

FIELD EXPERIMENT HISTORY

Title: Density, Row Spacing and Competition Effects on Corn Forage and Grain Yield
Experiment: 17 Competition **Trial ID** 1451 **Year:** 1999
Personnel: H. Darby, J.G. Lauer
Location: Arlington, WI **County:** Columbia
Supported By: Hatch

Site Information

Field: 396 **Previous Crop:** Soybean **Soil Type:** Plano
Soil Test: **Date:** N/A **pH** 6.7 **OM (%)** 3.0 **P (ppm)** 55 **K (ppm)** 225

Plot Management

Tillage Operations: Fall Moldboard

	<u>Analysis:</u>	<u>Rate lbs/A:</u>	<u>Date:</u>
Fertilizer:			
Preplant :	46-0-0	300	4 /30/99
Starter :	6-24-24	150	5 /11/99
Post plant :	None	N/A	N/A
Manure:		none	

Herbicide: Frontier @ 8 oz/A, Bladex 2lb/A

Insecticide: None

Irrigation: None

Hybrid/Variety: Pioneer 3751

Planting Date: 5/11/99, 6/1/99

Row Width: Varies

Planting Method: Kinze Inter-Row Planter

Planting Depth: 1.5"

Harvest Date: S:9/3/99, 9/7/99
G:10/29/99, 10/30/99

Harvest Method: Hand

Experimental Design

Design: RCB split-split plot

Replications: 4

Plot Size Seeded: 10' x 25'

Experiment Size: 1.53 A

Harvest Plot Size: 8'8" x 2.5'

Factors/Treatments:

Plant Density

15,000, 32,000, 44,0000 plants/A

Row Spacing

15 and 30-in

Removal or Addition of Competition

S:Control, V2, V4, V6, V8, V10
G:Control, V2, V4

Results: Tables E-45.

Table E-45. Plant Density, Row Spacing and Reduced Competition Influence on Corn Forage and Corn Grain Yield
Arlington, WI - 1999

