Intercropping: Pea-Cereal Silage

Project duration: May 2020 – August 2020
Objectives: To evaluate pea-cereal intercrop mixes for silage production
Collaborators: PCDF

Background
Silage plays an important part in the Manitoba livestock industry. Corn silage provides high yields, relative to barley silage (14 t/ac, over 7.5 t/ac, 2020 Silage Cost of Production, MARD). In the Parkland area, the yield for corn silage is variable and many producers opt to produce a cereal silage, such as barley or oat. Some producers have explored pea-cereals mixtures as a means to increase silage protein content. PCDF is eager to explore options for cereals silage production.

Results
The silage was harvested at soft-dough stage (65% moisture). The wet silage yields (t/ac) for treatments are shown in Figure 1, and dry yields (lb/ac at 15% moisture) are shown in Figure 2. The results are for 2019 and 2020.

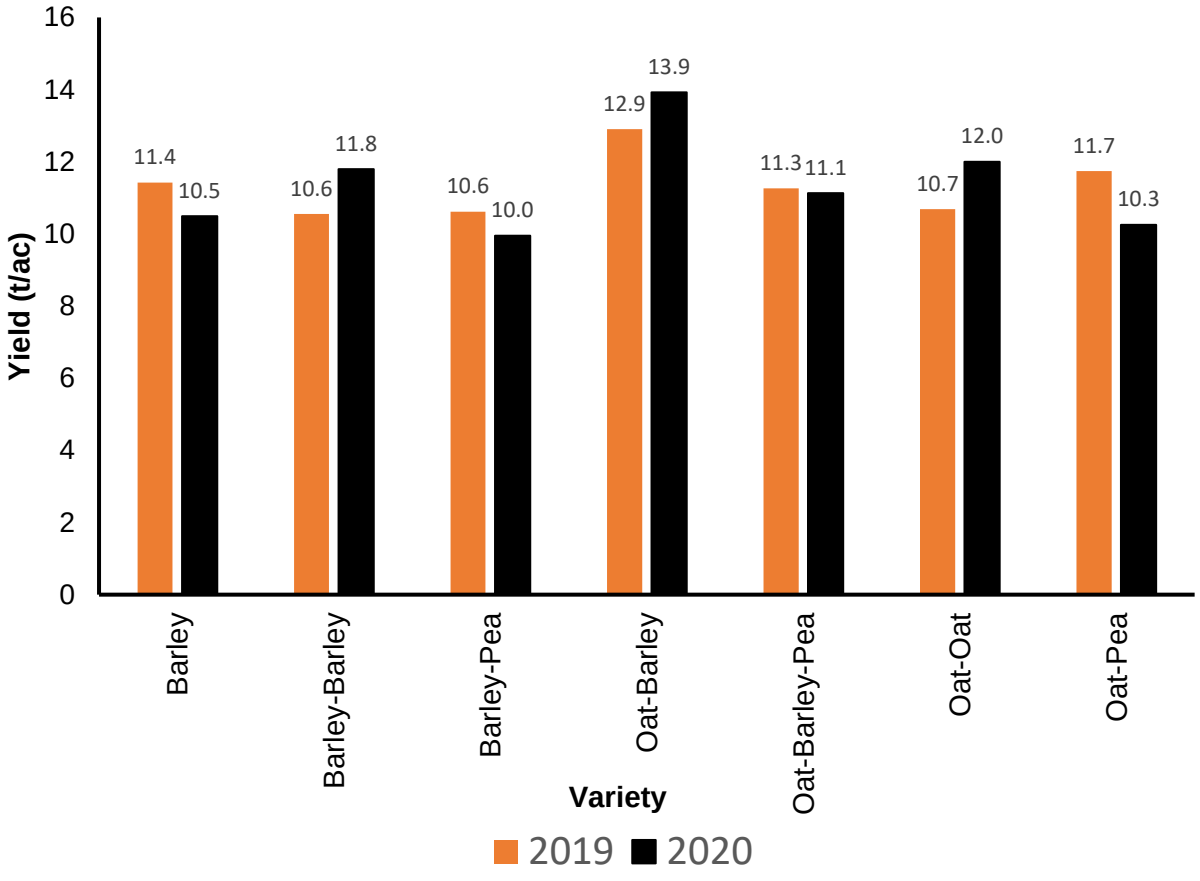

Figure 1: Wet silage yield (t/ac) by treatment, adjusted to 65% moisture.

