

SHORT-SEASON VARIETY SELECTION & AGRONOMIC PERFORMANCE

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ABSTRACT

The main limiting factor to producing high quality crops in the Peace River Region is the short, cool growing season. Having varieties adapted to thrive under these unique conditions is vital to the success of farming in the North. By reducing the number of days required to mature, the possibility of producing a high quality crop is increased. Triticale is the only crop, which excelled, CWRS, Barley, Oats and Canola while not meeting the goal all had notable early varieties. CPS/CWES and Flax unfortunately did not see similar improvements.

INTRODUCTION

The Peace River Region is known for its unique growing season with long daylight hours, cool weather and moist growing conditions which produce unpredicted crop and variety responses. It is therefore essential to evaluate new materials in this environment to see how they will respond under these conditions, hence the existence of the B.C. Grain Producers Research team. This short growing season is the number one challenge producers must overcome when attempting to grow a high quality crop, which is why it is the objective of this project to encourage the development and adoption of new short-season varieties specifically suited for this region. This provides the producers with a greater range of choices to plant, as well as the ability to grow high quality crops. The goal is to see the number of days required to reach maturity reduced in the top 20 percent yielding varieties in any given crop over the five-year study. Successful varieties will be earlier by seven days in the wheat, barley, oats, argentine canola and field peas, and by 14 days in the triticale and flax. These goals are over and above the average maturity of the check variety as entered in the 2001 Field Crop Variety Performance Book for the B.C. Peace River Region.

MATERIALS AND METHODS

Two farm sites are used to collect data: the first is located in the South Peace at Dawson Creek, the other is in the North Peace at Fort St. John. The sites are

kept as identical as possible and are treated equally throughout the season. Plots are planted, maintained, analyzed and harvested according to proper research protocol.

The following procedures were used to determine the Days to Maturity:

Cereals: whole-head dry-down samples were collected, weighed immediately in-laboratory, dried down completely in an air drier and weighed immediately after drying to prevent any moisture accumulation. Physiological maturity is said to occur at 20 percent head moisture.

Wheat: 20 heads with minimal stem were cut at random per plot.

Barley: 20 heads with minimal stem were cut at random per plot.

Oats: 20 panicles were stripped of seeds at random per plot.

Canola: maturity was determined using the Canola Council of Canada's definition. Please see Figure 1 below.

Peas: visited at weekly intervals to record percent color change, 80 percent change is classified as physiologically mature.

Data used from the books is an accumulated average; the 2001 book uses the years between 1996 and 2001, while the 2006 book uses data from 2002 to 2006. Unfortunately, there was one small detail which was overlooked: the system used for both wheat and barley in 2001 cannot be converted into days to maturity. Therefore both wheat and barley use the average from the 2006 book; this is based on the assumption that the checks have minimal movement across years. In both books, the data is listed as Days to Maturity plus or minus the check; this places the check at zero while placing the remaining varieties relative to it.

The conversion back into actual days can be found in the appendix. The varieties were then organized by yield, with the top 20 percent being compared to the 2001 check variety. The following table lists what was used: listing the 2001 check varieties, and the goal days to maturity, which is used as the comparison. The goal DTM is: seven days early than 2001 for wheat, barley, oats, Argentine canola and field peas, with 14 days early than 2001 for triticale and flax.

Table 1. 2001 and Goal Days to Maturity (DTM) for check variety

Crop	Check Variety	2001 DTM	Goal DTM
Wheat	Katepwa (CWRS)	111*	104
	AC Taber (CPS)	118*	111
Barley	Harrington	99.5*	92.5
Oats	Cascade	109	102
Canola	Legacy	121	111
Peas	Carrerra (yellow)	108	101
	Nitouche (green)	109	102
Triticale	Pronghorn	144	130
Flax	Norlin	138	124

* 2001 DTM is actually an average of 2002-2006 as the prior system was not transferable.

