



# Potato Progress

Research & Extension for the Potato Industry of  
Idaho, Oregon, & Washington

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Volume XII, Number 5

March 30, 2012

## Potato Psyllid Identification Workshops Scheduled

Zebra chip (ZC) and potato psyllid are on a lot of your minds this spring. To help industry prepare for psyllid monitoring and scouting, several training sessions have been scheduled. The workshops will have an open format, and we ask people to come any time that fits their schedule during each session. This will allow more personal attention and access to specimens and samples as people come and go. Dates, times, and locations for these sessions are:

### Washington

May 1, 1:30 – 4 pm, Moses Lake, Potato Commission office, 108 S Interlake Rd.

May 2, 9:30 – noon, Pasco, Franklin County Extension office, 404 W. Clark Ave.

### Idaho

May 15, 9:30 – noon, Parma Research and Extension Center, 29603 U of I Lane, Parma

May 16, 9:30 – noon, Miller Research LLC, 426 East 200 North, Rupert

May 17, 9:30 – noon, Idaho Falls R & E Center, 1776 Science Center Dr.

### Oregon

April 17, 9:00 – 10:00 am, Hermiston Ag. Research and Extension Center, 2121 South First Street

May 1, 9:00 – 10:00 am, Hermiston Ag. Research and Extension Center, 2121 South First Street



# Early Blight and Brown Leaf Spot: The Impact of Fungicide Resistant Isolates on Management Tactics in Idaho

Phillip Wharton, University of Idaho, Aberdeen

Early blight caused by *Alternaria solani* (Fig. 1) is a common disease of potato found in most potato-growing areas in Idaho. Although it occurs annually in most areas, the timing of its appearance and the rate of disease progress help determine the impact on the potato crop. Though losses rarely exceed 20%, if left uncontrolled the disease can be very destructive. Disease severity can be especially severe in crops stressed by insufficient nitrogen fertilization. Severe infection of foliage by the early- to mid- bulking period can result in smaller tubers, yield loss, and lower tuber dry matter content.

Brown leaf spot, caused by *A. alternata* (Fig. 1b) is also common in many potato growing regions of the U.S., and is often confused with early blight due to the similar symptoms. These diseases are difficult to distinguish from each other, and in fact, both pathogens are often present on diseased plants. In some areas of the U.S. such as Michigan, brown leaf spot may be more common than early blight. In these areas the disease is referred to as early blight/brown leaf spot complex.

Early blight control in Idaho has primarily depended on multiple fungicide applications at approximately 7- to 10-day intervals throughout the growing season. Many fungicides are registered for the control of early blight. However, the strobilurin fungicides (e.g. Headline, Quadris, Gem, and Tanos) are often favored because they offer protection against a wide range of fungal diseases. In 2008, many Idaho growers reported the failure of strobilurin fungicides to control early blight. Loss of fungicide efficacy is usually associated with the development of fungicide resistant isolates of a pathogen. Fungicide resistant isolates of *A. solani* have been reported in Idaho and are common in other potato growing regions (e.g. Wisconsin). However, these problems may also be due to misdiagnosis of early blight. Brown leaf spot, is often confused with early blight. However, unlike the early blight fungus (*A. solani*) where some fungicide resistance is known to occur, the brown leaf spot pathogen (*A. alternata*) is inherently more resistant to 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.

To try and sort out the confusion and to determine whether loss of fungicide efficacy was due to the presence of resistant isolates of early blight or the presence of brown leaf spot, the Idaho Potato Commission funded a study in 2009 to investigate the problem.

## Methods

The Potato Pathology program at the Aberdeen Research and Extension Center, purchased a spiral plating robot that is used to carry out fungicide resistance screening. Preliminary disease surveys were carried out in the potato growing regions of Idaho in 2009 and 2010. Leaves with symptoms of early blight or brown leaf spot were collected and fungal isolates were taken from the lesions. These isolates were then identified to determine whether they were *A. solani* or *A. alternata*. Once the fungal isolates had been identified, they were tested for resistance to a range of fungicides commonly used in Idaho, including the strobilurins, and the carboxamide fungicide boscalid (Endura).

## Results

Results from the survey showed that *A. solani* was the dominant pathogen causing early blight-like symptoms in Idaho. In all the locations surveyed in southern Idaho, from Parma in the southwest to Rupert to Aberdeen, all of the diseased plants collected had typical early blight disease symptoms and none had typical brown leaf spot symptoms. Typical brown leaf spot symptoms were only observed on potatoes growing in Bonners Ferry, ID. These observations were confirmed by isolations from diseased leaves. *Alternaria solani* was the only pathogen isolated from diseased leaves collected in southern

Idaho with typical early blight symptoms. *Alternaria alternata* was the only pathogen isolated from leaves collected in Bonners Ferry displaying brown leaf spot symptoms. *Alternaria solani* was also isolated from leaves collected in Bonners Ferry displaying typical early blight disease symptoms.

