



Potato Progress

Research and Extension for Washington's Potato Industry

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Detection of Powdery Scab on Hairy Nightshades

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The powdery scab pathogen, *Spongospora subterranea* (*S. subterranea*), infects potato roots, stolons and tubers, and also can transmit the *Potato mop-top virus* (PMTV). Infection of roots and stolons results in the development of sponge-like galls (Fig.1); and infection of tubers results in lesions (Fig.2). In the Columbia Basin infection occurs early in the growing season while soil temperatures are relatively cool (55-65° F); and irrigation supplies the water needed for infection. Under these environmental conditions, root galls usually appear 3 weeks after infection, which is approximately 1.5 to 2 months after plant emergence. The majority of the potato cultivars grown in the Columbia Basin are russet skin, which do not commonly suffer from tuber lesions, but their roots can become severely infected with root galls. Field observations point out that infection of the roots resulted in necrotic areas on the roots, reducing their mass and possibly water and nutrient up-take. Industry reports indicated that root infection can promote yield weight reduction of 2-5 tons/acre. Damage to potato roots can potentially influence the development of large tubers (>280g) needed for processing, resulting in the reduction of the useable potato yield.

During the 2002 and 2003 growing seasons, powdery scab like root galls were detected on roots of hairy nightshades (*Solanum physalifolium*, formerly *S. sarrachoides*) grown in potato fields where populations of the powdery scab pathogen were high. At the end of the 2007 growing season, hairy nightshades bearing root galls (Fig.3) were collected. To determine if the root galls were the outcome of infection by the powdery scab pathogen, potato cultivars susceptible to the disease, and hairy nightshade plants were inoculated separately with galls originating from potato or hairy nightshades.

The results of this preliminary study are summarized in Table 1, indicating that 2 of 8 hairy nightshade plants that were artificially inoculated with potato inoculum had root galls. One of 7 hairy nightshade plants that were inoculated with hairy nightshade inoculum had root galls; and 5 of 6 potato plants that were inoculated with potato inoculum had root galls. None of the potato plants (0 of 7) that were inoculated with hairy nightshades inoculum had root galls (Table 1). Detection of the powdery scab pathogen with molecular, PCR-based methods indicated that the root galls collected in the field from hairy nightshades were the out come of infection by the powdery scab pathogen (Fig. 4).

The present preliminary study indicated that the powdery scab pathogen, *Spongospora subterranea*, can infect and produce root galls on hairy nightshades. Also, powdery scab inoculum from potato or hairy nightshades can re-infect and develop root galls on hairy nightshades, but probably not on potato. Trials testing the infectivity of inoculum from hairy nightshades to potato are currently in progress.



Figure 1. Powdery scab galls on roots.
Photo credit: Dennis Johnson, WSU, Pullman



Figure 2. Powdery scab lesions on Ivory Crisp.
Photo credit: Nadav Nitzan, USDA-ARS, Prosser



Figure 3. Powdery scab root galls on hairy nightshades.
Photo credit: Rick Boydston, USDA-ARS, Prosser

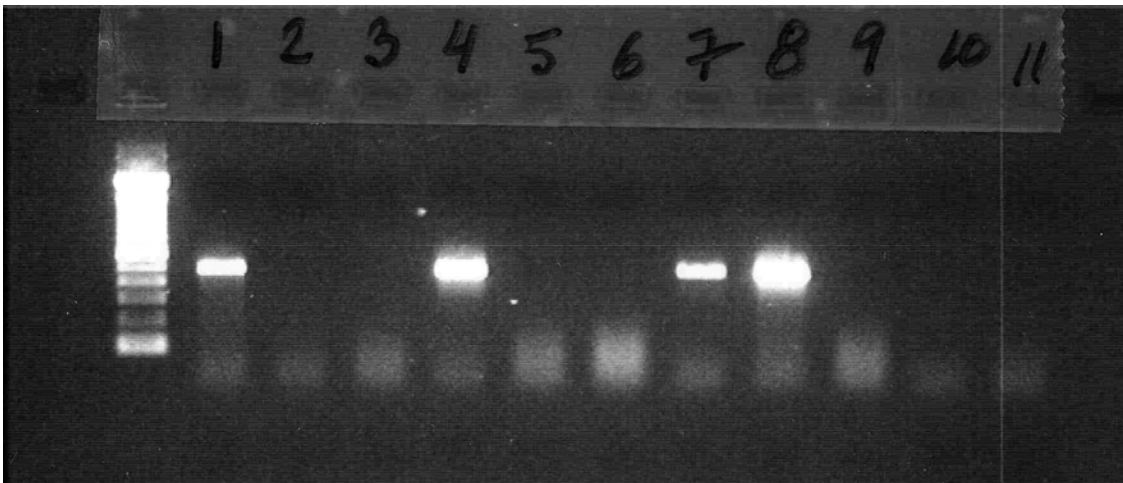


Figure 4. Detection by PCR of the powdery scab pathogen in galls collected from potato and hairy nightshades in the field, and in the galls that developed on roots of potato and hairy nightshades that were inoculated and grown in the growth chamber. Treatments, represented by the numbers above, are as follows: 1. Field collected root galls from potato, 2. Field collected root galls from hairy nightshade treated with bleach, 3. Decomposed root gall collected from potato that was inoculated with field collected root galls from potato and grown in the growth chamber, 4. Root gall from hairy nightshade plant that was inoculated with field collected root gall from hairy nightshade and grown in the growth chamber, 5. Root of non inoculated hairy nightshade, 6. Root of non inoculated potato, 7. Field collected root gall from hairy nightshade, 8. *Spongospora* - positive control, 9. Healthy potato leaf, 10. Water, 11. Diluted #3.

Table 1. Number of potato and hairy nightshade plants that were inoculated with inoculum from potato or hairy nightshades separately and had root galls.

Source of root galls inoculum	Number of plants with root galls	
	Potato	Hairy nightshades
Potato	5/6	2/8
Hairy Nightshades	0/7	1/7

WSU to Host Workshop on Potato Cyst Nematodes

Where: WSU-IAREC, Prosser, West Building

When: October 31st from 10am to 3:00pm

Who: The workshop is open to all industry members. RSVP would be appreciated to Katerina Riga at riga@wsu.edu or 509-786-9256.

The first part of the workshop will cover general nematode related issues in the Columbia Basin and information on the new *Globodera* species found in Oregon. The afternoon session will focus on potato cyst nematodes issues, news, and surveys.

WSPC Research Planning and Review Process Set

The research committee of the WSPC has set its research review process and schedule for the coming fall/winter review season. Persons interested in participating in the process as either industry observers or as scientists proposing research are encouraged to review the information on commission's website:

www.potatoes.com/research.cfm

Potato Tuberworm

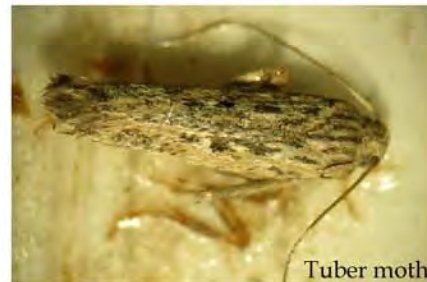
See also: <http://www.potatoes.com/research.cfm>



Recognizing Adults



Markings and color can vary



Many other small moths like these are found in tuber moth traps placed near native shrubs and herbs

These are NOT Tuber Moth



Trapping suggestions:

1. Use Delta style traps
2. Replace lures every 6 weeks
3. Store lures in freezer until use
4. Replace sticky cards weekly to maintain stickiness
5. Place traps in or near potato fields, about 12" above ground
6. Handle the lures with tweezers



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