

Section I Surveys of Invasive and Emerging

New Information on the Management of Potato Tuberworm in Columbia Basin Potatoes

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Despite its wide spread presence in Washington and Oregon, and local detections of adults moths in Idaho, potato tuberworm (PTW) as a pest of potatoes appears to have declined as a threat in potatoes in the Pacific Northwest. The commonly accepted basis for this was the minimum winter temperatures in January of 2006. PTW was detected in only lower numbers in 2006. In 2007, the insect was considered moderate in abundance, but higher than in 2006. At least one field in Washington was rejected for the fresh market due to presence of PTW. Potatoes from a research farm in Washington were rejected for use as processing potatoes due to presence of PTW. Dave Bragg complained that Columbia Basin potatoes he purchased in Pomeroy were infested with PTW.

Following conventional wisdom, it is thought that PTW will continue to be a pest of PNW potatoes barring an unusually cold winter. If minimum winter time temperatures are high, PTW could become a more serious pest of potatoes. The potato industry is still facing the management of insect pest for which little is known about its biology and management. Following are the results from two studies conducted on PTW north of Pasco, WA in 2007.

Overall PTW pressure was relatively low. As of August 17, no PTW were detected in our trial, however shortly thereafter the insect become more commonly detectable. One month later, the untreated check had an average of 3.0 mines per plant.

**Efficacy of Foliarly Applied Insecticides for Control of Potato Tuberworm in Potatoes
Ranked by decreasing number of larvae per plant on September 17**

Trt Name	Rate	8/17	9/17	9/17	10/1	10/1	10/15	10/15
		115 DAP mines/ plant	146 DAP mines/ plant	146 DAP larvae/ plant	160 DAP larvae/ tuber	160 DAP larvae/ tuber	174 DAP larvae/ tuber	174 DAP larvae/ tuber
1 UNTREATED CHECK		0 a	15 a	7 a	0.3 a	0 a	0.8 a	0.8 a
8 DIPEL DF	1 lb/a	0 a	9 b	1.5 b	1.5 a	1.8 a	2.3 a	2.3 a
12 MONITOR	2 pt/a	0 a	1.3 b	1.5 b	1.5 a	2 a	0.8 a	1 a
17 AZA DIRECT	2 pt/a	0 a	4.8 b	0.8 b	1.8 a	2.3 a	1.8 a	2 a
2 ALVERDE	16 fl oz/a	0 a	1.8 b	0.5 b	1 a	0.8 a	2 a	2.5 a
13 FURADAN	2 pt/a	0 a	1 b	0.5 b	1.3 a	2.3 a	1 a	1.5 a
3 ALVERDE	16 fl oz/a	0 a	3.8 b	0.3 b	0.5 a	0 a	1.5 a	2.5 a
6 ULTOR	8 fl oz/a	0 a	1 b	0.3 b	0 a	0 a	0.5 a	0.5 a
15 ASSAIL	1.7 oz/a	0 a	3.3 b	0.3 b	1.8 a	2 a	0 a	0 a
18 BATTALION	12.8 fl oz/a	0 a	0.5 b	0.3 b	2 a	2.3 a	0.5 a	0.5 a
4 RYNAXYPYR	3.4 fl oz/a	0 a	0 b	0 b	0 a	0 a	1.5 a	1.5 a
5 RYNAXYPYR	5.1 fl oz/a	0 a	0 b	0 b	0.3 a	0 a	0.5 a	0.8 a
7 BELT	3 fl oz/a	0 a	0 b	0 b	1.5 a	0.8 a	1.3 a	1.8 a
9 F6550	4.8 fl oz/a	0 a	0 b	0 b	1 a	1.3 a	2.5 a	4.8 a
10 F6550	6.14 fl oz/a	0 a	0.3 b	0 b	0 a	0 a	0.8 a	0.8 a
11 F6550	6.14 fl oz/a	0 a	0 b	0 b	0.5 a	0 a	0.3 a	0.3 a
14 ASANA	8 fl oz/a	0 a	0 b	0 b	0 a	0 a	1.5 a	2 a
16 ENTRUST	2 oz/a	0 a	0.3 b	0 b	0.5 a	0.8 a	2 a	3 a
19 BATTALION	12.8 fl oz/a	0 a	2.8 b	0 b	1.5 a	0 a	1 a	1.3 a
20 HERO	10.3 fl oz/a	0 a	0 b	0 b	0.8 a	0.8 a	0.8 a	1 a

**Impacts of Desiccants on Late Season PTW Infestation in Potatoes
Ranked by decreasing number of larvae per plant on September 17**