RESULTS

- CWRS did not meet the goal of 104 days to mature, it does however have some noteworthy varieties including: CDC Go, CDC Osler, Alvena and BW315a, which all matured at 109 days, five days short of the goal. Both Alvena and BW315a are first year entries and therefore have limited data. BW315a is the only variety from the top 20 percent yielding varieties.
- CPS unfortunately does not meet the goal, nor does it have any notable varieties.
- Barley also did not have any varieties meet the goal, however Conlon comes very close, maturing at 64 days, only one and a half days short of the goal. Conlon was in the top 20 percent yielding varieties and therefore is a great prospect.
- Oats had varieties meet the goal of 102 days, however none of them were part of the top 20 percent yielding. These include: Lu (100.7), AC Juniper (101.5) and SW Betania (102.4). It is also relevant to add that the check Cascade improved immensely, likely due to a change in weather patterns; 2001 showed it at 109 days to mature while in 2006 it was earlier at 103.5 days.
- Canola had only one variety worth noting, and that is Peace maturing at 115 days, only one day later than the goal. However, it is one of the lowest yielding varieties. 10 varieties out of the 13 top yielding varieties

- are first year entries, therefore have very limited data: this could be explained by the improvements made to herbicide-tolerant genetics.
- The yellow field peas have two notable varieties, neither of which made it into the top-yielding group. Both Swing and SW Circus matured at 102 days, only one day later than the goal.
 - Green field peas did have one variety meet the goal, Vortex, however it is not located in the top 20 percent yielding and it is a first year entry.
 - The crop of Triticale surpassed its goal of 14 days in more than just the top 20 percent. Tyndal is the top yielding variety with 124.2 days to maturity; this value unfortunately is based on only one year's worth of data, as it is a new entry. However, the varieties of AC Ultima (120.0), Companion (123.8) and well as the check Pronghorn (124.0) all met the stated goal, possibly due to a shift in weather patterns of late to drier warmer seasons, preferred patterns for most Triticale. It is also significant that between the top and bottom yielding varieties there is only a difference of six pounds per bushel per acre.
 - The last crop discussed is that of flax, despite the attempts to produce a successful early variety, none reached the outlined goal.

CONCLUSION

Overall, the crop of triticale was the most successful, with the majority of its varieties meeting the goal. However, while the other crops did not meet the goal specifically, all were successful. The goal was to witness and identify the introduction of earlier varieties; this was seen in most of the crops, unfortunately just not in the top yielding varieties. Genetically, breeders will claim it is a difficult matter to improve maturity while maintaining yield to that of later materials, at least while using traditional breeding methods. Thus, there is still a lot of room for improvements, however the past couple of years have shown a huge step forward. The goal of developing and adapting both new and old varieties will be an ongoing process as long as there are farmers attempting to grow crops under the unique conditions seen here in the Peace River Region.

LITERATURE CITED

2001. Field Crop Variety Performance for the B.C. Peace River Region.
Published by the B.C. Grain Producers Research Association.

www.bcgrain.com.

2006. Field Crop Variety Performance for the B.C. Peace River Region.
Published by the B.C. Grain Producers Research Association.

www.bcgrain.com.

APPENDIX I

CWRS 2003-2006

Variety DTM Height BU Wgt DTM
 +/- check cm lbs/bu **Katepwa is at 111**

BW315a *,**		-2	63	65	109.5	Top 20%
Prodigy		1.7	79	65	112.7	
5500 HR		2.5	76	64	113.5	
Superb		2	74	64	112.8	
Harvest		-1	72	64	110.1	
5601HR		2	86	64	113.4	

CDC Go		-1	71	64	109.8
5602HR		3	78	64	113.7
Journey		3	77	63	113.6
Snowbird**		1	77	63	111.8
AC Barrie		1	75	63	112.5
Alikat		0	73	63	111.1
CDC Osler		-2	73	63	109.2
Lillian		0	81	63	110.6
Katepwa		0	78	63	111.0
Kanata**		1	66	63	111.5
McKenzie		3	80	63	113.6
Alvena *		-2	61	63	109.0
AC Intrepid		0	78	63	110.9
Lovitt		0	81	63	111.1
Park		0	77	63	110.7
Peace		3	75	63	113.8
CDC Teal		0.1	76	63	111.1
Infinity		0	71	63	111.4
CDC Imagine		-1	73	62	110.3
CDC Alsask		0	76	62	110.6
AC Splendor		-1	75	62	110.1
BW 301		0	83	62	111.1
Somerset *		-1	63	61	110.0

varieties not tested in 2006 (averages 2002-2005)

* first year entries

check is in bold

CPS/CWES 2002-2006

Variety **Type** **DTM +/- check** **Height cm** **BU Wgt lbs/bu** **DTM**
AC Taber is at 118