Date of planting	Plant density plants/A	Row spacing inches	Iowa State Vegetative stage @ removal	Grain					Silage			
				Final population plants/A	Broken stalks %	Yield bu/A	Moisture %	Test weight lbs/bu	Final population plants/A	Kernel milk %	Dry Matter yield tons/A	Moisture %
131			C	29494	4.9	138	13.2	53.6	50820	53	10.5	57.4
131			V2	16754	4.5	112	13.0	53.3	30918	57	8.1	59.4
131			V4	16731	8.9	100	12.9	53.0	28800	56	8.2	58.6
131			V6						30855	57	8.6	60.6
131			V8						31515	55	8.7	59.1
131			V10						29205	54	7.4	57.1
131		15		20026	8.5	118	13.0	53.4	33055	55	8.5	59.5
131		30		21962	3.5	116	13.1	53.3	34375	56	8.7	57.9
131		15	C	28133	4.7	146	13.5	53.7	49500	49	10.1	59.7
131		15	V10						27720	58	6.7	59.3
131		15	V2	15246	4.5	111	12.6	53.3	28851	53	7.7	58.1
131		15	V4	16988	18.7	95	13.0	53.1	26928	54	8.2	58.3
131		15	V6						33660	58	9.3	62.6
131		15	V8						31350	59	8.9	59.0
131		30	C	30855	5.1	131	12.9	53.6	52140	57	10.8	55.2
131		30	V2	18513	4.5	113	13.5	53.3	33330	62	8.6	61.3
131		30	V4	16517	0.7	105	12.8	53.0	30360	58	8.2	58.9
131		30	V6						28050	57	7.9	58.7
131		30	V8						31680	52	8.5	59.1
131		30	V10						30690	49	8.0	54.9
131	15000			12070	8.6	89	13.1	53.1	18893	59	7.0	60.9
131	32000			20147	2.7	123	12.9	53.6	34073	56	8.7	58.6
131	44000			30764	6.6	139	13.1	53.4	48180	52	9.9	56.8
131	15000		C	16880	3.3	114	12.7	53.0	28710	56	10.3	59.4
131	15000		V2	10618	3.1	76	13.4	53.0	17325	55	6.9	59.6
131	15000		V4	8712	19.4	77	13.2	53.2	15345	61	5.3	63.5
131	15000		V6						19305	59	8.0	60.1
131	15000		V8						17820	65	5.7	63.3
131	15000		V10						14850	56	5.8	58.8
131	32000		C	28859	3.0	157	13.7	54.1	49995	54	9.3	58.7
131	32000		V2	14810	2.9	111	12.4	53.2	29304	55	7.3	59.3
131	32000		V4	17424	2.1	98	12.8	53.6	31020	60	10.2	56.1
131	32000		V6						32175	55	9.1	59.6
131	32000		V8						31680	51	9.3	58.6
131	32000		V10						30690	60	7.7	58.3
131	44000		C	42743	8.3	144	13.3	53.8	73755	49	11.8	54.2
131	44000		V2	25319	8.0	149	13.4	53.7	46530	61	10.0	59.4
131	44000		V4	24230	3.4	125	12.7	52.5	40590	48	9.6	55.6
131	44000		V6						41085	58	8.6	62.2
131	44000		V8						45045	50	11.1	55.2
131	44000		V10						42075	45	8.5	54.2
131	15000	15		11979	16.2	95	13.1	53.1	17655	61	7.0	60.5
131	15000	30		12161	1.0	84	13.1	53.0	20130	56	7.0	61.2
131	32000	15		19058	4.1	123	12.9	53.5	34980	53	8.8	59.6
131	32000	30		21236	1.3	123	12.9	53.7	33165	58	8.6	57.6
131	44000	15		29040	5.1	136	13.0	53.6	46530	51	9.6	58.3
131	44000	30		32489	8.0	142	13.2	53.2	49830	53	10.2	55.3
131	15000	15	C	16335	3.6	127	13.3	53.0	27720	58	10.2	61.9
131	15000	15	V2	9801	6.3	81	13.2	53.0	14850	55	7.8	56.7
131	15000	15	V4	9801	38.9	77	12.8	53.3	13860	58	4.8	60.7

continued

Table E-45. Plant Density, Row Spacing and Reduced Competition Influence on Corn Forage and Corn Grain Yield
Arlington, WI - 1999

