CROP DEVELOPMENT CENTRE USASK

Request for Support of Registration of DT1043

Crop Kind: Canada Western Amber Durum (CWAD)

Scientific name: *Triticum turgidum* L. var. *durum*

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Experimental Designations: DT1043; D17.066X.084

Origin and Breeding: DT1043 is derived from the cross DT593/DT882//DT890 made at the Crop Development Centre (CDC), University of Saskatchewan in 2017. The F_1 generation was increased at a contra-season nursery in New Zealand during the winter of 2017/2018 and resulting F_2 plants were grown in a space-planted nursery in Saskatoon. In 2018, approximately 300 single F_2 spikes were selected from desirable plants these were advanced to the F4 generation via single seed descent. In 2019, $F_{4:5}$ lines were grown as hill plots with selection for plant stature, plant height, resistance to lodging, and time to maturity and D17.066X.084 was selected for advancement. In 2020, In D17.066X.084 was evaluated in un-replicated F_6 yield trials at the Kernen Crop Research Farm, and in leaf, stem and stripe rust inoculated nurseries at Saskatoon. Resistance to Fusarium head blight (FHB) was evaluated at Carman, MB in the same year. D17.066X.084 expressed acceptable grain yield, test weight, plant stature, time to maturity, straw strength, and disease reactions. Quality evaluations on F_6 harvested seed indicated appropriate test weight, yellow pigment, grain protein concentration and falling number for the CWAD class. In 2021, D17.066X.084 was evaluated in Preliminary Yield Trials established at Kernen, Swift Current, Elrose, and Moose Jaw, SK and was assessed for resistance to leaf rust, stem rust, stripe rust, common bunt and FHB in inoculated disease nurseries. End-use functionality was assessed on a composite sample. D17.066X.084 was advanced to the cooperative Durum B trial (and associated disease nurseries) in 2022 and was evaluated as DT1043 in the Durum wheat Registration Test over three years (2023-2025).

Breeder Seed: Approximately 280 single spikes of DT1043 were selected from an $F_{4:9}$ increase grown at Saskatoon in 2023. The spikes were threshed individually and grown as single 0.5-m row plots in 2024 and off-type rows were discarded. The remaining head rows were harvested individually and used to establish 253 27-meter rows in 2025. Again, off-type rows were discarded, and bulk harvested to produce breeder seed. In total, 225 $F_{9:11}$ breeder lines were composited to form the breeder seed.

Area of Adaptation: Durum growing regions of Western Canada

Strengths: DT1043 combines high grain yield with high test weight, high protein content, resistance to leaf, stem, and stripe rusts, and common bunt, and improved semolina milling yield over check varieties.

Weaknesses: FHB reaction of DT1043 was variable, ranging from S to I, but on average was intermediate to CDC Precision and AAC Schrader.

Description:

Agronomy: Averaged over 33 station-years, DT1043 yielded more than all check varieties, but was similar to AAC Schrader (**Table 1**). DT1043 shorter than AAC Schrader, CDC Precision and AAC Weyburn (**Table 2**).

Maturity of DT1043 was in the range of the check cultivars (**Table 2)**. The test weight of DT1043 exceeded all of the check cultivars (**Table 2**). Seed weight of DT1043 was similar to AAC Weyburn, but higher than AAC Schrader and CDC Precision **(Table 2)**. DT1043 expressed similar straw strength to CDC Precision and AC Navigator but was better than AAC Weyburn and AAC Schrader (**Table 2**). Grain protein concentration of DT1043 is like AAC Schrader and CDC Precision, but higher than AC Navigator and AAC Weyburn (**Table 3**).

Disease and Pest: DT1043 is resistant to prevalent races of leaf, stem, and stripe rusts (**Table 4**). DT1043 was resistant to common bunt but showed moderately susceptible to susceptible reactions to loose smut (**Table 4**). Fusarium head blight reaction of DT1043 is variable over the years and ranged from susceptible to intermediate (**Table 5**). Similarly, DT1043 showed variable ratings for DON similar to the checks and ranged from intermediate resistance to susceptible ratings. Averaged over all years of trailing, FHB Index was similar to AAC Schrader, with average DON (ppm) being intermediate between AAC Schrader and CDC Precision (**Table 5**). Averaged over three years of testing, fusarium damaged kernels of DT1043 were slightly lower than AAC Schrader (**Table 5**).

