PGR IMPACT ON OAT VARIETIES

Oats are an important crop whose acreage in the prairies has increased in recent years due to breeding efforts resulting in high-yielding varieties. Several agronomic projects in the past have determined the relationship between seeding rates, dates, and wild oat suppression, as well as the relationship between caryopsis sizes, seedling vigor, and competition with wild oats (Willenborg, Rossnagel, and Shirtliffe 2005). A recent report from a one-year trial in Saskatchewan indicated that plant growth regulators (PGRs) had a significant effect on agronomic parameters in tall and short oat varieties (McInnes and Holzapfel 2022). Increased seeding rates are associated with better weed competition and increased yields. However, there is an optimum seeding rate for oats after which there are no benefits (May et al. 2009). For new oat varieties, the jury is still out on whether the current standard seeding rate is optimum. Oat yields and quality are affected by lodging and shattering, both of which pose a challenge for producers. PGRs used to address lodging were proven effective. However, how PGRs interact with seeding rates and their effects on shattering is unknown. While there is a genetic component to shattering, a study in China has attributed shattering to palea and lemma morphological polymorphism in naked oat varieties (Li et al. 2023). Management and environmental conditions are also huge contributing factors to shattering in addition to genetics.

This project aims to explore the interaction between plant growth regulators (PGRs), specifically Moddus® and Manipulator®, and increased oat seeding rates, as well as their impact on shattering and lodging across different prairie locations, both under normal field conditions and drought conditions in a greenhouse setting.

The 2025 season marked the second year of the project, and this report presents the findings from the Gateway Research Organization (GRO) site only. It is important to note that data from a single site and year is generally not sufficient to draw scientific conclusions.

AGRONOMIC INFORMATION

Seeding Date May 2, 2025
Seeding Depth 1 ¼ inch
Seeding Rates: 300 plants/m^2 ; 400 plants/m^2
Rainfall Recorded: May 1 to August 31, 2025: 192.2 mm
Fertilizer/ac
- Side banded: 26.8-1.9-16.0-5.4 @ 373.2 lbs/ac
  - 100 lbs/ac Actual N; 7.2 lbs/ac Actual P; 60 lbs/ac Actual K; 20 lbs/ac Actual S
- Seed placed: 11-52-0 @ 53.5 lbs/ac
  - 5.9 lbs/ac Actual N; 27.8 lbs/ac Actual P

Herbicides:
- Buctril M @ 400 ml/ac June 3, 2025

PGR Application @ GS 31-32
- Manipulator @ 930 ml/ac June 10, 2025
- Moddus @ 340 ml/ac June 10, 2025

