BARLEY
(Hordeum vulgare)

Proposed denomination: **'AB Maximizer'**
Application number: 22-11134
Application date: 2022/11/14
Applicant: Alberta Agriculture and Irrigation, Edmonton, Alberta
Agent in Canada: Olds College -Field Crop Development Centre, Lacombe, Alberta
Breeder: Yadeta Kabeta, Alberta Agriculture and Forestry, Lacombe, Alberta

Varieties used for comparison: 'CDC Austenson' and 'CDC Cowboy'

Summary: *At the 5-9 tiller stage, the lower leaf sheath of 'AB Maximizer' has sparse pubescence while that of 'CDC Cowboy' has absent or very sparse pubescence. At booting, the flag leaf auricles of 'AB Maximizer' have a medium intensity of anthocyanin colouration while those of 'CDC Cowboy' have a very strong intensity of anthocyanin colouration. The flag leaf of 'AB Maximizer' is shorter than that of 'CDC Cowboy'. At the end of anthesis, the spike of 'AB Maximizer' has a semi-erect to horizontal attitude while that of 'CDC Austenson' has a erect to semi-erect attitude. At the beginning of ripening, the plants of 'AB Maximizer' are shorter than the plants of 'CDC Cowboy'. The spike of 'AB Maximizer' is shorter than that of 'CDC Cowboy'. At maturity, the rachilla hairs on the kernel of 'AB Maximizer' are long while those of the reference varieties are short. The spiculation of the inner lateral nerves on the kernel of 'AB Maximizer' is strong while it is medium for 'CDC Austenson' and weak for 'CDC Cowboy'. Hairs are present on the ventral furrow of the kernel of 'AB Maximizer' while the ventral furrow on the kernel of 'CDC Austenson' is hairless.*

Description:
YOUNG PLANT: semi-erect growth habit at tillering, sparse pubescence on lower leaf sheaths
PLANT: two row, spring feed barley, low frequency of plants with recurved flag leaves

FLAG LEAF (AT BOOTING): sparse pubescence on blade
FLAG LEAF SHEATH: medium glaucosity, sparse pubescence
AURICLES: medium intensity of anthocyanin colouration at booting, sparse pubescence on margins

SPIKE: mid-season emergence, medium glaucosity at end of anthesis, semi-erect to horizontal attitude, platform shaped collar, tapering shape, medium density, divergent sterile spikelet, glume and its awn of the median spikelet are shorter than the grain
LEMMA AWNS: weak intensity of anthocyanin colouration of tips at beginning of anthesis, longer than spike length, rough spiculations on margins
FIRST SEGMENT OF RACHIS: medium length, weak curvature

KERNEL: weak intensity of anthocyanin colouration of nerves of the lemma at early to soft dough stage, long rachilla hairs, husk present, strong spiculation of inner lateral nerves of dorsal side of lemma, hairs present on ventral furrow, clasping disposition of lodicules, incomplete horseshoe shaped basal markings, medium length and width

Origin and Breeding: 'AB Maximizer' (experimental designations FB20601 and J12037056) was developed using a modified bulk breeding method with marker assisted selection. The variety originated from a cross between the varieties 'Canmore' and 'Merit 57' conducted in 2012 at the Field Crop and Development Centre in Lacombe, Alberta. The variety was advanced from the F1 to F5 generation in Alberta and one season in a winter nursery in California, USA. One F5 line was designated as J12037056 in 2015 based on grain yield, test weight, kernel weight, lodging resistance, straw strength, maturity, disease resistance as well as quality traits. The variety was evaluated from 2016 to 2021 for yield and disease resistance and was further evaluated as FB20601 from 2020 to 2022. Breeder seed was established at the F11 generation in 2021.

Tests and Trials: The comparative trials for 'AB Maximizer' were conducted at the Olds College Field Crop and Development Centre in Lacombe, Alberta in the 2022 and 2023 growing seasons. There were 3 replicates per variety per year. Plots consisted of 8 rows, each row measuring 2.5 metres long with 0.14 metres inter-row spacing. The seeding density of 269 seeds per square metre resulted in approximately 2175 plants per variety per year. Measured characteristics were based on a minimum of 30

measurements per variety per year. Mean differences were significant at the 5% probability level based on a paired Student`s t-test.