CDC Rama	CWES	-1	87	64	117.2	Top 20%
5700PR	CPS red	0	68	64	118.0	
AC Crystal	CPS red	0	68	63	117.6	
AC Barrie	CWRS	-4	76	63	114.3	
AC Taber	CPS red	0	67	63	118.0	
Amazon	CWES	0	87	63	118.4	
Snowwhite475 (HY 475)	CPS white	-2	70	63	115.5	
Snowwhite476 (HY 476)	CPS white	0	74	63	118.2	
5701PR	CPS red	-1	69	63	117.3	
AC Foremost	CPS red	-1	66	63	116.6	

varieties not tested in 2006 (averages 2002-2005)

* first year entries

check is in bold

Barley 2002-2006

Variety	Type	DTM +/- check	Height cm	BU Wgt lbs/bu	DTM
Millhouse *	2 row	0		59	99.3
Tyto *	6 row	0		58	99.4
CDC Cowboy	2 row	-1	90	55	98.2
Formosa *	2 row	1		55	100.1
CONLON	2 row	-5	75	55	94.3
CDC Trey	2 row	-1	68	55	98.6
Newdale	2 row	1	65	54	100.8
Ponoka	2 row	2	69	54	101.0
Sundre (BT566)	6 row	1	78	54	100.5

Top 20%

Seebe	2 row	4	76	54	103.1
CDC Helgason	2 row	-1	68	54	98.6
XENA	2 row	1	67	54	100.6
AC Metcalfe ¹	2 row	0	68	53	99.6
McLeod	2 row	2	59	53	101.7
CDC Dolly	2 row	4	59	53	103.1
Harrington	2 row	0	65	53	99.5
Calder	2 row	0	69	53	99.4
Kasota	6 row	-2	57	52	98.0
Niobe	2 row	1	63	52	100.0
Tradition	6 row	-2	69	52	97.1
Merit	2 row	5	66	52	104.5
CDC Clyde	6 row	-3	66	52	96.6
CDC Select	2 row	3	63	52	102.0
CDC Copeland	2 row	2	74	52	101.6
B1602	6 row	-3	67	52	96.6
Vivar	6 row	0	63	52	99.9
AC Albright	6 row	-2	73	52	97.3
CDC Kendall	2 row	0	61	51	99.8
Rivers	2 row	1	61	51	100.0
CDC Bold (sd)	2 row	1	59	51	100.4
Mahigan (sd)	6 row	-2	53	51	98.0
CDC Battleford	6 row	-1	71	51	98.8
Trochu	6 row	-2	66	51	97.9
LEGACY	6 row	-2	68	51	97.9
Lacey	6 row	-1	63	51	98.2
Manny	6 row	-1	74	50	98.9
CDC Sisler	6 row	0	77	50	99.4
CDC Springside	6 row	-2	72	50	97.2
AC Rosser	6 row	3	63	50	102.9
CDC Tisdale	6 row	-1	73	49	98.4
AC Lacombe	6 row	-1	68	49	98.9
AC Harper	6 row	1	62	48	100.2
Stellar-ND *	6 row	0		45	99.1
CDC YORKTON	6 row	-3	59	45	96.5

varieties not tested in 2006 (averages 2002-2005)

* first year entries

check is in bold

Oats 2003-2006

DTM Height BU Wgt DTM
 +/- check cm lbs/bu **Cascade is at 103.5**

Ronald	1	67	43	104.8
AC Mustang	1	82	42	104.4
CDC Orrin	3	78	42	106.3
7600M (OT 566)	0	79	42	103.4
AC Morgan	2	77	42	105.7
AC Jordon *	3	58	42	106.6
Cascade	0	85	42	103.5
Hi Fi *	0	44	41	103.7
CANMORE *	2	46	41	105.8
Leggett	2	71	41	105.2
AC Juniper	-2	76	41	101.5
SW Betania	-1	69	41	102.4
Lu	-3	73	41	100.7
CDC Dancer	0	49	41	103.1
CDC Weaver	5	74	40	108.5
CDC Baler	6	87	40	109.9
Murphy	2	92	40	105.6
Furlong	1	80	40	104.7
CDC Sol-Fi	0	81	39	103.4

Top 20%

* first year entries
check is in bold

Argentine Canola 2003-2006

Variety Yield Avg. DTM DTM
% of 46A65 +/-' check 46A65 is at 124

46P50 *	139	2	126
v1035 *	138	-3	121
9590 *	131	-3	121
45H26 *	128	-9	115
45P70 *	128	-3	121
1852 H *	127	-3	121
45H73 *	126	-4	120
1818 *	126	3	127
SP 621 RR *	125	-3	121
1759 S *	123	-1	123
5020	123	-3	121
5070	123	1	125
71-45 RR	121	0	124

