



APPLICATIONS UNDER EXAMINATION

BARLEY

BARLEY (*Hordeum vulgare*)

Proposed denomination: 'AAC Lariat'
Application number: 22-10890
Application date: 2022/04/26
Applicant: Agriculture & Agri-Food Canada, Brandon, Manitoba
Agent in Canada: Agriculture & Agri-Food Canada, Saskatoon, Saskatchewan
Breeder: Ana Badea, Agriculture & Agri-Food Canada, Brandon, Manitoba

Varieties used for comparison: 'CDC Austenson', 'AAC Synergy', 'AAC Connect' and 'CDC Kindersley'

Summary: At booting, 'AAC Lariat' has a medium frequency of plants with recurved flag leaves whereas that of 'CDC Austenson' and 'AAC Connect' have a high frequency of plants with recurved flag leaves. The degree of glaucosity on the flag leaf sheath of 'AAC Lariat' is very strong whereas it is strong for 'AAC Connect' and medium to strong for 'CDC Kindersley'. The pubescence on the flag leaf blade of 'AAC Lariat' is absent or very sparse whereas it is medium to dense for 'CDC Austenson' and sparse for 'CDC Kindersley'. The flag leaf of 'AAC Lariat' is narrower than that of 'AAC Connect'. The spike of 'AAC Lariat' is lax whereas it is of a medium density for 'CDC Kindersley', medium to dense for 'CDC Austenson' and 'AAC Connect' and dense for 'AAC Synergy'. Excluding the awns, the spike of 'AAC Lariat' is longer than that of the reference varieties. The first segment of the rachis is medium to long for 'AAC Lariat' whereas it is short for 'CDC Kindersley' and short to medium for 'AAC Connect'. The sterile spikelet of 'AAC Lariat' has a rudimentary development whereas those of the reference varieties are fully developed. The rachilla hairs on the kernel of 'AAC Lariat' are short whereas those for 'AAC Synergy', 'AAC Connect' and 'CDC Kindersley' are long.

Description:

YOUNG PLANT: erect to semi-erect growth habit at tillering, absent or very sparse pubescence on lower leaf sheaths

PLANT: two row, spring feed barley, medium frequency of plants with recurved flag leaves

FLAG LEAF (AT BOOTING): absent or very sparse pubescence on blade

FLAG LEAF SHEATH: very strong glaucosity, absent or very sparse pubescence

AURICLES: medium to strong intensity of anthocyanin colouration at beginning of anthesis, very sparse to sparse pubescence on margins

SPIKE: spike emergence occurs mid-season, medium to strong degree of glaucosity at end of anthesis, erect to semi-erect attitude, cup shaped collar, parallel shape, lax, reduced sterile spikelet due to rudimentary development, glume and awn of the median spikelet are equal to longer relative to the grain

LEMMA AWNS: weak to medium intensity of anthocyanin colouration of tips, longer than spike length, rough spiculations on margins

FIRST SEGMENT OF RACHIS: medium to long in length, medium to strong curvature

KERNEL: weak to medium intensity of anthocyanin colouration of nerves of lemma at beginning of ripening, whitish aleurone layer, short rachilla hairs, husk present, absent or very weak spiculation of inner lateral nerves of dorsal side of lemma, hairless ventral furrow, clasping disposition of lodicules, incomplete horseshoe shape of basal markings, medium length, medium width

