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# North Dakota Flax

## *Variety Trial Results for 2018 and Selection Guide*

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This selection guide summarizes flax variety performance at the various North Dakota State University Research Extension Centers. Give special attention to flax yield results of those trials nearest to your production area when evaluating varieties in these trials. Also, attempt to view yield averages of several years rather than using only one year's data as a determining factor. In addition, consider other agronomic characteristics, such as maturity, disease tolerance, lodging score and oil percentages, if available.

The agronomic data presented are from replicated research plots using experimental designs that enable the use of statistical analysis. The LSD (least significant difference) numbers beneath the columns in tables are derived from the statistical analyses and only apply to the numbers in the column in which they appear.

If the difference between two varieties exceeds the LSD value, it means that with 95 or 90 percent probability (LSD 0.05 or 0.10), the higher-yielding variety has a significant yield advantage. If the difference between two varieties is less than the LSD value, then the variety yields are considered similar. The abbreviation NS is used to indicate "no significant difference" for that trait among any of the varieties.

The CV is a measure of variability in the trial. The CV stands for coefficient of variation and is expressed as a percentage. Large CVs mean a large amount of variation that could not be attributed to differences in the varieties. In the tables, the mean indicates the average of the observations in the column. Only compare values within the table and look for trends for the desired trait among different experimental sites and years.

Oil content and harvested seed yield were adjusted to 9 percent moisture. In the table headings (Tables 4 to 9), the lead scientists are acknowledged. Presentation of data for the varieties tested does not imply approval or endorsement by the authors or agencies conducting the tests. NDSU approves the reproduction of any table in this publication only if no portion is deleted, appropriate footnotes are given, the order of the data is not rearranged and NDSU is credited for the data. Research specialists and technicians helped with the field work and data compilation.

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**Table 1. 2018 North Dakota Flax Variety Descriptions.**

Variety <sup>1</sup>	Origin <sup>2</sup>	Year Released	Days to Flower Avg. <sup>3</sup>	Seed Color	Plant Height	Plant Height		Wilt <sup>4</sup>
						inch	Avg. <sup>3</sup>	
Bison	ND	1926	--	Brown	Med.	--		MR
Carter	ND	2004	53	Yellow	Med.	22		MS/MR
CDC Bethune	Can.	1999	54	Brown	Med.tall	23		MR
CDC Glas	Can.	2012	55	Brown	Med.tall	23		MR
CDC Neela	Can.	2013	53	Brown	Med.	22		MR
CDC Sanctuary	Can.	2012	54	Brown	Med.tall	23		MR
CDC Sorrel	Can.	2007	55	Brown	Tall	24		MR
Gold ND	ND	2014	55	Yellow	Tall	24		MR/R
ND Hammond	ND	2018	--	Brown	Med.tall	--		MS
Nekoma	ND	2002	53	Brown	Med.tall	23		MR
Omega	ND	1989	53	Yellow	Med.	22		MS/MR
Pembina	ND	1998	53	Brown	Med.tall	23		MR
Prairie Blue	Can.	2003	52	Brown	Med.	22		MR
Prairie Sapphire	Can.	2012	52	Brown	Med.tall	23		MR
Prairie Thunder	Can.	2006	54	Brown	Tall	24		MR
Rahab 94	SD	1994	53	Brown	Med.tall	23		MR
Webster	SD	1998	53	Brown	Tall	24		MR
York	ND	2002	52	Brown	Med.tall	23		MR/R

<sup>1</sup> All varieties have resistance to prevalent races of rust; all have good oil yield and oil quality.

<sup>2</sup> Can. = Canada; ND = North Dakota State University; SD = South Dakota State University.

<sup>3</sup> Average of four locations: Carrington, Langdon, Minot and Williston in 2017.

<sup>4</sup> R = resistant; MR = moderately resistant; MS = moderately susceptible.