PGR IMPACT ON OAT VARIETIES CONTINUED

PGR OATS TRIAL - GRO, WESTLOCK - 2025

Trt	Variety	PGR	Seeding Rate	Plant Density		Productive Tillers		Tiller Production		Days to	
No.	Name	Product	(plants/ac)	(plants/m2)		(tillers/m2)		(tillers/plant)		Flowering	
1	AAC Morgan	No PGR	300	282.3	b-e	358.0	c	1.28	def	64.5	a
2	CDC Arborg	No PGR	300	274.0	cde	375.3	bc	1.38	c-f	64.3	ab
3	CS Camden	No PGR	300	266.3	cde	443.5	abc	1.66	b-e	61.0	d
4	AC Summit	No PGR	300	270.3	cde	432.3	abc	1.60	b-f	61.3	d
5	AAC Morgan	No PGR	400	362.5	a	398.5	abc	1.10	f	62.3	bcd
6	CDC Arborg	No PGR	400	331.5	abc	449.0	abc	1.37	c-f	62.8	a-d
7	CS Camden	No PGR	400	286.0	b-e	456.3	abc	1.61	b-f	61.0	d
8	AC Summit	No PGR	400	334.3	abc	528.3	abc	1.59	b-f	61.0	d
9	AAC Morgan	Manipulator	300	282.5	b-e	428.8	abc	1.52	c-f	64.5	a
10	CDC Arborg	Manipulator	300	267.5	cde	380.8	bc	1.42	c-f	63.5	abc
11	CS Camden	Manipulator	300	263.3	cde	529.3	abc	2.01	ab	62.5	a-d
12	AC Summit	Manipulator	300	288.3	b-e	536.5	abc	1.86	bc	62.3	bcd
13	AAC Morgan	Manipulator	400	378.0	a	428.5	abc	1.14	ef	63.5	abc
14	CDC Arborg	Manipulator	400	339.8	abc	467.0	abc	1.38	c-f	62.3	bcd
15	CS Camden	Manipulator	400	328.8	a-d	487.5	abc	1.49	c-f	62.8	a-d
16	AC Summit	Manipulator	400	398.0	a	532.0	abc	1.34	def	61.3	d
17	AAC Morgan	Moddus	300	256.0	de	411.3	abc	1.61	b-f	64.0	abc
18	CDC Arborg	Moddus	300	273.5	cde	485.3	abc	1.78	bcd	63.8	abc
19	CS Camden	Moddus	300	281.0	b-e	491.0	abc	1.74	bcd	62.5	a-d
20	AC Summit	Moddus	300	250.5	e	558.8	ab	2.23	a	63.5	abc
21	AAC Morgan	Moddus	400	380.0	a	485.0	abc	1.28	def	63.0	a-d
22	CDC Arborg	Moddus	400	334.8	abc	442.8	abc	1.32	def	62.0	cd
23	CS Camden	Moddus	400	352.3	ab	493.8	abc	1.39	c-f	62.3	bcd
24	AC Summit	Moddus	400	381.0	a	579.8	a	1.53	c-f	62.5	a-d
LSD P=.05 (% mean diff)				42.63 (14%)		98.29 (21%)		0.29 (19%)		1.18 (2%)	
Standard Deviation				29.98		69.13		0.2		0.83	
CV				9.64		14.84		13.26		1.33	

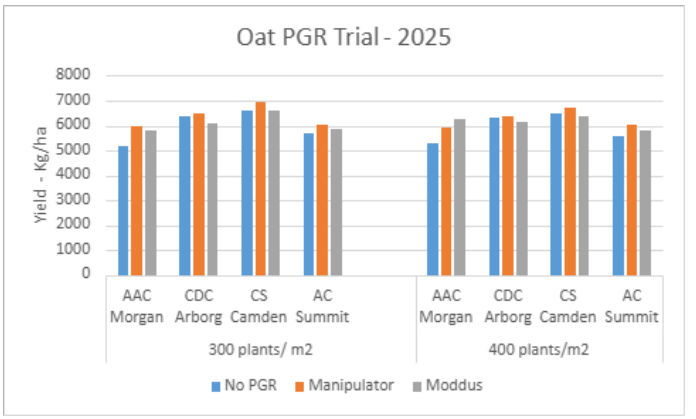
Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls). Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL,

