2020 Corn 2x2 Study

Corn was planted on April 21st at 34,000 plants/acre with three different liquid starter delivery treatments to show how different starter deliveries affect emergence, plant health, nutrient uptake through corn tissue, and overall yield. The three starter delivery treatments used were no fertilizer on the planter, John Deere 2x2, and Yield 360 Bandit 2x2x2 system. We anticipated the 2x2x2 would show better emergence and early season plant health. Fifteen gallons of 32% N and 10-34-0 were used as the starter fertilizer, 50/50 blend (7.5 gallons of each fertilizer). We used a 16R31 ExactEmerge planter and split the planter, so we used the standard John Deere 2x2 on half the planter and installed Yield 360 Bandit 2x2x2 on the other half of the planter. For the no fertilizer treatment, an entire planter pass was made with both starter fertilizer delivery systems shut off. Therefore, there were eight rows per 2x2 and 2x2x2 treatment and 16 rows for the no fertilizer treatment.

It was difficult to adjust the planter and maintain even planting depth due to half the planter having 2x2x2 and the other half 2x2. The 2x2x2 Bandits required more downforce to get the planter unit into the ground. We ended up having to remove the no-till coulters from the entire planter to reduce weight and help get the planter into the ground and maintain planting depth.

We noted emergence differences by population counts every 12 hours for the first five days then daily differences for days six-nine. We had several late emergers that emerged after we had stopped daily notes, so we took a final population count on 5/28 (three weeks after initial emergence) and noted the number of late emergers. All population counts were taken from the center two rows of each treatment and the average was recorded.

Corn 2x2 Treatment	Average Population at 24hr emergence (5/5 AM -5/6 AM)	Average Population at 48hr emergence (5/5 AM – 5/7 AM)	Average Population at 22 days (5/13)	Late Emergers 3+ weeks (5/28)	Final Population at 37 days (5/28)
2x2x2	5	12	28	2.5	30.5
2x2	7.5	13	26.5	4	30.5
No fertilizer	8	14	25.5	3.5	29

Table 1. Corn 2x2 study population counts. Multiply population listed x 1000.

Initial emergence was better in the no fertilizer and 2x2 treatments, but as time went on emergence was better where 2x2x2 fertilizer was applied at 22 days after emergence. Final populations ended up being very similar for all treatments. The 2020 site was planted when it was warm and bone dry, then it turned off cool and started receiving weekly rainfall within a few days after planting. In a year with more ideal germination and early growth conditions, we may have seen different results.

On May 13th, the corn was sidedressed with an Unverferth NutriMax applicator at 55 gallons per acre across all treatments. The application rate was not adjusted to compensate for the treatment that received no starter fertilizer at planting. Therefore, the no fertilizer treatment had a total of 195 pounds of N per acre, while the 2x2 and 2x2x2 treatments both received 230.7 pounds of N and 29.7 pounds of P per acre.

	2x2 Corn			2x2x2 Corn			No fertilizer Corn		
	5/29	6/19	7/10	5/29	6/19	7/10	5/29	6/19	7/10
N	5.21%	4.45%	3.14%	5.27%	4.26%	3.17%	4.96%	4.17%	3.16%
P	0.42%	0.43%	0.41%	0.44%	0.40%	0.43%	0.47%	0.41%	0.42%
K	4.13%	2.58%	2.31%	4.73%	2.58%	2.43%	4.34%	2.66%	2.51%
Mg	0.30%	0.31%	0.28%	0.32%	0.30%	0.28%	0.33%	0.27%	0.29%
Ca	0.80%	0.59%	0.52%	0.86%	0.62%	0.51%	0.90%	0.52%	0.52%
S	0.30%	0.26%	0.20%	0.31%	0.25%	0.20%	0.28%	0.23%	0.20%
B	5	13	6	5	13	7	5	10	7
Zn	31	33	24	26	27	24	28	29	26
Mn	61	68	31	58	55	35	53	50	36
Fe	177	136	106	188	145	109	206	119	116
Cu	19	43	11	20	21	11	19	17	12

Table 2. Corn 2x2 study tissue results.

Initially the 5/29 (V4 growth stage), 2x2x2 treatment had the highest N content (as highlighted in table 2). By 6/19 (V8 growth stage), the 2x2 treatment had the highest N content. By early ear development (R1-R2), all three treatments were showing similar nutrient levels across the board.

Corn 2x2 Treatment	Moisture	Dry Yield (bu/ac)
2x2x2	19.5%	207.7
2x2	19.0%	204.9
No fertilizer	19.1%	207.4*

Table 3. Corn 2x2 study yield data.

*The three treatments did not receive the same total pounds of N or P per acre.

**This study was for demonstrative purposes only and was non-replicated.