

Getting in early: a national approach to anticipating, detecting and managing potential new weeds in Australia

Paul Pheloung

Office of the Chief Plant Protection Officer, Agriculture, Fisheries and Forestry – Australia,
GPO Box 858, Canberra, ACT 2601, Australia

Summary This paper examines Australia's current capacity to detect and respond to new weed incursions and the prospects for improvement. Ensuring an effective national system is in place depends on several factors:

1. Effective surveillance and related triggers to provide sufficiently early warning of the presence of an exotic plant species.
2. Sound science-based decision support systems to assess the potential weed risk of a plant.
3. Adequately resourced national infrastructure to enable an eradication program or other response as appropriate.

Keywords Weed incursions, risk assessment, early warning and response.

INTRODUCTION

Australia has many well-established weeds. These are mostly new species introduced since European settlement that are a major problem for production systems and natural ecosystems. Many potential weeds are yet to enter or make their presence felt in Australia. Australia is relatively isolated and has stringent quarantine systems to minimise the risk of introducing new weeds, but so long as international tourism, mail, air and sea traffic continue, the risk cannot be eliminated. Groves (1998) concluded that the rate of naturalisation of exotic plants in Australia increased during the period 1971–1995.

The cost of managing a weed problem rises dramatically from the very low cost of quarantine systems to exclude weeds to the substantial and ongoing costs of living with an established weed. Early detection and eradication of a potential weed while the size of the infestation remains small can also, at relatively low cost, achieve substantial savings on the potential costs should the weed become established.

EARLY WARNING

The first step towards dealing with potential new weeds is knowledge of their presence in Australia. Figure 1 is an attempt to identify the main post entry pathways for exotic plants that may ultimately lead to the establishment of a self-sustaining and spreading population.

The first stage in Figure 1 is managed predominantly by the Commonwealth agencies, the Australian Quarantine and Inspection Service (AQIS) and Biosecurity Australia. Table 1 shows the principle pathways by which exotic plant material can enter Australia. AQIS seeks to widely and clearly communicate community awareness of the need to declare any plant material that is, or is planned to be, brought into Australia. Propagatable material not already permitted entry can then be assessed for weed potential (Walton 2001, Pheloung 2001) and entry permitted or excluded as appropriate.

Potential new weeds will continue to enter Australia via undeclared or unintentional pathways of entry despite the best efforts of AQIS. Furthermore, many potential new weeds are likely to have entered Australia long before the current rigorous quarantine protocols were implemented. Characteristically of weeds, many years may elapse before they are detected. The second stage in Figure 1 shows the possible locations of potential new weeds immediately following entry. Information derived from a number of sources including nursery trade catalogues, accession records of genetic resource centres and botanic gardens are an important source of knowledge on exotic plants present in Australia but not necessarily naturalised. This

Table 1. Pathways for the entry of exotic plants to Australia.

Pathway	Example	Management
Intentional		
Declared	Applications to import seed or nursery stock ~200 species are assessed p.a.	Weed risk assessment
Undeclared	Undeclared seed in international mail ~4000 seed containing mail items may be seized p.a.	100% intervention using x-ray, sniffer dogs
Unintentional	Seed contaminants in imported seed, machinery and other bulk commodities	Inspection and sampling

information is being assembled, together with existing lists of naturalised plants, into a comprehensive list of plants in Australia.

The third stage in figure one represents the transition from stored or cultivated plant stock to self-propagating and spreading populations, such as plants that have escaped into adjacent bushland from a private garden or rubbish dump.

Surveillance is the means to detect the presence of new plants in Australia. The term includes:

- Structured searching by trained personnel (AQIS's Northern Australia Quarantine Strategy is a prominent example of this).
- Desktop research towards the compilation of lists of plants in Australia.
- Communicating the need to be alert to the presence of new plants, particularly targeting those well trained and situated to recognise them.
- Reporting systems to quickly convey information on new plant records to those with responsibility for following up.

