

## Urgent Potato Late Blight Information Update April, 2011

Willie Kirk, Plant Pathology, MSU

Potato late blight in potato tubers is of significant importance in commercial production and in seed production because these tubers may (i) initiate epidemics by transmission from infected tubers to sprouts, stems and foliage and ii) may also directly reduce plant stand and delay plant emergence resulting in further problems which affect yield and tuber size distribution. In addition, late blight management incurs significant management costs to growers in terms of IPM scouting and control with fungicides. Over the past two years, the aggressive US-8 genotype of *Phytophthora infestans* has been largely displaced in potatoes by a slightly less aggressive strain, known as US-22 that is thought to have originated from tomatoes. This strain was found widely in Michigan in 2009 and again in 2010, at least as far north as Rogers City. There was therefore a high risk that potato seed crops could have been exposed to potato late blight. The late appearance of late blight in some crops may have caught some growers off guard and even in blight-free crops spore showers from external sources could potentially affect tubers even after desiccation of vines.

At MSU, samples are sent to our lab for testing regularly and we run a general test called multplex PCR to determine the presence of four pathogens. These are *Phytophthora infestans* (late blight), *Phytophthora erythroseptica* (pink rot), *Pythium ultimum* (leak) and *Pectobacterium carotovorum* (soft rot). These tests are very sensitive and are often run to determine what risk a crop might be under and what management steps are needed to maximize healthy stands. Earlier this month seed samples were brought to the lab that showed PCR reactions that were weakly positive for late blight. **I emphasize that these tests are extremely sensitive and the implications in terms of what this means in terms of the risk of late blight developing from tubers from these seed lots are not known.** From my own experience in research in this area of latent infections of potato seed my opinion is that the likelihood is very low but not impossible. Since this seed was sampled we have taken further samples and found these weak PCR positive reactions again but as yet have not been able to grow pure cultures from the seed. Visually the darkened seed tissue has the appearance of late blight but has also been impacted by other pathogens. The reason then for this letter is to alert growers that there is a potential risk that seed may be affected by late blight in 2011 but that we are not in a position to determine that this will result in seed-borne late blight developing. The following are the steps that have been taken so far in conjunction with the Michigan Seed Potato Association (MSPA) and its members, MSU, MPIC and MDA seed inspectors.

MSPA are being proactive by stepping up early and have visited commercial sites where seed lots are being cut and treated and they are working closely with MSU and MPIC on a short and long term management plan. MSPA are testing suspect tubers in seed lots at shipping point inspections with late blight immunodiagnostic test strips from AGDIA; so far no tubers have tested positive using these tests. We have tested these kits in the lab on tubers inoculated with the pathogen and they are reliable.

What do we know so far?

- The levels observed in the seed-lots were very low (less than 0.1% incidence, tolerance is 1%); several samples of 500 tubers had no infected tubers and suspect tubers were always spotted as isolated individuals on the face of the tuber pile
- Growers will not find blighted tubers easily themselves and in natural infestations late blight is usually always accompanied by other pathogens such as *Pythium*, soft rot or dry rot
- Difficult to get a pure culture – this is good for the grower - the other pathogens can either kill the seed or overcome (out compete) *P. infestans*

- The sensitivity of the test we use is very high and we pick up levels that may not be of biological significance – the hyphae (thread like growing structures of the pathogen) may never reach the growing part of the potato plant (the sprout) and may never get above ground
- Conversely, the hyphae can kill all the growing parts of the infected seed tuber and the plant never emerges

#### Issues

- The pathogen is a new strain that MSU has had limited experience with especially as a seed-borne pathogen
- We do have scheduled trial for this issue in 2011
- The strain (US-22) is overall less aggressive than US-8 in tubers
- Therefore US-22 is more likely to survive in seed but less likely to kill the sprouts
- Therefore there might be a higher risk for foliar late blight
- The strain is **Ridomil sensitive** - it can be managed efficiently with Ridomil-based products (mefenoxam or metalaxyl-based)

#### Current Management Strategies

- Pick out rotted and suspect seed tubers aggressively
- Apply seed treatment containing mancozeb (Nubark Mancozeb, Maxim MZ, Moncoat MZ)
- Curzate 60DF also has a national label for seed application to prevent seed to seed spread of the disease at cutting apply at 0.25 to 1.0 oz/cwt cut seed; must be used in combination with e.g. mancozeb
- Apply chlorinated product over cutting knives and keep knives sharp
- Plant seed tubers when possible within 24 hours of cutting and treating
- In Michigan, normal practice involves cutting and treating well in advance of planting therefore; try to cut and treat seed about 10 days prior to planting - or if holding longer keep at 50F or lower in aerated piles no higher than 12 feet - late blight develops optimally at 50F - US-22 is less aggressive and may need longer to rot infected tubers - therefore after cutting plus time to emergence:- 10 + 21 days = 31 days, the infected seed piece and may have rotted and the sprouts/stems been compromised
- Cutting and treating on the day of planting may favor the pathogen
- Some of the seed lots inspected so far also had pink rot and pythium therefore apply Ridomil in furrow at 0.42 fl oz/1000 row ft in a 6 – 8” band or Quadris Ridomil Gold 0.82 fl oz/1000 row ft in a 6 – 8” band for broad spectrum disease control
- Apply Ridomil Gold Bravo at 90-95% emergence when plants are about 3-6" tall or other fungicide such as Curzate (plus protectant); Revus Top; Forum (plus protectant); Previcur (plus protectant)
- Begin intense scouting at this time also
- If late blight found follow MSU recommendations for late blight management current version on <http://lateblight.org>