Comparison table for 'AB Maximizer'

	'AB Maximizer'	'CDC Austenson'*	'CDC Cowboy'*
Flag leaf length (at booting) (mm)			
mean (2022)	16.8	20.9	21.0
std. deviation (2022)	2.88	3.15	3.32
mean (2023)	8.1	9.2	9.5
std. deviation (2023)	1.90	2.36	2.43
Plant height (stem plus spike, including awns) (cm)			
mean (2022)	113.0	107.0	130.0
std. deviation (2022)	6.65	6.49	8.62
mean (2023)	84.0	87.0	104.0
std. deviation (2023)	4.90	3.06	4.05
Spike length (excluding awns) (cm)			
mean (2022)	8.0	8.0	8.6
std. deviation (2022)	0.69	0.54	0.80
mean (2023)	8.1	7.3	9.0
std. deviation (2023)	1.14	0.58	1.01

*reference varieties

Barley: 'AB Maximizer' (centre) with reference varieties 'CDC Austenson' (left) and 'CDC Cowboy' (right)

Barley: 'AB Maximizer' (centre) with reference varieties 'CDC Cowboy' (left) and 'CDC Austenson' (right)

Barley: 'AB Maximizer' (centre) with reference varieties 'CDC Austenson' (left) and 'CDC Cowboy' (right)

Proposed denomination: **'AB Standswell'**
Application number: 22-10932
Application date: 2022/05/25
Applicant: Alberta Agriculture and Irrigation, Edmonton, Alberta
Agent in Canada: Olds College -Field Crop Development Centre, Lacombe, Alberta
Breeder: Yadeta Kabeta, Alberta Agriculture and Forestry, Lacombe, Alberta

Varieties used for comparison: 'AC Ranger' and 'Vivar'

Summary: *At the 5 to 9 tiller stage, the plants of 'AB Standswell' have a semi-erect growth habit while those of 'AC Ranger' and 'Vivar' have an intermediate growth habit. The lower leaf sheath of 'AB Standswell' has sparse pubescence while that of 'AC Ranger' has absent or very sparse pubescence. At booting, the flag leaf of 'AB Standswell' is wider than that of 'Vivar'. At the beginning of anthesis, the lemma awn tips of 'AB Standswell' have a weak intensity of anthocyanin colouration while those of 'Vivar' have an absent or very weak intensity of anthocyanin colouration. At the end of anthesis, the spike of 'AB Standswell' has a semi-erect attitude while that of 'AC Ranger' has a horizontal attitude. At the beginning of ripening, the*

plants of 'AB Standswell' are shorter than the plants of 'AC Ranger'. The spike of 'AB Standswell' is lax while that of 'Vivar' is of a medium density. At maturity, the first segment of the rachis of 'AB Standswell' is long with a strong curvature while those of the reference varieties are of a medium length with a weak curvature. The rachilla hairs on the kernel of 'AB Standswell' are long while those of the reference varieties are short. Hairs are absent on the ventral furrow of the kernel of 'AB Standswell' while hair is present on the ventral furrow on the kernels of the reference varieties.

Description:
YOUNG PLANT: semi-erect growth habit at tillering, sparse pubescence on lower leaf sheaths
PLANT: two row, spring feed barley, low frequency of plants with recurved flag leaves

FLAG LEAF (AT BOOTING): sparse pubescence on blade
FLAG LEAF SHEATH: medium glaucosity, sparse pubescence
AURICLES: very weak intensity of anthocyanin colouration at booting, sparse pubescence on margins

SPIKE: mid-season emergence, weak glaucosity at end of anthesis, semi-erect attitude, platform shaped collar, tapering shape, lax, glume and its awn of the median spikelet are longer than the grain
LEMMA AWNS: weak intensity of anthocyanin colouration of tips at beginning of anthesis, longer than spike length, rough spiculations on margins
FIRST SEGMENT OF RACHIS: long, strong curvature

KERNEL: strong intensity of anthocyanin colouration of nerves of the lemma at early to soft dough stage, long rachilla hairs, husk present, weak spiculation of inner lateral nerves of dorsal side of lemma, hairless ventral furrow, clasping disposition of lodicules, incomplete horseshoe shaped basal markings, medium length and width

Origin and Breeding: 'AB Standswell' (experimental designations T09156061, FB 492 and SR18524) was developed using a single seed descent breeding method. The variety originated from a cross between an experimental line designated 109505 and the variety 'Vivar' conducted in 2009 at the Field Crop and Development Centre in Lacombe, Alberta. The variety was advanced from the F1 to F4 generation based on grain and forage yield, lodging resistance, maturity, test and kernel weight with one line being designated as T09156061 in 2011. The variety was further evaluated as T09156061 from 2014 to 2017 in Alberta and as SR18524 and FB 492 across Western Canada from 2018 to 2019. Breeder seed was established at the F11 generation in 2019.

