

PROJECT TITLE: The effect of row spacing, planting rate and Cerone on three spring malting barley varieties grown under irrigation management. SARC, Huntley, 1990.

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PROJECT LOCATION: MSU - Southern Agricultural Research Center, Huntley, MT 59037

OBJECTIVES: To evaluate malting barley yield and quality as affected by planting rate, row width and use of a plant growth regulator (Cerone). Each barley variety was seeded to 50, 100, and 150 lb/A on 4, 6, or 12 inch row spaces to evaluate effect on yield, test weight, plumpness, and lodging of, Moravian III, Clark, and Klages barleys.

RESULTS: This report is scheduled to be the 4th and final year of this study. In 1989, the total study was wiped out by hail. In 1987 the trial was also damaged by hail and grasshoppers, while in 1988, the extremely hot spring contributed to uneven emergence of the crop. Thus we really only had one good year of results, 1990.

The results with regard to Cerone applications in 1990 is in sharp contrast to previous years. Cerone application did not affect yields or any agronomic characteristics in 1990 whereas in previous years when the crops were stressed, Cerone significantly lowered barley yields. Results with regard to yields, test weights, kernel weight, percent plump and percent thins are in general agreement with previous years. The yield and agronomic data for the three barley varieties, Clark, Klages, and Moravian III with or without Cerone applications are given in Tables 1-6. Seeding rate of Clark barley showed a tendency to result in a higher percent plump at the higher seeding rate, an increase in spikes/meter square, and a decrease in seeds/head, (Tables 1,2). Heading date was delayed by the 50 lb/A seeding rate. Test weight was in some cases significantly higher at the 150 lb/A seeding rate. The Klages variety responded differently from the Clark variety responses (Tables 3,4). Results showed that seeding rate has very little to no effect on percent plump, test weight, kernel/head or spikes/meter square. However, as in the case of Clark, heading date was delayed in the 50 lb/A seeding rate. The Moravian III data followed the same trend of results as noted in the Klages variety (Tables 5,6). The only real trend was that consistent with the other two varieties, Moravian III planted at 50 lbs/A was also later in heading.

SUMMARY: Generally the results indicate that over the past several years, which included years of severe stress, there were no clear trends for any effects of either seeding rate or row width on yield and quality of the barley varieties used in this study. Clark and Klages, planted at 50 lbs/A was slightly lower in test weight and had slightly more plumps as compared to the 150 lbs/A seeding rate. In 1990, the Cerone treatments did shorten plant height and did not significantly affect the yield or quality parameters evaluated in this study. These results again support the fact that Cerone is a valuable tool to prevent lodging in barley, however if stress conditions exist, such as moisture, extreme heat, or hail after application, the Cerone will reduce barley yields. If these stresses do not exist the application of Cerone can enhance the harvestability and quality yield of barley.

FUTURE PLANS: The data from 1987, 1988, and 1990 will be reviewed to determine if the experiment needs to be repeated in 1991. If we decide not to continue the study, the data will be summarized as a final report for 1992.

TABLE 1. 1990 IRRIGATED BARLEY MANAGEMENT TRIAL USING CLARK MALT BARLEY
NOT TREATED WITH GROWTH REGULATOR.

MANAGEMENT	JULIAN	PLANT	KERNALS	1000	SPIKES/PER					
LBS/ACRE AT	YIELD	TESTWT	HEAD	HEIGHT	PER	KERNAL	SQUARE	PLUMP	THIN	
ROW SPACE IN.	BU/AC	LB/BU	DATE	INCHES	SPIKE	WT/GRMS	METER	%	%	
50 AT 4	107.9 ABC	51.9 ABC	165.8 B	34.0 ABC	23.0 A	49.5 C	124.8 A	91.4 AB	2.7 ABC	
50 AT 6	104.8 AB	51.8 A	166.0 BC	34.8 BCD	23.6 A	46.5 AB	122.8 A	89.6 A	4.1 D	
50 AT 12	106.2 AB	51.8 AB	166.8 C	33.6 AB	29.2 B	45.5 A	258.8 C	91.2 AB	3.2 BC	
100 AT 4	114.2 CDE	52.4 BCD	164.4 A	34.6 BCD	23.2 A	48.5 BC	150.0 AB	93.9 CD	2.3 AB	
100 AT 6	101.3 A	52.4 ABCD	164.4 A	31.6 A	23.2 A	47.5 ABC	141.6 A	93.0 BC	2.3 AB	
100 AT 12	117.0 DE	52.7 D	164.0 A	36.2 CD	23.0 A	47.8 BC	184.8 B	92.9 BC	3.3 CD	
150 AT 4	104.7 AB	52.8 D	164.0 A	36.6 D	22.4 A	48.3 BC	145.2 AB	94.4 CD	1.9 A	
150 AT 6	110.9 BCD	52.5 CD	164.2 A	35.4 BCD	21.4 A	48.0 BC	187.2 B	93.9 CD	2.1 A	
150 AT 12	119.0 E	52.7 D	164.0 A	34.0 ABC	22.4 A	47.0 AB	246.0 C	95.3 D	2.1 A	

