UREA-FORMALDEHYDE (UFC-85) FOR THE CONTROL OF POTATO SCAB

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Introduction

The Department of Botany at the Ontario Agricultural College has been testing soil fungicides for the control of common scab of potatoes for several years under the direction of the Ontario Potato Scab Research Committee.

Several workers (1, 2) have reported considerable success in controlling common scab by the discing in of an agueous solution of urea-formaldehyde prior to planting. Urea-formaldehyde UFC-85 is a polymethylol urea, containing approximately 85% solids, combined in a formaldehyde to urea mol ratio of about 4.6 to 1 or 59% formaldehyde and 26% urea. It is relatively non-volatile, having a vapor pressure lower than that of formaldehyde solutions normally used. This property of non-volatility tends to make UFC-85 a more effective soil fungicide. In addition to possessing fungicidal properties it is a good source of nitrogen. The material used in experimental work in 1959 and 1960 was obtained through the courtesy of Dr. H.J. Stangel, Nitrogen Division, Allied Chemical Corporation.

Methods

Two areas, known to be heavily infested with Streptomyces scabies (Thaxt.) Wakesman & Henrici, were chosen for the experiments in 1960. These were on the experimental farm at Hespeler, Ontario and on the farm of a seed grower near Lafontaine, Ontario. Sixteen 25-foot single-row plots were established at each location, eight of which were treated with urea-formaldehyde and eight left untreated as controls. One gallon of UFC-85 was diluted with 3 gallons of water and the resultant mixture was applied with a watering can at the rate of 1 gallon to 25 feet of row. At Hespeler the area was disced twice immediately after the liquid was applied and Foundation grade Kathadin potatoes were planted 3 days later with a 2-row planter. Commercial fertilizer, 6-12-12, was applied at the rate of 1000 lb./acre. At Lafontaine the liquid was hoed in and Foundation Red Pontiac potatoes were planted 2 days later. This area was fertilized with a 2-12-10 commercial fertilizer at 1000 lb./acre. Neither area was irrigated nor did they receive any special treatment during the growing season.

Four hills, selected at random from each 25-foot plot, were dug at Hespeler on October 14 and at Lafontaine on October 17. Scab indices were determined for ten tuber selected at random from those dug from each plot. Two separate indices were used; the percentage of the area occupied by scab as determined by the Richardson-Heeg chart (3), and a rating of the type of scab on a scale of 1 to 5, where 1 represents very small superficial lesions and 5 represents large deep pits.

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Results

The data presented in Table 1 show that UFC-85 not only reduces the amount of scab on the tubers but also changes the type of lesion from deep pits to small superficial spots. The calculated yield per acre in the treated plots was slightly lower than in the untreated plots and the potatoes were not quite as mature. This drop in yield is in contrast to the results obtained in 1959 when the plots treated with UFC-85 outyielded the control plots by 200 bu./acre with no difference in maturity.

Table 1. The influence of UFC-85 on the incidence of potato scab and on yields in 1960

	Yield, bu./acre		Scab Index			
Location	UFC-85	Control	UFC-85		Control	
Hespeler	462	537	4.9*	1.9**	19.95*	3.13**
Lafontaine	578	596	3.7	1.48	13.95	2.3

* Mean of eight plots - Percentage area of tuber covered with scab.
** Mean of eight plots - Type of scab present on tubers.

Discussion

The results obtained in these experiments, along with those reported by other workers, suggest that UFC-85 may have a definite value for the control of common scab of potato caused by Streptomyces scabies. It is easy to apply, no waiting period is necessary prior to planting, no special equipment other than a sprayer is required for its application, and it supplies added nitrogen to the soil. The discrepency in the effect on yield between the 1959 and 1960 experiments may have been due to the fact that the plots were irrigated in 1959 but not in 1960.

Literature Cited

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