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Best practice for on-ground property weed detection

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Introduction

Around 28,000 exotic plant species have been introduced into Australia since European settlement, and more than 2770 of these have become naturalised, of which around 65% are considered a problem for natural ecosystems and about 35% are considered a problem for agricultural systems.

Weedy species will continue to enter the country, while existing species will continue to expand their range within Australia through various pathways of weed spread (the subject of Defeating the Weed Menace Project UNE61 — *Pathway risk analysis for weed spread within Australia*, see: <http://lwa.gov.au/programs/defeating-weed-menace-rd-program>), particularly as changes in climate occur. The first step in the control of such weedy species is

their detection, and the sooner after introduction that this can be achieved, the more effective management strategies are likely to be.

There have been attempts to develop guidelines for professional surveying and mapping of nationally significant weeds and in national parks, weed spotting networks, and surveillance techniques for weeds that have already been detected in Australia such as branched broomrape. However, a large proportion of Australia is privately owned or managed by farmers and graziers, and as yet no one has undertaken a comprehensive study to ascertain current weed surveillance levels and practices amongst these landholders or the noxious weeds inspectors (or their equivalents in each state) that already check properties for new and existing invasive plants.

Concerned landholders and researchers inspect paddocks on the south coast of NSW where fireweed (*Senecio madagascariensis*) is spreading.



A recent survey of graziers in southern Australia by Trotter, Reeve, Scott and Sindel, conducted for Meat & Livestock Australia (data unpublished) showed that over 80% of the 900 respondents regularly checked their paddocks for weed infestations, but only 10% either recorded those infestations on maps or marked them in-field.

Here then is an existing Australia-wide network of people interested and committed to the detection of weeds ('weed spotters') but whose rigour is assumed to be relatively low. Likewise, public officers in most states and territories have a specified inspection function for weeds but how the states compare in their effectiveness has not been explored.

Information on existing landholder and weed inspector search patterns (particularly on their best and proven techniques) and data management and use, needed to be collected before we attempted to develop and extend widely more efficient methods for surveying and eradicating emerging weeds.

The research questions to be addressed in this project, therefore, were as follows.

1. What are the current inspection patterns for weeds on Australian farms?
2. What steps do landholders and inspectors take to report and obtain correct identifications of new species?
3. Which of these inspection and reporting strategies are most effective at detecting, identifying and eradicating new invasions?

Whilst weed spotter networks have been set up in Victoria (to survey for new and emerging weeds, and State Prohibited Weeds not already in the state) and in Queensland (working with community groups, such as bush walkers, to improve the capacity to find and record new weeds in national parks and other environmental areas), much private land is inaccessible to such groups. This project therefore complements these two existing systems by expanding enormously the coverage of land (across industries and land uses) and the number of interested people involved in weed detection networks.

Indeed, new weeds have a habit of being introduced to farms in imported feed, grain, pasture seeds, on travelling machinery and by livestock. Consequently, one of the best tools for detection of new weeds is landholders' eyes in their own paddocks.



Parthenium (*Parthenium hysterophorus*) can mature and spread if juveniles such as

Supplementing landholders are noxious weed managers. The role of this latter group is different in each state and territory and it is therefore essential to collate information from all jurisdictions to obtain a complete picture of inspection patterns (for example — methods, location, frequency, seasonality, time spent, single or multiple species focus, life cycle influences) and how data are then handled for weeds across the country to be able to identify where there are gaps and weak points in on-ground surveillance and eradication efforts.

An important aspect of this inspection picture is how long a plant can be present on a farm before a landholder or weed inspector recognises it as a 'new' weed, or before he or she takes a specimen away for identification. Key to this is the ecology of the weed, how quickly it reproduces after a propagule arrives at a new site, and how quickly the weed then spreads. A further consideration is the extent to which the invading weed has a negative economic impact on the landholder.



the one pictured above (left) are not undetected.

Photos Arthur Mostead.

