1992 Research Report

SMBSC

1/1/1992
Southern Minnesota Beet Sugar Company
SMBSC

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1992 Planting Season - SMSC
Dr. Jim Widner, Vice President - Agriculture

As of this date, the 1992 crop is off to the best start since 1987. This statement is based on the following factors:

1. Planting date - the crop was essentially planted by May 9.

2. Top soil moisture was adequate to provide rapid germination and emergence.

3. Limited replants.

4. Lack of significant plant stresses caused by crusts, wind, excessive moisture, and seedling diseases.

A general rain on May 23-25 of 0.5-1.5 inches will push the crop to rapid development, and help to fill in some incomplete stands where the seeds had previously lay ungerminated in dry soil.

Table 1 shows percent planted at various dates, and the final yields and sugar contents. Above average yields occurred in 1985, 1987, and 1989, partially due to the early planting season in each year. The positive effects of early planting were lost in 1988 and 1990 because of the extremely high percentage of the crop that had to be replanted.

A comparison of the 1992 planting season shows 99% planted by May 9, whereas the 8-year mean is 63% for the same date. Average yields since 1984 are 18.65 tons/acre, including the 1984, 1986, and 1991 crops which were stressed considerably by excessive moisture.

The 1992 crop is currently rated as above average in yield expectations. For planning purposes, the crop is estimated at 20.3 tons/acre which is certainly realistic barring extremes in the weather patterns or heavy disease pressure.

Table 2 shows a working model for the crop size, harvest schedule, and slice period. Campaign length would be 175 and 186 days with 19.8 and 21.0 tons/acre, respectively. Pre-pile harvest would begin in early September with a crop of this size in order to complete slice by the first week in March.

TABLE 1

COMPARISON OF PLANTING DATES AND FINAL YIELDS
SMSC

YEAR	TOTAL ACRES	REPLANT ACRES	PERCENT PLANTED BY 4-25	5-2	5-9	5-16	5-23	TONS/AC	% SUGAR	COMMENTS
1984	57240	6500	15	23	25	63	94	17.54	15.49	VERY WET SEPT. - OCT.
1985	59703	7082	10	40	85	95	98	21.73	16.20	EXCELLENT START
1986	66635	4150	1	1	9	24	62	15.09	16.22	VERY WET SPRING; DELAYED PLANTING
1987	66860	1450	76	99	100	100	100	22.53	16.98	CROP PLANTED 3 WEEKS EARLIER THAN NORMAL
1988	70646	42000	97	100	70	85	100	17.69	17.15	60% REPLANTS DUE TO HIGH WINDS
1989	74943	11000	19	45	78	98	100	20.36	15.91	19 DEGREES ON OCT. 1 STOPPED SUGAR ACCUM.
1990	80783	40350	85	90	75	90	99	17.91	15.60	50% REPLANTS DUE TO MAY 1 FROST; WIND
1991	82284	7600	25	58	61	96	99	16.36	15.42	250% OF NORMAL PPT
MEAN	71777	15017	41	57	63	81	94	18.65	16.12	
1992	(87350)	1200	17	65	99	100	100	(20.3)	(16.00)	CROP PLANTED 10 DAYS EARLIER THAN NORMAL

( ) - ESTIMATED VALUES

TABLE 2

YIELD ESTIMATES, EXPECTED HARVEST DATES, AND LENGTH OF SLICE CAMPAIGN

	Yield Estimates	
Variable	19.8 tons/acre	21.0 tons/acre
Net tons	1,695,000	1,798,000
Slice tons	1,575,000	1,672,000
No. days slice	175	186
Pre-pile harvest	September 1	September 1
Full harvest	October 4	October 4
End of slice	February 25	March 8

PREVIOUS CROP AND ROTATION FOR THE 1992 BEET CROP

JIM WIDNER, VICE PRESIDENT, AGRICULTURE

Southern Minnesota Sugar Cooperative planted a total of 87,200 acres in 1992. The majority of the beets were planted on fields that had corn as the previous crop (68%), and followed a 3+ year rotational pattern (62.5%). Over 26% of the crop was planted on fields considered as new ground i.e., beets have not been planted in the past recent cropping history.

PREVIOUS CROP

A review of the 1992 sugarbeet planting shows that corn was the primary previous crop. The other crops and percentage of the total number of acres are shown in Table 1.

Table 1. Previous Crop - 1992

Crop	% of Total
Corn	67.9
Soybeans	9.3
Sweet Corn	4.3
Wheat	4.1
Set Aside	0.5
Navy Beans	0.4
Oats	0.3
Peas	0.3
Alfalfa	0.1
Mixed	12.8
	100.0

ROTATION

The number of years between beet crops on the same farm is shown in Table 2. Rotation is defined as the number of intervening crops between the sugarbeet crops i.e., a rotational pattern of sugarbeets - soybeans - corn - sugarbeets is a three year rotation (two intervening crops).

Table 2. Rotational Pattern - 1992

Years	% of Total Acres
New Ground	26.5
2	11.0
3	45.7
4	12.1
5 +	4.7
	100.0

SEPTEMBER 28, 1992

TABLE 1

SEED USEAGE 1992

SIZE	LBS	PERCENT
SMALL	27249	14.98
MEDIUM	50143	27.56
LARGE	41256	22.68
EXTRA LARGE	23720	13.04
MINI PELLET	34507	18.97
REGULAR PELLET	5068	2.79
TOTAL	181943	100.00

TABLE 2

SEED SUMMARY BY COMPANY

SIZE	ACS	BETA	HILL	SEEDEX	VDH	TOTAL
SMALL	12800	10025	4175	199	50	27249
MEDIUM	12850	26850	10201	142	100	50143
LARGE	3600	31425	6054	52	125	41256
EXTRA LARGE		19825	3895			23720
MINI PELLET	6570	24882	2536	519		34507
REGULAR PELLET	840	3263	965			5068
TOTAL	36660	116270	27826	912	275	181943
PERCENT	20.15	63.90	15.29	0.50	0.15	100.00

PLANNED RESEARCH 1993

When planning for research one has to be innovative but practical. Innovative meaning that research needs to be conducted two, three, and sometimes even ten years in advance of usage. Practical in the sense that the grower needs to be able to use the idea.

A large emphasis has been based on Sugarbeet root rot diseases in recent years. This will continue with fumigation trials consisting of treatments of Vapam and Telone as fumigants; Tachigaren and Ridomil as seed treatments; and tolerant varieties.

Research pertaining to fertility and time of harvest will be continued. Fields with low fertility will be sought to permit a wide range of treatments. Optimum fertilization for maximum recoverable sugar per acre needs to be a top priority. Increased acreage relates into increased tons which brings about earlier harvest dates in order to get the processing completed in a reasonable time span. Thus, sugar percent will need to be optimum at an earlier date.

Variety selection for early harvest will also be part of management for early harvest. Varieties will be evaluated to screen for early, mid, and late harvest as in the past. New varieties that are not approved but show promise with one or two years of data in coded trials will be screened for early high sugar and recoverable sugar per acre in relation to time.

Weed control research will continue in cooperation with NDSU. Betamix, Betanex, and Nortron will be considered pertaining to rates, timing and environmental factors effect on efficacy. New products will be sought and researched referring to efficacy for weed control in sugarbeets and effect on all crops pertaining to persistence in soils or drift.

Cercospora leaf spot research will be conducted in SMSC growing area in 1992. This research will entail efficacy trials and operation of remote weather station for the leaf spot model.

Tillage and residue research will be conducted in 1993. This research will consider moldboard plowing vs. various forms of chisel plowing or reduced tillage. Planter efficacy must be considered as well.

Specific treatments and additional projects may be included in response to the growing season and environmental conditions. The success and completion of this research will depend on the available time and equipment and cooperation among growers, industry representatives, and SMSC Agricultural staff.

RESEARCH SUMMARY

1. **Variety Evaluation**. Nineteen varieties were approved for planting in 1992 growing season. Seven test market varieties and one special use variety were also approved. Fifteen of the varieties have been approved for three years or less.

2. **Date of Harvest Summary**. A summary of data from 1990 to 1992 indicates that there are differences among varieties in ability to accumulate sugar at different times of the harvest season.

3. **Sugarbeet Quantity and Quality as Influence by Fertilizer Rate and Time of Harvest**. Recoverable sugar/acre was equally obtained at early harvest at 75, 100, and 125 percent of recommended fertilizer rate. Recommended fertilizer rate of 100, 125, and 150 percent produced recoverable sugar/acre equally at mid and late harvest. Net revenue was best at early harvest with 75 percent and mid and late harvest with 100 percent of recommended fertilizer rate.

4. **Evaluation of Seed Treatment and Fumigation Effect on Seedling Disease**. Fumigant (Vapam) was not effective in improvement of stand establishment or increasing production regardless of planting time. Seed treatments at planting date 1 were equally effective in enhancing sugar production. Sugar production at planting date 2 was significantly increased only by Tachigaren at 30 and 45 g/kg.

5. **Delayed Control of Cover Crop**. Stinger effectively controlled peas at two weeks after sugarbeet emergence. Poast plus Oil effectively controlled oats and wheat at two weeks after sugarbeet emergence. Control of cover crops reduced significantly from two to four weeks after emergence.

6. **Common Lambsquarter, Redroot Pigweed and Eastern Black Nightshade Control with Postemergence Herbicides**. Treatment with NA307 controlled common lambsquarter, redroot pigweed, and eastern black nightshade as good or better than all other treatments. These data indicated that the addition of DPX-66037 would increase control of common lambsquarter and redroot pigweed and black nightshade.

7. **Velvetleaf Control with Postemergence Herbicides**. Velvetleaf control was best achieved with NA307 and DPX-66037 spray mixtures. Velvetleaf control of 95 percent or greater was obtained with DPX-66037 with NA307 or Betanex plus Stinger.

8. **Common Sunflower and Redroot Pigweed Control with Postemergence Herbicides**. Treatments with DPX-66037 and NA307 gave 90 percent or better control of common sunflower. All other treatments were unsatisfactory. Spray mixtures with NA307 gave best control of redroot pigweed.

9. Wild Buckwheat Control with Postemergence Herbicides. Stinger, H-273, or NA307 either tended to or did control wild buckwheat better than the other treatments. The best single component control was obtained with NA307.

10. Disease Index Summary. Temperatures were relatively cool during the 1992 growing season resulting in relatively low disease index values. Cercospora was sited in mid July and the disease was kept under control with a modest spray program.

11. Weather Data for 1992. The growing season for 1992 was relatively cool with adequate rainfall. This European type climate contributed to the record sugar production in Southern Minnesota Beet Sugar Cooperative.

Variety Evaluation

Nineteen varieties were approved for planting in the 1992 growing season. Seven test market varieties, ACH 309, ACH 311, Hilleshog 7505, KW 3291, Beta 5931, Maribo 914 and Seedex SX1004 and one special use variety ACH 205 were also approved.

The approved varieties for Southern Minnesota Sugar Cooperative since 1980 are listed in Table 1. Hilleshog 5135 and 5090, KW 3145, and ACH 198 have been approved for the last seven years, six, and four years, respectively. The remaining fifteen varieties have been approved for three years or less.

A comparison of the average sugar/acre, sugar/ton, tons/acre, percent sugar and leafspot rating for the past 13 years for all approved varieties are listed in table 2. These data indicate sugar production per acre has remained stable over 13 years. Varieties have varied in sugar production depending on growing conditions of various years.

The original seed issued to Southern Minnesota Sugar in 1992 was 179,909 lbs. Replant seed was 2,043 lbs, and this was reflected in final yields. The pounds of seed issued in previous years is listed in table 3. The increase form 1991 to 1992 is due to the SMSC expansion project. Tables 4 through 7 list the three and two year performance of the 19 approved varieties plus the test market varieties. Coded trial results for all varieties evaluated for the past three years are listed in Tables 8 through 13. Varieties evaluated for seedling diseases is presented in table 14.

The most popular varieties planted in 1991 were:

ACH 198
KW 2398
KW 3145
KW 1119
Hilleshog 5135

SOUTHERN MINNESOTA SUGAR COOPERATIVE

List of Approved Varieties Since 1980

Table 1.

1980	1981	1982	1983
Beta 1443	Beta 1443	Beta 1237	Beta 1237
Beta 1345	Beta 1345	Beta 1230	Beta 1230
Beta 1237	Beta 1237	Mono-Hy R1	Mono-Hy R1
Mono-Hy R1	Beta 1230	Mono-Hy M8	Mono-Hy M8
Mono-Hy E4	Mono-Hy R1	Mono-Hy M7	Mono-Hy M7
BJ Monofort	Mono-Hy M8	Mono-Hy E4	BJ Monofort
Holly HH33	Mono-Hy M7	BJ Monofort	ACH 14
ACH 14	Mono-Hy X73	Holly HH33	ACH 30
ACH 12	ACH 14	ACH 14	Maribo Ultramono
ACH 17	ACH 151	ACH 17	
ACH 30	ACH 30	ACH 145	
	Maribo Unica		
	Maribo Ultramono		
	BJ Monofort		

1984	1985	1986	1987
Beta 1230	Beta 1230	Beta 1230	Beta 1230
KW 3394	KW 3394	Beta 6264	Beta 6264
BJ Monofort	KW 1132	KW 3394	Beta 5494
Mono-Hy R1	BJ Monofort	KW 1132	KW 3394
Mono-Hy M7	Mono-Hy R1	KW 3265	KW 1132
ACH 30	Mono-Hy M7	BJ Monofort	KW 3265
ACH 145	ACH 30	BJ 1310	BJ Monofort
ACH 154	ACH 145	Mono-Hy M7	BJ 1310
Maribo Ultramono	ACH 154	ACH 30	Mono-Hy M7
	Maribo Ultramono	ACH 146	Mono-Hy R103
	Maribo 401	ACH 164	Mono-Hy R117
		Maribo Ultramono	ACH 164
		Maribo 401	Maribo Ultramono
		Maribo 403	Baribo 403
			Hilleshog 4046
			Hilleshog 5090
			Hilleshog 5135
			Mitsui Monohikari

SOUTHERN MINNESOTA SUGAR COOPERATIVE

List of Approved Varieties Since 1980

Table 1. (cont.)

1988	1989	1990	1991
Beta 1230	Beta 6625	Beta 6625	Beta 6625
Beta 6625	Beta 6269	Beta 6269	Beta 6269
Beta 3614	Beta 3614	Beta 3614	Beta 1238
KW 3265	KW 3265	KW 3265	Beta 2988
KW 1014	KW 1014	KW 1014	Beta 5657
KW 1132	KW 3145	KW 3145	KW 3265
KW 3145	KW 3394	KW 3394	KW 2398
KW 6264	Mono-Hy R103	Maribo Ultramono	KW 3145
KW 3394	Maribo Ulatramono	Maribo 403	Maribo Ultramono
BJ Monofort	Maribo 403	Maribo 411	Maribo 403
BJ 1310	Maribo 411	Maribo 875	Maribo 875
Mono-Hy R103	Hilleshog 4046	Hilleshog 4046	Hilleshog 2401
Maribo Ultramono	Hilleshog 5090	Hilleshog 5090	Hilleshog 5090
Baribo 403	Hilleshog 5135	Hilleshog 5135	Hillesho 5135
Maribo 411	Mitsui Monohikari	HM 2410	Mitsui Monohikari
Hilleshog 4046	ACH 164	Mitsui Monohikari	ACH 194
Hilleshog 5090	ACH 198	ACH 194	ACH 198
Hilleshog 5135	ACH 180	ACH 198	ACH 196
Hilleshog 8277	ACH 181	ACH 180	
Mitsui Monohikari		ACH 181	
ACH 164		ACH 196	
ACH 178			
ACH 180			
ACH 181			

1992	1992 (cont.)	1993	1993 (cont.)
Beta 2010	KW 1119	ACH 194	KW 2249
Beta 6625	Maribo Ultramono	ACH 196	KW 2398
Beta 6269	Maribo 875	ACH 198	KW 3580
Beta 1238	HM 2401	Beta 2010	KW 3145
Beta 2988	Hilleshog 5090	Beta 2988	KW 6770
Beta 5657	Hilleshog 5135	Hilleshog 5133	Maribo 875
BJ 1330	Mitsui Monohikari	Hilleshog 5090	Seedex Monohikari
KW 3265	ACH 194	HM 2401	VDH 66140
KW 2398	ACH 198	KW 1119	
KW 3145	ACH 196	KW 1800	

Table 2. Comparison of Approved Varieties for Southern Minnesota over a thirteen year period.

