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Harveson, Robert M., "NF02-543 Ascochyta Blight of Chickpeas" (2002). *Historical Materials from University of Nebraska-Lincoln Extension*. 1976.
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Published by Cooperative Extension, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln

NF02-543

Ascochyta Blight of Chickpeas

By Robert M. Harveson, Extension Plant Pathologist

The chickpea (*Cicer arietinum*) ranks among the world's three most important pulse (legume) crops. It is an important source of protein in many parts of central Asia, Africa and the Mediterranean and among the food legumes, is the most effective in reducing blood cholesterol levels. India is the largest producer, currently credited with growing 78 percent of the world's crop, followed by Pakistan, Mexico, Turkey, and Ethiopia. The crop is native to western Asia and the Middle East, and is usually grown as a rainfed cool-weather crop or as a dry climate crop in semi-arid regions.

Interest in chickpea production as an alternative crop to spring cereals has been increasing in areas where rainfall is marginal. In the United States, Idaho, Washington, California and North Dakota are the leading chickpea producers. Despite a reputation for low yields, 4000 lbs/acre is a commonly quoted maximum yield potential. Production in Nebraska has increased substantially over the last several years, with an anticipated 10,000 acres to be planted in 2002. This production is expected to further increase over the next several years.

Although chickpeas are reported to be susceptible to over 50 pathogens, few diseases are currently recognized as significant economic constraints to production. Ascochyta blight caused by *Ascochyta rabiei* is the most serious chickpea disease worldwide. The pathogen attacks all aerial portions of the plant. Lesions on foliage and pods tend to be circular while those developing on petioles and stems are usually elongate. Dark-brown lesions on pods and leaves contain concentric rings of pycnidia (spore-bearing structures). Early in the season, individual infected plants scattered in fields appear brown and dried up, and serve as foci from which disease progresses to other plants. This disease can cause economic losses due to reduced yields as well as reduced quality. For a crop such as chickpeas, quality may be more important than gross yields, as payments for small and discolored seeds (results of pod and seed infection) are significantly lowered.

Infection and Survival

Disease development is most rapid at temperatures of 68-70°F and high relative humidity. Blight will not develop at temperatures outside the range of 40-90°F or leaf wetness periods less than six hours. Spores are released from pycnidia during humid weather and are spread throughout fields by rain splashing and winds. Spores germinate 12 hours after landing on host surface, and penetrate and infect after 24 hours. The pathogen can survive in infected residue in soils under dry conditions for at least two years. However, viability of the fungus is lost rapidly under conditions of high humidity (65-100 relative humidity) or when buried in soil. The pathogen also can be carried over in seed, and can grow from the pod wall into immature seeds. Between 50 percent and 80 percent of seed from infected pods were found to be infected with the pathogen, but seed collected from healthy pods on the same plants were not infected. Seed infections can be internal and external on the seed surface, and both types of infections are equally capable of transmitting the pathogen to emerging seedlings. *Ascochyta rabiei* can retain its viability in seed for at least five years, and seed transmission is a more effective source of infection than is infected debris. Seed infections are probably the mechanism of long distance spread of the disease throughout the world.

Control Measures

Crop Rotation

Since only chickpea is susceptible to *A. rabiei*, rotating with non-host crops will help reduce inoculum levels in soils. Chickpeas should not be grown more frequently than every three to four years, and new crops should not be planted near previously blighted fields due to risk of infection.

Resistance

No resistance is available that is complete or exhibits immunity from the pathogen, but cultivars are available with partial resistance. Most have good resistance until flowering, when lesions may develop on stems and leaves. If conditions are favorable, disease can develop rapidly on these cultivars, and fungicide applications should be considered.

Fungicide applications

Producers should pay particular attention to protecting young, green foliage during pod fill. Bravo and Quadris have both been shown to increase yields and reduce losses from the pathogen, but their use will probably not be economical if disease pressure is low. Scouting fields early for the presence of isolated, infected plants is extremely important. These plants likely originated from infected seeds, and can rapidly spread the pathogen to surrounding plants if not treated with fungicides.

Treating fields at this early stage is much more effective than rescue treatments later after an epidemic has begun. Studies in North Dakota indicate that using Quadris as a rescue treatment is superior compared to using Bravo. Unfortunately, Quadris is not labeled for use in Nebraska, but Section 18 emergency exemptions have been previously obtained for local epidemics. It is hoped that either a label for chickpeas will be obtained or further special provisions will be sought for using Quadris in future emergency situations. For the latest information on labeled and appropriate use of fungicides for management of Ascochyta blight, contact the University of Nebraska.

The University of Nebraska does not endorse or guarantee effectiveness of fungicides mentioned in this publication, nor does it intend to discriminate against these or any additional products not listed here.

File under: PLANT DISEASES
C-11, Field Crops
Issued July, 2002

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture.
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