

Hettinger Soybean Seeding Rate Study

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Over the past decade soybean seeding rate recommendations in the corn-soybean belt have been reduced from 180,000 - 240,000 seeds per acre to 125,000 - 170,000. Much of this is due to increasing cost of soybean seed and soybeans tremendous ability to compensate for lower densities with increased branching and pod number. Yield per acre for soybeans remains relatively constant across population. This is because the number of seeds produced per plant is inversely related to the number of plants per acre. In general, numerous studies in the Midwest have shown 100,000 relatively uniformly spaced plants at harvest will produce the maximum economic return under most conditions. There have been many studies on soybean seeding rates in the Midwest, but there is little information on seeding rates for dryland soybeans in the semi-arid high plains.

A study was initiated in 2018 with nine seeding rates, 20,000 to 180,000 in 20,000 increments in both drilled (7") and row (30") configurations at Hettinger, North Dakota. In 2021 the variety ND17009GT was no-till planted on June 1 with a 9 row 7" inch spacing plot drill equipped with Acra Plant ADU double disk openers and a two row plot planter equipped with John Deere 1700 row units on 30" inch spacing. Weed control was obtained by a pre-emergence herbicide application of BroadAxe and post-emergence application of glyphosate. The trial was harvested with a Kincaid 8XP small plot combine on September 24. Data was recorded on flowering, height, maturity date, yield, test weight, seed size, seed protein and seed oil content.

The droughty conditions June and July limited yields to 23.9 bu/ac and caused significant plot variation in the 7" drill plots while the 30" rows were much more uniform. Because of this, only the 7" vs 30" row spacing used the full data set with population treatments analyzed separately by row spacing. For 30" rows, there was no significant difference in height, seed size, oil and protein. For maturity, test weight, and yield only the 20,000 seeding rate was different, with the rest of the seeding rates being similar in performance for those traits. The 7" rows had no significant difference in height and protein, but the 20,000 rate had lower test weight, bigger seed lower oil and lower yield than the rest of the seeding rates. The CV of 23.7 for yield indicated that there was a high amount of variation in the 7" a

In 2018, 2020 and 2021, there was no difference in yield between 7" and 30" rows, while in 2019, 7" rows yielded 5.5 Bu/Acre higher than 30" rows. Over the past four years the seeding rates of 100,000 seeds/acre and higher have not been significantly different in yield.

30" Rows vs 7" Drilled

Row Spacing	Mature Date	Plant Height	Moisture	Test Weight	Seed Size	Seed Oil	Seed Protein	Grain Yield
		inches	%	lbs/bu	Seeds/lb	%	%	bu/ac
7" Rows	9/11	26	8.2	56.9	3280	17.3	36.4	24.5
30" Rows	9/11	29	8.1	56.9	3296	17.5	36.4	23.3
Trial Mean	9/11	28	8.1	56.9	3288	17.4	36.4	23.9
CV	0.1	11.5	10.3	1.1	6.7	2	3	13.8
LSD 5%	NS	2	NS	NS	NS	NS	NS	NS

