Susceptibility of commercial lentil varieties to Sclerotinia stem rot (white mold)

Carrington, ND (2012)

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KEY FINDINGS:

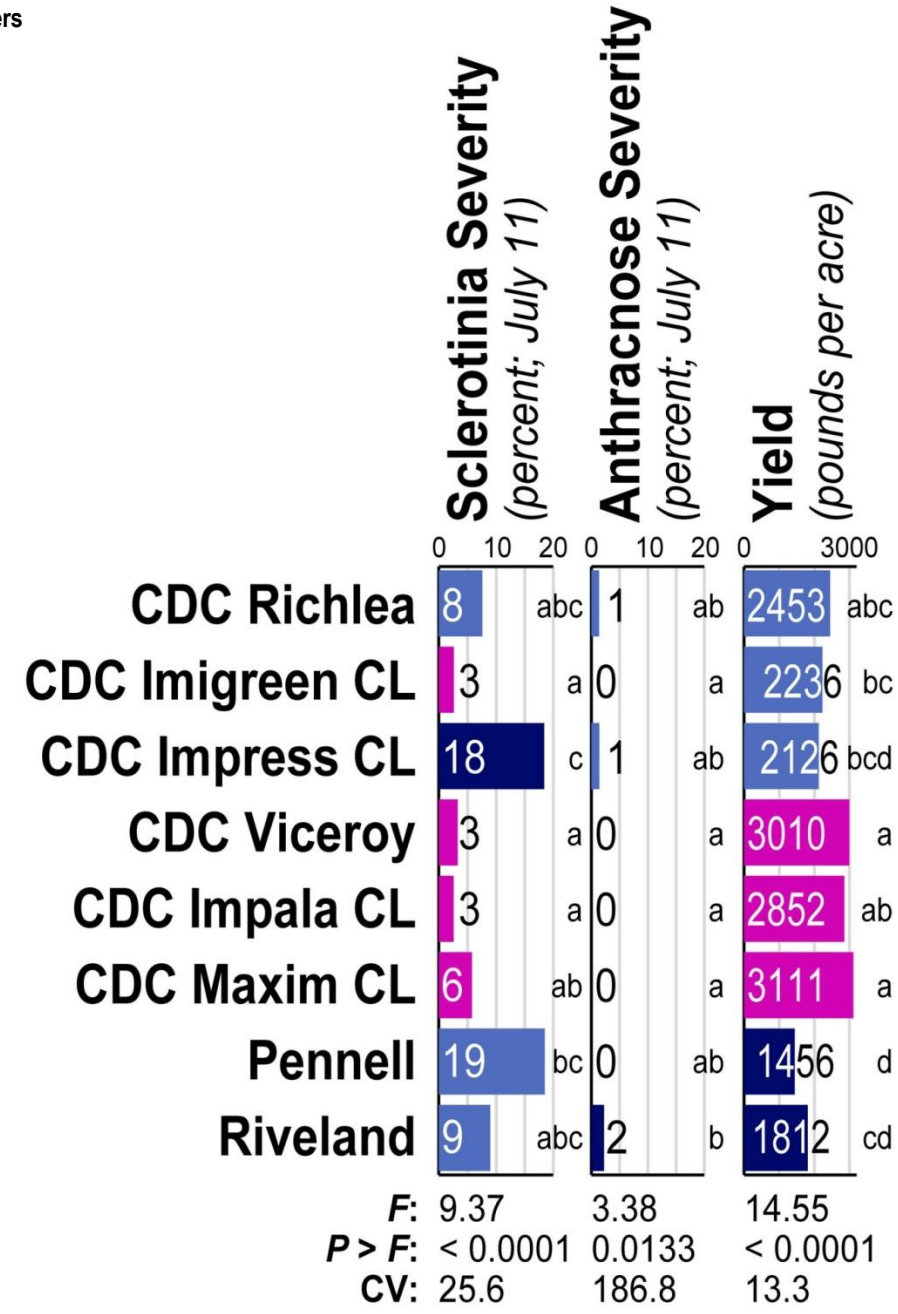
- **Under high Sclerotinia disease pressure, the yield potential of a variety was closely correlated to the susceptibility of that variety to Sclerotinia.**
- **'CDC Viceroy' (a small-green lentil), 'CDC Impala CL' (a extra-small red lentil), and 'CDC Maxim CL' (a small-red lentil) performed the best under high Sclerotinia stem rot disease pressure.**
- **Among medium-green lentils, 'CDC Imigreen CL' was least susceptible to Sclerotinia, 'CDC Impress CL' was most susceptible, and 'CDC Richlea' exhibited intermediate performance.**
- **The large-green lentils 'Pennell' and 'Riveland' performed poorly under high Sclerotinia disease pressure.**

SUMMARY OF KEY RESULTS:

Within-column means followed by different letters are significantly different
(*P* < 0.05; Tukey multiple comparison procedure).

