CONTROL OF VOLUNTEER POTATOES WITH GLYPHOSATE

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Summary

In small plot trials, foliage applications of glyphosate 0.8 kg/ha effectively controlled plants of cvs Rua and Ilam Hardy. No sprouts developed on the new Rua tubers formed when stored in a glasshouse for three months.

INTRODUCTION

Elimination of volunteer plants, also called 'self-sets' or 'ground-keepers', after potato crops are harvested is a continuing problem in areas of intensive cropping such as Pukekohe. As well as being a major weed in following crops, particularly onions, volunteer potatoes can harbour pests such as the aphid vectors of virus diseases, tuber moths and nematodes. From initial screening of candidate chemicals in glasshouse experiments at Levin Horticultural Research Centre in 1971 and 1972 only one material, ioxynil, showed any promise for controlling potatoes. However, this was not confirmed in the field where only a temporary growth check was obtained by defoliating the young potato plants with applications of ioxynil.

The subsequent introduction of glyphosate, a herbicide which is readily translocated in perennating organs and not persistent in the soil, offered another possibility for chemical control. This was investigated in field experiments at Levin HRC in 1973-74 which are reported here.

METHODS AND MATERIALS

Four replicates of both cv Rua and cv Ilam Hardy were planted in 1 m² plots, nine regularly spaced 'seed' potatoes per plot, on 3 October 1973. An application of paraquat/diquat mixture 0.5 kg/ha was made before the potatoes emerged. The treatments, applied on 13 November 1973, were glyphosate 0.8, 1.2 and 1.6 kg/ha and 0.8 kg/ha with 0.5% added wetter (Agral LN). By this time the foliage of both cultivars had developed and was 20 to 30 cm tall. A small hand-held sprayer was used inside a hessian covered frame and treatments were applied in a spray volume of 700 litres/ha.

Almost complete kill of foliage occurred on all four treatments and the plants were assessed according to the extent of survival of their underground parts. Tubers were dug, counted and weighed on 12 February 1974.

RESULTS AND DISCUSSION

The survival of plants from all glyphosate treatments, as indicated by new tuber development, was negligible. The mean numbers and weights of new tubers from all treated plots compared with untreated, are given in Table 1. Only new potatoes greater than 2 cm diameter were recorded, it being considered that tubers smaller than this would be unlikely to grow in any case. Those few larger Rua tubers which were

New Products

formed after glyphosate treatment were stored in a glasshouse for three months and, while control tubers produced healthy sprouts, no growth occurred in the treated sample.

These tests indicated that one foliar application of glyphosate can completely control potato growth. The contact effect was enhanced by translocation sufficient to stop sprout growth from the few new tubers the sprayed volunteer plants produced.

This susceptibility could be put to good use if time can be allowed for unharvested or rejected potatoes to sprout before preparing the land for the next crop. The success of this chemical technique would depend on full emergence of the tubers before spraying, however, and sufficient delay between crops could be too expensive in an intensive vegetable growing rotation. In this case it would be worth considering spot treatment in the following crop. Some simple device which would wet the potato foliage with no danger of chemical drift could still be preferable to chopping out by hand.

TABLE 1: EFFECT OF GLYPHOSATE ON NEW TUBER DEVELOPMENT

		<i>New tubers greater than 2 cm diameter (Means per tuber planted)</i>	
		<i>Number</i>	<i>Weight</i>
cv Rua:			
	all glyphosate treatments	1.3	27 g
	untreated	24.5	1518 g
cv Ilam Hardy:			
	all glyphosate treatments	1.1	16 g
	untreated	8.5	417 g