Flooding Effects on Canola Growth and Yield

Project Duration: 2019-2021

Objectives

Canola plots were flooded at the early and late crop stages to assess the effects of flooding on crop growth and yield. Plots were also grown under non-flooding conditions for comparisons.

Collaborators

Canadian Agricultural Partnership funding
Curtis Cavers, AAFC Portage la Prairie

Results

Canola in control plots grew taller than in plots, where flooding was applied as indicated in Table 1. In addition, crop in control plots took less number of days to mature, whereas the early and late flooded canola matured much later. There was no difference in plant establishment between the control and flooded plots (data not shown). Late-flooded plots had more lodging than early-flooded or control canola plots.

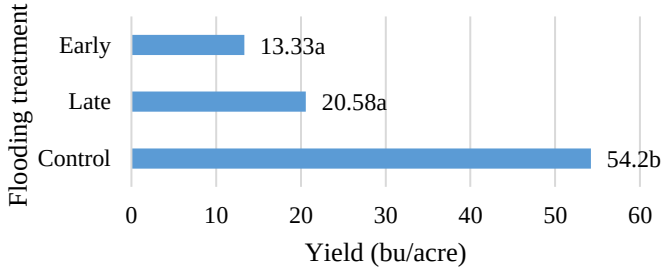
Table 1. Effect of flooding on canola growth.

Treatment	Days to maturity	Plant height (inches)	Lodging*
Early flooding	94.2	34.1	1.0 a
Late flooding	93.7	30.6	2.0 b
No flooding	84.0	40.4	1.0 a
P	0.0001	0.002	0.003
CV (%)	0.7	7.4	24.8

** Lodging on 1-5 scale; 1 = plants upright, 5 = plants flat on the ground.*
Means contain the same letter are not statistically different at P<005.

Flooding did have significant impact on canola yield and both the early and late flooding reduced canola yield (Figure 1). There was no difference in canola yield between the early and late flooded plots.

Fig. 1 Canola yield (bu/acre) as affected by flooding



Means contain the same letter are not statistically different at P<005.

Project Findings

Flooding significantly affected canola yield and flooded plots produced only 25-38% yield as compared to control canola plots. Canola in control plots grew taller and matured faster than the flooded canola plots. Lodging was more evident in late-flooded canola plots. The current study had only one canola variety (L233P) but this test will be expanded in the future by including more than one canola variety.

Background/References/Additional Resources

Extreme moisture in Manitoba causes significant losses to farmers. 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 (Canola Council of Canada).

Materials & Methods

Experimental Design – Replicated block design
Treatments – Canola grown in flooded (early and late) and Non-flooded set ups. Early flooding plots were flooded between June 20-July 4 and a total of 5 inches of flooding was applied in addition to natural precipitation. Flooding was started, when canola crop was at 2-3 leaf stage. Flooding was started in late-flooded plots on July 8, when the crop was at early flowering stage. Flooding continued until July 29 and a total of 7.5 inches of flooding was applied in addition to natural rainfall.
Varieties – L233P
Plot size – 9.12m^2
Data collected – plant population, days to maturity, plant height at maturity, 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 – No application
Seeding/Harvesting date – May 30/ Sep 6/11