Request to Add Mayflower (08032-156) to the AMBA Recommended List

08032-156 (Two row spring barley).

The original cross **08032** was made in 2008 between two Malteurop F1 populations and have both European & North American germplasm.
In 2011 08032-156 planted as rows & selected for harvest in North America. Since 2012 08032-156 has been included in Malteurop trials in North America & Canada & undergone quality testing.
08032-156 was entered in the AMBA Western Nursery in 2015 & 2016 and twice rated satisfactory; it is eligible for plant scale testing.
A small seed multiplication (breeder's seed) was done in New Zealand in 2016/17 and the seed was sent to Montana. After a seed increase in Montana in 2017, a seed increase has been planted in Arizona in 2017/18 followed by further seed increase in Montana 2018.
08032-156 is initially intended for growing in Montana and all malt beer production.

Requested by: Mary-Jane Maurice, M. Malt
Director of Technical Services
Malteurop North America, Inc.

December 2nd, 2020

Agronomic Comparisons of 08032-156 and Check varieties in 2016 and 2017 Montana Trials.

Exp: N17-5B Y3				irrigated							
Location Summary											
	Heading					Plump/thin			Montana		
	Date	Plt. Ht.	Lodging	T.W.	Protein	over	over		Yield bu/ac		
Entry	from 1/1	cm	%	(lbs/bu)	%	6/64	5.5	Pan	BZ (I)	GF (I)	AVG
08032-156	**187**	**65**		**50.9**	**10.4**	**84**	**10**	**6**	**131.9**	**105.7**	**118.8**
Expedition	188	70		52.3	10.6	95	4	1	120.6	96.8	108.7
Genie	188	69		51.6	10.1	86	9	5	141.2	109.5	125.3
Hockett	187	71		50.7	11.2	82	9	8	117.8	91.0	104.4
Merit	189	78		49.1	10.8	79	13	8	137.6	113.5	125.6
Metcalfe	187	89		52.1	11.5	90	7	2	129.1	93.8	111.4
Synergy	190	84		51.6	10.5	94	4	2	125.9	100.9	113.4

Exp: N16-5-12-1 Malteurop Y3												
Location Summary												
	Heading					Plump/thin			Montana			
	Date	Plt. Ht.	Lodging	T.W.	Protein	over	over		Yield bu/ac			
Entry	from 1/1	cm	0-9	(lbs/bu)	%	6/64	5.5	Pan	BZ (I)	NO (D)	GF (D)	AVG
08032-156	**187**	**59**	**0.0**	**51.6**	**8.2**	**91.1**	**6.2**	**2.7**	**148.1**	**64.2**	**42.4**	**84.9**
Conrad	188	68	3.0	52.5	9.9	93.1	5.0	2.0	140.8	67.4	43.6	83.9
Expedition	187	57	0.0	51.7	8.0	90.5	6.7	2.8	155.3	69.8	46.8	90.6
Hockett	187	68	7.3	52.5	8.7	91.8	5.3	2.9	116.2	55.7	53.7	75.2
Metcalfe	187	73	3.3	52.2	9.9	90.1	6.9	3.0	127.1	62.9	47.2	79.1