		Recoverable Sugar/Acre	Sugar/Ton	Tons/Acre	% Sugar	Leaf Spot Rating	LTM
Year	No. of Approved	Mean of Approved	Mean of Approved	Mean of Approved	Mean of Approved	Mean of Approved	Mean of Approved
1981 (78-79-80)	15	6724	264.5	25.7	15.40	4.43	2.18
1982 (79-80-81)	12	6282	262.6	23.9	15.50	4.31	2.17
1983 (80-81-82)	9	7053	261.9	26.9	15.60	4.84	2.37
1984 (81-82-83)	9	6823	253.1	26.9	15.30	4.80	2.50
1985 (82-83-84)	11	7682	269.7	28.6	15.90	4.87	2.64
1986 (83-84-85)	14	7837	280.9	27.9	16.10	4.80	2.41
1987 (84-85-86)	18	7764	300.4	25.9	16.70	4.68	1.68
1988 (85-86-87)	24	8884	308.7	28.7	16.95	4.93	1.51
1989 (86-87-88)	19	8689	318.6	27.2	17.40	4.70	1.47
1990 (87-88-89)	21	9078	307.8	29.4	17.10	4.87	1.71
1991 (88-89-90)	19	7554	294.1	25.7	16.39	4.56	1.59
1991 (89-90-91)	21	6831	276.6	24.8	15.50	4.60	1.60
1992 (90-91-92)	19	6943	296.2	23.5	16.30	4.83	1.49

Table 3. Seed usage for SMSC, 1987 - 1992

Year	Original Issue (LBs.)	Replant (LBs.) (LBs.)	Total (LBs.) (LBs.)
1987	117,000	2,540	119,540
1988	123,630	73,500	187,130
1989	131,150	19,250	150,400
1990	141,370	70,680	212,050
1991	156,440	14,660	171,100
1992	179,909	2,034	181,943

Table 4. Three year performance summary from coded trials conducted at SMSC, 1990-1992.

Variety	Rec. S/A	Rec. S/T	Leaf Spot**	Percent Sugar	Tons/ Acre	Percent LTM	Seed Vig**	% Field Emerg.
ACH 194	6903	298.2	4.94	16.42	23.23	1.52	1.46	65.57
ACH 196	6931	298.2	4.86	16.43	23.27	1.52	1.51	66.93
ACH 198	6733	292.6	4.18	16.23	23.23	1.60	1.39	68.83
Beta 2010	7034	298.3	4.78	16.37	23.76	1.45	1.82	
Beta 2988	6680	296.9	4.70	16.29	22.66	1.45	1.88	67.40
Hilleshog 5090	6822	286.3	4.83	15.88	24.01	1.57	1.69	62.33
Hilleshog 5135	6982	290.2	4.91	16.10	24.13	1.59	1.79	64.73
HM 2401	6824	293.2	4.83	16.18	23.36	1.52	1.78	70.03
KW 1119	6869	306.6	5.09	16.77	22.46	1.44	1.93	61.20
KW 2249 (Blend)	7143	297.3	5.13	16.32	24.12	1.46	1.83	
KW 2398	6878	299.3	5.02	16.42	23.12	1.46	1.80	66.90
KW 3145	7177	290.1	4.91	16.00	24.90	1.49	2.11	62.63
Maribo 875	6813	291.7	4.98	16.13	23.45	1.54	1.31	68.17
Mitsui Monohikari	6648	291.0	4.56	15.94	22.92	1.39	2.56	65.70
ACH 302 (890126)	6853	301.2	4.29	16.59	22.88	1.53	1.56	
KW 1800	7386	297.6	4.98	16.38	24.94	1.50	1.66	
KW 3580	7052	300.8	4.99	16.47	23.57	1.43	1.94	
KW 6770	7225	304.1	4.80	16.61	23.83	1.41	1.67	
Van der Have H66140	6960	294.9	4.90	16.21	23.70	1.46	2.07	
Mean of App.	6943	296.2	4.83	16.30	23.55	1.49	1.78	65.87

Special ACH 205	6782	286.2	3.91	15.75	23.85	1.45	1.60	

** Lower numbers indicate better resistance and vigor

SOUTHERN MINNESOTA SUGAR COOPERATIVE
LIST OF APPROVED VARIETIES FOR 1993
PERCENT OF MEAN OF APPROVED

Table 5. Three year performance summary from coded trials conducted at SMSC, 1990–1992.

Variety	Rec. S/A	Rec. S/T	Leaf Spot**	Percent Sugar	Tons/ Acre	Percent LTM	Seed Vig**	Field Emerg.	Est. Grower Return/T	Est. Grower Return/A
ACH 194	99.4	100.7	102.4	100.7	98.6	101.9	82.2	98.6	101.0	99.6
ACH 196	99.8	100.7	100.7	100.8	98.8	101.9	85.0	100.6	101.1	99.9
ACH 198	97.0	98.8	86.6	99.6	98.6	107.3	78.2	103.5	98.0	96.7
Beta 2010	101.3	100.7	99.1	100.4	100.9	97.2	102.4		101.2	102.1
Beta 2988	96.2	100.2	97.4	99.9	96.2	97.2	105.8		100.3	96.5
Hilleshog 5090	98.3	96.6	100.1	97.4	101.9	105.3	95.1		94.5	96.4
Hilleshog 5135	100.6	98.0	101.8	98.8	102.4	106.6	100.7		96.7	99.1
HM 2401	98.3	99.0	100.1	99.3	99.2	101.9	100.2	105.3	98.4	97.5
KW 1119	98.9	103.5	105.5	102.9	95.4	96.6	108.6	92.0	105.7	100.7
KW 2249 (Blend)	102.9	100.4	106.3	100.1	102.4	97.9	103.0		100.5	102.9
KW 2398	99.1	101.0	104.0	100.7	98.2	97.9	101.3	100.6	101.6	99.7
KW 3145	103.4	97.9	101.8	98.1	105.7	99.9	118.8	94.2	96.7	102.2
Maribo 875	98.1	98.5	103.2	98.9	99.6	103.3	73.7	102.5	97.6	97.2
Mitsui Monohikari	95.8	98.2	94.5	97.8	97.3	93.2	144.1		97.2	94.5
ACH 302 (890126)	98.7	101.7	88.9	101.8	97.1	102.6	87.8		102.7	99.8
KW 1800	106.4	100.5	103.2	100.5	105.9	100.6	93.4		100.8	106.7
KW 3580	101.6	101.5	103.4	101.0	100.1	95.9	109.2	100.6	102.5	102.6
KW 6770	104.1	102.7	99.5	101.9	101.2	94.6	94.0	104.2	104.2	105.5
Van der Have H66140	100.2	99.5	101.5	99.4	100.6	97.9	116.5	106.9	99.3	99.9
Mean of App.	6943	296.2	4.83	16.30	23.55	1.49	1.78	65.90		
Special ACH 205	97.7	96.6	80.1	96.9	101.3	97.3	89.9		94.4	95.6

** Lower numbers indicate better resistance and vigor

SOUTHERN MINNESOTA SUGAR COOPERATIVE

*LIST OF TEST MARKET VARIETIES **

***Table 6.** Two year performance summary from coded trials conducted at SMSC, 1991-1992.*

Variety	Rec. S/A	Rec. S/T	Leaf Spot**	Percent Sugar	Tons/ Acre	Percent LTM	Seed Vig**	% Field Emerg.
ACH 194	6910	301.4	5.14	16.58	23.09	1.51	1.31	63.0
ACH 196	7132	302.6	5.09	16.62	23.68	1.49	1.39	64.7
ACH 198	6787	299.9	4.37	16.56	22.97	1.56	1.21	66.0
ACH 302 (890126)	6936	306.9	4.42	16.86	22.86	1.52	1.31	
Beta 2010	7022	304.9	5.02	16.68	23.30	1.43	1.94	64.7
Beta 2988	6608	302.7	4.82	16.58	22.07	1.44	1.95	63.3
Hilleshog 5090	6894	290.3	4.84	16.08	24.07	1.57	1.56	57.7
Hilleshog 5135	7113	295.4	5.05	16.35	24.26	1.58	1.58	61.7
HM 2401	6935	299.4	4.94	16.46	23.33	1.49	1.60	66.6
KW 1119	6859	309.4	5.11	16.89	22.28	1.42	1.71	62.8
KW 1800	7499	303.2	5.16	16.65	24.93	1.49	1.44	
KW 2249 (Blend)	7144	303.6	5.22	16.62	23.68	1.44	1.89	62.4
KW 2398	6947	306.2	5.20	16.76	22.92	1.45	1.48	65.3
KW 3145	7134	294.2	5.01	16.20	24.50	1.49	1.85	60.8
KW 3580	7046	311.0	5.30	16.96	22.83	1.42	1.46	
KW 6770	7367	308.1	4.90	16.81	24.06	1.41	1.61	
Maribo 875	6857	295.7	5.06	16.31	23.38	1.53	1.19	64.6
Mitsui Monohikari	6959	293.7	4.80	16.07	23.89	1.39	2.56	62.6
Van der Have H66140	6931	296.7	4.96	16.31	23.56	1.48	1.79	
Mean of App.	7004	301.3	4.97	16.54	23.46	1.48	1.62	63.30

TEST MARKET

ACH 309 (890321)	7042	305.8	4.27	17.69	21.90	1.22	1.32	
ACH 311 (890416)	6830	305.2	4.36	17.54	21.56	1.35	1.07	
Beta 5931	6878	304.7	3.98	17.34	22.02	1.15	1.98	
Hilleshog 7505	6872	302.6	4.64	17.62	22.12	1.25	1.51	
KW 3291	7181	312.9	4.96	18.02	23.11	1.18	1.47	
Maribo 914	6799	301.3	5.12	17.76	22.60	1.31	1.22	
Seedex SX1004	6827	304.6	4.21	17.68	21.34	1.21	2.54	

** Subject to seed availability*

*** Lower number indicate better resistance and vigor*

SOUTHERN MINNESOTA SUGAR COOPERATIVE
LIST OF TEST MARKET VARIETIES FOR 1993
PERCENT OF MEAN OF APPROVED

Table 7. Two year performance summary from coded trials conducted at SMSC, 1991-1992.

Variety	Rec. S/A	Rec. S/T	Leaf Spot**	Percent Sugar	Tons/ Acre	Percent LTM	Seed Vig**	% Field Emerg.	Est. Grower Return/T	Est. Grower Return/A
ACH 194	98.7	100.0	103.4	100.2	98.4	102.1	80.7	99.5	100.0	98.5
ACH 196	101.8	100.4	102.4	100.5	101.0	100.7	85.7	102.2	100.7	101.7
ACH 198	96.9	99.5	87.9	100.1	97.9	105.4	74.6	104.3	99.3	97.3
ACH 302 (890126)	99.0	101.8	89.0	101.9	97.5	102.7	80.7	0.0	102.9	100.4
Beta 2010	100.3	101.2	101.0	100.8	99.3	96.7	119.6	102.2	102.0	101.3
Beta 2988	94.3	100.5	97.0	100.2	94.1	97.3	120.2	100.0	100.8	94.9
Hilleshog 5090	98.4	96.3	97.4	97.2	102.6	106.1	96.1	91.2	94.1	96.6
Hilleshog 5135	101.6	98.0	101.6	98.8	103.4	106.8	97.4	97.5	96.8	100.2
HM 2401	99.0	99.4	99.4	99.5	99.5	100.7	98.6	105.2	99.0	98.5
KW 1119	97.9	102.7	102.8	102.1	95.0	96.0	105.4	99.2	104.3	99.1
KW 1800	107.1	100.6	103.8	100.6	106.3	100.7	88.7	0.0	101.0	107.4
KW 2249 (Blend)	102.0	100.8	105.1	100.5	101.0	97.3	116.5	98.6	101.2	102.2
KW 2398	99.2	101.6	104.6	101.3	97.7	98.0	91.2	103.2	102.6	100.3
KW 3145	101.9	97.6	100.8	97.9	104.5	100.7	114.0	96.1	96.2	100.5
KW 3580	100.6	103.2	106.7	102.5	97.3	96.0	90.0	0.0	105.0	102.3
KW 6770	105.2	102.2	98.6	101.6	102.6	95.3	99.2	0.0	103.6	106.3
Maribo 875	97.9	98.1	101.8	98.6	99.7	103.4	73.3	102.1	97.0	96.7
Mitsui Monohikari	99.4	97.5	96.6	97.1	101.9	94.0	157.8	98.9	95.9	97.7
Van der Have H66140	99.0	98.5	99.8	98.6	100.4	100.0	110.3	0.0	97.5	98.0
Mean of App.	7004	301.3	4.97	16.54	23.46	1.48	1.62	63.3	41.12	

TEST MARKET

Variety	Rec. S/A	Rec. S/T	Leaf Spot**	Percent Sugar	Tons/ Acre	Percent LTM	Seed Vig**	% Field Emerg.	Est. Grower Return/T	Est. Grower Return/A
ACH 309 (890321)	100.5	101.5	85.9	106.9	93.4	82.5	81.3	0.0	115.0	107.4
ACH 311 (890416)	97.5	101.3	87.7	106.0	91.9	91.2	65.9	0.0	112.0	103.0
Beta 5931	98.2	101.1	80.1	104.8	93.9	77.7	122.0	0.0	112.0	105.2
Hilleshog 7505	98.1	100.4	93.4	106.5	94.3	84.5	93.1	0.0	113.9	107.5
KW 3291	102.5	103.8	99.8	108.9	98.5	79.8	90.6	0.0	118.9	117.2
Maribo 914	97.1	100.0	103.0	107.3	96.4	88.5	75.2	0.0	114.7	110.6
Seedex SX1004	97.5	101.1	84.7	106.9	91.0	81.8	156.5	0.0	115.0	104.6

*** Lower numbers indicate better resistance and vigor*

Table 8. Three Year Performance Summary of 1992 SMSC Commercial Coded Entries (All Locations)

	----Rec./Ton----					----Rec./Acre----					-Loss to Molasses-					--Cercospora Leaf Spot Ratings--				
Description	1990	1991	1992	3 Yr Mean	3 Yr % Mean	1990	1991	1992	3 Yr Mean	3 Yr % Mean	1990	1991	1992	3 Yr Mean	3 Yr % Mean	1990	1991	1992	3 Yr Mean	3 Yr % Mean
ACH 192	278.7	268.4	319.3	288.8	97.8	6790	6357	7702	6950	100.4	1.64	1.81	1.27	1.57	105.1	4.39	4.71	5.33	4.81	100.7
ACH 194	291.7	274.7	328.1	298.2	101.0	6890	6201	7618	6903	99.7	1.52	1.81	1.22	1.52	101.4	4.54	4.60	5.67	4.94	103.3
ACH 196	289.5	276.0	329.2	298.2	101.0	6529	6395	7868	6931	100.1	1.57	1.74	1.25	1.52	101.6	4.39	4.80	5.38	4.86	101.6
ACH 198	278.0	277.6	322.1	292.6	99.1	6626	6381	7192	6733	97.3	1.68	1.82	1.31	1.60	107.1	3.82	3.94	4.79	4.18	87.5
ACH 205 (895205 Aph)	275.7	270.3	312.6	286.2	97.0	6737	6264	7344	6782	98.0	1.49	1.67	1.18	1.45	96.7	3.64	3.63	4.46	3.91	81.8
ACH 301	286.9	269.2	323.3	293.1	99.3	6714	6332	7683	6910	99.8	1.56	1.84	1.28	1.56	104.3	4.96	5.06	5.33	5.12	107.1
ACH 302(890126)	289.9	286.1	327.7	301.2	102.1	6687	6690	7182	6853	99.0	1.56	1.82	1.22	1.53	102.5	4.04	3.91	4.92	4.29	89.8
Beta 2010	285.2	285.9	323.9	298.3	101.1	7058	6734	7309	7034	101.6	1.48	1.68	1.19	1.45	96.9	4.32	4.49	5.54	4.78	100.1
Beta 2988	285.3	276.3	329.1	296.9	100.6	6826	5981	7234	6680	96.5	1.46	1.72	1.17	1.45	96.9	4.46	4.31	5.33	4.70	98.4
Hilleshog 5090	278.5	262.9	317.6	286.3	97.0	6678	6397	7391	6822	98.5	1.57	1.84	1.30	1.57	104.9	4.82	4.54	5.13	4.83	101.1
Hilleshog 5135	279.9	267.1	323.6	290.2	98.3	6721	6332	7894	6982	100.9	1.60	1.86	1.31	1.59	106.3	4.64	4.71	5.38	4.91	102.8
Hilleshog 7003	283.6	278.1	313.9	291.9	98.9	6669	6080	7276	6675	96.4	1.51	1.74	1.29	1.51	101.1	3.93	3.97	5.29	4.40	92.0
HM 2401	280.9	272.3	326.5	293.2	99.3	6603	6163	7706	6824	98.6	1.56	1.76	1.23	1.52	101.4	4.61	4.66	5.21	4.83	101.0
KW 1119	301.0	284.6	334.1	306.6	103.9	6889	6129	7589	6869	99.2	1.47	1.67	1.18	1.44	96.2	5.04	4.34	5.88	5.09	106.5
KW 1800	286.4	277.7	328.6	297.6	100.8	7161	6729	8269	7386	106.7	1.52	1.78	1.20	1.50	100.2	4.61	4.49	5.83	4.98	104.1
KW 2249 (Blend)	284.9	277.2	329.9	297.3	100.7	7141	6504	7783	7143	103.2	1.48	1.70	1.19	1.46	97.3	4.96	4.69	5.75	5.13	107.4
KW 2398	285.6	273.8	338.5	299.3	101.4	6741	6252	7642	6878	99.4	1.46	1.72	1.19	1.46	97.3	4.68	4.60	5.79	5.02	105.1
KW 3145	281.9	265.1	323.3	290.1	98.3	7264	6550	7718	7177	103.7	1.50	1.78	1.20	1.49	99.8	4.71	4.63	5.38	4.91	102.7
KW 3580	280.6	280.8	341.1	300.8	101.9	7064	6413	7679	7052	101.9	1.44	1.69	1.16	1.43	95.6	4.39	4.80	5.79	4.99	104.5
KW 6770	296.3	286.1	330.0	304.1	103.0	6941	6750	7983	7225	104.4	1.39	1.67	1.16	1.41	94.0	4.61	4.46	5.33	4.80	100.5
Maribo 875	283.7	265.5	325.9	291.7	98.8	6724	6151	7563	6813	98.4	1.56	1.81	1.25	1.54	102.9	4.82	4.94	5.17	4.98	104.1
Maribo 905			320.0					7724					1.27					5.58		
Maribo 906			328.3					7257					1.30					5.46		
Mitsui Monohikari	285.7	268.0	319.4	291.0	98.6	6027	6284	7634	6648	96.0	1.38	1.65	1.13	1.39	92.7	4.07	4.06	5.54	4.56	95.4
Van der Have H66140	291.4	270.6	322.7	294.9	99.9	7019	6137	7724	6960	100.5	1.42	1.75	1.22	1.46	97.8	4.79	4.66	5.25	4.90	102.5
Mean	285.3	274.5	325.5	295.2	100.0	6804.3	6356.8	7598.6	6923.0	100.0	1.51	1.75	1.23	1.50	100.0	4.49	4.48	5.38	4.78	100.0

