FIELD EXPERIMENT HISTORY

Title: **Plant Density and Row Spacing Effects on Corn Grain and Silage**

Experiment: 06RSxPD **Trial ID** 2351 **Year:** 2002

Personnel: J.G. Lauer, P.J. Flannery and K.D. Kohn

Location: Arlington, WI **County:** Columbia

Supported By: Hatch

Site Information

Field: 371 **Previous Crop:** Soybean **Soil Type:** Plano

Soil Test: **Date:** 11/01/02 **pH** 5.8 **OM (%)** 2.8 **P (ppm)** 36 **K (ppm)** 128

Plot Management

Tillage Operations: Fall Chisel Plow Field Cultivator Soil Finisher

		Analysis:	Rate lbs/A:	Date:
Fertilizer:	**Preplant :**	46-0-0	325	N/A
	Starter :	N/A	N/A	N/A
	Post plant :	N/A	N/A	N/A
	Manure:	None	None	

Herbicide: Harness 2.5 pt/A
Hornet 4.5 oz/A

Insecticide: None

Hybrid: Pioneer 35R57

Irrigation: None

Planting Date: 5/7/02 **Planting Depth:** 1.5" **Row Width:** See Factors

Target Plant Density: See Factors **Planting Method:** Kinze Inter-Row Planter

Harvest Date: S: 9/26/02
G: 10/22/02

Harvest Method: S:New Holland Plot Chopper
G:Kincaid Plot Combine

Notes

Experimental Design

Design: RCB Factorial **Replications:** 3

Plot Size Seeded: 10' x 75' **Experiment Size:** 0.41 Acre

Harvest Plot Size: S: 5' x 8.75'
G: 5' x 75'

Harvest Plant Density: See Factors

Factors/Treatments:

Row Spacing:	Plant Density: (plants/A)
15 inch 30 inch	25000, 30000, 35000 and 40000

Results: Table C-33.

Table C-33. Plant Density and Row Spacing Effects on Corn Grain and Silage Yield and Quality
Arlington, WI - 2002

		Grain								
								Yield Components @ 15.5% moisture		
Row spacing	Density	Harvest pop	Broken stalks	Yield	Moisture	Test weight	Grower return	Ear number	Kernels number	100 Kernel wt
inches	plants/A	plants/A	%	bu/A	%	lbs/bu	$/A	ears/A	no./ear	grams
	25000	24725	4	141	20.4	56.8	297	25223	449	31.9
	30000	30368	6	139	20.2	57.2	294	30865	392	29.4
	35000	31529	8	141	20.7	56.8	297	32442	404	28.0
	40000	36259	6	137	20.2	57.0	289	37586	328	28.4
15 inches		29579	7	137	20.4	57.1	289	30451	397	29.8
30 inches		31861	5	142	20.4	56.8	299	32608	390	29.0
15 inches	25000	24062	7	139	20.8	56.6	292	24725	435	32.9
15 inches	30000	29040	7	136	20.4	57.3	287	29538	391	29.9
15 inches	35000	29372	7	139	20.3	57.4	294	30036	443	27.4
15 inches	40000	35844	7	135	20.0	57.2	285	37503	318	29.1
30 inches	25000	25389	2	143	20.1	57.0	302	25721	463	30.9
30 inches	30000	31695	6	143	20.1	57.0	302	32193	393	28.9
30 inches	35000	33686	8	142	21.1	56.1	299	34848	365	28.6
30 inches	40000	36673	4	139	20.4	56.8	292	37669	338	27.8
Mean		30720	6	139	20.4	56.9	294	31529	393	29.4
Probability(%)										
Row Space (S)		22.3	38.8	1.4	83.7	21.8	1.0	22.0	65.2	10.8
Plant Density (D)		0.0	52.4	60.4	41.6	41.8	65.3	0.0	1.0	4.6
S x D		57.6	58.5	94.0	16.1	8.8	88.6	41.1	28.5	63.4
LSD(0.10)										
Row Space (S)		NS	NS	4	NS	NS	6	NS	NS	NS
Plant Density (D)		2366	NS	NS	NS	NS	NS	2535	51	2.3
S x D		NS	NS	NS	NS	0.7	NS	NS	NS	NS
CV(%)		7	64	4	3	1	4	8	13	8

continued

Table C-33. Plant Density and Row Spacing Effects on Corn Grain and Silage Yield and Quality
(continued) **Arlington, WI - 2002**

