



# Risk protocol proves its worth with researchers

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ABOVE: Researchers have used the protocol to assess the potential weed risk of Enrich species such as *Rhagodia preissii*. (Photo: J Emms)

The Weed Risk Protocol, developed under the FFI CRC Biodiversity Program, has been published on the CRC’s website and in the *Journal of Experimental Agriculture*. But what does it mean for researchers and landholders?

Dr Lynley Stone, Department of Environment and Conservation, WA (DEC) worked with researchers in the FFI CRC and CRC for Australian Weed Management to develop a Weed Risk Assessment Protocol. The Protocol uses a series of questions about a plant’s biology and ecology to assess its potential to become an environmental weed.

The CRC recognises it has a responsibility to minimise the chance of new perennials causing harm and to foster a risk-management culture within the organisation.

Dr Stone said that researchers already had well-developed measures for assessing aspects such as a plant’s toxicity, and meat and wool taint potential, but methods for evaluating environmental weediness are still evolving.

Dr Stone explained that the Protocol was developed for southern Australia and as such was quite general in the level of information it could provide. She sees the Protocol as a dynamic document, which will be refined over time and could be adapted for specific areas.

“Natural Resource Management groups may want to develop specific weed risk protocols for their catchments, using the Protocol as a starting point, with information on local conditions and priorities incorporated,” Dr Stone said.

FFI CRC researchers have been assessed using the Protocol (see Table 2). Each plant was assessed separately for Western Australia, South Australia, Victoria and New South Wales, as a plant’s potential as an environmental weed depends upon where it is grown.

“When species are found to have a low or negligible environmental weed potential, that signals the end of our involvement,” Dr Stone said.

## Take these for example

For example, birdsfoot trefoil (*Lotus corniculatus*) (see *Focus on Perennials* Issue 2) has a low environmental risk so researchers can promote it knowing that it is unlikely to cause problems in the environment.

Similarly, *Melilotus siculus* was found to have negligible environmental weed potential. *Melilotus siculus* is an annual legume that is highly tolerant to salinity and waterlogging. Although the plant is naturalised in Australia, it is new to Australian agriculture and not

## key points

- The Weed Risk Protocol uses a questionnaire to assess its potential environmental weed risk
- NRM groups can use the Protocol as a starting point for developing their own risk assessment protocol
- Questions are divided into sections relating to invasiveness, impacts and potential distribution
- Researchers are embracing the Protocol in their investigations of potential plant species.

## Invasiveness, impacts and distribution

Questions on the Protocol are divided into sections relating to invasiveness, impacts and potential distribution. Plants are scored depending on the answers. Scores for each section are multiplied together to acknowledge the interactions between the criteria and to give a broad spread of scores (i.e. invasiveness x impacts x potential distribution). Plants are then assigned a score and one of five weed risk categories (see Table 1).

Dr Stone said that it is a lengthy process to assess a plant and, to date, 15 plants of interest to

Table 1. Weed Risk Protocol categories

| Frequency band                         | Weed risk score              | Weed risk  |
|--|------------------------------|------------|
| 80 – 100% (top 20% of possible scores) | Greater than or equal to 236 | Very high  |
| 60 – 80%                               | <236                         | High       |
| 40 – 60%                               | <111                         | Medium     |
| 20 – 40%                               | <49                          | Low        |
| 0 – 20%                                | <18                          | Negligible |

Table 2. Completed weed risk assessments of species in the FFI CRC

| Species   | WA         | SA         | Vic        | NSW        |
|---|------------|------------|------------|------------|
| Orange wattle ( <i>Acacia saligna</i> )             | Medium     | High       | High       | High       |
| Old man saltbush ( <i>Atriplex nummularia</i> )     | Low        | Low        | Negligible | Low        |
| Wallaby grass ( <i>Austrodanthonia caespitosa</i> ) | Low        | Low        | Negligible | Low        |
| Chicory ( <i>Cichorium intybus</i> )                | Negligible | Negligible | Negligible | Negligible |
| Cullen ( <i>Cullen australasicum</i> )              | Low        | Low        | Negligible | Low        |
| Cocksfoot ( <i>Dactylis glomerata</i> )             | High       | Medium     | Medium     | Medium     |
| Perennial veldt grass ( <i>Ehrharta calycina</i> )  | Very high  | Very high  | Medium     | Medium     |
| Flat-topped yate ( <i>Eucalyptus occidentalis</i> ) | Negligible | Negligible | Negligible | Negligible |
| Flooded gum ( <i>Eucalyptus rudis</i> )             | Low        | Low        | Negligible | Negligible |
| Birdsfoot trefoil ( <i>Lotus corniculatus</i> )     | Negligible | Negligible | Low        | Low        |
| Panic grass ( <i>Megathyrsus maximus</i> )          | Medium     | Low        | Low        | Medium     |
| Melilotus ( <i>Melilotus siculus</i> )              | Negligible | Negligible | Negligible | Negligible |
| Kikuyu ( <i>Pennisetum clandestinum</i> )           | High       | High       | Medium     | High       |
| Rhagodia ( <i>Rhagodia preissii</i> )               | Medium     | Low        | Low        | Low        |
| Mountain rye ( <i>Secale strictum</i> )             | Negligible | Negligible | Negligible | Negligible |

