

# CDC Bow

## Highlights:

- 🌾 Medium-high grain protein content
- 🌾 High extract yield
- 🌾 Medium-high enzyme levels
- 🌾 Low  $\beta$ -glucan content
- 🌾 High FAN levels
- 🌾 High brewhouse efficiency
- 🌾 High attenuation limit

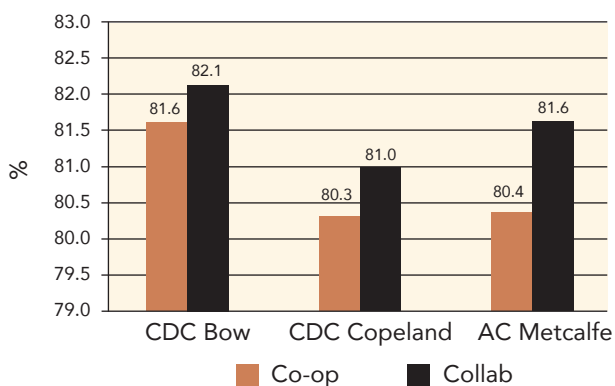
**CDC Bow** is a two-row, spring, hulled malting barley variety registered in Canada in 2016. A cross of SM04261 x TR05285, it was developed by Dr. A. Beattie, Dr. B.G. Rosnagel and T. Zatorski at the Crop Development Centre, University of Saskatchewan.

All barley varieties in Canada undergo a rigorous process of evaluation prior to registration, and are required to meet minimum agronomic, disease and quality standards established by check varieties. The following are highlights of the results of the Cooperative and Collaborative trials<sup>1</sup> taken from the breeder's registration application.

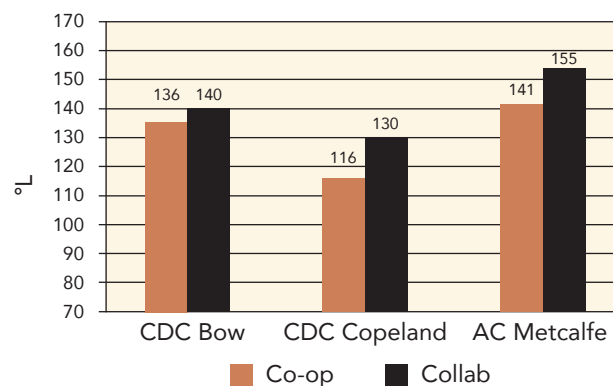
## Malting Quality Traits:

- Fine extract yield higher than AC Metcalfe and CDC Copeland
- Enzyme levels lie between CDC Copeland and AC Metcalfe
- FAN levels higher than both CDC Copeland and AC Metcalfe
- Conversion time comparable to AC Metcalfe and quicker than CDC Copeland
- Brewhouse efficiency comparable to AC Metcalfe and CDC Copeland
- Attenuation limit comparable to CDC Copeland and higher than AC Metcalfe.

### Fine Extract



### Diastatic Power



## 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

<sup>1</sup> 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 AND 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<sup>2,3</sup>.

The data below represents average results generated by pilot scale trials at the CMBTC for samples of CDC Bow and the controls (AC Metcalfe and CDC Copeland) over five years from 2015 - 2019. Range figures are derived from annual averages.

## Malting Performance

The malt exhibits very good extract yield slightly higher than CDC Copeland and slightly lower than AC Metcalfe; CDC Bow malt has good enzyme levels that are higher than CDC Copeland, but lower than AC Metcalfe. Soluble protein and FAN levels are also higher than AC Metcalfe and CDC Copeland.  $\beta$ -glucan is comparable to CDC Copeland and lower than AC Metcalfe.

**Table 1. Comparative Malt Quality Parameters**

|                           | CDC Bow            |                  | CDC Copeland        |                   | AC Metcalfe          |                    |
|---------------------------|--------------------|------------------|---------------------|-------------------|----------------------|--------------------|
|                           | 5 yr average (n=9) | 5 yr range (n=9) | 5 yr average (n=99) | 5 yr range (n=99) | 5 yr average (n=101) | 5 yr range (n=101) |
| Fine Extract, %           | 81.8               | 80.5 – 84.0      | 81.6                | 78.7 – 83.8       | 82.0                 | 79.3 – 83.9        |
| Color, EBC                | 5.07               | 3.41 – 6.19      | 3.68                | 1.66 – 6.91       | 4.39                 | 2.30 – 8.92        |
| Color, ASBC               | 2.36               | 1.74 – 2.79      | 1.84                | 1.08 – 3.06       | 2.11                 | 1.30 – 3.80        |
| Total Protein, %          | 11.71              | 9.59 – 13.71     | 11.56               | 9.40 – 13.41      | 11.84                | 9.75 – 13.32       |
| Soluble Protein, %        | 5.20               | 4.18 – 5.85      | 4.86                | 3.84 – 5.80       | 5.14                 | 4.25 – 6.20        |
| Kolbach Index, %          | 44.8               | 35.1 – 55.6      | 42.3                | 30.4 – 50.8       | 43.4                 | 34.7 – 51.9        |
| Diastatic Power, WK       | 478                | 331 – 569        | 455                 | 334 – 600         | 516                  | 336 – 586          |
| Diastatic Power, °L       | 141                | 99 – 167         | 135                 | 100 – 176         | 152                  | 109 – 172          |
| Wort $\beta$ -glucan, ppm | 119                | 65 – 218         | 117                 | 56 – 372          | 139                  | 60 – 341           |
| FAN, ppm                  | 221                | 188 – 273        | 191                 | 128 – 253         | 214                  | 158 – 279          |

<sup>2</sup> **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.

## Brewhouse Performance

CDC Bow performs well in the brewhouse. Its runoff time is comparable to AC Metcalfe and CDC Copeland. While conversion time is quicker than CDC Copeland and comparable to AC Metcalfe, time for wort to clear to <100 FTU during vorlauf is slightly longer than both CDC Copeland and AC Metcalfe. Wort colour is darker than CDC Copeland and comparable to AC Metcalfe. Brewhouse efficiency is comparable to AC Metcalfe and CDC Copeland, whereas attenuation limit is comparable to CDC Copeland, but higher than AC Metcalfe.

**Table 2. Comparative Brewing Quality Parameters**

|                                    | CDC Bow            |                  | CDC Copeland        |                   | AC Metcalfe         |                   |
|------------------------------------|--------------------|------------------|---------------------|-------------------|---------------------|-------------------|
|                                    | 5 yr average (n=8) | 5 yr range (n=8) | 5 yr average (n=65) | 5 yr range (n=65) | 5 yr average (n=77) | 5 yr range (n=77) |
| Conversion Time, min.              | 15                 | 6 – 18           | 18                  | 7 - 26            | 15                  | 6 - 22            |
| Time to Clear During Vorlauf, min. | 8                  | 6 - 10           | 6                   | 2 - 9             | 6                   | 2 - 11            |
| Runoff Time, min.                  | 51                 | 49 - 53          | 49                  | 40 - 55           | 49                  | 40 - 58           |
| Wort Colour, SRM                   | 4.17               | 2.98 – 5.15      | 3.39                | 2.29 - 7.03       | 4.04                | 2.59 - 6.67       |
| Brewhouse Efficiency, %            | 92.3               | 90.7 – 93.8      | 92.3                | 87.8 - 96.1       | 92.6                | 85.9 - 96.5       |
| Attenuation Limit, %               | 88.8               | 86.1 – 91.5      | 88.6                | 80.6 - 92.4       | 86.7                | 79.6 - 90.4       |

<sup>3</sup> **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.