the adult stage. The life span of adult female thrips ranges between 28 and 37 days. Females lay about 2 eggs per day and are able to produce 70 to 80 eggs during their lifetime in good conditions.

Gorse thrips disperse by wind or jumping short distances. Occasionally winged thrips are produced enabling dispersal over longer distances.

Impact



Figure 3. Potted gorse damaged by gorse thrips (left) compared to healthy gorse (right).

Gorse thrips pierce the epidermis of gorse foliage and suck the contents from the cells beneath. Initially, feeding damage appears as white spots along the stems and spines but can ultimately give the gorse a mottled, blotchy appearance with stunted growth (Fig. 3). High levels of damage are consistently observed on potted gorse in glasshouse environments. However, high damage levels have not yet been observed in the field in Australia.

Releases

Gorse thrips were imported into DPI Victoria's quarantine facility at Frankston in October 2000. Since 2001, they have been mass reared and released at 128 sites in Victoria, 416 in Tasmania, 40 in South Australia and 12 in NSW. It has established at a number of sites but is spreading slowly and field densities are currently low.

To accelerate dispersal, large numbers of releases are currently being made from glasshouse cultures to establish nursery sites from which gorse thrips can eventually be collected and transferred to other gorse infested sites. Once densities start to increase, community groups should be able to assist in increasing the geographic coverage of the agent. The release of around 250 gorse thrips on a single bush is the minimum number currently being used to achieve successful field establishment. Therefore, the ideal nursery site would be one where populations are high enough to enable multiple collections of 250 thrips.

Other thrips species commonly inhabit gorse, particularly during flowering. Some of these are easily confused with

gorse thrips and can be present in high numbers. One of the more conspicuous species is *Odontothripiella* sp., which is commonly known as gorse flower thrips. It is therefore vital to have personnel trained in thrips identification to supervise collections, releases and post-release monitoring.

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.

The gorse thrips is the third biological control agent to be released on gorse in Australia. The gorse seed weevil, *Exapion ulicis*, was released in 1939 and is now well established throughout the range of gorse in Australia. The weevil larvae consume gorse seeds within developing pods during spring and summer. However, seed produced in autumn and winter is not attacked as the weevil is not active during this time of the year. The gorse spider mite, *Tetranychus lintearius* (see Landcare Note LC0167), was first released in Victoria and Tasmania in 1998 and is now firmly established. Studies in Tasmania show that damage by the gorse spider mite can reduce the growth of gorse plants by around 36%. However, predators such as the Chilean predatory mite, *Phytoseiulus persimilis*, and mite eating ladybirds, *Stethorus* spp., are likely to limit its effectiveness.

Biological control of gorse will be more effective if a suite of natural enemies are introduced into Australia that attack gorse in different ways and at different times of the year. The gorse soft shoot moth, *Agonopterix umbellana*, was introduced into Victoria and Tasmania in late 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 Victoria, Frankston centre, PO Box 48, Frankston, Vic., 3199, ph. 03 9785 0111.

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