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Residue trials, herbicide incorporation and leaching of chlorsulfuron

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SUMMARY OF EXPERIMENTAL RESULTS 1983.

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Experimental Summary 1983. T. Piper, Weed Agronomy Branch.

a) Residue Trials:

Breakdown rates have been established for trifluralin at Wongan Hills and Avondale over the past two seasons. The decay curve follows a hyperbolic curve rather than the expected exponential curve with constant half life, probably due to the considerable loss of chemical by volatalization in the first few days, before biological decomposition takes over as the main breakdown factor.

Time (in days) for trifluralin residues to decrease to 25% and 10% of the original rate.

Avondale	7.0 l/ha	1982-3	1983-4	1.4 l/ha	1982-3	1983-4
t. 25%		17.9	12.3		19.4	13.7
t. 10%		53.8	36.9		58.2	41.0
Wongan	7.0 l/ha			1.4 l/ha		
t. 25%		10.6	8.3		17.6	20.8
t. 10%		31.7	25.8		52.7	62.4

b) Herbicide Incorporation:

Suitable operating conditions have been established for monitoring the distribution of herbicide through the soil profile by the use of a co-incorporated fluorescent marker dye. Du Pont Z196 fluorescent orange powder at 30 g/m^2 could be readily seen when illuminated by 400 $\mu W/cm^2$ of 365 nm UV radiation, and was successfully photographed on Ektachrome 400 ASA film with a 4 sec. exposure (at night, and with no more than ¼ moon).

Preliminary tests have shown that simazine is often not uniformly incorporated. Cultivator bars with sweep tynes may concentrate the herbicide in ridges to such a degree that the crop is affected while weeds grow freely in the troughs where there is no herbicide. Covering harrows may reduce this effect, while a workup at spraying plus another at seeding was even better. A cultitrash gave the most uniform incorporation.

c) Leaching of Chlorsulfuron.

"Glean" has been shown to leach up to 30 cm in columns of a light sandy soil (South Perth) with 25mm rainfall. If applied pre-planting, this would mean that some 80-90% of the herbicide could be unavailable to seedling weeds by the time they emerged. In some columns herbicide concentration was greater at 12, 15 and 18 cm than at 3 cm depth.

The herbicide did not appear to leach twice as much with 50mm rainfall, so the weeds' roots will eventually reach all the chemical, but they will be larger and more resistant, and the dose will be less acute, and so control will be poor.

No significant difference has been found in the leaching patterns on initially dry and initially wetted to field capacity soil columns.

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Leaching has also been shown to occur in Wongan, Avondale and Newdegate soil columns, but these tests have only been done on 15 cm cores, and the limit of leaching is not certain.

d) Pasture Regeneration.

Trials have been laid down at Geraldton, Wongan and Wickepin to measure the regeneration of pasture following the use of herbicides in-crop. The aim is to separate any effect of the herbicide into a residue carry-over and a reduced seed set component, and to see if re-seeding of pastures may be a necessary adjunct to herbicide use.

Only clover, capeweed and ryegrass counts have been taken this season to provide an estimate of seed set. The ratio of % clover to % capeweed compared to control plots is interesting.

Ratio of Clover to Capeweed plants as a % of Control, after Herbicide Treatments.

Herbicide	Glean	Dicamba	2,4-D	Diuron	Tribunil	Brominil M
Geraldton	0	.59	1.67	2.17	2.0	
Wongan	.11	.37	1.8	1.58	1.32	12.3
Wickepin	.24	1.09	.57	.48	.91	

Glean is a relatively more effective clover killer than the older herbicides, and as its use becomes more widespread clover will be actively selected against in pastures. Thus quality may decline even faster.

e) Onion Weed Control

Stomp (1 & 2 litres/ha), Tramat (4 litres/ha), Tribunil (4 kg/ha) and Pyramin (4 kg/ha) were further evaluated for pre-emergent weed control in onions. Also trialled was a pseudo minimum tillage technique whereby the area was cultivated and prepared for seeding, watered for 2 weeks, Sprayseeded to kill emerged weeds and then sown to onions without further cultivation. Visual assessment of onion and weed growth was made.

Tribunil caused unacceptable crop damage, in contrast to earlier trials where this rate was tolerated. The other chemicals did not affect the onions.

All provided reasonable weed control, with Stomp at 2 litres being excellent and nearly as good at 1 litre. Stomp (1 litre) plus either Tramat (4 litres) or Pyramin (4 kg) were also excellent.

Pre-germination of weeds gave reasonable weed control, some control plots remaining weed free for 3 weeks after seeding. Combined with Stomp (1 litre) the results were excellent, with almost complete control of weeds for over 6 weeks. By this stage the onions had passed the 3 leaf stage and would tolerate all post-emergent herbicides.

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Pre-germination and Sprayseeding did cause a dramatic shift in weed population. Nightshade, with some sowthistle and capeweed, was the dominant weed on the site, but the Sprayseeding selectively removed the faster germinating broad-leaves and allowed crabgrass, with some stinkgrass, to take over the control plots. This is no disadvantage, as Fervin and Fusilade both control post-emergent grasses in onions safely.

Onions in the pre-germinated bed were slightly slower growing than those in the conventionally treated bed. This was attributed to the use of fowl manure as fertiliser, applied at cultivation. The two week pre-germination period would allow some breakdown and leaching of nutrients. This could be overcome to some extent by seeding the onions at cultivation, and applying Sprayseed some 5-7 days later, just before the onions emerge and just after the faster growing weeds have appeared. Stomp, however, would need to be applied at seeding. Applied just befor emergence in one trial, it caused unacceptable damage to onions.