AGRONOMIC CHARACTERISTICS: good resistance to lodging, poor malting quality

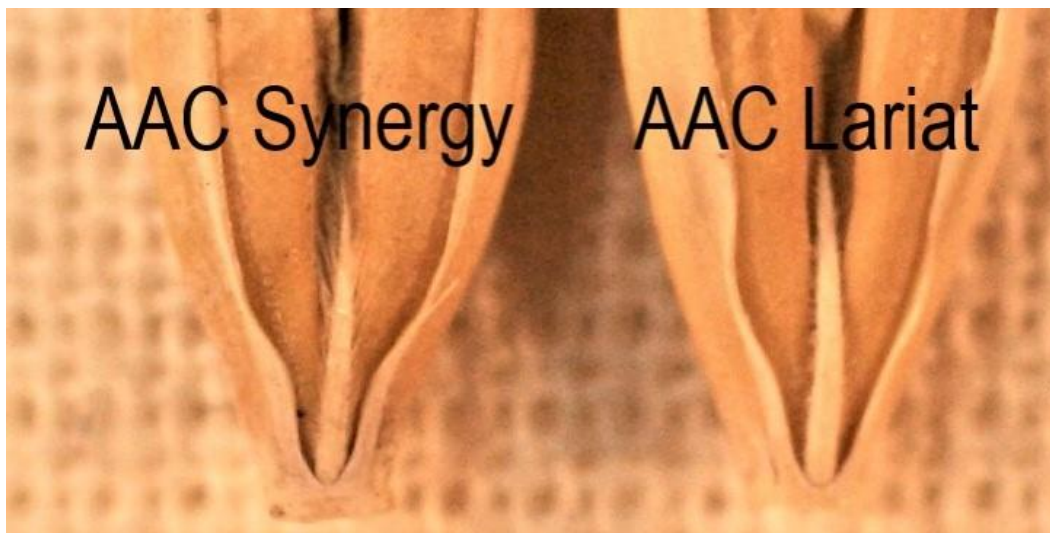
DISEASE REACTIONS: susceptible to Scald (*Rhynchosporium secalis*); moderately resistant to moderately susceptible to Spot Blotch (*Cochliobolus sativus*); moderately resistant to Net Blotch (spot form of *Pyrenophora teres*); moderately susceptible to Fusarium Head Blight (*Fusarium graminearum*) and Barley Yellow Dwarf virus; resistant to Stem Rust (*Puccinia graminis*), Net Blotch (net form of *Pyrenophora teres*), Covered Smut (*Ustilago hordei*), True Loose Smut (*Ustilago nuda*) and False Loose Smut (*Ustilago nigra*)

Origin and Breeding: ‘AAC Lariat’ (experimental designation TR19268) originated from a cross conducted between the variety ‘AAC Synergy’ and TR09398 conducted in the spring of 2010 in a greenhouse at the Agriculture and Agri-Food Canada Brandon Research Centre in Brandon, Manitoba. The early generations were handled using a modified bulk method. From 2010 to 2011, increases were performed in Brandon, and in Leeston, New Zealand. In 2012, the F4 generation was grown as two bulk plots in Brandon, Manitoba. From the four hundred spikes harvested, the first 300 spikes were threshed individually were planted as single F5 hill plots in the irrigated field leaf disease nursery in Brandon, Manitoba. Based on spot blotch resistance and general appearance, 73 lines selected were grown as F6 progeny rows in a field in Brandon in 2014. The 22 lines selected based on height, maturity, lodging resistance, general appearance and field disease reactions were then grown as F7 short row increases in Leeston, New Zealand. One F8 line, designated as BM1001-259, was grown as a single plot in a preliminary yield test at Brandon in 2015 and was advanced to replicated preliminary intermediate yield test, at Brandon and Hamiota, Manitoba in 2017. BM1001-259 was grown in an advanced yield test at 5 locations in Western Canada in 2017 and at 7 locations in Eastern Prairie Barley test in 2018. The line was advanced to the Western Cooperative Two-row Barley Registration test as TR19268 and evaluated from 2019 to 2020. Breeder seed was established from a bulk of 200 F12 derived lines in 2021. Additional selection criteria included yield, heading date, kernel plumpness, test weight, kernel weight, kernel brightness, hull peeling, malting quality, disease resistances and resistance to pre-harvest sprouting.

Tests and Trials: The comparative trials for ‘AAC Lariat’ were conducted at the Agriculture and Agri-Food Canada, Brandon Research and Development Centre in Brandon, Manitoba in 2021 and 2022. There were 4 replicates per variety arranged in an RCB design. Plots were 3.8 square metres and consisted of 6 rows with a row length of 4 metres with 0.18 metres between rows. Plots were spaced 46 cm apart. The seeding density was 1200 seeds per plot resulting in approximately 4800 plants per variety. Measured characteristics were based on a minimum of 20 measurements per variety per year. Mean differences were significant at the 5% probability level based on LSD values. Disease reaction ratings were provided through the Disease Evaluation team of the Prairie Recommending Committee for Oat and Barley conducted in 2019 and 2020.

