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NORTH AMERICAN BARLEY SCAB EVALUATION NURSERY (NABSEN) REPORT

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Introduction

The 2022 North American Barley Scab Evaluation Nursery (NABSEN) was grown at Fargo, and Langdon, ND, Casselton, ND, St. Paul and Crookston MN, and Brandon, Manitoba. Nurseries either were misted or non-misted (dryland). Dryland nurseries provide conditions similar to those found in commercial fields. Disease in misted fields was more severe than growers would observe in most years and entries with only moderate FHB resistance may have higher disease levels. Dryland nurseries allow discrimination of entries with moderate to low levels of FHB resistance. Each nursery included a set of common checks. The checks were Chevron, and Quest (resistant six-row checks), Explorer and AAC Synergy (new for NABSEN 2022), Stander (susceptible six-row checks), and Conlon (resistant two-row check). At all locations, the percentage of FHB severity was determined around the middle dough stage by determining the ratio of infected kernels to total kernels on 10-20 spikes per entry, and then multiplying by 100.

Results

There was no FHB disease severity taken at Fargo dryland and Casselton dryland nurseries. FHB disease severity levels were high at Langdon, & St Paul, and moderate at Fargo, Crookston, and Brandon. DON levels were highest in Brandon and Langdon, and moderate at Fargo. DON levels were high in misted fields and very low at Fargo dryland and Casselton dryland locations (Table 5). FB22204, TR22285, and 2ND39386 were the lowest DON levels in the majority of misted trials.

Temperatures were below the 30-year average (Table. 6), for May and August at all locations.

Precipitation was below the 30-year average at all locations for June. All locations had near normal precipitation or were above for May and July (Table 7).

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Site details are as follows:

Fargo, & Langdon ND – Thomas Baldwin and Abraham Hangamaisho

- Misted
- Inoculated by grain spawn method.
- 3 Replicates
- Disease severity - percentage of infected kernels
- Disease incidence - percentage of infected heads
- DON content (ppm) measured by GC/ECD by P. Schwarz, NDSU on a composite sample of 3 replicates.
- Day to heading counted from date planted to 50% of heads emerged 50%.

Fargo, ND – Richard Horsley

- Dryland
- 3 Replicates

- Disease incidence or severity – none taken.
- DON content (ppm) measured by GC/ECD by P. Schwarz, NDSU on a composite sample of 3 replicates.

Casselton, ND – Marie Timmerman and Austin Case

- Dryland
- 3 replicates
- Disease incidence or severity – none taken.
- DON content (ppm) measured by GC/ECD by P. Schwarz, NDSU on a composite sample of 3 replicates.

St. Paul & Crookston, MN– Kevin Smith and Ruth Dill-Macky

- Misted (Crookston and St. Paul))
- Inoculated by grain spawn method.
- Disease severity - percentage of infected kernels
- DON content (ppm) measured by GC/ECD by P. Schwarz, NDSU on a composite sample of 3 replicates.
- Day to heading counted from date planted to 50% of heads emerged 50% (no heading date for Crookston)

Brandon, Manitoba – Ana Badea and James Tucker

- Misted
- 4 replicates RCB design
- Disease severity - percentage of infected kernels
- Disease incidence - percentage of infected heads

- Day to heading counted from date planted to 50% of heads emerged 50%.
- DON content (ppm) measured by ELISA technique at ECORC, Ottawa on a composite sample of 4 replicates.

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Table 1. Means of Heading date, FHB Incidence, FHB severity and DON content at seven locations.

