

Keeping Late Blight in Your Rear View Mirror – Planning for 2010 – Commercial Potato Grower Version

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The 2009 season was very challenging for all commercial potato growers (both conventional and organic) because of weather conditions unsuitable for uniform potato growth and because of the widespread occurrence of late blight (LB). LB, the fungal-like disease responsible for the Irish Potato Famine, occurred much earlier in the season (early July) compared with previous occurrences. And environmental conditions in 2009 during June and July, and continuing into August were very conducive for the occurrence and spread of LB inoculum, since the organism responsible, *Phytophthora infestans*, prefers cool and wet conditions for its reproduction and spread. Thus in 2009, potato growers were required to make numerous fungicide sprays of the best products available to control LB, and do this on a very tight schedule if they expected to harvest any disease-free tubers.

The more frequent occurrence and the presence of more virulent genotypes (isolates) of LB has been a continual progression which began in the 1990's and has continued to the present day. Two different genotypes of LB occurred in New York and in other areas of the Northeast in 2009, and these genotypes fit the category of being more virulent for potato, tomato or both. Genotype US8 is quite specific for potato, has an A2 mating type and is metalaxyl resistant. It has become nationally predominant since 1995 (locally present 1992-present) and is easily disseminated on infected potato tubers used for seed. Infection of potato with US8 was a concern for potato growers in 2009, especially for acreage located in western NY. The genotype responsible for widespread losses for tomato and some potato fields was a new isolate called US22. US22 is also mating type A2, but is actually metalaxyl sensitive.

Many fungicides are labeled for the control of LB, and some if mixed with a protectant (contact) fungicide, will also provide control of early blight (EB, *Alternaria solani*) (Table 1). Fewer fungicides are labeled for the control black dot (BD, *Colletotrichum coccodes*), with the highest level of control obtained with the mixture of a strobilurin fungicide with a contact fungicide like chlorothalonil (ie. Quadris Opti, and Headline or Reason + chlorothalonil). Another choice for BD control is Quadris Top which was recently labeled in NYS. Choosing the right fungicides for LB control will depend upon how vigilant you are in terms of whether LB occurred on your farm last year, if you have a cull pile or if volunteers exist for a potential source of LB for 2010. Fungicides can be broken down into contact, translaminar and systemic. Because LB was so prevalent in 2009, most growers used the wide selection of fungicides, which certainly included translaminar and systemic products. Almost all fungicides are effect for EB control, with this precautionary note.

First, repeated use of chlorothalonil as the single choice fungicide is not recommended because the EB fungus (*Alternaria solani*) will develop tolerance by the middle of the season when chlorothalonil is used repeatedly. Thus it is important to rotate products even among contact fungicides. Secondly, isolates of *A. solani* exist in the state that are resistant for strobilurin fungicides, meaning that group 11 fungicides (ie. Quadris, Headline, Gem, Reason and others) should never be used alone, but always mixed with a contact fungicide (ie. Quadris Opti or your own mixture).

Actions to be taken at the beginning and during the 2010 growing season. Choosing cultivars with resistance or tolerance is not a viable option for most potato growers. However, for organic growers, choosing early maturing varieties that will allow early harvest and thus avoidance of LB is an option. Eliminate cull piles (some growers also have stone piles with occasional potato tubers) and volunteers before plants emerge in the spring. Infected shoots from these plants can provide initial inoculum for field infection. Since LB was so prevalent in the Northeast and also the Midwest, be especially careful of the tuber source this season. Asking for shipping point inspections may help. Growers may also elect to use a seed piece treatment that includes mancozeb or another component that will help to reduce the spread of LB that can occur by seed piece to seed piece contact during handling, cutting and the planting process. Products include: ^{M3}Dithane DF (*mancozeb*); ^{7+M3}Moncoat MZ (⁷ *flutolanil* + ^{M3}*mz*); Tops MZ (¹*thiophanate-methyl* + ^{M3}*mz*); Tops-MZ-Gaicho (^{Insecticide} *imidacloprid* + ¹*thiophanate-methyl* + ^{M3} *mz*); and Evolve (^{M3}*mz* + ²⁷ *cymoxanil* + ¹*thiophanate-methyl*). These products are not efficacious against systemic seed-piece infections or from airborne (secondary) inoculum.