Comparison table for ‘AAC Lariat’

	‘AAC Lariat’	‘CDC Austenson’**	‘AAC Synergy’**	‘AAC Connect’**	‘CDC Kindersley’**
<i>Flag leaf width (cm)</i>					
mean 2021 (LSD=0.69)	5.70	6.91	7.40	6.60	4.65
std. deviation 2021	1.2	1.4	1.1	1.4	0.9
mean 2022 (LSD=0.89)	7.20	7.38	7.25	9.02	6.37
std. deviation 2022	1.9	1.6	1.7	1.2	1.3
<i>Spike length (excluding awns) (cm)</i>					
mean 2021 (LSD=0.47)	10.15	8.22	9.22	9.02	8.17
std. deviation 2021	1.2	1.0	0.6	0.8	0.4
mean 2022 (LSD=0.68)	10.07	8.35	8.57	8.82	7.57
std. deviation 2022	0.5	0.8	0.9	0.6	1.0
*reference varieties					



Barley: 'AAC Lariat' (right) with reference variety 'AAC Synergy' (left)

Proposed denomination:	'AAC Stockton'
Application number:	22-10891
Application date:	2022/04/26
Applicant:	Agriculture & Agri-Food Canada, Brandon, Manitoba
Agent in Canada:	Agriculture & Agri-Food Canada, Saskatoon, Saskatchewan
Breeder:	Ana Badea, Agriculture & Agri-Food Canada, Brandon, Manitoba

Varieties used for comparison: 'CDC Austenson', 'AAC Synergy', 'AAC Connect' and 'CDC Kindersley'

Summary: *At the 5 to 9 tiller stage, the pubescence on the lower leaves of 'AAC Stockton' is sparse whereas the pubescence is absent or very sparse on the lower leaves of 'AAC Synergy' and 'AAC Connect'. At booting, 'AAC Stockton' has a high frequency of plants with recurved flag leaves whereas 'AAC Synergy' and 'CDC Kindersley' have a medium frequency of plants with recurved flag leaves. The margins of the flag leaf auricles for 'AAC Stockton' have a sparse to medium density of pubescence whereas those of 'AAC Synergy' has absent to very sparse pubescence. At the beginning of ripening, the plants of 'AAC Stockton' are shorter than the plants of 'AAC Synergy'. The first segment of the rachis is long to very long for 'AAC Stockton' whereas it is short for 'CDC Kindersley', short to medium length for 'AAC Connect' and of medium length for 'CDC Austenson' and 'AAC Synergy'. The curvature of the first segment of the rachis is strong to very strong for 'AAC Stockton' whereas the curvature is weak for 'AAC Connect' and weak to medium for 'CDC Austenson' and 'CDC Kindersley'. The rachilla hairs on the kernel of 'AAC Stockton' are long whereas those of 'CDC Austenson' are short.*

Description:

YOUNG PLANT: erect to semi-erect growth habit at tillering, sparse pubescence on lower leaf sheaths

PLANT: two row, spring feed barley, high frequency of plants with recurved flag leaves

FLAG LEAF (AT BOOTING): very sparse to sparse pubescence on blade

FLAG LEAF SHEATH: medium to strong glaucosity, very sparse pubescence

AURICLES: medium to strong intensity of anthocyanin colouration at beginning of anthesis, sparse to medium pubescence on margins

SPIKE: spike emergence occurs mid-season, strong degree of glaucosity at end of anthesis, erect to semi-erect attitude, platform shaped collar, parallel shape, dense to very dense, reduced sterile spikelet due to rudimentary development, glume and awn of the median spikelet are shorter to equal in length relative to the grain

LEMMA AWNS: weak to medium intensity of anthocyanin colouration of tips, longer than spike length, rough spiculations on margins

FIRST SEGMENT OF RACHIS: long to very long, strong to very strong curvature

KERNEL: weak to medium intensity of anthocyanin colouration of nerves of the lemma at beginning of ripening, whitish aleurone layer, long rachilla hairs, husk present, medium degree of spiculation of inner lateral nerves of dorsal side of lemma, hairless ventral furrow, clasping disposition of lodicules, horseshoe to incomplete horseshoe shape of basal markings, medium length, medium width

AGRONOMIC CHARACTERISTICS: good resistance to lodging

DISEASE REACTIONS: susceptible to Scald (*Rhynchosporium secalis*); moderately resistant to moderately susceptible to Spot Blotch (*Cochliobolus sativus*) and Net Blotch (net form and spot form of *Pyrenophora teres*); moderately resistant to Fusarium Head Blight (*Fusarium graminearum*); resistant to Stem Rust (*Puccinia graminis*), Covered Smut (*Ustilago hordei*), True Loose Smut (*Ustilago nuda*) and False Loose Smut (*Ustilago nigra*)

