GRAZIER ATTITUDES TO WEEDS, RESEARCH AND EDUCATION IN NORTHERN NEW SOUTH WALES

B.M. Sindel
Department of Agronomy and Soil Science, and Co-operative Research Centre for Weed Management Systems, University of New England, Armidale, New South Wales 2351, Australia

Summary A mail survey of 88 land managers from northern New South Wales in 1995 showed that most graziers considered weeds to be a moderate problem on their properties and that the situation was getting worse rather than better, principally because of the spread of 'new' weeds into previously uninfested areas. The research issue which most graziers regarded as a priority was biological control of weeds, both in general terms and of particular species. Herbicide application and grazing management were considered to be of lesser research importance. Of the respondents, 82% were interested in attending one or more one-day workshops on the identification, ecology or management of weeds and the use of herbicides. A smaller proportion of respondents were interested in attending short courses on the above topics (over several days) (13%) and correspondence courses to certificate (5%) and diploma (8%) level. Nearly all the graziers who responded wished to be kept directly informed about research results and educational activities of the Co-operative Research Centre for Weed Management Systems. The results of this weed survey are discussed in terms of the factors likely to have influenced grazier attitudes and the implications for future education, research and extension initiatives in the region.

INTRODUCTION

The establishment of the federally-funded Co-operative Research Centre (CRC) for Weed Management Systems in July 1995 has focused considerable attention on research, education and extension activities related to weed management in Australia. While the overall impact of weeds on the Australian economy has been estimated at over $A3.3 billion annually in lost production, contamination of agricultural products and management costs (Combellack 1989), the weed problems of any one region may be quite unique. Climatic, edaphic, topographic, historical and land-use factors all combine to determine the composition and significance of the weed flora. Hence, regionally-based weed data are required by research groups to design effective research, education and extension strategies.

Mail questionnaires are an easy and inexpensive method of obtaining data on occurrence and history of well known weeds (Cuthbertson 1978) and have been used successfully to obtain information on the attitudes of land-holders to weeds and their control (e.g. Auld 1971, Seaman and Dellow 1987, Williams *et al*. 1987, Sindel and Michael 1988). More recently, an extensive mail survey of over 2000 producers throughout nine pastoral regions of temperate eastern Australia (Lees and Reeve 1994) identified characteristics of the pasture management systems being used in those regions and producer attitudes towards pasture management. Weed management was inevitably a major component of each system and in all but one region, was ranked as the highest priority issue in need of research.

As one of the three providers of educational programs in the CRC for Weed Management Systems, the University of New England, situated at Armidale on the Northern Tablelands of New South Wales, has an important training role in the surrounding pastoral and cropping industries. In this study, a comparatively small mail survey was used to assess weed problems and grazier attitudes in the region in order to provide information on which to base future decisions regarding educational and research initiatives.

MATERIALS AND METHODS

In December 1995, a two-page questionnaire was sent to 88 graziers and other land managers from northern New South Wales who had attended a wool industry exposition in Armidale in May 1995 and had participated in a weed identification competition.

The questionnaire asked farmers to state their main enterprise, whether they considered weeds to be a problem on their property, and whether the weed problem was getting worse, and if so, why? Farmers were also asked to list their major weeds, the research issues they wanted addressed and the educational and training activities they would be interested in attending. Two additional questions sought information on ways that the weed group at the University of New England could assist land managers and whether they were interested in receiving regular updates of research results and training programs.

Specific techniques used in this survey to give a high response included printing the questionnaire on yellow paper, and enclosing a letter of explanation and reply-paid envelope.

RESULTS AND DISCUSSION

A 48% response rate was obtained from the single mailing. Of those 42 respondents, 29 were sheep and cattle graziers from the Tablelands (at or above approximately 1000 m altitude between Walcha and Tenterfield), eight from the Slopes (between approximately 500 and 1000 m altitude between Quirindi and Warialda) and two from the Plains (below approximately 500 m altitude at Moree and Mungindi) of northern New South Wales. The other three respondents were government land managers and a hobby farmer, and for the purpose of this survey were excluded from further analysis.