Table 9. Three Year Performance Summary of 1992 SMSC Commercial Coded Entries (All Locations)

	-Sugar Content (%)-					--Root Yield (T/A)--					--Seedling Vigor--					--Field Emerg (%)--				
Description	1990	1991	1992	3 Yr Mean	3 Yr % Mean	1990	1991	1992	3 Yr Mean	3 Yr % Mean	1990	1991	1992	3 Yr Mean	3 Yr % Mean	1990	1991	1992	3 Yr Mean	3 Yr % Mean
ACH 192	15.57	15.23	17.24	16.01	98.5	24.33	24.12	24.13	24.19	102.6	1.44	1.00	1.21	1.22	69.3	70.1	63.4	68.3	67.27	102.0
ACH 194	16.10	15.54	17.63	16.42	101.0	23.49	22.97	23.22	23.23	98.5	1.75	1.25	1.38	1.46	83.2	70.7	59.0	67.0	65.57	99.4
ACH 196	16.04	15.54	17.71	16.43	101.1	22.44	23.47	23.89	23.27	98.7	1.75	1.00	1.79	1.51	86.2	71.3	65.3	64.2	66.93	101.5
ACH 198	15.58	15.70	17.42	16.23	99.9	23.74	23.60	22.35	23.23	98.5	1.75	1.13	1.29	1.39	79.2	74.5	65.2	66.8	68.83	104.3
ACH 205 (895205 Aph)	15.27	15.18	16.80	15.75	96.9	24.29	23.74	23.53	23.85	101.2	1.90	1.06	1.83	1.60	91.0		71.7	68.9		
ACH 301	15.90	15.29	17.45	16.21	99.8	23.31	23.88	23.77	23.65	100.3	1.25	1.09	1.29	1.21	68.9			57.5		
ACH 302(890126)	16.05	16.12	17.61	16.59	102.1	22.91	23.78	21.94	22.88	97.0	2.04	1.00	1.63	1.56	88.7			65.0		
Beta 2010	15.74	15.98	17.39	16.37	100.7	24.66	24.03	22.58	23.76	100.8	1.58	1.56	2.33	1.82	103.9		64.9	64.3		
Beta 2988	15.72	15.53	17.63	16.29	100.2	23.83	22.15	22.00	22.66	96.1	1.75	1.94	1.96	1.88	107.3	75.6	66.6	60.0	67.40	102.2
Hilleshog 5090	15.49	14.98	17.18	15.88	97.7	23.88	24.86	23.28	24.01	101.8	1.94	1.38	1.75	1.69	96.3	71.6	59.6	55.8	62.33	94.5
Hilleshog 5135	15.59	15.21	17.49	16.10	99.0	23.87	24.12	24.41	24.13	102.4	2.19	1.63	1.54	1.79	101.8	70.7	61.3	62.2	64.73	98.1
Hilleshog 7003	15.69	15.64	16.98	16.10	99.1	23.39	22.31	23.19	22.96	97.4	3.09	2.19	2.42	2.57	146.2			67.8		
HM 2401	15.60	15.38	17.55	16.18	99.5	23.41	23.04	23.62	23.36	99.1	2.13	1.38	1.83	1.78	101.4	76.9	69.2	64.0	70.03	106.2
KW 1119	16.52	15.90	17.89	16.77	103.2	22.81	21.83	22.73	22.46	95.3	2.38	1.25	2.17	1.93	110.1	57.9	67.4	58.2	61.17	92.7
KW 1800	15.84	15.67	17.63	16.38	100.8	24.94	24.69	25.18	24.94	105.8	2.10	1.25	1.63	1.66	94.6			57.5		
KW 2249 (Blend)	15.72	15.56	17.69	16.32	100.4	24.98	23.76	23.61	24.12	102.3	1.71	1.75	2.04	1.83	104.5		62.3	62.5		
KW 2398	15.74	15.41	18.11	16.42	101.0	23.52	23.25	22.60	23.12	98.1	2.44	1.25	1.71	1.80	102.6	70.0	66.6	64.0	66.87	101.4
KW 3145	15.60	15.04	17.37	16.00	98.5	25.71	25.11	23.89	24.90	105.6	2.63	1.50	2.21	2.11	120.4	66.2	64.4	57.3	62.63	94.9
KW 3580	15.47	15.72	18.21	16.47	101.3	25.06	23.14	22.52	23.57	100.0	2.89	1.25	1.67	1.94	110.3			64.3		
KW 6770	16.21	15.97	17.66	16.61	102.2	23.35	23.93	24.20	23.83	101.1	1.78	1.48	1.75	1.67	95.1			55.4		
Maribo 875	15.75	15.08	17.55	16.13	99.2	23.58	23.52	23.24	23.45	99.5	1.56	1.13	1.25	1.31	74.8	75.2	63.3	66.0	68.17	103.3
Maribo 905			17.27					24.17					1.79					57.3		
Maribo 906			17.72					22.11					1.88					53.8		
Mitsui Monohikari	15.67	15.05	17.10	15.94	98.1	20.97	23.86	23.92	22.92	97.2	2.56	2.38	2.75	2.56	146.0	71.9	63.6	61.6	65.70	99.6
Van der Have H66140	15.99	15.27	17.36	16.21	99.7	23.97	23.17	23.95	23.70	100.5	2.63	1.55	2.04	2.07	118.1			61.6		
Mean	15.78	15.48	17.51	16.25	100.0	23.76	23.58	23.36	23.57	100.0	2.05	1.41	1.81	1.75	100.0	71.0	64.6	62.1	65.97	100.0

* 1990 vigor from 2 locations

\+ Lower numbers indicate better vigor

Table 10. Combined Analysis

1992 Southern Minnesota Semi Commerical Coded Test
American Crystal Sugar Company Research Center

39 Entries 24 RepsXlocs 3 Tests combined 2 Rows/Plot 2 Samples/Plot

Entry	Code	Rec/T Lbs		Rec/A Lbs		Loss to Mol.		Sugar %		Yield T/A	
ACH 184 (Rhiz)	185	294.7	91	5717	75	1.43	115	16.16	92	19.43	83
ACH 194 (Check)	187	329.8	101	7662	100	1.25	101	17.74	101	23.24	99
ACH 206 (895204)(Aph)	177	315.4	97	7636	100	1.26	102	17.03	97	24.24	103
ACH 309 (890321)	181	330.1	101	7399	97	1.2	97	17.7	101	22.44	96
ACH 311 (890416)	200	324.3	100	7156	94	1.33	108	17.55	100	22.09	94
ACH 9000278	188	327.0	101	7260	95	1.25	101	17.6	101	22.23	95
Beta 1252	202	325.6	100	8387	110	1.21	98	17.5	100	25.75	110
Beta 1441	175	323.1	99	7956	104	1.18	96	17.34	99	24.63	105
Beta 1492	184	331.5	102	8533	112	1.15	93	17.72	101	25.75	110
Beta 3712	198	335.9	103	8535	112	1.17	94	17.96	103	25.42	108
Beta 5931	169	324.3	100	7316	96	1.13	92	17.35	99	22.56	96
Beta 6532	191	328.3	101	8408	110	1.1	89	17.52	100	25.62	109
Hilleshog 5135 (Check)	196	322.7	99	8392	110	1.23	100	17.37	99	26.03	111
Hilleshog 7015	197	325.8	100	7695	101	1.31	106	17.6	101	23.64	101
Hilleshog 7020 (7008)	180	318.4	98	7375	97	1.23	100	17.15	98	23.18	99
Hilleshog 7027	173	325.7	100	6811	89	1.35	109	17.63	101	20.92	89
Hilleshog 7028	190	326.0	100	7324	96	1.21	98	17.51	100	22.48	96
Hilleshog 7029	172	322.4	99	7805	102	1.26	102	17.38	99	24.21	103
Hilleshog 7505	201	327.9	101	7433	97	1.23	100	17.63	101	22.67	97
HM 2412	170	320.8	99	8271	108	1.22	99	17.26	99	25.79	110
HM 2416	199	338.2	104	7776	102	1.19	96	18.1	103	23.01	98
HM 2419	183	313.7	96	7506	98	1.31	106	16.99	97	23.94	102
Holly 91N175-02	186	314.8	97	7317	96	1.29	104	17.03	97	23.24	99
Holly 91N181-02	179	326.8	100	7711	101	1.28	103	17.62	101	23.6	100
Holly HH-67 (Rhiz)	174	300.9	92	6764	89	1.26	102	16.31	93	22.49	96
Holly HH-88	203	327.7	101	7849	103	1.19	96	17.57	100	23.96	102
KW 2398 (Check)	171	339.3	104	7702	101	1.18	95	18.17	104	22.69	97
KW 3291	204	337.3	104	7979	104	1.16	94	18.03	103	23.68	101
KW 6982	195	330.9	102	7483	98	1.19	96	17.73	101	22.62	96
Maribo 875 (Check)	193	326.9	101	7788	102	1.23	99	17.57	100	23.82	101
Maribo 914	168	329.6	101	7632	100	1.29	104	17.77	102	23.16	99
Maribo 921	192	325.3	100	7820	102	1.29	104	17.55	100	24.04	102
Maribo 923	194	327.4	101	7867	103	1.28	104	17.65	101	24.02	102
Maribo 927	205	327.9	101	7004	92	1.25	101	17.64	101	21.38	91
Seedex SX1004	206	330.0	101	7218	94	1.19	96	17.69	101	21.87	93
Seedex SX1005	178	323.1	99	7269	95	1.36	110	17.52	100	22.49	96
Van der Have H66156	182	330.7	102	8213	107	1.21	98	17.75	101	24.85	106
Van der Have H66168	176	327.0	101	8236	108	1.23	100	17.58	100	25.21	107
Van der Have H66171	189	330.0	101	7852	103	1.19	96	17.69	101	23.79	101
General Mean		325.31		7642.46		1.24		17.50		23.49	
Coeff. of Var. (%)		2.34		6.35		6.75		1.92		6.21	
Variety Mean Square		1791.44		7348762.95		0.10		3.76		50.54	
Error Mean Square B		57.99		235600.16		0.01		0.11		2.13	
F Value		30.89 **		31.19 **		15.02 **		33.34 **		23.72 **	
L.S.D. (.05)		4.20		267.94		0.05		0.19		0.81	
L.S.D. (.01)		5.16		328.69		0.06		0.23		0.99	

* Significant at 5% ** Significant at 1% ns Not significant

Second column for each trait is percent of check. General Mean used as check.

Table 11. Combined Analysis

1992 Southern Minnesota Semi Commerical Coded Test
American Crystal Sugar Company Research Center

39 Entries 24 RepsXlocs 3 Tests combined 2 Rows/Plot 2 Samples/Plot

Entry	Code	Na ppm		K ppm		Am N. pp		Gross/A Lb	
ACH 184 (Rhiz)	185	209	119	1827	99	545	134	6271	76
ACH 194 (Check)	187	189	108	1927	105	387	95	8244	100
ACH 206 (895204)(Aph)	177	151	86	1717	93	467	115	8248	100
ACH 309 (890321)	181	134	77	1850	100	387	95	7937	97
ACH 311 (890416)	200	159	91	1856	101	483	119	7746	94
ACH 9000278	188	142	81	1854	101	427	105	7818	95
Beta 1252	202	174	99	1839	100	389	96	9012	110
Beta 1441	175	187	107	1797	98	373	92	8541	104
Beta 1492	184	150	86	1748	95	370	91	9124	111
Beta 3712	198	158	90	1729	94	390	96	9130	111
Beta 5931	169	152	87	1674	91	379	93	7829	95
Beta 6532	191	151	87	1728	94	342	84	8974	109
Hilleshog 5135 (Check)	196	214	122	1788	97	403	99	9036	110
Hilleshog 7015	197	195	112	2028	110	405	100	8314	101
Hilleshog 7020 (7008)	180	143	82	1803	98	426	105	7948	97
Hilleshog 7027	173	145	83	1840	100	503	124	7375	90
Hilleshog 7028	190	148	85	1817	99	400	98	7868	96
Hilleshog 7029	172	200	115	1952	106	387	95	8417	102
Hilleshog 7505	201	171	98	1861	101	400	98	7993	97
HM 2412	170	156	89	1828	99	405	100	8900	108
HM 2416	199	179	102	1693	92	407	100	8326	101
HM 2419	183	191	109	2126	115	379	93	8133	99
Holly 91N175-02	186	246	141	1907	104	406	100	7918	96
Holly 91N181-02	179	193	111	1966	107	397	98	8315	101
Holly HH-67 (Rhiz)	174	189	108	1847	100	420	103	7332	89
Holly HH-88	203	156	89	1735	94	403	99	8420	102
KW 2398 (Check)	171	175	100	1791	97	372	91	8237	100
KW 3291	204	151	86	1805	98	369	91	8532	104
KW 6982	195	149	85	1862	101	373	92	8022	98
Maribo 875 (Check)	193	195	111	1881	102	381	94	8373	102
Maribo 914	168	183	105	1985	108	404	99	8228	100
Maribo 921	192	216	124	1950	106	399	98	8438	103
Maribo 923	194	209	120	1913	104	410	101	8484	103
Maribo 927	205	182	104	1850	100	410	101	7538	92
Seedex SX1004	206	162	93	1752	95	399	98	7740	94
Seedex SX1005	178	168	96	1872	102	499	123	7883	96
Van der Have H66156	182	166	95	1810	98	398	98	8816	107
Van der Have H66168	176	173	99	1825	99	407	100	8859	108
Van der Have H66171	189	204	117	1789	97	370	91	8416	102
General Mean		174.76		1841.55		406.84		8223.97	
Coeff. of Var. (%)		19.68		5.73		11.34		6.25	
Variety Mean Square		15595.53		208997.05		40006.32		7793178.9	
Error Mean Square B		1182.44		11115.75		2129.12		264137.78	
F Value		13.19 **		18.80 **		18.79 **		29.50 **	
L.S.D. (.05)		18.98		58.20		25.47		283.70	
L.S.D. (.01)		23.29		71.40		31.25		348.03	

* Significant at 5% ** Significant at 1% ns Not significant

Second column for each trait is percent of check. General Mean used as check.