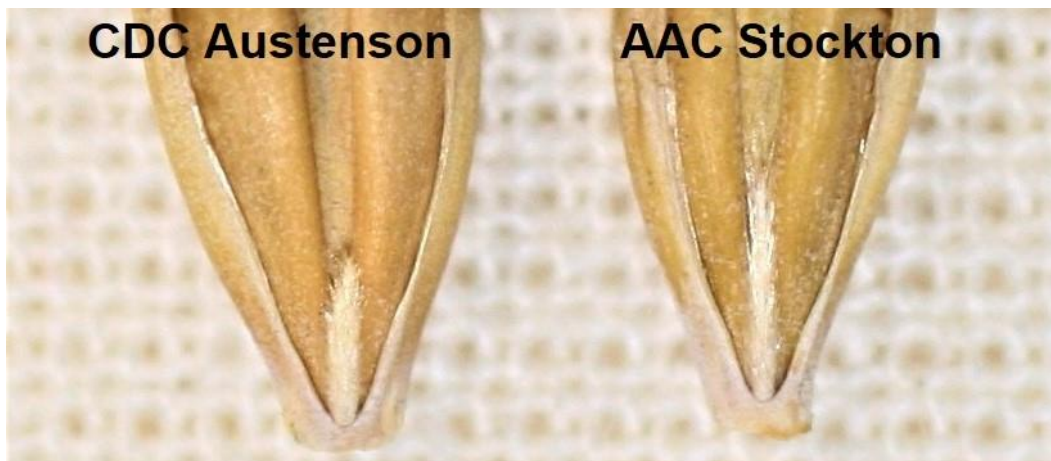
Origin and Breeding: ‘AAC Stockton’ (experimental designations TR20270 and BM1212-197) originated from the cross between TR11219 and ‘CDC Kindersley’ conducted in the spring of 2012 in a greenhouse at the Agriculture and Agri-Food Canada Brandon Research Centre in Brandon, Manitoba. The early generations were handled using a modified bulk method. From 2012 to 2013, increases were performed in Brandon and in Leeston, New Zealand. Due to flooding in Brandon in 2014, the F4 generation was grown as short rows at a winter nursery in Yuma, Arizona, USA in the winter of 2014-2015 with the first 349 spikes harvested and threshed individually and planted in F5 progeny rows in Brandon in 2015. The 38 lines selected based on height, maturity, lodging resistance, general appearance and field disease reactions were then grown as F6 short row increases in Leeston, New Zealand. One F7 line, designated as BM1212-197, was grown as a single plot in a preliminary unreplicated yield tests at Brandon in 2016 and entered into a new intermediate yield test at Brandon and Hamiota, Manitoba in 2017. BM1212-197 was then advanced in yield tests at 6 locations in Western Canada in 2018 and advanced, as a malting line, in the 2020 Western Cooperative Two-row Barley Registration test as TR20270. TR20270 was further evaluated in 2020 and 2021 in the Collaborative Malting Barley Trials. Breeder seed was established from a bulk of 175 F12 derived lines selected in 2021. Additional selection criteria included yield, heading date, kernel plumpness, test weight, kernel weight, kernel brightness, hull peeling, malting quality, disease resistances and resistance to pre-harvest sprouting.

Tests and Trials: The comparative trials for ‘AAC Stockton’ were conducted Agriculture and Agri-Food Canada, Brandon Research and Development Centre in Brandon, Manitoba in 2021 and 2022. There were 4 replicates per variety arranged in an RCB design. Plots were 3.8 square metres and consisted of 6 rows with a row length of 4 metres with 0.18 metres between rows. Plots were spaced 46 cm apart. The seeding density was 1200 seeds per plot resulting in approximately 4800 plants per variety. Measured characteristics were based on a minimum of 20 measurements per variety per year. Mean differences were significant at the 5% probability level based on LSD values. Disease reaction ratings were provided through the Disease Evaluation team of the Prairie Recommending Committee for Oat and Barley conducted in 2020 and 2021.

Comparison table for ‘AAC Stockton’

	‘AAC Stockton’	‘CDC Austenson’*	‘AAC Synergy’*	‘AAC Connect’*	‘CDC Kindersley’*
<i>Plant height at maturity (stem plus spike including awns) (cm)</i>					
mean 2021 (LSD=0.27)	62.0	65.0	64.9	64.2	67.9
std. deviation 2021	0.6	0.6	0.8	0.7	0.7
mean 2022 (LSD=0.87)	67.9	67.3	71.0	68.4	68.4
std. deviation 2022	1.0	2.5	1.6	1.8	1.3

*reference varieties



Barley: 'AAC Stockton' (right) with reference variety 'CDC Austenson' (left)