SUMMARY STATISTICS:

P-VALUE TRTS=	0.010	0.152	0.000	0.160	0.042	0.348	0.000	0.015	0.017
LSD(0.05by t)=	10.10	0.86	1.24	3.42	4.27	3.17	60.97	3.09	1.29

Numbers within columns with the same letters are not significantly different at the 5% level.

TABLE 2. 1990 IRRIGATED BARLEY MANAGEMENT TRIAL USING CLARK MALT BARLEY
TREATED WITH GROWTH REGULATOR.

MANAGEMENT	JULIAN	PLANT	KERNELS	1000	SPIKES/PER					
LBS/ACRE AT	YIELD	TESTWT	HEAD	HEIGHT	PER	KERNAL	SQUARE	PLUMP	THIN	
ROW SPACE IN.	BU/AC	LB/BU	DATE	INCHES	SPIKE	WT/GRMS	METER	%	%	
50 AT 4	106.2 A	51.9 AB	166.6 B	34.2 CD	23.6 C	47.1 A	154.4 AB	91.2 B	3.7 B	
50 AT 6	109.9 ABC	51.8 A	166.2 B	32.4 AB	24.0 C	47.6 AB	138.8 A	88.8 A	4.9 C	
50 AT 12	109.4 AB	52.0 AB	166.8 B	36.6 E	24.0 C	47.1 A	121.2 A	89.0 A	5.0 C	
100 AT 4	106.9 A	51.7 A	164.8 A	33.6 BC	22.8 BC	49.1 ABC	148.8 AB	93.4 CD	2.5 A	
100 AT 6	107.0 A	51.9 AB	164.6 A	32.6 AB	23.2 BC	48.3 ABC	132.0 A	93.1 BCD	2.4 A	
100 AT 12	116.5 C	52.4 BC	164.4 A	35.4 DE	22.2 ABC	49.4 BC	219.2 B	91.6 BC	3.5 B	
150 AT 4	110.4 ABC	52.6 C	164.4 A	34.6 CD	21.0 AB	48.1 ABC	167.2 AB	94.1 D	2.4 A	
150 AT 6	114.3 ABC	52.8 C	164.2 A	33.4 BC	20.0 A	49.9 C	158.8 AB	92.4 BCD	2.5 A	
150 AT 12	119.1 C	52.5 C	164.4 A	31.2 A	22.0 ABC	50.1 C	209.6 B	93.3 BCD	3.0 AB	

SUMMARY STATISTICS:

P-VALUE TRTS =0.448	0.0383	0.000	0.000	0.182	0.406	0.514	0.004	0.000
LSD(0.05by t)=13.06	0.75	1.10	2.13	3.21	3.21	99.72	2.95	1.35

Numbers within columns with the same letters are not significantly different at the 5% level.

TABLE 3. 1990 IRRIGATED BARLEY MANAGEMENT TRIAL USING KLACES MALT BARLEY
NOT TREATED WITH GROWTH REGULATOR.

