

SUMMARY RESEARCH PROGRESS REPORT FOR 1989
AND RESEARCH PROPOSAL FOR 1990

Submitted to:
SLV Research Center Committee
and the
Area II Potato Administrative Committee

TITLE: Epidemiology of Potato Virus S in the San Luis Valley

PROJECT LEADERS: Robert D. Davidson and Dr. Gary Franc

PROJECT JUSTIFICATION: Potato Virus S continues to be one of the primary viruses involved in the mosaic complex in the San Luis Valley. While this virus is usually considered to be latent in symptom expression, that is, with no visible symptoms evident during the growing season, mosaic symptoms can occasionally be seen. These symptoms, coupled with the potential yield losses and production of smaller than normal tubers from infected plants (whether symptoms are visible or latent), can cause problems for the certified seed potato program and subsequently for the buyers of this seed, the commercial producers. PVS is easily spread to healthy stocks through mechanical means (plant to plant contact) and possibly by aphid vectors. There are really only three potential sources of PVS in the San Luis Valley. These are other infected potatoes, weed hosts and/or aphid vectors. This project should help clarify the role of each of these potential sources and their effect on PVS spread to healthy potatoes.

PROJECT STATUS: This is a continuing project that was first funded in 1989.

SIGNIFICANT ACCOMPLISHMENTS FOR 1989: Potential weed hosts in and around potato fields were surveyed. These samples were tested serologically for the presence of PVS shortly after harvest. Results from the testing would indicate that several common weeds can harbor the virus, but rarely does the percentage of weeds infected with PVS in the field exceed the potato infection rate. This gives a preliminary indication that weeds act as a reservoir for the virus and have the potential for spreading the virus to the potato crop.

OBJECTIVES FOR 1990: The weed survey will be repeated with full testing for the presence of PVS including a followup inoculation of PVS free micropropagated potato plants (to establish the effectiveness of weeds as a source for PVS infection). In addition, aphid colonies will be established representing the San Luis Valley biotypes and tested for their ability to spread PVS from infected potato plants and weeds to healthy potatoes.

FUNDING REQUEST:

1989 Allocation: \$1500.00

1990 Request: \$2000.00 (Increase reflects more ELISA testing and labor for inoculation studies)

**Potato Virus S Weed
Survey Result for 1989**

Gary D. Franc, Ph. D.

&

Robert D. Davidson

SLVRC 0249 E.RD. 9 N.
Center, CO 81125

Materials and Methods

Weed surveys were done in 1989 in 6 potato fields. The potato cultivar and production type (seed versus commercial) are listed in the table. Foliage collected during the survey was placed in individually labelled zip-lock bags and immediately refrigerated. The foliage was assayed for PVS using standard ELISA procedures with AGDIA test kits.

Results

Data in Table 1 show that, based on ELISA tests, weeds appeared to be hosts for PVS in local potato fields. Presence of PVS in weeds was not dependent on whether the fields tested were for seed or commercial production. The percentage of potatoes sampled which were PVS infected ranged from 11.1% for Centennial (field 1) to 90.0% for White Rose (field 6). Results for the two commercial fields ranged from 40% to 100% for Sangre and Norkotah, respectively.

Objectives for 1990

Preliminary indications are that weed hosts may be a source of PVS which could infect healthy potatoes under the right conditions. We plan to repeat the weed survey, ELISA test for presence of PVS and followup with inoculations to micropropagated PVS-free potato plants. We hope to obtain some idea of the effectiveness of weeds as a PVS source for potato infection. In addition, we plan to obtain aphid colonies and screen SLV biotypes for their ability to spread PVS from infected potato plants and weed leaves to healthy potatoes.

Table 1. Potato Virus S survey results for 6 potato fields, Center CO 1989 (Franc & Davidson).

POTATO CULTIVAR	NUMBER and WEED HOST ASSAYED	NUMBER: PVS +:	PERCENT PVS +
1 CENTENNIAL-seed	18 POTATO	2 :	11.1%
	6 KOCHIA	1 :	16.7%
	6 LQUARTER	0 :	0.0%
	6 NIGHTSHADE	0 :	0.0%
	64 PIGWEED	6 :	9.4%
1 WEED TOTALS	82	7 :	8.5%
2 SANGRE-commercial	10 POTATO	4 :	40.0%
	3 KOCHIA	1 :	33.3%
	37 LQUARTER	3 :	8.1%
	10 NIGHTSHADE	1 :	10.0%
	4 PURSLANE	1 :	25.0%
	36 PIGWEED	6 :	16.7%
2 WEED TOTALS	90	12 :	13.3%
3 NORKOTAH-commercial	1 POTATO	1 :	100.0%
	2 KOCHIA	0 :	0.0%
	2 LQUARTER	0 :	0.0%
	4 PIGWEED	1 :	25.0%
3 WEED TOTALS	8	1 :	12.5%
4 R. NUGGET-seed	10 POTATO	5 :	50.0%
	20 LQUARTER	1 :	5.0%
	12 NIGHTSHADE	0 :	0.0%
	1 PURSLANE	0 :	0.0%
	50 PIGWEED	6 :	12.0%
4 WEED TOTALS	83	7 :	8.4%
5 CENTENNIAL-seed	13 POTATO	7 :	53.8%
	2 KOCHIA	0 :	0.0%
	20 LQUARTER	1 :	5.0%
	3 NIGHTSHADE	0 :	0.0%
	54 PIGWEED	1 :	1.9%
5 WEED TOTALS	79	2 :	2.5%
6 WHITE ROSE-seed	10 POTATO	9 :	90.0%
	2 KOCHIA	0 :	0.0%
	14 LQUARTER	1 :	7.1%
	12 NIGHTSHADE	0 :	0.0%
	60 PIGWEED	0 :	0.0%
6 WEED TOTALS	88	1 :	1.1%