Potato Progress

Research and Extension for Washington's Potato Industry
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Time to Clean Up Cull Piles and Spills

In a recent edition of this newsletter (Volume VII No. 2) we discussed the importance of cull piles and spilled potatoes in disease and pest issues for the commercial crop. Cull piles and other waste potatoes pose little or no threat during the winter, but with the growing season underway and the crop emerged, it is past time to clean up cull piles and maintain good sanitation around storages and other places where it might be tempting to pile culls. Some of the problems associated with cull piles, such as late blight, are community problems and must be handled by the whole community working together.

Caterpillars (a.k.a. 'worms') on Potatoes

This year the potato commission is funding the second year of a research project on the identification, biology, and pest status of the suite of caterpillars that feed on potato foliage (excluding tuberworm). Some background information follows:

1. Potential caterpillar pests in potato fields include the bertha armyworm, western yellowstriped armyworm, spotted cutworm, variegated cutworm, red backed cutworm, *Lacanobia subjuncta*, alfalfa looper, and cabbage looper.
2. These moths all are highly mobile, and can arrive in potato fields following flights of miles to hundreds of miles.
3. Regional populations vary significantly from year to year. Also, species have varied phenologies, with adult flight, egg laying, and feeding by larvae occurring at different times of the potato-growing season.
4. Larvae of these species vary in their ability to develop on potato. Some do extremely well on potato, while others fare poorly.
5. Most people, including most entomologists, have difficulty separating the different species, whether worms or adult moths. This is further confounded by the fact that over 850 species of moths in this group occur in the state, and about 250 are present in the irrigated areas of central Washington.

We are asking for your help!

As a part of this project, we want to find many infestations of foliage-feeding caterpillars in potatoes. Each outbreak will be studied in the field, and samples will be collected and studied in the laboratory. **If you detect a caterpillar outbreak, please contact Andy Jensen at 509-760-4859 or Alan Schreiber at 509-266-4348.**

Reducing Corky Ringspot Disease with Crop Rotation

R. A. Boydston, H. Mojtahedi, J. M. Crosslin, E. Riga

Introduction

Corky ringspot disease (CRS) of potato, caused by tobacco rattle virus (TRV) and vectored by *Paratrichodoris allius* nematodes, is an important disease of potato in the Pacific Northwest (PNW) and increases in importance every year (Pelter 1997). The disease is characterized by distinct necrotic concentric rings and diffused brown blemishes in tubers that render the crop unmarketable. Controlling the nematode vector with soil fumigation is the primary CRS management tool growers currently use. Although *P. allius* parasitize potato roots, populations of this nematode in potato fields of PNW are too low to be of any pathogenesis concern (Mojtahedi et al 1999) unless infected with TRV. Previously, we have demonstrated in greenhouse studies that growing alfalfa can cleanse the nematode population of TRV (Boydston et al. 2004). However, weed hosts growing with alfalfa can prevent cleansing of virus from the nematode population (Mojtahedi et al. 2003). We have established CRS disease plots at the Washington State University (WSU)-Prosser field units where we can conduct multi-year CRS research projects evaluating non-chemical control measures to alleviate CRS problem on potato (Mojtahedi et al. 2007). Early results indicate growing weed-free alfalfa can greatly reduce CRS incidence in the succeeding potato crop.

Materials & Methods

In 2005, a two acre field plot was allocated for CRS studies on the WSU-Roza Unit on a sandy loam (70% sand, 24% silt, 6%, clay and 1.05% organic matter) with pH = 6.6. Alfalfa had been grown the previous two years. *Paratrichodorus allius*, which is the dominant vector of TRV in the PNW and native to the region, was present in the field, but the nematode population was free of TRV. In July 2005, alfalfa was killed with glyphosate and tillage. TRV was introduced in the field by transplanting Samsun NN tobacco infested with viruliferous *P. allius* that was originally derived from a field near Pasco, WA with a CRS history. The soil was sampled for nematode and TRV assays were conducted four times throughout 2006 in late March, early April, May, and mid September. Samples were bioassayed for TRV on tobacco, and the presence of TRV was confirmed by ELISA.

After successfully infecting the field with TRV, the following crop rotation treatments were established in fall of 2006 and spring of 2007. The treatments were repeated in second study in fall 2007 and spring 2008.

