

Ascochyta Blight of Chickpea



Figure 1.
Ascochyta lesions
on chickpea pods,
leaves and stems.

(Photo by
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Ascochyta blight is the most problematic disease of chickpea in North Dakota and a severe disease in most chickpea growing regions of the world. Complete yield loss to Ascochyta has been recorded, and the disease can reduce seed quality significantly. In 2005, the Ascochyta pathogen developed resistance to FRAC group 11 fungicides (Headline and Quadris), rendering the most frequently applied fungicides ineffective in North Dakota.



Figure 2. Early *Ascochyta* blight symptoms on chickpea leaf. Note gray center with black margin.

(Photo by Sam Markell)



Figure 3. *Ascochyta* blight lesions on chickpea leaf. Note raised black dots (pycnidia) arranged in concentric rings. (Photo by Sam Markell)

Cause

The fungus *Ascochyta rabiei* (also called *Didymella rabiei*) causes *Ascochyta* blight of chickpea. *Ascochyta* blight of pea (*Ascochyta pisi*) and lentil (*Ascochyta lentis*) are caused by different species, and do not cause *Ascochyta* blight on chickpea.

Symptoms and Signs

Ascochyta blight can infect all above-ground plant parts (Figure 1), and can be found anytime after crop emergence. *Ascochyta* blight first appears as gray areas on the leaves, stems or pods that quickly turn into brown lesions with dark borders (Figure 2). As the disease progresses, small, circular, brown-black dots (pycnidia) develop in the center of the lesions, and are frequently arranged in concentric circles and resemble a bull's-eye (Figures 3-5). The concentric circles of pycnidia are large and relatively easy to identify on unifoliate or large kabuli varieties, while lesions on varieties with a desi-type leaf or fern leaf are smaller and may require a small magnifying glass. Concentric rings of pycnidia are the most diagnostic characteristic of the disease. Infected seed may be discolored, shrunken or shriveled and, when severe, lesions with dark pycnidia may be present on the seed.

Disease cycle

Ascochyta blight develops rapidly in cool (59 to 77 F), wet conditions. High humidity and periods of morning dew also favor disease development and spread. Hot, dry conditions can halt the development of disease, but spread can continue once conditions become favorable again.

Ascochyta rabiei can overwinter in field stubble for several years, and the pathogen is also seed-borne. In spring, sexual spores (ascospores) are produced on field stubble or seed and dispersed by wind. Ascospore dispersal can continue for several weeks and usually occurs before or at flowering. Spores can travel up to five miles, which allows disease to spread to new areas rapidly. Ascospores that land on chickpea leaves and stems need at least two hours of surface moisture (dew) to germinate, but the likelihood of infection increases if leaves and stems are wet for more than six hours. After infection, symptoms of disease may not appear for several days. Once pycnidia are formed in lesions, they can produce asexual spores (conidia). Conidia are dispersed by rain or other moisture on to surrounding plants, where they cause new infections. Repeated infection cycles can occur if conditions are favorable, allowing the disease to spread quickly through a field.



Figure 4. Ascochyta blight lesions on stem.
Note pycnidia arranged in concentric rings.

(Photo by Sam Markell)



Figure 5. Ascochyta blight lesion with pycnidia on chickpea flower. (Photo by Sam Markell)

Management

Managing Ascochyta blight requires an integrated approach to achieve effective results. Integrated pest management steps include:

Resistance — At the time of printing, no chickpea varieties have complete resistance to Ascochyta blight. However, some varieties have moderate levels of resistance under North Dakota conditions. Variety selection is largely market driven, but selecting moderately resistant varieties, such as the small kabuli/desi-type chickpeas, will make disease management easier.

Rotation — Rotate crops so that chickpea is grown only on the same ground once every three years. If possible, avoid growing chickpeas adjacent to fields that had chickpeas planted the year before.

Certified Seed — Always plant certified disease-free chickpea seed. The Ascochyta blight pathogen grows from the seed to the seedling and even a few infected seedlings can be a source of disease spread throughout a field.

Seed Treatments — If bin-run seed is used, having it tested each year for Ascochyta blight infection is critical. Seed infection levels of less than 0.3 percent are considered acceptable, and we recommend that

seed also be treated with a fungicide for Ascochyta blight. Fungicide seed treatments effective against Ascochyta blight are often different than seed treatment used for other soil-borne diseases, such as Pythium. For information regarding fungicide seed treatments, refer to the most current “North Dakota Field Crop Fungicide Guide” (PP-622) for information on registered products.

Fungicides — Under favorable environmental conditions for disease, fungicide applications are an integral component of control. However, fungicide selection and rotation should be approached conscientiously to obtain good disease control and to prevent the Ascochyta blight pathogen from developing fungicide resistance. Consult with your county agent or other knowledgeable personnel for the latest information on fungicide selection and use.

In general, preventative fungicides should be applied prior to flowering and before disease develops in a field. These fungicides will provide a barrier on the surface of the plant that prevents spores from causing infection. This can delay the onset of disease epidemics.

Fields should be scouted regularly to determine the onset of Ascochyta blight in the field. At flowering,



or once disease has developed, fungicides with a systemic mode of action should be applied. These fungicides will move short distances in the plant from the site of deposition and help prevent disease infection and spread. Rotate fungicide **FRAC groups** so that fungicides with the same mode of action are not applied in consecutive sprays. This practice will reduce the selection pressure on *Ascochyta* blight that leads to fungicide resistance. FRAC group information is found on the front of the fungicide label and in the “North Dakota Field Crop Fungicide Guide” (PP-622). Always apply fungicides at label rates and follow label restrictions.

At the time of printing, fungicides in FRAC group 11 are not recommended. The *Ascochyta* blight pathogen first was found to have resistance to these fungicides in 2005 in North Dakota, and widespread fungicide resistance was observed in 2006 in North Dakota. FRAC group 11 fungicide resistance has also been observed in Montana. FRAC group 11 fungicides do not control *Ascochyta* blight in areas where the pathogen is resistant. In fungicide studies conducted in Minot, N.D., in 2007, yield from chickpea

plots sprayed with FRAC 11 fungicides was the same as the nontreated control, whereas yield from plots sprayed with other FRAC groups was two to three times higher.

The number of fungicide applications will vary depending on the variety of chickpea grown, as well as weather conditions and level of disease in the field. In general, if a field has low levels of disease and weather conditions are hot and dry, the length of time between fungicide applications can be increased. Varieties with moderate levels of resistance, such as the small kabuli or desi-type chickpeas, also may require fewer fungicide applications to manage disease.

Several foliar fungicides are available for use on *Ascochyta* blight of chickpea and these can be effective when used along with other disease management strategies. Refer to the most current “North Dakota Field Crop Fungicide Guide” (PP-622) for updated information on products and rates for application.

For more information on this and other topics, see: www.ag.ndsu.edu

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