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Agronomic Benefits of Shifting from 30-in. to 20-in. Row Spacing for Corn

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Abstract
Planter row spacing is being considered across northwest Iowa. Typically when planter row spacing is mentioned it is in reference to soybean production but over the last five years there has been increased interest in shifting to 20-in. corn row spacing. The initial thought is to create an environment that would result in less plant-to-plant competition at higher populations. With major seed companies announcing improved genetic lines that allow for heavier plant populations and estimates of seeding rates over 40,000 plants/acre it will be more important than ever to reduce plant-toplant competition. One way to reduce plant-toplant competition at higher seeding rates is to reduce plant row spacing from the common 30-in. spacing to 20-in. spacing.

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Introduction

Planter row spacing is being considered across northwest Iowa. Typically when planter row spacing is mentioned it is in reference to soybean production but over the last five years there has been increased interest in shifting to 20-in. corn row spacing. The initial thought is to create an environment that would result in less plant-to-plant competition at higher populations. With major seed companies announcing improved genetic lines that allow for heavier plant populations and estimates of seeding rates over 40,000 plants/acre it will be more important than ever to reduce plant-to-plant competition. One way to reduce plant-to-plant competition at higher seeding rates is to reduce plant row spacing from the common 30-in. spacing to 20-in. spacing.

Materials and Methods

This was a 2-year project that began with grower discussion and trial planning in the fall of 2008. Two growers were identified with an interest in 20-in. corn row spacing. In 2009, two trials were conducted using the same corn hybrid, but different previous crop history. One field was planted into corn stalks and the other into soybean stubble. Again in 2010, two trials were conducted; both into soybean stubble, but with different corn hybrids. Each of the trials was conducted as a randomized complete block design utilizing 20-in. and 30-in. row spacing and 30,000, 35,000, and 40,000 plant populations for a total of six treatments in four replications.

Results and Discussion

Based on the data collected (Tables 1–4) there was no overall yield benefit to planting corn in a 20-in. row spacing compared with a 30-in. row spacing. Only at one trial were yields significantly different. Additional parameters were used as an indication of the effects of narrow row spacing on corn growth and development. Generally speaking, neither row spacing nor plant population had an effect on these additional parameters, except stalk diameter. In three trials it appears that stalk diameter was smaller as populations increased, but ear height was not significantly different. Additionally, it was observed in all trials that the precision planting index was greater at higher plant populations and in 30-in. rows.

Table 1. End of season measurements for the row spacing by plant population trial planted on May 11, 2009 into corn residue with Dekalb 61-69.

Rw. spc. in.	Planned pop.	Dis. rtng.	NO3-N ppm	Final pop.	Ldg. %	G-nck. %	Stlk. dia. in.	Ear ht. in.	Moisture %	Yield bu/ac
20	30,500	1.03	301	30,000	0.25	8.00	0.88	42.69	19.86	184.49
20	34,500	1.02	1097	31,000	4.25	19.75	0.80	43.74	19.53	183.92
20	41,500	1.01	1278	37,250	4.25	32.75	0.75	44.15	20.01	187.32
30	30,500	1.01	1152	30,583	0.50	37.25	0.83	45.59	19.95	187.40
30	34,500	1.01	634	31,417	0.50	24.75	0.79	43.86	19.83	189.88
30	41,500	1.00	652	38,167	0.50	25.00	0.73	39.63	19.84	189.62
LSD(0.05)		NS	NS	2,698	NS	NS	0.09	NS	NS	NS

Table 2. End of season measurements for the row spacing by plant population trial planted on May 11, 2009 into soybean residue with Dekalb 61.69.

Rw. spc. in.	Planned pop.	Dis. rtng.	NO3-N ppm	Final pop.	Ldg. %	G-nck. %	Stlk. dia. in.	Ear ht. in.	Moisture %	Yield bu/ac	Tst. wt. lb/bu
20	30,500	1.02	490	28,583	0.50	51.00	0.95	49.51	19.98	202.46	52.45
20	34,500	1.03	1066	30,250	0.75	33.25	0.90	49.24	19.68	204.92	52.50
20	41,500	1.04	289	36,417	3.50	32.75	0.84	47.79	19.55	197.37	52.58
30	30,500	1.05	326	28,917	1.25	31.00	0.90	48.52	19.78	203.19	51.75
30	34,500	1.04	806	29,334	0.25	58.75	0.90	47.87	19.70	202.47	51.85
30	41,500	1.02	448	36,167	1.00	52.25	0.82	46.97	19.60	203.41	52.73
LSD(0.05)		NS	NS	3,143	NS	NS	0.05	NS	NS	NS	NS

Table 3. End of season measurements for the row spacing by plant population trial planted on May 6, 2010 into soybean residue with Mycogen 2A551.

