



Potato Progress

Research and Extension for Washington's Potato Industry
Published by Washington State Potato Commission www.potatoes.com
Andrew Jensen, Editor. Submit articles and comments to: ajensen@potatoes.com
108 Interlake Rd., Moses Lake, WA 98837; Fax: 509-765-4853; Phone: 509-765-8845.

Volume VI, Number 13

November 21, 2006

Potato Tuberworm: A Potential New Pest of Potatoes in Washington Storages

Alan Schreiber, Agriculture Development Group, Inc.

Potato tuberworm (PTW) pressure in Washington was markedly less this year than the past two years. Those of us who do a lot of research on and thinking about PTW do not have all the answers as to why this is the case. One leading theory is that the weather last winter reduced the overwintering population to pre-2005 levels. While PTW populations are lower than previous years, the insect is still out there at damaging levels in various locations in the Columbia Basin. PTW populations build during the growing season with the highest levels occurring in the fall around harvest time, particularly late September and October.

The high population levels in September and October raise the specter that PTW larvae will have been in tubers at the time of harvest. The Washington State Potato Commission raised the question to me about whether PTW will be a pest in storage and more specifically will the insect spread from tuber to tuber in storage. PTW is more than infamous as a storage pest of potatoes in ambient temperature storages common in developing countries, but little work has been done on PTW in modern storage conditions.

With the help of WSU's Rick Knowles, we built a post harvest potato research facility that contains 54 micro storages that mimic commercial storages. We designed the facility to answer the question of whether PTW will move from tuber to tuber in commercial storage conditions and if so, how do we control the pest. First, we placed a mixture of tubers that were infested and not infested with PTW in 12 microstorages and held 4 each at a constant 62, 54 and 43°F. In a second trial, we put 50 tubers each in 4 microstorages. The tubers were 20% infested and 80% uninfested with PTW. We placed the tubers in the storages at a pulp temperature of 75°F and held the tubers at an air temperature of 55°F for 15 days, then gradually lowered the temperatures by 1°F every two days for 14 days. After 29 days into the trial, the tubers had pulp temperatures of 48°F. This temperature regime was selected to mimic a common temperature control regime in Washington stored potatoes. In a third trial we placed tubers in microstorages with 0, 10, 20 and 50% of tubers infested with PTW. This third trial was conducted at the same temperatures as the second trial. In all three trials, we periodically checked tubers to determine at what point they become infested. (It is easy to tell if a tuber is infested with PTW due to the insect's nasty habit of expelling feces to the surface of the tuber.)

In the first trial we found that at 62°F and 54°F, PTW will move from tuber to tuber. We found that PTW larvae will tunnel out of a tuber and into an adjacent uninfested tuber during the normal course of feeding. This trial demonstrated that PTW readily move from tuber to tuber and do so within the span of a single life cycle.

In the second trial we found that at 55°F PTW will very quickly move from tuber to tuber. A PTW infestation in which 20% of tubers were infested resulted in 77% of all tubers infested after 15 days of storage. This means that 57% of tubers became infested in 15 days at temperatures that Washington potatoes are commonly held. Our trial was very conservative because our smaller-than-conventional research storages went from 75°F to 55°F in one to two days while a commercial storage will take 14 or more days to get to 55°F, giving our PTW fewer degree days to develop than those in commercial storages. Full grown PTW larvae (i.e. in their fourth and last instar) can become very mobile and we hypothesize that it was this later instar that was moving from tuber to tuber. Because cooling temperatures within a potato pile will significantly delay the development of PTW, we hoped that by more quickly cooling the pile we could lengthen the developmental time of the insect and reduce the likelihood of further infestation of tubers. In this trial, however, we commonly observed second and third instar larvae infesting new tubers. This finding is important in that it means PTW infestations can spread in storages more quickly than we had originally thought.

Our third experiment examined what would happen if tubers infested with different levels of PTW were mixed with tubers with no PTW (Table 1).

Table 1. Influence of Level of PTW Infestation on Rate of PTW Infestation

% tubers infested at day zero	% tubers infested at day fifteen
0	0
10	56
20	74
50	100

These three tests demonstrate that PTW can infest uninfested tubers in two weeks or less at temperatures under which Washington potatoes are commonly held. These results suggest that PTW can easily spread in infested potatoes held in storage.

At this time there are no products registered for post harvest control of any insects infesting potatoes going into storage or in storage. There are probably a few products that could be registered fairly easily but only if efficacy data can be established. Because there are no post harvest means of controlling PTW it is critical that the insect be controlled prior to harvest. See (www.potatoes.com/research.com) for information on how to control PTW in Washington potatoes. This article was reviewed by Andy Jensen, Washington State Potato Commission and Lerry Lacey, USDA ARS.

Potato Varieties in the Northwest

Data for the following table were gathered by the National Agricultural Statistics Service (NASS), and summarized here by the editor. In some cases, NASS does not report numbers for certain varieties, and these cases are indicated by the --. Several minor varieties not listed here were reported by NASS on occasion.

