

HERBICIDE RESISTANCE COMMUNICATION IN WESTERN AUSTRALIA

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Summary. Farmers in the Western Australian wheatbelt are well aware of herbicide resistance (96%). However, they need to be encouraged to keep accurate spray records and chemical groupings need to be better understood. Farmers also need to be encouraged to have a test done to determine current resistance status before making weed control decisions. The concept of rotating crops, pastures and chemicals to delay the development of herbicide resistance is reasonably well understood by farmers but some of the less popular choices for delaying herbicide resistance, such as delayed seeding, need to be better explained. This paper presents the results of a survey of farmers and advisers and provides details of a proposed information package on herbicide resistance.

INTRODUCTION

A communication campaign about herbicide resistance and the availability of a testing service was carried out in Western Australia in 1991. There is now a high level of farmer awareness of herbicide resistance and in this study we attempted to find out what farmers still needed to know about this problem so that we could improve the transfer of information to them.

The objectives were to:

- (a) determine the current state of herbicide resistance knowledge, values, attitudes and beliefs amongst farmers and all those engaged in the sale of and/or giving advice on the use of herbicides; and
- (b) formulate a communication strategy to address specific gaps in knowledge and to correct misconceptions regarding herbicide resistance.

METHODS

Cereal producers, with a property size exceeding 750 ha were chosen at random from the Agriculture Protection Board computer database. The number of farms selected from each Shire was in proportion to the total number of farms in the sample. A telephone survey of 150 farms was carried out by Insight Research Australia Pty Ltd in February 1993.

The results were tabulated on the basis of the regional sub-divisions used in the Department of Agriculture's wheat variety recommendations which correspond with low, medium and high rainfall regions.

A survey form was also mailed to all of the people thought to be giving advice on herbicides in Western Australia. A total of 354 surveys were mailed to Department of Agriculture advisers (45), private consultants (52), chemical company representatives (54) and reseller representatives (203). Responses were obtained by telephone from those who did not respond by mail. There were 148 usable replies to the farmer survey; 39, 43 and 66 from low, medium and high rainfall regions respectively.

RESULTS AND DISCUSSION

Herbicide resistance status. All of the farmers surveyed used herbicides on their farm and 96 percent of them had heard of weeds developing resistance to herbicides.

Farmers were asked if they had ryegrass or wild oat populations on their farm that had survived a selective herbicide application for no apparent reason; 31 percent said yes, 66 percent said no and 3 percent did not know. The number of herbicide failures increased as rainfall decreased but this trend was not statistically significant.

Of the farmers surveyed, 5.4 percent had a ryegrass herbicide resistance test done in 1992. Although not significant, the percentage varied between rainfall zones with 10.3, 2.3 and 4.5 percent of farmers from low, medium and high rainfall zones respectively having a test done.

A significant but expected finding was that only 57 percent of farmers keep accurate paddock records of herbicide use. This figure was only 44 percent in the low rainfall zone where the largest proportion of farmers had tested for herbicide resistance.

Cropping intensity. Farmers were asked to indicate the percentage of their farms in crop each year and these percentages were cross-tabulated with rainfall zones. The percentage of farm in crop varied significantly between rainfall zones (Fig. 1.). The crop component increased significantly as rainfall decreased. Most farmers in high rainfall cropped between 20 and 40 percent of the farm.

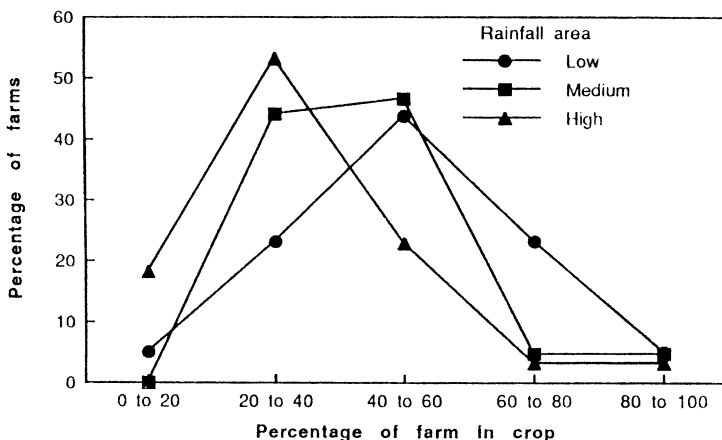


Figure 1. Variation in the percentage of farm in crop according to rainfall zone.

