



Biological Control of English Broom with the Broom Gall Mite

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This Landcare Note describes the broom gall mite, a biological control agent for broom, *Cytisus scoparius*.

Common and scientific names

Broom gall mite, *Aceria genistae* (Nal.) Castagnoli.

Family Eriophyidae (bud, blister, gall and rust mites). All mites are in the Subclass Acari (mites and ticks), Class Arachnida (which also includes spiders and scorpions).

Background

In Victoria, English (or Scotch) broom, *Cytisus scoparius* (L.) Link ssp. *scoparius* is a regionally controlled weed in the Wimmera, Corangamite, Port Phillip East, Goulburn Broken, North East, West Gippsland and East Gippsland regions under the *Catchment and Land Protection Act 1994*. It is a woody shrub invading natural ecosystems, forestry and grazing lands in these regions and is problematic in other areas of south eastern Australia with moderate to high rainfall, including NSW, Tasmania and in the Adelaide hills of South Australia. The use of one living organism (in this case, a mite) to control another living organism (a weed) is called biological control. A biological control program has been underway since the 1990's to introduce to Australia a number of natural enemies of English broom. These specialist agents were introduced from western Europe to help to suppress English broom populations, especially in situations where other methods of control are too difficult or too expensive to apply. Three biological control agents for English broom have previously been released in Australia: a twig mining moth, a seed-feeding bruchid and a sap-sucking psyllid. Partial control has been achieved, particularly at some sites in NSW. Unfortunately, many of the release sites in eastern Victoria were destroyed during the 2003 bushfires. The broom gall mite is the fourth agent to be released on broom in Australia.

Introduction

The broom gall mite belongs to the large family of Eriophyidae, which are microscopic and strictly phytophagous (plant eating) mites. They feed by inserting their stylet into plant cells to extract sap. While some Eriophyids are considered as agricultural pests due to the damage they cause to crops and cultivated plants, others

are highly specialised and inflict substantial damage to weeds and therefore are a useful tool in suppressing them. The broom gall mite originates from western Europe and feeds and develops exclusively on English broom. Its very small size requires the use of very powerful hand lens or microscopes for its observation. However, the damage it causes is distinct and easy to identify.

Description

Adults are light-pink in color and have a worm-like appearance. The anterior part of the body comprises a complex head (the gnathosoma) followed the prodorsum, while the longer posterior part (the opisthosoma) looks like an annulated abdomen. Eriophyids have only two pairs of developed legs located ventrally near the head. Adult females measure 160-225 microns in length (0.16-0.225 mm) and about 50 microns (0.05 mm) wide, while males measure only 165 microns in length and 44 microns in width.

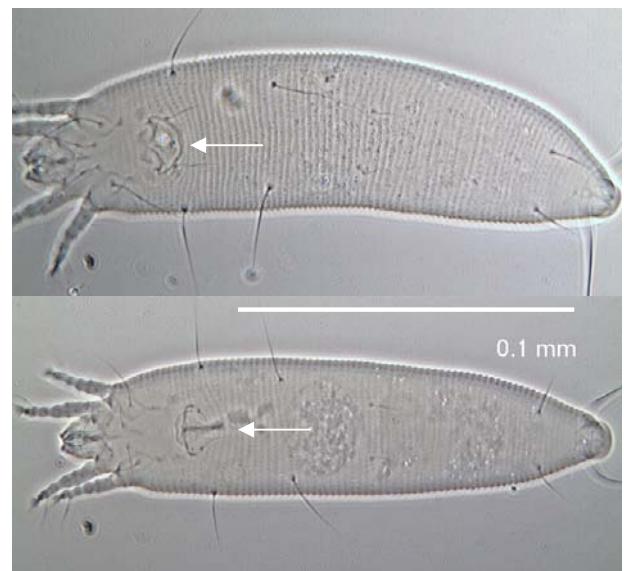


Figure 1. *Aceria genistae* adults: female (top) and male (bottom), white arrows indicate genital region.

Along with size, identification of the sex in adults is based on the differences of the genital region (Figure 1). Like the majority of Eriophyids, *Aceria genistae* has four life stages: egg, larva, nymph and adult.

Eggs are white, spherical and about 50 microns in diameter. Immature mites have two different stages (larva and nymph) and are pinkish-white in color and measure up to about 100-120 microns in length (0.10-0.12 mm). There is no sexual dimorphism among immatures.

Life cycle

At maturity, male *Aceria* deposits a spermatophore which is collected by a female via her genital flap. Fertilised eggs are produced by the female, one at a time. The female lays eggs either inside the gall or leaves the protection of the gall to colonise new buds on the same plant or be carried by wind to a new host plant. If she lands on another broom plant she will locate an unopened shoot bud in which to feed and shelter during winter.



Figure 2. Rosette stage in gall formation.



Figure 3. Aceria adult (left arrow) with immatures and egg (right arrow) inside a broom gall.

Impact

In spring the feeding process induces abnormal growth of plant tissues which after 8-12 weeks, develop into a tiny gall resembling a rosette (Figure 2), providing shelter for the growth of the new colony (Figure 3). Over the course of a year, the gall may grow up to 8-10 mm in diameter and harbour hundreds of mites. As galls grow, they

become more hairy until they senesce. At this time the mites leave the galls and migrate to colonise new buds or are wind-dispersed to new plants. Mite feeding has also been observed to affect flower development (Figure 4).

Releases

The first releases of mites are expected to occur in spring 2008 in the Alpine National Park, Victoria, in Tasmania and South Australia where nursery sites will be established and monitored.

Further information can be obtained by contacting DPI Victoria, Frankston centre, PO Box 48, Frankston, Vic., 3199, ph 03 9785 0111.



Figure 4. Deformed broom flowers after 4 months of mite's presence.

Acknowledgements

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