

## Eradication case history, *Hieracium pilosella* L. ssp. *nigrescens* (Fr.) Nägeli & Peter in Tasmania

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**Summary** In January 2001 a naturalised population of *Hieracium pilosella* L. ssp. *nigrescens* (Fr.) Nägeli & Peter was found in agricultural land in the Tasmanian midlands. This was the first recorded naturalisation of this species in Australia. Tasmania initiated the State weed incursion response plan, which included an assessment of the potential impact of this weed.

As this weed has been detected in nurseries and was permitted entry into Australia prior to 1995 it was determined to be already present and therefore its management became a State responsibility. Tasmania proceeded with a survey, eradication and education program. There was no co-ordinated national response particularly with respect to plants potentially in cultivation or being sold by nurseries on the mainland.

Though not strictly a new incursion to Australia, the ability for other States to respond similarly would enhance the effectiveness of eradication efforts. It is anticipated that *H. pilosella* will be a re-occurring weed problem under the current approach to its management within Australia.

**Keywords** *Hieracium pilosella*, weed risk assessment, eradication, surveillance, incursion management.

### INTRODUCTION

In January 2001 a routine botanical survey for proposed roadworks on the Midlands Highway in southern Tasmania resulted in the discovery of a small population of *Hieracium pilosella* L. ssp. *nigrescens* (Fr.) Nägeli & Peter (mouse ear hawkweed) along a roadside fenceline and a short distance into the adjacent paddock. Total extent of the infestation was about 50 square metres in three patches. However, it had a high density, varying from 40% to 80% cover. Relatively few plants had flowered and seed had already been shed that year.

*Hieracium pilosella* is a perennial stoloniferous herb in the Asteraceae family and native to Europe. Eight subspecies are recognised in Flora Europaea. The subspecies identified in Tasmania is predominantly of eastern and northern European distribution (Tutin *et al.* 1976). Its major mode of local spread is asexual by stolons though seedlings may germinate with adequate moisture in sparsely vegetated sites. Production of stolons and daughter plants is linked to initiation of flowering and the parent plant subsequently dies

(Makepeace 1985). *H. pilosella* is reported to have short-lived seeds with 99.5% mortality recorded after one year in New Zealand (Espie pers. comm.).

It is a widespread weed in Canada, New Zealand and the United States. *H. pilosella* is a declared noxious weed in Quebec and Washington State and a pest plant in Southland Regional Council, New Zealand. In England it occurs in areas of low rainfall with well-drained, sandy soils that are dry in summer and low in major organic nutrients (Peining 1988). In New Zealand it has established from sea level to 1500 m in the 500–1000 mm rainfall zone affecting both pasture and native grassland (Rose *et al.* 1998).

Grown and sold primarily for its herbal properties, it has been listed in nursery catalogues in Australia and has been for sale in a number of nurseries (Groves pers. comm.). It does not appear to be widely propagated or planted in Australia. *H. pilosella* is subject to a national weed alert issued by AQIS and prohibited entry into Australia. It was not at the time of detection declared under Tasmanian weed legislation.

### RESPONSE

As a new naturalisation record the Tasmanian Herbarium notified the Department of Primary Industries, Water and Environment (DPIWE) as soon as it was identified. Consequently, the Tasmanian weed incursion response plan was triggered. The primary role of the response plan is to ensure timely, efficient, consistent and comprehensive management of new incursions (Boersma *et al.* 1999). Key actions for the management of *H. pilosella* included:

- Confirmation of the plant's identity.
- National notification – Office of the Chief Plant Protection Officer (OCPPO) notified to determine national significance of the incursion.
- Weed risk assessment and investigation into distribution and source of incursion.
- Management plan developed and implemented in consultation with affected parties.
- Surveillance – Awareness material prepared and distributed through media, Weed Alert Network and other targeted groups.

**Confirmation of identification** Specimens of the plant were referred to the Tasmanian Herbarium for identification and it was positively identified as

*Hieracium pilosella* L. ssp. *nigrescens* (Fr.) Nägeli & Peter.

**National notification** Under policy developed by the then Australian Agricultural Council, if a weed is deemed to be exotic to Australia, nationally significant, and eradication is feasible, it may qualify for shared Commonwealth/State funding and its management overseen at a national level. Such an arrangement enhances the likelihood of eradicating the weed.