MANAGEMENT	JULIAN	PLANT	KERNALS	1000	SPIKES/PER				
LBS/ACRE AT	YIELD	TESTWT	HEAD	HEIGHT	PER	KERNAL	SQUARE	PLUMP	THIN
ROW SPACE IN.	BU/AC	LB/BU	DATE	INCHES	SPIKE	WT/GRMS	METER	%	%
50 AT 4	109.3 BC	51.2 A	171.2 D	37.4 B	26.2 C	44.8 B	135.2 ABC	90.5 C	3.8 A
50 AT 6	106.7 AB	52.0 B	171.4 D	36.8 AB	24.2 AB	47.6 C	128.4 AB	89.3 BC	3.7 A
50 AT 12	108.4 ABC	51.4 AB	171.2 D	37.4 B	25.4 BC	45.3 CB	171.6 CD	86.3 AB	4.7 ABC
100 AT 4	110.7 BCD	51.6 AB	170.2 C	36.8 AB	24.0 AB	43.0 AB	131.2 ABC	86.1 AB	5.7 C
100 AT 6	105.9 AB	51.7 AB	169.8 BC	35.6 AB	24.8 BC	45.1 BC	182.0 DE	87.2 BC	4.7 ABC
100 AT 12	115.3 D	51.5 AB	169.0 AB	35.2 AB	24.8 BC	44.2 B	170.4 CD	86.2 AB	5.5 BC
150 AT 4	111.0 BCD	51.4 AB	168.2 A	35.4 AB	25.2 BC	43.1 AB	146.0 BCD	88.5 BC	4.4 AB
150 AT 6	102.9 A	51.4 AB	168.2 A	34.4 A	22.8 A	43.0 AB	103.6 A	86.7 B	4.4 AB
150 AT 12	113.0 CD	51.2 A	169.0 AB	36.0 AB	24.0 AB	40.5 A	215.2 E	83.1 A	5.8 C

SUMMARY STATISTICS:

P-VALUE TRTS=	0.140	0.778	0.000	0.665	0.103	0.036	0.016	0.114	0.193
LSD(0.05by t)=	8.45	0.91	1.38	3.50	2.10	3.70	58.85	4.64	1.83

Numbers within columns with the same letters are not significantly different at the 5 % level.

TABLE 4. 1990 IRRIGATED BARLEY MANAGEMENT TRIAL USING KLAGES MALT BARLEY
TREATED WITH GROWTH REGULATOR.

MANAGEMENT	JULIAN	PLANT	KERNALS	1000	SPIKES/PER				
LBS/ACRE AT	YIELD	TESTWT	HEAD	HEIGHT	PER	KERNAL	SQUARE	PLUMP	THIN
ROW SPACE IN.	BU/AC	LB/BU	DATE	INCHES	SPIKE	WT/GRMS	METER	%	%
50 AT 4	111.8 B	50.9 AB	171.4 D	36.6 D	25.4 CD	45.5 BC	122.0 A	83.8 A	6.8 C
50 AT 6	112.0 B	50.8 A	171.4 D	36.2 CD	24.2 ABC	45.6 C	130.4 A	83.6 A	5.1 AB
50 AT 12	110.0 AB	50.6 A	172.0 D	36.0 CD	28.0 E	45.9 C	167.2 AB	83.5 A	6.4 BC
100 AT 4	112.9 B	51.9 CD	170.0 C	35.8 BCD	24.8 BC	45.9 C	152.0 A	87.0 B	5.1 A
100 AT 6	109.0 AB	51.7 CD	170.4 C	33.0 A	24.8 BC	46.0 C	163.6 AB	90.4 C	4.0 A
100 AT 12	111.4 B	52.0 D	169.8 BC	35.2 BCD	27.2 DE	45.3 BC	212.4 BC	87.5 B	4.8 A
150 AT 4	115.2 B	51.4 BC	168.6 A	34.2 ABC	22.8 AB	43.3 AB	158.8 AB	90.4 C	3.9 A
150 AT 6	104.6 A	51.4 BCD	168.6 A	33.8 AB	22.4 A	41.9 A	129.6 A	86.8 B	4.7 A
150 AT 12	113.0 B	51.5 CD	169.2 AB	35.4 BCD	24.4 ABC	45.8 A	223.6 C	85.9 B	5.1 AB

SUMMARY STATISTICS:

P-VALUE TRTS=	0.568	0.006	0.000	0.188	0.011	0.147	0.141	0.000	0.032
LSD(0.05 byt)=	9.41	0.80	1.12	2.84	3.06	3.24	79.56	2.89	1.78

Numbers within columns with the same letters are not significantly different at the 5% level.

TABLE 5. 1990 IRRIGATED BARLEY MANAGEMENT TRIAL USING MORAVIAN III MALT BARLEY
NOT TREATED WITH GROWTH REGULATOR.