Table 12. Combined Analysis

1992 Southern Minnesota Semi Commerical Coded Test
American Crystal Sugar Company Research Center

39 Entries   24 RepsXlocs   3 Tests combined   2 Rows/Plot   2 Samples/Plot

Entry		Code	Bolters %	Vigor		Tare %	
ACH 184 (Rhiz)		185	0.00	1.58	88	6.7	98
ACH 194 (Check)		187	0.00	1.33	74	6.8	100
ACH 206 (895204)(Aph)		177	0.00	1.21	67	6.9	101
ACH 309 (890321)		181	0.00	1.50	83	7.1	105
ACH 311 (890416)		200	0.00	1.21	67	6.8	100
ACH 9000278		188	0.00	1.42	78	7.6	111
Beta 1252		202	0.00	1.54	85	6.1	90
Beta 1441		175	0.00	1.96	108	5.6	83
Beta 1492		184	0.15	2.08	115	6.6	97
Beta 3712		198	0.00	1.83	102	5.7	83
Beta 5931		169	0.00	2.25	125	6.7	98
Beta 6532		191	0.00	2.33	129	6.3	92
Hilleshog 5135 (Check)		196	0.00	2.42	134	7.7	112
Hilleshog 7015		197	0.00	1.71	95	7.1	105
Hilleshog 7020 (7008)		180	0.00	2.04	113	7.5	110
Hilleshog 7027		173	0.00	2.25	125	8.0	117
Hilleshog 7028		190	0.00	2.71	150	7.4	109
Hilleshog 7029		172	0.07	1.71	95	7.2	105
Hilleshog 7505		201	0.00	1.71	95	7.2	106
HM 2412		170	0.00	1.63	90	6.2	91
HM 2416		199	0.00	1.83	102	6.5	95
HM 2419		183	0.00	1.75	97	6.2	90
Holly 91N175-02		186	0.00	1.92	106	7.7	112
Holly 91N181-02		179	0.00	1.46	81	7.1	105
Holly HH-67 (Rhiz)		174	0.15	2.08	115	7.5	111
Holly HH-88		203	0.00	1.58	88	7.0	102
KW 2398 (Check)		171	0.00	1.67	92	6.6	96
KW 3291		204	0.00	1.67	92	6.3	93
KW 6982		195	0.00	1.46	81	6.7	99
Maribo 875 (Check)		193	0.07	1.25	69	6.8	100
Maribo 914		168	0.00	1.38	76	7.0	102
Maribo 921		192	0.00	1.83	102	6.7	98
Maribo 923		194	0.00	1.42	78	6.9	101
Maribo 927		205	0.00	2.38	132	7.0	103
Seedex SX1004		206	0.00	2.88	159	7.0	103
Seedex SX1005		178	0.00	2.58	143	6.4	94
Van der Have H66156		182	0.00	1.33	74	6.8	99
Van der Have H66168		176	0.07	2.13	118	6.0	88
Van der Have H66171		189	0.00	1.42	78	6.6	97
	General Mean		0.01	1.81		6.82	
	Coeff. of Var. (%)		1158.27	30.45		24.62	
	Variety Mean Square		0.03	4.42		6.95	
	Error Mean Square B		0.02	0.30		2.82	
	F Value		1.46	14.62 **		2.46 **	
	L.S.D. (.05)		ns	0.30		0.93	
	L.S.D. (.01)		ns	0.37		1.14	

* Significant at 5%   ** Significant at 1%   ns Not significant
Second column for each trait is percent of check. General Mean used as check.
Vigor data collected from 3 locations.

Table 13

1992 Cercospora Readings for Coded Test Entries
Betaseed Nursery – Shakopee, MN

Ent	Code	Description	Average Rating for Each Date *						1992 Mean	2 Yr Mean	3 Yr Mean	3 Yr % Mean	1991	1990
			7/28	8/3	8/7	8/10	8/17	8/24						
102	185	ACH 184 (Rhiz)	2.75	4.00	4.75	5.75	5.75	6.25	4.88					3.54
7	7	ACH 192	3.25	4.50	5.25	5.75	6.25	7.00	5.33	5.02	4.81	99.9	4.71	4.39
19	19	ACH 194	3.75	4.50	5.50	6.00	7.00	7.25	5.67	5.13	4.94	102.5	4.60	4.54
9	9	ACH 196	3.25	4.25	5.00	6.00	6.75	7.00	5.38	5.09	4.86	100.9	4.80	4.39
42	74	ACH 198	2.75	3.75	4.50	5.75	5.75	6.25	4.79	4.37	4.18	86.9	3.94	3.82
38	49	ACH 205	2.25	3.50	4.25	5.25	5.50	6.00	4.46	4.04	3.91	81.2	3.63	3.64
95	162	ACH 206 (895204)	3.00	4.25	5.25	5.75	6.50	6.75	5.25	4.66				
24	24	ACH 301	3.50	4.50	5.00	5.75	6.25	7.00	5.33	5.2	5.12	106.3	5.06	4.96
43	79	ACH 302 (890126)	3.00	3.75	4.50	5.75	6.00	6.50	4.92	4.41	4.29	89.1	3.91	4.04
109	304	ACH 306 (Rhiz)	2.75	4.00	4.75	5.75	6.00	6.00	4.88	4.45			4.03	
76	120	ACH 307 (890374)	3.00	4.00	4.50	5.75	5.75	6.50	4.92	4.44			3.97	
101	181	ACH 309 (890321)	2.25	3.75	4.50	5.50	5.50	6.25	4.63	4.27			3.91	
57	98	ACH 310 (890323)	2.75	3.50	4.75	5.75	6.50	7.00	5.04	4.79			4.54	
106	200	ACH 311 (890416)	2.50	3.50	4.75	5.75	5.75	6.00	4.71	4.35			4.00	
53	94	ACH 890286	3.75	4.50	5.50	6.00	6.75	7.25	5.63	5.35			5.08	
87	141	ACH 890421	3.00	3.50	4.75	5.50	6.00	6.00	4.79	4.23			3.66	
72	116	ACH 9000278	3.25	3.75	5.00	6.00	6.25	6.25	5.08					
49	90	ACH 9000505	2.25	3.50	4.25	5.50	5.75	6.00	4.54					
75	119	Beta 1252	3.50	4.75	5.25	6.25	7.00	7.00	5.63					
62	104	Beta 1441	3.50	4.25	5.25	6.25	6.25	7.00	5.42	5.08			4.74	
55	96	Beta 1471	3.75	5.00	6.00	6.75	7.75	8.00	6.21	5.52			4.83	
81	125	Beta 1492	3.25	4.50	5.50	6.00	6.25	7.00	5.42					
30	30	Beta 2010	3.25	4.25	5.50	6.25	6.50	7.50	5.54	5.02	4.78	99.4	4.49	4.32
5	5	Beta 2988	3.25	4.25	5.00	6.00	6.50	7.00	5.33	4.82	4.7	97.7	4.31	4.46
77	121	Beta 3222	3.25	4.25	5.25	5.75	7.00	7.00	5.42					
69	113	Beta 3712	3.75	4.75	5.75	6.50	7.25	7.75	5.96					
97	169	Beta 5931	2.25	3.25	3.75	5.00	5.50	6.00	4.29	3.98			3.66	
90	148	Beta 6002	3.00	4.25	5.25	6.25	6.25	7.00	5.33					
45	86	Beta 6532	3.75	4.50	5.25	6.00	6.50	7.25	5.54					
16	16	Bush Johnson 1320	3.50	4.50	5.25	6.00	6.50	6.75	5.42	5.01	4.9	101.8	4.60	4.68
2	2	Bush Johnson 1330	3.75	4.75	5.25	6.00	6.50	7.00	5.54	5.11	5.03	104.4	4.68	4.86
31	31	Bush Johnson 1337	3.25	4.25	5.25	6.00	6.75	7.00	5.42	5.09	4.91	102	4.77	4.54
21	21	Bush Johnson 1340	3.50	4.75	5.50	6.00	6.75	7.50	5.67	5.32	5.14	106.8	4.97	4.79
46	87	Bush Johnson 1371	3.75	4.50	5.50	6.00	6.50	7.00	5.54					
74	118	Bush Johnson 1372	3.50	4.25	5.75	6.00	6.75	7.00	5.54					
59	100	Bush Johnson 1373	3.25	4.50	5.25	6.25	7.25	7.00	5.58					
1	1	Hilleshog 5090	3.00	4.25	5.00	5.75	6.00	6.75	5.13	4.83	4.83	100.3	4.54	4.82
13	13	Hilleshog 5135	2.75	4.25	5.00	6.25	6.75	7.25	5.38	5.04	4.91	102	4.71	4.64
35	39	Hilleshog 7003	3.00	4.00	5.50	6.00	6.50	6.75	5.29	4.63	4.4	91.3	3.97	3.93
105	197	Hilleshog 7015	3.00	4.00	4.75	6.00	6.75	7.00	5.25	4.97			4.69	
70	114	Hilleshog 7017	3.25	4.25	5.50	6.00	7.00	7.25	5.54	5.37			5.20	
37	47	Hilleshog 7020 (7008)	3.25	4.25	5.00	6.00	6.25	6.75	5.25	4.54			3.83	
78	122	Hilleshog 7024	3.50	5.00	5.75	6.75	7.75	8.50	6.21					
51	92	Hilleshog 7025	3.25	4.25	5.25	6.00	7.00	7.25	5.50					
89	147	Hilleshog 7027	3.00	3.75	4.75	5.75	6.25	7.00	5.08					
104	190	Hilleshog 7028	2.75	3.75	5.00	6.00	6.25	7.00	5.13					
98	172	Hilleshog 7029	3.00	4.00	5.00	6.00	6.50	7.00	5.25					
73	117	Hilleshog 7505	3.25	3.75	5.00	5.75	6.50	6.75	5.17	4.64			4.11	
27	27	Hilleshog 8277	3.75	4.75	5.75	6.50	7.50	7.25	5.92	5.46	5.41	112.4	5.00	5.32
34	35	Hilleshog 8351	3.50	4.25	5.50	6.00	6.75	7.00	5.50	5.09	4.96	103.1	4.68	4.71
80	124	HM 1114	3.75	5.00	5.50	6.50	7.00	7.50	5.88					
11	11	HM 2401	3.00	4.00	5.00	5.75	6.50	7.00	5.21	4.93	4.83	100.3	4.66	4.61
39	51	HM 2412	2.50	4.00	4.75	5.75	6.50	6.50	5.00	4.44	4.39	91.2	3.88	4.29

Table 13 (Continued)

44	85	HM 2416	3.50	4.50	5.25	6.50	7.00	7.75	5.75	5.16			4.57	
54	95	HM 2417	3.25	4.25	5.75	6.75	7.00	7.75	5.79					
56	97	HM 2418	3.00	4.25	5.00	5.75	6.50	6.50	5.17					
86	140	HM 2419	3.00	4.25	5.25	6.25	6.50	7.00	5.38					
110	305	HM RH01 (Rhiz)	2.50	4.00	4.75	5.50	6.00	6.25	4.83	4.37	4.16	86.5	3.91	3.75
96	163	Holly 91N171-02	3.25	4.50	5.00	6.00	6.75	7.00	5.42					
58	99	Holly 91N173-02	2.50	3.75	4.00	5.75	6.00	6.00	4.67					
103	186	Holly 91N175-02	2.75	3.75	4.75	5.50	5.75	6.75	4.88					
100	179	Holly 91N181-02	3.50	4.50	5.75	5.75	6.75	7.00	5.54					
92	154	Holly 91N188-02	3.50	4.50	5.25	6.00	6.25	7.00	5.42					
65	107	Holly 91N189-02	3.00	4.00	4.75	5.75	6.25	7.00	5.13					
93	157	Holly HH-67 (Rhiz)	3.25	4.50	5.25	6.00	6.50	7.00	5.42					
47	88	Holly HH-88	3.75	4.75	5.50	6.75	7.50	7.75	6.00					
12	12	KW 1119	3.75	4.50	5.75	6.50	7.00	7.75	5.88	5.11	5.09	105.6	4.34	5.04
22	22	KW 1745	3.25	4.25	5.50	6.25	6.75	7.00	5.50	5.15	5.04	104.7	4.80	4.82
26	26	KW 1800	4.00	4.50	5.75	6.25	7.00	7.50	5.83	5.16	4.98	103.4	4.49	4.61
6	6	KW 2249 (Blend)	3.50	4.50	5.75	6.50	7.00	7.25	5.75	5.22	5.13	106.6	4.69	4.96
79	123	KW 2262 (Blend)	3.25	4.50	5.25	6.25	6.75	7.00	5.50					
3	3	KW 2398	3.75	4.75	5.75	6.25	7.00	7.25	5.79	5.2	5.02	104.4	4.60	4.68
41	61	KW 3145	3.50	4.25	5.25	5.75	6.25	7.25	5.38	5	4.91	101.9	4.63	4.71
64	106	KW 3291	3.50	4.50	5.50	6.25	6.75	7.25	5.63	4.95			4.28	
18	18	KW 3580	3.50	4.75	6.00	6.50	7.00	7.00	5.79	5.3	4.99	103.7	4.80	4.39
28	28	KW 6770	3.25	4.25	5.25	6.00	6.25	7.00	5.33	4.9	4.8	99.7	4.46	4.61
68	111	KW 6982	3.00	4.50	5.25	6.00	6.25	7.00	5.33					
10	10	Maribo 403	3.50	4.50	5.50	6.25	7.00	7.00	5.63	5.21	4.91	101.9	4.80	4.29
32	32	Maribo 410	3.25	4.25	5.25	5.75	6.25	7.00	5.29	4.85	4.74	98.6	4.40	4.54
25	25	Maribo 862	3.75	4.50	5.50	6.50	7.00	7.25	5.75	5.26	5.04	104.8	4.77	4.61
4	4	Maribo 875	3.00	4.25	4.75	5.75	6.25	7.00	5.17	5.05	4.98	103.4	4.94	4.82
40	58	Maribo 897	3.25	4.25	5.25	6.00	6.75	7.00	5.42	5.12	5.1	105.9	4.83	5.04
15	15	Maribo 905	3.50	4.75	5.00	6.00	7.00	7.25	5.58	5.14	5.01	104	4.69	4.75
33	33	Maribo 906	3.25	4.25	5.50	6.25	6.50	7.00	5.46	5.23	4.96	103.1	5.00	4.45
48	89	Maribo 914	3.25	4.00	5.25	6.00	6.50	7.00	5.33	5.12			4.91	
71	115	Maribo 921	3.25	4.50	5.25	6.50	6.75	7.25	5.58					
84	128	Maribo 922	3.25	4.00	5.25	5.75	7.00	7.00	5.38					
52	93	Maribo 923	3.00	4.50	5.25	6.00	7.00	7.00	5.46					
107	205	Maribo 927	2.75	3.75	4.75	5.75	6.00	6.75	4.96					
23	23	Maribo Ultramono	3.75	4.50	5.50	6.00	6.50	7.00	5.54	5.26	4.98	103.5	4.97	4.43
14	14	Mitsui Monohikari	3.75	4.75	5.25	6.25	6.25	7.00	5.54	4.8	4.56	94.7	4.06	4.07
60	101	Seedex SX0804	3.25	4.00	4.50	5.25	5.75	6.50	4.88	4.64			4.40	
83	127	Seedex SX0805	3.00	4.50	5.25	6.25	7.00	7.00	5.50					
50	91	Seedex SX0806	3.50	4.50	5.50	6.00	7.00	7.00	5.58					
66	108	Seedex SX0807	3.50	4.00	4.75	5.75	6.25	6.50	5.13					
36	43	Seedex SX0902	3.50	4.00	4.75	6.00	6.00	6.50	5.13	4.75	4.45	92.5	4.37	3.86
94	158	Seedex SX0903	3.75	4.75	5.75	6.50	7.00	7.50	5.88					
88	142	Seedex SX0904	3.50	4.50	5.25	6.00	7.00	7.00	5.54					
91	151	Seedex SX0905	3.00	4.25	5.25	6.25	6.25	7.00	5.33					
8	8	Seedex SX1	3.25	4.00	5.00	5.75	6.25	6.75	5.17	4.66	4.48	93	4.15	4.11
108	206	Seedex SX1004	2.75	3.50	4.25	5.50	5.50	6.00	4.58	4.21			3.83	
99	178	Seedex SX1005	2.25	3.75	4.75	5.75	5.75	6.00	4.71					
20	20	Seedex SX2(SX-0802)	3.50	3.75	5.00	5.75	6.75	6.75	5.25	4.3	4.27	88.6	3.34	4.21
29	29	Van der Have H66140	3.00	4.00	5.00	6.00	6.75	6.75	5.25	4.96	4.9	101.8	4.66	4.79
17	17	Van der Have H66156	3.50	4.50	5.50	6.00	7.00	7.50	5.67	5.36	5.21	108.1	5.06	4.89
61	103	Van der Have H66168	3.75	5.00	5.50	6.25	7.25	7.25	5.83	5.37			4.91	
82	126	Van der Have H66169	3.25	4.75	5.50	6.00	7.00	7.50	5.67	5.12			4.57	
67	110	Van der Have H66170	3.75	4.75	5.50	6.25	7.00	7.25	5.75	5.22			4.68	
85	131	Van der Have H66171	3.75	5.00	6.00	6.25	7.00	7.50	5.92	5.4			4.88	
63	105	Van der Have H66181	3.75	4.50	6.00	6.25	6.75	7.75	5.83					
		Mean	3.24	4.27	5.18	6.00	6.55	6.96	5.37	4.92	4.81	100.00		

Table 14

Rhizoctonia Resistance Evaluation of ACS Entries
USDA-ARS, Fort Collins, CO, 1992

Entry	DI	% Hlth	% Hrvst	Z% Hlth	Z% Hrvst
ACH 184	0.45	98.0	100.0	86.3	90.0
ACH 306	0.64	98.8	100.0	87.1	90.0
HM RH-1	0.7	97.5	100.0	85.9	91.0
Holly HH-67	0.82	95.5	99.0	82.2	87.4
Susc check	1.01	87.8	93.1	73.0	76.5
High resist check	0.75	96.9	98.5	83.6	86.8
Resist check	0.82	94.6	100.0	81.4	90.0
LSD .05	0.35			9.7	5.7

DI = Disease index (scale of 0-7, with 0 = no rot and 7 = plant dead).
% Hlth = Percent healthy roots (classes 0 + 1).
% Hrvst = Percent of roots in classes 0 thru 3.
Z% Hlth = Arcsin transformation of % data on which ANOVA was performed.
Z% Hrvst = Arcsin transformation of % data on which ANOVA was performe

Disease Rating for Sugarbeet Seedlings Following Inoculation
with Aphanomyces cochlioides oospores
Texas A & M University, 1992

Entry	Disease Rating *
ACH 198	5.7 ab+
ACH 205	3.5 bc
ACH 206	5.2 ab
Susceptible Ck (HH39)	6.6 a
Resistant Ck (85303-0)**	2.1 c

* Rating system form 0 = immune and 9 = extremely susceptible.
** A multigerm parental line supplied by Claire Theurer.
+ Means followed by the same letter are not significantly different according to Duncan's Test (P = 0.05).

