

***Hypericum* in National Parks: current control strategies in New South Wales**

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Background

The NSW National Parks and Wildlife Service is responsible for the management of over four million hectares of public land. A special funding package for pest management has been used to appoint and resource Pest Management Officers in each of the Service's 27 districts. During 1995/96 the Service has undertaken over 200 weed control programs (Leys 1996).

Funding for pest management on the Service's estate has increased from approximately \$2 million in 1994/95 to \$3.3 million in 1995/96 with a further increase anticipated for 1996/97. One half of this amount is spent on weed control programs.

The Service aims to manage weed populations to reduce their adverse impacts rather than to attempt eradication, which in most cases is not feasible. Some areas have been so badly degraded prior to reservation that rehabilitation will be a slow and costly process. The methods used often reflect a balance between the desire to use the most effective control techniques with a desire to minimize non-target effects.

Wherever possible integrated control programs are adopted using a range of methods. Biological control is incorporated into programs wherever effective bio-control agents are available. However, in many cases biological control is a long-term option that at best will reduce the vigour of the target species. The Service is committed to a regional/catchment approach to weed control where the programs are undertaken in collaboration with neighbours, community groups, and local government councils.

Distribution of *Hypericum* in National Parks of New South Wales

In general, St. John's wort originally infested the central and southern tablelands and slopes (Watson and Campbell 1993). More recently there has been an increased incidence of wort in the northern areas of New South Wales, in National Parks. The distribution by districts which are known to have occurrences of *Hypericum* are shown in Table 1.

Control of *Hypericum* on National Parks

In the financial year 1994/95 approximately \$82 000 was spent on control of *Hypericum* in New South Wales.

As mentioned earlier, wherever possible integrated control programs are adopted using a range of methods. For *Hypericum* chemical spraying, biological control, and in some minor outbreaks, manual removal is used (Robinson 1996).

Control strategy

Any infestations found should be treated as a priority. Contain existing infestations, particularly along roadsides to stop further spread into clean areas. Large infestations should be considered for a comprehensive biological control program utilizing as many of the organisms as possible. Prevention of clean areas becoming infested by limiting movement of contaminated machinery (including Park vehicles) should be enforced through regular washing of vehicles and plant and stopping contaminated material such as gravel or soil from being moved into clean areas with track maintenance. New patches of the weed should be sprayed as a priority if in clean areas.

Kosciusko National Park - a case history
Kosciusko National Park has a large infestation of St. John's wort. It occurs along most major highways and along approximately 25% of the 1200 kilometres of management trails within the park boundary. It also occurs along the foreshores of most of the large reservoirs of the Snowy Mountains Scheme, and the associated power line easements.

It has occurred at Charlotte Pass, an altitude of 1840 metres, probably brought into the area by imported gravel or soil.

All efforts are taken to keep all weeds, including St. John's wort out of the alpine area.

Over \$40 000 per annum is spent on control of St. John's wort in Kosciusko National Park. This is primarily spent on chemical spraying. The primary foliar spray chemical used is Grazon DS® 500 millilitres per 100 litres of water. Other chemicals used in New South Wales are Garlon 600® 170 millilitres per 100 litres of water, Roundup® 500 millilitres per 100 litres of water and Trounce® 173 grams (1 pack) per 100 litres of water.

Biological control has been trialed and used extensively on the western side of Kosciusko National Park as well as the Blowering Dam foreshores - Talbingo area in northern Kosciusko.

The St. John's wort mite (*Aculus hyperici*), and the St. John's wort aphid (*Aphis chloris*) and the St. John's wort

Table 1. Distribution by districts in New South Wales with known occurrences of *Hypericum*.