Screening of early blight isolates collected in 2009 showed that there was widespread resistance to azoxystrobin, and 15% of isolates were found to be resistant to boscalid. All isolates tested were sensitive to pyraclostrobin. These results were confirmed in 2010 when many isolates were tested and 62% were found to be resistant to boscalid. In addition, these results confirmed earlier findings indicating that *A. alternata* is generally more resistant to the strobilurin fungicides, with up to 50% of *A. alternata* isolates from Bonners Ferry showing resistance to the strobilurins.

The discovery of boscalid-resistant *A. solani* isolates was very important as this is the first report of resistance to boscalid in *A. solani* on potatoes in the U.S. and Canada. As such, after confirmation of the 2009 results with the results from 2010, these results were published in the journal Plant Disease.

### Impacts and future directions

These results suggest that azoxystrobin is losing efficacy as a potato early blight control agent in southeastern Idaho, similar to other areas of the U.S. where resistant isolates of *A. solani* have developed. Further testing is needed of more isolates from more locations in Idaho, more stages of disease development during the growing season, and more years to accurately estimate the current frequency and future potential of azoxystrobin resistance in Idaho.

Resistance to boscalid (Endura) has not been reported in *A. solani* previously. The discovery of resistant isolates suggests that Endura should be considered at high risk for resistance development. Boscalid insensitivity *in vitro* may not translate directly to commercial production, and to date, there is limited evidence to suggest that Endura has failed to control early blight in Idaho. Fungicide spray trials carried out at the University of Idaho show it to still be one of the most effective fungicides for controlling early blight and white mold. Nevertheless, growers need to be aware of the importance of rotation strategies to discourage the selection for resistance to Endura.

The discovery of boscalid-resistant isolates of *A. solani* is worrying as several new fungicides with similar chemistries and modes of action have been developed and are due to be released in the next one to two years. In cooperation with the registrants, we have been testing these new fungicides against these boscalid-resistant isolates. Results so far have shown that these new products are 100% effective, even against the resistant isolates.

With continued support from the IPC we are now also testing additional fungicides for their efficacy against not only *A. solani* isolates but also *A. alternata* isolates. This will enable us to make recommendations about which fungicides are effective for the control of both diseases and suggest effective fungicide rotation strategies.

**Figure 1.** Left: typical foliar symptoms of early blight caused by *Alternaria solani*. Right: typical foliar symptoms of brown leaf spot caused by *Alternaria alternata*.



## 2012 WA Commercial Seed Lot Pick Up & Trial Information

Info also available each year at: [www.potatoes.wsu.edu](http://www.potatoes.wsu.edu)

Commercial potato seed samples are requested for the 2012 Washington Seed Lot Trial. **Two to three hundred whole (single drop) seed is an acceptable sample size, or 50 lbs of 4 oz single drop seed.**

**Requested: 50 lbs of 2-4 oz whole seed, no seed treatments (Seed over 6 oz is not acceptable)**

A representative sample is needed. Sampling the first (or last) 300 seed from the truck is not likely to provide a representative sample of the lot. Sample tags may be obtained by calling (509-765-8845) the Potato Commission or simply stopping by.

Your assistance with collection and drop off of seed samples is needed. Seed samples may be taken to the WSU Othello Research Unit (509-488-3191) located on Booker Road ¼ mile south of State Highway 26 and about five miles east of Othello. For sample pick up and any questions regarding the seed lot trials please call:

**South Basin:** Tim Waters (509-545-3511), Mark Pavek (509-335-6861), or Zach Holden (509-335-3452).

**North Basin:** Carrie Huffman Wohleb (509-754-2011), Mark Pavek (509-335-6861), or Zach Holden (509-335-3452).

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. Please call the numbers below to arrange additional pick up sites. Samples will be picked up at 2:00 pm the day before each planting date (below) to be included. Growers planting in early March should drop their samples off at the Othello Research Center or store the samples and call the numbers below for pick up. For all alternative pick up locations or questions please call Mark Pavek at 509-335-6861 or Zach Holden at 509-335-3452.

**PICK UP DATES ARE ONE DAY PRIOR TO THE PLANTING DATES BELOW**

**Remaining planting dates for 2012 are:**

2nd (mid)	April 10
3rd (late mid)	April 24
4th (late)	May 8

### ***2012 Potato Field Day - Thursday June 28***

This year's virus reading of the seed lots will take place on June 12 and 26