



Request for Support for Registration of OT3098

Crop: Oat (*Avena sativa* L.)
Type: Spring oat - milling

Proposers: A.D. Beattie and B.G. Rossnagel
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Test #'s: OT3098 or SA130460
Pedigree: SA080443 x OT7053

Area of Adaptation: Western Canada

Description:

OT3098 is a high β -glucan, higher oil oat line with good groat percentage, high kernel weight, and good plumpness, combined with good yield potential and good lodging resistance. **OT3098** also demonstrates resistance to crown rust and smut, and intermediate resistance to stem rust.

Strengths:

- Good grain yield (2% < AC Morgan).
- Good resistance to lodging (= AC Morgan).
- Short plant height (< Leggett).
- High kernel weight (= best check).
- Excellent groat β -glucan content (>> Leggett).
- Good groat protein (= Leggett).
- Resistant to crown rust and smut.
- Intermediate reaction to stem rust (= Summit).

Neutral characteristics:

- Maturity (= Leggett).
- Test weight (= AC Morgan).
- Plumps and thins (= AC Morgan).
- Groat % (= Leggett).
- Oil content (> checks).
- Groat total dietary fibre content (= best check).
- FHB reactions (= checks)

Weaknesses:

- Susceptible to stem rust (= AC Morgan).

Table 1. Grain yield for OT3098 and checks from 2016 and 2017 WCORT.

Entry	Black Soil Zone		Black & Grey Zone		Brown Soil Zone		Irrigated		Combined	
	Yield (kg/ha)	Yld as % Dancer	Yield (kg/ha)	Yld as % Dancer	Yield (kg/ha)	Yld as % Dancer	Yield (kg/ha)	Yld as % Dancer	Yield (kg/ha)	Yld as % Dancer
CDC Dancer	6572.4	100	6815.8	100	6191.4	100	6135.5	100	6368.2	100
AC Morgan	7358.8	112	7523.7	110	6965.7	112	6757.4	110	7158.0	112
Leggett	6926.2	105	6746.0	99	5970.7	96	7036.4	114	6503.7	102
OT3098	7463.4	114	7286.8	107	6554.9	106	6713.5	110	6951.0	109
Station years	10		6		5		2		23	

Table 2. Grain yield for OT3098 and checks from 2017 WCORT.

Entry	Black Soil Zone		Black & Grey Zone		Brown Soil Zone		Irrigated		Combined	
	Yield (kg/ha)	Yld as % Dancer	Yield (kg/ha)	Yld as % Dancer	Yield (kg/ha)	Yld as % Dancer	Yield (kg/ha)	Yld as % Dancer	Yield (kg/ha)	Yld as % Dancer
CDC Dancer	6940.4	100	6969.5	100	4386.4	100	8157.2	100	6451.7	100
AC Morgan	7697.4	111	7499.9	108	5261.8	120	8769.9	108	7172.3	111
Leggett	7005.9	101	6881.3	99	4359.0	99	8229.8	101	6459.9	100
Summit	7481.0	108	7117.5	102	4708.1	107	8754.1	107	6855.0	106
OT3098	7609.4	110	7409.2	106	4931.6	112	8473.0	104	7011.8	109
Station years	6		3		3		1		13	

Table 3. Agronomic characteristics for OT3098 and checks from 2016 and 2017 WCORT.

Entry	Days to Head	Days to Mature	Height (cm)	Lodging (1 - 9)	Test Wt. (kg/ha)	Kern. Wt. (mg)	Plump (%)	Thins (%)	Groat (%)
CDC Dancer	53	96	107.8	4.0	55.0	38.5	92.9	1.2	76.0
AC Morgan	54	99	105.0	3.1	53.6	40.6	89.4	1.8	71.7
Leggett	53	100	99.3	3.9	55.0	38.5	89.8	1.6	74.6
OT3098	54	101	90.3	3.1	53.0	40.2	89.9	1.9	74.4
Station years	10	18	20	6	23	23	12	12	12

Table 4. Agronomic characteristics for OT3098 and checks from 2017 WCORT.

Entry	Days to Head	Days to Mature	Height (cm)	Lodging (1 - 9)	Test Wt. (kg/ha)	Kern. Wt. (mg)	Plump (%)	Thins (%)	Groat (%)
CDC Dancer	54	93	99.3	3.0	57.8	39.1	93.3	1.5	72.8
AC Morgan	55	97	96.6	4.8	56.6	41.4	87.6	2.3	71.4
Leggett	54	98	90.5	2.6	57.9	38.2	85.8	2.3	73.1
Summit	54	98	91.2	3.3	57.5	38.8	90.2	1.6	73.9
OT3098	55	98	85.4	4.9	55.6	40.8	86.2	3.3	72.8
Station years	5	10	10	1	13	13	6	6	6

Table 5. Grain quality characteristics for OT3098 and checks from 2016 and 2017 WCORT.

Entry	Protein		Oil		β-Glucan			TDF
	2016 ^w (% db)	2017 ^w (% db)	2016 ^v (% db)	2017 ^v (% db)	2016 ^u (% db)	2017 ^u (% db)	Mean (% db)	2017 ^t (% db)
CDC Dancer	14.7	14.9	6.6	6.2	4.7	4.4	4.5	8.6
AC Morgan	14.8	15.2	6.5	6.0	4.6	4.3	4.5	8.9
Leggett	17.7	17.4	7.1	7.4	5.3	5.2	5.2	9.6
Summit	-	16.5	-	7.1	-	5.0	5.0	9.5
OT3098	17.8	17.7	8.2	7.5	6.1	6.0	6.0	9.7
Station years	6	6	6	6	6	6	12	3

^wData supplied by N. Ames, AAFC-Winnipeg. Wholemeal samples were analysed by a standard combustion procedure using the Flash 2000.

