WEED CONTROL IN YAMS

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Summary

Herbicide screening trials in Levin and Manawatu districts indicated that the triazines were more effective in the yam crop (*Oxalis tuberosa*) than other herbicides. Prometryn 1 kg/ha pre-emergence, simazine 0.5 to 1.0 kg/ha pre-emergence and aziprotryne 1.5-2 kg/ha were considered to have most promise.

INTRODUCTION

The yam or oca, *Oxalis tuberosa* Mol (syn. *O. crenata* Jacq.) originates in the Andean highlands of South America where it has been grown since the Inca civilisation and is still a basic foodstuff of the indigenous people (Hodge 1951).

In New Zealand, yams are grown commercially on a small scale, mainly in the southern part of the North Island and also in Canterbury. Plants have trifoliate leaves with reddish stems and produce red or yellow flowers which do not set seed. The tubers are up to 10 cm long, irregularly cylindrical.

Crops are planted in November in a similar manner to potatoes in ridged rows and tubers form in April-May. The foliage is killed by winter frosts and harvesting is carried out in June or July.

No reports of work on weed control have been found in the literature. In commercial practice in New Zealand prometryn has been used successfully, applied just after crop emergence (D P Halford pers comm). This report describes two initial herbicide screening trials.

METHOD

The first trial, in 1977-78 at the Horticultural Research Centre, Levin on Levin silt loam compared the more commonly used herbicides at both pre- and post-emergence stages (Table 1). The second trial in 1978-79, on a property near Feilding on a Rangitikei sandy loam, compared a wider range of triazines at pre- and post-emergence stages, also alachlor and metolachlor applied pre-emergence (Table 2). Treatments were applied in a spray volume of 350 litres/ha at 200 kPa. Plot size in the first trial was 1.5 x 6 m and in the second 1.62 x 6 m. Both trials contained two replicates.

Following the application of the post-emergence treatments in the 1978-79 trial a heavy rain shower occurred which probably reduced their effect.

The 1977-78 crop was grown on raised beds; tubers were dug by hand in early June 1978 and plot yields compared with hand weeded control. The 1978-79 crop was grown on ridges which were harrowed down to almost level ground soon after planting and before application of

Crop Weeds

Table 1. Details of 1977-78 trial.

Herbicide	Rate kg/ha	Application	Crop† injury score	Yield
trifluralin	1.0	Ppsi*	2	Good
pendimethalin	1.0	Ppsi	5	Low
dinitramine	0.6	Ppsi	3	Good
alachlor	2.0	Pre-em	3	Good
lenacil	1.0	Pre-em	4	Good
linuron	1.0	Pre-em	4	Good
metribuzin	0.4	Pre-em	5	Good
prometryn	1.0	Pre-em	0	Good
simazine	0.5	Pre-em	2	Good
simazine	1.0	Pre-em	4	Good
aziprottryne	2.0	Early post-em	0	Good
chlormethazole	1.0	Early post-em	8	Very low
ioxynil	0.6	Post-em	6	Good
linuron	0.5	Post-em	7	Low
methabenzthiazuron	1.5	Post-em	9	Nil
metribuzin	0.2	Post-em	7	Low
phenmedipham	1.0	Post-em	7	Good
prometryn	0.5	Post-em	2	Low
Control, hand weeded	—	—	0	Good

* Ppsi = post-planting, soil incorporated.

† Crop injury scoring scale: 10 = complete death of foliage. 0 = full vigour of foliage.

treatments; the rows were ridged up again 2 months later when the crop was established.

Early post-emergence sprays on both trials were applied when the crop was up to 8 cm high and the weeds cotyledon to 2 true-leaf stage.

Post-emergence sprays on the 77-78 trial were applied when the crop was up to 10 cm high, and the weeds 2-4 true leaves; crop injury scores were done 2 weeks later. The main weed species were spurrey

Table 2. Details of 1978-79 trial.

Herbicide	Rate kg/ha	Application	Crop† Vigour Score
alachlor	2.0	Pre-em	7
metolachlor	2.0	Pre-em	7
atrazine	0.5	Pre-em	5
simazine	0.5	Pre-em	8
propazine	1.5	Pre-em	6
cyanazine	1.5	Pre-em	6
terbuthylazine	0.6	Pre-em	6
terbutryn	0.8	Pre-em	8
prometryn	1.0	Pre-em	9
aziprottryne	2.0	Early post-em	7
terbuthylazine	0.3	Early post-em	9
cyanazine	0.8	Post-em	6
cyanazine	1.5	Post-em	2
terbutryn	0.4	Post-em	6
prometryn	0.5	Post-em	10
control, weedy	—	—	8

† Crop vigour scoring scale: 0 = complete death of foliage 10 = full vigour of foliage.

Crop Weeds

(*Spergula arvensis*), twin cress (*Coronopus didymus*), willow weed (*Polygonum persicaria*), fathen (*Chenopodium album* agg) and black nightshade (*Solanum nigrum*).

Post-emergence sprays on the 1978-79 trial were applied when the crop was up to 14 cm high and the weeds at the young plant stage up to 10 cm high; crop vigour scores were done 2 weeks later. The main weed species were fathen, nightshade and redroot (*Amaranthus powellii*).

RESULTS

1977-78 Trial

The safest treatments were the triazines, prometryn 1.0 kg/ha, applied pre-emergence and aziprotryne 2.0 kg/ha early post-emergence (Table 1). Other reasonably safe treatments were trifluralin 1 kg/ha and dinitramine 0.6 kg/ha both soil incorporated, and alachlor 2 kg/ha and simazine 0.5 kg/ha, both applied pre-emergence. Those causing slight to moderate injury were simazine 1 kg/ha, lenacil, linuron pre-emergence, metribuzin and pendimethalin.

Those causing moderate to severe injury were ioxynil, linuron and phenmedipham post-emergence, the latter treatment made a surprisingly good recovery and produced a satisfactory yield. Chlormethazole and methabenzthiazuron caused very severe injury.

1978-79 Trial

The herbicides which caused least affect on the crop were prometryn applied at 0.5 kg/ha post-emergence and at 1.0 kg/ha pre-emergence and terbuthylazine at 0.3 kg/ha early post-emergence (Table 2). Simazine and terbutryn pre-emergence caused a slight reduction in crop vigour. Other fairly safe chemicals were aziprotryne, alachlor and metolachlor. Terbuthylazine 0.6 kg/ha and cyanazine 1.5 kg/ha pre-emergence and 0.8 kg/ha post-emergence caused some damage. Applied post-emergence at 1.5 kg/ha cyanazine severely injured the crop.

None of the post-emergence treatments controlled fathen in the second trial but a better result might have been obtained without the rain shower which occurred.

CONCLUSION

The triazines were the most useful group of herbicides tested in these trials. Further work would be worthwhile with prometryn 1 kg/ha pre-emergence and 0.5 kg/ha post-emergence, and with simazine at rates between 0.5 and 1.0 kg/ha pre-emergence and aziprotryne 1.5 to 2 kg/ha early post-emergence.

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REFERENCE

Hodge, W. H., 1951. Three native tuber foods of the High Andes. *Economic Botany* 5: 185-201.