

Mustard In The Field

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M21 demonstration plots at Swift Current, SK, (WCA) 2021.

Wheatland Conservation Area has been participated in a number of mustard projects over the past few years. Most recently a demonstration of optimum fertility to achieve target yields in hybrid and composite mustard. The goal being to demonstrate the higher yield potential of hybrid (AAC Brown 18) and composite mustard (AAC Yellow 80) compared to an open-pollinated variety and show the importance of using proper fertility to achieve target yields. In this demo, N, P, K and S fertilizer was applied according to soil test recommendations based on nutrient removal rates. Target yields were 30, 40, 50 and 60 bushels per acre. Fertilizer forms included Urea, MAP, AMS and ESN. Resulting yields increased with increasing fertilizer rate, but neither the target plant population, or yield was met due to limited available moisture. Using a simple economic analysis, targeting 30 bushels per acre resulted in the highest return (\$) in 2021.

Target Yield	Variety
1. 30 (bu/ac)	1. AAC Brown 18 (hybrid mustard)
2. 40 (bu/ac)	2. AAC Yellow 80 (composite mustard)
3. 50 (bu/ac)	
4. 60 (bu/ac)	

A second trial, which is a part of the Strategic Field Program (SFP) looks to establish optimum nitrogen fertilizer and seeding rates for AAC Brown 18. It is important to understand nitrogen requirements of a hybrid mustard compared to an open pollinated variety (Centennial). We also want to demonstrate how to best maximize production by determining seeding rates based on seeds/ft², rather than using pounds per acre due to the varietal differences in seed size and

establishment. This is a multisite, multiyear project and it takes place in Swift Current, Redvers and Indian Head from 2020-2022.

Nitrogen Rates	Variety
1. 0 (lbs/ac)	
2. 60 (lbs/ac)	
3. 80 (lbs/ac)	1. AAC Brown 18 (hybrid mustard)
4. 100 (lbs/ac)	2. Centennial (open pollinated mustard)
5. 120 (lbs/ac)	
6. 140 (lbs/ac)	
7. 160 (lbs/ac)	

Seed Rates	Variety
1. 10 (seeds/ft ²)	
2. 14 (seeds/ft ²)	1. AAC Brown 18 (hybrid mustard)
3. 18 (seeds/ft ²)	2. Centennial (open pollinated mustard)
4. 22 (seeds/ft ²)	
5. 26 (seeds/ft ²)	

Preliminary results show emergence averaged over 6 site-years had a slightly negative relationship with increasing nitrogen. (All treatments were seeded at 22 seeds/ft²). Centennial mustard (12.3 plants/ft²) resulted in a higher average plant stand than AAC Brown 18 (10.2 plants/ft²). This has been fairly consistent across site years, where 5 of the 6 years received below average precipitation. However, similar to previous research, the vigorous nature of AAC Brown 18 allowed for better utilization of higher nitrogen rates to increase branching, pod development, and yields, despite lower plant stands. AAC Brown 18 yields increased with nitrogen up to 160N total (1602 kg/ha). The highest Centennial mustard yield resulted from 140N total (1402.3 kg/ha) with no significant increase resulting from 160N.

Plant density increased with seeding rate. (All treatments received a balanced application of NPKS). However, the higher seeding rates resulted in a lower percentage of surviving plants and increased competition amongst seedlings at higher rates. The highest yielding hybrid brown treatment resulted when seeded 10-18 seeds/ft². The highest Centennial yield resulted when seeded a slightly higher rate of 14-22 seeds/ft².

Although AAC Brown 18 establishment rates were lower than Centennial, average yields were higher. This demonstrates hybrid mustards increased vigor compared to the open pollinated variety. Final results will be available after the 2022 growing season. Based on 6 site years of data, we've seen that AAC Brown 18 has the ability to compensate for a lower plant stand and may demonstrate a stronger yield response to available nitrogen when not limited by moisture. This trial will be featured at upcoming field days in Swift Current that will also include a demonstration of the new synthetic variety, AAC Yellow 80.

- AAC Brown 18 was generally taller than Centennial. Height increased with nitrogen rate, but decreased as seeding rate increased, although there was not a lot variation.



- Lodging increased linearly with nitrogen and seeding rate, but was low overall and not statistically significant.



- The number of days to reach maturity was less at higher seeding rates. Variation between treatments was small due to limited moisture and above average temperatures, but generally Centennial mustard matured 1-2 days later than AAC Brown 18.



We want to acknowledge the Ministry of Agriculture, including Shannon Chant and Cory Jacob, as well as the Saskatchewan Mustard Development Commission, and collaborating locations (IHARF and SERF). Full report available at <https://wheatlandconservation.ca/research/>



Centennial brown with 100N (soil and applied lbs. of N/ac)



AAC Brown18 with 100N (soil and applied lbs. of N/ac)