Tests and Trials: The comparative trials for 'AB Standswell' were conducted at the Olds College Field Crop and Development Centre in Lacombe, Alberta in the 2022 and 2023 growing seasons. There were 3 replicates per variety per year. Plots consisted of 8 rows, each row measuring 2.5 metres long with 0.14 metres inter-row spacing. The seeding density of 269 seeds per square metre resulted in approximately 2175 plants per variety per year. Measured characteristics were based on a minimum of 30 measurements per variety per year. Mean differences were significant at the 5% probability level based on a paired Student`s t-test.

Comparison table for 'AB Standswell'

	'AB Standswell'	'AC Ranger'*	'Vivar'*
Flag leaf width (at booting) (mm)			
mean (2022)	17.0	14.0	7.0
std. deviation (2022)	1.08	1.63	2.88
mean (2023)	10.0	10.0	9.0
std. deviation (2023)	1.77	1.50	1.60
Plant height (stem plus spike, including awns) (cm)			
mean (2022)	102.0	114.0	103.0
std. deviation (2022)	6.60	7.18	5.75
mean (2023)	63.0	72.0	64.0
std. deviation (2023)	4.27	5.36	3.80

*reference varieties

Barley: ‘AB Standswell’ (centre) with reference varieties ‘AC Ranger’ (left) and ‘Vivar’ (right)

Barley: ‘AB Standswell’ (centre) with reference varieties ‘AC Ranger’ (left) and ‘Vivar’ (right)

Barley: 'AB Standswell' (centre) with reference varieties 'AC Ranger' (left) and 'Vivar' (right)

Proposed denomination: **'KWS Orbit'**
Application number: 21-10717
Application date: 2021/09/13
Applicant: KWS LOCHOW GMBH, Bergen, Germany
Agent in Canada: Sollio Agriculture, Saint-Hyacinthe, Quebec
Breeder: KWS LOCHOW GMBH, Bergen, Germany

Variety used for comparison: 'OAC Elmira'

Summary: *At the 5 to 9 tiller stage, the plants of 'KWS Orbit' have a semi-erect growth habit while those of 'OAC Elmira' have a semi-prostrate growth habit. The lower leaf sheath of 'KWS Orbit' has dense pubescence while that of 'OAC Elmira' has absent or very sparse pubescence. At booting, the flag leaf auricles of 'KWS Orbit' have a weak intensity of anthocyanin colouration while those of 'OAC Elmira' have a medium intensity of anthocyanin colouration. The flag leaf sheath of 'KWS Orbit' has a medium degree of glaucosity while that of 'OAC Elmira' has weak glaucosity. The flag leaf of 'KWS Orbit' is shorter than that of 'OAC Elmira'. The plants of 'KWS Orbit' head earlier than those of 'OAC Elmira'. At the end of anthesis, the spike of 'KWS Orbit' has absent or very weak glaucosity while that of 'OAC Elmira' has weak glaucosity. At the beginning of ripening, the plants of 'KWS Orbit' are shorter than those of 'OAC Elmira'. The collar on the spike of 'KWS Orbit' is open shaped while that of 'OAC Elmira' is platform shaped. The rachilla hairs on the kernel of 'KWS' Orbit' are long while those of 'OAC Elmira' are short. Hairs are present on the ventral furrow of the kernel of 'KWS Orbit' while the ventral furrow on the kernel of 'OAC Elmira' is hairless. The kernel of 'KWS Orbit' is long and wide while the kernel of 'OAC Elmira' is of a medium length and width. The 1000 kernel weight of 'KWS Orbit' is greater than that of 'OAC Elmira'.*

Description:
YOUNG PLANT: semi-erect growth habit at tillering, dense pubescence on lower leaf sheaths
PLANT: six row, winter feed barley

FLAG LEAF (AT BOOTING): absent or very sparse pubescence on blade and sheath
FLAG LEAF SHEATH: medium glaucosity
AURICLES: weak intensity of anthocyanin colouration at booting, absent or very sparse pubescence on margins

SPIKE: spike emergence occurs early in the season, absent or very weak glaucosity at end of anthesis, semi-erect attitude, open shaped collar, medium density
LEMMA AWNS: weak intensity of anthocyanin colouration of tips, longer than spike length

KERNEL: long rachilla hairs, husk present, hairs present on ventral furrow, long, wide

