The pathogen is introduced through infected seed and via airborne inoculum. Note that infected seeds are often symptomless.

Timing of disease onset depends on inoculum arrival, but disease symptoms often appear at early bloom.

Infections result in tan to brown lesions on leaves, stems, and pods.

Within lesions, concentric rings of small gray to brown specks can generally be found. Each of these specks is a pycnidium, a tiny flask-shaped fruiting structure containing thousands of spores of the causal pathogen.

Diseased pods often fail to produce seed or may produce shriveled, discolored seeds.

Ascochyta blight can reach epidemic levels very quickly.

Even low levels of foliar disease during the bloom period can lead to high levels of pod infections during the pod-fill period. Because many infected pods do not set seed, management of pod infections is critical for preserving yield potential.

Disease risk is always highest during periods of rainfall and/or heavy dews.

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**Causal pathogen:** *Ascochyta rabiei*

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**Management of ascochyta blight of chickpea**

**FOLIAR AND POD LESIONS:**

**STEM LESIONS:**
Management of ascochyta blight of chickpea

Causal pathogen: Ascochyta rabiei

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1. Select a moderately resistant variety.
   • B-90 (also known as Amit) is a small-seeded Kabuli chickpea with moderate resistance to Ascochyta blight.
   • CDC Frontier is a medium-seeded Kabuli chickpea with moderate resistance to Ascochyta blight.
   • CDC Luna is a large-seeded Kabuli chickpea with fair resistance to Ascochyta blight.

2. Use seed that has been tested for Ascochyta.
   • Ascochyta is seed-borne, and the disease is readily transmitted from infested seeds to seedlings.
   • Diseased seeds are not always discolored. Make sure your seed has been tested for Ascochyta; the plant disease diagnostic labs at NDSU and MSU conduct this test. It is best to only use seed that tests completely negative for Ascochyta. Never use seed with Ascochyta incidence greater than 0.3%.

3. Treat your seed with the fungicide thiabendazole (Mertect 340-F).
   • Treat your seed with thiabendazole even if your seed test indicates an incidence of Ascochyta infection of 0%. Seed testing is done on only a few seeds, and virtually no seed lot is completely free of Ascochyta-infected seeds.
   • Other commonly used seed treatments (eg Apron Maxx) are not very effective against Ascochyta. Likewise, thiabendazole is not very effective against Phytophthora root rot, Rhizoctonia root rot, and other seed and seedling diseases of chickpea. Treat with a mix of thiabendazole and other products if you need protection against seed and seedling diseases.

4. Do not plant chickpeas in a field or adjacent to a field where chickpeas were grown the previous 2 years.
   • A minimum 3-year rotation is recommended.
   • This crop rotation recommendation should be extended to adjacent fields. Ascochyta will be readily transmitted from residues in an immediately adjacent field; planting chickpeas immediately adjacent to a field where chickpeas were grown in the previous 2 years will place your crop at high risk of disease.

5. Use foliar fungicides.
   This disease can reach epidemic levels very quickly, and fungicide applications must be made in a timely manner.
   • A preventative approach to managing this disease is generally recommended. If no disease has been detected 7 to 10 days before bloom initiation (if there have been frequent rain events and/or heavy dew) or at bloom initiation (if it is dry), a preventative application of chlorothalonil (Bravo WS, Echo 720, etc.) is advised. Seven to ten days after applying chlorothalonil, applications of systemic fungicides (Proline, Endura, Priaxor, etc.) should begin on a 10 to 14 day schedule.
   • If you prefer to start fungicide applications as soon as disease occurs, scout your fields very carefully. Beginning in the late vegetative stages (approx. 2 weeks prior to bloom initiation) walk in a zig-zag pattern through the field, stopping at multiple points to examine the bottom third of the canopy for Ascochyta lesions. As soon as trace levels of Ascochyta blight are found, applications of systemic fungicides should begin. Sequential applications should be made 10 to 14 days apart during the critical bloom and pod-fill period.
   • Even if disease is at low levels at the end of bloom, a fungicide application may be warranted during the pod-fill stage. Even when foliar disease is at low levels, the incidence of pod infection can be quite high. When pods become infected, they often do not produce seeds.

5. Guidelines for fungicide use on chickpeas.
   • ROTATING FUNGICIDE CHEMISTRIES IS CRITICAL.
     - Inadequate rotation of fungicide chemistries caused a loss of efficacy of QoI (strobilurin/FRAC 11) fungicides (Headline and Quadris).
   • ROTATE BETWEEN TRIAZOLE (DMI/FRAC 3) AND CARBOXAMIDE (FRAC 7) FUNGICIDES.
     - TRIAZOLE FUNGICIDES: Proline (prothioconazole) is registered (5.0 and 5.7 fl oz/ac)
     - CARBOXAMIDE FUNGICIDES: Endura (boscalid) is registered (6.0 oz/ac); Priaxor (xemium + pyraclostrobin) and Vertisan (penthiopyrad) should be registered for the 2012 growing season. Because pyraclostrobin is no longer effective against Ascochyta blight of chickpea, you can assume that disease control conferred by Priaxor is due to the carboxamide ingredient, xemium.
   • CONSIDER TANK-MIXING TRIAZOLEs or CARBOXAMIDES WITH CHLOROTHALONIL (Bravo WS, Echo 720, etc.), especially if the chickpea canopy is still open.
   • DO NOT USE STROBILURIN (QoI/FRAC 11) FUNGICIDES such as Headline and Quadris: They no longer work.
   • ProPulse, a new product from Bayer that may be registered as early as 2012, should be used cautiously. ProPulse is a premix of a triazole fungicide (prothioconazole, the active ingredient in Proline) and a carboxamide fungicide (fluopyram). If you apply ProPulse and then Priaxor, Endura, or Vertisan, you will not be rotating fungicide chemistries. Carboxamide (FRAC 7) chemistries are high-risk for the development of pathogen resistance, and you need to make sure that you do not make sequential (back-to-back) applications of carboxamide chemistries.
Fungicide usage for management of Ascochyta blight of chickpea