Entry	Name	Manitoba, Canada				Langdon, ND				Fargo, ND				Fargo (DL)	Casleton (DL)	Crookston		St Paul		
		HD(Avg)	Severity(%)	Incidence(%)	DON(%)	HD(Avg)	Severity(%)	Incidence(%)	DON(%)	HD(avg)	severity(%)	incidence(%)	DON(%)	DON(%)	DON(%)	Severity(%)	DON(%)	HD(Avg)	Severity(%)	DON(%)
1	2ND 3252 9	53.8	3.8	60.0	16.6	49.3	15.3	95.0	9.5	49.7	7.9	86.7	1.0	0.2	0.0	1.9	6.5	50.3	17.9	1.9
2	2ND 3463 4	54.0	3.3	57.5	20.8	52.3	20.4	100.0	16.7	54.3	7.3	80.0	1.8	0.3	0.0	2.2	14.3	51.3	15.8	3.2
3	2ND 3663 8	54.8	3.2	55.0	21.5	52.0	18.4	100.0	8.4	59.7	8.8	90.0	1.7	0.1	0.0	3.7	14.6	48.7	30.8	3.1
4	2ND 3664 2	52.3	5.4	65.0	10.1	52.0	17.1	90.0	9.8	54.0	12.5	96.7	2.3	0.1	0.1	6.8	14.4	51.7	24.1	3.2
5	2ND 3756 8	51.8	3.7	60.0	8.9	51.0	12.5	90.0	6.2	55.0	12.3	90.0	2.6	0.1	0.0	3.2	7.3	50.3	22.5	2.1
6	2ND 3875 2	48.5	7.0	92.5	11.7	48.7	24.8	100.0	6.1	53.3	13.7	93.3	2.8	0.1	0.1	7.3	10.7	46.3	31.5	1.3
7	2ND 3938 6	55.8	3.2	55.0	13.1	51.0	14.2	95.0	4.4	54.0	8.8	86.7	0.9	0.0	0.0	1.5	7.1	55.3	14.3	1.3
8	2ND 3951 3	54.3	3.0	55.0	7.5	50.0	15.6	100.0	6.7	50.0	10.3	93.3	1.1	0.1	0.1	1.9	6.4	53.3	12.6	2.1

9	S2M 184	54.0	5.7	67.5	21.6	50.7	22.5	100.0	9.8	51.3	15.3	90.0	3.4	0.2	0.0	2.7	10.8	50.0	31.4	3.4
10	S2M 189	55.8	4.3	57.5	15.3	51.0	23.3	100.0	9.9	54.3	14.2	93.3	2.3	0.0	0.0	4.1	12.8	52.0	30.3	3.5
11	S2M 190	48.0	4.8	70.0	8.7	48.0	22.9	100.0	6.0	50.0	13.5	93.3	2.3	0.0	0.0	2.4	7.0	45.3	26.3	1.9
12	S2M 191	50.5	4.8	67.5	10.7	49.7	28.9	100.0	7.3	53.7	13.3	93.3	3.1	0.2	0.0	6.6	9.0	51.0	17.3	2.4
13	S2M 192	53.3	5.7	80.0	11.1	49.0	27.5	100.0	9.4	50.0	13.0	96.7	2.8	0.2	0.0	4.3	8.3	49.7	25.6	1.3
14	S2M 193	52.0	5.8	77.5	8.4	48.0	19.3	100.0	4.9	53.0	22.5	96.7	2.7	0.1	0.0	5.6	9.9	47.7	29.7	1.4
15	S2M 194	54.5	5.2	65.0	13.8	51.0	20.9	100.0	13.3	58.0	13.9	90.0	4.3	0.4	0.0	3.9	14.5	52.7	31.3	2.8
16	S2M 195	55.8	6.0	62.5	17.2	52.7	21.9	100.0	15.0	54.0	13.1	96.7	4.3	0.0	0.1	2.3	13.7	54.7	22.8	1.7
17	S2M 196	50.0	6.2	77.5	19.2	49.3	22.6	100.0	13.2	53.0	14.6	93.3	7.0	0.3	0.0	5.2	13.6	48.7	24.5	2.9
18	S2M 197	52.0	9.3	80.0	16.4	50.7	32.9	100.0	14.7	50.3	17.6	96.7	11.7	0.1	0.2	22.0	18.5	46.0	25.8	2.3
19	2IK1 6- 1184	55.0	5.1	75.0	15.1	52.3	26.7	100.0	7.8	54.3	9.0	90.0	1.1	0.2	0.0	1.0	7.4	52.0	9.3	1.8
20	2IK1 8- 4395	54.0	4.5	62.5	13.0	49.3	34.0	100.0	7.4	50.7	12.8	93.3	3.0	0.1	0.0	4.5	12.0	52.7	20.7	3.8
21	2IK1 8- 4451	54.8	5.4	67.5	18.0	50.0	21.9	100.0	11.5	53.3	23.1	96.7	3.0	0.1	0.2	8.5	14.9	54.7	23.7	2.2
22	2IK1 8- 4477	52.8	5.0	70.0	12.4	51.3	22.9	100.0	10.6	54.0	13.1	90.0	4.5	0.2	0.0	4.8	10.0	52.0	16.3	2.5
23	2IK1 8- 4618	55.3	3.0	62.5	31.0	54.0	23.7	100.0	12.5	55.7	8.0	90.0	1.7	0.0	0.0	0.8	11.0	56.0	17.8	2.7

