

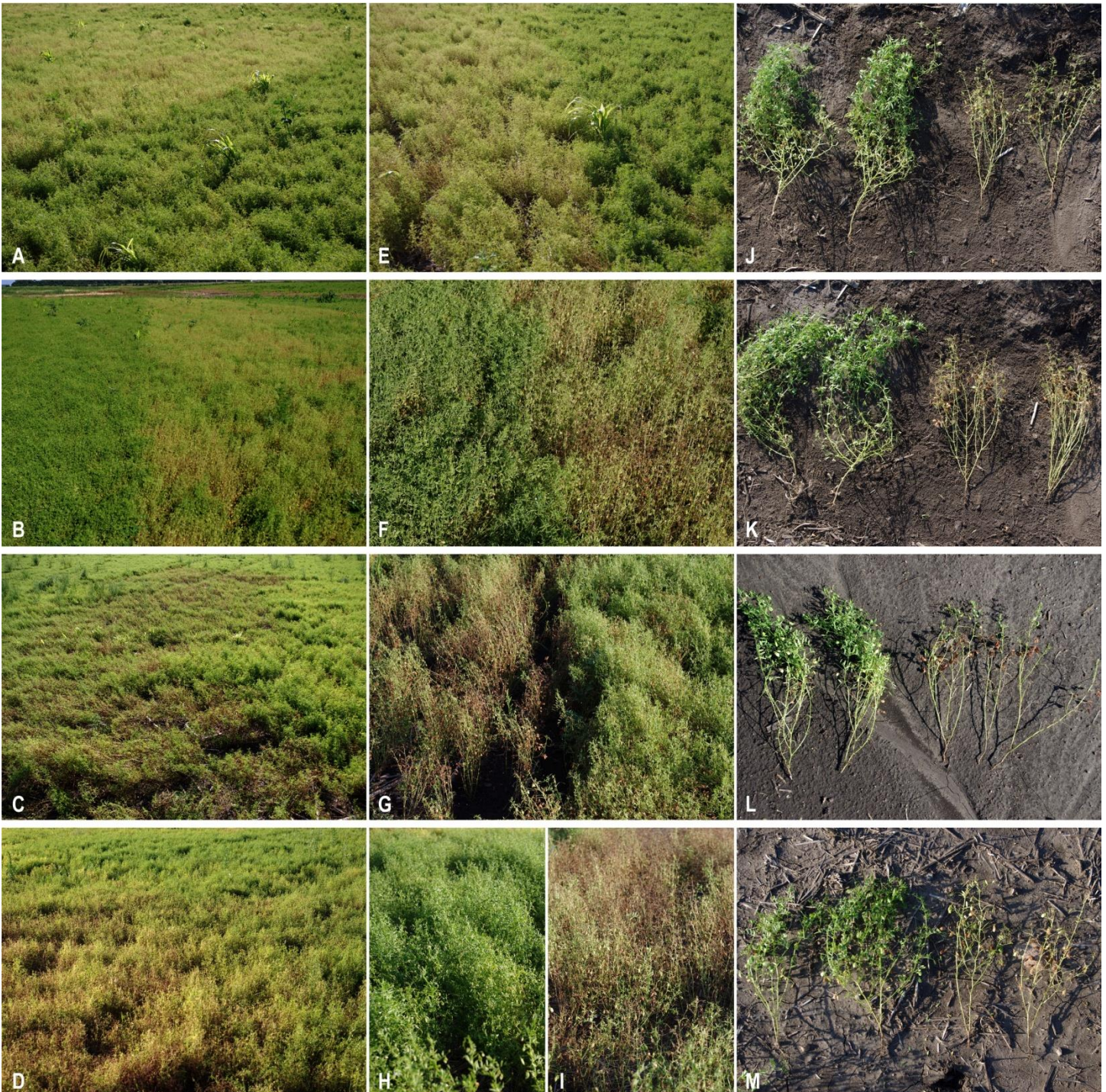
Management of *Stemphylium* blight of lentils

Causal pathogen: *Stemphylium* sp.

Michael Wunsch, Plant Pathologist
North Dakota State University Carrington Research Extension Center

FIELD-LEVEL SYMPTOMS:

- *Stemphylium* blight causes severe leaf drop, resulting in defoliated plants (**J,K,L,M**; healthy plants on left, diseased plants on right). Diseased plants are often left with only terminal leaves.
- The disease often develops in large, irregular patches within fields (**A,B,C,D**), and it may be more severe where plants are under nitrogen stress. In pictures **B, F** and **L**, the healthy plants (on the left side of the pictures) received inoculant at seeding and the diseased plants (on the right side of the pictures) did not.
- In North Dakota, Saskatchewan and Montana, this disease is a problem when rains occur late in the season. In this region, the disease generally only develops in the last third of the growing season, from late bloom through late pod-fill.

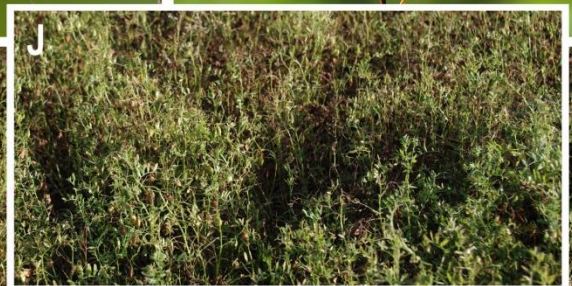


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- At disease onset, stems are healthy but leaves are chlorotic to tan (A,B,C,D). When relative humidity is high (early mornings and after rainfall events), the causal pathogen, *Stemphylium* spp., sporulates, and diseased leaves take on a gray to black appearance (B,C,J).
- Shortly after leaves become diseased, leaf drop occurs, leaving the plants defoliated (E,F,G,H,I). Often, only terminal leaflets on the tops of the plants remain. Complete defoliation can occur within days of first symptom expression. As disease progresses further, the stems eventually turn tan and then brown, with disease progressing from the tip (E).