Trt Name	Rate	9/17	9/17	10/1	10/1	10/15	10/15
		146 DAP mines/ plant	146 DAP larvae/ plant	160 DAP larvae/ tuber	160 DAP larvae/ tuber	174 DAP larvae/ tuber	174 DAP larvae/ tuber
1 UNTREATED CHECK		8.8 a	2.3 a	1 a	1.5 a	1 a	1.3 a
3 REGLONE	2 pt/a	7.8 ab	2 a	2.5 a	4 a	2.3 a	2.5 a
4 ENQUICK		7.3 ab	1.5 a	0.5 a	1 a	2.3 a	2.8 a
6 AIM	5.8 fl oz/a	6.3 b	1.3 a	0.8 a	0 a	1.8 a	3 a
2 RELY	3 pt/a	4.3 c	0.5 b	0.5 a	1 a	1.3 a	1.3 a
5 RELY/Monitor	3 +2 pt/a	2.5 d	0.3 b	2.5 a	2.5 a	1.8 a	2.3 a

Following are the 2007 recommendations for controlling PTW in potatoes in the Pacific Northwest.

Products that have been found to be effective for control of PTW in Washington and Oregon – based on one season of testing. All rates are in formulated product per acre. Unless otherwise noted, the products discussed in this section were found to reduce the incidence of PTW larvae in the foliage to close to zero in a moderate pressure situation or significantly reduce larval populations in a high pressure situation. All treatments began approximately four to six weeks before desiccation.

Monitor. Monitor applied by ground and chemigation at 32 ounces (2 pints) was effective when applied at a 7-day interval.

Rimon 0.83EC. Rimon applied at 9 and 12 ounces provided effective control of PTW when applied at a 10 day interval by ground and chemigation.

Avaunt. Avaunt was effective when applied by ground and chemigation at 7 day intervals at 3 and 5 ounces. Avaunt applied by chemigation at desiccation and 7 days after desiccation was effective at reducing tuber infestation.

Agri-Mek. Agri-Mek was effective when applied by ground at 7 day intervals at 10 ounces.

Asana. Asana was effective at 4 and 8 ounces when applied by ground and chemigation at 7 to 10 day intervals. There is no indication that the higher rate is more effective.

Lannate. Lannate applied by ground and chemigation at 1 and 2 pints at 5-day intervals was effective at controlling PTW.

Imidan. Imidan at 1.3 and 2.5 pints applied by ground at 10-day intervals was effective against PTW.

Success. Success was effective at 6 ounces when applied by ground at a 7-day interval.

Furadan. Furadan was effective at a 7-day interval at 2 pints when applied by ground.

Leverage. Leverage applied by ground and chemigation at 10-day intervals at 3.75 ounces was effective against PTW.

Baythroid. Baythroid at 1.5 ounces was effective when applied by chemigation at 10-day intervals.

Assail. Based on the results of research trials in 2005, Assail is not recommended for PTW; however use of the product against other insect pests may reduce PTW populations.

Penncap M. Penncap M applied at 4 pints at 10 day intervals by ground was effective against PTW.

Dipel (Bacillus thuringiensis). Dipel at 1 pound per acre applied by ground in rotation with Entrust at 3 ounces per acre at 10-day intervals was effective in controlling PTW. Entrust was applied first and third and Dipel was applied second and fourth.

Products Considered Ineffective Against PTW. No planting time treatments are known to be effective against PTW including Gaucho, Admire Pro, Cruiser, Platinum, Venom, Temik and Thimet/Phorate.

Foliar Insecticides Considered Ineffective Against PTW. Sevin, Provado, Actara, dimethoate, Fulfill, Beleaf, Acramite, Comite and Oberon have not demonstrated efficacy against PTW.

Products of Unknown Efficacy Against PTW. Research has not yet determined the efficacy of Thiodan against PTW.

Chart for activity by life stage. This information is based on research data, information provided by registrations and our knowledge of the products listed.

Product	Egg	Larvae	Adult	Activity against larvae in leaf tissue
Monitor		X	X	X
Imidan			X	X
Penncap M		X	X	X
Rimon	X	X		
Avaunt	X	X		X
Agri-Mek		X		
Asana		X	X	
Leverage		X	X	
Baythroid		X	X	
Success, Entrust		X		

Furadan	x	x	x
Lannate	x	x	x
Bacillus thuringiensis	x		
Assail	x		

Year	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Population	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Area	100	100	100	100	100	100	100	100	100	100	100
Per Capita Income	100	100	100	100	100	100	100	100	100	100	100

The following table shows the population, area, and per capita income of the county from 1950 to 1960. The population of the county has remained constant at 1,000 persons throughout the period. The area of the county is 100 square miles. The per capita income of the county has remained constant at 100 dollars throughout the period.