Extent of the weed problem All graziers considered that weeds posed problems for them on their properties, with 31% considering them to be a minor problem, 49% a moderate problem and 20% a major problem. The majority of graziers (64%) thought that the weed problem was getting worse, principally because of the spread of 'new' weeds into previously uninfested areas which was aided by a long period of drought in the region. The lack of soil moisture and perhaps inevitable overgrazing of pastures during the drought led to the depletion of ground cover and weakly competitive pasture grasses at the time that good rains fell in spring 1995. Conditions were then ideal for a massive germination of weed seeds, some of which had been only recently introduced onto farms in imported drought fodder.

Some respondents commented on the spread of weeds from neighbouring properties where weeds were allowed to grow unchecked and the need for legal constraints to ensure that control of noxious weeds was carried out by all growers in an area.

Weeds such as saffron thistle (*Carthamus lanatus* L.) and Bathurst burr (*Xanthium spinosum* L.) were apparently spreading despite increased control measures. According to some respondents, weed problems were getting worse on their properties because they were unable to afford expensive and time-consuming weed management programs. Similarly, where farms were left unattended for extended periods (e.g. prior to sale) or were maintained by aging farmers, less time was devoted to weed control and this led to a worsening weed situation.

The main reason given by respondents for having either a static (26%) or declining (10%) weed problem was continuous and vigilant monitoring and control of weeds, usually by chipping and spraying.

Major weeds Graziers were asked to rank, in order of importance, up to five weeds with which they have most problem on their farms. A score of five was then assigned to the top ranked weed in each case, a score of four to the second and so on down to one. On the Tablelands, 46 weed species were listed by the 29 graziers. Table 1 lists those weeds which had a combined score from these respondents of 12 or greater. It is clear that in this region, saffron thistle is by far the weed of most major concern to growers.

Of the weeds in Table 1, saffron thistle, Bathurst burr and variegated thistle were also each mentioned by at least two graziers from the Slopes region. In contrast, blackberry, horehound, rat's tail fescue and the nodding, spear, Scotch and slender thistles were restricted to the cooler and wetter highland areas.

Table 1. The most troublesome weeds among the graziers surveyed from the Tablelands of northern New South Wales.

Weed	Presumed species	Number of respondents[A]	Score[B]
Saffron thistle	*Carthamus lanatus* L.	22	90
Blackberry	*Rubus fruticosus* L. *s.lat.*	12	38
Nodding thistle	*Carduus nutans* L. ssp. *nutans*	8	31
Bathurst burr	*Xanthium spinosum* L.	7	31
Spear thistle	*Cirsium vulgare* (Savi) Ten.	7	27
Thistles (generally)		6	20
Scotch thistle	*Onopordum* spp.	4	19
Horehound	*Marrubium vulgare* L.	7	18
Slender thistles	*Carduus pycnocephalus* L. *Carduus tenuiflorus* Curtis	5	12
Variegated thistle	*Silybum marianum* (L.) Gaertner	3	12
Rat's tail fescue	*Vulpia* spp.	3	12

[A] Number of respondents from the Tablelands who listed a particular species among their five worst weeds.
[B] Combined score of weed importance from rankings given by all 29 respondents from the Tablelands.

Despite the relatively low number of respondents from the Northern Slopes, the high proportion (five out of eight) who ranked saffron thistle as their worst weed suggests that it is probably the weed of most major concern to graziers in that region as well as on the Tablelands. Its combined ranking score of 32 was well above that of the two next most noted weeds, Bathurst burr and Paterson's curse (*Echium plantagineum* L.), which each had a combined score of nine. Twenty four weed species were listed in total by these eight graziers.

The sample size from the Northern Plains was too small to identify the major weeds.

Research issues Biological control of weeds (generally, and of specific species such as saffron thistle) was by far the most important research issue which graziers (46%) wanted addressed by organizations like the CRC for Weed Management Systems. Herbicide application (15%), grazing management (13%) and studies focused on specific weeds (10%) were considered to be more minor research issues.

Several factors are likely to have influenced the attitudes of graziers to these research issues. In particular, biological control of weeds is generally seen by the community as a relatively benign and safe form of weed control which has little impact on the environment. It has also gained a high profile in the media and unlike other forms of weed control, the costs of the program are not borne directly by the land manager. Moreover, potential benefits may be comparatively long-lasting.