I=irrigated

D = Dryland

2015 AMBA Quality Evaluation Program
Western Nursery - Sites A & B

		Two-Row		Two-Row		Two-Row		Two-Row	
		Mayflower 08032-156		Harrington		AC Metcalfe		Merit 57	
		A	B	A	B	A	B	A	B
BARLEY									
Skinned & Broken Kernel	(%)	15.6	6.5	16.4	6.7	12.7	12.1	11.7	8.6
3-Day Germination	(%)	98.3	99.8	98.5	99.3	99.3	98.5	99.5	98.8
On 7/64	(%)	52.5	50.4	29.1	35.6	21.5	45.3	45.4	27.1
Plump (On 6/64 + 7/64)	(%)	95.9	97.0	91.8	94.7	91.6	96.3	94.7	93.0
Moisture	(%)	9.3	9.9	9.3	9.5	9.2	10.1	9.2	9.2
Total Protein	(% d.b.)	11.1	10.6	11.8	11.3	13.2	11.9	10.6	11.6
MALT									
Moisture at Steep-out	(%)	44.4	44.1	44.7	44.6	46.3	45.9	45.1	45.1
On 7/64	(%)	79.2	86.8	70.4	82.2	69.3	77.9	80.6	80.5
Extract, Fine Grind	(% d.b.)	83.6	83.1	81.6	81.9	81.0	82.4	84.2	82.6
F-C Difference		0.7	0.6	1.1	1.0	0.9	1.1	1.2	0.9
Wort Viscosity		1.42	1.43	1.48	1.45	1.45	1.48	1.45	1.45
Wort Color	(Deg. Lov.)	2.31	2.66	2.10	1.99	2.47	2.37	2.09	2.18
Wort Turbidity	(Hach NTU)	21.5	42.2	5.7	6.1	6.1	9.1	4.0	6.0
Diastatic Power	(Deg. L)	130	113	169	137	196	155	172	164
Alpha Amylase	(D.U.)	61.2	60.6	74.1	72.7	87.2	83.5	89.7	92.4
Soluble Protein	(% d.b.)	5.20	4.76	5.57	5.30	6.05	5.46	5.23	5.81
Total Protein	(% d.b.)	11.0	10.6	11.4	11.0	12.6	11.6	10.9	11.5
Soluble/Total Protein	(% d.b.)	47.2	45.1	49.1	48.3	48.1	47.3	48.3	50.5
Moisture	(%)	4.4	4.3	4.3	4.2	4.4	4.4	4.6	4.4
Beta-Glucan	(ppm)	56	59	149	110	68	63	81	59
Friability		92.7	97.3	78.1	87.4	78.1	87.2	84.9	91.0
Free Amino Nitrogen (FAN)		229	200	247	236	270	248	230	258

Site A = Fairfield, MT & Site B = Filer, ID

Each value is the average of four collaborators, except wort color (3) & friability (3).

2015 AMBA Quality Evaluation Program
Western Nursery - Average of Sites A & B

		Two-Row	Two-Row	Two-Row	Two-Row
		Mayflower 08032-156	Harrington	AC Metcalfe	Merit 57
BARLEY					
Skinned & Broken Kernel	(%)	11.0 bcdefgh	11.6 bcdefg	12.4 bcde	10.2 cdefgh
3-Day Germination	(%)	99.0 abc	98.9 abc	98.9 abc	99.1 abc
On 7/64	(%)	51.4 defg	32.3 j	33.4 ij	36.3 hij
Plump (On 6/64 + 7/64)	(%)	96.4 ab	93.2 de	93.9 bcde	93.8 cde
Moisture	(%)	9.6 ab	9.4 abc	9.7 a	9.2 c
Total Protein	(% d.b.)	10.9 e	11.6 cde	12.6 ab	11.1 e
MALT					
Moisture at Steep-out	(%)	44.3 defg	44.7 cdef	46.1 a	45.1 bcd
On 7/64	(%)	83.0 bcde	76.3 fg	73.6 g	80.6 def
Extract, Fine Grind	(% d.b.)	83.3 ab	81.8 defg	81.7 efg	83.4 ba
F-C Difference		0.7 c	1.1 bc	1.0 bc	1.1 bc
Wort Viscosity		1.43 f	1.46 def	1.46 def	1.45 def
Wort Color	(Deg. Lov.)	2.48 b	2.05 cdefg	2.42 bc	2.13 bcdef
Wort Turbidity	(Hach NTU)	31.9 b	5.9 d	7.6 d	5.0 d
Diastatic Power	(Deg. L)	122 gh	153 cde	176 a	168 abc
Alpha Amylase	(D.U.)	60.9 g	73.4 def	85.4 ab	91.1 a
Soluble Protein	(% d.b.)	4.98 gh	5.44 bdefc	5.76 bac	5.52 abcde
Total Protein	(% d.b.)	10.8 f	11.2 ef	12.1 bcd	11.2 ef
Soluble/Total Protein	(% d.b.)	46.2 bcd	48.7 abc	47.7 bcd	49.4 ab
Moisture	(%)	4.3 abc	4.2 c	4.4 abc	4.5 abc
Beta-Glucan	(ppm)	57 fg	130 defg	65 efg	70 efg
Friability		95.0 a	82.8 bcde	82.7 bcde	88.0 abc
Free Amino Nitrogen (FAN)		215 gh	241 bcde	259 ab	244 abcd

Site A = Fairfield, MT & Site B = Filer, ID

Each value is the average of four collaborators, except wort color (3) & friability (3).

Means with the same letter statistically the same at the 95% level.

