



APPLICATIONS UNDER EXAMINATION

WHEAT

WHEAT (*Triticum aestivum*)

Proposed denomination: 'AAC Westlock'
Application number: 21-10726
Application date: 2021/10/21
Applicant: Agriculture & Agri-Food Canada, Lethbridge, Alberta
Agent in Canada: Agriculture & Agri-Food Canada, Saskatoon, Saskatchewan
Breeder: Harpinder S. Randhawa, Agriculture & Agri-Food Canada, Lethbridge, Alberta

Varieties used for comparison: 'AAC Foray' and 'AAC Penhold'

Summary: *At booting, the frequency of plants with recurved flag leaves on 'AAC Westlock' is low whereas the frequency is absent or very low on the plants of 'AAC Foray'. The intensity of anthocyanin colouration of the auricles on the flag leaf of 'AAC Westlock' is absent or very weak whereas it is of medium intensity for 'AAC Foray'. The flag leaf sheath and lower side of the leaf blade of 'AAC Westlock' have a weak glaucosity whereas those of 'AAC Foray' have a medium degree of glaucosity. The flag leaf of 'AAC Westlock' is narrower than that of 'AAC Penhold'. At heading, the spike of 'AAC Westlock' has a weak glaucosity whereas that of 'AAC Penhold' has a medium degree of glaucosity. In profile, the spike of 'AAC Westlock' has a tapering shape whereas that of 'AAC Foray' has a parallel-sided shape. The awns of 'AAC Westlock' are equal to the length of the spike while those of 'AAC Foray' are longer than the spike. The mature plants, including the spike and awns, of 'AAC Westlock' are shorter than the mature plants of 'AAC Foray' and taller than those of 'AAC Penhold'. The lower glume shoulder of 'AAC Westlock' is elevated and broad whereas the lower glume shoulder of the reference varieties is straight and narrow. The lower glume beak of 'AAC Westlock' is very long and slightly curved whereas that of the reference varieties is very short and straight. The thousand kernel weight of 'AAC Westlock' is less than that of 'AAC Foray'.*

Description:

PLANT: spring type, common wheat, erect growth habit at 5 to 9 tiller stage, low frequency of plants with recurved flag leaves, heads mid-season, matures mid-season

SEEDLING (4-LEAF STAGE): absent or very weak anthocyanin colouration of the coleoptile, glabrous sheath and blade of lower leaves

FLAG LEAF (AT BOOTING): absent or very weak intensity of anthocyanin colouration of auricles, weak glaucosity of sheath and lower side of leaf blade, glabrous sheath and blade before anthesis

CULM: absent or very sparse hairiness of uppermost node, absent or very weak glaucosity at anthesis, curved neck at maturity.

STRAW (AT MATURITY): pith thin in cross-section, anthocyanin colouration absent

SPIKE: weak glaucosity at heading, tapering shape in profile, medium density, erect attitude, white at maturity, absent or very sparse hairiness of convex surface of apical rachis segment

AWNS: equal to spike length, white at maturity

LOWER GLUME: medium length, medium width, glabrous, sparse extent of external and internal hairs

LOWER GLUME SHOULDER: elevated, broad

LOWER GLUME BEAK: very long, slightly curved

LOWEST LEMMA: slightly curved

KERNEL: hard red type, medium red, large, long, medium width, elliptical shape, rounded cheek, medium length brush hairs, medium width, shallow crease

GERM: medium size, broad elliptical shape

AGRONOMIC TRAITS: good resistance to shattering, good resistance to pre-harvest sprouting

BREAD MAKING QUALITY: good

DISEASE REACTIONS: resistant to Common bunt (*Tilletia tritici* and *Tilletia laevis*), Leaf rust (*Puccinia triticina*), Stem rust (*Puccinia graminis*) and Stripe rust (*Puccinia striiformis*); moderately resistant to Fusarium head blight (*Fusarium graminearum*)

INSECT REACTION: susceptible to Orange Wheat Blossom Midge (*Sitodiplosis mosellana*)

Origin and Breeding: ‘AAC Westlock’ (experimental designations WB25597 and HY2090) originated from a three way cross conducted at Agriculture and Agri-Food Canada, Lethbridge Research and Development Centre in Lethbridge, Alberta in January, 2014. The initial cross between ‘AAC Foray’ and ‘AAC Tenacious’ was followed by a subsequent cross to ‘AAC Penhold’. F1 derived double haploids were produced using maize hybridization techniques in the summer of 2014 with 461 resulting double haploid lines evaluated in a contra-season nursery in Leeston, New Zealand during the winter of 2015-2016. One hundred and sixty nine rows selected based on plant type, plant height, maturity and leaf rust resistance were harvested and evaluated in single replicate yield trials and disease nurseries in multiple locations in western Canada. Twenty two lines selected based on agronomic, disease resistance and quality traits were advanced to B-level testing in multiple locations in western Canada and simultaneously evaluated in various disease nurseries in 2017. One line designated WB25597 was entered in the 2018 High Yield Wheat Registration Trial as HY2090 where it was evaluated from 2018 to 2020. Breeder seed production commenced in 2021.