24	2IK1 8- 4680 2IM1 4-	52.8	3.9	65.0	12.3	51.3	16.9	100.0	5.9	54.3	8.8	90.0	0.7	0.0	0.0	1.3	6.8	54.3	14.4	4.4
25	8212 ABI CAR DINA L	54.5	3.7	55.0	19.1	51.0	22.8	100.0	19.0	55.3	16.2	90.0	2.8	0.3	0.0	3.6	14.9	51.7	36.8	3.4
26	TR22 283	53.8	5.9	65.0	23.3	51.7	23.5	100.0	12.5	62.0	12.6	86.7	1.8	0.1	0.1	3.2	12.6	54.3	23.4	3.0
27	TR22 285	57.3	5.1	67.5	13.1	53.7	34.3	100.0	12.1	58.3	9.1	90.0	3.1	0.0	0.1	3.6	10.1	54.3	14.3	1.6
28	FB22 203	58.3	3.9	60.0	11.9	56.0	18.7	100.0	5.5	59.0	9.5	90.0	0.7	0.1	1.3	0.5	4.3	58.3	16.7	1.3
29	FB22 204	58.5	4.7	70.0	9.1	58.3	16.8	95.0	10.8	63.7	5.9	80.0	0.5	0.0	0.1	0.6	3.4	58.7	10.6	1.4
30	FB22 610	57.0	4.0	62.5	6.6	56.0	14.3	95.0	6.2	60.3	6.6	80.0	0.5	0.0	0.3	0.7	3.6	54.7	5.9	0.9
31	FB22 611	58.8	3.7	62.5	21.9	57.3	15.4	90.0	22.2	61.7	6.8	86.7	1.2	0.1	0.8	1.1	4.9	59.0	12.4	0.7
32	TR22 671	55.3	3.5	45.0	8.6	52.3	17.6	95.0	5.4	55.0	15.5	93.3	1.2	0.2	0.0	7.7	10.0	53.0	16.2	3.4
33	TR21 667	55.3	3.3	60.0	19.0	51.0	26.1	100.0	13.2	53.3	15.2	100	2.3	0.0	0.4	3.3	10.3	52.7	19.9	2.8
34	FB21 106	58.5	4.7	55.0	18.8	57.3	20.4	100.0	14.5	59.7	7.6	86.7	1.2	0.0	0.0	2.1	9.3	57.0	13.5	2.4
35	TR20 181	55.0	3.2	42.5	18.6	54.0	19.9	100.0	18.4	57.0	14.1	93.3	3.2	0.2	0.0	2.0	10.4	55.7	37.7	2.3
36	TR21 187	56.0	5.9	72.5	25.6	55.7	28.3	100.0	16.2	60.3	8.4	90.0	1.6	0.3	0.0	2.4	10.2	59.0	12.1	2.1
37	TR21 188	55.8	4.4	67.5	14.1	52.3	34.0	95.0	10.4	55.0	12.0	96.7	1.6	0.2	0.0	2.8	10.2	54.3	15.3	1.0
38		58.5	6.6	67.5	12.4	57.0	10.7	100.0	9.1	62.7	7.1	83.3	0.3	0.0	0.0	0.6	8.2	56.3	13.9	0.6

39	QUE ST	53.0	2.5	60.0	17.8	51.3	26.4	100.0	9.4	52.3	9.3	100	1.5	0.3	0.0	6.9	18.4	48.3	6.7	2.4
40	Conl on	49.5	5.1	67.5	6.8	48.3	12.4	100.0	6.4	49.7	12.3	93.3	0.7	0.7	0.0	9.9	5.8	46.3	18.4	2.2
41	Explo rer	55.5	4.6	62.5	11.4	51.7	19.4	100.0	4.8	54.3	13.2	93.3	3.0	0.1	0.0	3.8	12.1	56.3	12.8	1.6
42	AAC Syne rgy	57.3	4.8	67.5	18.3	55.0	14.1	95.0	24.4	58.7	9.6	93.3	1.0	0.1	0.0	1.3	8.8	58.0	9.8	0.5
43	Chev ron	59.0	1.4	45.0	13.8	55.3	7.3	90.0	4.8	57.7	2.0	46.7	0.3	0.0	0.0	1.3	3.2	56.3	4.6	0.6
44	Stan der	53.5	14	100.0	25.1	52.0	39.0	95.0	43.0	55.0	27.5	96.7	6.3	0.7	0.0	20	26.8	52.3	15.3	1.2

Table 2. Mean days to heading after planting of entries grown in 2022 NABSEN Nursery at Four locations.