The purpose of this research therefore, was to:

1. Assess current weed surveillance levels and practices amongst landholders and noxious weeds inspectors; and
2. Identify ways to improve weed detection by these groups on-ground.

Some results

- Over 74% of respondent weed inspectors have experienced hesitance on the part of landholders to report weeds. This is caused by the costs associated with weed control, fear of potential sanctions or enforcement, lack of interest, and insufficient knowledge.
- Inspectors consider that landholders have a moderate commitment to weed detection overall, with only just over 10% believing that landholders have a high level of commitment.
- The main incentives committing landholders to weed detection and control are believed to involve landholder knowledge, while the main impediments to landholder commitment involve various 'costs' (financial, time, staffing). The landholders assessed as least committed to weed detection are part-time farmers (absentee landholders, lifestyle farmers, and farmers with off-farm employment).
- Most inspectors (76%) believe that weed surveillance could be improved:
 - through supply of increased resources and personnel, community awareness and education, and
 - through more of their time being devoted to in-field detection work. Although less critical, improvements to weed identification would involve weed identification training for staff, landholders, volunteers and the general public, as well as dedicated weed identification resources.
- Other suggestions for improving weed detection involve the themes of training and education of staff, landholders and the general public, increased government resources and funding, improving inspection techniques, and changes to legislation.
- The great majority of farmers (84.3%) check for weeds on a regular basis though most (65.3%) do so while conducting other on-farm tasks.
- Most farmers consider that weed declaration makes no difference to checking for weeds, though it does make a difference for a small majority of Western Australian interviewees, suggesting a more effective declaration strategy and promotion in that state.
- Only 4.8% of landholders indicate that the impending visit of an inspector makes them change their weed checking activity, which is in contrast to the more favourable perception of this impending visit amongst weed inspectors surveyed.
- Farmers believe that weed authorities should focus on making sufficient information available to landholders on target plants rather than focusing on getting landholders to simply report suspicious plants to authorities, although 28.5% suggest that both strategies would be useful.

- More farmers (65.3%) than inspectors (45.8%) believe that weed distribution information on private property should be made publicly available.
- Of all property types, crop farmers have the highest checking rate overall (96.5%) and horticulturalists the lowest (86.1%).
- Approximately half of the farmers believe their surveillance strategy is 'mostly effective' while the other half said that it was 'very effective'.
- Curiosity, is the main motivation for having a weed identified. This interest influences farmer behaviour to a greater degree than concerns about spread, and possible economic losses.
- When finding a new weed, 42.1% of farmers will mark the site in the paddock with a stick or pole, while 36.8% will record it in a diary or notebook.
- The majority of farmers believe that impediments to reporting new weed discoveries include the cost of eradication, threat or fear of legal action, and concern over what other landholders might think.
- Over half of all farmers rate the level of government commitment to weed control as 'low'. However, this percentage varies between states. For example, while 72.4% of Victorian interviewees and 68.2% of those from Tasmania rate the level of commitment as 'low', only 41.9% of interviewees from South Australia do so.

Birds, such as this King Parrot, are believed by farmers and weeds inspectors to be a major pathway for the spread of weeds such as this cotoneaster. Photo Brian Sindel.

Conclusion

On the whole, this research project showed that Australian farmers are alert to new weeds, and have a reasonably high level of commitment to their detection and control. As a group, farmers therefore need to be encouraged, and equipped to be vigilant and effective weed spotters. This may be achieved through training opportunities, greater extension and educational activities, increased resources devoted to weed detection, and greater cooperation between landholders and weeds authorities.

There was often considerable variation between states and territories, and property types in relation to weed spread detection and reporting. Some states and territories, and landholder types were considered as performing better than others, though geographic and climatic differences, as well as enterprise differences, accounted for some of the variability. Research and extension programs aimed at improving weed detection strategies will need to take into account such variation and target specific groups appropriately.

Overall, there was seen to be a low level of government commitment to weed detection. Given the high environmental, social and economic impact of weeds, this situation needs to be remedied, since early detection is much more cost-effective than a later cure.

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