

by

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Although Australians on the whole are not as flower conscious as are their counterparts in many countries overseas, there is still quite a large cut flower market and, consequently, significant commercial flower farming activities. Second only to the rose in commercial importance is the gladiolus - a more than £1,000,000 per annum crop in New South Wales alone - thus, a fitting plant on which to conduct our first weed control trials in flower crops.

If overseas work and recommendations are any indication of what to expect in Australia, it seems that weed control recommendations made for gladiolus could be expected to apply equally well for daffodils, hyacinths, tulips, freesias, bluebells, tuberose, Dutch iris and the like. Actually, pre-emergence recommendations given to enquirers concerning these crops have as yet been based on a combination of overseas reports and local gladiolus trial results.

In the last three years three weed control trials have been set out in gladiolus, two under irrigation at Richmond and one under non-irrigation conditions at Kurrajong Heights. Commercial sprayings and observation plots involving isolated chemicals have also been treated.

1. The first trial was at Richmond in 1958 and involved three varieties, Vrede (white), Sunspot (biscuit) and Scheherazade (flesh pink). Corms were graded into large, medium and small sizes and treatments were applied pre-emergence to single rows spaced 30" apart. Weed counts were taken at 4 weeks and 8 weeks after planting, the second count particularly to gauge residual effect. Flowering commenced 5 weeks after the second count.

Under good moisture conditions weed control was excellent, as shown in Table 1.

⁺New South Wales Department of Agriculture

TABLE 1

WEED COUNTS IN 1958 RICHMOND TRIAL - 4 AND 8
WEEKS AFTER PLANTING

	TCA 2,4-D 10 + 2 lb./ac.	TCA 2,4-D 20 + 4 lb./ac.	CIPC 3	CIPC 6
4 weeks	9	1	80	5
8 weeks	6	2	524	126

	2,4-DES 3	2,4-DES 6	DNBP 4	DNBP 8	CONTROL
4 weeks	35	68	1	1	121
8 weeks	28	28	74	58	693

Resulting corm weights did not seem to be greatly affected by any treatment but 2,4-D-TCA where in the small size there was a drastic reduction in weight and numbers.

2. The second trial was set out late in 1958 on part of a commercial planting near Kurrajong Heights. Here conditions were warm and dry for six weeks after planting and as irrigation was not possible, the surface layer of soil dried out. This did not stop either crop or deeply located weeds from germinating, however, in the latter case to the detriment of effective weed control. Many herbicides here expected to do well failed ignominiously. Large corms of Spic'n Span (pink) and Jo Wagenaar (red) were used.

Total weed counts consisting almost entirely of grasses are shown in Table 2.

TABLE 2

WEED COUNTS IN 1958 KURRAJONG HEIGHTS TRIAL

Control	TCA 2,4-D 10 + 2 lb./ac.	CDAA 2,4-D 4 + 2 lb./ac.	CDAA 4 lb/ac.	Neburon 2 lb./ac.	Neburon 4 lb./ac.
959	102	50	64	909	795

2,4-DES 2 lb./ac.	2,4-DES 4 lb./ac.	Simazine 1 lb./ac.	Simazine 2 lb./ac.	CMU $\frac{1}{2}$ lb./ac.	CMU $1\frac{1}{2}$ lb./ac.
601	470	991	691	1030	579

Only the 2,4-D-TCA treatment caused any crop damage. This appeared in some cases as sickle-shaped, narrow leaves, in others as twisted spikes and malformed florets.

3. The third trial (late 1959) was again located at Richmond but this time only one variety (Scheherezade) was used. 1,200 corms were used. From these each of the 36 plots in the trial was planted with 19 corms of identical size, although these corms ranged individually from 3" to $\frac{1}{2}$ " in diameter.

A buffer zone of mixed varieties was planted around the trial corms.

From the six EPTC treatment plots only two gladioli matured and flowered. Another 14 emerged, reached about 3" in height and then rotted away. Amitrol, at neither strength giving really good weed results, quickly lost all effect and soon became identical to the unweeded controls.

Spike and floret numbers, apart from in the EPTC plots, gave no significant variation between treatments and quality was unimpaired.

TABLE 3TOTAL WEED COUNTS 5 WEEKS AFTER SPRAYING -
RICHMOND TRIAL 1959

	EPTC 10 lb./ac. (Liquid)	EPTC 10 (Granular)	CIPC 4	CIPC 6	CDAA 4
Monocots	0	0	9	3	90
Dicots	9	0	52	24	40
Total Weed	9	0	61	27	130

	CDAA 6	Amitrol 4	Amitrol 8	CMU 1	CMU 2	Control
Monocots	30	298	118	170	69	350
Dicots	12	62	20	34	3	109
Total Weed	42	360	138	204	72	459

4. On commercial plantings at both Sydney and Kurrajong, the mixture of 10 lb. of TCA plus 2 lb. of 2,4-D was applied. In most cases weed control was excellent but with some varieties distorted spikes and disfigured corms resulted. Varieties particularly affected were Firebrand (red), Jo Wagenaar (red), New York (pink), Vrede (white), Tobruk (black red), Black Cherry (black red) and Topflite (pink). At Kurrajong Heights, where the weed was almost completely grassy, TCA at 10 lb. per acre alone was used. Control was excellent, no crop damage was recorded and flower quality was very good. This treatment was again commercially applied by the grower in 1960.

