**2022 American Malting Barley Association**

# Pilot-Scale Selection

**Selection:** DH162310  **Parentage:** DH130939/Calypso

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**Description:**

Growth Habit: Winter

Spike Type: 2-row, Lax

Awn Type: Rough

Rachilla Hair: Long

Aleurone Color: Blue

Glycosidic nitrile: Non-producer

**History**

DH162310 is a doubled haploid derived from the cross of DH130939/Calypso. DH130939 is an experimental winter 2-row malting type from the OSU program. Calypso is marketed in the US by Limagrain Cereal Seeds. The cross was made in 2015 and the doubled haploid was produced in 2016. DH162310 was advanced through mini-plot, preliminary, and advanced yield trials in the Willamette Valley of Oregon based on agronomic and malting quality performance. It has progressed to regional and national trials. It was in the 2021-2022 Idaho Extension trial and it will be in the 2022-23 Winter Malting Barley Trial (WMBT) and Idaho Extension trials.

Available data from Oregon environments are shown in Table 1. DH162310 has a 43 bu/acre yield advantage over the highest yielding check (Thunder). The test weight is excellent and 2 lbs/bu higher than the best check. DH162310 is earlier than any of the checks. DH162310 is eight inches taller than the shortest check (Thunder) but had 15% less lodging. Stripe rust epidemics were mild during the test years. The scald resistance is excellent compared to the checks.

In the Idaho Extension trial, DH162310 had a yield 26 bu/acre lower than Thunder. It had the highest test weight of the group. DH162310 was earlier than any of the checks and was similar in height. Lodging percentages were similar, but not as low as that for Wintmalt. Winter survival was excellent for all varieties.

In terms of malting quality (Table 3), DH162310 has much better kernel plumpness than Endeavor and is better than Wintmalt and Thunder. The malt extract is 1.6% higher than the best check (Endeavor) and within AMBA specifications for adjunct and all-malt. Barley proteins are optimal for DH162310 and the checks for both adjunct and all-malt. For S/T, only Wintmalt met specifications (for adjunct), but DH162310 showed lower S/T than the other checks. DH162310 had the highest DP and its alpha amylase was second only to Thunder. The wort beta glucans of all entries were higher than expected, but DH162310 was similar to Thunder and Wintmalt. The FAN was high, and comparable to that of Thunder.

In addition to the data provided by the USDA-ARS-CCRU, we have data from different samples varying in malt protein for 2021 crop. DH162310 and Thunder were micro-malted and pilot-malted at OSU and analyzed at Hartwick for the usual suite of malt parameters, as well as predicted spirit yield (PSY) (Tables 4 and 5). Compared to Thunder, DH162310 had higher malt extract, higher DP and similar alpha amylase. Beta glucan, FAN and PSY values were similar.

DH162310 is an epiheterodendrin (EPH) null and is therefore not a producer of glycosidic nitrile (GN). The distilling industry may have interest in using the same variety for all-malt and adjunct purposes. As shown in Table 6, managing levels of nitrogen fertility may be a tool for using DH162310 for both end-uses.

Lebanon and Corvallis, OR 2021 and 2022 crop data shows DH162310 with a similar germination index to Thunder and a potential for water sensitivity comparable to, or lower than, the checks (e.g., low in 2021 and high in 2022) (Table 7).

**Agronomic Strengths**

High yield, excellent kernel plumpness, good lodging resistance, resistance to stripe rust and scald.

**Adaptation and Probable Production Area**

DH162310 was bred for fall-planting in the Pacific Northwest (South Idaho, Palouse, Columbia Basin, and western valleys of Oregon and Washington). Performance in South Idaho will be assessed in the Idaho Extension trials and the WMBT data will show if it has broader adaptation.

**Agronomic Characteristics**

**Table 1.** Agronomic performance of fall planted DH162310 compared to check cultivars. Average of 2019-2022 trials in Oregon.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Entry | Yield  (bu/acre) | Test Weight  (lbs/bu) | Heading (DOY) | Plant height  (in) | Lodging (%) | Stripe rust (%) | Scald (%) |
| *Station yrs.* | 7 | 7 | 4 | 7 | 7 | 7 | 7 |
| DH162310 | 157 | 53.6 | 111 | 47 | 1 | 1 | 2 |
| Endeavor | 111 | 51.6 | 113 | 40 | 26 | 2 | 47 |
| Wintmalt | 107 | 49.4 | 121 | 39 | 12 | 8 | 39 |
| Thunder | 114 | 50.4 | 114 | 39 | 16 | 7 | 36 |