While many farmers regard biological control as the ideal weed management technique, most scientists now believe that to be effective it must be combined with a variety of other control measures which together place greater stresses on the weed component of pastures than each could do alone.

The aim of any long-term program to control pasture weeds in the region, with or without the release of biological agents, should be the maintenance of a competitive cover of perennial grasses, particularly during periods of peak weed emergence. The sustainability of these grasses in times of drought is a key research issue, as is an understanding of the ecology and population dynamics of the relevant weeds.

Educational and extension activities Of the respondents, 82% were interested in attending one or more one-day workshops on the identification (54%), and ecology or management (56%) of weeds and the use of herbicides (49%). A smaller proportion of respondents were interested in attending short courses on the above topics over several days (13%) and correspondence courses to certificate (5%) and diploma (8%) level.

Given the means by which these farmers were selected to be surveyed, they could be considered to be relatively motivated and enthusiastic operators. Nevertheless, the very high interest in educational and training activities suggests that there is a broader demand for such initiatives in weed management, particularly since many of the traditional government extension services have been wound down over recent years. The University of New England and the CRC for Weed Management Systems will be endeavouring to meet some of this demand both through short workshops and the introduction of an externally-taught undergraduate and postgraduate course in Integrated Weed Management.

Respondents also believed that University personnel could play a significant role in the extension of local research results and demonstration of best control options. A service in weed identification and information transfer was also considered to be highly desirable. However, the method by which such information is passed on is critical for the successful adoption of new techniques. In the survey by Lees and Reeve (1994), the most favoured information sources for the adoption of new pasture management practices were either seeing the method working on a local property or at a local field day, talking to a local producer who uses it, or reading about it in an article (presumably newspaper) or newsletter.

Communication The majority of graziers who responded to the survey (85%) wished to be kept informed about research results and education activities of the CRC and were prepared to supply their address details once again in order to establish a direct communication link with them.

CONCLUSION

Weeds are a major issue in the minds of most graziers in northern New South Wales with saffron thistle being considered the most troublesome species in the area surveyed. It should therefore be a natural target for weed management research, and along with other thistles (particularly on the Tablelands) could profitably be the subject of short educational and extension programs. The perceived benefits of biological control amongst the community needs to be tempered with the realization that it is rarely successful as a lone control method and that on-farm management techniques, e.g. competitive pastures, are likely to remain the basis of control programs.

While the interest in weeds in this survey may have been heightened by good rains following a long drought, there nevertheless appears to be a strong demand for educational and extension work in weed management within the region.

ACKNOWLEDGEMENTS

I thank Associate Professor Robin Jessop and Dr. Jim Scott for their helpful comments on this paper.

REFERENCES

Auld, B.A. (1971). Survey of weed problems of the North Coast of New South Wales. *Tropical Grasslands* 5, 27-30.

Combellack, J.H. (1989). Resource allocations for future weed control activities. Proceedings of the 42nd New Zealand Weed and Pest Control Conference, pp. 15-31.

Cuthbertson, E.G. (1978). Advances in weed distribution mapping. Proceedings of the 1st Conference of the Council of Australian Weed Science Societies, pp. 273-87.

Lees, J. and Reeve, I. (1994). TPSKP 1994 producer survey (M.414). Report to the Meat Research Corporation. (The Rural Development Centre, University of New England, Armidale).

Seaman, J.T. and Dellow, J.J. (1987). A survey of landholder attitudes to *Echium plantagineum* L. in three shires in the Central West of New South Wales. *Journal of the Australian Institute of Agricultural Science* 53, 296-301.

Sindel, B.M. and Michael, P.W. (1988). Survey of the impact and control of fireweed (*Senecio madagascariensis* Poir.) in New South Wales. *Plant Protection Quarterly* 3, 22-8.

Williams, K., Syme, G., Crackel, L.J. and Roberts, E.J. (1987). Farmer attitudes to weeds and weed control in Western Australia—a preliminary study. Proceedings of the 8th Australian Weeds Conference, pp. 270-3.