

Flooding Effects on Different Canola Varieties in the Interlake

Project Duration - 2019

Objectives

This study was planned to determine how different canola varieties perform under excess moisture conditions. Six commercially grown canola varieties (RR and liberty link traits) were evaluated, and were flooded throughout the growing season. These varieties were also grown under ideal conditions (on tile drainage land) for comparisons.

Collaborators

BASIC

Results

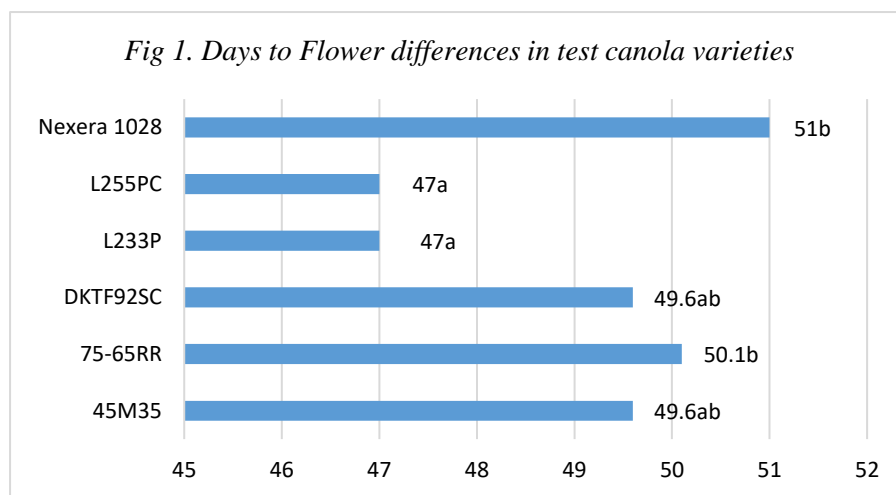
There were no differences in plant establishment among the canola varieties tested. Flooding did not have any effect on plant establishment ($p = 0.299$, data not shown) and days to flower ($p = 0.430$, data not shown); however, canola varieties differed for days to flower ($p < 0.0001$, Figure 1). Overall, flooded canola plots took 11 more days to mature. Plants were shorter in flooded plots and having greater lodging (Table 1). Flooding resulted in significant reduction in yield and flooded plots yielded almost one-third of the control canola plots.

Table 1. Effect of flooding on canola growth and yield parameters.

Treatment	Days to maturity	Plant height (inches)	Lodging*	Yield (bushels/acre)
Flooding#	95.8	28.1	1.8	15.4
No Flooding#	84.8	41.1	1.1	39.9
P	<0.0001	<0.0001	<0.0001	<0.0001
CV (%)	2.6	11.6	9.6	12.4

