Potato Progress

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Managing Potato Late Blight in the Columbia Basin

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Integration of several control tactics is needed to manage potato late blight in sprinkler irrigated potatoes. These include strict sanitation practices, proper irrigation management, cultural practices and timely applications of fungicides. In storage, temperature, relative humidity, air movement, and holding time of tubers need to be managed to reduce any late blight tuber rot. This paper lists practices that will help manage late blight in sprinkler irrigated potato fields in semiarid environment such as the Columbia Basin or southern Idaho.

Sanitation

Sanitation practices are aimed at reducing potential sources of infections and include:

1. Plant certified, late blight free seed tubers
2. Eliminate culls and tuber refuse
3. Manage volunteer potato plants
4. Treat seed with a fungicide containing mancozeb or Curzate
5. Plant seed tubers within 24 hours of cutting

Epidemics of late blight characteristically arise from a very low level of infected seed tubers, a few infected volunteer plants, or from infected tuber refuse. Certified seed lots should be selected from seed areas where late blight did not occur or from farms where the disease was successfully managed. Seed health certificates and visits to the seed farm during the growing season can be helpful in selecting satisfactory seed lots. Volunteers in fields that had late blight the previous year are especially likely to be infected and pose a threat the current year. Refuse tubers pose a serous threat as a source of late blight inoculum and should not be tolerated.

Spores of the late blight organism can form on infected seed tubers and spread to and infect other seed pieces during cutting and handling. Research at WSU has documented that sporulation can occur on infected seed within 24 hours after cutting, because of favorable temperature and humidity within a pile of cut seed tubers. Spread to other seed pieces occurs as air currents disperse spores and as seed pieces are mixed during handling. Fungicide seed treatments that contain mancozeb or Curzate reduce this spread. Planting seed tubers within 24 hours of cutting will also help reduce tuber to tuber infections. The use of fungicides on potato seed will not negate the importance of using certified seed tubers free of late blight. Soil temperatures should be 55 F and increasing at planting.

Cultural and irrigation practices

Judicious cultural and irrigation practices reduce the rate at which late blight increases and potentially reduce the number of fungicide applications needed for late blight management. Effective practices include:

1. Potatoes should not be grown within the first 80 ft of the pivot center. This is usually the wettest area of the circle and most conducive environment for late blight infection on foliage and tubers. Late blight often begins in fields near the pivot center, and recent research demonstrated that large proportions of infected tubers originate in this area. Rot in storage can move throughout the storage from concentrated sources of infected tubers. Lost production area is about 0.4 acre or 0.3% of a 125-acre field. This is with a 25 ft radius subtracted for pivot turn around road. Yield and tuber quality are often lower in this area so lost tuber yield would be less than the lost production area. Benefits can be a reduction in number of fungicide applications, better late blight control and fewer infected tubers going into storage.

2. Irrigate sparingly until just before tuber initiation. This reduces the risk of early season late blight, infection by *Verticillium dahliae* (cause of early die disease), and infection of seed pieces by soft rot bacteria.

3. Avoid pivot overlaps, over watering and watering during rainy periods or when dew is occurring. Try to irrigate when leaf wetness periods will be less than eight hours. Moisture for sporulation and infection mostly come from sprinkler irrigation in the Columbia Basin. Watering during late evenings and at night will usually extend the leaf wetness period in this semiarid environment. This is because temperatures are cooler and wind speeds lower and the foliage will dry less rapidly than during the day. Potato fields infected with late blight should be irrigated during the daylight hours to minimize continued late blight development. Reduce irrigation when the crop canopy begins to open and towards the end of the growing season.

4. Plant seed pieces relatively deep and form an adequate hill to provide a soil cover over tubers. Tubers become infected when spores of the late blight pathogen come in contact with tubers in the field. Tubers infected during the growing season may partially or completely rot before harvest, whereas tubers infected late in the season may not show obvious symptoms at harvest, but rot in storage. Soil cracking and hill erosion expose tubers in the field and make them especially vulnerable to infection from spores that are washed from infected foliage by irrigation water or rain. Spores are not washed more than an inch through intact soil. In a study at WSU where spores were applied over the surface of silt loam, medium sand and fine sand, tuber infection decreased with increasing soil depth. Most infected tubers were found at the soil surface, and infection was rare on tubers at 2 inches and deeper. In consequence, planting depth, hilling practices, and other cultural practices should be exercised to promote an adequate covering of soil over tubers and to reduce soil cracking.

5. Use good fertilization practices. Massive vine growth creates a microclimate favorable for late blight.

6. Monitor fields for late blight, especially near the center of pivots, along wheel tracks, and low areas in fields.

7. Harvest during dry weather. Harvesting tubers during wet weather exposes tubers to inoculum being washed from the atmosphere or splashed from nearby surfaces in addition to providing a favorable environment for infection. Spores in the atmosphere can arise from adjacent and more distant fields.
8. Pulp temperatures of tubers for storage should be less than 68 F. High tuber temperature is a major contributor of rot in storage.