On notification of the infestation of *H. pilosella*, OCPPO undertook an assessment of its distribution to determine the national status, which highlighted this infestation as the first recorded naturalisation of the plant in Australia. However, as this weed was not on the AQIS pre-1995 prohibited list and as it has been detected being sold in nurseries, it was concluded that this plant was present in Australia (Duthie pers. comm.). As a consequence a national response was not initiated and the management of this nationally significant weed became a Tasmanian responsibility.

**Weed risk and source** A defined weed risk assessment process was not in place in Tasmania at the time of the incursion. As such, a largely subjective approach was taken to assess weed risk to meet the short response time frame required by Tasmania's incursion response protocol (Boersma *et al.* 1999). At-risk environments and communities were identified based on the literature, available largely from New Zealand, which suggested *H. pilosella* to be a significant threat to unimproved pastoral lands and native grasslands in environments similar to those of Tasmanian grasslands.

Tasmania has significant areas of grassland within a comparable rainfall and altitudinal range to that of *H. pilosella* in New Zealand, particularly where it has its greatest impact in montane grasslands with rainfall of 500–1200 mm. It was additionally noted that the expansion of *H. pilosella* in New Zealand has occurred long after its original introduction indicating a classic sleeper weed pattern. The stimulus for this expansion of its impact in New Zealand is not fully understood however a relationship with the degradation of grassland condition has been suggested (Rose *et al.* 1998). We don't know whether *H. pilosella* would behave similarly in Tasmania, however we do know many Tasmanian grasslands are in poor condition and are climatically suitable to invasion by *H. pilosella*. Furthermore, the high density of *H. pilosella* in the small infested area in Tasmania reflects the New Zealand experience in degraded short tussock grasslands.

The potential agricultural impact in Tasmania was assessed as considerable. In New Zealand the

consensus is that greatest management problems arise in unimproved tussock grasslands. The structurally intact tall tussock grassland appears the most resistant to invasion and the short tussock grasslands are most at risk (Rose *et al.* 1998). Large areas of unimproved grassland exist within the grazing areas of Tasmania making it potentially susceptible to invasion by *H. pilosella*.

The environmental significance of the incursion was assessed in terms of the potential to impact on biodiversity at the State level. In Tasmania, grassland communities are restricted in distribution and considered a high priority for conservation (Kirkpatrick *et al.* 1995) containing nine nationally listed threatened species and a further 30 State listed threatened species. Many of these threatened species occur in the inter-tussock spaces that *H. pilosella* so successfully dominates in New Zealand grasslands. *H. pilosella* was assessed as a significant biodiversity threat in Tasmania.

The potential issues related to the control of *H. pilosella* should it develop into a more widespread problem were also considered. Tasmania is largely reliant on conservation programs on private land for maintenance of grassland biodiversity. Improving soil fertility and pasture productivity is the most effective and productive approach to control available to managers, however this technique will also bring about further demise of the threatened grassy ecosystems. Only physical and herbicide approaches to control could be exercised within native grasslands if their conservation values are to be retained. This would further increase the costs of conserving native grasslands on private land should *H. pilosella* establish.

Investigations to determine potential sources of the infestation were unsuccessful and it is unknown how long it could have been established. It is known to have been sold through nurseries on the mainland and could possibly have arrived from New Zealand as a pasture seed contaminant. It is known that the infested site had not been sown or ploughed for about 50 years.

**Management plan** Fortunately, eradication was easily facilitated within the road widening works proposed for the area. An eradication program was negotiated with the Department of Industry, Energy and Resources (DIER) and integrated with the roadworks program at little extra cost. The operation involved scalping the soil (top 15 cm) from the infested area and a substantial buffer area and deep burying the material on site. The area scalped has been subsequently buried beneath the roadworks and it would be highly unlikely that any regeneration in the previously infested area would be possible. Machinery used in the removal of the infested material was washed down on

site in a designated hygiene area. This operation was approved by DPIWE and overseen by a DIER officer. No *H. pilosella* plants were detected during follow up monitoring undertaken in 2002.

