

Gorse control in Western Australia

John H. Moore and P. Williams

Department of Agriculture and Food Western Australia, 444 Albany Highway, Albany,
Western Australia 6330, Australia
Email: jmoore@agric.wa.gov.au

Summary Gorse is a Weed of National Significance and has become the focus of an intensive control program in Western Australia. The total area of infestation is less than 100 ha and is spread over 360 locations. Top growth is treated with herbicides funded by landholders, South Coast Natural Resource Management Inc. and the Department of Agriculture and Food Western Australia. The program is outlined and the costs and risks associated with this weed, which has very long seed dormancy, are discussed. The need for innovative research into controlling weed seed banks is emphasised as these have been the major source of new infestations and the main reason for failure of previous control programs. Control of the movement of seed infested soil and long term commitment to seedling control are key factors for eventual eradication. This requires ongoing and long term funding, and dedication by both government and land managers.

Keywords Gorse, *Ulex europaeus*, control, eradication, strategies.

INTRODUCTION

Gorse (*Ulex europaeus* L.) was declared in Western Australia in 1976. The level of infestation has remained relatively constant since that time, with relatively high levels of control occurring in the 1980s, but generally little control in the 1990s. With renewed interest in the environmental weeds, Natural Heritage Trust (NHT) funded projects were implemented from 2002 for the control of gorse on public lands and the supply of chemicals and advice for control on private land (Moore 2002). This was followed by a one year research project into potential methods for controlling the long lived seed bank (Moore *et al.* 2006) and then the appointment of a biosecurity officer for two years by South Coast Natural Resource Management Inc. (SCNRM) to implement high levels of gorse control (Moore and Williams 2006). This was supported by the National Gorse Taskforce that identified gorse as a target for eradication in WA due to the low levels of gorse infestation.

CURRENT STATUS

In 2007, there were 360 recorded infestations of gorse in WA, totalling less than 100 ha. About 90 occur on

private properties and the rest are on Government or Shire lands, where most of these are small roadside outbreaks consisting of only one to 10 plants. Overall the total area of gorse has remained relatively constant over the last 30 years. The locations of the current infestations are shown in Figure 1.

Nearly all the active infestations are within 50 km of Albany. One is 250 km west on a property that has close links with Albany and with an earth moving company. Three other outlying infestations have been recorded in the past but no plants have been found at these locations for the past 10 years.

STRATEGY

The strategy from 2000 has been to control gorse on public lands, then on private lands, and then to prevent the movement of soil that contains gorse seed. Control on public lands was implemented first because it is difficult to get private landholder support for control when adjacent government land is infested. Support for control on private land is essential for weeds like gorse that have little direct impact on private income and which mainly infest non-productive areas.

Control of movement of infested soil is the most difficult practice to implement, and requires good maps locating prior infestations. These maps are developed during the control phase.



Figure 1. The distribution of gorse in Western Australia.

Infested areas require annual inspections for seedlings for around 30 years before they can be declared gorse free. This long time frame is usually the underlying cause of continuing gorse infestations in most areas. Land tenure often changes over this period, with new owners who may not be aware of previous infestations, or the movement of infested soil from sites that appear to be gorse free. Ideally, a public officer is required who has overall responsibility for gorse eradication over a 30 year period. This is generally difficult to achieve as management and political objectives change with time. The alternative is to find methods of more quickly eliminating the seed bank. Research into this problem is the key to achieving a successful eradication outcome for gorse.

There are very effective techniques for the control of gorse once it has germinated, and most control and biocontrol programs focus on control of plants rather than seed banks. Significant long term funding is required to solve the seed dormancy problem. Much work has already been done on gorse seed banks and dormancy over many years without much success. However, the benefits compared to the alternative of 30 years of inspection and seedling control should be significant.

CURRENT PROGRAM

The aim of the current program is to prevent all seed set on gorse in WA. This is relatively easy to achieve on 80% of the infestation with an annual cost of around \$80,000. The remaining 20% of the area is in difficult situations and requires specialised equipment for access and control. It is estimated that this will cost a similar amount. In 2006/2007, 20% of properties or 75% of the total area of infestation was treated.

New infestations are still being found, but are nearly all directly connected to movement of machinery or soil. One was found by tracing back a known infestation to its likely source: this was an instance where water flows spread the infestation. Spread by birds appears to be of little importance.