Fungicide applications

Timely fungicide applications at effective rates are an important component of managing late blight. Important factors in managing late blight with fungicides include:

1. Consult the late blight information line for timing of initial fungicide applications and intervals between applications (phone = 800 984 7400; or web site = http://www.wsu.edu:8080/~djohnsn). Forecasts for the Columbia Basin use the Columbia Basin Late Blight Forecasting Model, current disease conditions and weather forecasts. The model is based on the number of days with rain in April and May.
2. Continue applications at recommended intervals to protect new and old foliage until harvest.
3. Use short application intervals when disease pressure is high. There are no fungicides available with a knock out punch!
4. The fungicides mancozeb and metiram on the soil surface either from direct application or redistribution from foliage may serve as a chemical barrier to tuber infection. Incorporating these fungicides into a fungicide regime near the end of the growing season may aid in preventing tuber infection.
5. Ridomil, copper and tin fungicides are not effective for late blight in commercial fields in the Columbia Basin. Super Tin is effective when mixed with metiram (Polyram) or mancozeb.
6. Foliar applications of phosphorous acid (Phostrol) will reduce late blight tuber rot at harvest and in storage. Two to three applications (8 – 10 pt/acre) at two-week intervals beginning at tuber initiation effectively reduced late blight tuber rot at Othello in 2001 –2003. Pink rot was also reduced with phosphorous acid applied to foliage.
7. An effective and cost-saving program for applying late blight fungicides begins by applying the first fungicide application by air and then rotating with chemigation there after. This method has the greatest advantage when disease incidence and pressure require a 7-day application frequency.
8. All fields need protection, even those scheduled for early harvest. Follow product label information when applying fungicides.

Potato Tuberworm Symposium at the World Potato Congress

This year Boise will be hosting the World Potato Congress, August 20-26. During the morning of August 21 there will be a symposium dedicated to the potato tuberworm. There will be speakers from across the U.S. and around the world. For more information on the Congress, see http://www.potatofoundation.com/WPC_2006/index.html.

Cull Pile and Waste Potato Management Important for Tuberworm Control

Cull pile and waste potato management was mentioned in Dr. Johnson's article about late blight above, and it is also important for management of potato tuberworm. Any potatoes exposed to moths can be food sources for larvae, and contribute to building tuberworm populations. One of the most likely places moths will build up is the grounds surrounding storage buildings and other places where potatoes might be piled intentionally or spilled accidentally. Cull piles and piles of dirt mixed with potatoes are likely a major means of overwintering of tuberworm, and important in the buildup of populations in the spring.

Cull/Dirt Piles

Our tuberworm trapping network identified a population buildup last summer near a complex of storage buildings north of Othello. This buildup was found to be due to cull potatoes and spilled potatoes lying about in large numbers. Tuberworm moths had colonized the area and, because there are usually no insecticides applied to this kind of situation, had built up to huge numbers. It is important to note that the amount of waste potatoes in the area was not unusually large – no large heaps of culls or pits full of potatoes. There were piles of mostly dirt with a few potatoes, and quite a few potatoes lying about which had been spilled from trucks. Tuberworm larvae are not afraid to share their food, and 25-50 (or more) larvae can develop in one tuber. Therefore, what seems like a small number of tubers in comparison to the thousands of tons you handle each day could be enough to support large numbers of moths. Such moths can then colonize neighboring fields or overwinter and start the race anew in the spring. **Cull potatoes should be destroyed, processed, or buried under at least 18 inches of soil as soon as possible.**

One More Planting Date Left for the Commercial Seed Lot Trial

Seed samples may be taken to the WSU Othello Research Unit (509-488-3191): south on Booker Road from State Highway 26 about five miles east of Othello. Mark Trent (509-754-2011, ext 413) will be the main contact for North Basin seed pickup (north of Othello). For South Basin sample pickup and any questions regarding the seed lot trials, please call Mark Pavek at 509-335-6861 or Ed Driskill at 509-335-6859.

In the North Basin, one seed "drop-off" has been established. It is located at Qualls Ag Labs (Mick Qualls, 509-787-4210 ext 16) on the corner of Dodson Road and Road 4; come to front office between 8 am and 5 pm. Samples will be picked up at 2:00 pm the day before each planting date. For alternative pickup locations please call Mark Pavek at 509-335-6861 or Mark Trent at 509-754-2011, ext 413. *The final seed lot planting date is May 2nd.* **The 2006 Potato Field Day is scheduled for Friday June 23.**