

Objective:

The objective of this demonstration was to highlight the impact of fertilizer placement and rate on oat establishment, seed yields, and quality.

Trial Design:

- This trial was conducted at Scott and Melfort in 2023
- Treatments consisted of nitrogen placement, nitrogen rate, and phosphorus placement on oats (Table 1).

Table 1. Treatments used in 4R management: Right rate and placement for fertilizer in oats and Melfort and Scott, SK in 2023.

Treatment #	Nitrogen Placement	Nitrogen Rate (kg/ha)	Phosphorus Placement ²
1	N/A	0	No P
2	N/A	0	Seed Row
3	N/A	0	Side-Band
4	Mid-Row	75	Seed Row
5		100	
6		125	
7	Side-Band	75	Seed Row
8		100	
9		125	
10	Side-Band	75	Side-Band
11		100	
12		125	

²phosphorus to be applied at 45 kg/ha of P₂O₅

Results:

- There were no significant responses of plant density, days to maturity, or TKW to fertilizer treatments at either site.
- At Scott, yield was significantly increased from 75 kg/ha (4662 kg/ha) to 100 kg/ha (5140 kg/ha) of applied nitrogen in the mid-row. At 125 kg/ha (4977 kg/ha) grain yield was not significantly different from 75 or 100 kg/ha.
- At Melfort, oat yield was significantly increased at 125 kg/ha (5376 kg/ha) as compared to 75 kg/ha (5085 kg/ha) of applied nitrogen in the mid-row. There was also an increase in average yields at 100 kg/ha (5248 kg/ha) as compared to 75 kg/ha of nitrogen; however, the difference was not statistically significant.

- Nitrogen and phosphorus placement did not significantly affect oat yield at either site; however, yields did increase with additions of seed-placed phosphorus and side-band nitrogen.
- At Scott, test weight was significantly reduced from 75 kg/ha (238 g/0.5 L) to 125 kg/ha (233 g/0.5 L) of applied nitrogen. Test weight was also reduced for 75 kg/ha to 100 kg/ha (235 g/0.5 L) of nitrogen; however, the difference was not statistically significant. Test weight was reduced when nitrogen was side band (235 g/0.5 L) as compared to midrow band (236 g/0.5 L).
- At Melfort, differences in test weight were not significant; however, test weight was reduced with side band nitrogen (238 g/0.5 L) as compared to midrow band nitrogen (239 g/0.5 L).

Table 2. Effect of Nitrogen fertilizer rates (75, 100, 125 kg/ha) applied in the side-band and mid-row on yield (kg/ha) and test weight (g/0.5 L) of oats.

N rate (kg/ha)	Yield (kg/ha)		Test Weight (g/0.5 L)	
	side-band	mid-row	Scott	Melfort
75	5015	5092	238 a	239
100	5180	5348	235 ab	238
125	5114	5330	233 b	238
mean	5103	5257	235	238
p-value	0.5413	0.1452	0.0316	0.9716
75	4662 b	5085 b	237	239
100	5140 a	5248 ab	236	238
125	4977 ab	5376 a	235	239
mean	4926	5236	236	239
p-value	0.0478	0.0071	0.4997	0.7512

Conclusions:

In conclusion, the results of this one-year demonstration suggest that applying high rates of N (100-125 kg/ha) will maximize oat yields, but applying high rates and side banding N may reduce test weights. Additionally, yields were improved with seed-placed phosphorus.

The full report is available at www.warc.ca. This project was supported by the Agricultural Demonstration of Practices and Technologies (ADOPT) initiative under the Canadian Agricultural Partnership bi-lateral agreement between the federal government and the Saskatchewan Ministry of Agriculture. As well as financial contributions from the Saskatchewan Oat Development Commission.

WARC Project #6-23
February 2024