There are a number of instances where new bushes or seedlings have been detected close to known infestations and have been found by community members or control officers. Each spring, when gorse is flowering, the local media are used to raise public awareness and seek help to find new infestations. A local biosecurity officer investigates all reports. Most new infestations are found by public reporting; however, many reports are of other species such as *Hibbertia* spp. and prickly *Acacia* spp.

Several options for the future management of gorse are being considered, and some are already in use:

- 1) Working with landholders to provide innovative solutions to infestations. For example, a number of the large infestations are on land that will be developed into housing blocks. In these areas there is potential to bury the seed bank too deep for germination. Control of the movement of surface soil is implemented to reduce the risk of seed being moved to clean areas. Vehicle movements are adjusted to reduce traffic through infested areas. Earth moving equipment is cleaned down on site. These simple and low cost measures have been readily embraced by the developers. Advice, herbicide and some financial support are being provided to private landholders, and public landholders are encouraged to maintain and increase control programs. Most public land managers are willing to control large, heavy and publicly visible infestations, but rarely continue the control of the remnants until they reach appreciable size again.
- 2) Continued control of gorse bushes to keep seed set at very low levels.
- 3) Inspection of all infested areas to remove seedlings.
- 4) Development of protocols for councils and earth-moving contractors to reduce the amount of soil that is transferred away from infested sites. This is being done in conjunction with the Jarrah Dieback Program, so there is one system to reduce both disease and weed spread. This could become one of the conditions on development applications.
- 5) Placing maps of infested sites on the internet.
- 6) Continued research and seeking of funds to work on seed dormancy mechanisms.
- 7) Development of practical techniques to tackle seed banks.
- 8) Support for biocontrol programs, especially those that target the soil seed bank.

Points 1 to 5 will be significantly implemented by the employment of a biosecurity officer on South Coast Natural Resource Management funds, with the risk that the value of this investment may be limited if longer term funding does not materialise.

Points 6 to 8 potentially provide a far better solution, but there is the risk that no solution may be found with the investment provided.

Enforcement Under WA legislation, landholders are responsible for gorse control on their properties. This has been difficult to implement where the weed is not causing economic loss (or potential economic loss). It is especially difficult in areas close to towns, or where non productive land is being held for development or lifestyle uses and where there is resistance to using herbicides. To achieve very high levels of control, very

high levels of landholder cooperation are required. This is a particular problem on government controlled land where enforcement does not always occur.

Intervention Interactive programs where herbicide and, occasionally, equipment is supplied has resulted in all large infestations in the Albany area being treated. There has not been any need to enforce control. The main cost is associated with the project officer who will maintain community contact and enthusiasm. This officer is also required to investigate, map and ensure control when community members report infestations. Lack of action quickly results in disillusionment and loss of community support. Gorse has been a serious weed in many countries for many years and various strategies have been used over time. Doing the same things that have not worked in the past is not a good strategy for the future. More critical analysis of program failures is required.

Each Weed of National Significance has a few key features that give it significance when combined with its other weedy traits. In the case of gorse the key traits are its seed dormancy combined with its prickly nature and tendency to form large monocultures. Most prickly weeds tend to be treated by concerned landholders and

most decline to very low levels over time due to low recruitment rates. In the case of gorse, the extended seed life in the soil allows it to persist until favourable conditions occur, or when control efforts are reduced. Controlling the seed bank is the key to success in any gorse control program.

ACKNOWLEDGMENTS

Funding supplied by DAFWA, Defeating the Weed Menace, NHT, SCNRM Inc., Albany City Council and land managers is gratefully acknowledged.

REFERENCES

- Moore, J.H. (2002). Gorse. *Farmnote* 61/2002, 1-2. Department of Agriculture, Western Australia.
- Moore, J.H., Sandiford, E., Austin, E. and Poulish, G. (2006). Controlling gorse seed banks. Proceedings of the 15th Australian Weeds Conference, eds C. Preston, J.H. Watts and N.D. Crossman, pp. 283-6. (Weed Management Society of South Australia, Adelaide).
- Moore, J.H. and Williams, P. (2006). Gorse (furze) *Ulex europeus*. *Farmnote* 160, 1-2. Department of Agriculture and Food, Western Australia.