MANAGEMENT			JULIAN	PLANT	KERNALS	1000	SPIKES/PER			
LBS/ACRE AT	YIELD	TESTWT	HEAD	HEIGHT	PER	KERNAL	SQUARE	PLUMP	THIN	
ROW SPACE IN.	BU/AC	LB/BU	DATE	INCHES	SPIKE	WT/GRMS	METER	%	%	
50 AT 4	107.2 BCD	53.2 ABC	168.6 B	35.4 A	26.6 C	45.9 C	126.4 AB	93.7 AB	2.7 D	
50 AT 6	101.8 AB	52.7 AB	168.2 B	33.0 A	25.4 ABC	45.5 BC	163.0 BC	92.9 A	2.2 ABCD	
50 AT 12	99.2 A	52.7 A	168.8 B	34.6 A	25.8 BC	45.1 ABC	180.0 C	94.0 ABCD	1.7 A	
100 AT 4	107.9 CD	53.3 BC	165.6 A	35.0 A	25.8 BC	45.7 BC	117.2 AB	94.3 ABCD	1.9 AB	
100 AT 6	103.4 ABC	53.0 ABC	166.2 A	33.6 A	24.4 A	45.5 BC	122.4 AB	93.3 AB	2.4 BCD	
100 AT 12	101.4 A	53.2 ABC	165.6 A	33.0 A	25.6 ABC	43.4 A	174.4 C	93.4 AB	2.6 CD	
150 AT 4	109.4 D	53.1 ABC	165.8 A	34.8 A	25.0 AB	43.8 AB	106.8 A	95.0 BCD	1.7 A	
150 AT 6	100.3 A	53.0 ABC	165.4 A	33.0 A	24.6 AB	44.1 ABC	119.6 AB	95.3 CD	2.0 ABC	
150 AT 12	107.4 BCD	53.4 C	165.4 A	33.4 A	24.6 AB	44.3 ABC	242.8 D	95.8 D	1.6 A	

SUMMARY STATISTICS:

P-VALUE TRTS=	0.087	0.653	0.000	0.756	0.259	0.495	0.004	0.345	0.108
LSD(0.05by t)=7.86		0.82	1.40	3.52	1.80	2.68	67.05	2.66	0.86

Numbers within columns with the same letters are not significantly different at the 5% level.

TABLE 6. 1990 IRRIGATED BARLEY MANAGEMENT TRIAL USING MORAVIAN III MALT BARLEY TREATED WITH GROWTH REGULATOR.

MANAGEMENT	LBS/ACRE AT	YIELD	TESTWT	JULIAN	PLANT	KERNELS	1000	SPIKES/PER		
ROW SPACE IN.	BU/AC	BU/AC	LB/BU	HEAD	HEIGHT	PER	KERNAL	SQUARE	PLUMP	THIN
				DATE	INCHES	SPIKE	WT/GRMS	METER	%	%
50 AT 4		111.4 E	52.3 A	167.4 CD	33.6 C	25.0 AB	44.8 A	139.6 BCD	93.0 AB	1.9 AB
50 AT 6		107.4 CDE	52.2 A	168.4 E	32.4 ABC	25.0 AB	44.2 A	98.8 A	92.1 A	2.6 C
50 AT 12		99.0 A	52.6 AB	167.6 DE	33.4 BC	24.6 AB	43.7 A	167.6 DE	93.2 AB	1.9 AB
100 AT 4		98.4 A	53.2 C	166.2 B	32.8 ABC	23.2 A	45.1 A	153.2 CD	94.2 BC	2.0 AB
100 AT 6		104.9 BCD	53.1 C	167.0 BCD	32.2 ABC	23.4 A	44.6 A	121.6 ABC	95.0 C	1.7 A
100 AT 12		105.8 BCDE	53.1 C	166.6 BC	31.4 AB	24.4 AB	44.9 A	196.0 EF	94.8 C	1.7 A
150 AT 4		109.0 DE	53.0 C	165.0 A	34.0 C	26.6 B	43.8 A	118.4 AB	93.2 AB	2.3 BC
150 AT 6		100.9 AB	52.9 BC	165.2 A	31.2 A	24.8 AB	44.6 A	120.8 AB	94.1 BC	2.1 AB
150 AT 12		102.1 ABC	52.9 BC	165.0 A	33.4 BC	23.0 A	43.7 A	206.8 F	94.7 C	1.7 A

SUMMARY STATISTICS:

P-VALUE TRTS=	0.026	0.003	0.000	0.559	0.629	0.996	0.000	0.045	0.149
LSD(0.05by t)=	8.18	0.55	1.34	3.04	3.66	3.78	45.39	1.88	0.73

Numbers within columns with the same letters are not significantly different at the 5% level.