

## A SURVEY OF WEEDS OF WINTER CROPS IN AUSTRALIA

Yohannes Alemseged, Randall Jones and Richard Medd

Cooperative Research Centre for Weed Management Systems, NSW Agriculture,  
Orange Agricultural Institute, Forest Road, Orange, NSW 2800, Australia

Weeds are of major economic importance in the Australian crop production system. Weeds impose costs on producers through both yield and quality reductions and increasing farm production costs for weed control. Few attempts have been made to objectively measure the cost of weeds in Australian cropping system. To undertake an economic analysis to determine the cost of weeds, the distribution and density of major weeds within the cropping region needs to be assessed. Although several regional weed surveys have been reported, very little quantitative data is available on the abundance and distribution of weeds on a national level.

This paper reports results of a national survey of the numeric abundance and geographic distribution of the major weed species. The survey was conducted by TQA Research Pty Ltd. on behalf of the CRC for Weed Management Systems and Grains Research and Development Corporation (GRDC). Formal self-completion questionnaires were mailed individually to 10,000 grain growers. To adjust for non-response bias, the sample has been weighted to reflect the 'true' representation of grain growers across Australia. The variables used to weigh the sample were total grain grower population in each of 13 agroecological zones across Australia and whether or not growers use specialist agronomic consultants. The sample base of 1040 was adequate to ensure that conclusions drawn on key national issues were of high statistical accuracy ( $\pm 2\%$  at 95% confidence level). Results were compiled based on the GRDC regions.

The 10 most difficult weeds to control in each region were: *Avena* spp., *Brassica tournefortii* Gouan., *Phalaris paradoxa* L., *Sonchus Oleraceus* L., *Polygonum avicular* L., *Lolium rigidum* Gaud., *Fallopia convolvulus* Adens., *Raphanus raphanistrum* L., *Argemone mexicana* L. and *Arctotheca calendula* L. in the northern region; *L. rigidum*, *Avena* spp., *A. calendula*, *R. raphanistrum*, *Vulpia* spp., *P. avicular*, *C. juncea*, *Bromus* spp, *Hordeum leporinum* Link and *P. paradoxa* in the southern region and *L. rigidum*, *R. raphanistrum*, *Avena* spp., *A. calendula*, *Vulpia* spp., *Bromus* spp., *H. leporinum*, *Eemx australis* Steinh., *B. tournefortii* and *P. aviculare* in the western region.

*L. rigidum*, *Avena* spp. and *R. raphanistrum* (in that order) were the most important weeds nationally. The other species showed regional and zonal disposition. One of the unexpected results from this survey was the fact that *L. rigidum* is becoming an important weed in northern Australia. In fact it was only second in importance to *Avena* spp. ahead of *P. paradoxa*, *B. tournefortii*, *R. raphanistrum* and *P. aviculare* (all of which were rated higher in 1988) in the NSW-NW, QLD-SW agroecological zone. Whether this is due to 'floristic shift' as a result of successful weed control measures is not clear.

Farmers in all regions regard weeds to be the number one problem of winter cropping activities with over 90% of farmers affected in each region. Farmers in the western (62%) have a higher propensity to believe that the weed problem is getting worse now than five years ago compared to those in the northern (34%) and southern (45%) regions.

Despite the widespread use of several weed control methods, including herbicide and cultural practices such as crop rotation and high crop density (the 'average' farmer routinely uses between four and five different methods to control weeds in winter crops), and despite the high proportion of farmers (90%) who believe that they are competent enough to manage weeds, the major weed species still persist. This is in line with the general worldwide trend that weed control measures are having a marginal effect. One of the reasons for this could be herbicide resistance, especially in the western region where 60% of farmers believed that herbicide resistance is a serious or moderate problem.

The survey also confirmed that the weed species that are present in winter crops are by and large what the farmers perceived are hard to control weeds. The high correlation observed between what farmers perceive as 'hard to control weeds' and the high infestation of crops by those weeds indicate that further research is warranted into their control. It is believed that this study has established that weeds are the main constraints to winter crop production. Furthermore, it has put in place a foundation for future assessment of the effectiveness of weed control measures.

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