Potato Progress

Research and Extension for Washington's Potato Industry

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Control of Wireworm in Washington Potatoes

Alan Schreiber, Agriculture Development Group, Inc.

Many Washington potato fields have wireworms, or growers may be unsure whether wireworm exists in a field and do not want to run the risk of sustaining wireworm damage. Growers wanting to control wireworms have two strategies: fumigation, or use of an at-plant insecticide. Because it is fall, this article will focus on fumigation as a tool for control of wireworms.

Generally speaking, growers fumigate to control nematodes, however, repeated research conducted by Gary Reed prior to his retirement from Oregon State University and by myself, has shown that application of Telone is an effective means to control wireworm. Despite clear and convincing data that show Telone controls wireworm, the label states that the product will suppress wireworm; so why the seeming disconnect? The answer lies in the interaction of wireworm behavior and weather.

Telone is injected down to the depth of 18 inches and assuming optimum soil temperature and moisture and fracturing of the soil, one can expect an inverted cone of Telone forming a zone of fumigation with additional downward movement beyond the point of injection. Telone will kill wireworms throughout this zone of fumigation. However, when soil temperatures decline wireworms will move down in the soil profile and possibly below the zone of fumigation. Dave Horton, USDA ARS in Wapato is conducting some excellent and long over-due research on wireworm biology and is specifically examining these issues. While we do not know all of the answers, based on Horton's work and by my research, both of which are funded by the Washington State Potato Commission, we believe that a significant portion of the wireworm population moves downward in excess of 24 inches by the time soil temperatures go below 55 degrees.

The Telone label states that applications can be made as long as soil temperatures are at least 40 degrees. Every year I have commonly observed Telone fumigations occurring when the soil temperatures are between 40 and 50 degrees. While there is nothing wrong with these applications when targeting nematodes, they can result in reduced efficacy if the wireworms have moved below the effective zone of fumigation. Additionally, as soil temperatures decrease the zone of fumigation decreases, further reducing the area in which wireworms will be controlled. Because wireworms start to leave the zone of fumigation during temperatures that are within the label instructions of Telone, Dow AgroSciences cannot guarantee control at the lower temperatures, hence the word, "suppression", on the product label.

If you are fumigating this fall and have a need to manage wireworms, applications made prior to the soil temperatures falling below 50 degrees will likely provide better results. All of our research data suggest that applications of Telone at 20 gallons per acre, injected 18 inches with adequate soil moisture and proper soil sealing is a very effective means to manage wireworm.

If you need to wait until planting time to control wireworm, the only product that I recommend is Mocap, both the liquid and granular formulations. Mocap may be applied as a broadcast incorporated application or in-furrow at planting time. If the product is broadcasted, it is critical that it be incorporated as deeply as possible. Applications of 1 gallon of the 6 EC liquid formulation or 40 pounds of the 15% granular formulation are recommended. Ideally the incorporation should be in the 6 to 12 inch depth. An in-furrow application should be applied as a band that is as wide as possible, ideally 10-12 inches wide. Applications of 2 quarts of the 6EC liquid formulation or 20 pounds of the 15% granular formulation are recommended for the band treatment. Narrow in-furrow bands are not recommended. This article was reviewed by Dave Horton, USDA ARS and Harvey Yoshida, Dow AgroSciences.

Tuber Transmission of "Purple Top" Phytoplasma

Jim Crosslin, USDA-ARS, Prosser, WA and Joe Munyaneza, USDA-ARS, Wapato, WA

The Columbia Basin potato purple top phytoplasma, also known as the beet leafhopper transmitted virescence agent (BLTVA), causes purpling, leafrolling, stunting, and aerial tubers on infected plants. There have been reports of internal symptoms occurring in tubers produced on infected plants, but this has not been thoroughly studied in the Columbia Basin. Similarly, transmission of phytoplasmas in tubers of the major cultivars grown in the Pacific Northwest has not been investigated. Recent evidence does show that tubers from phytoplasma-infected plants can be of lower quality due to the production of darker fries and chips when the tubers are processed. We are currently studying (1) the susceptibility of the major cultivars to phytoplasma, (2) the tuber transmission of the phytoplasma in the Columbia Basin, and (3) the effects of tuber infections on the quality of processed potato products.