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CHOOSING A CARBOXAMIDE CHEMISTRY TO ROTATE WITH PROLINE:

1. **Endura**: Endura (6 oz/ac) performed the same as Proline in one field trial and performed worse than Proline in two field trials.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>DISEASE SEVERITY OVER TIME</strong></td>
<td><strong>DISEASE SEVERITY OVER TIME</strong></td>
<td><strong>END-OF-SEASON DISEASE SEVERITY</strong></td>
</tr>
<tr>
<td>June 23 to Aug.9 (0 to 100 scale)</td>
<td>July 2 to Aug. 21 (0 to 100 scale)</td>
<td>Aug. 31 (percent)</td>
</tr>
<tr>
<td>Non-treated check</td>
<td>76</td>
<td>64</td>
</tr>
<tr>
<td>Endura 70WG 1.5 oz/ac (A,B,C,D)</td>
<td>75</td>
<td>cd</td>
</tr>
<tr>
<td>Endura 70WG 2.0 oz/ac (A,B,C,D)</td>
<td>74</td>
<td>cd</td>
</tr>
<tr>
<td>Endura 70WG 2.5 oz/ac (A,B,C,D)</td>
<td>74</td>
<td>cd</td>
</tr>
<tr>
<td>Endura 70WG 3.0 oz/ac (A,B,C,D)</td>
<td>61</td>
<td>abc</td>
</tr>
<tr>
<td>Endura 70WG 3.5 oz/ac (A,B,C,D)</td>
<td>61</td>
<td>abc</td>
</tr>
<tr>
<td>Endura 70WG 4.0 oz/ac (A,B,C,D)</td>
<td>61</td>
<td>abc</td>
</tr>
<tr>
<td>Endura 70WG 4.5 oz/ac (A,B,C,D)</td>
<td>65</td>
<td>ab</td>
</tr>
<tr>
<td>Endura 70WG 5.0 oz/ac (A,B,C,D)</td>
<td>65</td>
<td>ab</td>
</tr>
<tr>
<td>Endura 70WG 5.5 oz/ac (A,B,C,D)</td>
<td>65</td>
<td>ab</td>
</tr>
<tr>
<td>Endura 70WG 6.0 oz/ac (A,B,C,D)</td>
<td>55</td>
<td>ab</td>
</tr>
<tr>
<td>Proline 480SC 5.9 fl oz/ac (A,B,C,D)</td>
<td>50</td>
<td>21</td>
</tr>
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</table>

   **FUNGICIDE APPLICATION TIMING**, Carrington 2011:
A = June 23 prior to bloom and 3 days after the appearance of symptoms, B = July 6, C = July 18, D = July 29.

   **FUNGICIDE APPLICATION TIMING**, Minot 2011:
A = disease severity less than 10% on bottom of canopy and 35% in middle and top of canopy, B = July 15, C = July 26, D = Aug. 12.

2. **Vertisan**: Vertisan (20 fl oz/ac) performed equivalently to Proline or a Proline-Endura rotation in both trials in which it was tested.

<table>
<thead>
<tr>
<th>Williston (2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FOLIAR DISEASE SEVERITY percent (Aug. 9)</strong></td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>Non-treated check</td>
</tr>
<tr>
<td>Vertisan 1.67EC 20 fl oz/ac (A,B,C)</td>
</tr>
<tr>
<td>Proline 5 fl oz/ac (A,C) / Endura 6 oz/ac (B)</td>
</tr>
<tr>
<td>Proline 5 fl oz/ac (A,B,C,D)</td>
</tr>
</tbody>
</table>

   **Fungicide application timing**, Carrington:
A = June 23 prior to bloom (disease severity = 1-3%), B = July 6, C = July 18.

   Chickpea variety = ‘Xena’, highly susceptible to Ascochyta blight.
Seeding rate = 4.5 pure live seeds/square foot.
Seeding date = May 25.

   **Fungicide application timing**, Williston:
A = June 28 prior to bloom (disease severity = trace), B = July 7, C = July 21.

   Chickpea variety = ‘Dylin’, susceptible to Ascochyta blight.
Seeding rate = 5 seeds/square foot.
Seeding date = May 26.

3. **Priaxor**: Priaxor (4 and 6 fl oz/ac) provided much better disease control than Proline (5 fl oz/ac) in a field trial conducted in Carrington in 2011.

   Note that Priaxor is a premix of xemium (FRAC 7) and pyraclostrobin (FRAC 11).
Disease control associated with Priaxor is conferred by the xemium component.

**YIELD DATA FOR THE 2011 TRIALS**:

   **WILLISTON**: Yield data will be forthcoming for the 2011 fungicide trial conducted in Williston.

   **MINOT**: The combination of recurrent, heavy rains and the use of a highly susceptible chickpea variety resulted in chickpea yields near zero in Minot.

   **CARRINGTON**: The combination of (1) inoculating the trials, (2) using a highly susceptible chickpea variety, and (3) recurrent, torrential rains led to severe levels of Ascochyta blight in the chickpea fungicide trials in Carrington in 2011. Yields were zero or nearly zero in all treatments.

**FUNGICIDE APPLICATION TIMING**, Carrington 2011:
A = June 23 prior to bloom (disease severity = 1-3%), B = July 6, C = July 18, D = July 29, E = Aug. 10.

**AGRONOMICS**: ‘Xena’, a large-Kabuli chickpea that is highly susceptible to Ascochyta blight, was seeded May 25 at 4.5 pure live seeds/sq ft.