CHANGING WEED PROBLEMS DUE TO SELECTIVE CHEMICAL TREATMENTS IN SOUTH AUSTRALIA

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With the current concern about the effects of chemicals on the environment, it is appropriate to consider here one of those aspects of the subject related to weed science. This is the increase of resistant weeds caused by consistent usage of a particular herbicide or of combinations of herbicides. Changes in the weed populations of cereal crops have been discussed in a more general way by Johnson (1968).

Weed populations resistant to herbicides used for particular purposes have developed in a number of completely different situations in South Australia; some cases are given here.

Situation	Herbicides Used	Purpose	Resistant Weed Problem
Legume seed crop	Benefin or trifluralin	Annual grass & wireweed control	Crucifers & composites
Orchards	Amitrole, 2,2-DPA, simazine mixture (Dimatol)	Total weed control	Plantain
Firebreaks	Amitrole + atrazine (Vorox AA)	Total weed control	Perennial/ ryegrass, plantain
Footpaths	Amitrole + atrazine (Vorox AA)	Total weed control	Couch, convolvulus, plantain
	Diuron	Total weed control	Plantain, longstyled feathergrass
Cereal crops	Hormone-type herbicides	Broadleaved weed control	Fumitory, sheepweed, deadnettle, emex
	Early post-emergence herbicides, e.g. linuron, prometryne	Resistant weeds to above treatment	Cleavers, wireweed

Even from these few examples, some inportant principles are apparent. From the Table it may bee seen that:

(1) The same herbicide used for a similar purpose but in different situations can cuase different problem weeds (e.g. Vorox AA for total weed control).

(2) Different herbicides can lead to the same resistant weed problem (e.g. Domatol, Vorox AA, and diuron lead to a plantain build-up).

(3) A secondary resistance situation may arise as is shown for cereal crops.

For observations not recorded here, it was noticed that:

(4) The rate of population increase is very variable (e.g. total infestations of cruciferous weeds have occurred in 12 months using benefin or trifluralin, but the increase in resistant weeds in cereals took place over a number of years).

Understandably, herbicides selective for crop plants will have other gaps in their phytotoxic spectrum. The gaps may be filled by using another herbicide in combination or by using a mixture e.g. trifluralin before and 2,4-DB after emergence in legume seed crops, or bromoxynil and MCPA mixtures in cereals). But these methods incur extra financial outlay and inefficiency, as parts of the weed spectrum are controlled by both chemicals, and the crop is placed under a greater stress. Much thought must be given to making the most efficient combinations.

Conversely, a reversion to cheap herbicides, (e.g. hormone-type chemicals), may be necessary and we may have to tolerate a low but constant level of weeds. This approach would be restricted to crops where quantity rather than quality, i.e. crop cleanliness, is desired.

This paper has been restricted to the effects of herbicide type. Mistimed applications of herbicide can have similar results, later applications of hormone herbicides to *Echium lycopsis* in pasture for example, causes rapid weed increases.

The problem of resistant weeds can only increase under present circumstances. It is hoped that this paper will be provocative and that suggestions for other examples and ways of handling this problem will be forthcoming.