Tests and Trials: The comparative trials for ‘AAC Westlock’ were conducted at Agriculture and Agri-Food Canada, Lethbridge Research and Development Centre in Lethbridge, Alberta in 2021 and 2022. There were 3 replicates per variety arranged in an RCB design. Plots were 2.76 square metres, and consisted of 4 rows 3.0 metres in length with 0.23 metres between rows. Plots were spaced 0.54 metres apart. The planting density was 250 plants per square metre, resulting in approximately 2050 plants per variety per year. Measured characteristics were based on a minimum of 20 measurements per variety per year, except for the kernel weight which was based on 15 measurements per variety per year. Mean differences were significant at the 5% probability level based on Student’s t-tests. Disease and insect reaction ratings were provided through the disease evaluation of the High Yield Wheat Registration trials from 2018 to 2020.

Comparison table for ‘AAC Westlock’

	‘AAC Westlock’	‘AAC Foray’*	‘AAC Penhold’*
<i>Flag leaf width (cm)</i>			
mean 2021	1.0	0.8	1.2
std. deviation 2021	0.2	0.2	0.3
mean 2022	1.3	1.2	1.6
std. deviation 2022	0.2	0.2	0.2
<i>Plant height at maturity (including spike and awns) (cm)</i>			
mean 2021	78.0	86.1	75.2
std. deviation 2021	3.7	5.3	1.9
mean 2022	90.1	100.2	78.0
std. deviation 2022	3.5	1.8	3.0
<i>Kernel weight (grams per 1000 kernels) (g)</i>			
mean 2021	42.2	46.0	40.4
std. deviation 2021	0.8	0.7	0.6
mean 2022	37.9	42.0	37.3
std. deviation 2022	1.1	1.2	0.8

*reference varieties



Wheat: 'AAC Westlock' (bottom) with reference varieties 'AAC Foray' (centre) and 'AAC Penhold' (top)

Proposed denomination: 'OAC Moon'
Application number: 22-10826
Application date: 2022/02/10
Applicant: University of Guelph, Guelph, Ontario
Breeder: Jason Reinheimer, Limagrain Cereal Seeds, Windsor, Colorado, United States of America

Varieties used for comparison: 'Branson' and 'Cruze'

Summary: *The coleoptile of 'OAC Moon' has a medium to strong intensity of anthocyanin colouration whereas that of 'Cruze' has an absent or very weak anthocyanin colouration. At heading, the spike of 'OAC Moon' is shorter than the spike of 'Branson'. At maturity, the spike of 'OAC Moon' has an inclined attitude whereas the spike of both reference varieties has a nodding attitude.*

Description:

PLANT: winter type, common wheat, intermediate growth habit at 5 to 9 tiller stage, very low frequency of plants with recurved flag leaves

SEEDLING (4-LEAF STAGE): medium to strong intensity of anthocyanin colouration of the coleoptile, glabrous sheath and blade of lower leaves

FLAG LEAF: absent or very weak intensity of anthocyanin colouration of auricles, medium glaucosity of sheath at heading, glabrous sheath and blade before anthesis

CULM: straight neck at maturity

STRAW (AT MATURITY): pith thin in cross-section, anthocyanin colouration absent

SPIKE: weak glaucosity at heading, tapering shape in profile, dense, inclined attitude, yellow at maturity

AWNS: equal to spike length, light brown at maturity

LOWER GLUME: narrow, medium to long

LOWER GLUME SHOULDER: absent or very narrow, sloping

LOWER GLUME BEAK: medium length, slightly curved

KERNEL: soft red type, light red, medium size

Origin and Breeding: ‘OAC Moon’ (experimental designations OAC19 SRW-01 and LES15-5199) originated from the three-way cross between the F1 of ‘97397J1-4-1-4-7’ and ‘SR30-530’ and the variety ‘Branson’, which was completed at Limagrain Cereal Seeds, Illinois, USA in 2006. ‘OAC Moon’ was derived from a F4 segregating population and selected as an F4:5 head row based on height, maturity, and general disease resistance. While testing in first yield trial, the F4:6 plants were found to be segregating and therefore 24 spikes were pulled and grown as F6:7 rows the following year. A superior row was selected and named LES15-5199 in the fall of 2014. This F6:8 line was then entered into year 1 trials based on yield, disease resistance, and general agronomics. LES15-5199 was received by the University of Guelph in 2015. After three years of testing in Ontario in the preliminary, advanced, and elite yield trials, the line was re-designated as OAC 19 SRW-01. From 2018 to 2020, this line was tested in the Ontario registration trials. Breeder seed production commenced in the fall of 2020.

Tests and Trials: The comparative trials for ‘OAC Moon’ were conducted at University of Guelph, Elora Research Station, Elora, Ontario in 2021 and 2022. The varieties in the trial were sown in the previous fall in late September. There were 3 replicates per variety arranged in an RCB design. Plots were 4.24 square metres. There were approximately 2100 plants per variety per year. 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 Student’s t-tests.

