Integrated management of blackberry in Western Australia

John Moore[1], Andrew Reeves[2] and Simon Merewether[2]
[1] Department of Agriculture and Food, 444 Albany Highway, Albany, Western Australia 6330, Australia.
[2] Department of Agriculture and Food, Box 1231, Bunbury, Western Australia 6231, Australia.
Email: jmoore@agric.wa.gov.au

Summary Blackberry (*Rubus* spp.) is a major environmental weed. Three major species (*R. anglocandicans*, *R. ulmifolius* and *R. laudatus*) exist in Western Australia (WA). New rust strains (*Phragmidium violaceum)* have been introduced to help control this weed. These rusts affect *R. anglocandicans* severely, affect *R. ulmifolius* moderately, and have little effect on *R. laudatus.* There is concern that as one species is controlled the other species will simply replace them. Surveys of the distribution of species indicated that the *R. anglocandicans* occurred in most areas and *R. laudatus* occurred mainly in the northern section of the infestation. *R ulmifolius* was at low levels and scattered across the region.

An integrated weed management strategy was developed. This included the use of herbicides to control minor infestations of *R. ulmifolius* and *R. laudatus* in the southern areas and creating a blackberry-free buffer zone to stop *R. laudatus* spreading southwards. The northern and southern infestations will be separated by controlling blackberry on two parallel rivers approximately 10 km apart and all infestations in-between. Initial control is subsidised with funding from the Defeating the Weed Menace program of the Natural Heritage Trust (NHT) and the WA state government. Follow-up control will be the responsibility of land owners and will be strictly enforced by the Department of Agriculture and Food Western Australia (DAFWA). Infestations of *R. laudatus* and *R. ulmifolius* south of the buffer zone will be controlled by DAFWA and land managers with some support from NHT. This should ensure the maximum effect of the new rust strains on the blackberry infestation.

Keywords Blackberry, biocontrol, *Rubus*, *fruticosus*, *laudatus*, *anglocandicans*, *ulmifolius*, rust, *Phragmidium violaceum*, herbicide, environmental weed, Western Australia.

INTRODUCTION

Blackberry (*Rubus* spp.) is a major environmental weed of Western Australia (Moore and Wheeler 2002) infesting a 600 km long by 100 km wide belt from Perth to Albany. Birds and mammals are the most important vectors for medium distance spread of a few kilometres.

There are three main species. *Rubus laudatus* from North America occurs mainly in the northern part of the infestation, especially around the Perth metropolitan area and is generally only present north of Collie. The other two species originate from Europe. *R. anglocandicans* occurs over most of the infested region and *R. ulmifolius* is mainly found in scattered populations around the townships of Manjimup and Pemberton with a few infestations around Albany. These make up approximately 70, 28 and 2% of the infestation respectively. In the northern half of the infestation the species grow together. There are two varieties of *R. ulmifolius.* Variety *ulmifolius* is locally called 'small leaved blackberry' and a variety *anaplothyrsus* is a thornless form. Four other *Rubus* have also been recorded in the state at very low levels and they don't appear to be spreading quickly. They are *R. idaeus, R. loganobaccus, R. parviflorus,* and *R. rugosus.* The latter two could not be found in a 2004 survey.

Two strains of the rust (*Phragmidium violaceum*) have been released, one in 1984 (Moore and Hoskins 1985) and one in 1991. These are now widely distributed but have had little impact (Moore 2002). Eight new strains were released in 2004 to help control this weed (Morin *et al*. 2005). They cause significant damage to *R. anglocandicans*, moderate damage to *R. ulmifolius* and little damage to the American species, *R. laudatus.* It is anticipated that the damage caused by the rusts may result in the American species replacing the European species and the maximum benefit of the biocontrol program will be lost. A similar situation occurred when other strains of the same rust were released in Victoria in the 1980s. A strategy to maximise the effects of the biocontrol program was developed.

THE STRATEGY

Buffer zone A line from Collie to the west coast essentially separates the relatively pure *R. anglocandicans* in the south from the northern mixed infestations (see Figure 1). The Brunswick and Collie rivers, railway line and road provide access across the rugged Darling Scarp and creates an opportunity to develop 10 km wide blackberry free barrier between these two species that will reduce seed borne spread of blackberry to very low levels.

Herbicidal control Triclopyr at 3 kg a.i. ha^{-1} plus picloram at 1 kg a.i. ha^{-1} as Grazon® is preferred for control as it provides high levels of control and potential eradication (Moore and Moore 2007). Metsulfuron or glyphosate may be used in some areas such as water catchments and mechanical control may be used in some sensitive areas such as organic farms or where the landholder is not willing to use herbicides.

South of this buffer zone, all known *R. laudatus* and *R. ulmifolius* plants will be sprayed with Grazon unless there are grounds for alternative control.

Funding The program is funded by land managers, the Department of Agriculture and Food Western Australia (DAFWA) and the Natural Heritage Trust (NHT) Defeating the Weed Menace program and has a total cost of $150,000, shared approximately equally.