available commercially. SARDI researcher Andrew Craig is assessing its worthiness for commercialisation and its potential value to agriculture.

“We can go through a process to make sure the plant is worthwhile agronomically but we also need to know it has low risk. We have a duty of care to make sure there are no insidious side effects, including its chances of becoming a weed,” Andrew said.

Andrew, who was also involved in the early stages of developing the Protocol, likened it to insurance. He said it draws upon a different skill set to those that plant breeders and agronomists traditionally have.

“Plant breeders and agronomists are not necessarily asking those questions that the Protocol asks. You need to ask the right questions to get the right answers,” he said.

“With *Melilotus*, we don’t really know how it will perform. The weed risk assessment shows its potential as a weed is quite low – it does not appear to pose a significant threat. We have the reassurance that we have a necessary check and balance that we didn’t have before.”

### Enriching experience

Dr Jason Emms, a SARDI researcher with the *Enrich* project, said that one of the *Enrich* species, *Rhagodia preissii*, has been thoroughly assessed under the Protocol. It was found to have low weed risk in SA, NSW and Victoria and medium risk in WA.

Dr Emms said that *Rhagodia preissii* was not well researched previously and there were scarce published data. As such, the *Enrich* research was vital to completing the Protocol.

“Data collection has been increased to gather information for the weed Protocol,” Dr Emms said.

Some of the same biological traits important for agricultural potential were also important for weed potential. Others were measured primarily due to their effect on weed potential. For example, seedling recruitment is not generally considered when assessing perennial shrubs’ agricultural potential, as they are planted out at optimal density when a stand is established so recruitment is not a necessary attribute. However, seedling recruitment is a contributing factor to a plant’s weed potential so was measured on species of interest to *Enrich* researchers.

Dr Emms said that the Protocol provided a necessary safe-guard for researchers but it was important not to consider it to be a licence to proceed without caution.

“We don’t really know a lot about *Rhagodia*. As our knowledge grows, our assessment may change. It may be prudent for us to come back to the Protocol and reassess it later,” Dr Emms said.

### Management guidelines

When a plant is found to have a medium to high risk, management guidelines are developed to minimise its environmental impact.

“For example kikuyu (*Pennisetum clandestinum*) is widely promoted, but has a high to medium weed risk, especially in riparian environments,” Dr Stone said.

Dr Stone is currently working on guidelines for kikuyu. The kikuyu guidelines will be the first developed under the revised Protocol and will provide the prototype for developing future guidelines. They are expected to be completed by mid-2009.

“The guidelines will be for land managers,” Dr Stone said. “The Protocol is for plant researchers but the management guidelines will give land managers information so they can make informed decisions about how they use a species, or if they use it at all.”

Guidelines may cover management aspects such as preventing seed set or recommending that a plant is not grown in particular areas, such as near watercourses. Such recommendations would depend upon an understanding of the plant’s biology.

Dr Stone said for many plants, management for profitability would also lead to appropriate management for environmental weed risk. For example, the best pasture production of perennial grasses is generally when plants are kept in an active growing phase, rather than a reproductive one. In their reproductive phase, grasses tend to grow rank and unpalatable and are less nutritious. And it is in this phase that they set seed and disperse propagules, which causes them to spread beyond pasture areas.

For species that are found to have a very high risk, the CRC policy is to not recommend their use and to remove them from trial sites. Veldt grass (*Ehrharta calycina*) scores a very high risk for WA and SA so would not be recommended in those states. In Victoria and NSW it scores a medium risk, so would be subject to management guidelines.

The FFI CRC Weed Risk Protocol can be downloaded from: [www.futurefarmcrc.com.au/publications.html](http://www.futurefarmcrc.com.au/publications.html)

### More information

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BELOW: Dr Lynley Stone sees the Protocol as a dynamic document that can be adapted for specific areas over time. (Photo: J Emms)

