

CDC Bow

Highlights:

- ★ Medium-high grain protein content
- ★ High extract
- ★ Medium-high enzyme levels
- ★ Low beta-glucan content
- ★ High FAN levels
- ★ High fermentability
- ★ Good overall brewhouse performance

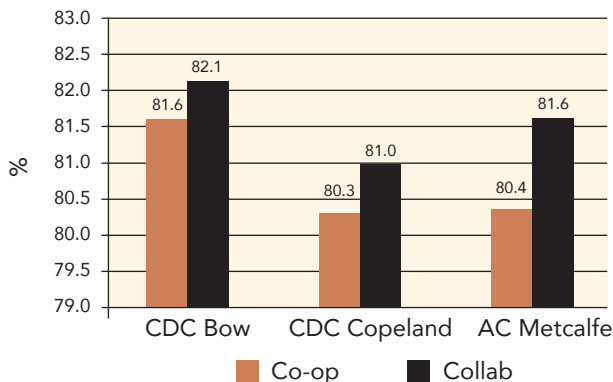
CDC Bow is a two-row, spring, hulled malting barley variety registered in Canada in 2016. A cross of SM04261 x TR05285, it was developed by Dr. A. Beattie, Dr. B.G. Rossnagel and T. Zatorski at the Crop Development Centre, University of Saskatchewan.

As per the registration requirement, this barley has undergone a rigorous evaluation process prior to the registration. The following are highlights of the results of the Cooperative and Collaborative trials¹ taken from the breeder's registration application.

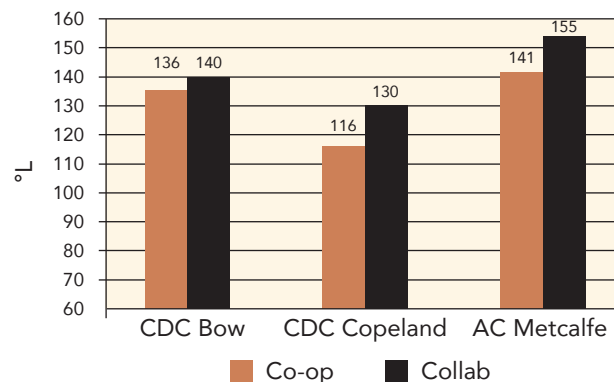
Malting quality traits:

- Fine extract yield higher than AC Metcalfe and CDC Copeland
- Enzyme levels between CDC Copeland and AC Metcalfe
- FAN levels comparable to CDC Copeland and higher than AC Metcalfe
- Higher fermentability than AC Metcalfe and CDC Copeland

CDC Bow Fine Extract



CDC Bow DP



Agronomic traits:

- Yields 9% higher than AC Metcalfe and 3% higher than CDC Copeland
- Grain protein content similar to CDC Copeland
- Strong straw and good resistance to lodging
- High kernel weight and plumpness
- Resistance to covered smut and stem rust

¹ Near the end of the breeding cycle, selected lines enter the "Cooperative" testing program, coordinated by breeders, for two years where they are grown in up to 20 sites across the prairies alongside check varieties (AC Metcalfe, CDC Copeland and AAC Synergy). After the first-year, the best lines from Cooperative trials also enter the "Collaborative" testing program grown at 8 sites across the prairies alongside the same check varieties for two years (coordinated by the Brewing & Malting Barley Research Institute). Cooperative and Collaborative test samples are evaluated for malting quality through micro-malting trials. Results are presented to the Prairie Registration Committee for Oats and Barley (PRCOB) leading to the recommendations for registration by the Canadian Food Inspection Agency.

CMBTC PILOT SCALE MALTING & BREWING RESULTS

Once varieties have been registered in Canada and supply begins to be scaled up by the corresponding seed company responsible for commercializing the variety or by a contracting party, representative barley samples are sent to the CMBTC for pilot scale malting and brewing trials under standard processing conditions ^{2,3}.

CDC Bow Results in CMBTC Pilot Scale Trials

The data below represents average results generated by pilot scale trials² at the CMBTC for samples of 2017 and 2018 crop CDC Bow. In the case of controls, the data represents five-year averages (2014-2018). Range figures were derived from annual averages.

Table 1: Comparative malt quality parameters

The malt exhibited very good extract yield including good enzymes that are higher than CDC Copeland, but lower than AC Metcalfe. Soluble protein and FAN levels were also higher than AC Metcalfe and CDC Copeland. Beta-glucan was lower than both control varieties.

	CDC Bow		CDC Copeland		AC Metcalfe	
	4 yr average (n=6)	4 yr range (n=6)	5 yr average (n=74)	5 yr range (n=74)	5 yr average (n=82)	5 yr range (n=82)
Fine Extract, %	81.6	81.0 – 82.5	81.8	80.1 – 83.8	82.0	80.6 – 83.1
Color, EBC	5.10	3.99 – 5.87	3.73	2.19 – 5.8	4.39	2.67 – 6.56
Color, ASBC	2.38	1.96 - 2.67	1.86	1.28 - 2.64	2.11	1.46 - 2.93
Total Protein, %	11.7	10.9 – 12.3	11.22	9.4 – 12.5	11.7	9.8 – 13.0
Soluble Protein, %	5.35	5.0 – 5.85	4.91	3.93 – 5.70	5.21	4.25 – 5.99
Kolbach Index	45.8	42.7 – 49.5	43.8	36.5 – 49.7	44.5	37.4 – 50.4
Diastatic Power, WK	463	400 – 543	443	327 – 510	500	443 – 560
Diastatic Power, L	143	124 - 167	137	102 - 157	154	137 - 172
Wort Beta-glucan, ppm	104	65 – 158	100	56 - 182	119	60 – 199
FAN, ppm	228	194 – 273	203	160 – 244	223	173 – 279

² **Malting Process conditions:** Steep: 42-44 hours at 14-15°C; Germination: up to 96 hours @14-16°C; Kiln: 21 hours with cure temperature @80-82°C for up to 4 hours.

Table 2: Comparative malt quality parameters

The malt processed well in the brewhouse. Conversion time, time to clear and runoff time were all comparable to CDC Copeland and AC Metcalfe. Wort colour was lower (lighter) than both CDC Copeland and AC Metcalfe. Although brewhouse efficiency was lower, attenuation limit was greater than both CDC Copeland and AC Metcalfe.

	CDC Bow		CDC Copeland		AC Metcalfe	
	4 yr average (n=5)	4 yr range (n=5)	5 yr average (n=58)	5 yr range (n=58)	5 yr average (n=78)	5 yr range (n=78)
Conversion Time (min.)	15	6 – 18	17	7 - 33	14	6 - 22
Time to Clear (min.)	8	6 - 10	7	4 - 16	6	2 - 9
Runoff Time (min.)	51	50 - 53	49	40 - 55	49	40 - 58
Wort Colour (SRM)	2.38	1.96 – 2.67	3.71	2.29 - 7.03	4.37	2.59 - 10.11
Brewhouse Yield (min.)	71.2	70.4 – 72.2	71.5	66.5 - 74.1	71.8	66.5 - 75.2
Brewhouse Efficiency (%)	87.7	86.6 – 89.0	88.4	84.9 - 91.8	88.6	82.7 - 92.0
Attenuation Limit (%)	89.1	88.0 – 91.5	88.5	80.6 - 91.5	86.9	79.6 - 90.4

³ **Brewing Process conditions:** Mash for 30 min. @ 48°C, 30 min. @65°C, 1 min. @77°C using 3.75:1 Water grist ratio. 135L sparge. 90 min. boil. 15 min. whirlpool rest.