WEED CONTROL IN PEANUTS IN NORTHLAND

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SUMMARY

Trials investigating the control of weeds in peanuts (*Arachis hypogaea*) on three soil types in Northland demonstrated the effectiveness of linuron in combination with alachlor or trifluralin for pre-emergence application. Control of later germinating weeds appears possible using herbicides applied in various ways although commercial-scale evaluation of potential treatments is necessary.

INTRODUCTION

In the current evaluation of peanuts in northern North Island (Anderson and Piggot 1981) weed control presented a serious problem. The highest yielding cultivars grew slowly and reached a maximum height of about 40 cm, providing little competition with weeds at any stage of growth. Also peanut plants below a weed canopy appeared to incur a higher incidence of lethal white mould (*Sclerotinia* and *Rhizoctonia* spp.). The two trial series reported here aimed to provide preliminary recommendations for controlling weeds, the treatments compared being chosen after consideration of their ability to control common weeds of the region, and suspected tolerance of the crop.

METHOD

Two trial series were conducted in successive years - control of weeds during crop establishment (1980-81) and control of late germinating weeds (1981-82). Three sites were used in each series:-

1. Otakanini (Whananaki sand, OM 7%); a deep alluvial soil
2. Dargaville (Te Kopuru sand, OM 8%); a podzolised soil
3. Sites with "volcanic" soil; Kerikeri in 1980-81 (Okaihau gravelly clay, OM 9%); Whangarei in 1981-82 (Whakapai clay loam, OM 9%).

Weeds of establishment

The seedline used was a mixture of the 12 cultivars used in the concurrent cultivar x sowing date trial (Anderson and Piggot 1981). Plots (3 rows x 3 m long in 0.5 m rows) were hand sown into cultivated ground between 7th and 11th November 1980. All herbicides shown in Table 1, were applied with an Oxford Precision sprayer using Teejets 730154 at 180 kPa. No tank mixes were made and trifluralin was incorporated with a rake. The trial design was randomised blocks with 5 replicates. Plant counts were made in late December and between 13th and 20th January 1981, weeds in 2 x 0.25 m² quadrats/plot were recorded, harvested and dried. About 1st April the centre row of each plot was dug, and shells removed for drying and shelling.

Late germinating weeds

A single replicate of a 6 weed treatments (Table 2) x 6 cultivars factorial design was laid out at each site by hand sowing into 4 rows x 3 m long x 0.5 m row plots on cultivated ground between 9th and 11th November 1981. All trials were sprayed pre-emergence with a tank mix of alachlor (3 kg/ha) and linuron (1.5 kg/ha). The cultivation was conducted by pushing a garden-type, rolling tine cultivator ('Spintiller') in the inter-row area so as to severely damage the weeds between the rows. This treatment was applied twice (about 8.1.82 and 2.2.82) before the canopy "closed" in late February. The overall spray of 2,4-DB (at 0.3 kg/ha) and the inter-row spray

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(paraquat at 0.4 kg/ha plus 2,4-DB at 0.4 kg/ha) was applied by hand-pumped knapsack sprayer about 10.1.82. The wiper treatment was applied twice (in early February and early March) using a 15% glyphosate solution applied through a hand-held, hockey stick wiper. About 3rd April the centre two rows were harvested, partially field-cured, picked, and sub-sampled for yield determinations. Weed yield was assessed by harvesting all weeds from the central inter-row area.

RESULTS

Weeds of establishment

There was no effect of any treatment on plant population after establishment or at final harvest. The populations were 6, 12 and 11 plants/m² for sites 1, 2 and 3 respectively. Site 3 had few weeds (Table 1) and based on its peanut yield and visual scoring of peanut plants at the other sites, the crop appeared tolerant of all the herbicide treatments applied. All herbicide treatments reduced the amount of weed until January but weeds germinating from this date obscured any treatment effects on peanut yields at sites 1 and 2. The combinations of linuron plus alachlor or trifluralin showed an advantage over linuron alone. At all sites annual broadleaf weeds predominated; the prime species being redroot (*Amaranthus powellii*), black nightshade (*Solanum nigrum* complex), and purple amaranth (*Amaranthus lividus*).