Effective surveillance provides warning of the presence of a potential new weed in sufficient time to contain and, hopefully, eradicate it. The effort and resources expended on surveillance strategies must be cost effective – a surveillance strategy must be reasonably likely to reveal the presence of a weed before it is too well established and widespread, and consequently beyond cost-effective eradication or containment.

ASSESSMENT

For the purpose of this paper, a potential new weed is a recently detected exotic plant currently restricted in its distribution but with the potential to have a negative impact on production systems, natural ecosystems or human welfare in Australia. At least 2800 exotic plant species have become naturalised in Australia (J. Hosking 2002 pers. comm.) and many more are present in nurseries, private gardens and germplasm stores. Only a small proportion of these are significant potential new weeds that warrant positive action. The apparent considerable benefits over costs of early action to eradicate would be rapidly lost if this small proportion cannot be identified.

At the time of writing, a subcommittee of the Australian Weed Committee, the Consultative Committee on Exotic Plant Incursions (AWC/CCEPI), has the task of evaluating the weed risk of newly discovered plants and making recommendations on the need for cost sharing and coordinated action. It is this committee, with representatives from Commonwealth, State and Territory government departments responsible for natural resources in Australia, that is responsible for following up on reported new plant records. The

principles and criteria that recommendations are based on are currently being refined and documented. Four basic criteria must be met to justify a nationally coordinated response:

- The identification of the suspected weed must be authoritatively confirmed.
- The weed must be potentially a serious weed of Australia.
- Eradication must be feasible, the infestation confined to a small area and without there being major biological/ecological impediments to eradication.
- Cost-benefit of eradication must be favourable – there should be a clear and significant net benefit to Australia.

These criteria are difficult to clearly evaluate but tools and techniques are available and being constantly improved.

RESPONSE

An effective response to an incursion of a potential new weed depends on effective and ongoing

- surveillance to determine the current distribution,
- quarantine measures to prevent further spread, and
- controls and treatments to reduce and ultimately eradicate the weed.

If AWC/CCEPI is satisfied that these conditions are met, a recommendation can be made to develop a national cost-sharing arrangement to fund the eradication with contributions from Commonwealth, State and Territory Governments. At this time, the inclusion of contributions from affected industries is being examined. The State or Territory in which the candidate is located is responsible for the management of the eradication campaign but must regularly report to AWC/CCEPI, and through this body to funding decision makers, on progress.

Over the last decade, there have been three nationally cost-shared weed eradication campaigns (Table 2). A more detailed examination of the history of weed eradications in Australia is the subject of a separate forum of this conference.

DISCUSSION

This paper has examined some of the issues that govern an appropriate response to potential new weeds. Policy decisions rely on good knowledge and effective methods to analyse and apply this knowledge. At the moment we are enjoying a promising balance of available resources, government commitment and growing community awareness that I hope can be capitalised on in the coming years.

