VINE PULLING AS A MEANS OF TOP KILLING POTATOES
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Abstract

Vine pulling as a means of top killing potatoes was evaluated by measuring tuber discolouration, desiccation of stems and leaves, stems missed and rerooted, and tubers exposed during pulling. Tuber discolouration ratings determined for potatoes that had been top killed in mid-August by chemical desiccant, rotobeating or vine pulling, remained low during the four-year study except in 1978 with the chemical desiccant. Machine pulling evaluations indicated effective vine kill to be rated at 89-99% for leaves and 79-98% for stems with several cultivars of potatoes. A number of stems rerooted which reduced the vine kill ratings.

Resumen

El arranque del follaje como método de eliminación de la parte aérea de la papa fue evaluado midiendo la decoloración del tubérculo desecación de tallos y hojas, tallos perdidos y rebrotado y exposición de tubérculos durante el arranque. Los rangos de decoloración de tubérculos determinados para papas cuya parte aérea fue eliminada a mediados de Agosto mediante desecantes químicos, distención con rotativas o arranque del follaje permanecieron bajos durante un estudio de 4 años excepto en 1978 con el desecante químico.

Las evaluaciones del arranque mecánico indicaron una eliminación efectiva del rango de 89 - 99% para hojas y 79-98% para tallos en varios cultivares de papa. Un número de tallos rebrotados redujeron los rangos de eliminación del follaje.

Introduction

Potato top killing is practiced to reduce the bulk of potato vines for easier harvesting, to reduce losses from late blight tuber rot, to reduce disease infection such as leaf roll virus spread by aphids, to control tuber size and to reduce skinning of tubers during harvest. Methods commercially employed in Canada for top killing include the application of chemicals and rotobeating, as well as natural frost action.

Potatoes grown for seed usually must be top killed earlier or in a less mature condition than those grown for processing or table stock. Young potato plants, or those that have not matured sufficiently to start to

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senesce, are generally much more difficult to top kill with chemicals than the mature plants. With immature plants, the rate of top killer used must be increased over that usually required for satisfactory desiccation. This additional material increases the cost of top killing and may also increase the amount of stem-end discolouration in the tubers (4).

Rotobeating the vines is helpful for harvesting but does not prevent spread of diseases due to infection of the regrowth that often occurs.

Some of the alternative methods for rapid killing or removal of potato haulms are steaming, flaming, electrocuting, or pulling the vines. Steaming and flaming appear to be less practical economically because of their high fuel requirement (2, 3). Pulling appears to be the most logical approach. However, this method of top killing requires a practical machine and some testing of the ancillary effects of pulling such as ratings of stem-end discolouration.

The objective of the study reported in this paper was to evaluate vine pulling in Atlantic Canada. Both the effect of pulling on the tubers and machine evaluation were completed in the evaluation. The machine selected for the study was manufactured by Drost Machines, B.V., located in Rhenen, Holland.

**Materials and Methods**

A comparison between the effectiveness of top killing potatoes by vine pulling (hand pulling) or by a chemical top killer (diquat) either alone or in combination with rotobeating, was done in replicated plots at the Research Station in Fredericton, N.B., during a four-year study. Two varieties of potatoes, Netted Gem and Red Pontiac, were used. The potatoes were grown for seed purposes and, consequently, were top killed in mid-August each year. The various treatments and rates of chemical application used are listed in Tables 1 and 2. Desiccation ratings of the leaves and stems were made three weeks after top killing. Plots were harvested four to five weeks after top killing, and the stored tubers were rated for stem-end discolouration.

The mechanical vine puller (Figure 1) used in the evaluation consists of two parts — a pulling mechanism and a foliage chopper. The front-mounted foliage chopper consists of a set of rotating flails which cut the vines at a height of approximately 20 cm. The principal part of the pulling mechanism consists of a pair of spring loaded belts which operate in a nearly horizontal plane. Vine lifters are connected to the frame in front of the belts, and support plates or shoes are located beneath the belts. The vines enter between the belts and are pulled in a horizontal direction towards the rear of the machine. The angle of the pulling belts, with respect to the ground is maintained as small as possible in order that the vines are pulled nearly horizontally. Thus, the action of pulling tubers out of the ground is limited. With