District	Hectares	Comment
Upper Hunter		
Avisford Nature Reserve	2 431	near Mudgee
Wollemi National Park	488 420	north-west end, Rylestone to Denman, 100 km north-west of Sydney
Nulla Mountain		
Coolah Tops National Park		recently gazetted
Munghorn Gap Native Reserve	5 935	recently gazetted
Goulburn River National Park	30 102	
Bathurst		
Hill End Historic Site	133	80 km north of Bathurst
Barton Nature Reserve	529	
Evans Crown Nature Reserve	425	
Winburndale Nature Reserve	10 048	50 km west of Orange
Weddin Mountains National Park	8 361	19 km south-west of Grenfell
Queanbeyan district		
Brindabella National Park		
Queanbeyan Nature Reserve	2	
Burrinjuck Nature Reserve	1 300	
Razorback Nature Reserve	2 595	
Tumut district		
Ulandra Nature Reserve	3 931	
Kosciusko National Park	690 000	northern half of park
Jindabyne district		
Kosciusko National Park	690 000	southern half of park
Dorrigo district		
Guy Fawkes River National Park	135 630	minor occurrence on Bi-centennial Trail, 60 km west of Torrigo

beetle (*Chrysolina quadrigemina*) have been released at various sites. A total of 16 sites are being monitored. It is probably still too early to fully assess the impact, but early signs are good.

References

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Towards the integration of control methods for St. John's wort: Workshop summary and recommendations

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Introduction

St. John's wort has been a problem weed in south-eastern Australian landscapes for the last 100 years. Its toxicity to stock and its perennial habit made St. John's wort an early and serious pest of pastures, and led to several attempts at control by chemicals, pasture management and biological control (see Groves 1997, Briese 1997b). Despite subsequent improvements in methodology and some degree of success using these various methods, the weed has still continued to spread; currently, it is becoming increasingly important in natural ecosystems as well as on grazed land.

Given the considerable research effort to date, is it simply a matter of putting all the accumulated knowledge together and combining the most relevant results into an effective integrated package for management; alternatively, is further research still needed in some areas? In 1995, the Co-operative Research Centre (CRC) for Weed Management Systems was set up with the purpose of co-ordinating research and fostering collaboration between groups to promote more effective weed management. As St. John's wort is one of only a few weeds to be considered a problem of both pastoral and natural environments, it is appropriate that the CRC Programs for Perennial Pastures and Natural Ecosystems jointly sponsored a workshop to answer these questions. The workshop brought together researchers from Australia and New Zealand, representing expertise in the ecology of St. John's wort, grazing and pasture management, animal health, herbicide use and biological control, as well as extension workers involved directly in weed control, and end-users, such as landholders and representatives of Landcare groups.

Papers presented at the workshop covered aspects of the weed's ecology/biology (including its history of introduction and spread) and toxicity to stock, as well as control strategies currently being used in pastoral situations and National Parks, including biological control, grazing management and herbicide use. From the formal presentations and ensuing workshop discussion, it became obvious that more research was required on certain aspects of the biology and control of St. John's

wort as a basis for more effective integration of different control methods. This paper summarizes the key points emerging from the workshop, and the recommendations made to address those gaps in our knowledge and develop the means to produce integrated management strategies for control of St. John's wort in different ecosystems.

Status and impact of the weed

Since soon after its introduction, summarized by Harris and Gill (1997), St. John's wort has presented a problem to grazing enterprises. The toxic effects of the weed on stock, comprehensively summarized by Bourke (1997), are well known. On this aspect, it is interesting to note that not all species of *Hypericum* contain hypericin; for instance tutsan and the two species native to Australia do not (Mathis and Ourisson 1963). Extrapolations to lost carrying capacity and an assessment of the economic impact of St. John's wort are possible. Costs of herbicides are similarly known (Campbell and Watson 1997) and while an Australia-wide figure is not available, the overall economic impact in pastoral areas is not difficult to estimate for particular properties or regions.

What is not clear is the impact of St. John's wort in non-pastoral situations where the weed may occur on crown land or national parks. Its importance may vary from insignificant, except as a source of infestation for neighbouring land and as a declared weed requiring costly control, to an assumed significant impact in areas of floral and faunal significance. The importance of the weed's competitive effect on native flora and its consequent indirect effect on native fauna, or possible direct toxic effect on native fauna, is completely unknown, however. Some better estimate of this aspect is desirable in assessing priorities for control methods in natural ecosystems.

To translate the existing pasture information and some estimate of conservation significance into a national assessment would require a more up-to-date knowledge of the weed's distribution, but whilst useful, this may not have the highest priority in the short term.