CHLOROTHALONIL FUNGICIDE

Limits Blight Development on Chickpeas

Larry J. Smith and Maury V. Wiese

The fungicide, chlorothalonil, formulated as Bravo 720, was recently registered for use on chickpea (garbanzo bean) for the control of Ascochyta blight. The fungicide has a new supplemental label for this purpose and is expected to be available for application during the 1996 growing season.

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*). During the 1980s, the large-seeded Kabuli type chickpea was introduced into the area in a cooperative effort between area growers and scientists at Washington State University and the University of Idaho. The new crop fit well into rotations as a non-cereal alternative, and initial yield trials and returns on investment were favorable.

In 1982, approximately 500 acres of chickpea were grown in the Palouse using seed from outside the region. In the seasons that followed, the crop grew further in popularity and acreage but became increasingly affected by a blight disease. The blight, caused by the fungus *Ascochyta rabiei* and called Ascochyta blight, began to significantly reduce seed yields by severely damaging the stems, foliage and pods of developing plants. After infecting plants in the field, the blight fungus persisted in harvested chickpea seed, crop residues, and volunteer plants. Thus, the blight fungus multiplied and spread rapidly within the Palouse chickpea acreage which expanded from 500 acres in 1982 to nearly 12,000 acres in 1987. In 1987, Ascochyta blight reached epidemic proportions and caused a 50 percent yield loss in northern Idaho. For this reason, many growers refrained from growing chickpeas in subsequent years in an attempt to limit or destroy the blight fungus.

Although limiting chickpea production significantly reduced both crop residues and volunteer plants, blight reoccurred in 1991 when commercial plantings of susceptible varieties resumed in Northern Idaho. Today, Ascochyta blight still occurs and remains a threat to chickpea production throughout the Palouse region. Blight resistant varieties such as Dwelley and Sanford (Kabuli type) and Myles (Desi type) are available and widely grown. However, susceptible varieties, especially those producing large white seeds, continue to be grown because of a favorable market.

University of Idaho College of Agriculture
Cooperative Extension System • Agricultural Experiment Station CIS 1044

Chlorothalonil: An Additional Tool to Limit Blight Development

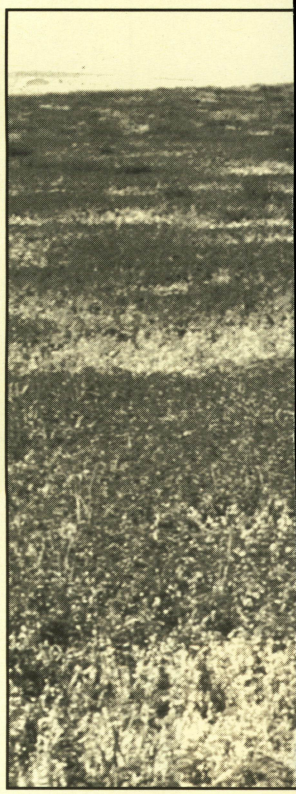
While the use of blight resistant varieties is encouraged and widespread, a preference remains among some growers to cultivate blight susceptible varieties such as Spanish White or Surutato-77 in an attempt to meet a favorable market for large, light-colored chickpea seeds. When a susceptible variety is grown and at risk to be significantly damaged by blight, application of chlorothalonil (Bravo 720) fungicide to chickpea foliage may limit blight development and prevent yield losses.

Fungicide Trials

Field trials have been conducted in the Palouse region in recent years to compare various experimental fungicides for control of Ascochyta blight on susceptible chickpea varieties. Results from several

Treatment	Rate/A	Number of applications[1]	Blight rating[2] Jul 5	Blight rating[2] Aug 12	Seed yield (lb/A)[3] Total	Seed yield (lb/A)[3] Marketable[4]
Untreated check			5.3	7.8	369	281
Bravo 825	2.7 lb	3	4.3	2.3	817	759
Bravo 720	3.0 p	3	4.5	3.5	794	727
Bravo 720	3.0 p	6	4.3	2.8	760	720
Bravo 825	2.7 lb	6	4.8	3.8	652	615
Dithane M-45	3.0 lb	3	5.8	5.0	617	555
LSD	(P = 0.05)				121	116

[1] Fungicides applied three times at first, full and post bloom (July 5, July 24, and August 11, respectively) or six times weekly 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.
[4] Seed held on a 22/64-inch screen.



ealthy field of chickpeas.

of these tests have shown that formulations of chlorothalonil (sold as Bravo 720 by ISK-Biosciences) limit both blight development and yield losses.