MARKET CLASSES OF LENTIL VARIETIES SCREENED IN THIS TRIAL:

CDC Richlea – MEDIUM GREEN
CDC Imigreen CL – MEDIUM GREEN
CDC Impress CL – MEDIUM GREEN
CDC Viceroy – SMALL GREEN
CDC Impala CL – EXTRA SMALL RED
CDC Maxim CL – SMALL RED
Pennell – LARGE GREEN
Riveland – LARGE GREEN



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METHODS:

- **Location of trial:** NDSU Carrington Research Extension Center, Carrington, ND.
- **GPS coordinates of research trial location:** 47.51026,-99.133342
- **Soil type:** Heimdal-Emrick loam
- **Tillage:** conventional
- **Experimental design:** randomized complete block **Replicates:** 4
- **Seeded plot size:** 5 feet wide (center-to-center) x 25 feet long **Harvested plot size:** 5 feet wide (center-to-center) x approx. 19 feet long
- **Row spacing:** 7 inches **Rows per plot:** 7
- **Non-treated buffer plots were established between treatment plots.**
- **Previous crop:** soybean
- **Planting date:** May 2, 2012
- **Seeding rate:** 18 pure live seeds per square foot
- **Seed treatment:** Cruiser 5FS 1.28 fl oz/cwt + ApronMaxxRTA 5.0 fl oz/cwt + Mertect 340F 1.05 fl oz/cwt
- **Rhizobium inoculant:** "Nodulator' peat-based granular inoculant for peas and lentils (Rhizobium leguminosarum; Becker Underwood, St Joseph, MO); applied at the commercially recommended rate of 6 oz/1000 feet of row.
- **Sclerotinia inoculation details:** To promote disease, resting structures (sclerotia) of *Sclerotinia sclerotiorum,* the causal fungus of Sclerotinia stem rot, were applied to the soil prior to seeding, and ascospores of *S. sclerotiorum* were applied to the canopy during bloom. The trial was inoculated with overwintered sclerotia at a rate of 0.09 grams of sclerotia per square foot on April 23, 2012. Laboratory-produced ascospores of S. sclerotiorum were applied to the canopy during full bloom on July 4 at 1:00 to 2:00 am. Spores were applied with a 60-inch hand boom with four equally spaced 8003 twinjet nozzles at a spray volume of 26 gallons/ac and operated at 20 psi. The spore concentration utilized was 2,000 spores/ml, and 3,250 spores were applied per square foot. Spores were applied to a moist canopy; 0.26 inches irrigation was applied from 10:20 to 11:20 pm the same night.
- **TO PERMIT THE ASSESSMENT OF FUNGICIDE EFFICACY AGAINST SCLEROTINIA WITHOUT THE CONFOUNDING INFLUENCE OF OTHER DISEASES,** anthracnose and Ascochyta were controlled with Headline. Headline, which does not have efficacy against Sclerotinia, was applied across all plots (including the non-treated control) on June 21 (bloom initiation; 6 fl oz/ac), July 3 (6 fl oz/ac), and July 12 (8 fl oz/ac).
- **Disease assessments:** Sclerotinia and anthracnose severity were evaluated on July 11 during the pod-fill period. Sclerotinia and anthroacnose severity was noted as the percent of the canopy exhibiting symptoms and/or plant mortality caused by either disease. No other diseases were present above trace levels.
- **Irrigation:** To facilitate disease establishment, overhead irrigation was applied with a center pivot during bloom.
- **Harvest date:** August 6, 2012. The trial was swathed July 31, 2012.
- **Statistical analysis:** Data were evaluated with analysis of variance . The assumption of constant variance was assessed by plotting residuals against predicted values, and the assumption of normality was assessed with a normal probability plot. To meet model assumptions, a systematic natural-log transformation [LN(x+1) for data sets including values below 1.0; LN(x) for data sets in which no values were below 1.0] was applied to the disease severity data. All other data met model assumptions. Single-degree-of-freedom contrasts were performed for all pairwise comparisons of isolates; to control the Type I error rate at the level of the experiment, Tukey's multiple comparison procedure was employed. Analyses were conducted with replicate and treatment as main factor effects, and they were implemented in PROC GLM of SAS (version 9.2; SAS Institute, Cary, NC).

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- **Pulse USA** for providing seed of most of the varieties screened in this trial.

Without their support, this project would not have been possible.

IMPORTANT NOTICE:

- Variety performance differs in response to environmental conditions, agronomic practices, and biotic and abiotic stresses including diseases.
- This report summarizes variety performance as tested at the NDSU Carrington Research Extension Center in 2012 under the conditions partially summarized in the methods section (above).
- Variety performance may differ under other conditions; when choosing varieties, always evaluate results from multiple trials.
- This report is shared for educational purposes and is not an endorsement of any specific products.