- Winter wheat, weed free (high herbicide rates and hand-weeding)
- Winter wheat, weedy (standard herbicide rates)
- Alfalfa, weed free (high herbicide rates and hand-weeding)
- Alfalfa, weedy (standard herbicide rates)
- Winter wheat, weed free, fumigated following wheat crop

Each treatment was replicated five times in a randomized complete block. Treatments were selected based on previous greenhouse results that indicated that viruliferous *P. allius* feeding on alfalfa is able to cleanse itself of TRV after several months (Boydston et al. 2004). Wheat was previously identified as a crop that does not eliminate CRS disease from the soil (Mojtahedi et al. 2002). Weed control levels were included in the treatment list because previous greenhouse studies revealed some weed species can serve as TRV and nematode hosts and prevent the cleansing of TRV from the nematode population when present (Boydston et al. 2004, Mojtahedi et al. 2003). The two levels of weed control were established using

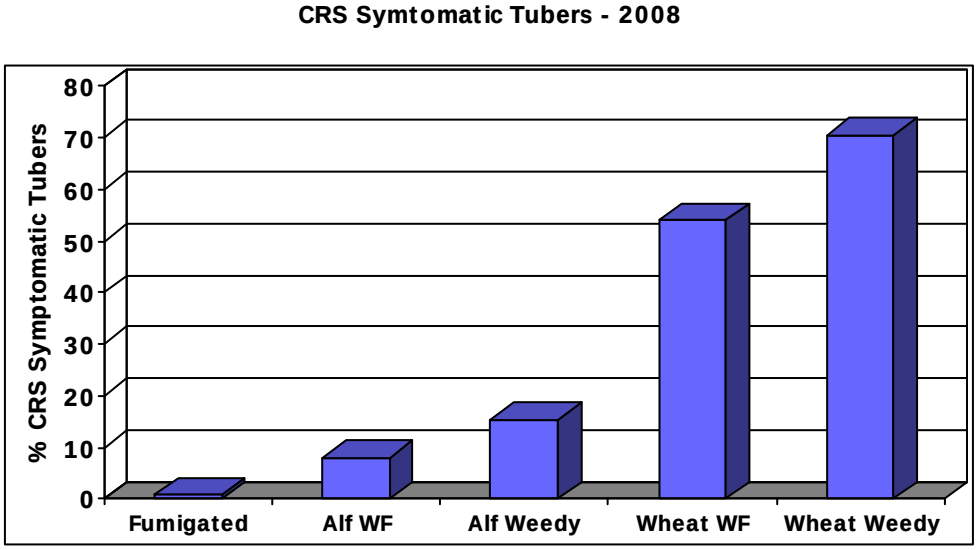
registered herbicides in wheat and alfalfa and hand-weeding escape weeds in weed-free plots. In 2008, potatoes, variety Russet Burbank, were planted to determine levels of CRS following each treatment. Potato tubers were harvested and 100 tubers from each plot were evaluated for CRS symptoms by cutting tubers and examining for necrotic CRS symptoms. A repeat of this study is currently being conducted in 2009.

Initial Results

CRS disease was present in the 2008 potato crop and the tuber infection levels varied among previous cropping treatments (Fig. 1). Highest levels of CRS symptomatic tubers were found in both weedy wheat and weed-free wheat treatments, with 70 and 54% tubers exhibiting CRS symptoms, respectively. Potatoes following weedy alfalfa had 15.4% CRS symptomatic tubers, whereas potatoes following weed-free alfalfa had 8% tubers showing CRS symptoms. Potatoes following weed-free wheat that had been fumigated with Telone and Vapam in the fall 2007 prior to potatoes, had the lowest CRS incidence with only 0.8% symptomatic tubers. Only one of five replicates of potatoes following the weed-free alfalfa had some CRS infection, indicating that one replicate of the trial could possibly have been cross contaminated with viruliferous nematodes by soil movement on equipment or foot traffic during the study.

These studies illustrate that fumigation is very effective in managing CRS disease and that growing alfalfa without weeds can greatly reduce CRS disease incidence in a following potato crop. Eliminating possible weed hosts in alfalfa is important to maximize the cleansing effect. Several weed hosts of both TRV and *P. allius* that we have identified include hairy nightshade, black nightshade, cutleaf nightshade, common chickweed, prickly lettuce, annual sowthistle, henbit, and kochia.

Figure 1. Corky ringspot tuber infection levels in potato following five pre-cropping treatments; weed-free wheat fumigated, weed-free alfalfa, weedy alfalfa, weed-free wheat, and weedy wheat.



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Mark Your Calendars

OSU Potato Field Day – June 24, 8:30 am, OSU Hermiston. Contact: http://oregonstate.edu/dept/hermiston/

WSU Potato Field Day – June 26, 8:30 am – 1 pm, Othello Research Unit, Hosted lunch. Contact: Mark Pavek, 509-335-6861, mjpavek@wsu.edu.

Centennial Celebration! OSU Hermiston Agricultural Research and Extension Center, June 30, 2:00 - 8:00pm. Contact: HAREC station at 541-567-8321.

WSU Mount Vernon NWREC Field Day – July 9, 4:00 – 7:00 pm, Washington State University Mount Vernon NWREC. Contact: Don McMorran, 360-428-4270, donaldm@co.skagit.wa.us.