DATE OF HARVEST SUMMARY

OBJECTIVES

Evaluate varieties for relative root yields and quality characteristics harvested early (mid prepile), mid (beginning full harvest) and late (late full harvest).

EXPERIMENTAL PROCEDURES

Trials were planted at seven locations in 1990 and 1991 in which six locations were harvested. Trials were planted at four locations in 1992 in which three locations were harvested.

The 12 varieties that were planted in 1992 were:

ACH 198	KW 1119
ACH 194	KW 1800
ACH 302	KW 6770
Hilleshog 5135	KW 2249
Hilleshog 7003	KW 3580
KW 2398	Beta 2010

Varieties ACH 198, KW 2398 and Hilleshog 5135 have been tested for three or more years. Varieties ACH 194, KW 1119, and 2249 have been tested for two years. The remaining varieties are relatively new varieties being tested only one year.

The experimental units in 1990, and 1991 consisted of two row strip trials planted and maintained with the cooperators equipment. Experimental units in 1992 were arranged in a split plot design. The dates of harvest were split into three intervals; early, mid, and late harvest. The dates of harvest were September 14, 17, 10 for early harvest; October 10, 5, 2 for mid harvest; and October 24, 18, 21 for late harvest in 1990, 1991, and 1992, respectively.

RESULT AND DISCUSSION

The basis for this trial is to provide sugarbeet grower with information to produce the highest quality crop obtainable. At this time sugar accumulation early in the harvest season is as important as its ever been in the history of SMSC. A variety that produces high sugar percent early is in even greater need, due to the expansion in acres that SMSC is experiencing. The acreage expansion means that sugarbeets may have to be harvested earlier than has been experienced in the past. Thus, varieties that obtain high percent sugar early will be needed to maintain the economic advantage of an expansion.

The sugar percent needs to be accumulated early with substantial increases as the harvest season progresses. Thus, multiple variety and management practices will be used to obtain these goals. The combination of a high sugar variety plus proper fertility practices will be needed to obtain high early sugar percents. Full season varieties and fertility programs to match this program will be used for optimum sugar production.

The 1992 growing season was cool with moderate to above normal precipitation. The climatic conditions produced a crop in quantity and quality that will be hard to exceed. To exceed such crop there is a combination of conditions that need to occur.

1) Growers need to conduct proper production practices for top yields.

2) SMSC Agricultural staff and other agricultural agencies need to properly advise growers on production practices.

3) Research needs to be conducted to give growers the tools to obtain top production and variety selection is an integral part of this program.

VARIETY PERFORMANCE

Data are presented in Tables 1-5. Sugar percent (Table 3) increase from early to late harvest averaged 3.08 percent. This increase was 0.22 percent less than 1991 and 0.4 percent higher than 1990. Sugar percent was .85 to 1.72 percent higher in 1992 than in 1990 or 1991 dependent on time of harvest. Hilleshog 7003 ranked number one regardless of time of harvest. However, sugar percent with Hilleshog 7003 was not significantly different from the other variety at the early and late harvest. Sugar percent at mid harvest showed Hilleshog 7003 being similar to the remaining top six varieties.

Loss to molasses (LTM) was nonsignificant regardless of time of harvest. The relatively low LTM at early harvest decreased 0.13 percent from early to late harvest. This is slightly higher than the change that has occurred over the last few years since LTM records have been recorded. The data obtained in this trial over the last three years (LTM first recorded in 1990) indicated that LTM does not change to a great degree from early to late harvest. This lack of change is unlike that observed in the other yield factors. This may indicate that LTM in relation to time of harvest may not be as important as sugar percent, tons/acre, recoverable sugar/acre or recoverable sugar/ton. However, this is not to discredit the importance of a low LTM regardless of time of harvest.

Root yield average increase was 3.81 tons per acre from early to late harvest. This increase is slightly above the average increase observed over the last six years of 3.40. Seed varieties were different only at the early harvest. However, the top ten varieties performed equally at the early planting. Root yield was statistically equal among all varieties at the mid ad late harvest date. The increase from early to mid harvest was significant with all varieties. The change from mid to late harvest varied in significance depending on variety. This indicates that the change was generally greatest from mid to early harvest for ton per acre.

Recoverable sugar per ton average increase was 66.66 pounds from early to late harvest. Hilleshog 7003 produced the highest recoverable sugar per acre at early, mid, and late harvest times. However, recoverable sugar per acre was not significantly different from the other varieties at early and late harvest. Recoverable sugar per acre for Hilleshog 7003 was equal to the top eight varieties. Thus, Hilleshog 7003 produced recoverable sugar per acre greater than only four other varieties.

Recoverable sugar per acre average increase was 2748.9 from early to late harvest. This increase has been exceeded only once in 1988 when the increase from early to late harvest was 3272. All varieties performed equally at all harvest times. All varieties increased from early to mid and mid to late harvest except for ACH 302 and Beta 2010 at the mid to late harvest time interval. This is due to the lack of an increase in ton/acre at the mid to late harvest time interval for these varieties. These two varieties may have peaked in ton/acre at the mid harvest time. This indicates that these two varieties should be harvested at or before mid harvest (early October).

Varieties could be chosen for early, mid, and late harvest by considering rank of varieties with recoverable sugar per acre.

The following varieties ranked in the top five for recoverable sugar per acre.

EARLY	MID	LATE
Hilleshog 7003	Beta 2010	Hilleshog 7003
KW 2249	Hilleshog 7003	KW 1800
Hilleshog 5135	ACH 302	KW 2398
KW 1119	KW 2249	KW 6770
ACH 194	KW 6770	ACH 194

However, remember that all varieties performed equally within the harvest times for recoverable sugar per acre.

Average deviation from the mean for each variety tested in 1992 is presented in figure 1-5 for sugar percent, tons/acre, loss to molasses, recoverable sugar per ton, and recoverable sugar per acre.

These data indicate which varieties would be best harvested at early, mid or late harvest in relation to the mean. A grower may want to consider certain varieties for various harvest dates depending on the quality or quantity a variety produces at various dates.

When considering factors such as percent sugar, LTM and tons/acre one must realize these factors make up recoverable sugar per acre. Recoverable sugar per acre dictates a growers income per acre and consequently, profit. ACH 198 produced below average recoverable sugar per acre regardless of harvest time. However, ACH 198 is well known for the root disease tolerance it possesses. KW 2398 produced recoverable sugar per acre close to the mean except at late harvest where it was 157.8 pounds above average. Hilleshog 5135 produced above average sugar early, but was below average later in the growing season. ACH 194 was close to average regardless of harvest time. KW 1119 was best harvested for recoverable sugar per acre at early or late harvest time. KW 2249 produced above average recoverable sugar per acre at all harvest times. However, KW 2249 seemed to be best harvested at early or mid harvest. ACH 302 production of recoverable sugar per acre was best at mid harvest and dramatically below average at late harvest. Beta 2010 was best harvested at mid harvest for recoverable sugar per acre. KW 3580, 1800, and 6770 were best harvested at the late harvest time. Hilleshog 7003 produced recoverable sugar per acre dramatically above average regardless of harvest time.

All varieties approved by SMSC are excellent varieties for sugar production. This is evident in the closeness to the mean in the data presented earlier in this article. Thus, a grower could choose from any of the approved varieties and maintain their potential for top sugar production. Certain varieties may produce a higher recoverable sugar per acre than others at a given harvest time.

A grower can obtain this top production by selecting the proper seed for the different harvest times and for this decision one should consider the data presented here.

Table 1. Combined locations performance of date of harvest trials harvested early mid and late for recoverable sugar per acre.

Variety	Rank	Early Mean	Rank	Mid Mean	Rank	Late Mean	Change E->L	Early Mean	Mid % Mean	Late % Mean	Early 2 yr. Mean 91-92	Mid 2 yr. Mean 91-92	Late 2 yr. Mean 91-92	Early 3 yr. Mean 90-92	Mid 3 yr. Mean 90-92	Late 3 yr. Mean 90-92
ACH 198	9	6342.8	11	8261.1	9	9126.5	2783.7	98.8	96.9	99.5	5955.1	6996.5	7825.4	5714.0	6879.3	7111.2
KW 2398	8	6364.3	6	8550.4	3	9325.4	2961.1	66.1	100.3	101.7	6112.1	7362.3	8115.5	5941.7	6818.8	7522.8
HILL. 5135	3	6602.0	8	8389.5	11	8872.5	2270.5	102.8	98.4	96.7	5957.9	7144.2	7793.9	5832.2	6673.4	7427.0
ACH194	5	6519.5	7	8522.3	5	9263.2	2743.7	101.5	100.0	101.0	6103.5	7349.7	8256.2			
KW 1119	4	6525.3	12	8045.8	6	9251.3	2726.0	101.6	94.4	100.9	6027.5	6821.3	8038.5			
KW 2249	2	6651.2	4	8680.5	8	9213.6	2562.4	103.6	101.8	100.5	6145.5	7327.8	8154.3			
ACH 302	7	6466.3	3	8758.7	12	8793.3	2327.0	100.7	102.8	95.9						
BETA 2010	6	6501.8	1	8939.9	10	8929.9	2428.1	101.2	104.9	97.4						
KW 3580	11	6105.4	9	8334.2	7	9230.8	3125.4	65.1	97.8	100.7						
KW 1800	12	5997.6	10	8294.4	2	9374.4	3376.8	93.4	97.3	102.2						
KW 6770	10	6255.5	5	8583.8	4	9271.4	3015.9	97.4	100.7	101.1						
HILL. 7003	1	6734.2	2	8915.9	1	9400.4	2666.2	104.9	104.6	102.5						
Loc. Mean		6422.2		8523.0		9171.1	2748.9	100.0	100.0	100.0						
LSD (0.05) (with in dates)		705.8		956.8		859.2										
LSD (0.05) (across dates)		--------	----	345.3	----	--------										
C.V. %		--------	----	15.21	----	--------										

Table 2. **Combined locations performance of 1992 varieties harvested early, mid, and late for recoverable sugar per ton.**

							Recoverable Sugar Per Ton									
Variety	Rank	Early Mean	Rank	Mid Mean	Rank	Late Mean	% Change E->L	Early % Mean	Mid % Mean	Late % Mean	EARLY 2YR MEAN 91-92	MID 2YR MEAN 91-92	LATE 2YR MEAN 91-92	EARLY 3YR MEAN 90-92	MID 3YR MEAN 90-92	LATE 3YR MEAN 90-92
ACH 198	5	269.1	11	309.2	6	330.8	61.70	100.4	98.2	100.0	255.4	295.0	323.0	245.7	292.5	306.5
KW 2398	10	265.1	6	315.1	7	330.3	65.20	98.9	100.0	99.9	255.5	297.2	321.5	246.8	290.6	306.8
HILL. 5135	11	263.7	10	310.4	10	328.8	65.10	98.3	98.6	99.4	252.6	293.0	316.6	244.3	290.0	306.3
ACH 194	4	269.9	5	316.6	3	333.4	63.50	100.7	100.5	100.8	257.9	298.8	323.0			
KW 1119	2	271.7	12	308.4	8	328.9	57.18	101.3	97.9	99.4	258.2	291.9	321.1			
KW 2249	12	261.9	9	313.4	8	330.0	68.10	97.7	99.5	99.8	252.8	296.8	320.9			
ACH 302	6	269.0	2	319.1	11	327.6	58.60	100.3	101.3	99.0						
BETA 2010	7	268.4	3	318.4	4	332.2	63.82	100.1	101.1	100.4						
KW 3580	3	270.4	8	314.0	5	330.9	60.55	100.8	99.7	100.0						
KW 1800	9	267.1	7	314.3	2	335.3	68.20	99.6	99.8	101.4						
KW 6770	8	268.3	4	318.2	12	325.6	57.31	100.1	101.0	98.4						
HILL. 7003	1	273.1	1	322.5	1	335.7	62.60	101.9	102.4	101.5						
Loc. Mean		268.14		314.97		330.79	62.66	100.00	100.00	100.00						
LSD (0.05) (within dates)		12.01		8.87		10.07										
LSD (0.05) (across dates)		--------4.23--------														
C.V. %		--------4.92--------														

Table 3. Combined locations performance of 1992 varieties harvested early, mid, and late for sugar percent.

		Sugar Percent									EARLY	MID	LATE	EARLY	MID	LATE
											2YR	2YR	2YR	3YR	3YR	3YR
		Early		Mid		Late	Change	Early	Mid	Late	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN
Variety	Rank	Mean	Rank	Mean	Rank	Mean	E->L	%Mean	%Mean	%Mean	91-92	91-92	91-92	90-92	90-92	90-92
ACH 198	5	14.45	11	16.48	6	17.49	3.04	100.6	98.5	100.2	13.83	15.84	17.20	13.83	15.84	17.20
KW 2398	8	14.26	6	16.80	4	17.54	3.27	99.2	100.5	100.5	13.83	15.95	17.12	13.73	16.00	17.22
HILL. 5135	9	14.26	10	16.53	9	17.38	3.12	99.2	98.8	99.6	13.73	15.72	16.89	13.73	15.87	17.14
ACH 194	10	14.24	5	16.82	3	17.61	3.37	99.1	100.6	100.9	13.87	16.01	17.21			
KW 1119	2	14.69	12	16.46	10	17.37	2.68	102.2	98.4	99.5	14.00	15.68	17.09			
KW 2249	12	14.11	9	16.67	8	17.43	3.32	98.2	99.7	99.9	13.70	15.94	17.12			
ACH 302	3	14.53	2	16.97	11	17.34	2.81	101.1	101.4	99.3						
BETA 2010	7	14.41	3	16.90	5	17.53	3.13	100.2	101.1	100.5						
KW 3580	4	14.52	7	16.74	7	17.44	2.92	101.0	100.1	99.9						
KW 1800	6	14.42	8	16.71	2	17.65	3.23	100.3	99.9	101.1						
KW 6770	11	14.20	4	16.88	12	17.20	3.00	98.8	100.9	98.6						
HILL. 7003	1	14.70	1	17.14	1	17.66	2.96	102.3	102.5	101.2						
Loc. Mean		14.37		16.72		17.45	3.08	100.0	100.0	100.0						
LSD (0.05) (with in dates)		0.58		0.42		0.46										
LSD (0.05) (across dates)		-------0.72----------														
C.V. %		-------4.35----------														

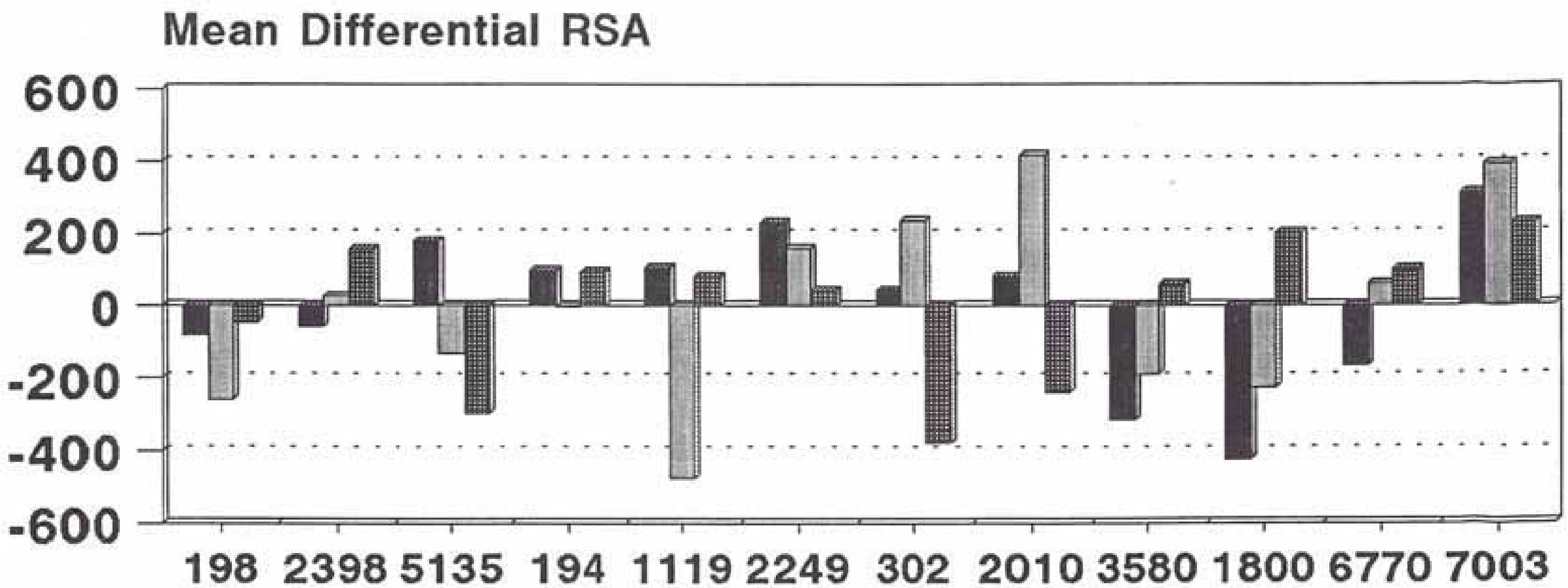
Table 4. Combined locations performance of 1992 varieties harvested early, mid, and late for Root Yield.