Community involvement In WA, blackberry is a declared plant and control can be enforced, if necessary, on private land. However, because very high levels of control are required with the goal of eradication in the buffer zone, a more cooperative approach was adopted. Funds were sought and DAFWA was given the lead role for this project as it has had many years experience in blackberry control programs. Within the buffer zone, there are 390 landholders and all were contacted in writing. The aims of the project were explained to them and technical advice was provided. An aerial photograph of each property was provided along with a reply paid envelope asking that any outlying infestations be identified for follow-up by the local biosecurity officer. An offer of financial assistance was made to any landholder who felt the control program was beyond their budget capability. The landholder had to make a long-term commitment to maintain the blackberry at the reduced level achieved by control with government funds. There have been no recalcitrant landholders that required control enforcement notices, but these may be required in the future. The greatest challenges come from ensuring control on government-managed land where funds are often limited and other priorities such as limiting herbicide use in water catchment areas, tourist development and a lack of appreciation of the effects of blackberry may override weed control priorities. In the buffer zone about a third of the land area is managed by various government bodies.

Most blackberry infestations in WA are associated with watercourses or wet areas. Water samples will be taken during the control program to measure the amount of herbicide entering or moving in streams after normal field applications. Trials with alternative herbicides are planned for plantation areas because the normal triazine and glyphosate-based weed control programs are not providing good blackberry control.

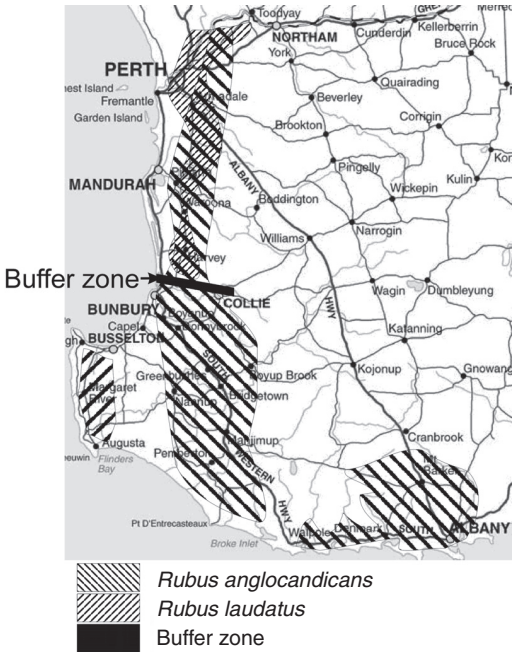

Figure 1. The distribution of the main species of blackberry in WA and the blackberry-free buffer zone.

Issues related to the use of herbicides in water catchment areas have been considered and the management strategy for blackberry is consistent with Department of Health guidelines.

Complementing the blackberry buffer zone project are two blackberry identification workshops which include representatives from industry, local government, state government and the local Weed Action Groups and is funded by the Defeating the Weed Menace program. From this workshop community, government and industry groups have engaged in mapping blackberry infestations in bushland areas that are difficult to access to help management in future years.

The capacity within the community to identify minor species of blackberry is an essential element of the overall strategy. As the biocontrol takes hold, the tolerant species should be more obvious to the casual observer and a widespread network of community surveillance volunteers allows funds to be focused on control activities. Weed Watcher is a web-based weed reporting mechanism that is used in WA to enable members of the public to report weed locations. This is also being promoted at the various weed workshops

and field days to try and increase the levels of surveillance. The current blackberry maps generally have only recorded blackberry to the *R. fruticosis* (agg.) level. Over the next few years, these maps will be updated to reflect the particular species present. This will allow priority for control to be placed on the minor and/or tolerant species.

Monitoring and extension Articles in the local media are used to increase awareness and encourage reporting of infestations. Demonstrations sites are used to convince land managers that effective control can be achieved with minimal damage to the environment. Monitoring of water in some infested streams where spraying has occurred is used to substantiate the lack of herbicide movement off-site. There is often an initial reluctance to using herbicides for control on public lands. When this occurs, a small-scale demonstration is usually implemented to give the public land manager the confidence to approve a larger program. This is supported by supplying free herbicide to landholders for the control of minor species or outliers of the major species. Their personal input into spraying provides good ownership of the situation and usually leads to better ongoing control levels to achieve local eradication.

CONCLUSION

Successful implementation of the strategy depends on engagement of the land manager coupled with good support from the lead agencies and continued control on government controlled lands. If this is achieved, the impacts of the blackberry infestation in WA will be reduced.

ACKNOWLEDGMENTS

Assistance from Brad Rayner, Brett Vukelic, Paul Merks, Lee Fontanini, CSIRO, Department of Environment and Conservation, Forest Products, Collie, Brunswick and Manjimup Weed Action groups, Westrail and many stakeholders is gratefully acknowledged.

REFERENCES

Moore, C.B. and Moore, J.H. (2007). HerbiGuide – The pesticide expert on a disk. Version. 20.5. Box 44, Albany, Western Australia, 6331, HerbiGuide, www.herbiguide.com.au.

Moore, J.H. (2002). Blackberry. Farmnote 60/2002. Western Australia Department of Agriculture Western Australia, Perth.

Moore, J.H. and Hoskins, E.B. (1985). Beating the blackberry. *Journal of Agriculture – Western Australia* 26, 24-30.

Moore J.H. and Wheeler J. (2002). Southern weeds and their control. Bulletin No. 4558/02. Department of Agriculture Western Australia.

Morin, L., Aveyard, R., Batchelor, K.L., Evans, K.J., Gomez, D.R., Hartley, D., Jourdan, M. and Scott, J.K. (2005). New strains of *Phragmidium violaceum* for the biological control of blackberry. Conference handbook: 15th Biennial Conference of the Australasian Plant Pathology Society, 26–29 September 2005, Geelong, p. 379.