

# Determining excess moisture effects on Canola

Nirmal Hari, Roger Burak, James Lindal

## Cooperators

Derrick Chomokovski, Manitoba Agriculture

Laura Grzenda, Manitoba Agriculture

Bifrost Agricultural Sustainability Initiative Committee (*BASIC*)

## Background & Objectives

Canola is quite susceptible to water logging and shows a yield reduction if exposed to excess moisture in the earlier phase of crop growth. Wet soils cause an oxygen deficiency, which reduces root respiration and growth. This reduces nutrient uptake, and if conditions persist, plants can die or prematurely senesce (Canola Council of Canada). With wet conditions, roots may be shallow and not able to access nutrients once the soils begin to dry. A few days in waterlogged soil can be enough to kill canola plants, and yield loss is certain — although as canola plants age, they tend to be more resilient.

The current study was designed with the objective to determine if canola variety agronomic attributes (maturity and height) and seeding rate can be used to dictate canola yield and performance under excess moisture conditions. Three canola varieties and three seeding rate combinations were evaluated under excess moisture and ideal growing (on tile drainage land) conditions.

## Materials and Methods

This trial was conducted in a Randomized Complete Block Design with three replications. Three canola varieties were planted at three seeding rates (see below for details). This trial was conducted both under irrigated and non-irrigated (on tile drained land) set up using same randomizations. Plot size was 7.1m<sup>2</sup> with row-to-row spacing at six inches. The trial was seeded on June 11 and 100 lb/acre of nitrogen and 15 lb/acre of sulphur were broadcasted in the soil before seeding. Further, 27 lb/acre of phosphorous were applied at the time of seeding. Weed suppression was achieved spraying Liberty (1L/acre) on July 6.

1. **Variety** (maturity and height from Mid Season Zone Summary at [www.canolaperformancetrials.ca](http://www.canolaperformancetrials.ca))
  - a. L130 – approximately 93 days maturity, 44 inches height
  - b. L252 - approximately 95 days maturity, 44 inches height
  - c. L261 - approximately 96 days maturity, 49 inches height
2. **Seeding rate**
  - a. Low – target population 6 plants/ft<sup>2</sup> (75% survival)
  - b. Average – target population 9 plants/ft<sup>2</sup> (75% survival)

- c. High – target population 12 plants/ft<sup>2</sup> (75% survival)

### 3. Water Stress:

- a. Natural precipitation (no stress): This trial set was grown on tilled land to mimic the ideal growing conditions.
- b. Excess moisture: This trial set was conducted on non-tiled land. Irrigation was started towards end July and a total of 4 inches of rainfall were put on the crop during three weekly simulated irrigations. Afterwards, irrigation were discontinued for remainder of growing season to allow the flooded plants grow to maturity. A rain gauge was used to estimate the simulated irrigation that were put on the crop in the irrigated trial.

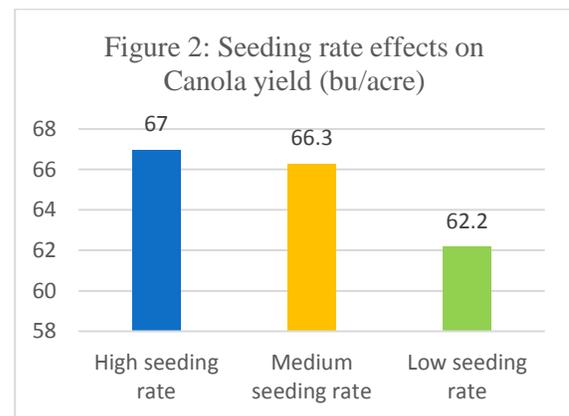
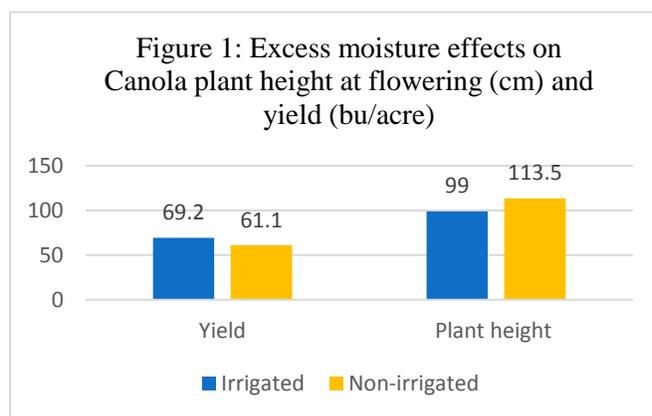
Arborg got almost three inches of natural rainfall both in May and June, two inches in July and four inches in August. Overall the growing season was good and Arborg experienced near normal (351 mm) rainfall during May-Sep period.

