

SEED POTATO WINTER TEST COMPARISON STUDY PRELIMINARY REPORT--YEAR TWO

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Abstract

An experiment to compare winter testing schemes for certifying seed potato lots was undertaken in the fall of 1995. Samples taken from seedlots produced during the 1995 and 1996 growing seasons were obtained from local growers and divided into two size ranges. The 2-3 ounce tubers were planted at Oceanside, California (outdoor site), and the 4-6 ounce tubers were planted at Corvallis, Oregon (greenhouse site) and rated for viral and bacterial diseases by certifying agencies in Idaho and Oregon, respectively. In each year, the percentage of plants visually observed to be infected with Potato Virus Y (PVY) or Potato Leafroll Virus (PLR was nearly identical at each testing location, although seedlot infection levels varied widely. A lower percentage of emerged plants was observed at Oceanside than the greenhouses in Corvallis in each year the experiment was conducted.

Introduction

Seed potato certification agencies require seed lots to be inspected during the growing season for various pathogens, chemical injury, and other varieties. In addition, many agencies require all seed lots passing growing season inspections to be winter tested prior to sale as certified seed potatoes. Some certifying agencies winter test outdoors in southern sites such as Oceanside, California or Homestead, Florida. Other agencies winter test seedlots in greenhouses in more northern climates. Seed growers in Oregon (and perhaps other states) have wondered if the two winter testing methods are equivalent. This study was designed to evaluate samples from the same potato seedlot under two winter testing schemes.

Materials and Methods

1995-96 Experiment

'Russet Burbank' (*Solanum tuberosum* L.), 'Ranger Russet', and 'Shepody' tubers used for the study were collected from a variety by irrigation by *Verticillium* study planted at Madras in 1995 by Mary Powelson and Meghan Arbogast, Oregon State University Plant Pathology Department. The 'Katandin' seedlot used for that study was 40-50% infected with Potato Virus Y (PVY). The other seedlots used in that study ('Russet Burbank', 'Ranger Russet', 'Shepody', 'Viking', and 'Red Lasoda') were not initially infected with PVY but became infected with PVY during the growing season. Late blight was also present in that study during the later part of the growing season.

Tubers from each lot were collected and sorted into three groups: 1) single drop seed weighing 2-3 ounces, 2) small tubers weighing 4-6 ounces, and 3) tubers weighing over 6 ounces. The single drop seed was packaged and sent to the Idaho Crop Improvement Association for planting and evaluation in Oceanside, California. The 'Russet Burbank', 'Ranger Russet', and 'Shepody' lots were subjected to the same winter testing protocol as seedlots submitted from other seed

growers except that the samples arrived too late to receive the normal dormancy breaking treatment. The 4-6 ounce tubers were submitted to the Oregon State University Seed Certification Service, and tubers were subjected to the same winter testing protocol as seedlots submitted from other seed growers. The tubers weighing over 6 ounces were discarded. The seedlots were scored by certification personnel from each respective location for the presence of PVY, potato leafroll virus (PLRV), and any "other varieties" that may have been present in the seedlot.

1996-7 Experiment

Five 'Norkotah' seed lots from the 1996 crop were obtained from local growers and divided into two size ranges. The 2-3 ounce tubers were planted at Oceanside, California (outdoor site) and the 4-6 ounce tubers were planted at Corvallis, Oregon (greenhouse site) by certifying agencies in Idaho and Oregon, respectively. Submitted seed lots included three lots grown for seed, one commercial lot, and one lot from research trials grown at Central Oregon Ag Research Center

(COARC). The commercial and COARC lots were expected to contain higher levels of PVY than the lots grown for seed. Seed certification personnel handled the submitted seedlots in the same fashion as lots received from seed growers. Once plants had emerged and grown to sufficient size, they were rated for viral and bacterial diseases by personnel from each certifying agency.

Results and Discussion

1995-96 Experiment

Table 1 summarizes the winter test results from the 1995-96 Oceanside and Corvallis plantings. The percent leafroll, PVY, and other varieties observed at each location were nearly identical for each of the varieties tested except 'Shepody'. Fewer PVY infected 'Shepody' plants were reported for Oceanside because the 'Shepody' lot was observed only one time on January 23, 1996. Dr. Richard G. Clarke reported concerning the 'Shepody' lot planted at Oceanside: "I'm sure that I would have scored more visually positive plants if I had read it again on the second inspection. Virtually every plant was probably PVY-infected." ELISA tests performed on 100 'Shepody' leaves at Oceanside showed 99% were PVY-positive.

The percentage of plants that emerged and were observed at Corvallis was greater than that observed at Oceanside. The Oceanside samples were not submitted in time to receive the customary dormancy breaking treatment. They were also planted about six weeks earlier than the Corvallis samples and this likely resulted in a greater number of dormant seed pieces.

1996-97 Experiment

Results of the 'Norkotah' seedlots planted at Oceanside and Corvallis during the winter of 1996-97 are shown in Table 2. The percentage of plants visually observed to be infected with PVY was very similar for each testing location, although infection levels varied from zero to over 50% infected. No PLRV was observed in any of the submitted samples at either location. Relatively poor stand counts were recorded at the Oceanside location, possibly because some plants had not broken dormancy and emerged by the first inspection date (January 26-30, 1997) when stand

Table 1. Summary of winter test results for three potato cultivars grown at Oceanside, CA and Corvallis, OR, 1995-96.

Cultivar	Plant Count ¹		PLRV (%) ²		PVY (%) ²	
	Ocean	Corvallis	Ocean	Corvallis	Ocean	Corvallis
Russet Burbank	305/370	361/400	0.33	0.00	42.30	44.60
Ranger Russet	315/427	430/450	0.00	0.00	41.00	38.37
Shepody	247/400	398/450	0.00	0.00	89.07	98.99

¹ Number of plants observed/number of tubers submitted

² Percent based on number of plants observed

Table 2. Summary of winter test results for five Norkotah seedlots grown at Oceanside, CA and Corvallis, OR, 1996-97.

Cultivar	Plant Count ¹		PLRV (%) ²		PVY (%) ²	
	Ocean	Corvallis	Ocean	Corvallis	Ocean	Corvallis
Norkotah Lot 1	122/200	198/200	0.00	0.00	0.00	0.00
Norkotah Lot 2	69/200	192/194	0.00	0.00	56.52	47.40
Norkotah Lot 3	138/200	209/209	0.00	0.00	0.00	2.87
Norkotah Lot 4	122/150	203/207	0.00	0.00	0.00	0.00
Norkotah Lot 5	140/200	221/223	0.00	0.00	13.71	12.67

¹Number of plants observed/number of tubers submitted

²Percent based on number of plants observed

Acknowledgements

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