



CROP DISEASES

UNDERSTANDING ASCOCHYTA/ MYCOSPHAERELLA BLIGHT

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Ascochyta blight is the most destructive foliar disease of pea in western Canada and around the world. It is caused by a complex involving three fungal pathogens: *Ascochyta pisi*, *Mycosphaerella pinodes* and *Phoma pinodella*. Of the three, *M. pinodes* is by far the most abundant, causing 90% of Ascochyta blight infections. It is found in all commercial pea fields. It interferes with photosynthesis, causes the crop to lodge and reduces the weight, number and quality of the seed. All field pea cultivars are susceptible.

Symptoms

Symptoms appear within two to four days after infection under optimal conditions and lesions appear on all above-ground portions of the plant, including leaves, stems, flowers and pods. Symptoms of infection are always more severe on the lowest parts of the plant. Infection begins with many small purple spots on the leaves. Under drier conditions these spots remain about the same, while under moist conditions they get larger, and turn a brown to black colour. Spots on the stems are similar in colour and are usually found close to where the leaf attaches. These stem lesions slowly get larger and join together to completely girdle the stem and give the entire lower plant a purplish-black appearance.

It is the breakdown of the stems that causes the crop to lodge and makes the problem worse by encouraging

moisture and making harvest very difficult. When the flowers are infected, you see small, pinpoint lesions that cause them to fall off and affect seed set. Infected pods may affect the size and quality of the seed. Infected seed will be small with a dark brown discolouration.

Disease Cycle

Ascochyta blight survives in the soil, on the seed coat, in the seed, and on the pea straw residue. This disease is spread by two types of spores, one type by wind and the other type through rain splash. Initial infection usually occurs during wet weather, when wind-borne spores are carried from infected fields into new fields. In this way, the pathogen can move across large areas, including throughout an entire crop and even to nearby fields in which field pea may not have ever been grown.

Later infections occur when the pathogen produces the other type of spores that are spread by rain splash to other leaves and nearby plants. A large number of spores can be spread by rain splash from an infected plant, although most of these spores are deposited nearby. The most critical factor affecting the disease spread is leaf wetness or the level of moisture in the canopy. Canopy structure, lodging, previous injury, and plant density can all have an effect on leaf wetness and will impact the severity of the disease.

Management

Management of Ascochyta is best achieved by first reducing the amount of available inoculum and then suppressing the subsequent infections. Pea debris must be destroyed if possible, clean seed must be used, and soil-borne inoculum must be managed. Careful selection of cultivars and application of foliar fungicides are used to suppress further infection. Ideally, cultivar resistance would be the best long-term strategy, but breeding attempts to achieve this have been unsuccessful so far. The current most utilized strategy for management of this disease is the application of fungicides. A combination of the above strategies would offer the best result, but the combination would be determined by economics and the available options at the time.

Problems will arise with some of these management strategies, as in a no-till or reduced till cropping system, where burial of the residue is not compatible with the farm practices, or in areas where crop residue breakdown is slow. In some areas where the wind-borne spores are the major source of the infection, crop rotation would be less effective, and fungicide application would have to be considered as the most effective option.

With fungicide application, the timing is critical. You need to consider that the fungicides are protectants and

so won't kill the disease. It is best to spray before the canopy closes if possible. If not, penetration into the plant stand reaching the lower leaves is difficult. It would only be a good idea to spray if the disease levels are high enough to warrant application and if a yield increase is to be expected. It is important to consider whether the yield loss caused by not spraying is higher than the cost of application.

Ascochyta Scorecard

There is an Ascochyta Prediction Scorecard available to help producers make the "to spray or not to spray" decision for this disease. It considers four aspects related to disease spread:

- Crop Canopy
Thin, moderate, or heavy
- Leaf wetness
None, low, moderate, or high
- Percent of plants showing symptoms
None, low (<20%), moderate (20-50%) or high (50-100%)

- 5 day weather forecast
Dry, unsettled, showers, wet

The prediction scorecard assigns values to each of these factors which when added up will help the producer determine the risk to the crop.

Using this chart, field inspections should be done twice a week and a score is added up for each factor. If the score is above 65 points, a fungicide application is recommended. If the score is below 65 points, an application is not deemed necessary at the time but field inspections should continue.

This prediction scorecard is only a tool to help make the decision easier and the producer must do what they feel would be best for their farm. Keep in mind that more than two sprays per season is not recommended and pre-harvest intervals need to be considered. Finally, the crop must be healthy to start with or a fungicide application will not save it.



Ascochyta Scoring System

Field ID _____
Time Period _____

Characteristic	Estimation Risk Scale				Prediction Score					
	Thin	Moderate	Mod/Heavy	Heavy	1	2	3	4	5	6
1. Crop canopy	0	10	15	30						
2. Leaf wetness/humidity/dew at noon	0	10	20	40						
3. Percent of plants (crop), showing symptoms	0	15	25	40						
4. 5 day weather forecast	0	10	15	20						
TOTAL										

The estimated risk value is 1+2+3+4= estimated risk value. If the estimated risk value is less than 65, no fungicide application is deemed necessary, but field inspections should continue on a bi-weekly basis. If the estimated risk value is +65, the fungicide spray application is recommended.

Source: K. J. Lopetinsky¹ and S. Strydhorst² 2002

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