**Table 2.** Agronomic performance of fall planted DH162310 compared to check cultivars. Average of the 2022 University of Idaho Extension Trials (Aberdeen and Rupert).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Entry | Yield  (bu/acre) | Test weight\*  (lbs/bu) | Heading (DOY) | Plant height  (in) | Lodging (%) | Spring Stand  (%) |
| *Station yrs.* | *2* | *2* | *2* | *2* | *2* | *2* |
| DH162310 | 164 | 50.6 | 148 | 41 | 18 | 100 |
| Endeavor | 155 | 49.2 | 154 | 43 | 32 | 100 |
| Wintmalt | 169 | 48.3 | 154 | 40 | 7 | 100 |
| Thunder | 190 | 50.7 | 152 | 40 | 24 | 100 |
| Charles | 156 | 45.8 | 153 | 41 | 67 | 100 |

\*Test weight as measured by the on-board combine weighing system.

**Malting Quality Characteristics**

**Table 3**. Malt quality1 of DH162310 and check cultivars using data from analyses of barley samples grown in Oregon (2019-2021).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Entry | Plump Kernels (%) | Malt Extract (%) | Barley protein (%) | Wort protein (%) | S/T  (%) | DP  (0ASBC) | Alpha amylase  (20°DU) | Beta glucan  (ppm) | FAN  (ppm) |
| *Station yrs.* | *5* | *5* | *5* | *5* | *5* | *5* | *5* | *5* | *5* |
| DH162310 | 98.9 | 83.8 | 11.5 | 5.7 | 52.0 | 211 | 113 | 118 | 299 |
| Endeavor | 89.8 | 82.2 | 10.0 | 5.2 | 54.6 | 146 | 92 | 201 | 251 |
| Wintmalt | 92.7 | 80.4 | 10.7 | 4.6 | 45.9 | 144 | 72 | 104 | 187 |
| Thunder | 95.4 | 82.0 | 10.9 | 5.7 | 57.5 | 168 | 122 | 107 | 304 |

1Data courtesy of the USDA-ARS Cereal Crops Research Unit, Madison, WI.

**Table 4**. Malt quality of DH162310 and Thunder grown in Oregon 2021. Micro-malted at OSU and analyzed at Hartwick College.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Entry | Malt Extract (%) | Malt protein (%) | Wort protein (%) | S/T  (%) | DP  (0ASBC) | Alpha amylase  (20°DU) | Beta glucan  (ppm) | FAN  (ppm) | PSY (LAA/Tonne) |
| DH162310 | 84.0 | 10.5 | 5.36 | 51.0 | 141 | 65.1 | 88 | 251 | 405 |
| Thunder | 82.8 | 9.7 | 5.38 | 55.5 | 120 | 77 | 52 | 266 | 398 |

**Table 5.** Malt quality of DH162310 and Thunder grown in Oregon 2021. Pilot malted at OSU and analyzed at Hartwick College.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Entry | Malt Extract (%) | Malt protein (%) | Wort protein (%) | S/T  (%) | DP  (0ASBC) | Alpha amylase  (20°DU) | Beta glucan  (ppm) | FAN  (ppm) | PSY (LAA/Tonne) |
| DH162310 | 84.4 | 12.1 | 6.11 | 50.5 | 200 | 80.9 | 70 | 284 | 409 |
| Thunder | 83.4 | 10.7 | 5.63 | 52.6 | 162 | 85.3 | 83 | 267 | 405 |

**Table 6.** Malt quality of DH162310 at increasing protein levels, grown in Corvallis, OR 2021. Micro-malted and analyzed at USDA-ARS CCRU.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Entry | Barley protein (%) | Plump Kernels (%) | Malt Extract (%) | Wort protein (%) | S/T | DP | Alpha amylase | Beta glucan | FAN |
| (%) | (0ASBC) | (20°DU) | (ppm) | (ppm) |
| DH162310 | 9.4 | 99.7 | 85.1 | 5.7 | 62.6 | 193 | 115 | 69 | 309 |
| DH162310 | 12.5 | 99.6 | 83.4 | 6.6 | 55.6 | 259 | 120 | 82 | 349 |
| DH162310 | 12.9 | 99.6 | 82.9 | 6.6 | 54.2 | 256 | 119 | 117 | 346 |
| DH162310 | 13.2 | 99.6 | 82.4 | 6.7 | 53.6 | 279 | 109 | 87 | 355 |

**Table 7.** Germination index (IK) and Water Sensitivity (WS) of DH162310 and checks at Lebanon (LEB) and Corvallis (COR), 2021 & 2022 crop. Data recorded in December 2021 & September 2022 of their respective harvest year.

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