Date of planting	Plant density plants/A	Row spacing inches	Iowa State Vegetative stage @ removal	Grain					Silage					
				Final population plants/A	Broken stalks %	Yield bu/A	Moisture %	Test weight lbs/bu	Final population plants/A	Kernel milk %	Dry Matter yield tons/A	Moisture %		
131	15000	15	V6							20790	63	8.5	59.7	
131	15000	15	V8							15840	68	5.9	60.8	
131	15000	15	V10							12870	68	4.6	63.3	
131	15000	30	C	17424	3.1	102	12.0	53.1		29700	55	10.4	56.9	
131	15000	30	V2	11435	0.0	72	13.6	52.9		19800	55	4.9	65.5	
131	15000	30	V4	7623	0.0	77	13.7	53.2		16830	65	5.8	66.3	
131	15000	30	V6							17820	55	7.6	60.6	
131	15000	30	V8							19800	63	5.5	65.9	
131	15000	30	V10							16830	45	7.0	54.4	
131	32000	15	C	28314	2.1	155	13.8	54.1		58410	45	10.1	61.0	
131	32000	15	V2	13431	4.8	114	12.3	53.1		28380	50	7.2	58.0	
131	32000	15	V4	17424	6.3	89	13.1	53.4		31680	60	11.1	57.8	
131	32000	15	V6							31680	55	9.5	61.3	
131	32000	15	V8							32670	55	9.2	60.1	
131	32000	15	V10							28710	60	7.4	59.1	
131	32000	30	C	29403	3.8	159	13.6	54.1		41580	63	8.5	56.3	
131	32000	30	V2	16880	0.0	107	12.5	53.3		30690	63	7.3	61.4	
131	32000	30	V4	17424	0.0	103	12.7	53.7		30690	60	9.7	55.3	
131	32000	30	V6							32670	55	8.8	57.9	
131	32000	30	V8							30690	48	9.3	57.2	
131	32000	30	V10							32670	60	8.0	57.5	
131	44000	15	C	39749	8.3	157	13.4	54.0		62370	45	10.1	56.0	
131	44000	15	V2	23414	2.4	137	12.4	53.8		43560	55	8.2	59.6	
131	44000	15	V4	23958	4.6	116	13.3	52.9		37620	48	10.2	56.1	
131	44000	15	V6							48510	55	9.8	66.7	
131	44000	15	V8							45540	55	11.5	56.2	
131	44000	15	V10							41580	48	8.0	55.5	
131	44000	30	C	45738	8.3	132	13.2	53.7		85140	53	13.5	52.4	
131	44000	30	V2	27225	13.6	160	14.3	53.7		49500	68	11.9	59.3	
131	44000	30	V4	24503	2.2	135	12.2	52.1		43560	48	9.0	55.1	
131	44000	30	V6							33660	60	7.4	57.7	
131	44000	30	V8							44550	45	10.6	54.2	
131	44000	30	V10							42570	43	9.1	52.9	
Mean				20994	6.0	117	13.0	53.3		33715	55	8.6	58.7	
Probability (%)														
Density (D)				0.0	62.6	1.7	81.5	17.9		0.0	11.1	3.1	16.7	
Row Spacing (RS)				37.8	37.8	90.5	96.8	38.4		50.2	69.7	88.4	47.6	
D x RS				25.8	34.8	56.5	89.2	82.9		29.8	23.2	53.8	19.3	
Stage of Removal (SOR)				0.0	78.2	0.0	75.2	48.6		0.0	78.6	0.2	16.3	
D x SOR				0.2	60.6	16.2	18.7	44.5		11.2	39.5	2.7	23.7	
RS x SOR				35.2	38.5	34.7	15.8	95.9		47.6	15.0	37.1	6.5	
D x RS x SOR				76.9	73.0	73.6	25.6	99.6		5.6	92.4	35.4	56.1	
LSD (0.10)														
Density (D)				1851	NS	13.6	NS	NS		3391	NS	1.1	NS	
Row Spacing (RS)				NS	NS	NS	NS	NS		NS	NS	NS	NS	
D x RS				NS	NS	NS	NS	NS		NS	NS	NS	NS	
Stage of Removal (SOR)				1664	NS	15.3	NS	NS		4495	NS	1.1	NS	
D x SOR				2920	NS	NS	NS	NS		NS	NS	2.0	NS	
RS x SOR				NS	NS	NS	NS	NS		NS	NS	NS	6.1	
D x RS x SOR				NS	NS	NS	NS	NS		10981	NS	NS	NS	
CV (%)				11	250	18	7	2.0		19	0	19	7	

Table E-45. Plant Density, Row Spacing and Reduced Competition Influence on Corn Forage and Corn Grain Yield
Arlington, WI - 1999