**Surveillance** The surveillance approach implemented to locate further occurrences of the weed was essentially based on the use of the media and the production and distribution of education material to members of the Weed Alert Network and Landcare/farmer organisations. The Weed Alert Network is a group of people with botanical skills who have the opportunity to participate in weed surveillance. Due to resource constraints surveillance undertaken by Department officers was limited to the immediate area of the weed occurrence.

#### DISCUSSION

Tasmania is currently developing the weed risk assessment process to be used in State incursion response planning. However, there is still a need for improved databases and systems for quickly compiling global distribution records and undertaking climate matching in Tasmania. Establishment of a national set of resources would facilitate State action and ensure consistency in weed risk assessments. Lack of resources to undertake this weed risk assessment was found to be a major hurdle in meeting response protocols.

In this case, the decision to eradicate *H. pilosella* was uncomplicated in the absence of a more objective weed risk assessment. Road works proposed for the area facilitated a simple cost effective eradication solution. The capacity to eradicate has been enhanced by the short-lived nature of the seed. Annual monitoring of the previously infested area and immediate surrounds is planned to take place for the next four years.

Bearing in mind that weeds are seldom as limited in their distribution as we originally think, there is still some uncertainty as to whether there are other infestations of *H. pilosella* in Tasmania. Although the Weed Alert Network was notified with bulletins distributed to members and farmers engaged in an education program via the media, the extent of specific surveys for *H. pilosella* has been very limited. The preparation and resourcing of a surveillance plan would have increased our confidence of eradication.

The most significant ongoing issue for Tasmania is the risk of further incursion from interstate. As *H. pilosella* was known to occur in Australia in horticulture, which we define as a pre-naturalised situation, no process existed for coordinating the management of this issue with other states such as ensuring the control over sale and distribution of this species nationally. As a result we expect further naturalisations will occur.

This compromises the actions taken by Tasmania and those other states seeking to eradicate *H. pilosella*.

Clearly there is an opportunity to eradicate or suppress at little cost, significant weeds in Australia that fall into this pre-naturalised category. A process that parallels how new incursions are managed in Australia is desirable to coordinate the management of significant eradicable 'pre-naturalised' weeds. For example, Csurhes and Edwards (1998) list a number of similar pre-naturalised species of significant weed potential in Australia that would benefit from such an approach. Recent policy discussions by the Australian Weeds Committee and initiatives by the CRC for Weed Management Systems, Environment Australia and the Department of Agriculture, Fisheries and Forestry suggest this issue is starting to gain prominence. The major challenge will be determining the assessment process and criteria for national eradication. This process could be developed as a broadening of the role of the consultative committee on exotic plant incursions as set up under the Australian Weeds Committee.

#### REFERENCES

- Boersma, M., Bishop, A., Gonionon, C., Hanson, C., Rudman, T. and Welsh, S. (1999). Establishment of a weed surveillance and response protocol for new plant incursions in Tasmania, Proceedings of the 12th Australian Weeds Conference, Hobart, Tasmania, pp. 651-654.
- Csurhes, S. and Edwards, R. (1998). 'Potential environmental weeds in Australia. Candidate species for preventative control'. (National Weeds Program, Environment Australia, Canberra).
- Kirkpatrick, J.B., McDougall, K. and Hyde, M. (1995). Australia's most threatened ecosystem: the south eastern lowland native grasslands. (World Wide Fund for Nature Australia, Beatty and Sons, Chipping Norton, NSW).
- Makepeace, W. (1985). Growth, reproduction and production biology of mouse-ear and king devil hawkweed in eastern South-Island, New Zealand. *New Zealand Journal of Botany* 23, 65-78.
- National Weed Strategy Website [www.weeds.org.au](http://www.weeds.org.au).
- Peining, C. (1998). Element stewardship abstract for *Hieracium pilosella*, mouse ear hawkweed. (The Nature Conservancy, Virginia).
- Rose, A.B., Basher, L.R., Wiser, S.K., Platt, K.H. and Lynn, I.H. (1998). Factors predisposing short-tussock grasslands to *Hieracium pilosella* invasion in Marlborough, New Zealand. *New Zealand Journal of Ecology* 22, (2) 121-140.
- Tutin, T.G. *et al.* (1976). 'Flora Europaea, Vol. 4, Plantaginaceae to Compositae (and Rubiaceae)'. (Cambridge University Press, Cambridge, UK).