		Whole Plant											
Row spacing	Density	Harvest pop	Yield	Moisture	Kernel milk	Crude protien	ADF	NDF	In Vitro Digest	NDFD	Starch	Milk per Ton	Milk per Acre
inches	plants/A	plants/A	tons/A	%	%	%	%	%	%	%	%	lbs/T	lbs/A
	25000	25167	7.2	46.0	18	6.7	23.2	47.0	82.7	63.3	36.2	3336	23913
	30000	28667	7.3	43.9	18	6.6	22.6	46.0	83.0	63.1	38.5	3340	24241
	35000	31500	8.3	45.4	20	6.6	23.1	46.5	83.0	63.5	37.3	3355	27701
	40000	35333	7.6	43.3	18	6.9	21.4	44.2	84.0	63.9	39.4	3410	26059
15 inches		29583	7.7	44.6	20	6.8	22.2	45.5	83.5	63.9	38.5	3382	26005
30 inches		30750	7.5	44.7	17	6.6	22.9	46.3	82.9	63.1	37.2	3338	24952
15 inches	25000	27000	7.4	48.5	18	6.8	21.8	44.9	83.8	64.2	38.4	3407	25051
15 inches	30000	27333	7.3	43.3	23	6.7	22.4	46.1	83.1	63.3	38.5	3348	24339
15 inches	35000	30000	8.1	44.0	20	6.8	22.9	46.2	83.3	63.8	37.9	3369	27406
15 inches	40000	34000	8.0	42.6	18	6.9	21.7	44.7	83.9	64.2	39.2	3405	27223
30 inches	25000	23333	7.0	43.4	18	6.6	24.6	49.0	81.6	62.5	34.0	3265	22776
30 inches	30000	30000	7.3	44.5	13	6.6	22.8	46.0	82.9	63.0	38.6	3333	24144
30 inches	35000	33000	8.4	46.8	20	6.4	23.3	46.8	82.8	63.3	36.7	3341	27995
30 inches	40000	36667	7.3	44.1	17	6.9	21.1	43.7	84.1	63.7	39.6	3415	24894
Mean		30167	7.6	44.7	19	6.7	22.6	45.9	83.2	63.5	37.8	3360	25478
Probability(%)													
Row Space (S)		16.6	48.7	97.6	19.2	24.2	56.6	64.4	49.7	54.0	56.8	48.6	49.6
Plant Density (D)		0.0	32.4	78.6	89.9	41.4	64.8	60.8	72.5	90.4	50.2	76.9	21.0
S x D		12.6	87.5	55.0	42.2	60.8	72.1	67.0	74.0	92.3	68.0	77.7	81.8
LSD(0.10)													
Row Space (S)		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Plant Density (D)		2662	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
S x D		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CV(%)		9	14	11	31	4	12	8	2	3	10	4	13

FIELD EXPERIMENT HISTORY

Title: **Plant Density and Row Spacing Effects on Corn Grain and Silage**

Experiment: 06 Plant Density x Row Spacing **Trial ID:** 02C53 **Year:** 2002

Personnel: M.G. Bertram

Location: Marshfield, WI **County:** Wood

Supported by: Marshfield Ag. Research Station and Pioneer Hi-Bred

Site Information

Field: 6 **Soil Type:** Withee silt loam

Soil Test : **Date:** 10/25/00 **pH** 6.5 **SOM (%)** 3.6 **P (ppm)** 83 **K (ppm)** 208

Plot Management

Tillage Operations: Moldboard Plow Field Cultivator

Fertilizer:

	Analysis	Rate	Date
Preplant	none	N/A	N/A
Starter	none	N/A	N/A
Post plant	46-0-0	300	7/3/2002
Manure	Manure	7500 gal	5/21/2002

Herbicide: Harness 2.0 pt/A
Hornet 2.4 oz/A

Insecticide: None

Irrigation: None **Hybrid:** Pioneer 38K07

Planting Date: 5/22/2002 **Planting Depth:** 1.5" **Row Width:** See Factors

Target Plant Density: Varies **plants per acre** **Planting Method:** See Factors

Harvest Date: **Silage:** 10/1/02 **Harvest Method:** **Silage:** Hand Harvest
Grain: 11/4/02 **Grain:** John Deere plot combine

Notes:

Experimental Design

Design: RCB **Replications:** 3

Plot Size Seeded: 30' x 10' **Experiment Size:** 0.87 A

Harvest Plot size: **Silage:** 10' x 3 - 5'
Grain: 20' x 3 - 5'

Factors/Treatments:

Row Spacing	Target Population
John Deere 7000 corn planter: 30"	30000
John Deere 450 grain drill: 30"	45000
John Deere 450 grain drill: 18"	60000
John Deere 450 grain drill: Twin 30"	75000

Results: Table C-34.

Table C-34. Plant Density and Row Spacing Effects on Corn Grain and Silage Yield and Quality
Marshfield, WI - 2002

