

WEEDS IN THE AGRICULTURAL FIELD CROPS OF SOUTH AUSTRALIA

Reviewed by
G.B. Baldwin
Department of Agriculture, South Australia

In round figures, and in order of importance, the agricultural crops of significance in South Australia are as follows:-

<u>Crop</u>	<u>Acres</u> (Average Annual)	<u>Yields lbs/acre</u> (Average Annual)	<u>Gross</u> <u>Value</u>
Wheat	3 million (1.2 mill. hectares)	1,080 (1210 kg/ha)	\$A65,000,000
Barley	1.5 million (0.6 mill. hectares)	1,000 (1120 kg/ha)	\$A30,000,000
Oats	0.5 million (0.2 mill. hectares)	600 (670 kg/ha)	\$A 4,500,000
Peas	30,000 acres (12,000 hectares)	720 (805 kg/ha)	\$A0.75 million

South Australia has a predominantly winterspring rainfall pattern with high summer temperatures. The timeliness of crop sowing is of prime importance. Later sowings can give lower yields than the earlier sowings in areas where there is a lack of moisture available to finish the crop.

Most cultural practices or procedures for annual weed control take place between the 'break in the season' and the optimum sowing time. This interval is so variable that cultivations can be successful; or very inadequate. Excessive rainfall at this time can make these operations difficult and ineffective.

Barley, peas and oats are normally drilled into wheat stubble, or (in the case of barley) into an annual medic ley. The opportunity to control weeds in a fallow year preceding drilling is not available. Weed control by cultivation is thus much more difficult with these crops than with wheat.

THE SIGNIFICANCE OF WEEDS ON PRODUCTION

With a rainfall pattern as described previously, greatest significance that weeds have in these crops is their ability to compete for moisture and nutrients early in crop growth, resulting in a yield loss.

Few samples of wheat are docked or recleaned because of weed seed contamination, efficient screening by harvest machines can eliminate most seeds from the sample. Weed seeds help downgrade the quality of barley, and probably have more of an influence in this crop than is generally realized by contributing with other factors to lower gradings. Oats for grain can be downgraded from milling quality to feed because of the presence of weed seeds. There is less incentive for weed control in oat crops because of the lower returns per acre, and the fact that in some areas of the State only one grade (feed) is recognized. Of the crops being considered peas are the least able to compete with weeds and weed control prior to sowing this crop is particularly important.

The widespread occurrence of *Brassica tournefortii* Gowan, *Rapistrum rugosum* L. All. and *Sisymbrium* spp. in South Australia can result in choked machinery and a harvest problem in all crops.

THE PRESENT PRACTICES OF WEED CONTROL

Soil preparation for these crops generally involves a short fallow of two or three months initiated after sufficient summer or early autumn rains have moistened the soil. Generally the problem weeds of the crop have not germinated uniformly at this stage. The smaller seeded weeds such as *Lamium* and *Fumaria* often germinate in profusion at a later stage when the seedbed has been more finely prepared. Preventing annual weeds from seeding in the pasture year prior to cropping, can be a valuable method for reducing the weed seed burden in the soil. The pasture may be heavily grazed during late spring or topped with a rotary slasher.

A large number of herbicides are available for weed control in these crops, and they can be broadly grouped as follows:-

1. Pre-sowing crop, post-emergent weed.
2. Pre-sowing crop, pre-emergent weed.
3. Post-sowing crop, pre-emergent weed.
4. Early post-emergent crop and weed.
5. Later post-emergent.

Most of the herbicides are used in the 4.5 million acres (1.8 million hectares) of wheat and barley. A rough estimate is that some 30% (1.35 million acres (0.54 million hectares)) is sprayed with a herbicide of some type each year.

Approximately 18% is sprayed by the aerial operators. About 9% is treated with 'newer' herbicides other than the various forms of 2,4-D and MCPA. The total herbicide cost to the State to protect these crops is approximately \$A½ million, this represents ½% of their gross annual value.

THE EFFECT OF RESEARCH AND EXTENSION

By the late 1950's the widespread use of 2,4-D in cereals had resulted in an annual broad leaved weed population which was relatively tolerant to this herbicide. Research in the 1960's made available many products which would control these weeds as seedlings, a major advantage yield-wise when compared to later sprayings. Private industry played a major part in developing and extending these products.

The acceptance of rolling and windrowing in barley to avoid wind loss and aid bulk harvesting has meant that weed seeds of such plants as *Emex australis* Steinh., are being harvested at the 'new' crop level. The release of the barley variety, Clipper, which is sensitive to barban has restricted the use of this herbicide to resistant varieties.

In these last two situations the acceptance of a new technique and a new variety have changed weed control practice.