**Table 2. Yield of Flax Varieties at Four Locations in North Dakota, 2016-2018.**

Variety	<u>Carrington</u>		<u>Langdon</u>		<u>Williston dryland</u>		<u>Hettinger</u>		<u>Average N.D.</u>	
	2018	3 Yr. Avg.	2018	3 Yr. Avg.	2018	3 Yr. Avg.	2018	3 Yr. Avg.	2018	3 Yr. Avg.
	----(bu/a)----		----(bu/a)----		---(bu/a)---		---(bu/a)---		----(bu/a)---	
Bison	32.6	--	40.0	41.8	15.6	15.5	21.6	--	27.5	--
Carter <sup>1</sup>	28.4	24.8	37.6	41.6	15.9	15.8	24.5	26.1	26.6	27.1
CDC Bethune	36.4	28.1	42.3	43.3	18.1	16.9	23.6	25.1	30.1	28.3
CDC Glas	34.1	27.5	43.0	45.8	15.2	16.7	24.1	26.9	29.1	29.2
CDC Neela	35.7	27.4	37.6	40.3	16.9	17.7	25.1	27.6	28.8	28.3
CDC Sanctuary	34.5	27.7	43.7	43.8	16.9	18.1	23.0	26.9	29.5	29.1
CDC Sorrel	36.2	29.3	41.4	41.2	15.1	16.8	24.3	26.2	29.3	28.4
Gold ND <sup>1</sup>	32.9	27.4	43.0	44.4	16.3	16.8	22.0	24.8	28.5	28.4
ND Hammond	35.5	--	39.2	--	11.6	--	22.0	--	27.1	--
Nekoma	34.2	28.1	41.7	44.0	14.8	16.0	20.6	--	27.8	--
Omega <sup>1</sup>	30.0	23.7	38.5	39.0	20.7	16.4	18.9	21.8	27.0	25.2
Pembina	34.9	26.3	42.5	43.8	15.1	15.8	23.5	23.9	29.0	27.4
Prairie Blue	40.3	26.5	39.2	43.4	15.8	16.8	21.7	24.9	29.2	27.9
Prairie Sapphire	34.2	26.8	45.8	44.8	15.9	16.8	22.0	24.1	29.5	28.1
Prairie Thunder	35.5	29.3	43.1	45.0	11.2	15.2	27.0	24.7	29.2	28.5
Rahab 94	36.0	28.4	42.5	44.6	14.3	15.5	23.1	24.7	29.0	28.3
Webster	37.1	30.3	44.2	45.2	13.5	15.7	23.9	24.9	29.7	29.0
York	34.2	27.4	41.7	44.3	18.0	16.2	24.0	25.7	29.5	28.4
Mean	34.6	27.4	42.2	43.3	15.2	16.4	23.1	25.2	28.7	28.1
CV %	12.5	--	7.9	4.7	36.2	--	11.6	7.1	8.1	4.4
LSD 0.05	NS	--	NS	3.4	NS	--	3.7	3.0	NS	1.8
LSD 0.10	NS	--	4.6	2.8	NS	--	3.1	2.5	NS	1.5

<sup>1</sup>Yellow seeded.