Entry	Name	Manitoba, Canada	Langdon	Fargo	St Paul
		Heading	HD Avg	HD Avg	Heading Date
1	2ND32529	53.8	49.3	49.7	52
2	2ND34634	54	52.3	54.3	52.67
3	2ND36638	54.8	52.0	59.7	54.67
4	2ND36642	52.3	52.0	54	52
5	2ND37568	51.8	51.0	55	56
6	2ND38752	48.5	48.7	53.3	54.3
7	2ND39386	55.8	51.0	54	51.67
8	2ND39513	54.3	50.0	50	50.3
9	S2M184	54	50.7	51.3	51.3
10	S2M189	55.8	51.0	54.3	48.67
11	S2M190	48	48.0	50	51.67
12	S2M191	50.5	49.7	53.7	50.3
13	S2M192	53.3	49.0	50	46.3
14	S2M193	52	48.0	53	55.3
15	S2M194	54.5	51.0	58	53.3
16	S2M195	55.8	52.7	54	58
17	S2M196	50	49.3	53	54.3
18	S2M197	52	50.7	50.3	56.3
19	2IK16-1184	55	52.3	54.3	46.3
20	2IK18-4395	54	49.3	50.7	56.3
21	2IK18-4451	54.8	50.0	53.3	55.67
22	2IK18-4477	52.8	51.3	54	58.67
23	2IK18-4618	55.3	54.0	55.7	54.67
24	2IK18-4680	52.8	51.3	54.3	59
25	2IM14-8212	54.5	51.0	55.3	53
26	ABI CARDINAL	53.8	51.7	62	48.3

27 TR22283	57.3	53.7	58.3	50
28 TR22285	58.3	56.0	59	52
29 FB22203	58.5	58.3	63.7	45.3
30 FB22204	57	56.0	60.3	51
31 FB22610	58.8	57.3	61.7	49.67
32 FB22611	55.3	52.3	55	47.67
33 TR22671	55.3	51.0	53.3	52.67
34 TR21667	58.5	57.3	59.7	54.67
35 FB21106	55	54.0	57	48.67
36 TR20181	56	55.7	60.3	46
37 TR21187	55.8	52.3	55	52.3
38 TR21188	58.5	57.0	62.7	59
39 QUEST	53	51.3	52.3	54.3
40 Conlon	49.5	48.3	49.7	56.3
41 Explorer	55.5	51.7	54.3	57
42 AAC Synergy	57.3	55.0	58.7	54.3
43 Chevron	59	55.3	57.7	58.3
44 Stander	53.5	52.0	55	52.67

Table 3. Mean FHB incidence of entries grown in the 2022 NABSEN Nursery at three locations.

Entry	Name	Manitoba, Canada	Langdon	Fargo
		Incidence (%)	incidence (%)	Incidence (%)
1	2ND32529	60	95.0	86.7
2	2ND34634	57.5	100.0	80
3	2ND36638	55	100.0	90
4	2ND36642	65	90.0	96.7
5	2ND37568	60	90.0	90
6	2ND38752	92.5	100.0	93.3
7	2ND39386	55	95.0	86.7
8	2ND39513	55	100.0	93.3
9	S2M184	67.5	100.0	90
10	S2M189	57.5	100.0	93.3
11	S2M190	70	100.0	93.3
12	S2M191	67.5	100.0	93.3
13	S2M192	80	100.0	96.7
14	S2M193	77.5	100.0	96.7
15	S2M194	65	100.0	90
16	S2M195	62.5	100.0	96.7
17	S2M196	77.5	100.0	93.3
18	S2M197	80	100.0	96.7
19	2IK16-1184	75	100.0	90
20	2IK18-4395	62.5	100.0	93.3
21	2IK18-4451	67.5	100.0	96.7
22	2IK18-4477	70	100.0	90
23	2IK18-4618	62.5	100.0	90

