

What to do with Soybean Seeding Rates?

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Soybean prices are over \$12.00/bu on the Chicago Board of Trade for May delivery and even with the negative basis in New York, soybean growers are receiving over \$10/bu for the 2007 crop. Many growers have locked in prices for \$9/bu or more for the 2008 crop so soybeans will be very profitable again on the prospective 235,000 acres in NY, another new record. Last year, we revised our recommended seeding rates downward to 180,000 seeds/acre for drilled soybeans. What should we do with plant populations for the 2008 crop?

We revised our soybean seeding rates downward based on studies at the Aurora Research Farm with the Group II variety, 92B38, planted with a drill under conventional tillage (Table 1). Despite doubling seeding rates from 160,000 to 320,000 seeds/acre, average soybean yields remained almost constant at 52-53 bu/acre. Furthermore, in field-scale studies under no-till conditions with late Group I varieties, AG1903 (2005 and 2006) or NKS19-R5 (2007), soybean yields remained almost constant in all 3 years of the study (Table 2). Last year was exceptionally dry at Aurora (less than 8 inches from May 1-September 10) so yields were quite low and we observed no response to seeding rates, as expected. In the previous 2 years, however, yields were quite high but surprisingly we observed no response to increased seeding rates. With no response to seeding rates whatsoever in the last 5 years of our studies, an obvious question is why not revise recommended soybean seeding rates downward to 150,000 seeds/acre or less?

Soybeans planted in New York with a drill typically have emergence rates of 80% or even less. For example, 92B38 under conventional tillage planted in mid-May during the 2003-2005 seasons averaged 68 to 78% emergence, depending upon seeding rate (Table 1). Soybeans have a remarkable ability to compensate or fill in the gaps in the stand so the relatively low emergence rates do not result in yield reductions even at seeding rates of 140,000 seeds/acre or less. But what happens if soybeans are planted at 150,000 seeds/acre but stands are further reduced because of crusting or soil insect problems such as seed corn maggot? How does this affect soybean yields?

In 2006-2007, we conducted a study where we simulated further damage to soybean stands of 92B38 by removing every 10th, 4th, or 2nd plant in each drilled row, which resulted in stand reductions of 10, 25, or 50% (Table 3). Once again, soybean yields were essentially the same across seeding rates of 150,000, 200,000, and 250,000 seeds/acre when no further stand reductions occurred. Table 3, however, clearly indicates that further stand reductions of either 10 or 25% resulted in significant yield losses at both the 150,000 and 200,000 seeds/acre rate. In contrast, the 250,000 seeding rate didn't take a yield hit until a 25-50% stand loss occurred. Quite often May conditions in New York are cool, which results in extended emergence time and increased seed corn maggot potential. Likewise, heavy thunderstorms after planting followed by dry conditions and crusted soils are not uncommon. For these reasons, we will keep our recommended seeding rates at 180,000 seeds/acre while continuing studies on seeding rates and stand losses.

We urge New York soybean growers to also conduct seeding rate studies on their farms to fine-tune seeding rates for soil and planting conditions in their fields. I think that our 5 years of data, however, indicate the seeding rates should not exceed 180,000 seeds/acre and probably could

be further lowered. With the high soybean prices, however, it is probably best to seed at 180,000 seeds/acre and don't experiment with lower seeding rates until a year when low prices occur.

Table 1. Seeding rate, final stand, and yield of 92B38 under conventional tillage at 7.5" row spacing, averaged across the 2003-2005 growing seasons at the Aurora Research Farm.

SEEDING RATE	FINAL STAND	YIELD
-----seeds/acre-----	-----plants/acre-----	-----bu/acre-----
160,000	124,833	52
200,000	146,972	52
240,000	174,857	53
280,000	197,232	53
320,000	219,884	53
LSD 0.05		NS

Table 2. Seeding rate, final stand, and yield of AG1903 or NKS19-R5 under no-till at 7.5" row spacing, in field-scale studies, averaged in the 2005, 2006, and 2007 growing seasons at the Aurora Research Farm.

Seeding Rate	FINAL POPULATIONS			YIELD		
	2005	2006	2007	2005	2006	2007
137,500	127200	111475	100300	42	50	29
170,000	156100	144125	123445	44	50	29
200,000	178300	164376	138700	47	51	29
230,000	199400	185100	-----	47	50	---
262,500	243200	217275	-----	49	52	---
LSD 0.05				NS	NS	NS

Table 3. Seeding rate, final stand, and yield of 92B38 under chisel tillage at 7.5" row spacing after 0, 10, 25, and 50% of the final stands were hand-removed at the V2 stage in the 2006 growing season at the Aurora Research Farm.

STAND LOSS	SEEDING RATE (seeds/acre)					
	150,000	200,000	250,000	150,000	200,000	250,000
	FINAL STAND			YIELD		
%	-----Plants/acre-----			-----Bu/acre-----		
				2006		
0	128,555	154,585	176,265	64	66	66
10	124,793	158,303	182,739	59	65	68
25	112,619	122,711	152,460	62	59	68
50	72,223	87,165	105,294	57	55	57
LSD0.05 ⁺					5	
				2007		
0	112,800	133,875	165,000	33	34	31
10	109,752	119,750	148,500	31	31	33
25	89,150	98,500	121,000	29	27	30
50	59,000	71,100	97,350	27	25	26
LSD0.05 ⁺					3	

LSD 0.05. The interaction LSD that compares the individual means of the four stand loss treatments at the three seeding rates.