

SUMMARY RESEARCH PROGRESS REPORT FOR 2002

Submitted to:

**SLV Research Center Committee
and the Colorado Potato Administrative Committee (Area II)**

TITLE: Comparison of Potato Vine Kill with Sulfuric Acid (simulated), Diquat, Desiccate II, and Rely When Vines Remain Immature from Fungicide Applications (new title).

PROJECT LEADERS: Dr. Scott Nissen, Department of Bioagricultural Sciences and Pest Management, Colorado State University, Fort Collins.

IMPACT STATEMENT: Managing late blight to maintain the quality of SLV potatoes is a top priority; however, since most potatoes are stored for future delivery efforts most be made to insure that tubers are sufficiently mature to withstand significant handling. This research project attempted to understand the influence of aggressive late blight management on tuber maturity in order to maintain the salability of stored tubers.

PROJECT JUSTIFICATION: Potato producers are concerned that intensive fungicide programs designed to manage late blight could be affecting tuber maturity by maintaining vines in an immature state. Tubers harvested without sufficient skin set could be easily bruised or skinned during handling.

In the SLV, most vines are killed with sulfuric acid. Sulfuric acid is effective and causes the most rapid rate of vine desiccation. Other vine desiccation products that could be used for potato vine kill in addition to sulfuric acid include Diquat, Desiccate II or endothall and Rely. Aventis, now part Bayer Crop Protection, received a label for "Rely" for 2000 as a potato vine desiccant. Little information is available on potato vine desiccation with these products in the SLV.

PROJECT STATUS: Complete

SIGNIFICANT ACCOMPLISHMENTS FOR 2002:

- We redirected research efforts on vine kill to focus on interactions between fungicide applications which prolong the immature nature of vines and vine desiccation with sulfuric acid, Diquat, Desiccate II, and Rely under field conditions in the SLV. Plots were planted to Russet Nuggets and Sangre to evaluate differences between varieties. Nuggets produce significant vines and can be difficult to kill, while Sangre are more susceptible to bruising or skinned during processing.
- Two fungicide treatment levels were established. The high fungicide program began on July 16th, and involved alternating applications of Quadris (6.4 oz prod/ac) and Dithane (2 lbs prod/ac) on a weekly basis for a total of 3 applications of each. The low application involved a single application of Dithane (2 lb prod/ac) applied on July 31st. The 2001 program was slightly different because the high program involved Quadris (15.4 oz prod/ac) applied July 13th, followed by: Bravo Weather Stick (1.5 pt prod/ac), Dithane (2lb prod/ac), and final Bravo (1.5 pts produ/ac) applied on August 24th. There were no fungicides applied to the low fungicide program in 2001. The

fungicide programs in 2002 did not produce as the same contrast between high and low fungicide programs compared to 2001. The hot, dry field season resulted in minimal visually differences between the two fungicide programs in 2002.

- Vine kill treatments were applied on August 28th and consisted of natural senescence (control), hand removal of vines to simulate sulfuric acid applications, Diquat, Desiccate II, and Rely. All applications were made at the higher end of the recommended use rates (especially for Diquat and Desiccate II) and applied in 20 gal/ac using a CO₂ backpack sprayer. Plots were harvested on September 19-20th using the two row digger and graded on September 29. Sub-samples were taken for analysis of skin set using a variation of the torque meter test described by Halderson and Henning (Am. Pot. J. 70:132-141).
- There were no significant differences in yield due to high vs low fungicide programs and there were no difference in yield comparing vine kill treatments. Skin set within variety was not affected by fungicide or vine kill treatment, but Nugget skin set values were significantly higher than Sangre values. Due to space limitations treatments were replicated only three times in 2001, but in 2002 treatments were replicated 4 times. This did reduce variability but overall results were very similar between 2001 and 2002. Yields were better in 2002 by over 100 cwt/ac. (**See attached sheets**).

FUNDING REQUEST:

2002 Allocation: \$5,000

2003 Request: \$0

The Influence of Fungicide Programs on Potato Vine Kill

Colorado State University

Trial ID: POTO082 Location: Center, CO Investigator: Dr. Scott Nissen, Jim Sebastian

Crop Code POTATO POTATO POTATO POTATO POTATO POTATO POTATO
 Part Rated POTATO POTATO POTATO POTATO POTATO POTATO POTATO
 Rating Data Type StemDes LeafDrop StemDes LeafDrop StemDes LeafDrop StemDes
 Rating Unit % % % % % % %
 Rating Date 9-4-02 9-4-02 9-11-02 9-11-02 9-11-02 9-11-02 10-9-02