24	2IK18-4680	65	100.0	90
25	2IM14-8212	55	100.0	90
26	ABI CARDINAL	65	100.0	86.7
27	TR22283	67.5	100.0	90
28	TR22285	60	100.0	90
29	FB22203	70	95.0	80
30	FB22204	62.5	95.0	80
31	FB22610	62.5	90.0	86.7
32	FB22611	45	95.0	93.3
33	TR22671	60	100.0	100
34	TR21667	55	100.0	86.7
35	FB21106	42.5	100.0	93.3
36	TR20181	72.5	100.0	90
37	TR21187	67.5	95.0	96.7
38	TR21188	67.5	100.0	83.3
39	QUEST	60	100.0	100
40	Conlon	67.5	100.0	93.3
41	Explorer	62.5	100.0	93.3
42	AAC Synergy	67.5	95.0	93.3
43	Chevron	45	90.0	46.7
44	Stander	100	95.0	96.7

Table 4. Mean FHB severity of entries grown in the 2022 NABSEN Nursery at five locations.

Entry	Name	Manitoba, Canada	Langdon	Fargo	Crookston	St Paul
		Severity (%)	% sev avg	% severity (avg)	%severity	%Severity
1	2ND32529	3.8	15.3	7.9	1	9.33
2	2ND34634	3.3	20.4	7.3	4.467	20.67
3	2ND36638	3.2	18.4	8.8	8.53	23.67
4	2ND36642	5.4	17.1	12.5	4.8	16.25
5	2ND37568	3.7	12.5	12.3	0.83	17.75
6	2ND38752	7	24.8	13.7	1.33	14.42
7	2ND39386	3.2	14.2	8.8	3.57	36.83
8	2ND39513	3	15.6	10.3	1.9	17.92
9	S2M184	5.7	22.5	15.3	2.23	15.83
10	S2M189	4.3	23.3	14.2	3.67	30.83
11	S2M190	4.8	22.9	13.5	6.767	24.083
12	S2M191	4.8	28.9	13.3	3.1667	22.5
13	S2M192	5.7	27.5	13	7.33	31.5
14	S2M193	5.8	19.3	22.5	1.53	14.25
15	S2M194	5.2	20.9	13.9	1.867	12.58
16	S2M195	6	21.9	13.1	1.3	9.75
17	S2M196	6.2	22.6	14.6	3.23	23.42
18	S2M197	9.3	32.9	17.6	1.33	4.567
19	2IK16-1184	5.1	26.7	9	9.93	18.4167
20	2IK18-4395	4.5	34.0	12.8	3.767	12.75
21	2IK18-4451	5.4	21.9	23.1	2.03	37.67
22	2IK18-4477	5	22.9	13.1	0.6	10.583
23	2IK18-4618	3	23.7	8	0.67	5.92

24	2IK18-4680	3.9	16.9	8.8	1.067	12.417
25	2IM14-8212	3.7	22.8	16.2	7.73	16.167
26	ABI CARDINAL	5.9	23.5	12.6	6.93	6.7
27	TR22283	5.1	34.3	9.1	2.7	31.42
28	TR22285	3.9	18.7	9.5	4.067	30.25
29	FB22203	4.7	16.8	5.9	2.4	26.25
30	FB22204	4	14.3	6.6	6.567	17.33
31	FB22610	3.7	15.4	6.8	4.3	25.58
32	FB22611	3.5	17.6	15.5	5.6	29.67
33	TR22671	3.3	26.1	15.2	3.867	31.25
34	TR21667	4.7	20.4	7.6	2.3	22.83
35	FB21106	3.2	19.9	14.1	5.2	24.5
36	TR20181	5.9	28.3	8.4	21.967	25.75
37	TR21187	4.4	34.0	12	20.267	15.3
38	TR21188	6.6	10.7	7.1	2.4	12.08
39	QUEST	2.5	26.4	9.3	2.8	15.25
40	Conlon	5.1	12.4	12.3	0.567	13.92
41	Explorer	4.6	19.4	13.2	2.1	13.5
42	AAC Synergy	4.8	14.1	9.6	3.6	14.25
43	Chevron	1.4	7.3	2	0.467	16.7
44	Stander	14.4	39.0	27.5	3.267	19.92

Table 5. Means for DON (ppm) entries grown in 2022 NABSEN Nursery at seven locations.

