

## Annual ryegrass (*Lolium rigidum* Gaudin) resistance to glyphosate and other herbicides in crops and pasture seed in northern New South Wales

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**Summary** Annual ryegrass (*Lolium rigidum* Gaudin) is one of the most important weeds of the grain cropping regions of southern Australia (Pannell *et al.* 2004). The over reliance on herbicides with similar modes of action has resulted in the evolution of herbicide resistance in many *L. rigidum* populations across Australia (Gill 1995, Preston *et al.* 1999, Llewellyn and Powles 2001). Recently, glyphosate-resistant *L. rigidum* was discovered on the Liverpool Plains near Tamworth in northern NSW (Storrie and Cook 2002).

In this preliminary experiment, seed of *L. rigidum* was collected from one Liverpool Plains property which had confirmed glyphosate resistance. The extent of resistance was evaluated against five herbicides: glyphosate, diclofop-methyl, chlorsulfuron, sulfometuron-methyl and tralkoxydim each at seven rates – 0, 0.25, 0.5, 1, 2, 4 and 8 times the recommended rate. The experiment was conducted in a glasshouse at the University of New England, Armidale, in 2005 and repeated in 2006. A commercially available pasture seed lot of *L. rigidum*, originating from Victoria and presumed to be susceptible to glyphosate, was purchased locally for comparison with the glyphosate resistant seed lot from the Liverpool Plains.

The data on efficacy of herbicides (% control) were collected at 7, 14 and 21 days after herbicide spraying. Plants in pots were scored on a 0 to 10 scale (0 = all live plants; 10 = all plants dead). The *L. rigidum* populations were classified on the criteria defined by Llewellyn and Powles (2001). According to these, the population was resistant if more than 20% of the plants survived the herbicide treatment. Populations in which 1 to 20% of plants survived were classified as developing resistance and those classified as susceptible were where all plants were killed.

The seed sample of *L. rigidum* obtained from a cropping site on the Liverpool Plains and the purchased pasture seed sample both showed some level of resistance to all the herbicides used in this trial. Both populations had resistance to group A herbicides (diclofop-methyl and tralkoxydim) as well as groups B (chlorsulfuron) and M (glyphosate) herbicides. Only sulfometuron-methyl provided substantial control of

*L. rigidum*, for that collected from the Liverpool Plains, but not the Victorian population.

While only one population of *L. rigidum* from the Liverpool Plains was tested, its resistance to both the non-selective glyphosate and various selective herbicides is of concern, particularly if this population is typical of others in the region. Grain growers in northern cropping areas need to be aware of the potential for such multiple resistance and to rotate chemicals accordingly. Growers may also be forced to occasionally employ non-chemical techniques such as cultivation and burning to adequately control herbicide resistant *L. rigidum*.

Likewise, commercial *L. rigidum* pasture seed may also be a source and add to the spread of herbicide resistance in northern NSW. Sowing commercial seed with resistance will create potential problems for graziers wishing to spray out this species in the future.

### REFERENCES

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