Top 20%

5030	116	1	125
74P00 LL *	116	3	127
45H24	113	-4	120
9551	112	2	126
v1030	111	-2	122
SW 9803	111	-2	122
SP Desirable RR	111	-1	123
45H25	110	-4	120
v1031	109	0	124
45H21	109	-2	122
821RR (SW G5251 RR) *	108	4	128
46H02	108	2	126
Café *	107	-6	118
32-75	107	-2	122
997 RR *	106	-2	122
InVigor® 2733	106	-5	119
45H72	106	1	125
46H23	106	3	127
SP Favourable RR *	104	-1	123
9451	104	1	125
292CL	104	4	128
LBD644RR	104	0	124
Prairie 719RR	103	-1	123
71-25 RR (AV 9525)	103	-3	121
SP Banner	102	-1	123
LBD612RR	102	1	125
Manor	102	5	129
1839 V	100	-3	121
1896	100	-1	123
34-55	100	4	128
46A65	100	0	124
225RR	100	1	125

Variety Yield Avg DTM DTM
% of 46A65 +/-' check 46A65 is at 124

71-20 CL	100	-4	120
9550	100	-2	122
43A56	98	-8	116
SW 6802	98	-1	123
SW 3950	98	1	125
46H70	97	5	129
5108	97	-4	120
289 CL (AV 9289)	96	0	124
FortuneRR	96	1	125
624RR *	96	5	129
829RR *	96	7	131
Reaper	96	5	129
SW GladiatoRR	92	-3	121
SP Force CL *	92	0	124
SP Deliver CL	91	1	125
LBD449RR	90	0	124
Peace	86	-9	115
NEX 822 CL *	85	3	127
NEX 828 CL *	82	6	130

varieties not tested in 2006 (avg. 2003-2005)

* first year entries

check is in bold

Field Peas 2002-2005

Yellow

Variety **Yield Avg. DTM** **DTM**
 % of Carrei +/-'-' chec **Carrera is at 104**

SW Carousel	113	4	108	Top 20%
SW MIDAS	109	2	106	
CDC Bronco	109	8	112	
<i>SW Cabot *</i>	109	3	107	
Miser	108	6	110	
Eclipse	108	6	110	
CDC Minuet	107	3	107	
CDC Mozart	107	4	108	
Cutlass	107	6	110	
Tudor	104	6	110	
Carneval	103	4	108	
CDC Golden	101	3	107	
DS-Admiral	101	4	108	
Carrera	100	0	104	
DELTA	100	0	104	
Swing	99	-2	102	
<i>SW Marquee *</i>	99	10	114	
CDC Handel	96	6	110	
SW CIRCUS	96	-2	102	
Topeka	95	2	106	

varieties not tested in 2005 (averages 2002-2004)

check is in bold

Green

Variety **Yield Avg. DTM** **DTM**
 % of Nitouc +/-'-' chec **Nitouche is at 108**

Carneval (yellow pea)	111	-1	107	Top 20%
COOPER	110	7	115	
Stratus	108	5	113	
Camry	107	4	112	
Nessie	105	-2	106	
Nitouche	100	0	108	
CDC Striker	97	0	108	
<i>Vortex *</i>	96	-6	102	
TOLEDO	94	-2	106	
<i>CDC Sage *</i>	87	1	109	

varieties not tested in 2005 (averages 2002-2004)

* first year entries

check is in bold

Triticale 2003-2006

Variety	DTM +/- check	Height (cm)	BU Wgt (lbs/bus)	DTM Pronghorn is at 124
<i>Tyndal</i> *	0	68	59	124.2 Top 20%
<i>Bunker</i> *	4	68	58	128.5
AC Ultima	-4	87	57	120.0
Pronghorn	0	90	56	124.0
Companion (forage type)	0	104	53	123.8
AC Alta	3	87	53	126.8

varieties not tested in 2006 (averages 2002-2005)

* first year entries

check is in bold

Flax 2002-2005

Variety	Yield Avg. % of Norlin	DTM +/- check	DTM Norlin is at 127
<i>Flanders</i> *	104	9	136.3
CDC Bethune	103	7	133.9

Top 20%

<i>CDC Sorrel</i> *	101	6	132.8
Hanley	100	3	129.8
NorLin	100	0	127.0
^1084	97	12	139.0
^2149 *	95	9	135.8
Taurus	95	8	135.0
Macbeth	94	7	133.5
^2090	88	7	134.3
^2047	80	10	136.6

varieties not tested in 2005 (averages 2002-2004)

* first year entries

check is in bold