2016 AMBA Quality Evaluation Program
Western Nursery - Sites A & B

		Two-Row		Two-Row		Two-Row		Two-Row	
		Mayflower 08032-156		Harrington		AC Metcalfe		Merit 57	
		A	B	A	B	A	B	A	B
BARLEY									
Skinned & Broken Kernels	(%)	9.3	9.5	5.6	15.8	5.5	10.3	11.6	8.6
3-Day Germination	(%)	98.0	97.5	98.5	99.5	98.5	99.3	99.0	100.0
On 7/64	(%)	71.2	33.8	44.1	10.9	57.4	10.4	52.4	6.7
Plump (On 6/64 + 7/64)	(%)	98.3	95.0	93.5	78.0	96.0	81.1	95.6	74.8
Moisture	(%)	8.7	8.1	8.4	8.5	8.5	8.0	8.5	7.8
Total Protein	(% d.b.)	11.4	9.9	13.0	12.3	12.3	12.7	10.1	11.3
MALT									
Moisture at Steep-out	(%)	44.4	43.3	43.8	44.9	44.4	43.6	45.0	45.0
On 7/64	(%)	90.5	84.2	79.7	55.4	85.5	60.4	79.5	57.3
Extract, Fine Grind	(% d.b.)	82.7	83.3	80.0	80.8	81.3	80.4	84.1	82.0
F-C Difference		1.0	0.6	1.8	1.3	0.8	0.8	0.9	0.8
Wort Viscosity		1.45	1.46	1.47	1.55	1.43	1.44	1.45	1.45
Wort Color	(Deg. Lov.)	3.28	2.56	1.83	1.53	1.96	1.66	2.10	1.56
Wort Turbidity	(Hach NTU)	55.2	45.9	6.5	5.6	5.6	5.2	6.4	3.5
Diastatic Power	(Deg. L)	132	108	184	160	189	190	156	187
Alpha Amylase	(D.U.)	58.7	61.2	73.6	71.9	81.1	86.9	89.0	96.8
Soluble Protein	(% d.b.)	4.91	4.38	5.51	5.03	5.51	5.24	5.07	5.09
Total Protein	(% d.b.)	11.2	10.1	12.3	11.9	12.1	12.5	9.9	11.2
Soluble/Total Protein	(% d.b.)	44.1	43.5	45.0	42.3	45.6	41.8	51.2	45.7
Moisture	(%)	4.3	4.1	4.1	4.0	4.3	4.1	4.3	4.3
Beta-Glucan	(ppm)	123	77	245	168	72	45	58	61
Friability		87.7	95.7	78.5	64.2	73.5	67.7	86.5	88.4
Free Amino Nitrogen (FAN)		196	183	226	196	231	216	225	207

Site A = Fairfield, MT & Site B = Filer, ID

Each value is the average of four collaborators, except fine-coarse difference (3) & friability (2).

2016 AMBA Quality Evaluation Program
Western Nursery - Average of Sites A & B

		Two-Row	Two-Row	Two-Row	Two-Row
		Mayflower 08032-156	Harrington	AC Metcalfe	Merit 57
BARLEY					
Skinned & Broken Kernels	(%)	9.4 bcde	10.7 bc	7.9 bcde	10.1 bcde
3-Day Germination	(%)	97.8 ab	99.0 a	98.9 a	99.5 a
On 7/64	(%)	52.5 abcd	27.5 efg	33.9 defg	29.5 efg
Plump (On 6/64 + 7/64)	(%)	96.7 a	85.7 def	88.5 cdef	85.2 ef
Moisture	(%)	8.4 a	8.5 a	8.3 a	8.2 a
Total Protein	(% d.b.)	10.6 j	12.6 bc	12.5 bcd	10.7 j
MALT					
Moisture at Steep-out	(%)	43.8 bcd	44.3 abc	44.0 abc	45.0 a
On 7/64	(%)	87.3 abc	67.5 hij	72.9 defghi	68.4 ghij
Extract, Fine Grind	(% d.b.)	83.0 ab	80.4 ij	80.9 ghi	83.0 ab
F-C Difference		0.8 hi	1.5 cdefg	0.8 hi	0.9 hi
Wort Viscosity		1.45 d	1.51 d	1.44 d	1.45 d
Wort Color	(Deg. Lov.)	2.92 a	1.68 cdef	1.81 cd	1.83 cd
Wort Turbidity	(Hach NTU)	50.6 a	6.1 de	5.4 de	5.0 e
Diastatic Power	(Deg. L)	120 ij	172 bcd	189 a	172 bcd
Alpha Amylase	(D.U.)	60.0 gh	72.8 de	84.0 bc	92.9 a
Soluble Protein	(% d.b.)	4.65 gh	5.27 abc	5.37 ab	5.08 cde
Total Protein	(% d.b.)	10.7 klm	12.1 cdef	12.3 cd	10.6 lm
Soluble/Total Protein	(% d.b.)	43.8 bcde	43.6 bcde	43.7 bcde	48.5 a
Moisture	(%)	4.2 bcd	4.1 d	4.2 bcd	4.3 bcd
Beta-Glucan	(ppm)	100 fg	206 def	58 g	60 g
Friability		91.7 a	71.4 defg	70.6 efg	87.5 ab
Free Amino Nitrogen (FAN)		190 efgh	211 bcd	223 b	216 bc