State	Russet Burbank	Russet Norkotah	Shepody	Ranger Russet	Umatilla	Alturas	Other
Idaho							
1996	79.7%	3.7%	10.0%	2.7%	--	--	3.9%
1997	79.7%	5.0%	7.1%	4.0%	--	--	4.2%
1998	77.9%	4.8%	5.6%	6.6%	--	--	5.1%
1999	74.4%	8.3%	4.2%	9.1%	--	--	4.0%
2000	74.9%	8.0%	3.9%	7.7%	1.3%	--	4.2%
2001	70.8%	8.4%	3.8%	11.1%	--	--	5.9%
2002	71.0%	7.5%	3.4%	12.0%	--	--	6.1%
2003	69.2%	10.1%	1.3%	12.9%	--	1.2%	5.3%
2004	63.3%	14.2%	1.7%	12.5%	--	2.9%	5.4%
2005	63.1%	11.8%	1.3%	15.1%	--	2.8%	5.9%
2006	66.0%	10.2%	--	12.7%	--	2.2%	8.9%
Oregon							
1996	35.4%	22.5%	25.8%	3.6%	--	--	7.1%
1997	30.9%	38.8%	18.2%	1.8%	--	--	7.9%
1998	39.5%	24.8%	17.2%	10.3%	--	--	7.2%
1999	42.9%	21.4%	12.5%	12.5%	--	--	8.9%
2000	32.7%	27.8%	9.8%	11.2%	3.1%	--	13.3%
2001	38.9%	12.3%	10.8%	22.5%	1.9%	--	13.6%
2002	24.3%	16.8%	18.8%	19.2%	1.8%	--	19.1%
2003	22.3%	25.6%	13.3%	15.4%	--	5.0%	18.4%
2004	22.8%	16.3%	10.3%	31.3%	--	7.2%	12.1%
2005	15.2%	23.8%	17.1%	25.3%	2.1%	7.7%	8.8%
2006	25.9%	20.4%	13.5%	22.5%	2.2%	5.5%	10.0%
Washington							
1996	50.3%	17.8%	11.3%	8.7%	--	--	11.9%
1997	50.2%	17.5%	7.6%	15.5%	--	--	9.2%
1998	58.1%	13.2%	8.9%	11.4%	--	--	8.4%
1999	41.3%	15.4%	10.8%	17.6%	6.7%	--	8.2%
2000	33.7%	17.2%	10.8%	20.2%	12.3%	--	5.8%
2001	35.3%	19.3%	6.8%	19.9%	12.1%	--	6.6%
2002	34.8%	11.8%	10.3%	22.3%	8.1%	--	12.7%
2003	34.9%	11.1%	9.3%	22.1%	8.2%	1.5%	12.9%
2004	34.7%	12.9%	8.2%	18.5%	10.7%	3.5%	11.5%
2005	40.6%	14.4%	4.7%	16.0%	10.8%	3.3%	10.2%
2006	34.9%	14.0%	6.9%	15.9%	8.3%	3.7%	16.3%



Washington Organic Recycling Council

2006 Annual Meeting
December 6, 2006, 9 AM – 4 PM
Brockey Conference Center, South Seattle
Community College

**Save the
Date!**

Organics and Plant Pathogen Suppression

With Dr. Harry Hoitink, Professor Emeritus at Ohio State University
Nationally recognized expert in the field of plant pathology and disease suppression

Dr. Hoitink will address compost process controls and their effect on beneficial microbial activity and product quality. A second presentation will center on production composts that provide consistent broad-spectrum plant disease suppressive properties.

The knowledge and experience of this speaker and other presenters will make this a not-to-miss event. Our program will feature additional presentations from northwest research and educational professionals on related topics.

This event is an exceptional learning opportunity for composters, horticulturists, orchardists, organic farmers or anyone utilizing organics in sustainable agricultural programs.

Responding to consumer and environmental incentives, growers are facing changes in agricultural practices that call for producing hardier crops, efficiently and cost-effectively, while relying on nonchemical alternatives to pesticides and herbicides.

Composters, already focused on producing quality organics with proven soil function and fertility, are also learning more about the role of beneficial organisms in recovered organics on plant growth and pathogen suppression.

Dr. Hoitink is one of the world's leading scientists in the area of organic waste recycling with emphasis on biological

control of diseases of ornamental plants. He has been invited to talk around the world to scientists, practitioners, commercial nursery growers, and students on the topics of disease management in woody ornamental crops, biological control of root pathogens, microbiology of the composting process, commercial composting for management of organic wastes, and use of organic composts as potting mixes to improve health of containerized plants. His research in all these topics over nearly four decades is widely recognized around the world.

During his career at OSU, Dr. Hoitink and his many graduate students and postdocs unraveled several principles by which composts affect root diseases in plants and in some cases even suppress foliar diseases due to the induction of systemic resistance.

Dr. Hoitink retired from the faculty in December 2003, having served in that capacity since 1967.

For more information about Dr. Hoitink's research, visit:
<http://www.ag.ohio-state.edu/~pl-antdoc/faculty/hoitink.php>

This educational event will speak to both the end users and producers, and provide an excellent networking opportunity. Meet new members and catch up on what's new with your friends and colleagues.

Registration

Registration is open to both members and non-members (including exhibiting opportunities)

Sponsored By (to date)

AM Todd Company
 Cascadia Consulting Group
 Cedar Grove Composting
 CH2M HILL
 Columbia Resource Company
 Engineered Compost Systems
 King County Solid Waste Division
 Natural Selection Farms
 North Mason Fiber
 Pacific Rock & Recycle
 Equipment Company
 Parametrix
 Price-Moon Enterprises
 Seattle Public Utilities

This is a great event to support. Please contact the office for information on sponsorship opportunities! (360) 556-3926.

Exhibit Opportunity!

We have a great exhibit area. Space is limited. Please contact the office ASAP if you are interested in exhibiting.