Variety	Rank	Early Mean	Rank	Mid Mean	Rank	Root Yield Late Mean	% Change E->L	Early % Mean	Mid % Mean	Late % Mean	EARLY 2YR MEAN 91-92	MID 2YR MEAN 91-92	LATE 2YR MEAN 91-92	EARLY 3YR MEAN 90-92	MID 3YR MEAN 90-92	LATE 3YR MEAN 90-92
ACH 198	9	23.57	8	26.81	9	27.67	4.11	98.3	98.9	99.6	21.9	23.7	25.3	20.8	23.3	23.4
KW 2398	8	24.01	5	27.20	2	28.29	4.28	100.1	100.4	101.8	23.1	24.7	26.0	22.5	24.4	24.9
HILL. 5135	2	25.06	6	27.14	10	27.06	2.00	104.5	100.2	97.4	23.2	24.6	24.5	21.8	23.3	24.2
ACH 194	6	24.14	7	26.97	8	27.86	3.72	100.7	99.5	100.2	23.0	25.1	25.5			
KW 1119	4	24.41	12	26.21	1	28.35	3.94	101.8	96.7	102.0	22.3	24.0	26.0			
KW 2249	1	25.20	2	27.78	7	28.02	2.82	105.1	102.5	100.8	23.2	25.2	25.6			
ACH 302	7	24.05	4	27.50	12	26.92	2.87	100.3	101.5	96.9						
BETA 2010	5	24.24	1	28.14	11	26.94	2.70	101.1	103.9	96.9						
KW 3580	11	22.62	9	26.61	3	26.29	5.67	94.3	98.2	101.8						
KW 1800	12	22.46	11	26.44	5	28.03	5.57	93.7	97.6	100.8						
KW 6770	10	23.31	10	26.60	6	28.03	4.72	97.2	98.2	100.8						
HILL. 7003	3	24.68	3	27.71	4	28.07	3.39	102.9	102.3	101.0						
Loc. Mean		23.98		27.09		27.79	3.81	100.00	100.00	100.00						
LSD (0.05) (within dates)		2.43		2.90		2.55										
LSD (0.05) (across dates)		--------1.08---------														
C.V. %		---------14.48--------														

Table 5. Combined locations performance of 1992 varieties harvested early, mid, and late for loss to molasses.

		Loss to Molasses									EARLY	MID	LATE	EARLY	MID	LATE
							%				2Yr	2Yr	2Yr	3Yr	3Yr	3Yr
		Early		Mid		Late	Change	Early	Mid	Late	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN
Variety	Rank	Mean	Rank	Mean	Rank	Mean	E->L	% Mean	% Mean	% Mean	91-92	91-92	91-92	90-92	90-92	90-92
ACH 198	1	1.00	9	1.02	11	0.95	0.04	94.6	101.1	103.1	1.05	1.10	1.05	1.16	1.20	1.15
AVH 302	10	1.08	7	1.01	12	0.96	0.13	102.7	100.1	103.7	1.07	1.07	1.04	1.14	1.16	1.13
BETA 2010	7	1.06	2	0.98	5	0.92	0.14	100.4	97.1	99.9	1.08	1.05	1.06	1.17	1.15	1.14
KW 1119	11	1.12	11	1.04	6	0.93	0.19	106.1	103.1	100.4	1.14	1.11	1.04			
KW 2249	3	1.01	5	1.00	8	0.93	0.08	96.1	99.1	100.9	1.06	1.08	1.03			
KW 2398	2	1.01	12	1.05	7	0.93	0.08	95.6	103.6	100.9	1.05	1.11	1.05			
KW 3580	12	1.13	10	1.04	3	0.89	0.24	107.0	103.1	96.6						
HILL. 5135	9	1.08	6	1.01	9	0.94	0.14	102.3	100.1	101.5						
HILL. 7003	6	1.05	8	1.01	1	0.88	0.17	99.4	100.1	95.0						
KW 1800	8	1.07	3	0.99	2	0.89	0.18	101.3	98.1	96.1						
ACH 194	5	1.03	4	0.99	10	0.94	0.09	97.5	98.1	102.0						
KW 6770	4	1.02	1	0.97	4	0.92	0.10	97.0	96.2	99.9						
Loc. Mean		1.05		1.01		0.92	0.13	100.00	100.00	100.00						
LSD (0.05) (within dates)		0.16		0.08		0.08										
LSD (0.05) (across dates)		--------0.04--------														
C.V. %		-------17.44--------														

Deviation From Mean for RSA
Combined Data for 1992



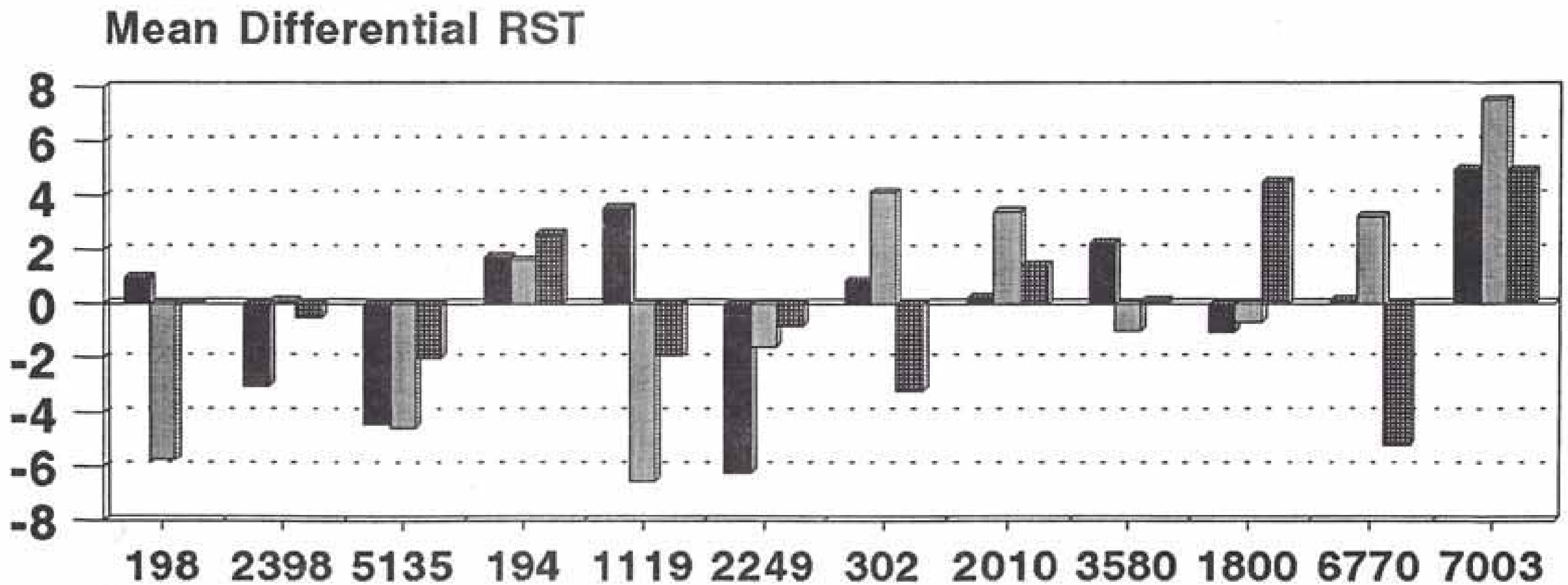
Early	-79	-58	180	97	103	229	44	79	-317	-425	-167	312
Mid	-262	27	-133	-0.7	-477	157	236	417	-189	-227	61	393
Late	-45	157	-299	92	80	42	-378	-241	60	203	100	229

Variety

Early Mid Late

Figure 1.

Deviation From Mean for RST
Combined Data for 1992



	198	2398	5135	194	1119	2249	302	2010	3580	1800	6770	7003
Early	0.96	-3.04	-4.44	1.76	3.56	-6.24	0.86	0.26	2.26	-1.04	0.16	4.96
Mid	-5.77	0.13	-4.57	1.63	-6.57	-1.57	4.13	3.43	-0.97	-0.67	3.23	7.53
Late	0.01	-0.49	-1.99	2.61	-1.89	-0.79	-3.19	1.41	0.11	4.51	-5.19	4.91

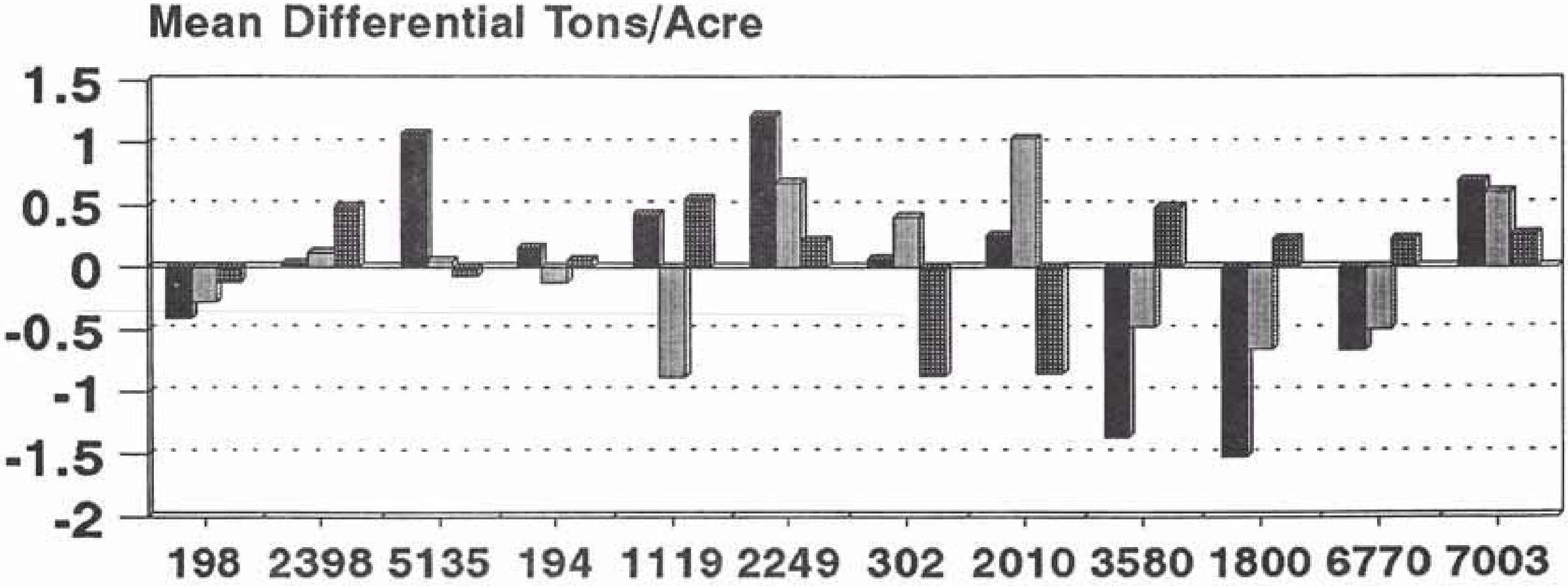
Variety

Early Mid Late

Figure 2.

Deviation From Mean for Tons/Acre

Combined Data for 1992



	198	2398	5135	194	1119	2249	302	2010	3580	1800	6770	7003
Early	-0.41	0.03	1.08	0.16	0.43	1.22	0.07	0.26	-1.36	-1.52	-0.66	0.7
Mid	-0.28	0.12	0.05	-0.12	-0.88	0.69	0.41	1.04	-0.48	-0.65	-0.49	0.61
Late	-0.12	0.49	-0.07	0.06	0.56	0.22	-0.87	-0.85	0.49	0.23	0.23	0.27

Variety

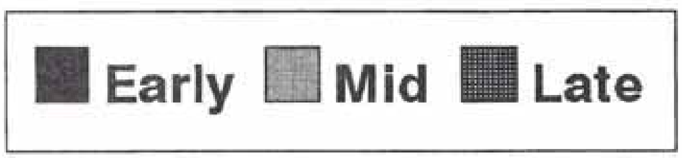
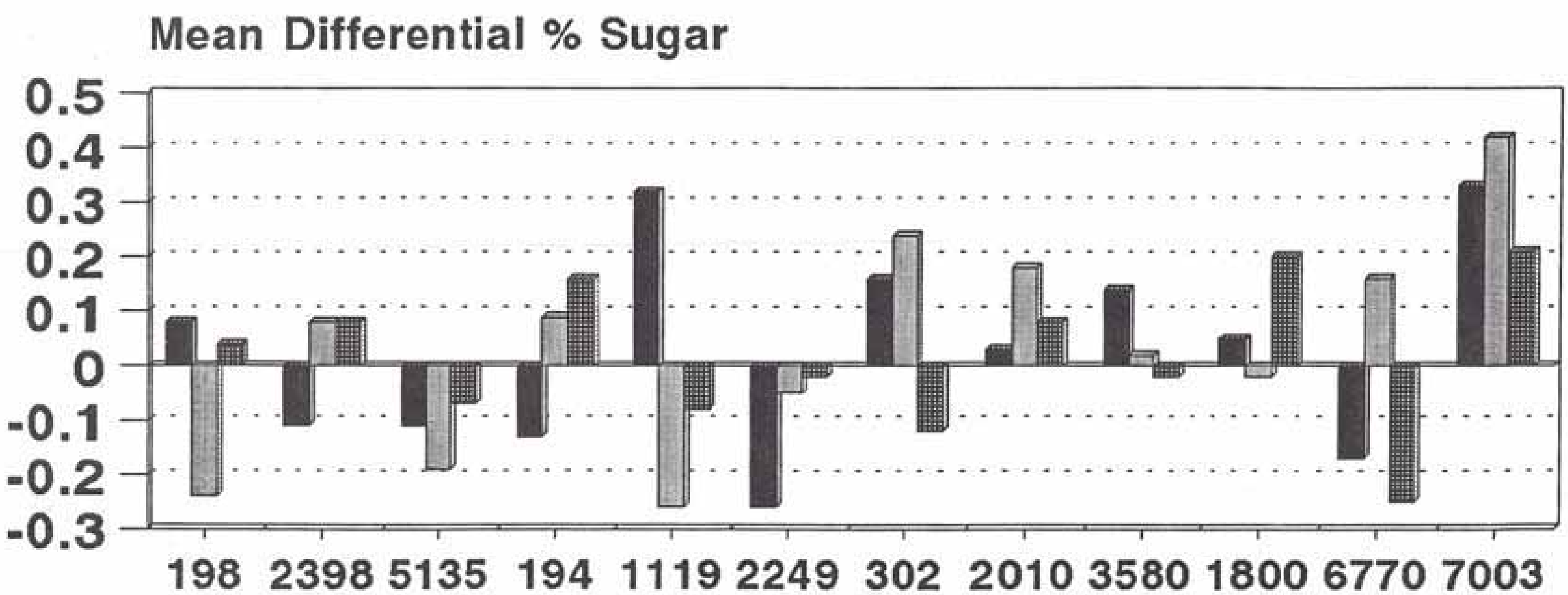


Figure 3.