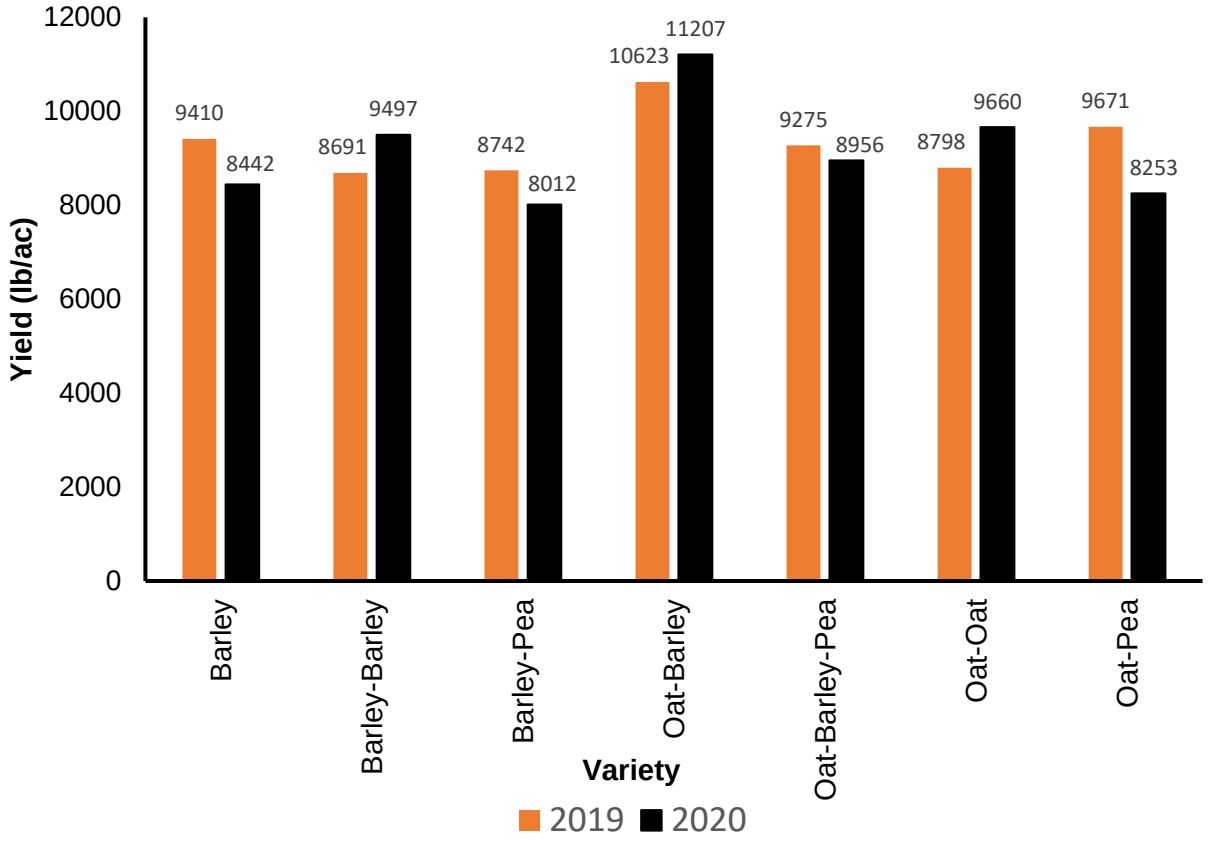

Figure 2: Yield (lb/ac) by treatment, adjusted to 15% (hay) moisture.

The results for silage yield differ statistically by treatment (Table 1). Oat-barley yields were significantly higher than other treatments (A). Yields for treatments including pea were not statistically different from the barley-only treatment (C).

Table 1: Summary of statistical information for 2020 silage yield

Entry	Statistical significance: wet and dry*		
Barley-only		B	C
Barley-Barley		B	
Barley-Pea			C
Oat-Barley	A		
Oat-Barley-Pea		B	C
Oat-Oat		B	
Oat-Pea		B	C
CV (%)	13.8		
LSD (0.05)	1.8		

* Wet = 65% moisture; dry = 15% moisture. Treatments not marked with the same letter are statistically different from other treatments.

The feed values for each treatment, as well as recommendations, are shown in Table 2.

Table 2: Feed values for silage by treatment compared to animal feed requirements*

Entry	% Crude Protein	% TDN
Barley	8.21	58.86
Oat-oat	7.78	61.46
Barley-barley	8.24	60.51
Oat-barley	7.14	63.19
Barley-pea	10.91	60.65
Oat-pea	9.12	59.26
Oat-barley-pea	8.84	60.43
Animal feed requirements		
Mature cows		
Mid gestation	7	50-53
Late gestation	9	58
Lactating	11-12	60-65
Replacement heifers	8-10	60-65
Breeding bulls	7-8	48-50
Yearling bulls	7-8	55-60

* Animal feed requirements developed by Elisabeth Nernberg (ARD).

Observations

The silage was prepared by running the harvested material from each plot through a plant shredder. The oat-barley treatment appears to be a promising option, both for higher yields relative to other treatments (Table 1) and higher TDN values (Table 2). However, this treatment will not provide enough protein to meet all animal feed requirements.

Materials and methods

Experimental Design: Random Complete Block Design
Entries: 7
Replications: 3
Seeding: May 25
Harvest: Aug 12

Barley-oat silage allows for good weed control, but there are no herbicides registered for barley-oat-pea silage intercrops. Good weed control prior to seeding is crucial. The trial was hand-weeded.

Table 3: Treatments, seeding rates and seeding costs

Treatments	Percent of Monocrop Seeding Rate	Seeding Rate (lb/ac)	Cost per acre
Barley (Maverick)	100	90	$14.91
Barley-barley (Maverick-Austenson)	75-75	68-68	$22.53
Barley-pea (Maverick-Lacombe)	25-100	22-150	$34.89
Oats-oats (Haymaker-Summit)	75-75	68-68	$28.40
Oats-barley (Haymaker-Maverick)	75-75	22-150	$26.16
Oat-pea (Haymaker-Lacombe)	25-100	22-150	$36.07
Oats-barley-pea (Haymaker-Maverick-Lacombe)	12.5-12.5-100	11-11-150	$35.48

Data collected	Date Collected
Pea Emergence:	Jun 2-4
Cereal Emergence:	Jul 5-7
% Emergence:	Jul 11-18
Plot Wet Weight:	Aug 12
Plot Dry Weight:	Sep

Agronomic info	
Previous year's crop:	Barley Silage
Soil Type:	Erickson Loam Clay
Landscape:	Rolling with trees to the east
Seedbed preparation:	Heavy harrowed

Table 3: Fertility Information

	Available	Added	Type
N	72 lb/ac	none	N/A
P	22 ppm	10 lb/ac	11-52-0-0
K	257 ppm		
Inoculant added			