

# THE WEED SOCIETY / OF NEW SOUTH WALES

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## SUMMARY OF TALKS PRESENTED BY ANDREW LEYS AND WARICK FELTON AT A MEETING OF THE WEED SOCIETY OF N.S.W., 22nd AUGUST, 1977.

### Problems of Weed Control in Soybeans in North Western N.S.W. by W. L. Felton

Weeds can be a major production problem in soybeans in New South Wales and in the past this has influenced many farmers not to grow them. Grasses can be fairly easily controlled with trifluralin but until now no herbicide satisfactorily controlled many of the broadleaf weeds. The most important of these being Datura spp. (thornapple) and Xanthium spp. (Noogoora burr) although many others can also be a problem.

The influence of row spacing and planting density on weed competition was examined and, in summary, the effect of weeds on yield was reduced by reducing the row spacing and increasing the planting density.

Narrow rows and higher within row density increase the height of the bottom pod, lodging and the number of pods  $m^{-2}$  but decrease stem diameter, number of pods per plant and the yield per plant. Narrow rows decrease yield per pod and seeds per pod. There was a trend towards reduced yield per pod and seeds per pod with higher within-row densities.

Weed competition reduces stem diameter, pods per plant, pods  $m^{-2}$  and yield per plant. Weeds had no effect on the height of the bottom pod, yield per pod and seeds per pod.

Soybean grain weight was not changed by row spacing, row density or weed competition.

In other experiments the reduction in soybean yield was as high as 60% when weeds were not controlled. However while the total yield loss is important the stage of crop growth at which weeds have the most significant effect is equally important. This information is necessary so that the possibility of using cultivation and/or a post emergence herbicide can be determined. The onset and result of weed competition has been examined in time of weed removal experiments. The results of these are summarised in Table 1.

TABLE 1. The effect of time of weed removal on Soybean yield

<u>Time of Weed Removal</u> (weeks after sowing)	<u>Soybean Yield kg ha<sup>-1</sup></u>			
	<u>1971/72</u>	<u>1972/73</u>	<u>1974/75</u>	<u>1976/77</u>
Weed Free	3000	3500	2900	3700
4	2900	3500	2900	3800
8	2800	3400	2900	-
12	2400	1800	2700	2700
16	1900	1700	1700	2400

The important factor to observe in this data is that soybean yield is not reduced by weeds during the early stages of crop growth. The onset of competition from Datura appears to be at least 6-8 weeks after sowing, so using a post-emergence herbicide appeared the most likely avenue to pursue to control these "hard to kill" broadleaf weeds.

### Bentazone (Basagran)

Bentazone was one of five herbicides included in an experiment at the Liverpool Plains Field Station, Breeza, in 1974/75. The experiment was carried out on an area which had been sown to Datura several seasons earlier to ensure an established weed population.

Following spraying it was apparent that weeds not contacted because of shielding from the crop or larger weeds were not controlled. Weeds germinating after spraying were also not controlled. Consequently a split application technique at the lower rates was more effective than a single application at the highest rate for weed control.

This result was considered most significant in the development of a satisfactory herbicide control measure in soybeans.

As a continuation of the 1974/75 work, an experiment which consisted of bentazone at 0.25, 0.5, 1.0 and 2.0 kg ha<sup>-1</sup> applied at 4, 6, 8, 4 + 6, 4 + 8, 6 + 8 and 4 + 6 + 8 weeks after sowing was undertaken at Breeza in 1975/76.

A single application of bentazone was inadequate to obtain complete control of Datura even at 2.0 kg ha<sup>-1</sup>. Timing was of little consequence at this rate indicating a shading effect or subsequent weed germination. Less control resulted with later application of lower rates, 0.5 and 1.0 kg ha<sup>-1</sup>. The 0.25 kg ha<sup>-1</sup> rate was too low to give satisfactory control even when applied at 4 + 6 + 8 weeks although a very good yield resulted. However, a split application as low as 0.5 kg ha<sup>-1</sup> gave good control when applied at 4 + 6 or 6 + 8 weeks after sowing and complete control at 4 + 8 weeks after sowing.