**Table 3. Test Weight and Oil Content of Flax Varieties at Four Locations in North Dakota, 2016-2018.**

Variety	<u>Carrington</u>		<u>Langdon</u>		<u>Williston dryland</u>		<u>Hettinger</u>		<u>Average N.D.<sup>2</sup></u>	
	Test Wt. (lb/bu)	Oil (%)	Test Wt. (lb/bu)	Oil (%)	Test Wt. (lb/bu)	Oil (%)	Test Wt. (lb/bu)	Oil (%)	Test Wt. (lb/bu)	Oil (%)
Bison	54.3	42.5	52.7	42.6	55.9	44.2	54.3	43.1		
Carter <sup>1</sup>	54.5	42.9	53.0	42.4	55.2	44.1	54.2	43.1		
CDC Bethune	53.6	43.2	52.7	42.3	56.1	43.9	54.1	43.1		
CDC Glas	53.3	43.1	51.8	42.9	54.7	44.7	53.3	43.6		
CDC Neela	55.0	44.0	52.4	42.3	55.6	44.1	54.3	43.5		
CDC Sanctuary	54.2	42.8	52.4	42.1	55.5	44.4	54.0	43.1		
CDC Sorrel	53.6	43.2	52.7	42.5	56.1	44.5	54.1	43.4		
Gold ND <sup>1</sup>	54.7	43.1	53.1	42.8	55.8	44.4	54.5	43.4		
ND Hammond	53.9	42.1	52.5	41.0	53.4	42.5	53.3	41.9		
Nekoma	54.7	43.5	52.7	42.7	55.5	44.0	54.3	43.4		
Omega <sup>1</sup>	54.7	42.4	53.4	41.6	56.1	43.6	54.7	42.5		
Pembina	54.5	43.8	53.0	42.3	55.4	44.3	54.3	43.5		
Prairie Blue	54.4	43.6	52.4	42.2	56.3	44.6	54.4	43.5		
Prairie Sapphire	54.4	42.0	51.9	43.6	54.8	45.6	53.7	43.7		
Prairie Thunder	54.9	43.4	52.4	41.8	55.7	44.5	54.3	43.3		
Rahab 94	54.5	44.1	52.3	41.2	55.0	44.3	53.9	43.2		
Webster	54.3	44.2	52.9	42.1	56.4	44.4	54.5	43.6		
York	55.1	42.1	52.5	41.7	55.5	43.9	54.4	42.6		
Mean	54.4	43.4	52.6	42.3	55.5	44.2	54.2	43.2		
CV %	0.4	3.2	0.5	1.0	1.3	1.5	0.87	1.3		
LSD 0.05	0.34	2.0	0.4	0.7	1.0	0.9	0.8	0.9		
LSD 0.10	0.28	1.6	0.3	0.6	0.9	0.8	0.7	0.8		

<sup>1</sup>Yellow seeded.<sup>2</sup>Test weight average of three dryland trials and oil average of three dryland trials.

**Table 4. 2018 Flax - Carrington - Authors, M. Ostlie and B. Schatz.**

Variety	Days to	Days to	Plant	Plant	Oil	Test	Seed Yield		
	Flower	Maturity	Height	Lodge <sup>1</sup>	Content	Weight	2018	2-yr. Avg.	3-yr. Avg.
	(DAP) <sup>2</sup>	(DAP)	(inch)	(0-9)	(%)	(lb/bu)	------(bu/a)-----		
Bison	48	81	32	0.3	42.5	54.3	32.6	--	--
Carter <sup>3</sup>	49	83	28	0.5	42.9	54.5	28.4	26.7	24.8
CDC Bethune	50	83	33	1.0	43.2	53.6	36.4	33.9	28.1
CDC Glas	49	81	30	1.3	43.1	53.3	34.1	32.4	27.5
CDC Neela	48	82	29	0.8	44.0	55.0	35.7	31.3	27.4
CDC Sanctuary	48	82	31	0.5	42.8	54.2	34.5	32.2	27.7
CDC Sorrel	48	80	29	1.8	43.2	53.6	36.2	34.7	29.3
Gold ND <sup>3</sup>	51	85	33	1.0	43.1	54.7	32.9	30.7	27.4
ND Hammond	48	82	30	0.3	42.1	53.9	35.5	33.4	--
Nekoma	50	83	32	0.8	43.5	54.7	34.2	31.6	28.1
Omega <sup>3</sup>	48	78	29	0.8	42.4	54.7	30.0	29.0	23.7
Pembina	49	82	34	0.3	43.8	54.5	34.9	30.9	26.3
Prairie Blue	45	75	28	0	43.6	54.4	40.3	32.8	26.5
Prairie Sapphire	49	77	29	0.8	42.0	54.4	34.2	31.3	26.8
Prairie Thunder	48	81	28	0.3	43.4	54.9	35.5	34.5	29.3
Rahab 94	49	82	32	0.3	44.1	54.5	36.0	33.4	28.4
Webster	49	83	33	0	44.2	54.3	37.1	34.5	30.3
York	49	82	29	0	42.1	55.1	34.2	33.8	27.4
Mean	49	81	31	1	43.1	54.4	34.6	32.2	27.4
CV %	1.3	2.5	5.0	189	3.2	0.4	12.5	--	--
LSD 0.05	0.9	2.8	2.2	NS	2.0	0.3	NS	--	--
LSD 0.10	0.7	2.4	1.8	NS	1.6	0.3	NS	--	--

Planted: May 16. Harvested: Aug. 23. Previous crop: forage barley.

