



Potato Progress

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Andrew Jensen, Editor. Submit articles and/or notes to: ajensen@potatoes.com

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Late Blight Tuber Rot: Phostrol A Potential New Management Tool

Dennis A. Johnson, Lyndon D. Porter, Tom F. Cummings,
Debra I. Inglis, and Phil B. Hamm

Tuber rot is a major concern at harvest and in storage whenever potato late blight is present in an area. Tuber infection occurs when late blight spores from potato or nightshade foliage come in contact with tubers in or on the soil surface. Soil cracking or erosion of hills can expose tubers and make them especially vulnerable to infection from spores that are washed from infected foliage by irrigation water or rain. Swimming spores may also move short distances in the soil and infect tubers. Tubers infected during the growing season may partially decay before harvest. Tubers may also become infected at harvest when they contact viable spores on infected foliage or spores in soil. Moisture is needed for tuber infection and the prevalence of tuber infection may increase when harvest is done during rainy weather.

Research at WSU Othello has recently demonstrated that phosphonate (Phostrol, Nufarm Americas) is effective in reducing late blight tuber infection. Phostrol was applied to foliage of Ranger Russet in three-row, replicated plots at Othello. A maximum of three applications were initiated at tuber bulking and were made at two-week intervals (Table 1). Tubers were harvested at maturity and then challenge-inoculated with an aggressive isolate (US-8) of *Phytophthora infestans*, the late blight pathogen. Tubers were stored for six weeks at 48 F and then evaluated for rot. Percentage of infected tubers and severity of infection was significantly reduced with two and three applications. Three applications were significantly better than two. Tuber yields did not differ significantly among treatments (Table 1).

Phostrol is a systemic fungicide and moves from plant foliage to tubers where it protects tubers against late blight infection. However, the material does not protect potato foliage so fungicide applications are required to protect the crop canopy against foliar late blight. Phostrol is registered for use on potato in Washington; consult the label about mixing with foliar fungicides. Application of Phostrol at tuber bulking followed by two additional applications at two-week intervals protected tubers from late blight infection in 2001. Additional research tests at Othello, Mount Vernon, and Aberdeen are being conducted in 2002 to further evaluate Phostrol for control of late blight tuber rot and other tuber rotting diseases.

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LATE BLIGHT MANAGEMENT

Management of late blight tuber rot must not be based on a single chemical or practice. Integration of several control tactics is needed to manage potato late blight in the Columbia Basin and to reduce the likelihood of chemical resistance developing in the pathogen population. This includes strict sanitation practices, proper irrigation management, cultural practices, and timely applications and judicious use of fungicides. A check-list of practices needed for late blight management follows:

LATE BLIGHT CHECK-LIST

Plant seed tubers free of late blight. Visit seed growers during the growing season to confirm fields and area are free of late blight.

Treat seed tubers with a fungicide containing mancozeb (Maxim MZ, Tops MZ) or cymoxanil (Evolve).

Plant seed tubers within 24 hours of cutting.

Eliminate culls and tuber-refuse material before the potato crop emerges.

Eliminate volunteer potatoes.

Do not grow potatoes within the first 80 ft of the pivot center.

Do not plant seed pieces shallow; form an adequate hill.

Use good fertilization practices - massive vine growth favors late blight.

Avoid pivot overlaps, over watering, and watering during rainy periods.

Monitor fields for late blight, especially near the pivot center, wheel tracks or anywhere water accumulates.

Consult late blight information line for timing of fungicide applications (Washington 1-800-984-7400, Oregon 1-800-705-3377).

Begin fungicide applications at least 7 days prior to late blight exposure. In the Columbia Basin this usually requires making the first application just prior to row closure and continuing on a 7-day interval for at least three weeks. In western Washington, foliar applications generally need to begin when plants are 3-4 inches high. Early applications are extremely important to prevent establishment of late blight in fields.

Continue fungicide applications at recommended intervals (consult late blight information line) to protect new and old foliage until harvest. The use of relatively inexpensive materials such as mancozeb, metiram (Polyram), and chlorothalonil will provide adequate control when used on a weekly bases, even when disease pressure is high.

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Apply three applications of Phostrol (each at maximum label rate) at two-week intervals beginning at tuber bulking for potatoes scheduled for storage.