			Grain									
Equipment type	Row spacing	Target pop	Early pop	Average spacing	Std. Dev spacing	Grain pop	Ear density	Barren stalks	Broken stalks	Moisture	Yield	Grower return1
	in.	plants/A	plants/A	in.	in.	plants/A	ears/A	%	%	%	bu/A	$/A
Planter	30	30000	31436	6.6	2.8	31603	34007	1.8	0.0	32.3	161.5	236
Planter	30	45000	48424	4.2	2.6	46859	45489	1.9	0.9	33.6	183.5	247
Planter	30	60000	57281	3.7	2.3	58809	56534	5.1	2.2	33.4	196.3	248
Planter	30	75000	69841	2.9	2.0	65799	60035	6.9	5.8	34.0	172.1	182
Drill	30	30000	34993	5.7	5.0	36423	38977	0.4	0.3	32.5	182.7	272
Drill	30	45000	39349	4.7	4.0	40651	41536	2.8	0.7	33.4	183.9	248
Drill	30	60000	54668	3.5	3.1	54691	52278	5.7	6.0	33.0	187.0	233
Drill	30	75000	55612	3.3	3.0	55790	53692	3.6	4.8	33.6	178.2	194
Drill	18	30000	32912	9.2	7.6	33948	36537	1.2	0.0	32.7	152.8	219
Drill	18	45000	59290	5.6	4.3	60015	59819	4.6	1.3	33.3	202.7	282
Drill	18	60000	72842	4.6	4.1	68601	62126	6.2	5.5	32.5	229.0	307
Drill	18	75000	76170	4.3	3.8	73985	68177	5.7	6.0	33.0	208.9	249
Drill	Twin 30	30000	38406	11.2	8.7	45389	46506	1.8	0.0	33.1	199.7	299
Drill	Twin 30	45000	55031	6.6	5.4	58719	55803	6.6	2.0	33.0	185.6	253
Drill	Twin 30	60000	67083	6.5	5.7	70137	56386	7.9	10.7	33.1	172.6	208
Drill	Twin 30	75000	75794	5.4	5.0	74660	62039	8.7	10.5	33.2	207.0	245
Mean			54321	5.5	4.3	54755	51871	4.4	3.5	33.1	187.7	245
Probability (%)			<0.1	<0.1	<0.1	<0.1	<0.1	1.0	<0.1	38.3	4.5	3.6
LSD 5%			6697	1.2	1.0	7598	7650	4.6	4.4	NS	39.2	69
C.V. (%)			9	16	16	10	10	74	88	3	15	20

continued

1/ Grower return calculated using $118/80K unit for seed.

Table C-34. Plant Density and Row Spacing Effects on Corn Grain and Silage Yield and Quality

(continued) **Marshfield, WI - 2002**

			Whole Plant												
Equipment	Row	Target	Harvest	Ear			Kernel	Crude			In Vitro			Milk Per	
type	spacing	pop	pop	density	Yield	Moisture	milk	protein	ADF	NDF	Digest	Starch	NDFD	Ton	Acre
	in.	plants/A	plants/A	ears/A	Tons/A	%	%	%	%	%	%	%	%	lb/T	lb/A
Planter	30	30000	31799	36809	7.2	70.8	76	6.2	24.5	48.4	75.0	19.9	48.2	2736	19703
Planter	30	45000	52054	52708	8.6	69.6	84	5.8	25.0	48.9	73.9	19.7	46.5	2640	22621
Planter	30	60000	60113	57935	9.4	67.4	71	5.9	24.7	47.7	74.1	20.9	45.7	2639	24810
Planter	30	75000	75359	69479	8.3	69.6	81	5.8	27.5	51.9	72.2	16.3	46.6	2497	20748
Drill	30	30000	35937	39204	7.8	69.3	68	6.3	24.2	48.2	75.2	19.6	48.6	2739	21355
Drill	30	45000	44213	46174	8.0	69.4	81	6.1	25.5	49.6	73.9	18.6	47.4	2653	21433
Drill	30	60000	58153	57282	8.9	69.7	81	6.2	25.3	48.9	74.0	19.7	46.8	2681	23998
Drill	30	75000	59024	55539	8.7	67.5	81	5.8	24.0	47.1	74.0	21.8	44.9	2644	22901
Drill	18	30000	37026	43560	8.0	69.5	83	6.1	23.6	47.2	75.2	21.4	47.5	2772	22340
Drill	18	45000	67155	62436	8.9	70.6	85	6.0	23.8	47.2	75.2	21.1	47.4	2741	24192
Drill	18	60000	79134	74778	10.2	69.3	83	6.1	25.1	48.3	74.1	20.8	46.3	2706	27526
Drill	18	75000	85305	76230	9.8	69.2	79	5.8	25.4	49.3	73.6	19.4	46.5	2630	26068
Drill	Twin 30	30000	50094	50094	9.1	68.0	86	5.9	24.3	48.2	74.1	20.2	46.3	2648	24060
Drill	Twin 30	45000	57499	56193	8.7	70.0	79	5.9	27.0	51.1	72.7	20.0	46.5	2560	22347
Drill	Twin 30	60000	70132	66212	9.0	69.6	79	6.0	26.6	50.9	72.5	17.4	46.0	2533	22767
Drill	Twin 30	75000	75795	66647	8.8	69.1	78	6.2	24.0	47.5	74.9	20.6	47.2	2719	23732
Mean			58674	56955	8.7	69.3	80	6.0	25.0	48.8	74.0	19.8	46.8	2659	23163
Probability (%)			<0.1	<0.1	0.2	46.5	42.6	>50	22.9	25.4	17.5	24.3	14.6	32.1	4.9
LSD 5%			9177	7914	1.2	NS	NS	0.5	NS	NS	2.3	NS	2.2	NS	4092
C.V. (%)			11	10	10	6	12	6	8	5	2	13	3	5	12