Deviation From Mean for % Sugar
Combined Data for 1992



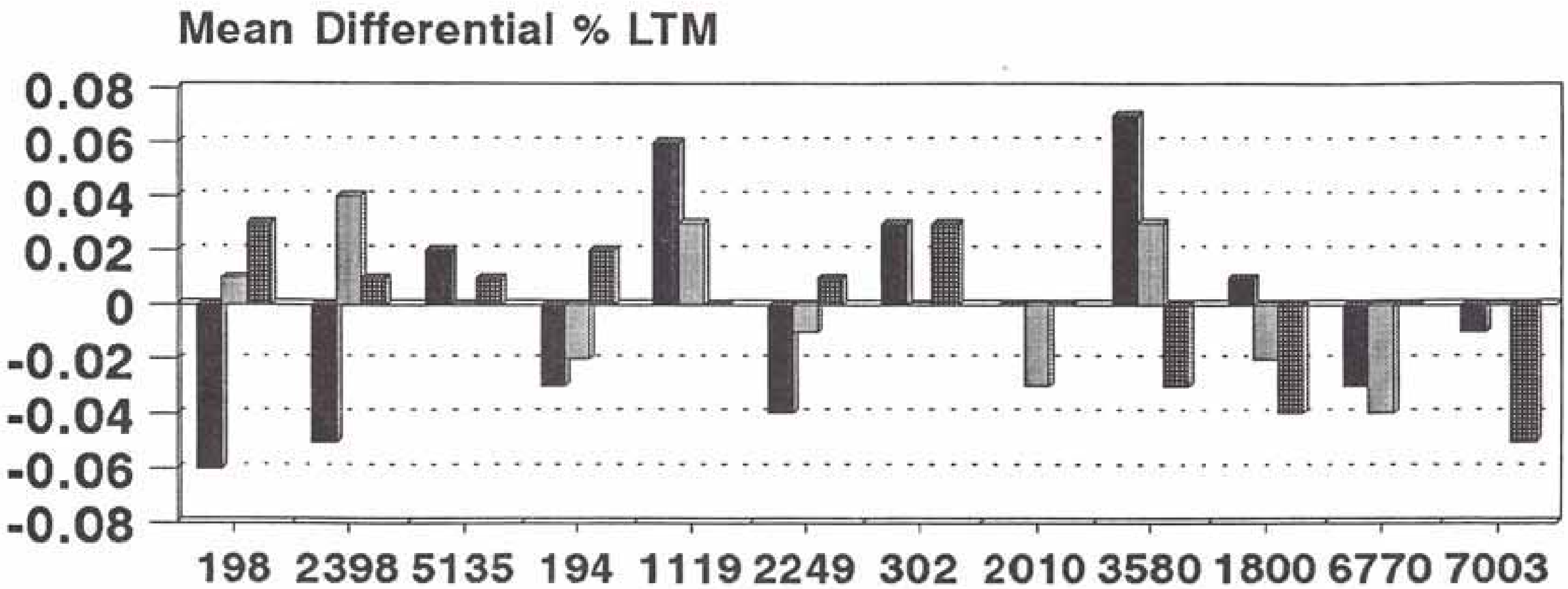
	198	2398	5135	194	1119	2249	302	2010	3580	1800	6770	7003
Early	0.08	-0.11	-0.11	-0.13	0.32	-0.26	0.16	0.03	0.14	0.05	-0.17	0.33
Mid	-0.24	0.08	-0.19	0.09	-0.26	-0.05	0.24	0.18	0.02	-0.02	0.16	0.42
Late	0.04	0.08	-0.07	0.16	-0.08	-0.02	-0.12	0.08	-0.02	0.2	-0.25	0.21

Variety

Early Mid Late

Figure 4.

Deviation From Mean for % LTM
Combined Dta for 1992



	198	2398	5135	194	1119	2249	302	2010	3580	1800	6770	7003
Early	-0.06	-0.05	0.02	-0.03	0.06	-0.04	0.03	0	0.07	0.01	-0.03	-0.01
Mid	0.01	0.04	0	-0.02	0.03	-0.01	0	-0.03	0.03	-0.02	-0.04	0
Late	0.03	0.01	0.01	0.02	0	0.01	0.03	0	-0.03	-0.04	0	-0.05

Variety

Early Mid Late

Figure 5.

SUGARBEET QUANTITY AND QUALITY AS INFLUENCED BY FERTILIZER RATE AND TIME OF HARVEST

Objectives:

Evaluate the effect of fertility base on (1) soil test analysis, (2) recommendation of nutrients, and (3) time of harvest.

Experimental Procedures:

Three separate experiments were conducted at each location in a randomized complete block. Experiments were harvested at three harvest times early, mid, and late. Harvest of experimental units was conducted on September 12, and October 1 and 20.

Fertility rates were 50, 75, 100, 125, 150 percent of recommended nutrient analysis. The recommended nutrient analysis was 140-40-200 of nitrogen, phosphate, and potassium, respectively. The soil test analysis in the top two feet was 30-10-110 of nitrogen, phosphate-potassium. The recommended nutrient analysis was obtained by following guidelines set forth by the North Dakota State Extension bulletin "Fertilizing Sugarbeets". The actual fertilizer analysis applied is found in Figure 1. Fertilizer was spread by hand in 11 x 35 foot plots which were replicated six times.

The experiment was conducted at two locations. Locations were chosen due to their relatively low fertility as indicated by their fertility test. The data presented is combined data from both locations.

Results and Discussion

These experiments were conducted to determine quality and quantity of sugarbeets dependent on fertility rate and time of harvest. Acreage increase over the last two years has increased the importance of production practices that provide optimum production at various harvest dates. Fertility may need to be fluctuated due to time of harvest.

All data (Figures 1 - 5) increased significantly over time when considering time by fertility interaction. Sugar percent (Figure 4) at the early harvest date was greatest with the 50 and 75 percent rate of fertilizer. A rate of 100 and 125 percent produced sugar percent less than 50 and 75, but greater than 150 percent fertility.

Sugar percent at mid harvest was equally obtained by all fertility rates except 150 percent fertility which was significantly lower. Late harvest sugar percent was equally produced by fertilizer rates of 75, 100, and 125 percent of fertilizer. Treatments with 50 and 150 percent fertility produced equal sugar percent, but significantly lower than 75, 100, and 125 percent treatments.

Ton/acre (Figure 3) was equally obtained by all treatments except 50 percent fertilizer rate, regardless of harvest time. Tons/acre at 50 percent fertilizer rate was significantly lower than all other treatments. Treatments of 75, 100, 125, and 150 varied from as little as .08 tons at early harvest to as much as 2.18 at late harvest.

Loss to molasses (Figure 5) was equally obtained by all treatments except 150 percent fertility at early and late harvest. Mid harvest loss to molasses was non-significant. Loss to molasses was higher at early and late harvest with 150 percent fertility compared to the other treatments.

Recoverable sugar per ton (Figure 2) is a reflection of sucrose percent and loss to molasses. Sugar percent minus loss to molasses multiplied by 20 equals recoverable sugar per acre. Recoverable sugar per ton was equally obtained at early harvest when 50, 75, and 100 percent fertilizer recommendation was applied. These treatments were significantly higher for recoverable sugar per ton than 125 and 150 percent of fertility treatments. All treatments equally produced recoverable sugar per ton at mid and late harvest.

Recoverable sugar per acre (Figure 1) is the determining factor in the effectiveness of a treatment since payment to grower is based on recoverable sugar per acre. Recoverable sugar per acre was equal with 100 and 125 percent fertility, which were greater than 50 and 150 percent. Early harvest recoverable sugar per acre at 75 percent fertility was greater than all other treatments except 100 percent fertility.

Recoverable sugar per acre at mid harvest was equally obtained by 75, 100, 125 and 150 percent fertility. These treatments were significantly higher than 50 percent fertility.

Late harvest recoverable sugar per acre was equally obtained by 100, 125, and 150 percent fertility. However, recoverable sugar per acre was equally produced by 75 and 150 percent fertility. Recoverable sugar per acre with 50 percent of fertilizer recommendation was significantless than all other treatments.

These data indicates the following percent of fertility recommendations should be applied to obtain top recoverable sugar per acre at early, mid, and late harvest.

EARLY	MID	LATE
75	75	75
100	100	100
125	125	125
	150	150

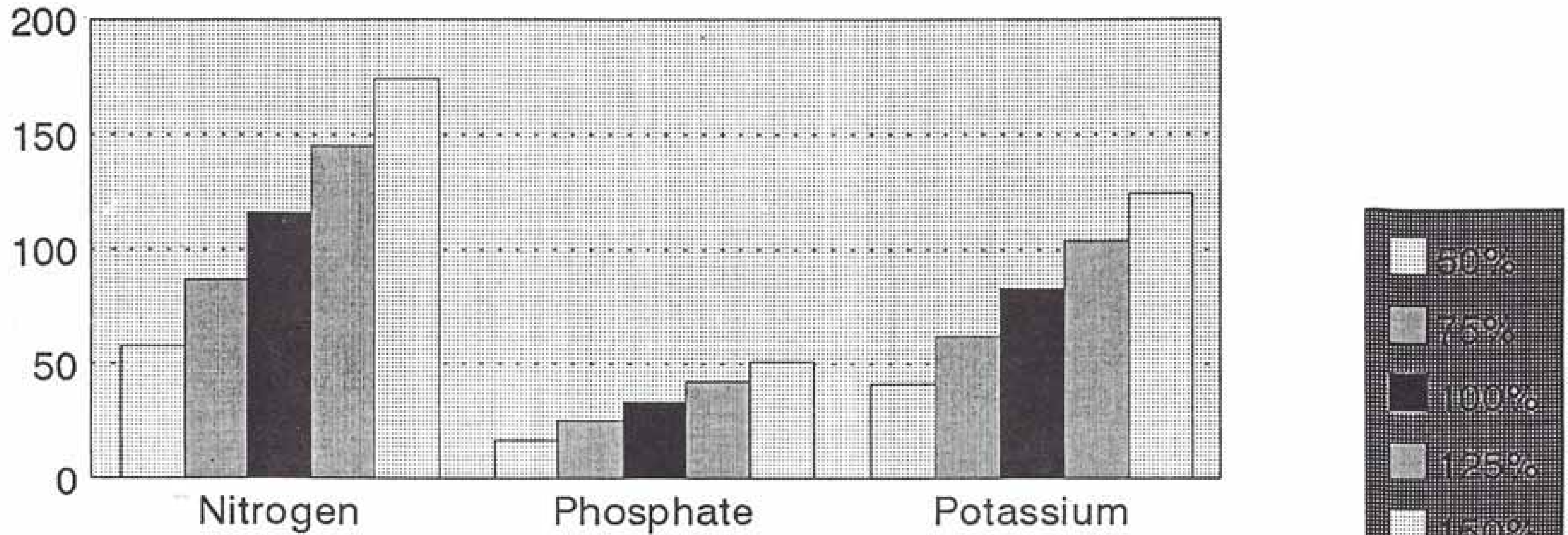
Thus, within the parameters of these experiments 75, 100, and 125 percent of recommended fertilizer can be applied and similar results will be obtained for recoverable sugar per acre, regardless of harvest time. However, one could consider cost of treatments and trucking to determine which treatment may be most effective (Figure 6). These data are calculated by subtracting cost of fertilizer and cost of trucking (lack of or excessive tons/acre depending on fertility rate) from revenue per acre. These data will be referred to as net revenue and is presented as a percent of the recommended fertility rate (100 percent treatment). Net revenue at early harvest for 75 percent fertility was 24 percent greater than the 100 percent fertility treatment. Fertility rates of 50 percent of recommended fertilizer net revenue was only 2 percent greater than the 100 percent fertility of recommended rate. All other treatments were below the 100 percent recommended rate by 10 to 21 percent.

Mid and late harvest net revenue was greatest at 100 percent of the recommended rate. Net revenue varied slightly from the 100 percent of recommended rate treatment when 75 and 125 percent of recommended rate was applied.

These data indicate that the best treatment for early harvest was 75 percent of recommended fertilizer rate. Net revenue at mid and late harvest was best with 100 percent of recommended fertilizer rate. This indicates that fertilizing for 17-18 ton instead of 20 ton for early harvest (early pre-pile) would be advantageous. However, one would want to fertilize at the recommended rate for mid and late harvest (full harvest).

These experiments need to be repeated in the future to further substantiate the results of these experiments. The use of practices as a result of this experiment needs to be considered. But one needs to realize that these data constitute the results from one year and could vary from year to year.

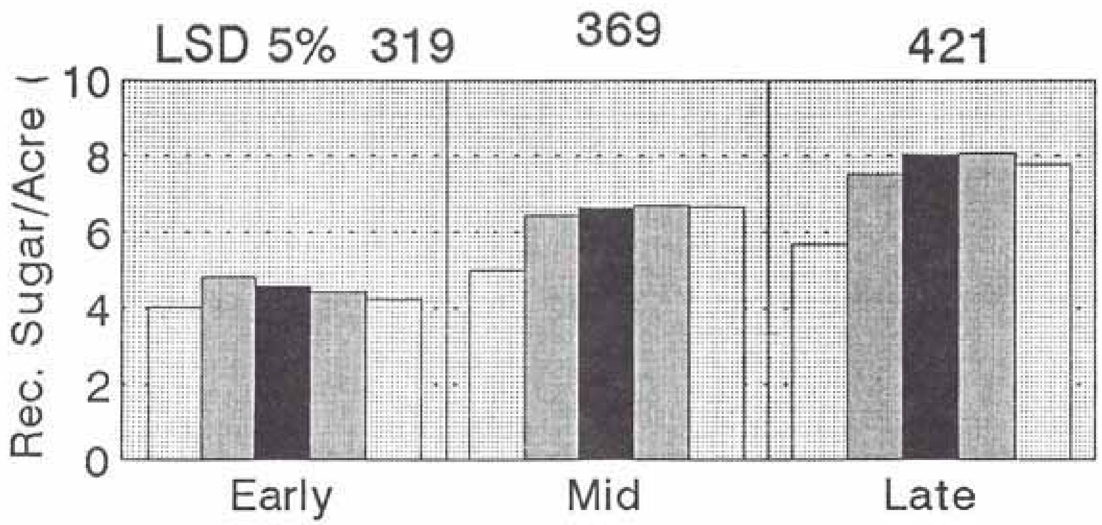
Fertilizer Rates Applied for Each Treatment



	Nitrogen	Phosphate	Potassium
50%	58	17	41.5
75%	87	25.5	62.25
100%	116	34	83
125%	145	42.5	103.75
150%	174	51	124.5

Figure 1.