Consult Potato Progress Vol. 1, No.1 (April 30 2001) for additional information on fungicide application for management of potato late blight.

Monitor tubers during storage for rot. Maintain adequate temperature, humidity and air circulation in storage.

Table 1. Mean late blight tuber rot and yield when foliage of Ranger was treated with Phostrol and harvested tubers were challenge-inoculated with the late blight pathogen.

Treatment	Tuber Rot Incidence (%)	Tuber Rot Severity (%)	Tuber Rot Yield (lbs/plot)
Non-treated Control	100 a	72 a	88
Phostrol - 3 applications at 5 pt/a	95 a	36 b	86
Phostrol -2 applications at 10 pt/a	68 b	17 c	95
Phostrol - 3 applications at 10 pt/a	21 c	6 d	94

Means followed by the same letter are not significantly different at P = 0.05.

WSPC Seeks Four New Research Council Members

The Washington State Potato Commission funds a large amount of potato-related research each year in the Pacific Northwest. The Commission uses an established procedure for solicitation of research proposals. Proposals are reviewed and funding recommendations made by the Research Council. Research Council members are drawn from the WSPC Research Committee, interested growers, potato processing companies, ag/chem companies, other potato companies, and includes three at large positions. There are currently four vacant slots among the seventeen voting members on the Council. The Commission is seeking volunteers and/or nominations of interested individuals from the Washington potato industry, including growers, who would like to serve on the WSPC Research Council. Membership on the Council entails about three meetings per year, all in the late fall and winter months. Please send nominations or volunteer to Andrew Jensen, Director of Research and Technical Affairs, Washington State Potato Commission, 108 Interlake Rd., Moses Lake, WA 98837; ajensen@potatoes.com; (509) 765-8845.

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RECOMMENDATIONS FOR GROWING MUSTARD GREEN MANURES

Here are steps you can take to help you manage a mustard green manure successfully:

1. **Species and variety selection.** Obtain seed early so that you have it on hand when planting time arrives. Two types of mustard are being sold, white and oriental, separately and in blends, with both giving pest control benefits. Choose varieties based on biomass production and glucosinolates levels. Green manure trial results are available-see location below.
2. **Planting date, method, and rates.** Growers in the upper Columbia Basin should plant mustard in August, with the first two weeks being optimum. Earlier plantings are not recommended and later plantings will produce much less biomass. Warmer locations can adjust planting dates according to their climate. Drilling (8-10 lb/ac), with minimal disturbance of crop residue, has given the best results, but good stands have also been obtained with broadcast seeding (10-15 lb/ac). Seeding rates for oriental mustard may be reduced by 1/3 because of their smaller seed.
3. **Irrigation and Fertilization.** Mustard requires good soil moisture and fertility levels to produce biomass and to delay flowering. Monitor soil moisture and irrigate appropriately. Test soil and provide 100-140 lb N/ac for early to mid-August planting. Be sure to apply a portion of the N at seeding to give the plants a good start.
4. **Weed control.** If given adequate water and fertility, mustard will compete well with most weeds. However, if you are trying to control nematodes with the mustard, further weed control is recommended because many weeds, including volunteer wheat, can act as hosts for parasitic nematodes. A selective herbicide may be used to control the volunteer wheat.
5. **Incorporation.** First, break up the plants as much as possible, and then get it into the soil quickly, while still green. This is normally done with a flail chopper followed by one or two passes of a disk. If the chopped mustard lies on the soil surface for very long, disease control may be decreased.
6. Finally, growers of mustards have a responsibility to either incorporate or otherwise kill plants which survive in fields or field borders to prevent potential cross-pollination with seed crops.

You can access more information about mustard green manures and how to use them in potato cropping systems online at <http://grant-adams.wsu.edu> or call the WSU Cooperative Extension, Grant-Adams Area office at 509-754-2011. A. McGuire

Field Day Dates

It's time to mark your calendars for the upcoming potato field days planned by local scientists and extension staff.

Patterson - Potato Cropping Systems Field Day & hosted lunch, July 8, 9:00 AM

Eltopia - Potato Pest Management Field Day & hosted lunch, August 7, 10:00 AM

Mt. Vernon - Mt. Vernon Field Day, WSU Research Unit, August 20, 4:00 PM