Entry	Name	Manitoba, Canada DON	Langdon DON	Fargo DON	Fargo(Dry land) DON	Caselton (Dry land) DON	Crookston DON	St Paul DON
1	2ND32529	16.60	9.50	1.03	0.23	0.03	7.43	1.77
2	2ND34634	20.80	16.70	1.80	0.33	0.00	12.00	3.83
3	2ND36638	21.50	8.40	1.67	0.10	0.00	14.87	2.17
4	2ND36642	10.10	9.80	2.27	0.07	0.06	10.03	2.53
5	2ND37568	8.90	6.20	2.57	0.07	0.00	10.97	2.73
6	2ND38752	11.70	6.10	2.80	0.10	0.13	6.83	4.43
7	2ND39386	13.10	4.40	0.90	0.00	0.00	14.90	3.40
8	2ND39513	7.50	6.70	1.10	0.10	0.07	6.53	1.93
9	S2M184	21.60	9.80	3.43	0.17	0.00	14.27	3.17
10	S2M189	15.30	9.90	2.33	0.00	0.00	14.57	3.10
11	S2M190	8.70	6.00	2.27	0.00	0.00	14.40	3.20
12	S2M191	10.70	7.30	3.07	0.23	0.03	7.33	2.10
13	S2M192	11.10	9.40	2.83	0.17	0.00	10.73	1.30
14	S2M193	8.40	4.90	2.73	0.10	0.00	7.13	1.33
15	S2M194	13.80	13.30	4.27	0.37	0.00	6.40	2.10
16	S2M195	17.20	15.00	4.30	0.03	0.07	8.83	0.50
17	S2M196	19.20	13.20	7.00	0.27	0.03	12.57	3.03
18	S2M197	16.40	14.70	11.67	0.13	0.20	3.17	0.63
19	2IK16-1184	15.10	7.80	1.10	0.20	0.00	5.80	2.17
20	2IK18-4395	13.00	7.40	2.97	0.07	0.00	12.10	1.63
21	2IK18-4451	18.00	11.50	3.03	0.07	0.17	10.43	2.27
22	2IK18-4477	12.40	10.60	4.50	0.20	0.00	3.40	1.37
23	2IK18-4618	31.00	12.50	1.67	0.00	0.00	3.63	0.87
24	2IK18-4680	12.30	5.90	0.73	0.00	0.03	4.87	0.67
25	2IM14-8212	19.10	19.00	2.83	0.25	0.00	9.97	3.37
26	ABI CARDINAL	23.30	12.50	1.77	0.07	0.10	18.43	2.40

27	TR22283	13.10	12.10	3.10	0.00	0.10	10.83	3.40
28	TR22285	11.90	5.50	0.73	0.05	1.33	12.83	3.50
29	FB22203	9.10	10.80	0.53	0.00	0.07	7.00	1.90
30	FB22204	6.60	6.20	0.53	0.00	0.27	9.00	2.40
31	FB22610	21.90	22.20	1.17	0.05	0.83	8.30	1.27
32	FB22611	8.60	5.40	1.20	0.23	0.00	9.93	1.43
33	TR22671	19.00	13.20	2.33	0.00	0.40	14.53	2.83
34	TR21667	18.80	14.50	1.20	0.00	0.00	13.70	1.67
35	FB21106	18.60	18.40	3.17	0.20	0.00	13.57	2.93
36	TR20181	25.60	16.20	1.57	0.27	0.03	18.47	2.27
37	TR21187	14.10	10.40	1.63	0.20	0.00	26.80	1.23
38	TR21188	12.40	9.10	0.33	0.00	0.00	10.20	2.13
39	QUEST	17.80	9.40	1.47	0.33	0.00	10.23	1.00
40	Conlon	6.80	6.40	0.67	0.70	0.03	8.17	0.60
41	Explorer	11.40	4.80	3.00	0.10	0.00	9.33	2.40
42	AAC Synergy	18.30	24.40	1.03	0.07	0.00	10.13	1.63
43	Chevron	13.80	4.80	0.27	0.00	0.03	4.33	1.33
44	Stander	25.10	43.00	6.27	0.73	0.00	10.33	2.80

Table 6. Temperature (°F) compared to the 30-year average 2022.

Location	May	June	July	August
Fargo, ND	-2	4	1	-1
Langdon, ND	-4	2	-1	-1
Casselton, ND	-1	3	2	0
St. Paul, MN	1	-1	0	1
Crookston, MN	1	-1	-1	-1

Table 7. Rainfall (in.) compared to the 30-year average 2022.

Location	May	June	July	August
Fargo, ND	0.14	-1.65	0.50	0.08
Langdon, ND	0.97	-2.38	1.38	-0.68
Casselton, ND	0.98	-0.61	-0.25	-0.43
St. Paul, MN	0.65	-3.67	-2.94	-0.04
Crookston, MN	1.69	-0.82	-1.44	-2.38