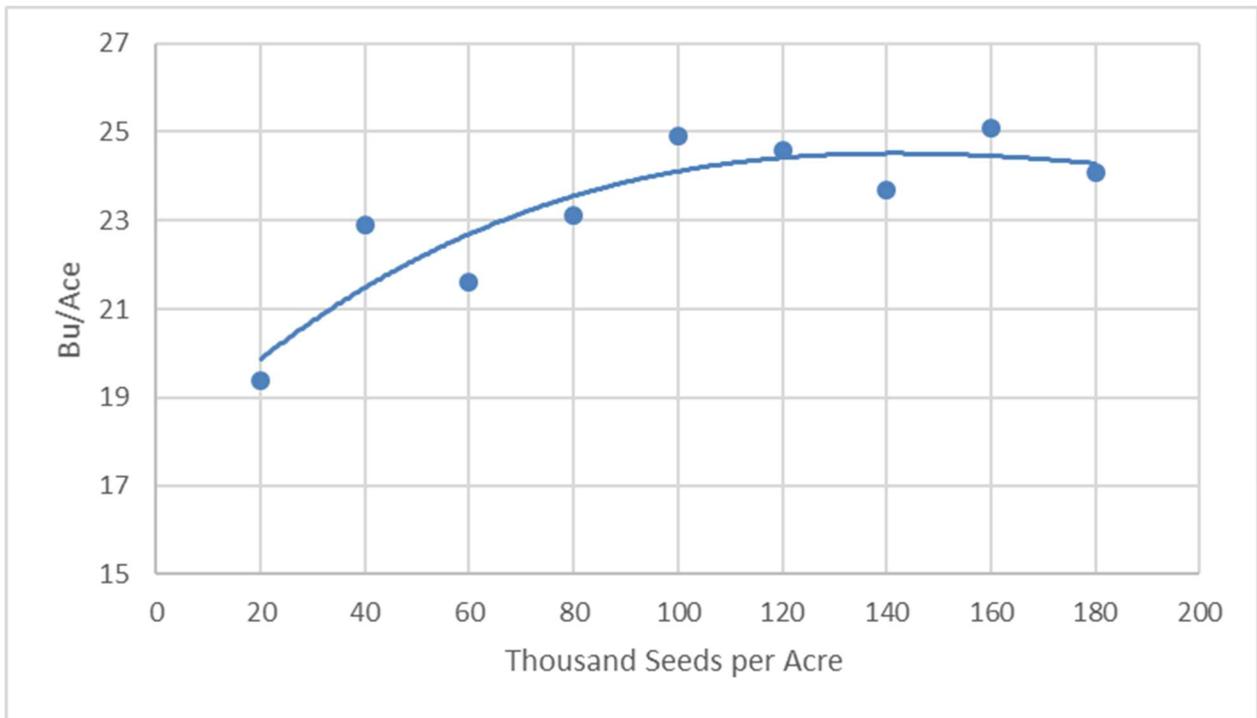
30" Rows x Population

Population	Mature Date	Plant Height	Moisture	Test Weight	Seed Size	Seed Oil	Seed Protein	Grain Yield
		inches	%	lbs/bu	Seeds/lb	%	%	bu/ac
20,000	9/14	31	9.8	56.0	3279	17.4	38.1	19.4
40,000	9/11	29	8.5	56.7	3234	17.6	36.3	22.9
60,000	9/11	28	8.2	57.0	3244	17.6	35.8	21.6
80,000	9/11	29	7.4	57.2	3316	17.5	35.8	23.1
100,000	9/11	29	7.0	57.4	3349	17.9	36.5	24.9
120,000	9/11	29	9.1	56.6	3274	17.3	37.3	24.6
140,000	9/10	30	8.0	57.1	3301	17.6	35.5	23.7
160,000	9/11	29	7.1	57.0	3339	17.8	35.7	25.1
180,000	9/11	28	7.5	57.0	3327	17.6	37.2	24.1
Trial Mean	9/11	29	8.1	56.9	3296	17.6	36.5	23.3
CV	0.1	6.6	11.3	0.7	4.9	1.9	2.0	8.9
LSD 5%	1	NS	1.3	0.6	NS	NS	NS	2.8

7" Rows x Population

Population	Mature Date	Plant Height	Moisture	Test Weight	Seed Size	Seed Oil	Seed Protein	Grain Yield
		inches	%	lbs/bu	Seeds/lb	%	%	bu/ac
20,000	9/13	32	12.3	55.5	2669	16.4	38.5	17.5
40,000	9/10	25	8.0	56.2	3278	17.1	37.0	26.1
60,000	9/11	29	7.6	57.2	3368	17.3	36.2	23.4
80,000	9/12	25	7.8	56.3	3402	17.4	35.9	23.1
100,000	9/12	26	7.6	57.9	3266	17.2	36.8	26.6
120,000	9/11	26	8.3	57.2	3251	17.5	36.2	27.8
140,000	9/12	25	7.5	57.3	3307	17.4	36.3	29.8
160,000	9/11	24	7.6	56.9	3517	17.5	35.7	22.9
180,000	9/10	25	7.2	57.6	3462	17.6	35.7	23.3
Trial Mean	9/11	26	8.2	56.9	3280	17.3	36.5	24.5
CV	0.1	15.1	9.6	1.4	8.1	2.3	3.2	23.7
LSD 5%	1	NS	1.2	1.2	386	0.6	NS	8.5

Yields by Seeding Rate in 30" Rows, 2021.



Yield by Row Spacing, 2018 - 2021.

