

INSECTS AND DISEASES OF FIREWEED, *SENECIO MADAGASCARIENSIS*,
AND THE CLOSELY RELATED *SENECIO LAUTUS* COMPLEX

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Summary. Fireweed, *Senecio madagascariensis*, is an exotic species from Madagascar and South Africa. *S. madagascariensis* has become a major weed of pastures in eastern Australia. Field studies are currently under way in Australia to determine the insects and diseases found on *S. madagascariensis* and the closely related *S. lautus* complex in an effort to determine whether naturally occurring agents discriminate between these species. Most insects and diseases that occur on *S. madagascariensis* also occur on *S. lautus*. In excess of 70 species of insects and two rusts have been recorded on *Senecio* spp. to date.

INTRODUCTION

Fireweed, *Senecio madagascariensis* Poiret, is an exotic species which is native to Madagascar and South Africa. *S. madagascariensis* has become an important weed of pastures in eastern Australia where it covers hundreds of thousands of hectares. It was first recorded in the lower Hunter Valley in 1918 and has since spread throughout coastal regions of New South Wales, into parts of the Northern Tablelands and the Western Slopes, and into south-eastern Queensland (4). *S. madagascariensis* has the potential to continue to spread within and around its present limits of distribution, but is unlikely to cause serious problems elsewhere in Australia (6).

The cost of *S. madagascariensis* to the agricultural community is estimated to be in excess of \$2 million per annum (L. Smith, pers. comm.). These losses are made up of decreased pasture production due to plant competition and reductions in growth rates or death of cattle and horses caused by pyrrolizidine alkaloids occurring in the plant (4).

Present methods of control include spraying with herbicides, mowing, hand weeding, competitive pastures and grazing by goats and sheep. However, the plant produces vast quantities of seed which germinate over a long period of time so control practices must be repeated at regular intervals.

There are many gaps in our knowledge of the ecology of *Senecio* spp. These include plant taxonomy, distribution and ecology, interactions between plant species, and the ecology and distribution of naturally occurring insects and diseases on *Senecio* spp. The Dairy Research and Development Corporation recently funded a three year co-operative research program between the Weed Ecology Unit at Sydney University and NSW Agriculture to study these aspects.

PLANT TAXONOMY

Correct identification of plant species is important in any form of control strategy. Because *S. madagascariensis* is similar to the native *Senecio lautus* Forster f. ex Willd. complex it is important to differentiate between the two species. This is especially important since members of the *S. lautus* complex are essentially non-weedy (5). The taxonomy of *S. madagascariensis* and the *S. lautus* complex is unclear at present. Four subspecies of the *S. lautus* complex have been recognised (1). However, *S. madagascariensis* was not recognised as a separate species and herbarium specimens indicate its inclusion in *S. lautus* aff. ssp. *lanceolatus* (5). Subsequent

Biocontrol with insects

taxonomic studies (3) made it possible to differentiate between these two species. Current indications are that there may be more than four subspecies in the *S. lautus* complex.

INSECTS AND PATHOGENS ON *SENECIO* SPP.

Surveys in Madagascar (2) have found a variety of insects feeding on *S. madagascariensis*. Two of these insects, a stem and tip boring moth, *Lobesia* sp. (Lepidoptera: Tortricidae) and a flower feeding moth, *Phycitoides* sp. (Lepidoptera: Pyralidae) have been imported as potential biological control agents. Since mid 1990, The Alan Fletcher Research Station, Department of Lands, Queensland has been conducting quarantine host specificity studies on *Lobesia* sp. and *Phycitoides* sp. These studies are proceeding slowly, supported by a three year Meat Research Council grant. While severely damaging *S. madagascariensis*, these insects also damage the native *S. lautus* complex.

Australian field studies are currently under way to determine insects and diseases found on *S. madagascariensis* and the *S. lautus* complex in an effort to determine whether naturally occurring agents discriminate between these species. Most insects and diseases which occur on *S. madagascariensis* also occur on *S. lautus*. In excess of 70 species of insects, and two rusts have been recorded on *Senecio* spp. to date.

The most common insects include a leaf feeding beetle, *Chalcolampra* sp. (Coleoptera: Chrysomelidae); two moths, the leaf feeding magpie moth, *Nyctemera amica* (White) (Lepidoptera: Arctiidae) and blue stem borer, *Patagoniodes farinaria* (Turner) (Lepidoptera: Pyralidae) and two seed head feeding bugs, *Nysius clevelandensis* Evans and *Nysius vinitor* Bergroth (Hemiptera: Lygaeidae). A stem mining fly, *Melanagromyza seneciophila* Spencer (Diptera: Agromyzidae); a leaf mining fly, *Phytomyza syngenesiae* (Hardy) (Diptera: Agromyzidae) and two species of gall forming flies, *Sphenella ruficeps* (Macquart) (Diptera: Tephritidae) which forms galls in flower heads and *Trupanea* sp. (Diptera: Tephritidae) which forms galls in stems and flower heads, are also commonly found. The larvae of *Chalcolampra* sp. and *N. amica* can cause significant defoliation of *Senecio* spp. Larvae of *P. farinaria* ringbark stems and may kill many plants. The two rusts found on *Senecio* spp. are *Puccinia lagenophorae* Cooke and *Albugo tragopogonis* (DC.) S. F. Gray.

DISCUSSION

The studies in Madagascar (2) found two *Nysius* spp. feeding on seed heads of *S. madagascariensis*. Similarly, Australia has two *Nysius* species which feed on seed heads. The flower head feeding fly, *Sphenella marginata* (L.), was also found in Madagascar (2). There is some conjecture whether this is a different species to *S. ruficeps* (P. Cranston, pers. comm.), which was identified in this study. Many of the Australian insects found so far appear to be specific to *Senecio* spp. although generalist feeders such as some Lepidoptera, the *Nysius* spp. and the leaf mining fly, *P. syngenesiae*, were also found. *P. syngenesiae* feeds mainly on Asteraceae (7) while the others mentioned feed on a wide range of species in a number of families. In excess of 40 species of Hymenoptera have also been found so far during this study. Their role is unclear at present. Many of these are probably parasitoids of other insects found although some could be gall formers.

The taxonomic similarity between *S. madagascariensis* and the *S. lautus* complex is paralleled by the similarity in insect and disease species occurring on these plants. If imported biological

control agents show a similar lack of discrimination, there will be a conflict of interest between biological control of *S. madagascariensis* and the desire to prevent damage to native *Senecio* species. The release of these imported agents may therefore not be approved by the Australian Quarantine Inspection Service and the Australian National Parks and Wildlife Service.

ACKNOWLEDGEMENTS

We thank the various taxonomists at both the Australian National Insect Collection and Biological and Chemical Research Institute who identified the insects and pathogens found in this study. This project was partially funded by a research grant from the Dairy Research and Development Corporation.

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