In the 1976/77 trials the amount of water used in applying bentazone was investigated. Most of the data still has to be sorted out, but again, the rate and time of application of bentazone were the most important factors. The volume of water had no effect on the results.

### Mung Beans

Two dryland mung bean experiments were carried out in the 1976/77 season. Both were initial experiments on the use of bentazone in this crop.

Experiment 1 - was at the Agricultural Research Centre, Tamworth, where bentazone was applied to Berken and Regur varieties. No weeds were present.

Experiment 2 - on a private property near Tamworth in an area of Berken infested with dwarf marigold.

The only comment at this stage is that bentazone does appear to have had an effect on the mung beans (both experiments) and on dwarf marigold (experiment 2).

### Weed Control Research in Southern N.S.W. by A. Leys

In addition to providing cash returns lupins benefit the wheat farmer by adding nitrogen to the soil. The benefits of this added nitrogen are quickly wasted unless weeds are effectively controlled.

Trifluralin applied at twice the rate used in wheat and incorporated to 8 cm, controls most of the annual grass weeds. Simazine has been widely used in the past because of the diverse range of weeds controlled. However, because it requires rainfall to move into the root zone, it is unreliable, particularly for control of grass weeds. As lupins need to be sown early when rainfall is often unreliable, trifluralin should be added to simazine when both broad-leaves and grasses are expected to be a problem.

Initial work in chickpeas, a grain legume suited to the drier parts of the wheat belt, indicates that they are more sensitive to herbicides than lupins. Both simazine and trifluralin, the two herbicides most commonly used in lupins can be phytotoxic. Triallate is one herbicide that appears safe even at rates up to 4 litres per hectare.

Oilseed rape is more competitive than either lupins or chickpeas, however, high weed densities can severely reduce yields. Every effort should be made to enhance the crops competitive ability with good crop husbandry. Slides illustrated the importance of soil fertility in promoting a vigorous crop.

Developments in the research on the ecology and control of silverleaf nightshade were then outlined.

Silverleaf nightshade has a deep and extensive root system which is capable of regenerating from depth. This makes chemical control difficult. Prolific emergence of seedlings buried at depths of one and three centimetres, suggest that this is an important factor in the spread of the weed in N.S.W. The seedling also has the ability to propagate vegetatively at a very early stage. This allows it to germinate after spring rains and survive very dry summer periods shortly afterwards.

The distribution of silverleaf nightshade in Australia was outlined along with results which showed it could severely reduce pasture and wheat yields.

Topgrowth can be controlled using 2,4-D, Tordon 50-D(R), glyphosate. Soil sterilants such as atrazine or bromacil, effect more permanent control but because of cost and/or residues, can only be considered over small areas.

Control in N.S.W. is based on containing the larger infestations and eradicating small outbreaks with the appropriate herbicide.

#### 6th Asian Pacific Weed Science Society Conference, Jakarta, July, 1977.

Fifteen Australian delegates attended this Conference in Jakarta at which 250 people were present. Dr. P. W. Michael, University of Sydney, was elected President of the Society for the next two years and the next Conference will be held in Sydney in 1979.

Planning for the 7th A.P.W.S.S. Conference in Sydney is already underway. It is expected that the Conference will be held in November. Details regarding the Conference will be released soon.

#### Recent Publications

"The Control of Aquatic Weeds", Bulletin 194, Ministry of Agriculture, Fisheries and Food, London.

Many bulletins of agricultural and horticultural interest are available from Her Majesty's Stationery Office, Atlantic House, Holborn Viaduct, London, EC1P 1BN. A list of titles is available free on request.

"The World's Worst Weeds, Distribution and Biology" by Holm, Plucknett, Pancho and Herberger, published by University Press of Hawaii, was not ready for shipping at last contact. The book is expected to be published this Spring at a cost of \$31.50 (10% professional discount).

#### "Pesticide Manual"

The fifth edition of this well known manual edited by Hubert Martin and Charles R. Worthing was released in April. At £15, surface mail, it is available directly from the publishers, British Crop Protection Council.

