

The Pea Report

Managing Ascochyta (Mycosphaerella) Blight in Field Peas

Serena Klippenstein, Production Specialist – West, MPSG

ASCOCHYTA (MYCOSPHAERELLA) BLIGHT

is the most widespread and economically damaging foliar disease in Manitoba field peas. Infection can lead to reduction in field pea grade, productivity and even seed yield, if severe widespread infection occurs early in the growing season. Of the pea fields surveyed in Manitoba for root and foliar diseases in 2017, mycosphaerella blight was present in all of them.¹ On a scale of 0 (no disease) to 9 (whole plant severely diseased), average disease severity was 4.5 and ranged from 2.7 to 7.2.¹

DISEASE COMPLEX

The Ascochyta disease complex in Canadian field peas is made up of three fungal pathogens: *Ascochyta pisi*, *Ascochyta pinodes* and *Phoma pinodella*, that together can cause leaf, stem and pod spot, stem lesions and foot rot symptoms.² Ascochyta blight, otherwise known as mycosphaerella blight, is the disease caused by *Mycosphaerella pinodes*, the sexual stage of the *A. pinodes* pathogen. It is the most common field pea disease in western Canada.

DISEASE CYCLE

Field peas are the single host crop of mycosphaerella blight, caused by a pathogen that can be stubble-, air-, soil- and seed-borne. *A. pinodes* overwinters on pea stubble and residue, the primary source of inoculum, and can survive on stubble or in the soil as resting spores for many years. Air-borne spores are released and spread by rain splash to plants nearby, or by wind to plants up to several kilometres away. This creates a disease risk even in fields where no field peas have been grown previously.

Plant shoots can also be directly infected through exposure to resting spores in soil or from fungus on seeds that infects emerging seedlings. Foot lesions develop from infected seed, though seed is considered a

minor inoculum source and risk of mycosphaerella blight infection transferring from seed to seedling is low.

DISEASE DEVELOPMENT

Cool, wet conditions and short crop rotations encourage the initiation of infection and disease development. Field pea plants are infected throughout the growing season, with the production and release of new spores during wet periods. Mycosphaerella blight progresses upwards from the bottom of the plant, where symptoms appear on lower leaves, branches and the stem. Frequent precipitation and humid conditions in the lower canopy often cause greater disease severity.

Along with weather conditions, timing of initial infection influences the effect of mycosphaerella blight on crop yield. Bloom to early/mid-pod development is the most damaging time for infection establishment.

SCOUTING

Scouting for mycosphaerella blight symptoms in field peas should occur from the 10th node stage (V10) during the vegetative pea stages to the beginning bloom stage (R2) (Figure 1) (see MPSG's *Field Pea Growth Staging Guide* for all field

pea stages). This typically occurs from the middle of June to the end of July. Risk of yield loss increases when symptoms are higher than the bottom third of the plant canopy by the R2 stage, so any upward movement of symptoms in the crop canopy should be surveyed closely. Scouting is especially important in fields where peas have recently been grown, as disease risk is greater in these fields.

SYMPTOMS

Mycosphaerella blight can infect field pea leaves, stems, flowers, pods, seeds and seedlings, depending on the severity and primary source of disease infection. Symptoms are described as follows:

Minor symptoms

Leaf lesions (Figure 2)

- Begin as small, irregular purplish-brown/black spots or flecks
- Can become large, circular brown/brownish-black lesions with concentric rings (target-like appearance)
- Either one or both types of lesions may be present
- May grow and merge as the disease progresses, covering entire leaves; dry, disease-covered leaves remain attached to the stem

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Figure 1. Field pea at beginning bloom stage (R2).



Photo: Dennis Lange, Manitoba Agriculture

Figure 2. Small, irregular purplish-brown spots/flecks and circular brown lesions with concentric rings on a field pea leaf infected with mycosphaerella blight.

- Flower infection causes blossoms to drop, decreasing the number of potential pods formed

Severe symptoms

Stem lesions

- Purple/bluish-black stem lesions, often at the base of the plant
- May develop below the soil-line on the upper root
- May appear at nodes, elongating 10 mm (3/8 in.) above and below

Foot rot

- Exhibits stem girdling in seedlings
- Weakens the stem when infection is severe
- May cause lodging and premature senescence

Pod lesions

- Small, purplish-black or brown flecks or lesions
- Develop from continuous moist conditions or lodging
- May cause pods to shrink or dry-down early when infection is severe, causing seed quality loss due to seed shrinkage and dark brown discolouration

Due to the similarities between symptoms of mycosphaerella blight and bacterial blight (Figure 3), a blight initiated by the infection of pea seed and uncontrolled by fungicides, proper identification is crucial. Like mycosphaerella blight, bacterial blight symptoms occur on field pea leaves, stems, petioles and pods. However, bacterial blight lesions are typically brown and shiny, have a water-soaked, greasy appearance and can appear translucent.

