

Optimizing Nutrient Management in Irrigated Culinary Mustard for Spice Production

Dr. Janh investigated effects of soil and foliar applications of nitrogen, phosphorus, potassium, sulfur, zinc, manganese, boron), and the influence of seeding rate on mustard yield and

optimal fertilizer rates (N, P, S) and seeding rates to optimize yellow mustard yield in Idaho irrigated growing conditions.

timing of N applications' (all applied at planting; split-applied at planting and the bud stage; split-applied at planting and the bud stage; split-applied at planting, the rosette and bud stage) effect on yellow mustard yield and oilseed quality.

effect of soil and foliar applications of copper, zinc, manganese, and boron on culinary yellow mustard yield and spice quality.

effect of seeding rate on irrigated culinary yellow mustard yield. We also tested one application (150 lb/ac at planting and 30 lb/ac applied at rosette) with different seeding rates (4, 6, 8, 10, 12, 14 lb/ac). Micronutrient treatments (copper, zinc, manganese, boron) applied at planting and 30 lb/acre at rosette. Seeding rates (4, 6, 8, 10, 12, 14 lb/ac) and fertilizer rates (N, P, S) were tested in a factorial design. The experiment was conducted in a randomized complete block design with three replicates. The data were analyzed using ANOVA and the means were separated using Duncan's multiple range test. The results are presented in Table 1.

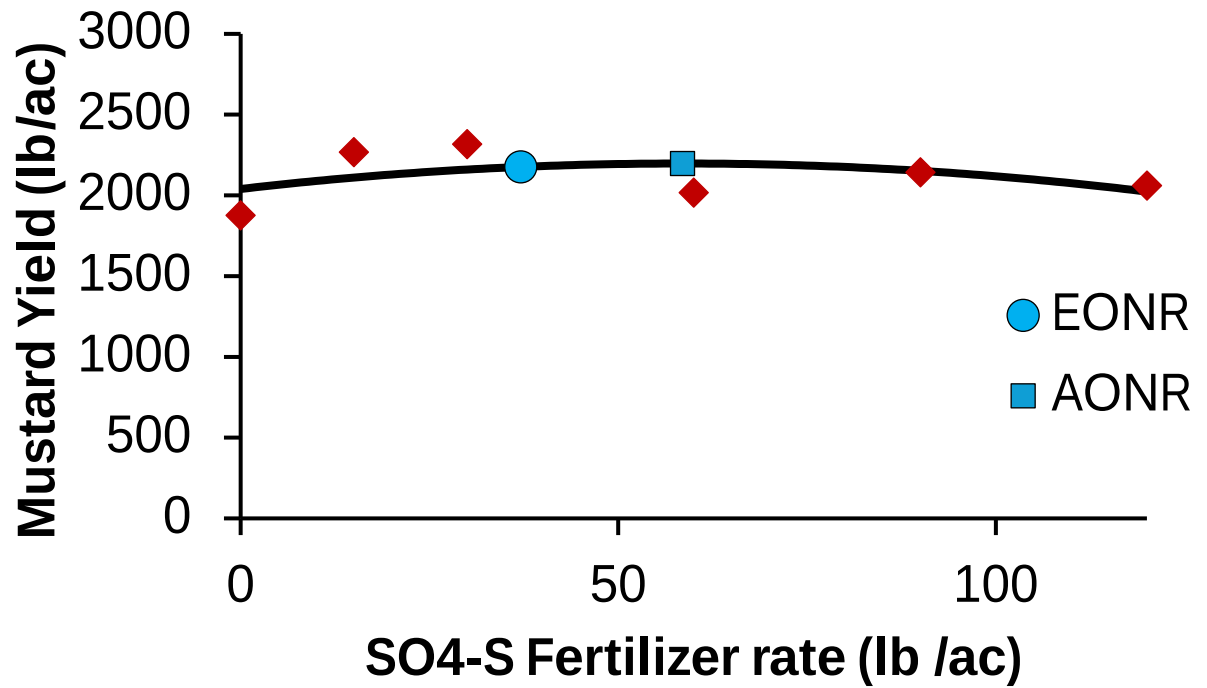
Previous Crop	Small Grain	
pH 1:1 water	8.15	
Salts (mmhos/cm)	0.975	0.95
Cl (ppm)	11.5	
Na (meq/100g)	0.275	
CEC (meq/100g)	15.275	
Excess Lime (%)	3.45	
OM (%)	1.2425	1.08

While there were no statistically significant differences between N application timings, the 150/30 split at planting and either rosette or bud stages produced 240-340 lb more seed than the 180 or 120/30/30 lb/ac split application treatments.

- o Given the lack of statistical differences, a one-time application of N at planting is likely to produce yield similar to one or more split applications.

Between the N split applications, the 150 lb/ac (at planting) and 30lb/ac (at flowering) treatment maxi

PHOSPHORUS AND SULFUR FERTILITY RESPONSE



MICRONUTRIENTS

The micronutrient treatments had a significant impact only on the spring stand counts. Manganese and manganese+copper+zinc+boron treatments done at planting had the highest stand counts at the seedling stage.



There was no significant difference in yield between the micronutrient treatments. However, the highest yields were observed when zinc, manganese, or boron were applied as a single micronutrient addition.

SEEDING RATES

Spring stand counts increased with increasing seeding rate. However, there was no effect of seeding rate on plant height at flowering or at harvest.

The number of branches per plant increased with seedings rate of up to 8-10 lb seed/ac. The average number of pods per plant and number of seeds per pod decreased with the seeding rate.

There was not a clear pattern of yield response to increased seeding rate. The maximum yield was observed at 6 lb/ac but an appropriate seeding rate could be anywhere between 6 to 12 lb/ac. It appears that the mustard crop will adjust according to interplant crop competition.

- o A higher seeding rate may help mustard outcompete any weed species present in the field.
- o Although we did not measure this directly, we did observe that plots seeded at lower seeding rates had thicker stems (diameter of a thumb or greater) than plots seeded at higher rates. Thinner stems could potentially be at greater risk of lodging.

Treatments	Spring Stand Count (plants/ac)	Flowering Plant Height (m)	Preharvest Plant height (m)	Branches /plant	Avg Pods/Branch	Seed/Pod	Grain Yield (lb/ac)	Fat[%]	Glucosinolate [μmol/g]	Moisture[%]	Protein [%]
Nitrogen (lb N/ac) Planting [each treatment received 60 lb P/ac and 60 lb S/ac]											
0	533490.5	1.06	1.34	17.75	11.56	4.25	1358.58	23.21	18.50	9.05	25.33
60	466175.0	1.35	1.46	17.25	15.37	5.00	1684.71	22.85	26.25	9.15	

0.2Cu 0.5Zn 0.4B	468817.3	1.50	1.67	17.3	14.27	5.9	2193.52	17.86	23.7	9.81	28.96
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