Farmers in medium rainfall cropped between 20 and 60 percent of the farm, the broadest band. Farmers in low rainfall cropped most intensively with most in the 40 to 60 percent category and about 20% in the 60 to 80 percent category.

Herbicide resistance and tolerance

Knowledge of herbicide resistance. When asked how many applications of a selective herbicide would be necessary to develop herbicide resistance in ryegrass, less than half of the farmers knew the correct answer and more than one quarter did not know how many applications it would take. In contrast, the majority of representatives from the manufacturers, resellers, consultant and Government advisory groups gave a correct answer.

Our current knowledge of herbicide resistance in ryegrass indicates that once resistance has developed to a particular herbicide, the population may never become susceptible to that herbicide again. On this basis, 90.5 percent of farmers did not correctly answer this question with more than half not prepared to commit themselves to an answer. It was of concern that 36 percent of farmers believed that ryegrass populations would become susceptible again. An even greater proportion of farm advisers believed that ryegrass populations would become susceptible again.

Knowledge of herbicide groups. Farmers were given 4 commonly used herbicides and asked if they had used them or not. They were then given 4 chemical groups, 'fops', 'drams', 'SUs' and triazines, and asked to place each chemical in its correct group. Over two thirds of farmers could not place commonly used herbicides in their correct chemical groups. In comparison, over 90 percent of farm advisers were able to correctly group these herbicides. There were some regional differences for farmers' use of herbicides with a lower percentage of Glean® and Hoegrass® users in high rainfall areas. There was also a tendency for farmers in high rainfall areas to be less knowledgeable about herbicide groupings than in the other 2 rainfall areas.

Perceived value of management options. Farmers and advisers were asked to rank a list of weed management options according to their value (high, low or of no use) in delaying the development of herbicide resistance on their farm (Table 1).

Farmers in low rainfall areas were significantly less enthusiastic about cutting a weedy crop for hay to prevent seed set. Those in higher rainfall areas viewed more favourably the option of delayed seeding compared to those in low rainfall areas. Most low rainfall farmers considered the delayed seeding option of no use. Burning the stubble was considered to be of low or no use.

Advisers agreed with farmers on the ranking of the 3 most valued options; effective spraytopping, rotation of herbicides and introducing a longer pasture phase. They also agreed with the ranking of cutting a weedy crop for hay (5th) and using trailing bins (8th). Both farmers and farm advisers ranked below label rates as the least useful option to delay the development of herbicide resistance. Farmers gave a higher value to autumn 'tickle' and delayed crop seeding to get an extra weed kill than did the farm advisers. However, resellers favoured autumn 'tickle' more highly than did other farm advisers. In contrast to farmers, manufacturers, consultants and government advisers were strongly against using selective herbicides in the pasture phase. Manufacturers were very strongly against this practice. Resellers were more in agreement with farmers. All farm adviser groups were much more in favour of burning crop or pasture stubble to kill weed seeds than were farmers.

Farmers and advisers were asked if Hoegrass resistant ryegrass swamped their crop this year, what is the likelihood that they would take the following action (Table 2).

Herbicide resistance and tolerance

The overwhelming majority of farmers said they would harvest the crop and switch to pasture if Hoegrass resistant ryegrass swamped their crop. Farmers in medium and high rainfall areas were again more likely to cut the crop for hay than those in low rainfall areas. Farmers in low and medium rainfall areas were more willing to burn stubble than those in high rainfall areas.