5. Following the previous spectacular result with EPTC further plots were laid down at Sydney. The granular form was worked into the soil at 5 lb./ac. at the stage where corms had shot but were not yet through the ground.

Many corms were destroyed, a few flowered and some new corms were formed and harvested but the EPTC was far too drastic to consider any commercial usage with gladiolus. A thick stand of nut grass which was on the point of emerging was killed out by the EPTC and it was not till late autumn, 3 months later, that some unhealthy plants became established.

6. In summer 1960 at Pennant Hills, to the west of Sydney, another commercial planting was treated with CMU at 3 lb./ac. Weed control was excellent right till the time that corms were lifted. One small area was treated at 10 lb./ac. and plants here also grew, flowered and matured as normal, showing a remarkable tolerance to this herbicide.

COMMENTS ON HERBICIDES TESTED.

2,4-D causes distortion to many varieties, even at 2 lb./ac. Many lifted new corms showed furrowing and bulging, e.g. GK Gilliam (yellow), Sunspot (biscuit). As many newer herbicides can give comparable weed control for similar, if not longer periods, 2,4-D should no longer (if it ever was) be recommended with gladiolus.

2,4-DES - Weed control with this herbicide has been sometimes excellent but at other times very poor. Until the factors causing such unpredictability can be isolated and controlled, 2,4-DES should not be preferred.

TCA - For grass control in pre-emergence sprayed plantings this chemical is excellent. It is comparatively cheap, crop plants are quite tolerant to it and it is easy to handle and apply. Residual effect, however, is only moderate.

CDAA - Although more expensive than TCA, a wider range of weed is controlled and for a longer period. Despite this, however, it still cannot keep weeds controlled all through the life of the crop. Again results with CDAA are quite erratic until soil conditions really warm up and by this time a large part of the crop is up and even in spike.

CIPC - This herbicide has been tending to sink back further into obscurity as newer and more predictable chemicals have been forthcoming. In the case of gladiolus

weed control, this need not be so, especially with early plantings. In the Richmond trials, CIPC has given good weed control, has exhibited good residual effects and has produced no ill effects with either flowers or corms. 6 lb./ac. pre-emergence in spring would probably give the best response with gladiolus, but then even at this rate there are many weed species still resistant to CIPC.

EPTC - Although weed control is excellent and residual effect is good, commercial use of this chemical should not be contemplated because of its adverse effect on the crop.

Amitrol - Very dependent on soil moisture for good weed control but even so, residual effect is poor compared with other available alternatives.

Simazine - As the one trial involving this herbicide was inconclusive owing to dry conditions, no decisive comment is justified. Overseas reports are quite favourable but here it is obvious that a certain amount of rain or irrigation after treatment is essential to its successful use.

DNBP - Used as a pre-emergence herbicide in one trial DNBP gave excellent weed control of initial weed germination but this was only transitory and weed numbers soon started to build up. It was also noticed in this trial that where DNBP treatments were, no sign of nematodes could be found, whereas in adjoining treatments a degree of infestation in the form of root nodules was apparent. It has not yet been possible to carry out additional observations on this phenomenon.

Taking only weed control aspects into consideration, it is doubtful whether costs could compare with either CMU or TCA and that of handling makes its adoption even more unlikely.

CMU - Results available so far are quite variable. Its comparative insolubility makes it very useful for weed control under irrigation conditions, especially with moderately deep plantings. Despite its widespread adoption in total vegetation destruction programmes, no ill effects have yet been noticed with gladiolus - even as previously mentioned at up to 10 lb./ac. 2 lb./ac. has shown itself necessary for continued weed control

through the total crop life and an increase to 3 lb./ac. is in the author's experience to be preferred.

Neburon - As with simazine, the one trial involving neburon was inconclusive. With CMU showing such promise, there is certainly room for further work with neburon, especially under irrigation.

SUMMARY.

Whatever herbicide is here used to combat weeds, it should be reasonably cheap and should hold its effectiveness for at least four months.

The most likely then would appear to be CMU, Neburon or Simazine. With these potentially dangerous, and to gladiolus, non-selective herbicides, shallow planting is to be avoided, especially where high rainfall and/or copious irrigation is likely. CMU at 3 lb./ac. is at present favoured.

If grassy weed is the dominant factor to be combated, then TCA at 10 lb./ac. is cheap and temporarily satisfactory.

CIPC at 6 lb./ac. is also capable of excellent prolonged weed control, but only where CIPC resistant weeds are not a problem.