In 2005, greenhouse-grown plants of several cultivars were inoculated with beet leafhoppers carrying the phytoplasma, observed for the development of purple top symptoms, and tested by the polymerase chain reaction (PCR) for phytoplasma. Tubers from these plants were collected and similarly tested. Also, field-grown plants naturally exposed to beet leafhoppers were observed, tested, and tubers were harvested and stored. After storage, some of the tubers from both greenhouse- and field-grown plants were planted in the greenhouse and the resulting plants were tested by PCR for phytoplasma.

The results so far show that:

1. Phytoplasma-infected plants of Ranger Russet, Shepody, Russet Norkotah, Atlantic, Russet Burbank, and Umatilla all produced phytoplasma-infected tubers.
2. 68% of phytoplasma-infected plants produced some infected tubers.
3. 35% of infected tubers gave rise to infected daughter plants.

These data clearly show that we can reliably detect the phytoplasma in plants and stored tubers and that the phytoplasma can indeed be transmitted through the tuber. Also, essentially all of the major potato cultivars grown in the Columbia Basin are susceptible to phytoplasma infection and that the tubers of these plants can be infected. The fact that the phytoplasma can be transmitted through the tubers to daughter plants has implications for the movement of phytoplasma in seed potatoes.

In 2006, larger-scale field trials are underway and plants of several cultivars are being grown and tested for phytoplasma infections. Similar to our previous work, we will be evaluating infected tubers from these plots to obtain more detailed information on the effects of infection on processing quality.

PNW Vegetable Extension Group

The new PNW Vegetable Extension Group (PNW-VEG) is comprised of the former WSU Vegetable Pathology Team members, as well as Oregon State University and University of Idaho faculty and staff who work with disease and pest management and production issues on vegetable crops. The team has recently revised its website, http://mtvernon.wsu.edu/path_team/vegpath_team.htm, and invites you to bookmark or link to pages that are relevant to your work. Also, please contact Carol Miles (milesc@wsu.edu), Debbie Inglis (dainglis@wsu.edu), or Lindsey du Toit (dutoit@wsu.edu) if you have a website to which the team can add a link.

Meet the PNW-VEG members at http://mtvernon.wsu.edu/path_team/meet_team.htm. For those interested in joining the team, please contact Debbie Inglis (dainglis@wsu.edu) or Lindsey du Toit (dutoit@wsu.edu) for further information.

A schedule of current vegetable events throughout the PNW region can be found at http://mtvernon.wsu.edu/path_team/current_calendar.htm. To list an event, please send a message to Debbie Inglis (dainglis@wsu.edu) or Lindsey du Toit (dutoit@wsu.edu) with the following information on the event: event title, date(s), time(s), contact information (email address, telephone, website), and any other pertinent information (e.g., driving directions to a field day).

A team newsletter, published two to four times each growing season, can be viewed at http://mtvernon.wsu.edu/path_team/newsletterArchives.htm. Each newsletter typically features a current disease or pest issue, as well as information on vegetable resources.

Internet links to resources for common vegetable issues can be found at http://mtvernon.wsu.edu/path_team/VegCropResources.htm. This page includes links to regional diagnostic labs, disease forecast systems, nematode identification services, weather databases, pesticide information centers/services, and pest identification sites.

Photos of common diseases of vegetables in the PNW region are featured at http://mtvernon.wsu.edu/path_team/diseasegallery.htm .

Also included are links to websites that present disease management options. The photo gallery will be updated regularly as new images and information are received, including vegetable pest and other production problems.

Mustard Green Manure Field Days

North Columbia Basin
Wednesday, Oct. 25th, 2006
10 am at the Dale Gies Farm
1.5 mi. West of Rd. M on Rd. 5 SE
Moses Lake, Washington

South Columbia Basin
Thursday, Oct. 26th, 2006
10 am at Glen Roundy Farm
0.5 mi. E of Douglas Fruit (Taylor Flats Rd) on Clark Rd.
Pasco, Washington

- **The Benefits of mustard green manures**
- **Management of mustard green manures**
- **Research results on green manures in combination with fumigants for nematodes**
- **Economics of green manures before potatoes**
- **New *Brassica* green manures**

For More Information Call Andy McGuire
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