WEEDS IN THE HORTICULTURAL CROPS OF SOUTH AUSTRALIA

Reviewed by
I.S. Rogers,
Department of Agriculture, South Australia

At the present stage herbicides are recommended in virtually all horticultural crops in South Australia including pome fruits, citrus, stone fruits and vines, as well as most vegetable crops. In this paper it is proposed to discuss herbicides in horticulture under the headings of:

1. Present practices
2. Trends
3. Effectiveness of Research and Extension

PRESENT PRACTICES

The widespread use of chemical weed control has enabled remarkable development both in crop management and mechanization in the vegetable industry in South Australia. It has helped to force a trend from small scale vegetable gardening to large scale vegetable farming.

One of the most notable examples is that of the inion industry. Since 1960-61 there has been an increase in South Australia in onion acreage from 657 (266 ha) with a yield of 5,947 tons (6,040 tonnes) to 1,883 (762 ha) acres with a yield of 18,639 tons (18,901 tonnes) in 1968-69.

An excellent example is at Purnong Landing where two brothers Gordon and Colin Marks share farmed a total of 160 acres (65 ha) of onions in 1969-70 under permanent sprinkler irrigation.

The increase particularly in the latter years is believed to be due to the widespread acceptance both of pre and post emergent herbicides. It is apparent from statistics that in onions the use of herbicides may have resulted in slight increases also in yields per acre over the past 4-5 years.

	61-62	62-63	63-64	64-65	65-66	66-67	67-68	68-69
tons/ acre	9.2	9.0	9.4	9.7	8.8	11.0	9.9	9.9
tonnes/ ha	(23.1)	(22.6)	(23.6)	(24.3)	(22.1)	(27.6)	(24.8)	(24.8)

As far as the South Australian Department is concerned there are very few horticultural crops where herbicides are not important. The most notable exception is that of potatoes (which in South Australia comes under Mr. H.D. Feddersen in Horticulture) in which cultural methods and the rapid establishment of the crop itself are supposed to keep weeds under control.

Important horticultural materials are chlorthal (stone fruits, onions, brassicas), trifluralin (stone fruits and tomatoes), diuron (pome fruits and citrus) and diuron and/or simazine (vines)). In citrus, diuron has become indispensible, and for the harder to kill weeds in citrus, bromacil for couch grass has become increasingly important. Strip treatments are often used in horticultural crops either to reduce cost, or as in the case of vines, which are only moderately resistant to these herbicides, to avoid phytoxicity.

TRENDS

Chemical weed control has opened up wide new possibilities for changes in cultural practices. For vegetable crops there should be interesting new developments in the fields of crop spacing and plant density, methods of irrigation, mechanical handling and seeding methods.

In tree crops much the same applies in that tree spacings can be modified and new irrigation techniques can be employed more easily.

The traditional wide row spacings in many vegetable crops was mainly necessitated by the need for inter row cultivation and hand weeding. Despite the inherent resistance of most growers to change, a few have changed over to triple or spread row seeding in onions and carrots, thereby increasing the number of rows per unit width threefold. In most cases where this has been carried out there have been remarkable increases in yields per acre.

Many tree crops were previously cultivated in two directions for weed control requiring wide tree spacings in both directions. The use of herbicides has and will facilitate such a practice as closer planting e.g. citrus 12' x 24' (3.66 x 7.32M) instead of 24' x 24' (7.32 x 7.32M).

Drip irrigation is a technique being developed in some fruit and vegetable crops. The nature of this technique may either prevent cultivation for weed control, or make it much more difficult. Solid set is another example of a method of irrigation in which cultivation is not possible. Other new methods of irrigation such as permanent undertree sprinklers and drag hose systems are also assisted by chemical weed control.

The advantages of weed free crops for mechanical handling and harvesting are obvious. In the case of onion harvesting, if weed infestation is heavy the weeds must be removed by hand before harvesting can proceed. A mobile pea viner will handle a weed infested pea crop but the rate of progress is very much slowed down, depending on the severity of the infestation.

The advantages of direct seeding of vegetable crops are again obvious such as saving in labour, quicker establishment of the crop, and less likelihood of entry of soil borne diseases. The main advantage of transplanting over direct seeding, was and still is, that of easier weed control.

EFFECTIVENESS OF RESEARCH AND EXTENSION IN SOUTH AUSTRALIA

Lack of space must limit this discussion to one subject, although the importance of other aspects should not be overlooked. First mention of Dacthal (R) or chlorthal came in 1964 from Mr. P. Gurner as a scribbled note on the authors desk which was not taken seriously. A rapid change of opinion occurred when Dacthal was tested on onions on wire weed infested sandy loam soils at Virginia and Two Wells. Subsequently Dacthal was found to control most of the major weeds in all of the onion growing areas of South Australia and in the years 1966-69 there was a rapid increase in its use as can be seen below.

	Tons Dacthal sold in Australia ( ) Tonnes				
1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
Nil	300 lbs	3	15	28	40
	(136 kg)	(3)	(15.2)	(28.4)	(40.6)

Experimental quantities only

In addition to pre-emergents many post emergents were also tested. Of the post emergents, ioxynil appeared to be superior to the others in trials over a wide range of conditions and a wide spectrum of broad leafed weeds. The first really spectacular trial results with ioxynil were at Purnong Landing where Mr. Gordon Marks was taking great interest in the proceedings. Mr. Marks himself obtained quantities of ioxynil and carried out his own experiments on a much larger scale. At this stage there seemed no hope that ioxynil would reach the commercial market. Mr. Marks himself then managed by devious means to persuade the manufacturing company to import

50 gallons of the octonoate ester the following year 1967-68. The sales of ioxynil have now increased to such an extent that formulation of this material will in future be carried out in Melbourne.

The work in South Australia on onions was an example of how results of research could be accepted by growers with a minimum of effort in extension.

WEED CONTROL IN NON-CROP SITUATIONS (INCLUDING AQUATICS) IN SOUTH AUSTRALIA

Reviewed by
M.J. Catt
Department of Agriculture, South Australia

Weed control in non-crop situations can be divided into three parts.

TOTAL VEGETATION CONTROL

Herbicides having a residual nature are used to maintain a vegetation free area, e.g. the South Australian Railways treat track-side areas to reduce fire risk, reduce ballast fouling by organic matter, stop trains slipping and for aesthetic reasons. Generally treatments are effective although the resistance of *Cynodon dactylon* L. and *Convolvulus arvensis* L. to a frequently used mixture of atrazine and amitrole is noteworthy.

Herbicides used include Vorox AA(R) 8 lb/acre (8.8 kg/ha) initially followed by 2-4 lbs/acre (2.2-4.4 kg/ha) annually and Karmex(R) Diuron 10 lbs/acre (11 kg/ha).

The South Australian Railways spend approximately $50,000 annually and the Electricity Trust $10,000 annually.

GENERAL WEED CONTROL

Control of declared dangerous or noxious weeds is required by the Weeds Act. The methods used depend on the weed concerned. The Department of Agriculture carried out research on control measures for new weeds. Local government bodies administering the Weeds Act spend an estimated $50,000 annually on roadside noxious weed control and the South Australian Railways $13,000 annually.