<sup>1</sup>Lodging: 0 = none, 9 = lying flat on the ground.<sup>2</sup>DAP = Days after planting.<sup>3</sup>Yellow seeded.**Table 5. 2018 Flax - Organic - Carrington - Author, S. Zwinger.**

Variety	Days to	Days to	Plant	Oil	Test	Seed Yield		
	Flower	Maturity	Height	Content	Weight	2018	2-yr. Avg.	3-yr. Avg.
	(DAP) <sup>1</sup>	(DAP)	(inch)	(%)	(lb/bu)	------(bu/a)-----		
Carter <sup>2</sup>	43	83	27	42.3	51.5	15.4	15.3	13.3
CDC Melyn <sup>2</sup>	45	88	31	43.6	50.8	15.9	13.8	--
CDC Neela	42	83	28	41.9	50.5	19.5	17.7	--
Gold ND <sup>2</sup>	44	85	31	43.1	51.6	19.3	17.3	14.3
Nече	43	87	29	42.1	51.2	15.8	--	--
Omega <sup>2</sup>	39	80	26	43.4	51.2	13.8	14.0	11.5
Pembina	42	82	31	42.0	50.9	15.5	14.3	12.4
Prairie Thunder	42	82	26	42.0	51.1	16.0	13.6	12.3
York	43	86	28	41.5	51.9	19.4	16.7	13.9
Mean	43	84	29	42.5	51.2	16.7	15.3	12.9
CV %	1.0	0.7	4.3	2	0.6	17.3	--	--
LSD 0.05	0.6	0.8	1.8	1.2	0.4	4.2	--	--
LSD 0.10	0.5	0.7	1.5	1	0.4	3.5	--	--

Planted: May 22. Harvested: Aug. 24. Previous crop: oats.

<sup>1</sup>DAP = Days after planting.<sup>2</sup>Yellow seeded.

**Table 6. 2018 Flax - Langdon - Authors, B. Hanson, T. Hakanson and L. Henry.**

Variety	Days to Flower (DAP) <sup>1</sup>	Plant Height (inch)	Test Weight (lb/bu)	Seed Yield				
				2016	2017	2018	2-yr. Avg.	3-yr. Avg.
				------(bu/a)-----				
Bison	49	25	52.7	36.6	48.9	40.0	44.5	41.8
Carter <sup>2</sup>	49	24	53.0	39.6	47.7	37.6	42.6	41.6
CDC Bethune	48	26	52.7	38.6	48.9	42.3	45.6	43.3
CDC Glas	49	27	51.8	40.5	54.0	43.0	48.5	45.8
CDC Neela	49	23	52.4	37.2	46.2	37.6	41.9	40.3
CDC Sanctuary	48	23	52.4	33.4	54.4	43.7	49.0	43.8
CDC Sorrel	49	25	52.7	33.7	48.5	41.4	45.0	41.2
Gold ND <sup>2</sup>	52	27	53.1	38.2	52.1	43.0	47.6	44.4
ND Hammond	48	25	52.5	--	48.8	39.2	44.0	--
Nekoma	50	23	52.7	38.2	52.0	41.7	46.9	44.0
Omega <sup>2</sup>	48	22	53.4	32.9	45.7	38.5	42.1	39.0
Pembina	49	24	53.0	37.5	51.5	42.5	47.0	43.8
Prairie Blue	49	25	52.4	39.9	51.1	39.2	45.2	43.4
Prairie Sapphire	50	24	51.9	34.9	53.7	45.8	49.7	44.8
Prairie Thunder	53	27	52.4	38.9	53.1	43.1	48.1	45.0
Rahab 94	50	25	52.3	40.0	51.3	42.5	46.9	44.6
Webster	50	27	52.9	39.9	51.6	44.2	47.9	45.2
York	48	25	52.5	40.9	50.2	41.7	46.0	44.3
Mean	49	25	52.6	37.7	50.5	41.5	46.0	43.3
CV %	2.2	6.2	0.5	7.3	6.6	7.9	2.3	4.7
LSD 0.05	1.8	2.5	0.4	4.0	4.7	NS	2.3	3.4
LSD 0.10	1.5	2.1	0.3	3.3	3.9	4.6	1.9	2.8

