Winter Canola Residue Trial – 2019/20

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Executive summary

The objective of this experiment was to assess the impact of crop residue (winter wheat or soybean) and tillage (no-till, strip till and conventional tillage) on the establishment, over winter survival and yield of winter canola. It has been previously reported that high levels of residue from the preceding crop has resulted in greater overwinter stand losses in winter canola, some of which has been attributed to slug feeding after fall emergence. In 2019/20, we did not observe any slug damage in our experiment. Stand losses during the fall and winter were generally acceptable in all treatments, however, they were lower when canola was seeded into soybean residue and in conventionally tilled plots. There was no difference in yield when canola was seeded into winter wheat or soybean residue but yields were higher in conventional and strip till than in no-till. These results suggest that crop residue and its management through tillage are important factors influencing the establishment, overwintering survival and yield of winter canola. The magnitude of these effects, however, were relatively small in 2019/20 and this suggests that winter canola can be successfully produced in southern Ontario using a wide range of crop management practices.

Trial Location

Harrow, Ontario, Canada
Location: 42°02'23.3"N 82°53'41.7"W
Soil type: 61% Sand, 31% Silt, 8% Clay
O.M = 1.6%
pH = 5.6

Residue treatments:

The residue treatments were managed with typical agronomy for each crop.

1) Winter Wheat – planted fall 2018
2) Soybeans – planted spring 2019

Winter canola planting treatments:

The canola hybrid Mercedes was planted in each of the following treatments on September 18, 2019:

1) No-till planting: Kinze planter with brush meter plates drilled on 15”
2) Strip till planting: 30” strips planted with the Monosem precision planter with plate 7212
3) Conventional till planting: 15” rows planted with the Monosem precision planter with plate 7212

Each canola treatment was planted in each residue type (both the winter wheat residue and the soybeans residue).

Plot size: Each plot was 6.3m by 8m long; only the three middle rows was harvested for the no-till and convention till plots and 2 rows was harvested for the strip-till plots.

Fall Fertilizer: Fall fertilizer blend 17.6-11.3-11.3-11.3(S) @ 197 Kg/ha
Spring Fertilizer: Spring fertilizer blend 38-0-0-6(S)-0.4(B) @ 437Kg/ha

- Total fall N: 35 Kg/ha (31 lbs/acre)
- Total spring N: 166 Kg/ha (148 lbs/acre)
- Total spring S: 26 Kg/ha (23 lbs/acre)
- Total spring B: 1.7 Kg/ha (1.5 lbs/acre)

Herbicide:

- Pre-plant burn down with Roundup (540g/L) @ 1.6 Kg a.i/ha
- Fall applied Assure II (96g/L) @ 48 g a.i/ha & Sure-mix @ 5% spray volume to control volunteer winter wheat and grasses.

Fungicide: None
Insecticide: None

Residue: The amount of residue left from each crop prior to winter canola planting was assessed by cutting all above ground plant material, drying it and weighing it.

- Winter wheat residue: 367.4 g/m^2
- Soybean residue: 415.1 g/m^2

Table 1. Winter canola emergence, fall and over winter stand loss and final spring population for 2019/20.

Crop residue	Tillage	Target density (plants/ha)	Fall emergence (plants/ha)	Stand loss Pre-winter (% of emergence)	Stand loss Post-winter (% of emergence)	Stand loss Total (% of emergence)	Spring population (plants/ha)
Wheat	No till	523,000	577,428	9.4	8.9	18.3	471,676
	Strip	437,000	410,105	7.5	9.7	17.2	339,646
	Conv.	593,000	374,016	11.7	1.9	13.6	323,011
	Mean		453,850	9.5	6.8	16.4	378,111
Soybean	No till	523,000	492,126	3.5	5.7	9.3	446,422
	Strip	437,000	331,365	11.7	0	11.7	292,629
	Conv.	593,000	393,701	1.8	1.9	3.7	379,099
	Mean		405,731	5.7	2.5	8.2	372,717

Pest Damage: Fall emergence counts were taken on 10 October 2019. A visual assessment of pest damage was performed throughout the fall with the final assessment and stand counts taken on 5 December 2019. The main pest of concern was slugs. During this particular fall there was no pest damage to account for besides some limited bird feeding on entire seedlings. Any stand loss during the fall was assumed to be a part of crop establishment.

Desiccation: To assist in harvest of the crop Reglone Desiccant (240g/L) was applied @ 400 g a.i/ha & Agral 90 @ 1L/100L of spray volume.

Harvest: July 6, 2020

Table 2. Winter canola yields (adjusted to 8.5%) for 2019/20.

Crop residue	Tillage	Target density (plants/ha)	Spring Population (plants/ha)	Yield (Kg/ha)	Yield (lbs/ac)	Yield (g/plant)
Wheat	No till	523,000	471,676	3141	2802	6.7
	Strip	437,000	339,646	3461	3088	10.2
	Conventional	593,000	323,011	3391	3025	10.5
	Mean		378,111	3331	2972	9.1
Soybean	No till	523,000	446,422	3050	2721	6.8
	Strip	437,000	292,629	3741	3338	12.8
	Conventional	593,000	379,099	3778	3371	10
	Mean		372,717	3523	3143	9.9