Canadian Agronomist

DIGGING INTO RESEARCH

Agronomic practices for red lentil in Alberta

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High lentil productivity was attained in all major soil zones and agroclimatic zones in Alberta. Plant stand density, inoculation, nitrogen management, and weed control recommendations were found to be similar to Saskatchewan.

Field trials were conducted at five locations over four years from 2012 through 2015 to determine productivity and optimum seeding rate, N management and imidazolinone herbicides for two Clearfield red lentil varieties (CDC Maxim CXL and CDC Dazil CL) over a broad geographic region of Alberta. Locations included Lethbridge, Brooks, Killam, St. Alberta and Falher, Alberta.

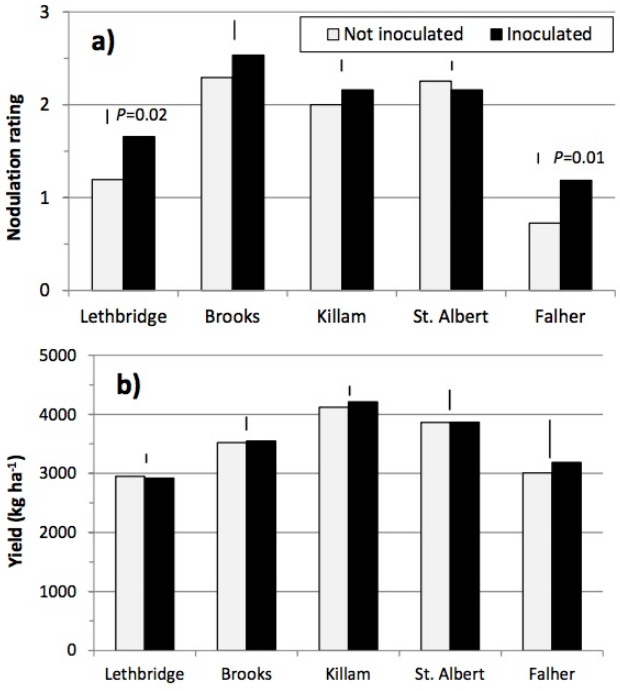
Growing season precipitation from May 1 to July 31 ranged from 1.6 to 12 inches (41 to 308 mm), or 30 to 160% of the long-term normal. The 2012 St. Alberta site was lost due to excessive moisture, cutworm, and hail damage. Low and variable yields were obtained at Lethbridge in 2013 due to hail and at Falher in 2015 due to herbicide damage. Drought conditions occurred at all locations in 2015.

Lentil yield declined when growing season precipitation was less than 4.3 inches (110 mm). The average yield at site-years with more than 4.3 inches of growing-season precipitation was 3204 pounds per acre (3600 kg/ha), which was higher than Statistics Canada 2018 average yield of 1335 pounds per acre (1500 kg/ha).

When growing season precipitation was above 4.3 inches, the research results were similar to other studies outside of Alberta. In these studies, lentil yields were low when available moisture (including available stored soil moisture, not measured in this study) declined below approximately 8 inches (200 mm) or exceeded 16 to 20 inches (400 to 500 mm).

The researchers indicated that several factors contributed to the high yields obtained in this study: very low disease and weed pressure, use of varieties with high yield potential and generally good growing conditions. The results are indicative of the high yield potential for red lentil in Alberta, although the yields from this study would not likely be possible on a commercial field.

Effect of inoculation on a) nodulation rating and b) yield of red lentil at five locations in Alberta (2012 to 2015). Error bars are standard errors.



Source: Bowness et al. 2019

Seeding rate

Lentils were seeded at five seeding rates targeting plant densities of 4, 8, 12, 16, and 20 plants per square foot (40, 80, 120, 160, and 200 plants/m^2).

Maximum yields were achieved at plant densities ranging from 5 to 19 plants per square foot (50 to 190 plants/m^2), although only consistently when plant densities exceeded 9 plants per square foot (90 plants/m^2). These densities are lower than other studies due to low weed pressure. The recommended plant density for conventional lentil production in Saskatchewan is 13 plants per square foot (130 plants m^2), and would be an appropriate recommendation for Alberta.

Seeding rate did not influence days to flowering or maturity.

Nitrogen management

Lentil cultivars were seeded with and without granular *R. leguminosarum* inoculant (Nodulator XL), and with five rates of side-banded urea fertilizer (0, 15, 30, 45 and 60 N kg/ha).

Inoculation with rhizobia did not affect yield, which was surprising because the field sites did not have a pea or lentil crop for a minimum of the past five years. Additionally, residual soil nitrate prior to trial establishment was only enough to meet 24% (range 6 to 60%) of lentil N requirements.

The lack of inoculation response was attributed to sufficient indigenous rhizobia in the soil at these locations. However, the researchers caution that relying on natural-occurring rhizobia is risky, and inoculation with rhizobia is recommended due to the low cost of inoculation and limited history of lentil production in Alberta.

Application of N fertilizer at any rate also did not affect yield. This is consistent with other research studies and current recommendations that applying N fertilizer does not increase yield or speed maturity.

Weed control

Four formulations of Group 2 imidazolinone-based herbicides were applied to both varieties: Solo (imazamox), Odyssey (imazamox + imazethapyr), Odyssey DLX (imazamox + imazethapyr + tepraloxydim) and Ares (imazamox + imazapyr). Herbicides were applied between the three- to six-node stage of the crop and a hand-weeded weed-free treatment was included as a control.

Low weed pressure in the research sites meant that herbicide application did not impact yield compared to each other or the hand-weeded control. However, under commercial production, the

researchers recommend application of Clearfield herbicides to Clearfield lentil at the five- to six-node stage to achieve weed control during the critical weed-free period.

Overall, the research concluded that red lentil production practices in Alberta are similar to those in Saskatchewan, and red lentils are adapted to a wide area of Alberta.

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