Planted: May 14. Harvested: Sept. 4.

<sup>1</sup>DAP = Days after planting.<sup>2</sup>Yellow seeded.

**Table 7. 2018 Flax - Dryland - Williston - Authors, J. Bergman and G. Pradhan.**

Cultivar	Days to	Days to	Plant	Stands	Oil	Seed Yield		
	Flower	Maturity	Height			Content	2018	2-yr. Avg.
	(DAP) <sup>1</sup>	(DAP)	(inch)	(%)	(%)	------(bu/a)-----		
Bison	49	82	25	78	42.6	15.6	13.0	15.5
Carter <sup>2</sup>	46	83	23	78	42.4	15.9	12.6	--
CDC Bethune	48	83	27	76	42.3	18.1	14.3	16.9
CDC Glas	51	83	23	53	42.9	15.2	13.9	16.7
CDC Neela	48	81	22	66	42.3	16.9	14.4	17.7
CDC Sanctuary	48	83	23	76	42.1	16.9	13.7	18.1
CDC Sorrel	51	83	25	63	42.5	15.1	12.7	16.8
Gold ND <sup>2</sup>	49	81	26	75	42.8	16.3	13.4	--
ND Hammond	48	84	23	48	41.0	11.6	--	--
Nekoma	50	82	23	62	42.7	14.8	12.7	16.0
Omega <sup>2</sup>	46	81	24	90	41.6	20.7	15.2	15.2
Pembina	49	82	25	77	42.3	15.1	12.4	15.8
Prairie Blue	50	84	25	68	42.2	15.8	13.8	16.8
Prairie Sapphire	50	82	24	74	43.6	15.9	13.6	16.8
Prairie Thunder	49	85	24	46	41.8	11.2	11.4	15.2
Rahab 94	50	85	25	53	41.2	14.3	11.6	15.5
Webster	51	85	24	56	42.1	13.5	11.7	15.7
York	48	83	23	76	41.7	18.0	13.8	16.2
Mean	49	83	24	65	42.3	15.2	13.2	16.3
CV %	2.3	2.6	9.9	35	1.0	36.2	--	--
LSD 0.05	1.8	NS	NS	37	0.7	NS	--	--
LSD 0.10	1.5	NS	NS	31	0.6	NS	--	--

Planted: May 8. Harvested: Aug. 20. Previous crop: durum.

<sup>1</sup>DAP = Days after planting.<sup>2</sup>Yellow seeded.**Table 8. 2018 Flax - Irrigated - Williston - Authors, J. Bergman, T. Tjelde and J. Jacobs.**

