

Report on 2017 Study:

Evaluation of OP lines and varieties for suitability for commercial production in Manitoba

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Similar to 2016, the 2017 experiment consisted of evaluating 10 entries (8 OP varieties, plus 2 WCC/RRC checks). Eight varieties were sourced from different breeders with interest in OP development. The inclusion of the WCC/RRC checks allowed a relative comparison with the commercial hybrids currently sold on the market in Western Canada. Three (3) varieties from the 2016 lineup were excluded due to poor performance or inadequate quality. These varieties (highlighted in the table below) were replaced by 3 other varieties supplied by the same breeders.

The experiment was again run at 7 locations in 4 replications per location. In addition, in 2017, the varieties were evaluated for resistance to blackleg at 2 locations, Carman and Minto.

The varieties used in the study:

ENTRY	2017	2016	Company	Comment
1	5440	5440	Bayer	WCC/RRC check
2	45H29	45H29	Dupont Pioneer	WCC/RRC check
3	AC Excel	AC Excel	AAFC	Old registered conventional variety, currently grown in MB
4	A05-6NI	A05-6NI	Univ. Alberta	Clearfield experimental line, recommended for registration
5	Bounty Gold	72P01 CL	Univ. Alberta	Clearfield variety, registered in Canada
6	Alfa Gold	Alfa Gold	Univ. Alberta	Clearfield variety, registered in Canada
7	PSL 11	PSL 11	Parsons Seed	Experimental conventional line, not registered in Canada
8	PSL 385	PSL 385	Parsons Seed	Experimental conventional line, not registered in Canada
9	PSL 215	PSL 427	Parsons Seed	Conventional line, not registered in Canada, in testing in EU
10	PSL 488	PSL 120	Parsons Seed	Conventional line, not registered in Canada, in testing in EU

The 2017 locations and contract research organization (CRO) used in the study:

Location	CRO	Comment
Carman	UofM	Marginal, yields low yields due to drought stress
Winnipeg	UofM	Trial cancelled early due to seeding error
Portage	UofM	Very good site
La Salle	Haplotech	Uniform site, yields lower due to drought stress
Arborg	PESAI	Some hail damage, data useful
Melita	WADO	Stand establishment issues, but recovered and filled in nicely, data useful
Minto	AgQuest	Very good site
Minto BL	AgQuest	Site uniform, blackleg pressure lower than allowable by WCC/RRC
Carman BL	Haplotech	Site uniform, blackleg pressure lower than allowable by WCC/RRC

Beausejour site was dropped at the request by PESAI and replaced by La Salle with approval of MCGA. The site in Winnipeg was damaged due to seeding error. Six of the seven sites produced useful data which is above average for 2017. Two blackleg locations, Minto and Carman, produced data which allowed some comparison. However, the disease pressure was lower than allowable by WCC/RRC (Westar rating of 2.6) and therefore could not be used to assign blackleg resistance ratings.

RESULTS AND COMMENTS

2017 yield in bu/ac and percentage of the WCC/RRC check (average of 5440/45H29)

EN	NAME	Arborg %		Carman %		Melita %		Minto %		Portage %		LaSalle %		AVERAGE %	
1	5440	77.4	106.0	39.3	101.7	66.8	102.9	76.4	104.3	41.1	95.6	34.9	93.4	56.0	100.7
2	45H29	68.6	94.0	37.9	98.3	63.0	97.1	70.0	95.7	44.9	104.4	39.8	106.6	54.1	99.3
3	AC Excel	32.5	44.5	31.2	80.8	51.1	78.7	55.7	76.0	35.6	82.7	18.2	48.8	37.4	68.6
4	A05-6NI	49.3	67.6	13.9	35.9	50.1	77.2	43.4	59.3	33.5	77.7	27.5	73.7	36.3	65.2
5	Bounty Gold	54.8	75.1	17.0	43.9	51.2	78.9	57.8	78.9	39.7	92.2	33.9	90.6	42.4	76.6
6	Alfa Gold	58.0	79.4	14.0	36.4	54.7	84.3	55.4	75.7	36.9	85.7	32.7	87.6	42.0	74.9
7	PSL 11	47.9	65.6	24.8	64.3	47.3	72.9	61.0	83.3	35.4	82.2	26.1	69.9	40.4	73.0
8	PSL 385	57.3	78.5	25.7	66.7	52.4	80.8	62.9	85.9	34.7	80.6	31.3	83.7	44.1	79.4
9	PSL 215	48.6	66.6	17.8	46.2	53.6	82.6	62.8	85.8	26.6	61.7	25.9	69.3	39.2	68.7
10	PSL 488	53.2	72.9	28.2	73.1	58.5	90.1	59.1	80.8	36.5	84.7	25.1	67.3	43.4	78.1
	CV*	10.9%		14.5%		10.1%		8.2%		11.4%		10.7%			

*CV is the coefficient of variation, indicates the precision of the experiment. The lower value indicates lower error (higher precision). Usually data from trials with CV higher than 15% is not used.

The best yielding OP varieties yielded just under 80% of the check (i.e. around 20% lower than the check). That would put these OP varieties at 15-25% below the majority of commercial hybrids. The table further below shows the average over both 2016 and 2017.