Images of LB of potato and additional resources can be found at:
http://vegetablemdonline.ppath.cornell.edu/PhotoPages/Impt_Diseases/Potato/Pot_Late.htm

Table 1. Mode of Action (MOA) for fungicides registered (NYS) for potato foliar diseases; -- no effect; ? = not known; P = Poor; F = Fair; G = Good; E = Excellent; OLF = other labeled formulations or products are available.

¹ Group No. as assigned by FRAC (Fungicide Resistance Action Committee) and used by EPA; DTH = days to harvest for main product.

| MOA (LB) | ¹ Group Fungicide ^{DTH} | LB - foliar | LB - stem | LB new growth | EB control | Blk Dot control |
|---------------|--|-------------|-----------|---------------|--|-----------------------|
| Contact | ^{M5} Bravo ⁷ or OLF (<i>chlorothalonil</i>) | G | P | No | G (tolerance) | G |
| | ^{M3} Dithane ³ or OLF (<i>mancozeb</i>) | G | P | No | G | -- |
| | ^{M3} Maneb ³ or OLF (<i>maneb</i>) | G | P | No | G | -- |
| | ^{M1} Nu-Cop ⁰ or OLF (<i>copper hydroxide</i>) ^{***} OMRI | P-F | P | No | F-G | -- |
| | † ³⁰ Super Tin, Agri Tin ⁷ (<i>tin hydroxide</i>) | G | P | No | G | -- |
| | ^{**22+M3} Gavel ³ (<i>zoxamide + mancozeb</i>) | E | P | No | E | -- |
| | ²¹ Ranman ⁷ + contact ⁷ (<i>cyazofamid</i>) | E | P | No | G (with contact) | -- |
| | ⁷ Endura ¹⁰ (<i>boscalid</i>) | -- | -- | -- | G | -- |
| | ⁹ Scala ⁷ (<i>pyrimethanil</i>) | -- | -- | -- | F-G | -- |
| | ² Rovral ¹⁴ (<i>iprodione</i>) | -- | -- | -- | G | -- |
| Trans-laminar | ²⁷ Curzate ¹⁴ + contact ¹⁴ (<i>cymoxanil + chloro, mz or copper</i>) | G | F | ? | G (with contact) | -- |
| | ¹¹⁺²⁷ Tanos ¹⁴ + contact ¹⁴ (<i>famoxadone + cymoxanil + above</i>) | G | F | ? | G | F (Supp.) |
| | ⁴⁰ Forum ⁴ + contact ⁴ (<i>dimethomorph</i>) | G | F | ? | G (with contact) | -- |
| | ⁴⁰ Revus ¹⁴ (<i>mandipropamid</i>) | E | F | ? | -- | -- |
| | ⁴⁰⁺³ Revus Top ¹⁴ (<i>mandipropamid + difenoconazole</i>) | E | F | ? | E | G |
| | ^{11+M5} Quadris Opti ¹⁴ or Quadris Top ¹⁴ (<i>azoxystrobin + chloro or difenoconazole</i>) | G | F | F | E | G |
| | ¹¹ Gem ⁷ , ¹¹ Headline ³ , ^{**11} Reason ¹⁴ + contact ^{varies} (<i>trifloxystrobin, pyraclostrobin, fenamidone</i>) | G | F | F | G (with contact for resistance management) | G (Headline & Reason) |
| Systemic | ²⁸ Previcur Flex ¹⁴ + contact ¹⁴ (<i>propamocarb</i>) | G | G | G | G (with contact) | -- |

† = Restricted use pesticide; * = restrictions apply; ** = not for use in Nassau/Suffolk Counties of NYS; ***OMRI = Organic Material Research Institute.