AGRONOMIC CHARACTERISTICS: good resistance to shattering

Origin and Breeding: 'KWS Orbit' (experimental designation CFOA2002) was developed using a combination breeding method with double haploid technique. The variety originated from a three-way cross. The initial cross between an experimental line LP 6-826 and the variety 'KWS Meridian' was followed by a cross to the variety 'KWS Tonic' which was conducted in May 2009 at KWS Lochow GMbH in Lower Saxony, Germany. From the F1 generation, double haploids were produced in Wohide, Germany in 2010. The variety was advanced from DH0 to DH3 based on time of head emergence, standability, disease tolerances, plant length, maturity and winterhardiness with one line designated CFOA2002. The line was further advanced based on the above criteria as well as number of tillers and spike size. Breeder seed was established at DH6 in Wetze, Germany in 2015.

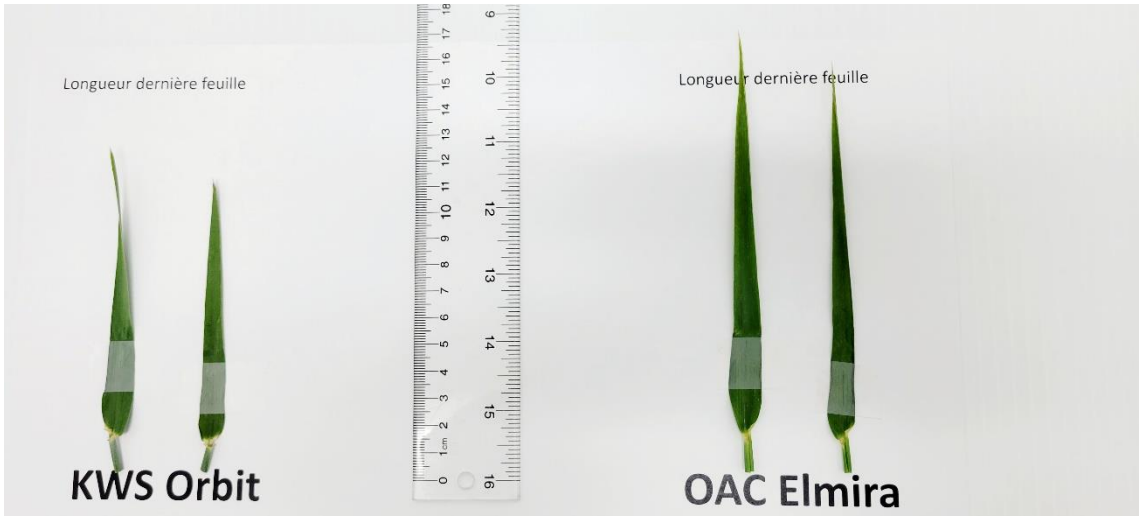
Tests and Trials: The comparative trials for 'KWS Orbit' were conducted at Sollio Agriculture in St-Hyacinthe, Quebec in the 2022 and 2023 growing seasons. There were 3 replicates per variety per year arranged in an RCB design. Plots consisted of 7 rows, each row measuring 4.5 metres long with 0.18 metres inter-row spacing. The seeding density was 333 seeds per square metre resulting in approximately 4995 plants per variety per year. Measured characteristics were based on a minimum of 20 measurements per variety per year except for the 1000 kernel weight which was based on 10 measurements per variety per year. Mean differences were significant at the 5% probability level based on a paired Student`s t-test.

Comparison table for 'KWS Orbit'

	'KWS Orbit'	**'OAC Elmira'***
Flag leaf length (at booting) (cm)		
mean (2022)	7.5	9.7
std. deviation (2022)	0.7	1.6
mean (2023)	10.9	13.3
std. deviation (2023)	1.2	1.2
Days to heading (number of days from January 1 to when 50% of heads are fully emerged)		
mean (2022)	145	147
mean (2023)	152	154
Plant height (stem plus spike, including awns) (cm)		
mean (2022)	69.1	93.5
std. deviation (2022)	4.9	5.5
mean (2023)	73.5	98.9
std. deviation (2023)	4.5	5.3
Kernel weight (grams per 1000 kernels) (g)		
mean (2023)	50.5	33.8
std. deviation (2023)	0.9	0.7
mean (2022)	47.4	34.6
std. deviation (2022)	0.8	0.4

*reference variety

Barley: 'KWS Orbit' (left) with reference variety 'OAC Elmira' (right)



Barley: 'KWS Orbit' (left) with reference variety 'OAC Elmira' (right)

Barley: ‘KWS Orbit’ (left) with reference variety ‘OAC Elmira’ (right)