CIS 1044

# Controlling Ascochyta Blight of Chickpea

**Larry J. Smith and Maury Wiese**

Symptoms of Ascochyta blight are emerging, and the disease again is threatening chickpeas (garbanzo beans) grown in the Palouse area of eastern Washington and northern Idaho. Sustainable and profitable chickpea production depends on vigilant management of blight-resistant chickpea varieties and on practices that reduce the incidence and severity of the blight fungus, *Ascochyta rabiei*.

## *Background*

The Palouse region of northern Idaho and eastern Washington offers a favorable climate, fertile soils, and compatible farming systems for the production of chickpeas, *Cicer arietinum* (garbanzo beans). Since the 1980s, large, cream-colored Kabuli type chickpeas have fit well into local crop rotations with wheat, barley, peas, and lentils. Chickpeas also have commanded a favorable price in domestic and foreign markets and provided favorable returns on investment when not damaged by Ascochyta blight.

Ascochyta blight is a disease caused by the fungus *Ascochyta rabiei* that gained a foothold in the Palouse in the 1980s. The fungus is genetically diverse and dynamic and may be developing new virulent forms that can overcome the blight resistance available in current chickpea varieties.

The development of Ascochyta blight in the past has been rapid and severe. It may again be poised to reduce chickpea seed yield and quality.

When chickpea varieties were initially grown in the Palouse in the 1980s, all were susceptible to Ascochyta blight. The blight fungus soon emerged—most likely from plantings of infected chickpea seed—and significantly damaged developing chickpea foliage and pods and reduced seed yields.

In 1987, Ascochyta blight reached epidemic proportions and reduced chickpea seed yields by 50 percent in northern Idaho. For this reason, growers voluntarily stopped growing chickpeas in an attempt to reduce the prevalence and activity of the blight fungus and to avoid poor returns on their production investment.

With the introduction in the mid 1990s of blight-resistant varieties developed by USDA Agricultural Research Service plant breeders in Pullman, Washington, local confidence in chickpea culture was renewed. However, since 1998 blight symptoms have been observed affecting both susceptible and resistant chickpea varieties in isolated areas of the Palouse. Growers, therefore, must be alert to the potential for serious blight development.

The blight-resistant chickpea varieties Dwelley, Evans, Sanford, and Myles introduced in the mid-1990s were widely adopted by local producers and extensively grown. But blight-susceptible varieties, especially those producing large, white or cream-colored seeds are still occasionally grown. Because the blight fungus can reproduce sexually and asexually in Palouse environments, new virulent strains with increased capacity to infect and damage varieties that were formerly resistant are an imminent possibility.

Currently, additional new forms of blight resistance are being incorporated into large, cream-colored Kabuli type chickpeas by the USDA ARS Pulse Breeding Program at Washington State University. In the meantime, it is increasingly imperative to minimize the local survival and multiplication of the blight fungus.

*Figure 1. Typical symptoms of Ascochyta blight on chickpea leaves and stems. Note the small, dark, raised fruiting bodies of* A. rabiei *within the dry, necrotic lesions. Courtesy of W. Kaiser*

*Figure 2. Pod infections by* A. rabiei *lead to infections of the seed. Note the concentric pattern in which the fruiting bodies emerge. Courtesy of W. Kaiser*

## How to sustain profitable chickpea production

Palouse-area growers should employ management practices that both promote crop vigor and limit Ascochyta blight development. This means applying various disease and crop management practices as follows:

• **Choose crop rotations that permit 3 to 4 years between successive chickpea crops.** This reduces populations of the blight fungus by eliminating a continuous supply of the host plants and crop residues on which it can survive.

• **Choose blight-resistant varieties such as Sanford, Evans, Dwelley, and Myles (table 1).** These varieties are less frequently infected and significantly less damaged by blight than are susceptible varieties.

• **Use only certified seed.** Only seed from inspected and certified blight-free chickpea fields should be selected for planting. This will limit, but may not eliminate, the possibility of planting infected or infested seed. Be mindful that seed contaminated with the blight fungus may sometimes escape detection.

• **Protect seed and seedlings with approved fungicide seed treatments.** It is prudent to eradicate or restrict the blight fungus that may be seedborne. A broad-spectrum fungicide registered for use locally as a seed treatment should be applied to all chickpeas sown in the Palouse. For more information about registered fungicides, refer to the current year's edition of the *Pacific Northwest Plant Disease Management Handbook*, available through the extension office in your county, or contact the Department of Agriculture in your state.