***End-use Suitability*:** Grain and semolina protein concentration of DT1043 measured from composite samples were similar to CDC Precision and AAC Schrader (**Table 6**). Cadmium concentration was low, similar to CDC Precision (**Table 6**). The average falling number of DT1043 was higher than AAC Schrader and CDC Precision. but lower than AC Navigator and AAC Weyburn. Total yellow pigment and pasta b* of DT1043 was in the range of the check cultivars (**Table 6**). DT1043 expressed high semolina milling yield, equal to the best check, AC Navigator (**Table 6**). However, the semolina ash content of DT1043 was lower than AC Navigator. DT1043 exhibited numerically higher gluten index ($P>0.05$) than all the check cultivars (**Table 6**).

Table 1. Grain yield (kg ha^{-1}) of DT1043 and check cultivars in the Durum Registration Test (2023-2025).

	2023			2024			2025			2023 – 2025		
Entry	Black	Brown	Mean	Black	Brown	Mean	Black	Brown	Mean	Black	Brown	Mean
CDC Precision	5331	3888	4183	5815	4198	4472	5615	4795	4930	5579	4298	4525
AC Navigator	4795	3909	4081	4740	4160	4260	4627	4384	4422	4718	4150	4245
AAC Weyburn	5824	4266	4579	6290	4438	4746	5688	5015	5130	5930	4583	4818
AAC Schrader	5566	4085	4379	6146	4398	4689	5710	5381	5429	5801	4641	4843
DT1043	**5371**	**4286**	**4507**	**6175**	**4499**	**4780**	**5914**	**5262**	**5362**	**5807**	**4703**	**4894**
LSD	498	318	273	521	313	286	682	257	240	913	339	291
No. Tests	2	8	10	2	9	11	2	10	12	6	27	33

Table 2. Maturity, test weight, 1000-kernel weight, height and lodging of DT1043 and check cultivars in the Durum Registration Test (2023-2025).

	Maturity (days)			Test weight (kg/hL)			1000-kernel weight (g)	Height (cm)	Lodging (1-9)
Entry	Black	Brown	Mean	Black	Brown	Mean	Mean	Mean	Mean
CDC Precision	101.4	98.9	99.5	80.9	80.6	80.6	38.9	88	2.5
AC Navigator	102.1	99.4	100.0	79.3	80.5	80.5	42.1	78	2.8
AAC Weyburn	102.8	100.0	100.6	80.5	80.6	80.6	39.6	88	3.4
AAC Schrader	102.9	99.6	100.3	80.6	80.4	80.4	38.9	93	3.0
DT1043	**102.6**	**99.4**	**100.1**	**81.1**	**81.1**	**81.1**	**39.5**	**85**	**2.7**
LSD	1.7	0.8	0.7	2.7	1.0	0.8	1.5	3	0.9
No. Tests	6	27	33	6	27	33	33	32	16

Table 3. Grain protein concentration (%) of DT1043 compared to check cultivars in the Durum Registration Test (2023-2025).

	2023			2024			2025			2023-2025
Entry	Black	Brown	Mean	Black	Brown	Mean	Black	Brown	Mean	Mean
CDC Precision	12.4	14.5	14.1	13.1	16.1	15.5	13.3	14.3	14.1	14.6
AC Navigator	12.4	13.9	13.6	13.5	15.1	14.8	13.5	14.2	14.1	14.2
AAC Weyburn	11.8	13.7	13.3	12.2	14.8	14.4	12.8	14.0	13.8	13.9
AAC Schrader	12.0	14.9	14.3	13.1	15.6	15.2	13.2	14.2	14.0	14.6
DT1043	**11.9**	**14.5**	**14.0**	**12.7**	**15.9**	**15.4**	**13.6**	**14.4**	**14.3**	**14.6**
LSD	0.9	0.5	0.4	1.1	0.5	0.5	0.8	0.4	0.4	0.4
No. Tests	2	8	10	2	9	11	2	10	12	33

Table 4. Disease reactions of DT1043 and check cultivars grown in the Durum Registration Test (2023-2025).