#### Early season post-emergence recommendations

- Scout fields for late blight, especially at wet areas, field edges, tree lines, machinery entrance points and low areas in fields.
- **Late blight spores spread quickly and can be widely disseminated during wet/windy weather. It is therefore important that growers/scouts mark the location of spots within infected fields and immediately inform Willie Kirk at MSU ([kirkw@msu.edu](mailto:kirkw@msu.edu); 517 775 6048; 517 353 4481; 517 355 4754; 517 242 3477) so that neighbors can be alerted to what is a community disease**

- Timely fungicide applications at effective rates are an important component of managing late blight (see Table 1 for current recommendations for Michigan)
- Begin fungicide applications when plants are meeting within the rows
- Late blight risk forecasts can be found at <http://lateblight.org> for recent late blight history in the state and forecast of weather-based conducive risk conditions in the state
- We can also send instant messages to your mobile if you sign up to follow [http://www.twitter.com/late\\_blight](http://www.twitter.com/late_blight)
- As soon as we confirm LB you hear about it
- The Syngenta late blight Hotline for Michigan is also regularly updated during the season: 1-888-379-9012; text BLIGHTMI to 97063

**Table 1. Suggestions for appropriate fungicides for late blight control including semi-systemic fungicides under different late blight conditions in susceptible potato varieties.**

| Disease category   | Late maturing especially storage varieties   |   |
|--|--|---|
|  | No senescence - early senescence   | Mid - late senescence   |
| a) none  | Ridomil Gold Bravo<br>Curzate or Tanos or Forum or Previcur Flex or Revus or Ranman + EBDC or chlorothalonil<br>Quadris or Headline or Gem + EBDC or Gavel<br>Omega<br>Champ or Kocide can be added to enhance activity  | Curzate or Tanos or Forum or Previcur Flex or Revus or Ranman + EBDC or chlorothalonil+<br>Supertin/Agritin+ EBDC or chlorothalonil<br>Chlorothalonil (various + ZN) or Gavel<br>Omega<br>Champ or Kocide can be added to enhance activity                                |
| b) few random lesions even distribution throughout field (0 - 1% foliar infection)   | Ridomil Gold Bravo<br>Curzate or Tanos or Forum or Previcur Flex or Revus or Ranman + EBDC or chlorothalonil+TPTH or Chlorothalonil fb<br>EBDC+TPTH or Chlorothalonil + TPTH 5day<br>fb Chlorothalonil (various + ZN) or Gavel   | Ridomil Gold Bravo<br>Curzate or Tanos or Forum or Previcur Flex or Revus or Ranman + EBDC or chlorothalonil+TPTH or Chlorothalonil fb<br>EBDC+TPTH or Chlorothalonil + TPTH 5 day<br>fb Chlorothalonil various + ZN) or Gavel  |
| c) one or more (up to 5) loci spreading from the edge of the field or from several centers within the field (1% overall field infection but locally heavily infected plants 5 - 10%) | Ridomil Gold Bravo<br>Curzate or Tanos or Forum or Previcur Flex or Revus Top or Ranman + EBDC or chlorothalonil +TPTH or Gavel<br>kill infected area with Reglone****<br>fb EBDC+TPTH or Chlorothalonil + TPTH every 5 days until vines dead                                  | Ridomil Gold Bravo<br>Curzate or Tanos or Forum or Previcur Flex or Revus or Ranman + EBDC or chlorothalonil +TPTH or Gavel<br>kill infected area with Reglone<br>fb EBDC+TPTH or Chlorothalonil + TPTH every 5 days until vines dead                                     |
| d) partial crop infection large areas infected with up to 20% loss of GLA evenly distributed throughout the field or large areas of the field  | Ridomil Gold Bravo<br>Curzate or Tanos or Forum or Previcur Flex or Revus Top or Ranman + EBDC or chlorothalonil +TPTH or Gavel<br>Chlorothalonil (various + ZN) + TPTH kill infected area with Reglone<br>fb EBDC+TPTH or Chlorothalonil + TPTH every 5 days until vines dead | Ridomil Gold Bravo<br>Curzate or Tanos or Forum or Previcur Flex or Revus or Ranman + EBDC or chlorothalonil +TPTH or Gavel<br>Chlorothalonil (various + ZN) +TPTH kill infected area with Reglone<br>fb EBDC+TPTH or Chlorothalonil + TPTH every 5 days until vines dead |
| e) 20-100% crop infection with large loss of GLA***  | kill infected area with Reglone<br>fb EBDC+TPTH or Chlorothalonil + TPTH every 5 days until vines dead   | kill infected area with Reglone<br>fb EBDC+TPTH or Chlorothalonil + TPTH every 5 days until vines dead  |

fb followed by;

GLA Green Leaf Area

\* TPTH has 7 day post harvest interval (max 11.25 oz/Acre/season);

\*\* Chlorothalonil has 7 day post harvest interval;

\*\*\* Protectant applications of an EBDC or chlorothalonil-based fungicide should be maintained on a 5 day schedule until the vines are completely dead.;

\*\*\*\* Infected areas should be treated last and a fungicide should be applied during the exit from the field  
Mention of a product in this table is not an endorsement but is supported by data generated from MSU late blight research or from data from other late blight research programs. Other products with the same or similar active ingredients may be substituted for those above at the users risk. The above information is intended as a guide to help users manage potato late blight.