Are You Managing the Right Disease?
Controlling early and late blight and brown leaf spot

With the growing season upon us, it is time to start thinking about what we can do to manage foliar diseases in the potato crop this year. Two of the most important diseases to consider when formulating a foliar disease management strategy are early blight and late blight.

CONFUSING TWO DISEASES
In the past couple of years, many Idaho growers reported the failure of the traditionally effective QoI strobilurin fungicides (azoxystrobin and pyraclostrobin) to control early blight. This may also be due to the development of fungicide resistant isolates of A. solani. Fungicide resistant isolates of A. solani have been found in Idaho; however, the proportion of resistant isolates present in the populations of A. solani in Idaho is unknown and currently under investigation at the University of Idaho.

An alternative hypothesis is that these fungicide-resistance problems may be due to misdiagnosis of early blight. Brown leaf spot, caused by A. alternate, is also found on potato in Idaho and other potato-growing regions of the U.S. This disease is often confused with early blight as its symptoms are very similar. The pathogens causing these two diseases are also very closely related. However, unlike the early blight fungus (A. solani) where fungicide resistance is known to occur, the brown leaf spot pathogen (A. alternata) is inherently more resistant to QoI strobilurins and has never been well controlled by this class of fungicides.

Due to the similarity of these two pathogens and their disease symptoms, it may be possible that growers are confusing brown leaf spot for early blight and thus reporting poor disease control of early blight. Brown leaf spot can occur throughout the growing season and is usually seen before early blight. On young leaves, lesions may be confused with those of early blight, which are also small, circular lesions initially. However, brown leaf spot lesions never develop the dark, alternating concentric rings characteristic of early blight.

LATE BLIGHT
First, it is important to eliminate sources of inoculum. The initial sources of inoculum are likely to be infected potatoes in cull piles, infected volunteer potato plants that have survived the winter and infected seed tubers. Therefore, it is important to keep a clean operation by destroying all cull and volunteer potatoes.

Rock piles that are deposited after planting contain rocks and potato seed pieces and should also be monitored carefully throughout the growing season. Emerging plants should be killed off with an effective herbicide. It is also very
important to make sure that you plant only certified seed. Using seed saved from local crops may increase the risk of late blight.

Second, avoid conditions that favor late blight. Weather conditions strongly influence the incidence and severity of late blight. Although weather conditions are beyond control, field selection and carefully managed irrigation practices can help reduce the extent of periods favorable for disease development.

After planting and early in the season, it is important to get rid of cull potatoes and potato pieces resulting from seed-cutting operations or left after loading or unloading at storage facilities, as these may support the production of inoculum, whether or not the pieces are sprouting. It is also beneficial to control weeds and alternative late blight hosts such as hairy nightshade, which may contribute to disease spread under some conditions.

Although weed species are not late blight hosts, they can contribute to conditions that favor disease development by restricting air movement within the canopy. Heavy weed infestations also prevent adequate coverage of potato foliage with fungicides. Current research also indicates that when late blight infestations are found early in small patches, it may be beneficial to disk, burn with a propane burner or spray these patches with a desiccant to remove these local sources of inoculum.

For destruction of affected areas within crops, the rule is that 30 rows on each side of the newest lesions at the border of the late blight locus and 100 feet along the row (each side) should be killed. Although this sounds harsh, university trials have shown that the latent period between infection and symptom development is about seven days, and although symptoms are not visible, plants within this area are already infected.

**INTEGRATED DISEASE MANAGEMENT**

It is possible to control early blight, brown leaf spot and late blight using an integrated disease management approach. Selecting the right product or program for disease control can save you money. On the other hand, selecting the wrong fungicide or program can cost you money. If you have found that the traditional QoI strobilurin fungicides have not been effective in controlling early blight in your potatoes in the past two growing seasons, there is a high likelihood that you either
have a population of early blight in your area that is fungicide resistant, or brown leaf spot is more prevalent in your area. In this case, you should probably consider using a different class of fungicide to manage foliar disease in your fields.

Protectant fungicides that contain either chlorothalonil or ethylene bisdithiocarbamate (EBDC) have a broad spectrum of activity against potato diseases including late blight, early blight and brown leaf spot. These products are effective against early blight and brown leaf spot when applied at approximately 10–14 day intervals and against late blight when applied at 7–10 day intervals.

The QoI strobilurin fungicides are very effective against late blight, so if you don’t have problems with A. solani fungicide resistance or brown leaf spot in your area, then they can provide a very effective means of protection against late blight and early blight. However, these products should always be mixed with a protectant fungicide (e.g. EBDC or chlorothalonil-based products) and never applied consecutively in order reduce the chance of the development of fungicide resistance.

If the threat of late blight in your area is low, then boscalid is a very effective fungicide for controlling both early blight and brown leaf spot. At higher rates, it provides good white mold protection; however, it is not effective against late blight. There are also several fungicides available that are mixtures of active ingredients that are effective against late blight and early blight/brown leaf spot.

For example, Revus Top contains mandipropamid and difenoconazole. Mandipropamid is effective against late blight and difenoconazole is effective against early blight/brown leaf spot. Tanos is another example, containing cymoxanil for late blight and famoxadone both early blight/brown leaf spot and late blight.

In summary, it is important to chose the right fungicide or fungicide program for your disease management program, based on the disease history of your fields and the risk of late blight in your area. Using a protectant fungicide on a regular schedule can be done economically and provide good protection against both late blight, early blight and brown leaf spot. It is important to maintain a good program while vines are actively growing as none of the fungicides available on the market today have curative action against late blight.