Rw. spc. in.	Planned pop.	NO3-N ppm	Final pop.	Bare %	Ldg. %	G-nck. %	Stlk. dia. in.	Ear Ht. in.	Moisture %	Yield bu/ac
20	30,500	1577	30,667	0.50	0.00	1.00	0.88	49.42	15.33	173.50
20	34,500	844	32,250	1.00	0.00	1.50	0.86	50.61	15.18	181.00
20	41,500	1169	37,834	2.25	0.25	1.75	0.79	48.91	15.13	178.93
30	30,500	960	30,250	0.25	0.25	1.00	0.82	46.82	14.60	174.50
30	34,500	1466	32,917	0.50	0.75	1.25	0.79	51.48	14.68	170.95
30	41,500	654	37,833	1.00	0.00	4.25	0.78	51.89	14.38	175.90
LSD(0.05)		ns	4,981	ns	ns	ns	ns	ns	0.32	ns

Table 4. End of season measurements for the row spacing by plant population trial planted on May 6, 2010 into soybean residue with Mycogen 2J597.

Rw. spc. in.	Planned pop.	NO3-N ppm	Final pop.	Bare %	Ldg. %	G-nck. %	Stlk. dia. in.	Ear ht. in.	Moisture %	Yield bu/ac
20	30,500	875	27,750	2.00	1.75	1.50	0.85	48.17	14.53	179.90
20	34,500	415	32,917	1.00	0.50	0.75	0.79	46.77	14.50	173.85
20	41,500	394	40,167	1.75	0.25	1.00	0.71	45.16	14.43	161.73
30	30,500	339	30,500	0.75	0.25	0.25	0.77	44.84	14.70	167.50
30	34,500	1076	31,000	0.50	0.00	0.75	0.79	46.88	14.65	165.78
30	41,500	519	40,167	0.75	1.75	5.00	0.73	46.92	14.58	152.33
LSD(0.05)		ns	3,181	ns	ns	ns	0.05	ns	ns	9.01

Table 5. Early season measurement for the row spacing by plant population trial planted on May 11, 2009 into corn residue with Dekalb 61-69.

Rw. spc. in.	Planned pop.	Spring pop.	Multiples	Miss	Quality	Precision
20	30,500	28,125	6.34	8.68	84.98	15.89
20	34,500	29,938	1.62	13.22	85.16	16.35
20	41,500	35,875	3.12	9.65	87.22	19.70
30	30,500	29,688	3.80	12.83	83.37	21.21
30	34,500	29,438	6.01	11.65	82.34	22.61
30	41,500	38,813	6.92	11.80	81.29	24.28
LSD(0.05)		2,290	ns	ns	ns	3.56

Table 6. Early season measurement for the row spacing by plant population trial planted on May 11, 2009 into soybean residue with Dekalb 61-69.

Rw. spc. in.	Planned pop.	Springer pop.	Multiples	Miss	Quality	Precision
20	30,500	26,875	0.93	7.97	91.10	15.66
20	34,500	31,125	2.43	8.67	88.91	15.63
20	41,500	37,500	0.86	8.38	90.77	19.15
30	30,500	27,875	2.90	9.90	87.20	21.01
30	34,500	29,750	4.63	12.65	82.73	22.23
30	41,500	38,125	7.73	13.36	78.92	25.32
LSD(0.05)		1,304	1.39	3.82	4.24	2.24

Table 7. Early season measurement for the row spacing by plant population trial planted on May 6, 2010 into soybean residue with Mycogen 2A551.

Rw. spc. in.	Planned pop.	Spring pop.	Multiples	Miss	Quality	Precision
20	30,500	29,500	4.11	4.77	91.13	17.24
20	34,500	32,813	5.54	9.06	85.40	19.27
20	41,500	40,625	4.35	5.41	90.24	20.98
30	30,500	30,188	8.63	6.28	85.10	22.03
30	34,500	30,688	10.49	12.50	77.02	23.13
30	41,500	38,500	9.82	12.04	78.14	24.07
LSD(0.05)		1,106	4.08	3.89	6.98	1.79

Table 8. Early season measurement for the row spacing by plant population trial planted on May 6, 2010 into soybean residue with Mycogen 2J597.

Rw. spc. in.	Planned pop.	Spring Pop.	Multiples	Miss	Quality	Precision
20	30.500	29.875	3.28	4.72	92.01	17.01
20	34.500	31.500	4.34	11.90	83.76	20.00
20	41.500	40.563	5.12	4.37	90.51	21.29
30	30.500	30.938	9.01	5.72	85.27	21.72
30	34.500	30.750	12.81	13.97	73.86	24.03
30	41.500	38.875	12.82	13.66	73.52	25.04
LSD(0.05)		2.107	2.72	6.17	6.31	2.16

Abbreviation list: Rw. spc. = row spacing; Planned pop. = target plant population; Spring pop. = observed spring plant population; Multiples = multiple planting index; Miss = miss planting index; Quality = quality feed planting index; Precision = precision planting index; Dis. rtng. = disease rating as 0.00 having zero pressure and 3.00 having greater than 11% leaf area affected; Final pop. = final plant population; Ldg. = lodging; G-nck. = goosenecking;
Stlk. dia. = stalk diameter; Ear ht. = ear height; Moisture - grain moisture at harvest; Yield = grain yield at 15.5%.