Site A = Fairfield, MT & Site B = Filer, ID

Each value is the average of four collaborators, except fine-coarse difference (3) & friability (2).

Means with the same letter statistically the same at the 95% level.

Quality Evaluation Subcommittee Ratings Table - WEST

		Rating	SkBk	Germ	B764	Plmp	BPro	M764	Ext	FC	Vis	Col	Tur	DP	Alpha	Sol	ST	BG	Fri	FAN	Comment
MT124027	2015	S																			Good Overall Modification
	2016	S																SH			GOM - Eligible
MT124728	2015	U									SH							SH			
	2016	U									SH							SH			no
MT124071	2015	S	H						G									G	L		
	2016	S	H						G												
MT124015	2015	U									SH							SH			
	2016	U									SH							H			no
MT090190	2013	U									SH							H			
	2014	S							G								SH	SH			
	2016	U																H			no
08ARS112-75	2015	U																H			
	2016	S																SH			
08ARS116-91	2015	S																G			
	2016	S							G									G			Eligible
08ARS012-79	2016	S							G								H				
08ARS028-20	2016	U							SL									G			
08042-077	2015	S	H																		
	2016	U					SH										L	SH	L		
08053-050	2015	U					H		SL												
	2016	S																			
08032-156	2015	S					G		G				H								
	2016	S					G		G				H								Eligible
08145-058	2016	S											H					G			
10003-006	2016	S	SH						G								L	SH			
UC1409	2016	U							L		H	L					L	H	L	L	no
UC1410	2016	U				L			L		H	L					L	H	L	L	no
UC1360	2016	U					H		L		H	L					L	H	L	L	no
UC1390	2016	U									H	L		L			L	H	L	L	no
12WA-120.14	2016	U					H		L									H	L		no
12WA-120.17	2016	U							L			L					L	H	L		no
11WA-107.58	2016	U	SH										SH	L	L		L	H	L	L	no
10WA-117.17	2016	U				L			L		H	L		L	L		L	H	L	L	no

U - Unsatisfactory
S - Satisfactory
G - Good
H - High
SH - Slightly High
SL - Slightly Low
L - Low
no - No Further Testing
E - Eligible for Plant Scale
GOM - Good Overall Modification

USDA

United States Department of Agriculture

Agricultural
Marketing
Service

Science &
Technology
Programs

Plant
Variety
Protection
Office

1400 Independence
Avenue, SW
Room 4512-SB,
Stop 0274
Washington, DC
20250-0274

May 21, 2020

3830 West Grant St. Milwaukee, WI 53215

Dear Malteurop North America, Inc,

SUBJECT: Notice of Allowance and Certificate Fee Request

We have completed our examination and have determined that a certificate of plant variety protection may be issued for the following applications: Barley: No. 202000025, Mayflower.

Please complete and return the enclosed Certificate Order Form with your remittance to the Plant Variety Protection Office at the address above. Any changes to the Variety Name or Seed Certification designation should be made on the Certificate Order Form attached.

If the company name needs to be changed, other than spelling corrections, then a recordation is required. Recordation is a revision of the original application filed with the Plant Variety Protection Office and requires an additional fee payment of $41 per application. All recordation transactions such as the transfer of authority, transfer of ownership, or change of owner's name requires an assignment document with an authorized signature(s) and should be attached to this form: Recordation Form (https://www.usda.gov/sites/default/files/media/Recordation%20Form.pdf)

The certificate of protection will be issued when payment and the Certificate Order Form for each application listed above has been received.

Sincerely,

Jeffery Haynes, Acting Commissioner
Plant Variety Protection Office