No. Name	Trt Treatment	Form Conc	Form Type	Form Rate	Rate Unit	Rate	Fungi Appl	9-4-02 %	9-4-02 %	9-11-02 %	9-11-02 %	10-9-02 %	10-9-02 %
1	Untreated Check						High A	88.8	11.3	42.5	66.3	110.3	139.0
2	Sulfuric (Handpull)						High A	100	100	100	100	117.0	135.5
3	Rely AMS	1	SL	0.38	LB A/A	High A	A	62.5	57.5	18.8	86.3	107.0	135.8
3		100	L	5	LB/A								
4	Diquat NIS	2	SL	0.5	LB A/A	High A	A	51.3	83.8	15.5	88.8	118.8	146.9
4		100	L	0.25	% V/V								
5	Dessiccate II LI 700 AMS	2	EC	1.0	LB A/A	High A	A	68.8	51.3	25.0	80.0	108.3	144.8
5		100	L	0.5	% V/V								
5		100	L	5	LB/A								
6	Untreated Check						Low A	88.8	6.3	36.3	68.8	116.3	128.5
7	Sulfuric (Handpull)						Low A	87.5	13.8	38.8	70.0	116.0	139.5
8	Rely AMS	1	SL	0.38	LB A/A	Low A	A	62.5	62.5	17.5	86.3	121.0	135.5
8		100	L	5	LB/A								
9	Diquat NIS	2	SL	0.5	LB A/A	Low A	A	48.8	83.8	13.8	88.8	121.5	143.0
9		100	L	0.25	% V/V								
10	Dessiccate II LI 700 AMS	2	EC	1.0	LB A/A	Low A	A	61.3	56.3	15.0	86.3	115.0	142.5
10		100	L	0.5	% V/V								
10		100	L	5	LB/A								

ISD (P=.01)	Standard Deviation	CV
8.38	19.68	15.59
4.28	10.05	7.96
6.04	23.03	30.4
18.78	20.78	10.61
9.58	10.61	9.21
12.15	9.21	5.

The Influence of Fungicide Programs on Potato Vine Kill
 Colorado State University

Trial ID: POTO082
 Location: Center, CO
 Crop Code
 Part Rated
 Rating Data Type
 Rating Unit

Cooperator: CPAC
 Investigator: Dr. Scott Nissen, Jim Sebastian
 POTATO POTATO POTATO POTATO POTATO POTATO POTATO POTATO
 12 oz 6 to 12 4 to 6 <4 Cull #2 Total
 -----Nugget-----
 -----Cwt/Acre-----

Trt Treatment	Form	Rate	Fungi Appl																	
No. Name	Conc	Type	Rate	Unit	code	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate
1	Untreated	Check			High	A	58.7	134.6	89.5	59.8	7.1	6.1	356.9							
2	Sulfuric	(Handpull)			High	A	49.1	124.0	95.0	72.0	1.0	8.4	350.8							
3	Rely	1 SL 0.38		LB A/A	High	A	65.1	169.7	101.2	66.9	7.3	9.4	420.1							
3	AMS	100 L 5		LB/A	A															
4	Diquat	2 SL 0.5		LB A/A	High	A	53.6	130.5	76.7	66.9	7.7	13.1	348.7							
4	NIS	100 L 0.25		% V/V	A															
5	Dessiccate	II 2 EC 1.0		LB A/A	High	A	49.8	137.0	97.5	84.8	0.0	9.6	379.3							
5	LI 700	100 L 0.5		% V/V	A															
5	AMS	100 L 5		LB/A	A															
6	Untreated	Check			Low	A	39.4	162.5	95.2	69.9	5.1	9.4	381.4							
7	Sulfuric	(Handpull)			Low	A	47.1	140.5	87.5	72.8	0.0	4.7	352.8							
8	Rely	1 SL 0.38		LB A/A	Low	A	61.4	144.2	78.7	69.5	1.6	7.3	365.0							
8	AMS	100 L 5		LB/A	A															
9	Diquat	2 SL 0.5		LB A/A	Low	A	29.2	127.0	83.6	76.9	6.1	4.5	328.3							
9	NIS	100 L 0.25		% V/V	A															
10	Dessiccate	II 2 EC 1.0		LB A/A	Low	A	51.8	126.2	79.1	74.2	8.8	7.5	348.7							
10	LI 700	100 L 0.5		% V/V	A															
10	AMS	100 L 5		LB/A	A															
LSD (P=.01)													38.9	74.0	39.8	38.0	11.2	12.9	110.2	
Standard Deviation													19.8	37.8	20.3	19.4	5.7	6.6	56.2	
CV													39	27	22	27	127	82	15	

2002 –Use of Funds Report

Report on funds used rounded to the nearest dollar.

1. Project labor

PI has 9 month contract (summer salary)	1 week	\$1,500
Research associate	2 week	\$1,750
Student hourly and 2 labors for two days	3@ 2 days	\$480

Total Labor \$3,730

2. Project Travel: Three trips of two days each with meals and lodging for 2-3 people (\$200/trip vehicle charges, rooms \$50/night, meals \$25/day).

Total travel \$1,450

3. Project Chemicals: \$0.0

4. Project Ag Supplies: \$0.0

5. Project Equipment: \$0.0

6. Project Misc.

Nozzles and extra plus spray bottles \$50

Total Misc. \$50

Total expenses \$5,185

SLVRCC Funding \$5,000