Date of planting	Plant density plants/A	Row spacing inches	Iowa State Vegetative stage @ removal	Grain					Silage			
				Final population plants/A	Broken stalks %	Yield bu/A	Moisture %	Test weight lbs/bu	Final population plants/A	Kernel milk %	Dry Matter yield tons/A	Moisture %
151			C	30789	15.6	139	14.5	53.5	54180	23	7.20	54.0
151			V2	17787	2.6	107	15.4	54.2	28710	26	6.14	52.4
151			V4	16607	5.7	111	15.4	54.3	28050	22	5.83	54.4
151			V6						28545	26	5.94	53.4
151			V8						26654	26	5.57	53.4
151			V10						27390	24	5.36	52.4
151		15		20389	8.0	118	14.6	54.0	30690	25	5.94	53.6
151		30		22385	9.0	117	15.6	54.1	33055	24	6.02	53.1
151		15	C	28496	17.0	141	14.7	52.9	47520	23	6.63	56.9
151		15	V2	17061	1.5	106	13.7	54.1	29370	23	6.07	53.8
151		15	V4	15609	5.6	107	15.4	55.2	27720	23	5.99	53.3
151		15	V6						29040	30	6.08	53.3
151		15	V8						24750	27	5.45	52.8
151		15	V10						25740	25	5.43	51.3
151		30	C	33541	13.9	136	14.3	54.3	62172	22	7.88	50.6
151		30	V2	18513	3.8	108	17.1	54.4	28050	29	6.20	50.9
151		30	V4	17606	5.9	115	15.4	53.5	28380	22	5.66	55.5
151		30	V6						28050	22	5.81	53.5
151		30	V8						28286	26	5.67	54.0
151		30	V10						29040	23	5.28	53.5
151	15000			13794	3.9	94	15.0	54.0	16500	25	4.60	54.0
151	32000			20419	6.3	125	15.0	54.6	31845	22	6.31	52.6
151	44000			29948	15.4	134	15.3	53.7	47273	26	7.04	53.4
151	15000		C	19239	3.8	129	14.2	53.5	24420	25	5.64	57.5
151	15000		V2	12251	0.0	82	16.8	53.8	16335	26	4.93	52.9
151	15000		V4	10073	0.0	75	14.0	54.1	15345	21	4.94	51.7
151	15000		V6						15345	30	4.05	57.6
151	15000		V8						15048	25	4.34	53.2
151	15000		V10						14850	23	3.99	52.3
151	32000		C	27497	11.3	144	15.6	54.8	49995	25	7.99	52.1
151	32000		V2	16607	0.0	106	14.8	54.4	29205	23	5.76	54.1
151	32000		V4	17152	7.6	130	14.7	54.5	28215	20	6.04	56.4
151	32000		V6						29205	15	6.10	50.6
151	32000		V8						27225	28	6.19	50.2
151	32000		V10						27225	24	5.80	51.9
151	44000		C	42743	28.7	142	13.7	52.3	80685	19	7.59	53.4
151	44000		V2	24503	7.8	134	14.7	54.6	40590	29	7.72	50.1
151	44000		V4	22597	9.7	127	17.5	54.3	40590	25	6.50	55.1
151	44000		V6						41085	33	7.67	52.0
151	44000		V8						40590	26	6.49	56.9
151	44000		V10						40095	25	6.27	52.9
151	15000	15		13250	1.9	94	14.7	53.9	14850	26	4.36	54.3
151	15000	30		14339	5.9	94	15.3	54.0	18150	24	4.83	53.7
151	32000	15		18332	6.1	121	14.4	54.6	30690	23	6.11	53.1
151	32000	30		22506	6.5	129	15.7	54.5	33000	22	6.52	52.0
151	44000	15		29585	16.0	138	14.8	53.7	46530	26	7.36	53.2
151	44000	30		30311	14.8	131	15.8	53.7	48015	26	6.71	53.6
151	15000	15	C	19602	5.6	129	14.2	52.4	20790	25	4.94	55.8
151	15000	15	V2	10346	0.0	82	15.7	54.0	16830	25	4.30	56.5
151	15000	15	V4	9801	0.0	73	14.2	55.4	14850	20	5.08	48.0

continued

Table E-45. Plant Density, Row Spacing and Reduced Competition Influence on Corn Forage and Corn Grain Yield
Arlington, WI - 1999