A detailed resource to distinguish the two diseases is available on the NDSU Carrington Research Extension website.³

FOLIAR FUNGICIDE APPLICATION DECISIONS AND TIMING

Foliar fungicides aim to protect healthy green plant material, but they are unable to reverse symptoms or repair plants damaged by foot rot. Therefore, the application of foliar fungicides before or during the early stages of mycosphaerella blight development can help minimize yield and quality loss from lodging caused by severe stem lesions. However, there are many factors that should be considered before applying foliar fungicide. The new *MPSG Fungicide Decision Worksheet for Managing Mycosphaerella Blight in Field*

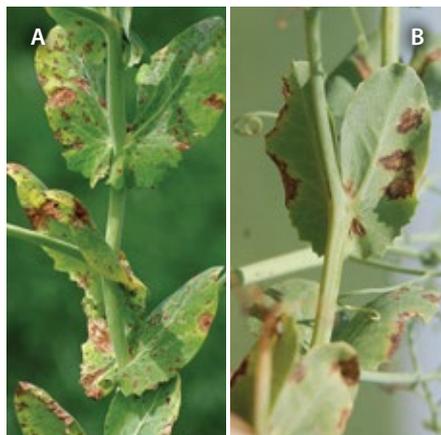


Photo: M. Wunsch, NDSU Photo: R. Harveson, University of Nebraska

Figure 3: (A) *Mycosphaerella* blight leaf lesions in field pea (B) *Bacterial* blight leaf lesions in field pea.

Peas can be used as a tool to assess fungicide needs according to current crop conditions and disease symptoms. In order to use this tool effectively, crop and disease assessments should occur during bi-weekly field inspections. Also consider expected yield and crop value to justify fungicide cost.

Fungicide Decision Worksheet for Managing Mycosphaerella Blight in Field Peas	
	RISK FACTOR
Crop canopy	
• Thin – high weed pressure, low yield expectations	0
• Moderate – some weeds, possibly low yield	10
• Normal – about 8 pea plants/ft ² or 85/m ²	15
• Dense – more plants than normal, lush growth	30
Leaf wetness/humidity/dew at noon	
• None	0
• Low	10
• Moderate	20
• High	40
The five-day weather forecast	
• Dry	0
• Unpredictable	10
• Light showers	15
• Rain	20
Symptoms on pea plants	
• No visible symptoms	0
• Up to 20 percent of plants showing symptoms	10
• 20 to 50 percent of plants showing symptoms	15
• 50 to 100 percent of plants showing symptoms	20
TOTAL SCORE OF RISK FACTORS – If 65 or more a fungicide application is recommended.	

Source: K. J. Lopetinsky, Ag Research Division, AARD and S. Strydhorst, University of Alberta, Edmonton, Alberta

Ideal application timing for foliar fungicide on field peas is beginning bloom (R2). Adequate canopy penetration and leaf coverage during the first application are crucial. Typically, a single fungicide application effectively controls mycosphaerella blight. If symptoms spread upward in the crop canopy and moist conditions continue, a second foliar application 10–14 days later using a different fungicide group is warranted. Although resistance to fungicides typically used to control mycosphaerella blight has not been reported in Manitoba, research suggests that insensitivity of *M. pinodes* to the strobilurin (QoI) fungicide pyraclostrobin may be emerging in parts of Saskatchewan and Alberta.⁴

ADDITIONAL CONTROL TIPS

Other mycosphaerella blight management practices should be considered when growing field peas and can be used together with foliar fungicide application. These practices are:

- Follow a minimum five-year crop rotation – or a six- to eight-year crop rotation if risk of *Aphanomyces* infection is present.
- Grow field pea varieties that have at least ‘fair’ disease resistance to mycosphaerella blight.
- Use disease-free seed or treat seed with a recommended fungicide if >10% of seed is infected with mycosphaerella blight.
- Avoid planting peas near a previously infected field.
- Work crop residue into field immediately following harvest. ■

References

¹ McLaren, D.L., T.L. Henderson, Y.M. Kim, K.F. Chang, S. Chatterton, T.J. Kerley and M.J. Thompson. 2018. Field Pea Diseases in Manitoba in 2017. *Can. Plant Dis. Sur.* 98:188-191.

² Liu, J., T. Cao, J. Feng, K.-F. Chang, S.-F. H, S.E. Strelkov. 2013. Characterization of the fungi associated with ascochyta blight of field pea in Alberta, Canada. *Crop Protection* 54:55-64.

³ <https://www.ag.ndsu.edu/cpr/plant-pathology/bacterial-blight-of-peas-in-north-dakota-and-minnesota-06-11-15>

⁴ Bowness, R., B.D. Gossen, K.-F. Chang, R. Goswami, C.J. Willenborg, M. Holtz and S.E. Strelkov. 2016. Sensitivity of *Mycosphaerella pinodes* to pyraclostrobin fungicide. *Plant Dis.* 100:192-199.