Cultivar	Days to	Days to	Plant	Plant	Test	Oil	Seed Yield		
	Flower	Maturity	Lodge <sup>1</sup>	Height	Weight		Content	2018	2-yr. Avg.
	(DAP) <sup>2</sup>	(DAP)	(0-9)	(inch)	(lb/bu)	(%)	------(bu/a)-----		
Bison	61	96	1.0	26	54.3	38.2	21.7	30.3	38.5
CDC Glas	63	93	1.3	26	53.6	38.5	23.7	30.7	39.3
CDC Sanctuary	61	96	3.0	26	53.3	37.6	23.0	30.4	--
CDC Sorrel	62	94	1.8	27	53.9	38.8	21.2	27.5	36.4
Gold ND <sup>3</sup>	62	97	1.3	25	54.7	38.0	22.2	30.3	38.5
ND Hammond	61	96	0.5	26	53.9	37.5	23.3	--	--
Pembina	60	96	0.8	26	54.2	38.5	23.2	--	--
Prairie Blue	62	96	1.0	26	54.0	38.6	20.5	28.6	37.1
Prairie Thunder	64	96	1.3	27	54.5	37.2	19.6	--	--
Rahab 94	61	94	2.0	25	53.9	37.9	22.8	--	--
York	58	92	2.5	26	54.3	37.7	23.0	29.8	38.1
Mean	61	95	1.5	26	54.1	38.0	22.3	29.6	38.0
CV %	--	--	--	--	0.5	0.7	21.1	--	--
LSD 0.05	--	--	--	--	0.4	0.5	NS	--	--
LSD 0.10	--	--	--	--	0.4	0.4	NS	--	--

Planted: May 8. Harvested: Aug. 23. Previous crop: durum.

<sup>1</sup>Lodging: 0 = none, 9 = lying flat on the ground.<sup>2</sup>DAP = Days after planting.<sup>3</sup>Yellow seeded.

**Table 9. 2018 Flax - Hettinger - Author, J. Rickertsen.**

Variety	Days to Flower (DAP) <sup>2</sup>	Plant Height (inch)	Oil Content (%)	Test Weight (lb/bu)	Seed Yield				
					2015	2016	2018	2-yr. Avg.	3-yr. Avg. <sup>1</sup>
------(bu/a)-----									
Bison	44	26	44.2	55.9	--	18.7	21.6	20.2	--
Carter <sup>3</sup>	45	25	44.1	55.2	35.5	18.2	24.5	21.4	26.1
CDC Bethune	45	28	43.9	56.1	32.5	19.1	23.6	21.4	25.1
CDC Glas	47	25	44.7	54.7	35.4	21.1	24.1	22.6	26.9
CDC Neela	45	26	44.1	55.6	36.2	21.6	25.1	23.4	27.6
CDC Sanctuary	45	25	44.4	55.5	35.1	22.5	23.0	22.8	26.9
CDC Sorel	47	29	44.5	56.1	32.8	21.4	24.3	22.9	26.2
Gold ND <sup>3</sup>	47	30	44.4	55.8	33.1	19.4	22.0	20.7	24.8
ND Hammond	45	28	42.5	53.4	--	--	22.0	--	--
Nekoma	46	27	44.0	55.5	--	19.3	20.6	20.0	--
Omega <sup>3</sup>	46	25	43.6	56.1	27.2	19.4	18.9	19.2	21.8
Pembina	44	27	44.3	55.4	30.5	17.6	23.5	20.6	23.9
Prairie Blue	45	26	44.6	56.3	33.8	19.2	21.7	20.5	24.9
Prairie Sapphire	45	26	45.6	54.8	30.5	19.9	22.0	21.0	24.1
Prairie Thunder	45	28	44.5	55.7	28.2	18.9	27.0	23.0	24.7
Rahab 94	46	24	44.3	55.0	33.1	17.8	23.1	20.5	24.7
Webster	46	29	44.4	56.4	30.8	20.1	23.9	22.0	24.9
York	44	28	43.9	55.5	33.8	19.4	24.0	21.7	25.7
Mean	45	27	44.2	55.5	32.6	19.6	23.1	21.4	25.2
CV %	2.6	5.9	1.5	1.3	6.9	9.6	11.6	7.3	7.1
LSD 0.05	1.6	2.2	0.9	1.0	3.2	2.7	3.7	3.4	3.0
LSD 0.10	1.4	1.8	0.8	0.9	2.6	2.2	3.1	2.8	2.5

Planted: May 16. Harvested: Sept. 26. Previous crop: oats.

<sup>1</sup>Three-year average is from 2015, 2016 and 2018. No data available for 2017.

<sup>2</sup>DAP = Days after planting.

<sup>3</sup>Yellow seeded.

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