Date of planting	Plant density plants/A	Row spacing inches	Iowa State Vegetative stage @ removal	Grain					Silage					
				Final population plants/A	Broken stalks %	Yield bu/A	Moisture %	Test weight lbs/bu	Final population plants/A	Kernel milk %	Dry Matter yield tons/A	Moisture %		
151	15000	15	V6							14850	38	3.73	59.0	
151	15000	15	V8							7920	25	3.85	55.4	
151	15000	15	V10							13860	25	4.24	51.3	
151	15000	30	C	18513	0.0	130	14.2	55.8		31680	25	7.03	61.0	
151	15000	30	V2	14157	0.0	83	17.9	53.6		15840	28	5.56	49.3	
151	15000	30	V4	10346	0.0	77	13.8	52.9		15840	23	4.80	55.4	
151	15000	30	V6							15840	23	4.38	56.1	
151	15000	30	V8	18513	35.3	116	14.2			19800	25	4.67	51.8	
151	15000	30	V10							15840	20	3.74	53.3	
151	32000	15	C	23958	11.6	145	16.0	54.4		47520	28	7.50	57.1	
151	32000	15	V2	15791	0.0	98	12.4	53.9		28710	18	5.26	54.6	
151	32000	15	V4	15246	6.7	121	14.9	55.4		27720	23	5.52	57.4	
151	32000	15	V6							29700	15	6.44	52.6	
151	32000	15	V8							25740	28	6.26	47.0	
151	32000	15	V10							24750	25	5.66	50.1	
151	32000	30	C	31037	10.9	141	15.2	55.2		52470	23	8.48	47.1	
151	32000	30	V2	17424	0.0	114	17.3	54.8		29700	28	6.27	53.7	
151	32000	30	V4	19058	8.5	139	14.6	53.7		28710	18	6.55	55.4	
151	32000	30	V6							28710	15	5.75	48.6	
151	32000	30	V8							28710	28	6.12	53.4	
151	32000	30	V10							29700	23	5.94	53.8	
151	44000	15	C	41927	33.7	149	14.0	51.9		74250	18	7.47	57.8	
151	44000	15	V2	25047	4.4	139	13.2	54.4		42570	25	8.66	50.3	
151	44000	15	V4	21780	10.0	126	17.3	54.7		40590	25	7.37	54.5	
151	44000	15	V6							42570	38	8.05	48.4	
151	44000	15	V8							40590	28	6.24	55.8	
151	44000	15	V10							38610	25	6.39	52.4	
151	44000	30	C	43560	23.8	136	13.5	52.7		87120	20	7.71	49.0	
151	44000	30	V2	23958	11.3	128	16.3	54.7		38610	33	6.78	49.8	
151	44000	30	V4	23414	9.3	128	17.8	53.8		40590	25	5.62	55.7	
151	44000	30	V6							39600	28	7.29	55.7	
151	44000	30	V8							40590	25	6.73	58.0	
151	44000	30	V10							41580	25	6.15	53.4	
Mean				21387	8.5	118	15.1	54.1		31873	24	5.98	53.3	
Probability (%)														
Density (D)				2.0	2.5	1.6	72.4	24.3		0.0	71.4	7.1	21.8	
Row Spacing (RS)				37.5	14.5	56.4	42.1	98.7		11.8	41.3	2.2	3.8	
D x RS				48.8	78.0	54.2	98.8	99.0		50.0	77.6	8.7	87.6	
Stage of Removal (SOR)				0.0	0.0	0.9	64.8	28.1		0.0	39.9	0.9	88.5	
D x SOR				4.9	0.3	10.7	15.2	24.3		0.0	4.4	42.9	44.1	
RS x SOR				85.7	9.4	71.7	16.9	3.1		3.4	11.8	67.2	56.8	
D x RS x SOR				79.6	37.0	96.1	90.9	66.4		75.1	83.2	69.2	48.0	
LSD (0.10)														
Density (D)				4494	4.6	10	NS	NS		1901	NS	1.37	NS	
Row Spacing (RS)				NS	NS	NS	NS	NS		NS	NS	0.03	0.1	
D x RS				NS	NS	NS	NS	NS		NS	NS	1.37	NS	
Stage of Removal (SOR)				2551	2.8	13	NS	NS		9160	NS	0.70	NS	
D x SOR				NS	5.9	NS	NS	NS		14585	14	NS	NS	
RS x SOR				NS	3.4	NS	NS	3.8		12020	NS	NS	NS	
D x RS x SOR				NS	NS	NS	NS	NS		NS	NS	NS	NS	
CV (%)				16	46	15	16	2.0		13	24	17.00	10	