

in infected tissues, we desired to learn of the association, if any, between the two. Young potato plants were root-dip inoculated with suspensions of bacterial isolates alone, the Pythium alone, and a mixture of both pathogens.

Results and Discussion

The combination of the organisms resulted in more dead plants and greater reduction in growth of surviving plants than either alone under our conditions (Table 1). The Pythium alone was slightly more pathogenic under these experimental conditions than the bacterium alone. The information obtained thus far implies a definite synergistic effect between the two organisms. Further investigations of the significance of this apparent interaction are being initiated.

Since this disease complex can evidently be a serious problem, both laboratory and greenhouse research directed towards finding control measures will be pursued.

Table 1. Data from inoculations of potato plants with a bacterial isolate and P. aphanidermatum. Seventeen days after inoculation.

	Total Plants	Living Plants	Dead Plants	% Dead	Average Height (mm)	Height as % of Controls
Bacterium	17	12	5	29	231.6	77
Pythium	17	13	4	24	130.7	42
Bacterium + Pythium	15	4	11	73	127.5	43
Controls	19	19	0	0	302.3	100

Influence of Tuber Maturity, Phorate Insecticide, Storage Conditions and Reconditioning on Chip Potato Quality and Chip Characteristics.

(Paul M. Bessey)

Introduction

Data in this report are from the first two years of a three-year study which is not yet complete.

Behind this experiment was a rash of protests from buyers and rejections of chipping potatoes which were claimed to fry up unacceptably dark. It was maintained that the phorate treatment for systemic insect control was the cause of this condition.

Since no direct information was available on the influence of phorate on chip color this series of tests was set up at the request of and in cooperation with the University of Arizona Entomology Department. To obtain background information and to evaluate their relative influences, certain other factors which are known to affect chipping quality of Arizona potatoes were combined in a complex factorial design.

Methods

Kennebec potatoes were planted with cooperating growers in the Queen Creek area.

Half of the experimental potatoes were grown with phorate applied in a fertilizer band at the rate of 2 lbs. actual insecticide per acre. Checks were protected from serious psyllid and aphid infestations by foliar treatment with other materials known to have no damaging effects. Plots were dusted once in 1963 and twice in 1964.

Harvests were made at 14 days prior to optimum maturity, at the optimum and at 14 days later. Terms used were immature, mature and overmature, although Arizona overmature potatoes might better be described as immature if based upon northern state standards.

After harvest, randomly selected lots were placed at 40, 55 and 70°F for periods of 0, 2 and 4 weeks. At the end of each storage period samples were drawn and placed in reconditioning storage at 70°F for 0, 1 and 2 weeks after which they were chipped. Lots included in 0 weeks storage were brought down to test temperatures overnight before continuing the test. Chips were evaluated for percent yield and color after frying.

Results

No deleterious effects of phorate were found in either year. On the contrary, there were slight benefits in improved yield, higher specific gravity and reduced tuber rots in the field. Otherwise, no material differences could be distinguished between phorate and check treatments.

Color of chips from phorate treated potatoes was 7.1, versus 7.4 for checks in 1963 and 6.5, against 6.6 in 1964. Percent yields were both 31% in 1963 and 33% in 1964.

Effects of maturity and storage temperature over 4 weeks of storage are shown in Table 1.

Table 1. Chip color and chip yields of potatoes of three maturities held at 40, 55 and 70°F for 0, 2 and 4 weeks. 1964 crop.

Weeks	Immature			Mature			Overmature		
	40	55	70	40	55	70	40	55	70
Chip Color on a 1 to 10 Scale ^{1/}									
0	5.5	5.7	5.5	7.3	5.5	5.3	5.0	5.0	5.0
2	9.8	6.0	5.5	10.0	6.2	5.0	9.8	7.0	5.8
4	10.0	5.3	4.7	9.8	6.7	5.2	8.8	7.3	5.3
Chip Yields in Percent ^{2/}									
0	29.0	29.5	30.5	32.5	34.0	34.1	33.6	34.0	34.3
2	31.5	32.5	35.2	33.2	33.0	34.4	29.9	32.2	33.8
4	32.5	34.5	37.0	31.4	33.1	34.0	31.3	33.3	34.7

^{1/} Chip color is graded on the 1 to 10 Caughlin Seale: 1=white, 5=most desirable light brown, 10=burned brown-black.

^{2/} Chip yields are in percent weight finished chips of peeled sliced stock placed in the fryer.

Reconditioning response of spring potatoes appears not to be quite the same as for northern grown fall potatoes. Further studies are to be made before a report is made.

Discussion

The hypothesis that phorate induced chips to fry up too dark seems effectively disproved. Slight quality advantages were found associated with the application of phorate, although not sufficient to recommend its use for those reasons alone.

Added maturity resulted in a little better color and higher percentage chip yields. Tonnage harvested and specific gravity were both up with increased maturity. Younger potatoes were slightly more sensitive to low temperature induced darkening and seemed less responsive to reconditioning.

The effect of low storage temperature on chip darkening was most dramatic, particularly when combined with prolonged storage. Not quite so visible, but of equal importance, as chips became darker, percent yield went down. It appears that transit and storage temperatures must be kept high despite respiration and evaporation losses. The most desirable holding and handling temperatures for Arizona spring chipping potatoes have not yet been precisely determined, but they are obviously different and warmer than for northern state storage stocks also being used for chips.

Reconditioning of potatoes by holding at 70°F or warmer is essential if low postharvest temperatures have been experienced in transit or short term storage. Some spring crop lots have been slow to return to producing the acceptable color for which Arizona chip potatoes are noted at harvest. Further studies are continuing in 1965.