Plant height was measured at flowering. The plots were combined using wintersteiger plot combine and yield and moisture were determined using this combine. The data were analysed using REML analysis to find out the effect of variety, seeding rate and irrigation on plant height and yield. Treatment means were compared at P =0.05.

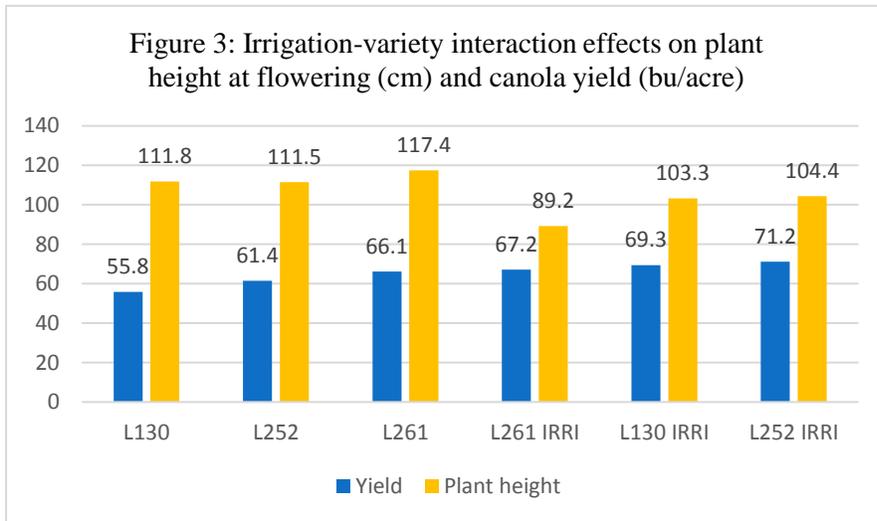
## Results

Overall irrigation treatment significantly reduced plant height at flowering (Figure 1) but this effect was more pronounced in canola variety L261 (Figure 3 – LSD value of 10.7).

Irrigation significantly improved Canola yields (Figure 1). Irrespective of seeding rate and variety, irrigated canola yielded almost eight bushels/acre more than non-irrigated canola plots. Similarly, plots with higher and medium seeding rates yielded higher than plots having lower seeding rate of canola (Figure 2 – LSD value of 3.7). A significant interaction was found between varieties and irrigation treatments (Figure 3). Irrigated plots of Canola varieties L130 and L252 had more yield than their counterparts in non-irrigated plots. Seeding rate, variety and irrigation interactions were not significant.



The current findings clearly demonstrated that four inches of excess moisture stress did not have any negative effect on canola yield. Conversely, it increased canola yield. One possible explanation is as the irrigation was started late in the season (end July) and the crop had already grown by that time, canola got benefitted from excess moisture rather than exhibiting any stress. The test canola varieties were efficient in using excess moisture for increasing yield if applied later in the season. Varietal differences existed in utilizing excess moisture and canola varieties L130 and L252 were more efficient.



### Project findings

Irrigation treatment had effects on canola growth and yield. This is the first year of trial and it will be repeated again in 2017 with more observations on days to maturity and lodging, etc.

### References

Canola Council of Canada. <https://www.canolacouncil.org/>.