Year	Entry	Leaf Rust (Morden)	Stem Rust (Morden)	Stripe Rust (Lethbridge)	Bunt Reaction	Loose Smut
2023	CDC Precision	0R	1R	0R	0R	21I
	AC Navigator	0R	1R	0R	0R	38MS
	AAC Weyburn	4R	1R	0R	3R	22I
	AAC Schrader	0R	1R	5R	1R	2R
	DT1043	**0R**	**1R**	**20MR**	**7MR**	**35MS**
2024	CDC Precision	0R	1R	0R	4R	94S
	AC Navigator	0R	2R	3R	6R	57MS
	AAC Weyburn	2R	1R	0R	1R	20I
	AAC Schrader	0R	1R	0R	9R	26I
	DT1043	**0R**	**1R**	**0R**	**15MR**	**79S**
2025	CDC Precision	0R	1R	13R	0R	53MS
	AC Navigator	0R	1R	13R	0R	59MS
	AAC Weyburn	0R	1R	5R	5R	63S
	AAC Schrader	0R	1R	20MR	4R	0R
	DT1043	**0R**	**1R**	**13R**	**7R**	**70S**

Note: R, resistant; MR, moderately resistant; I, Intermediate resistance; MS, moderately susceptible; S, susceptible.

Table 5. Mean FHB reactions of DT1043 and check cultivars evaluated in the Durum Registration Test (2023-2025).

FHB Index (%)

	Carman						Morden						Mean
Entry	2023		2024		2025		2023		2024		2025		2023-25
CDC Precision	3.3	MR	18.1	I	37.5	MS	33.7	MS	25.3	I	56.3	S	30.0
AC Navigator	19.7	MS	31.4	MS	66.5	S	37.3	MS	80.6	S	88.3	S	54.0
AAC Weyburn	9.9	I	18.8	I	50.3	S	39.0	MS	29.4	MS	53.8	S	33.5
AAC Schrader	2.8	MR	8.9	MR	22.7	I	25.8	I	28.1	I	46.4	MS	22.4
DT1043	**10.6**	**I**	**9.0**	**MR**	**35.9**	**MS**	**33.6**	**MS**	**22.5**	**I**	**49.2**	**MS**	**25.8**

DON (ppm)

	Carman						Morden						Mean
Entry	2023		2024		2025		2023		2024		2025		2023-25
CDC Precision	4.0	MS	11.9	I	41.2	S	32.7	I	18.1	I	43.6	MS	25.3
AC Navigator	10.9	S	21.2	S	69.9	S	58.2	S	40.4	S	47.6	MS	41.4
AAC Weyburn	7.3	MS	14.0	MS	61.5	S	34.1	I	22.0	MS	55.2	S	32.4
AAC Schrader	4.2	MS	8.4	I	33.9	S	21.4	I	18.1	I	28.1	I	19.1
DT1043	**6.1**	**MS**	**7.0**	**I**	**31.9**	**S**	**34.9**	**I**	**25.3**	**MS**	**32.4**	**I**	**22.4**

FDK (%)

	Carman			
Entry	2023	2024	2025	Mean
CDC Precision	4.7	39.2	73.1	39.0
AC Navigator	13.6	49.3	90.4	51.1
AAC Weyburn	7.2	34.1	79.4	40.2
AAC Schrader	3.7	20.2	69.0	31.0
DT1043	**7.1**	**16.7**	**68.8**	**30.9**

Note: Fusarium head blight index (FHB Index): (% infected spikelets × % infected heads)/100.
DON, Deoxynivalenol; FDK, fusarium damaged kernels.

Table 6. Average values for quality traits measured on yearly composite samples of DT1043 and check cultivars evaluated in the Durum Registration Test (2023-2025).

Entry	Wheat Characteristics			Milling Performance			Protein Content and Gluten Strength				Semolina Pigment and Pasta Color		
	FN (sec)	Cd (ppb)	HVK (%)	Milling Yield (%)	Semo Yield (%)	Semo Ash (%)	Wht Pro (%)	Semo Pro (%)	GI (%)	P/L	TYP (ppm)	b*	a*
CDC Precision	380	74	85	74.1	66.7	0.71	14.4	13.4	87	0.86	11.0	65.5	7.0
AC Navigator	435	221	88	75.7	67.2	0.68	14.0	13.0	83	1.06	10.0	64.1	7.0
AAC Weyburn	445	62	87	74.2	66.5	0.66	13.9	12.8	88	1.14	9.9	64.7	6.1
AAC Schrader	377	81	88	74.1	65.9	0.67	14.6	13.6	86	0.71	11.0	65.4	6.9
DT1043	**395**	**75**	**87**	**75.8**	**67.8**	**0.67**	**14.5**	**13.4**	**91**	**1.22**	**10.7**	**65.4**	**7.0**
$LSD_{0.05}$	52	21	5	0.9	0.9	0.03	0.4	0.4	6.9	0.18	0.6	0.9	0.4