

2002

PROGRESS REPORT

Potato Psyllid Management Trials

Notes for the November 15, 2002 Board Meeting

Principal Investigator: Whitney Cranshaw

Background

During Spring 2002 the board of the Colorado Potato Administration, Area III was approached to support development of a program on potato psyllid management. Three main objectives were outlined for 2002 studies.

Progress Towards Objectives

1. Determine the relative yield response of potato cultivars to potato psyllid injury

Nine varieties were included in this study, conducted at the Horticulture Field Research Farm north of Ft. Collins. Plots were split with one-half receiving full-season psyllid control (planting time Admire, foliar treatments of Actara and Warrior) and the other half not receiving any psyllid management.

Populations of psyllids were moderate-low, but present throughout the plots. Differences in numbers of psyllids could not be detected between varieties but yield differences were significant for all nine tested varieties (Table 1).

Table 1. Effect on yield from treatment for potato psyllid on nine potato varieties. Ft. Collins, CO 2002.

Variety	Avg. Yield (lbs)/Plot		Psyllid Treatment Benefit	
	Treated	Untreated	2002	2001
Russet Norkotah	13.43	11.73	+ 14.5%	41%
Atlantic	14.15	11.55	+ 22.5%	51%
Keystone	18.74	14.75	+ 27.0%	
Yukon Gold	14.76	11.50	+ 28.3%	10%
Frito-Lay 1867	12.48	9.22	+ 35.4%	
Cherry Red	12.14	8.11	+ 49.7%	48%
Silverton	19.38	11.70	+ 65.6%	
Chipeta	15.70	8.70	+ 80.5%	
Russet Nugget	8.26	3.48	+ 137.4%	70%

Conclusion: Again, yield reductions from psyllid occurred among all cultivars, but there was considerable range in the magnitude of response to psyllid infestation. Russet Norkotah showed the least response to psyllid control, a 14.5% yield increase. As has been consistent with all prior observations, Russet Nugget has shown the greatest response to treatment for psyllid, indicating that it is a highly sensitive variety to the effects of psyllid toxin.

Yukon Gold appeared somewhat more sensitive to psyllid infestation than in the preliminary trial of 2001. Russet Norkotah and Atlantic appeared less sensitive in 2002. Cherry Red showed a nearly identical yield response to psyllid treatment in both years.

As there were few differences in psyllid colonization of the cultivars, the differences in yield reduction from psyllid infestation *appear to be due to tolerance of the effects of psyllid toxin.*

Samples from the chipping varieties Atlantic, Chipeta, and Frito-Lay 1867 have been retained and plans are progress to have quality assessed during David Holms' chipping tests at the end of this month.

2. Investigate how timing of potato psyllid control can affect potato yield

Four varieties were included in this study - Russet Norkotah, Sangre, Atlantic, and Frito-Lay 1867. Four different treatment regimens were sustained on each. Full season control involved applications of Provado or Actara beginning at early June and sustained throughout the season. Early season treatments were initiated June 27 and mid-season on August 2. An untreated control was also included.

Conclusions: Russet Norkotah and Atlantic showed the expected response to psyllid treatment initiated at different times during plant growth, i.e., yields increased as treatments were initiated earlier (Tables 2, 3) . However, there was no difference between season-long control and that initiated June 27 with the Atlantic cultivar. In 2001 preliminary trials there was a significant yield response from early, mid and late season treatment schedules.

Table 2. Cultivar **Atlantic.** Effect of Psyllid Treatments Maintained at Different Times During the Season, Ft. Collins, 2002.

Treatment	Avg. Plot Yield (lbs)	Difference from Full-season Treatment
Season Long	30.14 a	-----
Initiated June 27	25.18 ab	(-16.5%)
Initiated August 2	22.08 b	(-26.8%)
Untreated Control	20.98 b	(-30.4%)

Table 3. Cultivar **Russet Norkotah**. Effect of Psyllid Treatments Maintained at Different Times During the Season, Ft. Collins, 2002.

Treatment	Avg. Plot Yield (lbs)	Difference (%) from Full-season Treatment
Season Long	27.54 a	-----
Initiated June 27	27.32 a	(-0.8%)
Initiated August 2	22.02 b	(-20.0%)
Untreated Control	21.28 b	(-22.7%)

Table 4. Cultivar **Frito-Lay 1867**. Effect of Psyllid Treatments Maintained at Different Times During the Season, Ft. Collins, 2002.

Treatment	Avg. Plot Yield (lbs)	Difference (%) from Full-season Treatment
Season Long	24.03 a	-----
Initiated June 27	26.08 ab	+8.5%
Initiated August 2	24.20 ab	+0.7%
Untreated Control	19.97 b	(-16.9%)

Table 5. Cultivar **Sangre**. Effect of Psyllid Treatments Maintained at Different Times During the Season, Ft. Collins, 2002.

Treatment	Avg. Plot Yield (lbs)	Difference (%) from Full-season Treatment
Season Long	21.80 ab	-----
Initiated June 27	25.16 a	+15.4%
Initiated August 2	21.76 ab	(-0.2%)
Untreated Control	14.26 b	(-34.6%)

With Frito-Lay 1867 and Sangre there were no differences in yield between the potatoes receiving season long control and those with control initiated August 2 (Tables 4, 5). With both cultivars there was considerable yield difference between those treated beginning August 2 and those not receiving any psyllid treatment.

This suggests that *there can be significant benefit from psyllid control when initiated in the last month of crop production.*

Whether early season control has particular benefits over treatment initiated later results are mixed and may involve cultivar responses.

Samples from the chipping varieties Atlantic and Frito-Lay 1867 have been retained and plans are progress to have quality assessed during David Holms' chipping tests at the end of this month.

3. Identify treatments that are effective for managing potato psyllid

A single trial of foliar treatments was conducted in 2002 and included the following treatments:

Warrior T 3.83 fl oz	Leverage 2.7 3.75 fl oz
Actara 25WG 3.0 oz	Provado 1.6L 3.75 fl oz
Assail 70WP 1.7 oz/A	Untreated Check

Psyllid numbers were too low to determine significant differences (5 psyllids/100 leaves on the untreated check). Lowest numbers were present on the Assail and Actara lots.

Observations on the "Sandhill chafer" (False Japanese beetle, *Strigoderma arboricola*)

Very high numbers of adult "sandhill chafer" were observed by Mark MacMillan during an early July survey of a potato field in the Wiggins area. A rescue treatment for control of larval damage was initiated in an area of this field on July 26. Treatments included Actara, Furadan, and an insect parasitic nematode (*Heterorhabditis heliothidis*).

There was no serious damage by larvae in the area of the field where this study was conducted so no data were collected.

Casual observations indicate that an excellent means of monitoring flight periods for this insect are to check for their presence on prickly poppy.

Proposed Laboratory Studies

Due in part to support by the Area III Colorado Potato Administration an M.S. graduate student, **Matt Camper**, is concentrating on potato psyllid as his major project. He will be continuing and expanding field studies, if there is some funding support. He also will be working on two laboratory studies:

1. Determination of the chemical composition of potato psyllid saliva
2. Development of laboratory bioassays for testing insecticides against potato psyllid
3. Describing the entire entomology fauna of eastern Colorado potato fields