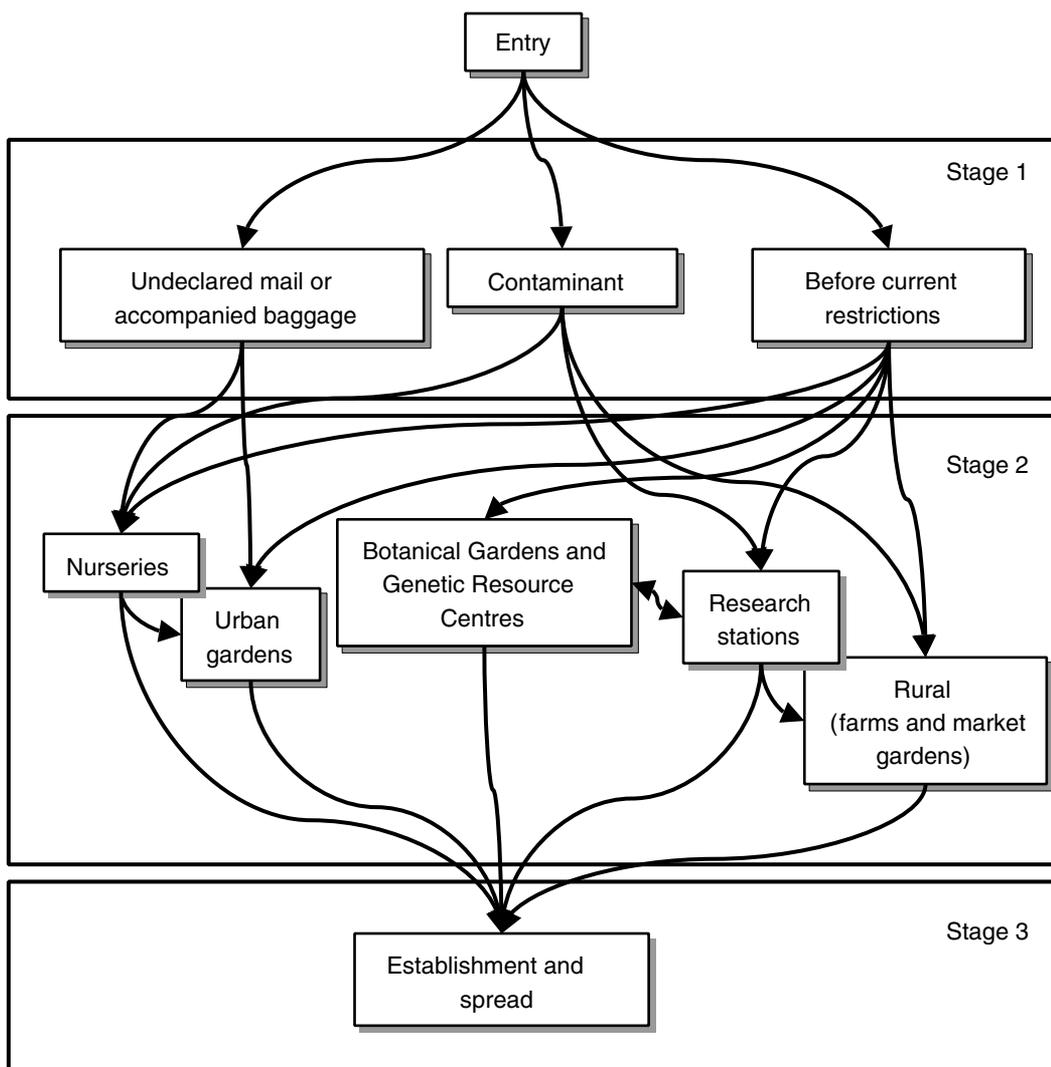


Figure 1. Pathways for the introduction, establishment and spread of exotic plants.

Table 2. Incursions of exotic weeds into Australia that have been the subject of a national eradication program.

Species	First detected	Current status	Cost to date
<i>Bassia scoparia</i> (kochia) ¹	1990	Infestation in WA presumed to be eradicated	<\$500,000
<i>Chromolaena odorata</i> (Siam weed)	1994	Infestation reduced to small area	>\$1,000,000
<i>Orobancha ramosa</i> (branched broomrape)	1992	Infestation contained to a 70 × 70 km area	>\$6,000,000

¹ See Dodd and Randall (2002) for the incursion in Western Australia. A later unrelated infestation in Tasmania associated with contaminated imported carrot seed has also been eradicated.

One important issue that deserves recognition is the current dependence on eradication as an endpoint to a nationally coordinated management of potential new weeds. Pest organisms, and weeds in particular, are notoriously difficult to totally eliminate. Careful consideration needs to be given to the considerable net benefits that can be derived from the long term and possibly indefinite containment of potential new weeds.

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Research Centre for Australian Weed Management has a key role in providing the technical tools that will assist these organisations.

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