Comparison table for ‘OAC Moon’

	‘OAC Moon’	‘Branson’*	‘Cruze’*
<i>Spike length (excluding awns) (cm)</i>			
mean 2021	8.3	9.0	9.6
std. deviation 2021	0.4	0.9	0.5
mean 2022	7.4	8.1	7.3
std. deviation 2022	0.4	0.6	0.6

*reference varieties



Wheat: ‘OAC Moon’ (centre) with reference varieties ‘Branson’ (left) and ‘Cruze’ (right)

Proposed denomination: 'OAC Twilight'
Application number: 22-10834
Application date: 2022/02/17
Applicant: University of Guelph, Guelph, Ontario
Breeder: Jason Reinheimer, Limagrain Cereal Seeds, Windsor, Colorado, United States of America

Varieties used for comparison: 'Branson' and 'Cruze'

Summary: *The coleoptile of 'OAC Twilight' has a medium intensity of anthocyanin colouration whereas that of 'Branson' has a very strong intensity of anthocyanin colouration and that of 'Cruze' has absent or very weak anthocyanin colouration. At maturity, the lower glume beak of 'OAC Twilight' is short and straight whereas the lower glume beak is of medium length and slightly curved for both reference varieties.*

Description:

PLANT: winter type, common wheat, intermediate growth habit at 5 to 9 tiller stage

SEEDLING (4-LEAF STAGE): medium intensity of anthocyanin colouration of the coleoptile, glabrous sheath and leaf blade of lower leaves

FLAG LEAF: absent or very weak intensity of anthocyanin colouration of auricles, medium degree of glaucosity of sheath at heading, glabrous sheath and blade before anthesis

CULM: weak glaucosity at heading, straight neck at maturity

STRAW (AT MATURITY): pith thin in cross-section, anthocyanin colouration absent

SPIKE: weak glaucosity at heading, tapering shape in profile, medium density, inclined attitude, yellow at maturity

AWNS: shorter than spike length, light brown at maturity

LOWER GLUME: medium width, medium length

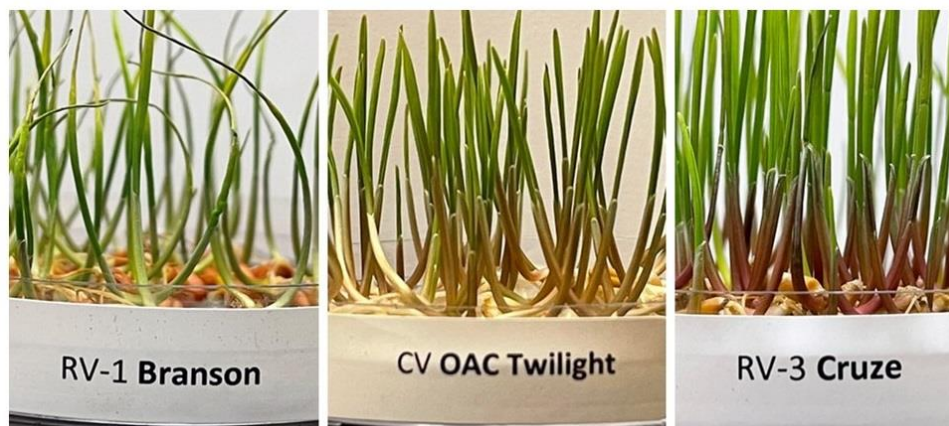
LOWER GLUME SHOULDER: broad, straight

LOWER GLUME BEAK: short, straight

KERNEL: soft red type, light red, medium size

Origin and Breeding: 'OAC Twilight' (experimental designations OAC19 SRW-03 and LES168064) originated from a cross between 'MO111359' and 'LCS19228', which was completed at Limagrain Cereal Seeds, Illinois, USA in 2013. Double haploid lines were created from the F1 seed in 2014 and grown as single plots and evaluated in 2015 to 2016. 'OAC Twilight' was selected in 2016 based on yield, disease resistance, and general agronomic traits. The line, designated as LES168064, was received by the University of Guelph and planted in fall 2016. LES168064 was evaluated in a preliminary yield test at Elora, ON and advanced yield trials in Ontario in 2017 and 2018, respectively. During 2018-19 and 2019-20 growing seasons, this line was tested in the Ontario registration trials. Breeder seed production commenced in the fall of 2020.

Tests and Trials: The comparative trials for 'OAC Twilight' were conducted at University of Guelph, Elora Research Station, Elora, Ontario in 2021 and 2022. The varieties in the trial were sown in the previous fall in late September. There were 3 replicates per variety arranged in an RCB design. Plots were 4.24 square metres. There were approximately 2100 plants per variety per year.



Wheat: 'OAC Twilight' (centre) with reference varieties 'Branson' (left) and 'Cruze' (right)