Farm advisers were largely in agreement with each other regarding their advice to a farmer who had a crop swamped with Hoegrass resistant ryegrass. The only major difference was that manufacturers were more strongly in favour of using modified headers to capture ryegrass seeds. In contrast to farmers, farm advisers were more strongly in favour of cutting the crop for hay rather than harvesting the crop and switching to pasture. Farm advisers ranked harvesting the crop with a modified header more highly than did farmers. Farm advisers gave a lower ranking to the value of grazing the crop with sheep than did farmers. Both farmers and farm advisers gave a low ranking to harvesting the crop and burning the crop stubble to kill ryegrass seeds.

Table 1. The perceived value to weed management options (1 = highest value).

Management option	Farmers	Advisers
Effective spray-topping and grazing pasture before cropping	1	1
Rotation of herbicide groups	2	2
Introducing a longer pasture phase in the rotation	3	3
Autumn 'tickle' to stimulate weed germination before seeding	4	6
Cutting a weedy crop for hay to prevent seed-set of weeds	5	5
Delaying crop seeding to get an extra weed kill	6	9
Not applying selective herbicides in the pasture phase	7	4
Using trailing bins behind the header to remove weed seeds	8	8
Burning crop or pasture stubble to kill weed seeds	9	7
Application of herbicides at below label rates	10	10

Table 2. Action or advised if Hoegrass resistant ryegrass swamped a crop (1 = highest value)

Action taken	Farmers	Advisers
Harvest the crop and switch to pasture to reduce ryegrass	1	2
Harvest the crop and switch to another herbicide next year	2	4
Cut the crop for hay or hay-freeze to prevent seed set of ryegrass	3	1
Graze the crop with sheep to prevent seed set of ryegrass	4	6
Harvest the crop and burn the crop stubble to kill ryegrass seeds	5	5
Harvest with a modified header to capture ryegrass seeds	6	3

Herbicide resistance and tolerance

Perceived value of testing. In the year after Hoegrass resistant ryegrass swamped their crop, 75 percent of farmers said they would have a test done before deciding on an alternative herbicide and 21 percent said they would not have a test done but switch to an alternative herbicide. In contrast, 94 percent of farm advisers said they would recommend a test be done before deciding on an alternative herbicide

New chemicals. On average, 46 percent of farmers thought there were no new chemicals on the horizon which would solve the herbicide resistance problem. Of the remainder, 26 percent thought there were and 26 percent did not know. Farmers in medium and high rainfall areas were more optimistic about new chemicals solving the herbicide resistance problem than were those in low rainfall areas. Farm advisers were less optimistic than farmers with only 14 percent thinking that new chemicals would solve the problem.

How farmers valued advisers and information sources. Farmers were read a list of personal contacts and asked how highly they valued their advice on herbicides. Most popular were the Department of Agriculture advisers and other farmers. Farm consultants also ranked highly. However, farmers placed a lower value on advice from spray contractors, chemical company representatives or resellers. Farmers were read a list of information sources and asked how they valued them for information on herbicides. As would be expected, there was close correlation between how farmers rated personal contacts and associated information sources. Information sourced from the Department of Agriculture, field days, seminars, and local farmer meetings was most highly valued by farmers. In contrast, Information sourced from chemical companies, videos and resellers was given a relatively low rating.

Extension initiatives. The major initiatives of the 1993/94 program will include a media liaison and communication program of regular articles for the press, television and radio coverage. The integrated weed management story will be broken down into seasonal components which can be communicated in a more timely manner. A survey is also planned for early 1994 to identify any shift in farmers' knowledge and enable us to re-focus the communication strategy.

An update and reference package will be prepared for all advisers servicing the industry in Western Australia. It will include a plastic binder "Herbicide Resistance Information". The binder will house the regular updates, including the new herbicide resistance bulletin and relevant Farmnotes, which we intend to mail to industry advisers. A presentation package will include a set of 5 or 6 overheads together with a video case study on herbicide resistance.

A diary is being produced which will facilitate farmers' record keeping of paddock use of herbicides and other weed control records. The diary will also contain other essential information such as herbicide groupings. A herbicide groups chart will also be produced separately as an A2 sized wall poster and a laminated A4 sized chart.

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