There are over 530 separate pesticide listings and an index containing over 3,500 names (common, chemical, ~~trade~~ and code numbers).

Each listing includes a number of features pertinent to each compound. There is an indication of the acceptable names for each compound and a history of the discovery, introduction and subsequent use of each compound. As well as strict chemical descriptions there is also a brief outline of the uses of the compound and related cautions during use.

There is a wealth of information contained under each heading, as well as references to other articles for further information.

With so many products available, it is not surprising that there are some omissions, particularly of very new and very old compounds. However, it appears that all current pesticides are listed. Where compounds have been superseded they are named in an appendix.

For people working, not only with herbicides but other agricultural chemicals, this book can provide answers to many often asked questions. The approach of the authors has been scientific but concise. Lengthy descriptions for use have been avoided due to the large variation in use from situation to situation.

Although new products are arriving frequently, this book should provide a valuable reference source for many years.

#### Aim for the target, not the crop

Prof. Vernon Joyce from Cransfield Institute of Technology addressed a meeting of industry and government people on 2nd June, 1977. The venue was the CIBA-Geigy Conference facilities at Pendle Hill, N.S.W.

Prof. Joyce has developed ideas and application procedures to better utilise aircraft in agricultural work. Commencing with a rethink of current aerial technologies, Prof. Joyce proposed that rather than think in terms of how much pesticide is required per hectare to kill weeds or control insects, we should instead be thinking in terms of how much pesticide is required to kill one weed or one insect in quantities of  $\mu\text{g cm}^{-2}$ . Further investigation of this concept then determines how many droplets of spray of a certain size are required to achieve, say, 95% control of the pest.

However, the single most important aspect of this concept is the recognition of the real biological target. For example, there is no point in attempting to achieve coverage of the older mature leaves of a weed when it may well be the younger active leaves near the top of the plant which provide the best site for herbicide uptake of an active translocated chemical. With this view in mind, there is a spray droplet size which is more efficient than other

droplet sizes for each target. Equipment such as micronair devices were shown to be more efficient at producing the desired droplet sizes than either flat fan or hollow cone aerial nozzles. As a result of the consideration of effective biologically active droplets, swathe width of an aircraft may vary greatly from target to target.

### Disposal of Herbicide Orange

Herbicide Orange is a 50 : 50 mixture of 2,4-D and 2,4,5-T which was used for jungle defoliation during the Vietnam War. Significant levels of the carcinogen, dioxin, have rendered untenable the use of excess quantities of this herbicide. The U.S. Air Force was given permission to incinerate 2.3 million (U.S.) gallons on the vessel "Vulcanus" about 1600km west of Hawaii in the period April to July this year.

### Coming Events in Weed Science 1978

April 12-15th - "New Advances in Weed Control" - A Conference organised by the Australian Council of Weed Science Societies.

Topics included in the programme are techniques for herbicide application, the economics of weed control and aspects of weed control in special situations. Several overseas speakers will be giving special presentations.

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### Council Weed Officer's School, Orange, 9-13th May, 1977.

A classification of the IMPORTANCE of Noxious Plants in N.S.W. as voted by the Weeds Officer's Group Sessions at the above School resulted in the following list:

	<u>VOTES</u>	<u>IMPORTANCE*</u>
Serrated Tussock	(6)	1
<u>XANTHIUM</u> SPP.	(6)	2
Blackberry	(6)	3
St. John's Wort	(6)	4
Johnson grass	(3)	5
Nodding thistle	(5)	6
African boxthorn	(4)	7
Groundsel bush	(3)	8
Galvanised burr	(5)	9
Spiny burr grass	(2)	10
Waterhyacinth	(5)	11
Scotch thistle	(2)	12
Sweet briar	(2)	13

\* The priority listing of IMPORTANCE was decided after general discussions at a Meeting chaired by the Principal Agronomist (Weeds).

NOTE: THE ANNUAL DINNER WILL BE HELD ON FRIDAY, 2nd DECEMBER, 1977.  
DETAILS WILL BE PROVIDED IN THE NEXT NEWSLETTER.

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