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DISEASE IMPACT:

- **Impact on yield and quality:** The impact of *Stemphylium* on lentil seed yield and quality in North Dakota, Montana, and Canada is unknown.

SOURCES OF DISEASE INOCULUM:

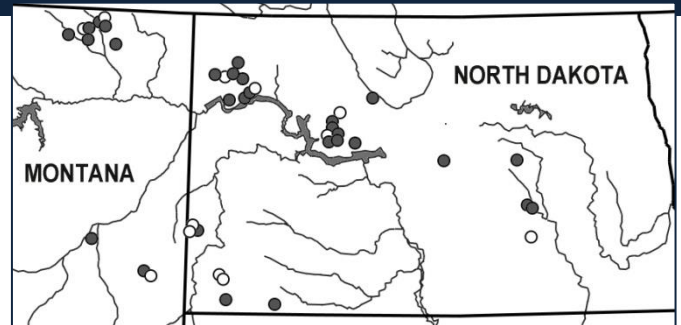
- **Other hosts:** *Stemphylium* spp. can infect a broad range of broadleaf plants and can also survive well as a saprophyte on dead plant materials. The fungus is common in the environment.
- **Lentil debris:** *Stemphylium* spp. presumably survive on lentil debris, but the pathogen has not been well studied on lentil.
- **Infected seed:** *Stemphylium* blight is a seedborne disease (the causal pathogen infects lentil seed). However, the pathogen has not been well studied on lentil, and it is unknown whether the disease is transmitted from infected seed to seedlings.

ENVIRONMENTAL CONDITIONS FAVORING DISEASE:

- **Last third of the growing season:** Lentils increase in susceptibility to *Stemphylium* blight as they mature. The disease tends to only develop in the last third of the growing season in North Dakota, Montana, and Saskatchewan.
- **Rainfall events late in the growing season:** *Stemphylium* blight can develop at a wide range of temperatures; temperatures from 59°F to approximately 72°F are moderately favorable for the disease, and temperatures from approximately 73°F to over 86°F are highly favorable. The most critical factor for disease development is an extended period of leaf wetness late in the growing season. The length of the wetness period determines the severity of an outbreak, with 6 to 12 hours of extended leaf wetness required for severe disease development when temperatures are high (77 to 86°F) and 24 hours or more of extended leaf wetness required when temperatures are moderate (59 to 68°F).

DISTRIBUTION:

- **Saskatchewan:** *Stemphylium* blight has been known to occur in Saskatchewan for over a decade.
- **North Dakota and eastern Montana:** In 2011, *Stemphylium* spp. were present on lentils in all of the major lentil production regions in North Dakota and eastern Montana. Epidemics of *Stemphylium* blight were observed in production fields in southwestern North Dakota (Bowman and Adams counties) and central and west-central North Dakota (McLean, Stutsman, and Ward counties) in 2011. However, disease symptoms were only apparent where late rainfall events occurred. In most fields, the pathogen was isolated from non-symptomatic leaves.



Distribution of Stemphylium blight in North Dakota and eastern Montana lentil production fields in 2011:

Solid circle = field assessed, disease present; open circle = field assessed, disease absent. A field was considered positive for Stemphylium blight if the causal pathogen was isolated in the lab from lentil tissues collected in that field. Many fields that were positive for Stemphylium did not show symptoms of the disease. The results suggest that the pathogen may be ubiquitous in lentil production fields but may only cause disease when late rainfall events occur.

DISEASE MANAGEMENT:

- **Crop rotation:** Data are not available on the influence of crop rotation on *Stemphylium* blight. However, because the causal pathogen persists well as a saprophyte in the environment, crop rotation is expected to be of limited utility for managing this disease.
- **Clean seed:** The significance, or indeed even the occurrence, of seed-to-seedling transmission of *Stemphylium* blight on lentils is unknown. However, Canadian researchers recommend that lentils that have over 10% incidence of *Stemphylium* infection not be used for seed.
- **Partial host resistance:** Lentil cultivars differ in their susceptibility to *Stemphylium* blight, and data from the 2011 field season suggest that differences in susceptibility may exist among locally adapted lentil cultivars. Among Clearfield™ lentils, the medium green lentil 'CDC Impress' was significantly less susceptible than the red lentils 'CDC Maxim', 'CDC Impact', 'CDC Imperial' and 'CDC Impala' in Minot, ND. Differences were not detected among CDC Maxim, CDC Impact, CDC Imperial, and CDC Impala. Among conventional lentils, 'Morena', a Spanish brown type, was highly susceptible to *Stemphylium* blight in variety trials conducted in Hettinger, Garrison, and Minot. The widely planted 'CDC Richlea' did not appear to be very susceptible. However, these results should be treated cautiously since they are the results of observations made in a single field season and additional testing is needed for confirmation.
- **Fungicides:** The efficacy of fungicides for control of *Stemphylium* blight on lentils is largely unknown. Canadian researchers report that Headline may have efficacy against *Stemphylium* blight on lentils, but Headline has not been rigorously tested against this disease on lentils. None of the other fungicides with current or anticipated registration on lentil have been tested against *Stemphylium* blight on lentils. To be effective against *Stemphylium* blight, fungicides will need to be applied in the last third of the growing season; because the disease rarely develops until late in the growing season, fungicide applications made at bloom initiation, canopy closure, or 10-14 days after these growth stages are unlikely to be effective. As with other diseases, foliar fungicides are likely best as preventative applications.