In 1993, for example, a commercial field of Surutato-77, a popular Kabuli type chickpea, that was severely threatened by blight near Culdesac in Nez Perce County, Idaho, was used as a trial site to evaluate three experimental fungicides. The field was seeded on April 16 following usual preplant tillage. The resulting stand appeared normal and vigorous with approximately 43,000 plants per acre. No supplemental fertilizer or irrigation was applied nor were the plots inoculated with *A. rabiei*. Area rainfall from May through August was near normal at approximately 4 inches. With inoculum available locally on crop residues and especially blown in by wind, rains promoted natural blight development but did not interfere with fungicide applications. Fungicides were applied at varying rates and times in an attempt to control Ascochyta blight and augment seed yield.

A field of chickpeas with severe Ascochyta blight.

The fungicides were applied as foliar sprays to plots that were 10 X 20 feet in size and separated by 10-foot alleys of untreated chickpea plants. Plots were arranged in a randomized block design with four replications. Fungicides were applied either in three applications at first, full and post bloom on July 5, July 24 and August 11, respectively or in six weekly applications beginning at first bloom on July 5. Fungicides were applied with a CO2-pressurized backpack sprayer with a single hollow cone nozzle at 50 psi delivering 50 gallons of water per acre. All plots were rated visually for initial blight severity at the onset (July 5) and conclusion (August 12) of treatment then harvested with a Hege small plot combine on August 29. All harvested seed was dried to 8.5 percent moisture prior to weighing. Marketable seed yield was measured as seed retained on a 22/64-inch screen. Seed yields were subjected to an analysis of variance and tested for significant differences.

Results

Promoted by early season rains, Ascochyta blight was prevalent and severe on this susceptible variety. At harvest, all plots treated with fungicide had lower blight ratings and yielded significantly more than the untreated check. Chlorothalonil (Bravo) formulations were more effective than Dithane M-45 in limiting blight symptoms and augmenting seed yield. Yields were highest in plots receiving three applications of Bravo 720 or Bravo 825 and appeared to be related to blight suppression. Six applications of fungicide did not improve seed yield or blight suppression relative to three applications. No phytotoxicity was observed.

Fungicide Control of Ascochyta Blight

Any chemical applied to chickpea foliage for blight control should specify "chickpea" or "garbanzo," "Ascochyta blight," and "foliage application" on its label and must be registered within the state where it is to be applied. Fungicides

currently registered for use on foliage of dry peas and dry beans are potentially eligible for use on chickpeas but may not meet all these criteria. Fungicide applicators should consult regulatory officials in their state to confirm which, if any, fungicide can be applied to chickpea foliage to control Ascochyta blight. Growers should be alert to any new test results and registrations of chickpea fungicides in their production area.

Chlorothalonil, formulated as Bravo 720, may be applied to chickpeas to limit Ascochyta blight if it bears the appropriate supplemental label. If Bravo 720 is not so labeled, it may be applied to chickpeas if the applicator possesses a copy of the supplemental label extending its use to chickpeas.

Where approved fungicides are available, they should not be used indiscriminately. Developing plants should be monitored—especially during the spring and early summer—to determine if blight symptoms are present, if the disease is progressing, and if a fungicide application is warranted. Green foliage should be protected especially during pod fill and especially if blight symptoms are present and increasing in incidence and severity. Foliar fungicide applications may not be cost effective when blight resistant varieties are grown or when disease pressure is low.

Recommendations

To sustain the profitable production of chickpeas in the Palouse, growers should employ management practices that promote crop vigor and limit Ascochyta blight development.

- Choose rotations that permit 3 to 4 years between successive chickpea crops.
- Choose blight resistant varieties such as Sanford, Dwelley, and Myles.
- Use only certified disease free seed.
- Protect seed and seedlings with approved fungicide seed treatments.
- Destroy blight infested crop residues and volunteer chickpea plants.
- When necessary, use an approved foliar fungicide during the growing season to limit blight development and associated yield losses.

The authors

Larry J. Smith is an Extension Professor and Nez Perce County Extension Educator, and Maury V. Wiese is a Professor of Plant Pathology at the University of Idaho.

Issued in furtherance of cooperative extension work in agriculture and home economics, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, LeRoy D. Luft, Director of Cooperative Extension System, University of Idaho, Moscow, Idaho 83844. The University of Idaho provides equal opportunity in education and employment on the basis of race, color, religion, national origin, age, gender, disability, or status as a Vietnam-era veteran, as required by state and federal laws.

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