PGR OATS TRIAL - GRO, WESTLOCK - 2025

Trt-No.	Variety Name	PGR Product	Height (cm)		Lodging 1 (erect) - 9 (flat)		Yield @ 14% moisture (kg/ha)		Protein (%)		Test Weight (kg/HL)		1000 KWT (g)	
1	AAC Morgan	No PGR	104.8	ab	1	b	5179	k	13.0	a-d	54.2	de	39.9	a
2	CDC Arborg	No PGR	108.8	a	2	a	6368	cde	13.1	abc	57.7	a-e	39.9	a
3	CS Camden	No PGR	103.5	ab	1.5	ab	6616	bc	12.6	bcd	59.1	abc	39.8	a
4	AC Summit	No PGR	92.3	def	1.3	b	5703	ij	13.4	ab	60.5	a	36.8	a
5	AAC Morgan	No PGR	103.8	ab	1	b	5298	k	13.1	a-d	55.3	cde	40.5	a
6	CDC Arborg	No PGR	101.5	abc	1.8	ab	6320	c-f	13.3	abc	57.9	a-e	40.8	a
7	CS Camden	No PGR	98.3	bcd	1	b	6461	bcd	12.7	a-d	58.5	abc	39.3	a
8	AC Summit	No PGR	88.3	efg	1	b	5550	j	13.5	ab	60.4	a	36.5	a
9	AAC Morgan	Manipulator	97.3	bcd	1	b	5972	ghi	12.8	a-d	53.8	e	40.5	a
10	CDC Arborg	Manipulator	103.3	ab	1.3	b	6459	bcd	13.0	a-d	57.2	a-e	41.0	a
11	CS Camden	Manipulator	90.5	d-g	1	b	6965	a	12.6	bcd	59.8	ab	39.6	a
12	AC Summit	Manipulator	85.0	fgh	1	b	6011	f-i	13.4	ab	58.5	abc	36.4	a
13	AAC Morgan	Manipulator	93.3	c-f	1	b	5905	hi	12.8	a-d	54.0	e	39.2	a
14	CDC Arborg	Manipulator	100.8	abc	1.5	ab	6396	cd	13.2	abc	57.2	a-e	40.0	a
15	CS Camden	Manipulator	87.5	efg	1	b	6729	b	12.7	bcd	58.7	abc	38.2	a
16	AC Summit	Manipulator	82.3	gh	1	b	6022	f-i	13.2	abc	59.7	ab	37.1	a
17	AAC Morgan	Moddus	86.3	fgh	1	b	5821	hij	12.8	a-d	54.8	cde	41.0	a
18	CDC Arborg	Moddus	98.8	bcd	1.3	b	6061	e-h	13.1	a-d	57.8	a-e	40.9	a
19	CS Camden	Moddus	94.5	cde	1	b	6588	bc	12.3	d	58.2	a-d	39.4	a
20	AC Summit	Moddus	79.3	h	1	b	5835	hij	13.6	a	58.9	abc	37.8	a
21	AAC Morgan	Moddus	85.0	fgh	1	b	6275	c-g	12.6	bcd	55.3	cde	40.7	a
22	CDC Arborg	Moddus	94.8	cde	1	b	6143	d-h	12.9	a-d	55.6	b-e	40.4	a
23	CS Camden	Moddus	82.3	gh	1	b	6372	cde	12.5	cd	56.9	a-e	37.1	a
24	AC Summit	Moddus	78.3	h	1	b	5820	hij	13.4	ab	59.6	ab	43.2	a
LSD P=.05 (% mean diff)			5.32 (6%)		0.44 (37%)		218.2 (4%)		0.47 (4%)		2.39 (5%)		3.70 (10%)	
Standard Deviation			3.74		0.31		153.5		0.33		1.68		2.60	
CV			4.01		26.01		2.51		2.56		2.93		6.61	

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls). Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL,

PGR IMPACT ON OAT VARIETIES CONTINUED



RESULTS AND DISCUSSION:

Plant growth regulator (PGR) treatments and plant density were found to influence the performance of the oat varieties tested. At both 300 and 400 plants/m², the application of PGRs resulted in higher yields compared with the no-PGR treatment, although the response varied among varieties. The Manipulator treatment consistently produced some of the highest values across most cultivars, suggesting a stronger positive response to this PGR. Moddus also improved performance in several cases but showed more variable results depending on the cultivar and plant density. Increasing plant density from 300 to 400 plants/m² did not uniformly increase yields across all varieties; AAC Morgan responded positively at the higher density, while others showed little change or slight reductions. Overall, CS Camden tended to produce the highest values across treatments and densities, indicating strong performance under the local (Westlock) conditions.

The season around Westlock was drier than usual, which resulted in minimal lodging and meant that differences among treatments were negligible. Moddus proved most effective in reducing plant height, followed by Manipulator, while plants without PGRs were the tallest. Moddus also slightly accelerated flowering, although the effect was small. Grain quality, including test weight, protein content, and 1000-kernel weight, was influenced more by cultivar than by seeding rate or PGR treatment.

These findings underscore the differential impacts of PGRs, seeding rate, and variety on oat agronomic traits, highlighting their potential for optimizing oat yield and plant characteristics in agricultural practice.

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