TABLE 1: Weed yield in January and peanut yield for the weeds-of-establishment trial series, 1980-81.

Treatments and rates (kg/ha)	Sites:	Weed DM (t/ha) January			Shell yield (t/ha) April		
		1	2	3	1	2	3
control		11.8	5.9	0.3	0	0	3.2
hand weeded		0	0	0	2.7	1.3	4.4
linuron 1.5		2.2	3.4	trace	0.3	0.6	5.2
linuron 1.5 alachlor 3		0.8	0.5	trace	1.3	1.1	5.0
linuron 1.5 trifluralin 0.8		1.6	2.0	trace	0.5	0.5	4.6
linuron 2 alachlor 3		1.0	0.6	trace	0.9	1.1	6.3
shelling percentage					68	70	78
MSD 5%		2.6	2.8	-	0.8	0.9	2.4

Late germinating weeds

Site 1 grew an exceptional peanut crop (Table 2) and had very low levels of late germinating weed. Only the treatment utilising cultivation and wiper application of glyphosate significantly reduced weed yield although there was no associated effect on peanut yield. Based on site 1 no treatment appeared to have a direct deleterious effect on shell yield. However the overall spray did have a striking visual effect for at least 1 month after spraying. At sites 2 and 3 all treatments significantly reduced the weeds in the crop, but of any treatment the inter-row spray tended to be the best, particularly when compared with the inter-row cultivated treatment. Redroot was the prime weed at site 2, whereas site 3 had a variety of weeds enabling assessment of the effect of treatments on the weed spectrum. The overall 2,4-DB encouraged a summer grass (*Digitaria sanguinalis*) infestation as did the cultivated treatment which also allowed "escapes" of large inkweed (*Phytolacca octandra*), redroot, fathen (*Chenopodium album*), and black nightshade plants. However the tall broadleaf weeds were controlled by the wiper but not the summer grass. This weed was largely controlled by the inter-row paraquat spray. White mould was present at all sites and its incidence was clearly greater in untreated plots at site 3 when compared with plots where weeds were sparse or absent.

TABLE 2: Weed yield and peanut yield for the late-establishing-weeds trial series, 1981/82.

Sites:	Shell yield (t/ha)			Weed DM (t/ha)		
	1	2	3	1	2	3
control	11.0	2.3	2.0	0.9	5.6	10.8
hand-weeded	12.4	3.9	4.6	0	0	0
cultivated	11.6	2.5	3.1	0.3	2.5	6.7
inter-row spray (paraquat + 2,4-DB)	11.1	3.4	4.4	0.3	1.2	2.1
overall 2,4-DB	11.3	2.6	2.6	0.7	2.6	4.2
cultivated + wiper (glyphosate)	11.6	2.8	3.9	0.1	0.7	1.2
shelling percentage	37	45	56			
MSD (P = 5%)	1.6	1.4	1.7	0.8	3.4	3.1

DISCUSSION

These results allow confidence in recommending linuron in pre-emergence herbicide combinations, linuron being demonstrably effective against the main annual broadleaf weeds of Northland (Piggot and Honore 1977; Rahman *et al* 1979). In combination with alachlor or trifluralin efficient control of most weeds during crop establishment is possible with linuron. These trials have also demonstrated the benefits from controlling weeds during the crop establishment stage and throughout the rest of the life of the crop. The effect of weed presence in increasing the incidence of white mould obscures to a degree the reasons for controlling late germinating weeds, but does not influence the clear need to deal with any weed problem.

These results have also demonstrated the potential for controlling late germinating annual weeds entirely with herbicides, using judicious selection of inter-row spraying, 2,4-DB over the canopy, and glyphosate application by a wiper. Adequate weed control could therefore be possible in peanuts grown in Northland. However the ease with which late germinating weeds can be controlled in commercial scale production is unknown. The small scale of these trials may influence the validity of extrapolating these results to larger plantings and the methods of applying the treatments may present problems.

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