Agronomic and quality data (average of all locations)

ENT RY	NAME	OIL		PROTEIN		GLUCS		SATURATES		DTM		Height cm	Lodging (1-5)
		%	+/- ck	%	+/- ck	μmol/g	+/- ck	(% of total)	Days to mature				
1	5440	47.1	-0.6	43.0	-0.1	10.6	-0.9	6.1	-0.1	92.2	0.4	119.0	1.3
2	45H29	48.4	0.6	43.2	0.1	12.3	0.9	6.4	0.1	91.3	-0.4	119.3	1.4
3	AC Excel	46.3	-1.4	45.6	2.5	11.5	0.0	6.6	0.3	92.2	0.4	114.3	1.7
4	A05-6NI	45.7	-2.0	43.3	0.2	10.3	-1.2	6.3	0.1	91.7	-0.1	98.5	2.0
5	Bounty Gold	45.1	-2.6	44.4	1.3	10.7	-0.8	6.3	0.0	91.4	-0.4	111.4	1.4
6	Alfa Gold	45.5	-2.3	46.4	3.3	12.5	1.0	6.3	0.0	95.7	4.0	115.4	1.2
7	PSL 11	46.4	-1.3	45.3	2.3	12.4	1.0	6.4	0.1	91.9	0.1	113.8	1.3
8	PSL 385	47.2	-0.5	44.2	1.1	10.8	-0.7	6.5	0.3	96.2	4.4	133.5	1.2
9	PSL 215	45.6	-2.1	43.9	0.8	12.9	1.5	6.8	0.5	97.3	5.6	125.8	1.0
10	PSL 488	46.8	-0.9	42.7	-0.4	13.3	1.9	6.8	0.6	94.8	3.1	121.0	1.0

Oil – highlighted values will meet the current requirements for registration. Data t shows that most of the OP entries were not meeting the requirements for registration in Canada.

Protein – none of the entries seems to have a problem meeting the requirements for registration.

Glucosinolates – the lower the better, only the last two varieties are marginally not meeting the requirements for registration.

Saturates – entries 8, 9 and 10 would not meet the requirements for variety registration.

Days to maturity (DTM) relative to the checks ranges from -0.1 days earlier to 5.6 days later. It is questionable if the varieties in the latest maturity range are adapted for the growing conditions in Manitoba. The highest yielding variety is also the tallest and latest maturing.

Lodging is scored on 1 to 5 scale, 1 being the best (no lodging) and 5 the worst (flat). None of the varieties showed excessive lodging as compared to the WCC/RRC checks (5440 outstanding, 45H29 moderate to strong).

Blackleg resistance data (average score of 25 plants per rep, 100 plants per entry).

Rating scale 0-5 (0 = no symptoms, 5 = dead or entire stem cross-section infected).

ENTRY	NAME	Carman BL	Minto BL	AVG
1	Westar	1.8	2.4	2.1
2	Resistant check	1.3	0.6	0.9
3	AC Excel	1.1	0.9	1.0
4	A05-6NI	1.3	0.8	1.0
5	UA Bounty Gold	1.3	1.0	1.1
6	UA Alfa Gold	1.2	0.6	0.9
7	PSL 11	1.2	0.9	1.0
8	PSL 385	0.7	1.2	0.9
9	PSL 215	1.2	1.0	1.1
10	PSL 488	1.2	0.6	0.9

Unfortunately, the disease pressure was too low to make definite conclusion about rating of the varieties. Most entries did not show severe weakness and scored about the same as the resistant check used in the trials.

Yield average over two years.

ENTRY	2016 YIELD (bu/ac, % chk)			2017 YIELD (bu/ac, % chk)			AVG (bu/ac, % chk)	
	Yield	% chk	% chk	Yield	% chk	% chk	Yield	% chk
1	5440	50.7	99.2	5440	56.0	100.7	53.9	100.1
2	45H29	49.8	100.8	45H29	54.1	99.3	52.4	99.9
3	AC Excel	35.9	72.9	AC Excel	37.4	68.6	36.8	70.3
4	A05-6NI	37.8	78.0	A05-6NI	36.3	65.2	36.9	70.3
5	72P01 CL	36.5	74.5	Bounty Gold	42.4	76.6		
6	Alfa Gold	41.6	83.1	Alfa Gold	42.0	74.9	41.8	78.2
7	PSL 11	40.9	81.4	PSL 11	40.4	73.0	40.6	76.4
8	PSL 385	42.5	86.1	PSL 385	44.1	79.4	43.5	82.1
9	PSL 427	37.5	76.1	PSL 215	39.2	68.7		
10	PSL 120	38.4	76.9	PSL 488	43.4	78.1		

The best OP varieties performed at approx. 20% below the hybrid checks. The performance of the OPs in 2017 was slightly poorer in comparison to 2016. This could be due to the elevated environmental stress (drought/heat) in 2017 as it is established that hybrids have greater advantage under stressful conditions.

None of the varieties had a claim on any value added trait, e.g. clubroot resistance, improved blackleg resistance, pod-shatter tolerance etc.

Note that the hybrid checks are very strong performers. Majority of newly developed hybrids do not outperform the average of 5440 and 45H29 in WCC/RRC. However, usually only the best performing hybrids are commercialized. It would be fair to assume that the commercial hybrids are at least as good as the hybrids and some are significantly (5-6%) above the checks.

With the average yield of 43.7 bu/ac over two years and yield penalty of 20-25%, the growers will have to give up 8-10 bu/ac for growing OP varieties. At current prices of \$11.25/bu (#1CR; MANITOBA MARKETS GRAINS AND OILSEEDS, November 3, 2017), this equals \$100-\$122/acre. Lower yields and canola prices tend to favour OPs but it is unclear what the break-even point is. A proper economic analysis will have to include:

- detailed seed pricing, including variety of treatments and value added traits;
- analysis of the risk associated with extreme situations such as losing the entire crop.

Dr. Rale Gjuric will be available for questions and further discussion on the study.

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