• **At regular intervals throughout the growing season, monitor developing chickpea crops for blight development.** Remain constantly aware of the general health and vigor of your developing chickpea crop. Recognizing the initial symptoms of blight development (figure 1) and identifying the

*Table 1. General characteristics of selected chickpea varieties.*

| Variety | Seed size[1] | Seed color | Reaction to Ascochyta blight[2] |
|---|---|---|---|
| Spanish White | Large | White | S |
| Evans | Medium | White-cream | R |
| Dwelley | Medium | White-cream | R |
| Sanford | Medium | White-cream | R |
| Myles | Small | Brown-black | R |

[1]Small: 15-20 grams per 100 seeds; medium: 20-40 grams per 100 seeds; large: 40-60 grams per 100 seeds

[2]S: susceptible; R: resistant

*Figure 3. A chickpea field severely damaged by Ascochyta blight has a nonuniform canopy and patches of blight development. Courtesy of W. Kaiser*

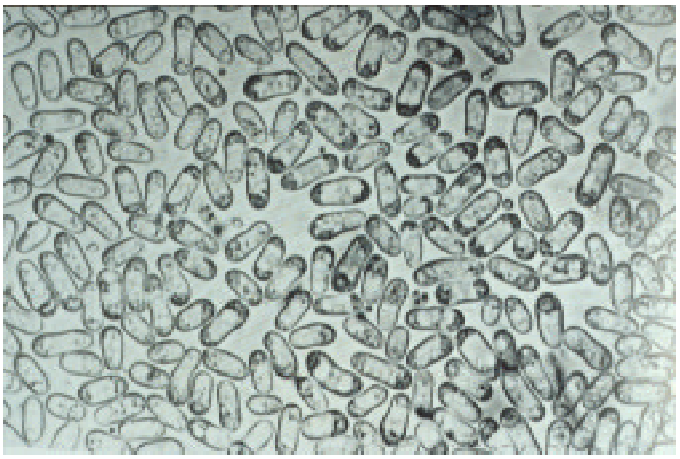

*Figure 4. Spores of* A. rabiei *collected from infected chickpea tissue.*

blight fungus (figure 4) are key to efficient and effective blight control. The onset, incidence, and severity of blight in the field dictate whether foliar sprays are warranted to protect the crop from further damage.

**• When necessary, use an approved (registered) and effective fungicide to protect foliage from infection by the blight fungus.** An initial spray should be applied at the onset of blight symptoms. When environmental conditions are expected to be moist or wet, subsequent sprays should be applied at intervals frequent enough to continuously protect the remaining foliage and developing pods (approximately 14 days).

See the results achieved with chlorothalonil treatments (table 2). Chlorothalonil is currently sold as Bravo Ultrex and Bravo Weather Stik. Any fungicide you apply must be registered for controlling Ascochyta blight on chickpeas in the state where the crop is grown. Follow all label instructions.

**• Never use fungicides indiscriminately.** Fungicide applications may not be cost effective on blight-resistant varieties, when disease pressure is low, or when conditions are hot and dry and disease development is expected to be slow.

**• Destroy blight-infested crop residues and volunteer chickpea plants.** After harvest, remove or destroy blight-infested crop residues. Growers opting to direct seed and/or minimum till will still need to be attentive and destroy chickpea residues and volunteer plants.

*Table 2. Comparison of fungicide treatments for controlling Ascochyta blight on chickpeas.*

| | | | Blight rating[2] | | Seed yield (lb/acre)[3] | |
|---|---|---|---|---|---|---|
| Treatment | Rate/acre | Number of applications[1] | July 5 | Aug. 12 | Total | Marketable[4] |
| Untreated check | | | 5.3 | 7.8 | 369 | 281 |
| Bravo 720[5] | 3.0 pint | 3 | 4.5 | 3.5 | 794 | 727 |
| Bravo 720[5] | 3.0 pint | 6 | 4.3 | 2.8 | 760 | 720 |
| Dithane M-45 | 3.0 lb | 3 | 5.8 | 5.0 | 617 | 555 |

[1]Fungicides applied either three times—at first, full, and post bloom (July 5, July 24, and August 11, respectively)—or weekly for six weeks beginning at first bloom (July 5).

[2]Ascochyta blight symptoms rated visually on July 5 and August 12 on a 1 to 9 scale where 1 = no symptoms and 9 = dead plant.

[3]Yields compared using Fisher's protected LSD test at P=0.05. Yield differences of 120 pounds per acre or more are statistically significant.

[4]Seed held on a 22/64-inch screen.

[5]Chlorothalonil is currently available as Bravo Ultrex and Bravo Weather Stik from Zenica, Inc.

Use sufficient tillage to place any blight-infested chickpea residues beneath the soil surface. Normal herbicide treatment for weed control will also destroy any volunteer chickpea plants that emerge after harvest from shattered seed. If not destroyed, volunteer chickpea plants will likely become infected, sustain the blight fungus on site, and provide inoculum for infection of subsequent chickpea crops.

## *Further readings*

*Ascochyta Blight of Chickpea* CIS # 886, order # 332, $1.00, available at Ag Publications, University of Idaho, PO Box 442240, 83844-2240.

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**Pesticide Residues**—Any recommendations for use are based on currently available labels for each pesticide listed. If followed carefully, residues should not exceed the established tolerances. To avoid excessive residues, follow label directions carefully with respect to rate, number of applications, and minimum interval between application and reentry or harvest.

**Groundwater**—To protect groundwater, when there is a choice of pesticides, the applicator should use the product least likely to leach.

**Trade Names**—To simplify information, trade names have been used. No endorsement of named products is intended nor is criticism implied of similar products not mentioned.

This publication, with color photographs, is available online at *info.ag.uidaho.edu/Resources/PDFs/CIS1044.pdf*

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