^vData supplied by N. Ames, AAFC-Winnipeg. Wholemeal samples were analysed by standard procedures using AOAC 922.06.

^uData supplied by N. Ames, AAFC-Winnipeg. Standard analytical procedures were used to quantify beta-glucan (AACC32_23).

^tData supplied by N. Ames, AAFC-Winnipeg. Standard analytical procedures were used to quantify total dietary fibre, using AACC Method 32.45.01 (AOAC method 2009.01)

Table 6. Disease reaction summary for OT3098 and checks from 2016 and 2017 WCORT.

Entry	Year	OCR	OCR GREENHOUSE RATING							
		FIELD RATING	CR13 SJQL-96	CR223 NGCB-94	CR241 DSGB	CR249 DOBG-94	CR254 LRBG	CR257 BRBG-94	CR258 NTGG	CR259 LQCB-91
CDC Dancer	2016	10MS	;	;	4	4	;	4	4	;4F
CDC Dancer	2017	5MR	;	;	4	4	;	4	4	3
AC Morgan	2016	15S	4	4	4	4	4	4	4	4
AC Morgan	2017	3MR	4	4	4	4	4	4	4	4
Leggett	2016	2R	;	;	;	;(4)	;	4	;	;
Leggett	2017	R	0	0	0	0	;	4	;	0
Summit	2017	3MR	0	;	;	0	;	0	4	0
OT3098	2016	2MR	0	0	0	0	0	4	0	;1
OT3098	2017	1R	0	0	0	0	;	3	;	0

Entry	Year	OSR	OSR GREENHOUSE RATING					
		FIELD RATING	NA8 FDJ	NA16 NGB	NA25 TDD	NA27 TGB	NA28 TGL	NA67 TJJ
CDC Dancer	2016	20I	;1-	;1-	1	11+	11+	34
CDC Dancer	2017	1R	11+	11+	12+	12	12+	34
AC Morgan	2016	60S	34	34	4	4	4	34
AC Morgan	2017	10MS	33+	4	4	33+	34	34
Leggett	2016	20MS	;1-	1-	11+	1	12-	34
Leggett	2017	5I	11+	12-	2-2	22-	22+	34
Summit	2017	10I	12-	2-2	33-	12-	33-	33+
OT3098	2016	20I	;1-	;1-	;1-	1-	11+	1-
OT3098	2017	5I	12-	12-	2-2	11+	3-3	34

Entry	Year	BYDV (1-9)	SMUT (%)	FHB DON (ppm)
CDC Dancer	2016	7.0	0	5.1
CDC Dancer	2017	-	0	6.5
AC Morgan	2016	4.0	0	4.2
AC Morgan	2017	-	0	6.6
Leggett	2016	5.5	0	2.6
Leggett	2017	-	0	4.2
Summit	2017	-	0	6.8
OT3098	2016	-	0	4.3
OT3098	2017	-	0	8.7

BYDV DATA - Provided by Dr. Frederic Kolb, University of Illinois, Urbana, IL USA.

Infections caused by natural viruliferous oat bird-cherry aphid (*Rhopalosiphum padi*). Rating based on field readings mid-dough using 1-9 (best-worst) scale; based on the average of 2 replications.

R = 1.0-3.5, MR = 3.51-4.5, I = 4.51-5.5, MS = 5.51-6.5, S = 6.51-9.0

SMUT DATA - J. Menzies: Note that at least three years are required to assess the smut resistance of an entry with confidence. % infection. R = 0 - 10%, MR = 11 - 30%, MR-MS = 31 - 50%, MS = 51 - 70%, S > 70%.

DON DATA - X. Wang: Field data based on a mean of 4 reps. DON data supplied by B. Blackwell

OAT CROWN RUST DATA - J. Menzies: Reactions in greenhouse tests based on infection types. Reactions in field were scored using the modified Cobb scale.

R=no chlorotic or necrotic flecks, otherwise any indication of sporulation resulted in a rating of MR

Field ratings based on artificial inoculation with composite of isolates from 2014 annual OCR (MB & SK) Rust Survey.

OAT STEM RUST DATA - T. Fetch: Field ratings based on artificial inoculation with a mixture of seven virulent races (NA8, 16, 25, 27, 28, and 67). Where a line segregates for disease resistance,

the first number in the seedling reaction score for stem rust indicates the number of plants and the second number in brackets indicates the infection type. Infection types are based on a 0-4 scale where

;(fleck), 1 and 2 are indicative of resistance while 3 and 4 indicate susceptibility. Numbers followed by plus (+) and minus (-,=) signs refer to gradients in pustule size.

Supplemental Table 1. Additional oil, lodging and smut data for OT3098.

Entry	Oil ^a		Smut ^b		Lodging		
	2014 (% db)	2015 (% db)	2014 (%)	2015 (%)	Goodale, SK (1-9) ^c	Kelburn, MB (1-9)	Codette, SK (1-9)
CDC Dancer	5.4	5.1	0	2.5	5	7	9
AC Morgan	-	-	10	25	-	-	-
Leggett	5.8	5.7	-	-	4	4	9
OT3098	6.5	6.0	0	5	1	1	1
Station years	1	2					

^a determined by NIT spectroscopy.

^b obtained from University of Minnesota field nursery (Dr. Ruth Dill Macky), 2 replications.

^c 1-9 scale; 1 = no lodging, 9 = completely lodged. Data from 2015, 3 replications per site.