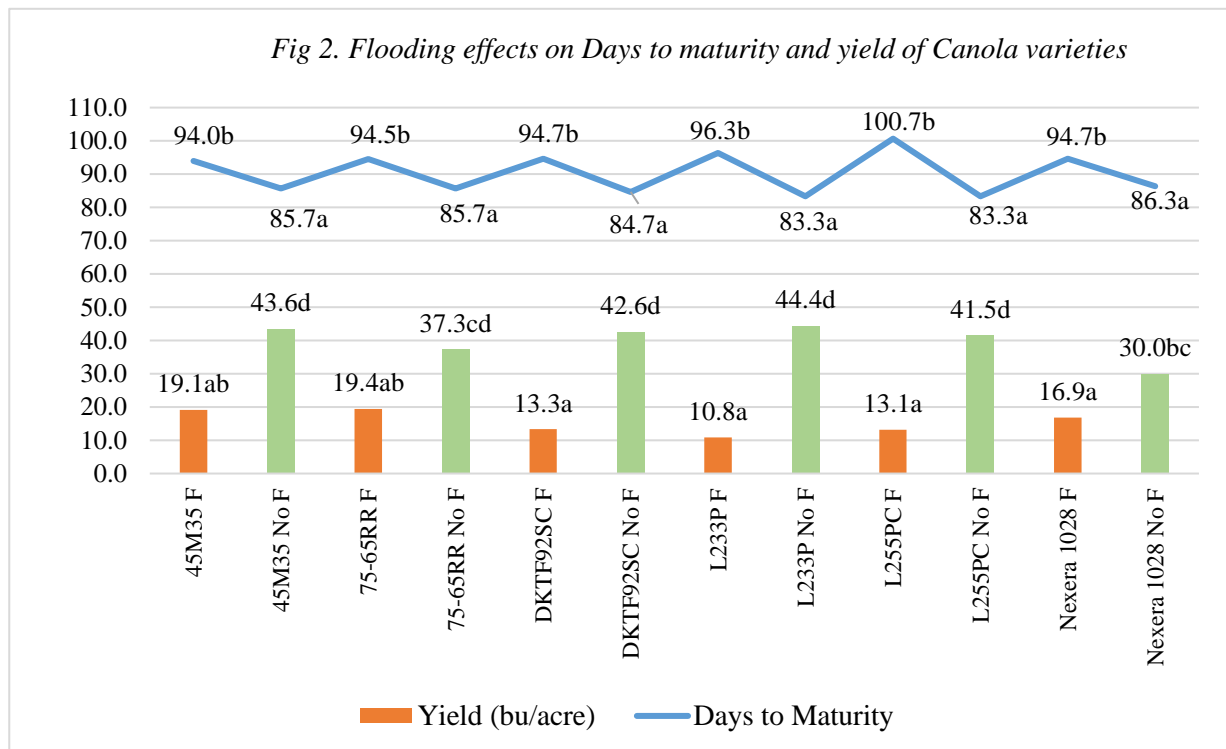
* Based on 1-5 scale; 1 = plants upright, 5 = plants flat on the ground.

#Data is pooled for all canola varieties.



Variety-flooding interactions were significant for days to maturity and canola yield (Figure 2). All canola varieties took significant higher number of days to mature in comparison to when they were grown under ideal conditions.

Similarly, all canola varieties suffered yield loss when grown under flooded conditions. Canola varieties DKTF92 SC, L233P, L255P suffered most and the yields were 31.2, 24.3 and 31.5% (of control plots), respectively, when grown under flooded conditions. Flooded plots of 75-65RR and Nexera 1028 had more than 50% the yield as compared to their non-flooded plots. Flooded plots of 45M35 and 75-65RR produced statistically similar yield as of non-flooded Nexera 1028 plots.



Project findings

Test Canola varieties suffered significant yield losses from flooding. Flooded plots had shorter plants, which took more days to mature. In addition, canola plants had greater lodging, when grown under flooded conditions. In the current study, no canola variety exhibited flooding tolerance.

Background/References/Additional Resources

Interlake region is known for extreme moisture conditions. Often, soils are poorly drained due to presence of heavy clay and crops suffer yield losses due to flooding. PESAI site has Fyala soil and this soil type is considered as Class -3 agricultural capability due to limitations in high moisture conditions. Fyala soil is a poorly drained soil due to presence of clay particles throughout the profile.

Wet soils cause an oxygen deficiency, which reduces root respiration and growth in canola plants (Canola Council of Canada). Canola is quite susceptible to water logging and shows a yield reduction with additional effects on days to maturity and plant height if exposed to excess moisture in the earlier phase of crop growth. 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.

Materials & Methods

Experimental Design – Replicated block design

Treatments – Six canola varieties grown in Irrigated and Non-irrigated set ups.

Irrigated plots got 16” simulated rainfall during June 14 – Aug 10 in addition to natural rainfall.

Varieties – L230, L233P, Nexera 1028, 45M35, 75-65RR, DKTF92SC

Replications -three

Plot size – 9.12m²

Data collected – plant population, days to flower, days to maturity, plant height at maturity, lodging, yield

Agronomic information

Stubble, soil type – Fallow, Heavy clay

Fertilizer applied – N - 100 lbs/ acre, P- 30 lbs/acre at the time of seeding.

Pesticides applied – Sprayed Liberty @ 1 L/acre and Roundup@0.67L/acre on June 26.

Decis @45 ml/acre on June 12 and June 17 (for flea beetles)

Seeding/Harvesting date – May 30/Sep 6/26