Winter Canola Planting Date and Variety in Northwest Montana

Clint Beiermann[1]
[1]Montana State University, Northwest Ag Research Center, Kalispell, MT
E-mail: clint.beiermann@montana.edu

Introduction

- Montana produced 180,000 acres of canola in 2022 (USDA 2022).
- Winter canola has advantages over spring planted canola, including higher yield potential and earlier flowering and maturity.
- Poor establishment and winter survival have historically limited winter canola production in Montana.
- Planting time of winter canola has shown to effect establishment and yield in other environments (Assefa et al. 2014).

- **Objective: Determine the effect of planting date and variety on establishment and yield of winter canola.**

Materials & Methods

- A trial was conducted in 2021 and 2022 near Kalispell, MT.
- Split-plot design with four replications.
  - Main-plot: Planting date (Table 1).
  - Sub-plot: Canola variety (Table 1).
- Canola was planted at a six inch row spacing, target population 18 plants/ft^2
- Fertility management; nutrients broadcast applied in spring
  - Nitrogen: 210 lbs/acre
  - Phosphorus: 40 lbs/acre
  - Potassium: 35 lbs/acre
  - Sulfur: 20 lbs/acre
- Data collection: fall and spring stand count, canola yield, test weight, and oil content
- Data was analyzed utilizing ANOVA with Tukey's HSD

Table 1. Treatments

Planting Date	Canola Variety
August 15	Croplan 1022WC
	Croplan 225RR
	Croplan 320RR
	Rubisco Mercedes
	Rubisco PluraxCL
	Photosyntech Quartz
September 1	Croplan 1022WC
	Croplan 225RR
	Croplan 320RR
	Rubisco Mercedes
	Rubisco PluraxCL
	Photosyntech Quartz
September 15	Croplan 1022WC
	Croplan 225RR
	Croplan 320RR
	Rubisco Mercedes
	Rubisco PluraxCL
	Photosyntech Quartz

Results

- Planting after September 1st caused increased overwinter stand reduction in both seasons (Table 2; 3).
- Overwinter stand reduction was higher in the varieties Quartz and CP225RR in 2022 (Table 4).
  - Lowest overwinter stand reduction in the varieties CP320RR, CP1022WC, PluraxCL, and Mercedes.
- August 15 planting date yielded higher than September 15 in the 2021 growing season (Figure 1).
- Mercedes, Plurax, and Quartz were highest yielding varieties in 2021 regardless of planting date (Figure 1).
- Mercedes and Plurax were highest yielding across all planting dates, in 2022 (Figure 2).
- CP1022WC and Quartz yielded considerably lower when planted on September 15th (Figure 2).
- High yielding varieties in 2021 also had highest oil content (Table 5).

Table 2. Canola Stand and % Reduction 2021

Treatment	Fall Stand plants ft^{-2}	Spring Stand plants ft^{-2}	% Stand Reduction
August 15	14.38 b*	10.81 ab	23.21 a
September 1	14.96 b	11.91 a	17.92 a
September 15	17.12 a	9.81 b	41.59 b

*Treatments denoted by different letters are significantly different at α=0.05

Table 3. Canola Stand, Overwinter Stand Reduction, and Oil Content 2022

Treatment	Fall Stand plants ft^{-2}	Spring Stand plants ft^{-2}	% Stand Reduction	% Oil Content	Variety	Fall Stand plants ft^{-2}	% Oil Content
August 15	12.3 ab*	9.6 a	20.0 b	48.1 a	CP1022WC	11.8 abcd	47.2 cd
					CP225RR	12.4 abcd	46.5 def
					CP320RR	10.5 de	47.1 cde
					Mercedes	12.1 abcd	49.5 ab
					PluraxCL	12.4 abcd	48.2 c
					Quartz	14.3 abc	49.6 a
September 1	13.3 a	8.9 a	31.0 b	47.0 a	CP1022WC	14.3 abc	46.5 def
					CP225RR	13.5 abcd	45.9 efg
					CP320RR	11.3 bcd	45.5 fg
					Mercedes	14.1 abc	48.1 c
					PluraxCL	12.2 abcd	48.3 bc
					Quartz	14.4 ab	47.8 cd
September 15	11.3 b	2.3 b	78.8 a	44.7 b	CP1022WC	14 a	44 gh
					CP225RR	11.4 bcd	43 h
					CP320RR	11.2 cd	43.1 h
					Mercedes	11.3 bcd	47.8 cd
					PluraxCL	12.3 abcd	47.1 cd
					Quartz	6.9 e	42.6 h

*Treatments denoted by different letters are significantly different at α=0.05

Table 4. Canola Stand and % Reduction main effects 2022

Variety	Spring Stand plants ft^{-2}	% Stand Reduction
CP1022WC	8.6 a*	37 bc
CP225RR	6.3 ab	48 ab
CP320RR	7.6 a	29 c
Mercedes	8.6 a	41 bc
PluraxCL	7.4 a	39 bc
Quartz	5.9 b	64 a

*Treatments denoted by different letters are significantly different at α=0.05

Figure 1. Canola Yield 2021

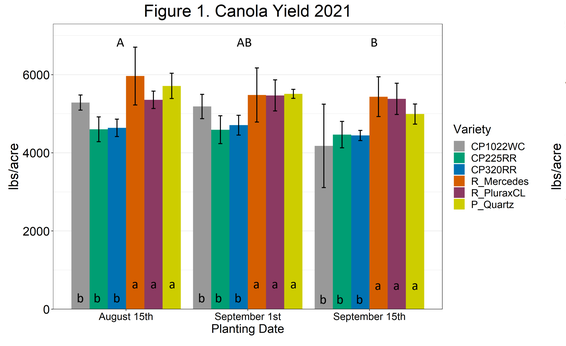

Figure 2. Canola Yield 2022

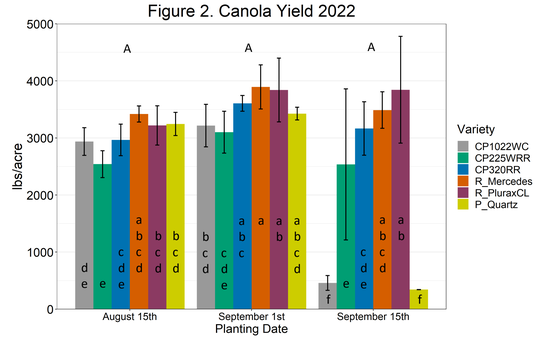

Table 5. Canola seed oil content 2021

Variety	% Oil Content
CP1022WC	48.3 b*
CP225RR	47.9 bc
CP320RR	47.4 c
Mercedes	51.2 a
PluraxCL	50.5 a
Quartz	50.4 a

*Treatments denoted by different letters are significantly different at α=0.05

Discussion & Conclusion

- Plant August 15 to September 1 for optimal stand establishment and overwinter survival.
- Early planting was beneficial to yield in 2021.
- Consider varieties that perform well at later planting dates if an optimal planting time cannot be achieved.
- Consider weed control options as well as yield potential when selecting a variety.

Literature

- Assefa Y, Roozeboom K, Stamm M (2014) Winter canola yield and survival as a function of environment, genetics, and management. Crop Sci 54:2303-2313
- USDA (2022) National Agricultural Statistics Service. Accessed: 18 November 2022 https://quickstats.nass.usda.gov/