Percent of Fertility Recomendation and Time Effect on Recoverable Sugar/Acre



	Early	Mid	Late
50%	4.042	4.995	5.683
75%	4.828	6.404	7.484
100%	4.579	6.618	8.029
125%	4.433	6.688	8.067
150%	4.228	6.648	7.771

Harvest Time

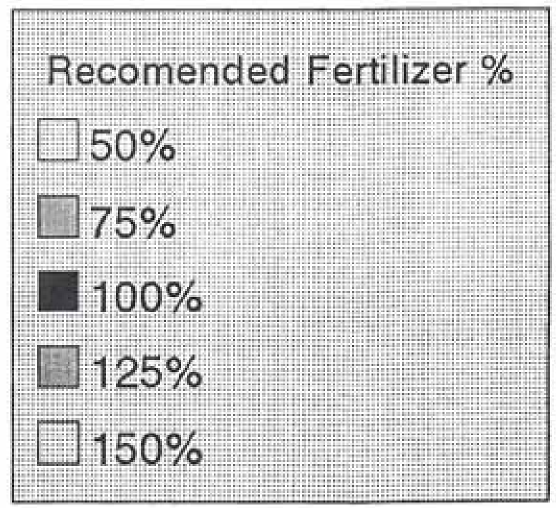
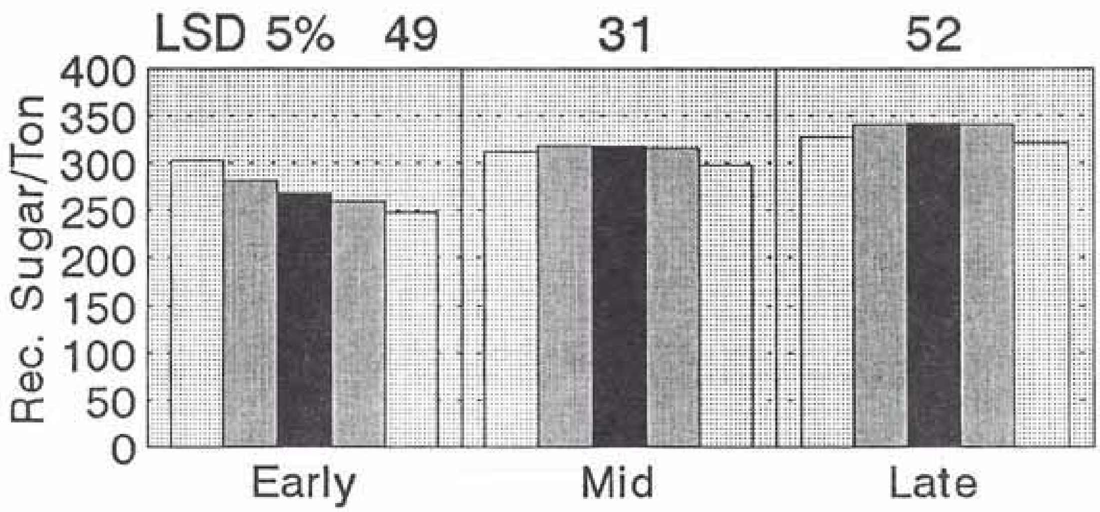
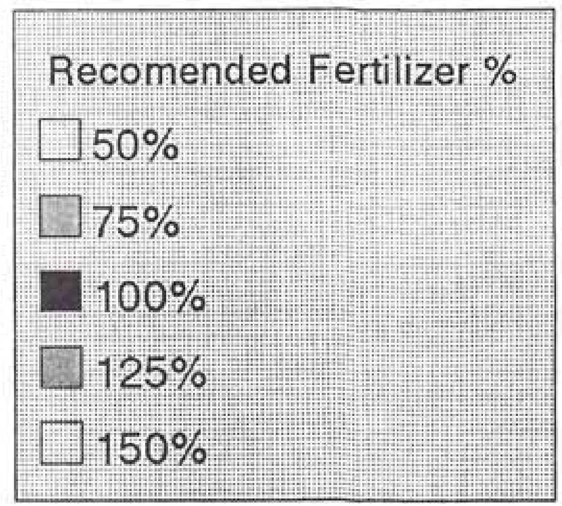


Figure 2.

Percent of Fertility Recomendation and Time Effect on Recoverable Sugar/Ton



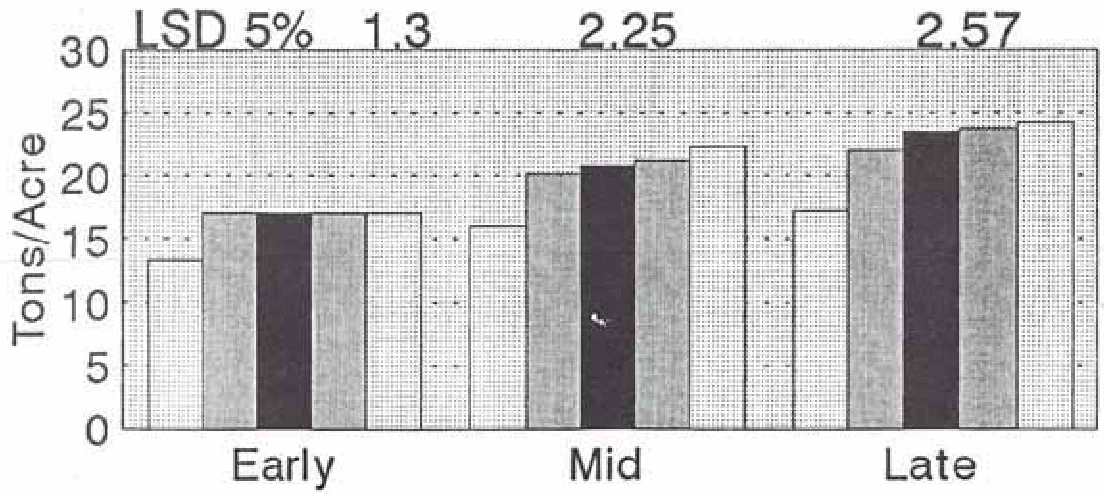


	Early	Mid	Late
50%	303	312	328
75%	282	318	340
100%	268	318	342
125%	259	316	340
150%	248	298	321

Harvest Time

Figure 3.

Percent of Fertility Recomendation and Time Effect on tons/acre



	Early	Mid	Late
50%	13.34	16.01	17.34
75%	17.11	20.15	22
100%	17.1	20.81	23.45
125%	17.13	21.19	23.7
150%	17.05	22.34	24.18

Harvest Time

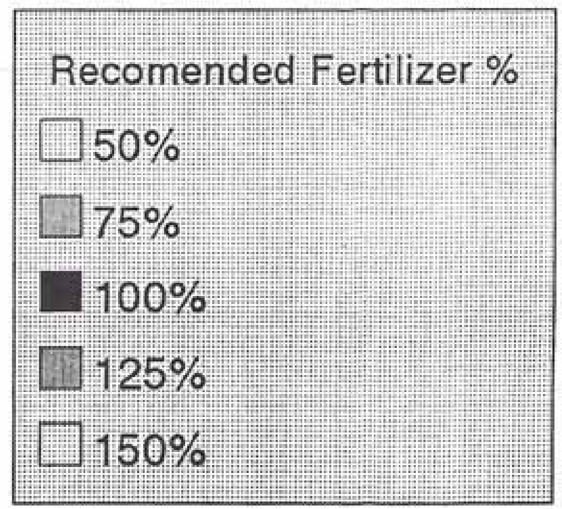
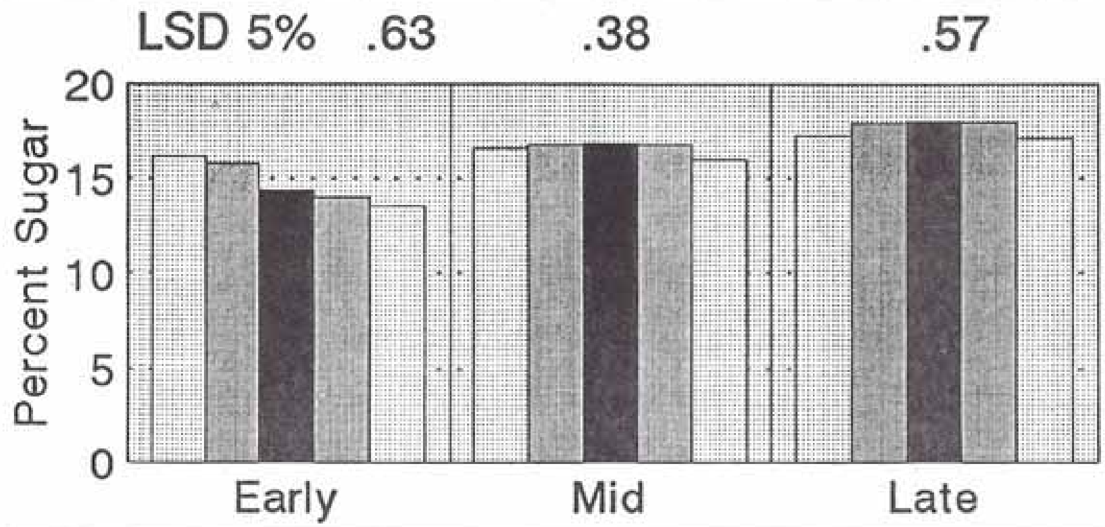
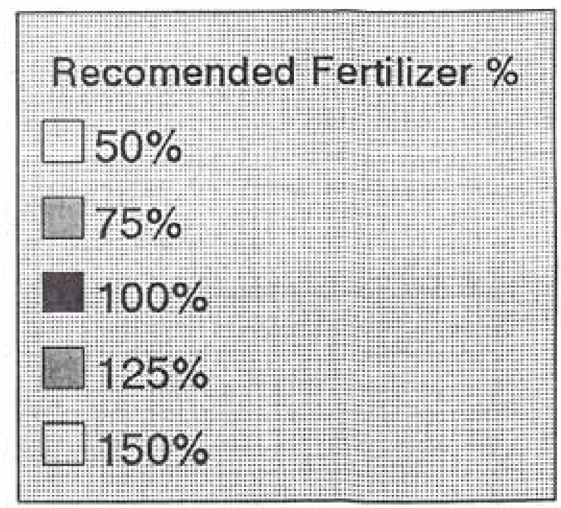


Figure 4.

Percent of Fertility Recomendation and Time Effect on Sugar percent



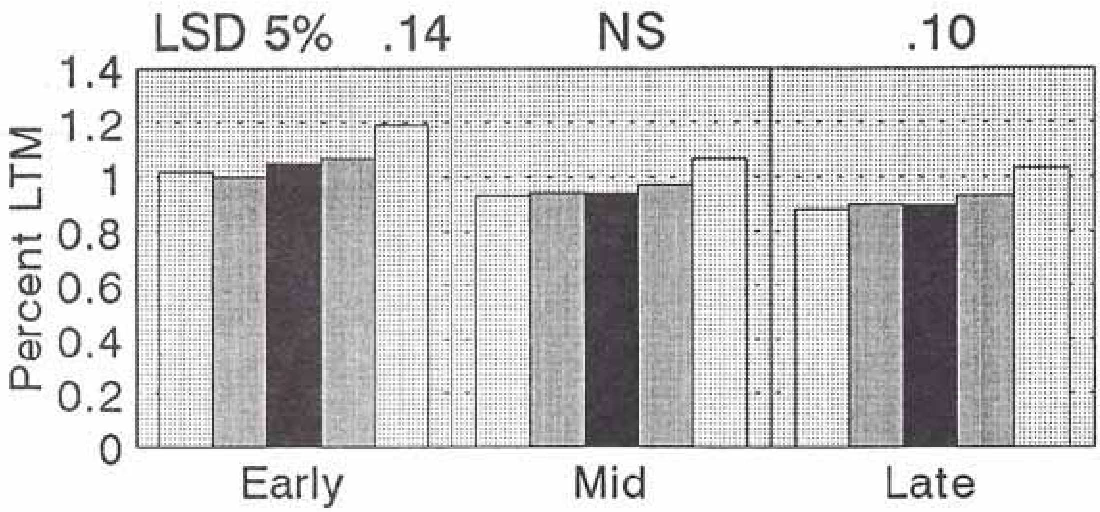


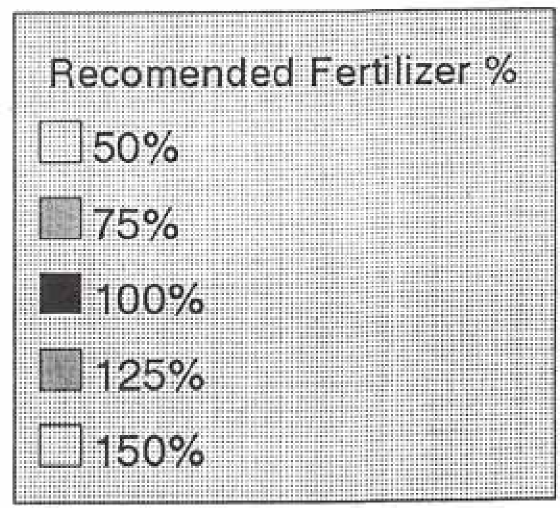
	Early	Mid	Late
50%	16.19	16.54	17.24
75%	15.81	16.79	17.91
100%	14.44	16.84	18.01
125%	14.01	16.75	17.95
150%	13.59	15.95	17.1

Harvest Time

Figure 5.

Percent of Fertility Recomendation and Time Effect on Loss to Molases



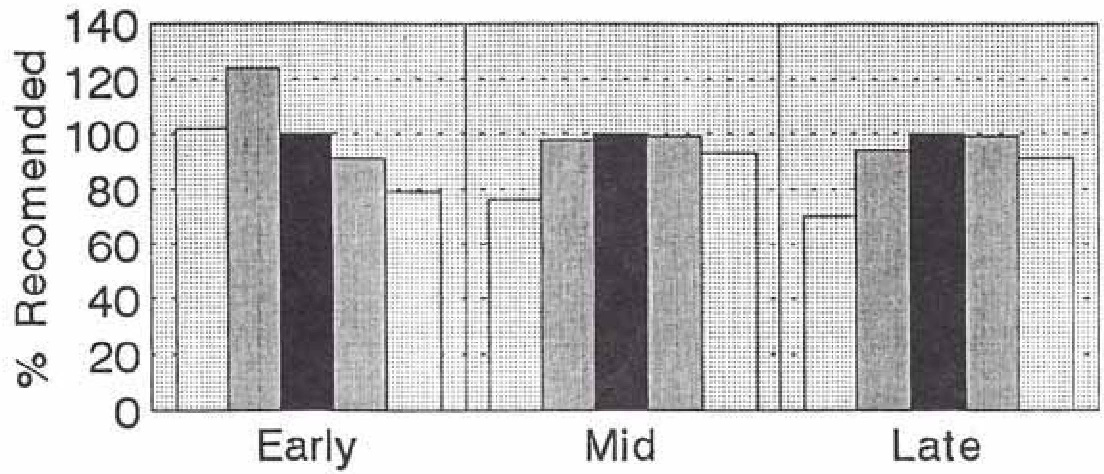


	Early	Mid	Late
50%	1.02	0.93	0.88
75%	1	0.94	0.9
100%	1.05	0.94	0.9
125%	1.07	0.97	0.93
150%	1.19	1.07	1.03

Harvest Time

Figure 6.

Percent of Fertilizer Recomendation and Time Effect on Revenue/Acre



	Early	Mid	Late
50%	102	76	70
75%	124	98	94
100%	100	100	100
125%	91	99	99
150%	79	93	91

Harvest Time

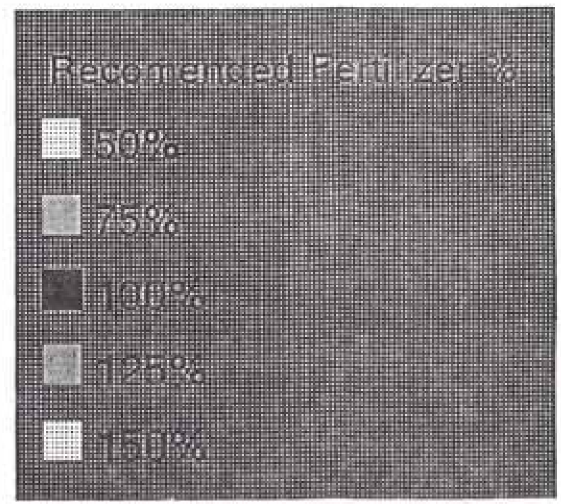


Figure 7.

EVALUATION OF SEED TREATMENT AND FUMIGATION EFFECT ON SEEDLING DISEASES

Objectives

To evaluate Vapam and various seed treatments for effect on common seedling diseases.

Introduction

Common seedling diseases such as Aphanomyces cochlioides, Pythium species, and Rhizoctonia solanai are considered the primary production limitation in the Southern Minnesota Sugar Cooperative growing area. Therefore, research is conducted annually considering this production problem. Fumigation with such products as Vapam has generally been considered economically unfeasible for common seedling disease control in southern Minnesota. However, this trial was primarily conducted to determine effectiveness and economics of fumigation in control of common seedling diseases. Seed treatments were also considered for their effect on common seedling diseases. The seed treatments were considered secondary in importance in the trial. The seed was planted at two dates. Date one, an early date to simulate normal planting date and greater potential for pythium seed disease. Date two, to simulate late planting date and enhance potential for Aphamyces cochlioides and Rhizoctonia solanai.

Experimental Procedure

Trials were conducted at seven locations. Vapam was applied October 10-11, 1992. The application was made approximately 10 inches deep with an 8 foot wide 16 knife applicator. The application was made horizontally within the trial (Figure 1). Vapam was applied at 0, 50, 60, 75, gal/acre.

Seed treatments were planted April 30 for planting date one and June 8 for planting date two. Seed variety Beta 2988 was treated by Seed Systems when pelletized (Table 1). Beta 2988 was treated with Blue Circle Innoculant (microbial fungicide) by Stine Seed Farms. Beta 2988 was also applied with Ridomil at 2.25 and 4.50 pounds per acre (1X rate and 2X rate, respectively). The remaining seed treatments ACH 205 and ACH 198 (tolerant varieties). The seed treatments are listed in Table 1.

Plant stands were measured 4, 8 and 12 weeks after emergence. Yield data was obtained September 15. General production practices were conducted to plots as needed.

Results and Discussion

Fumigant

Plant stand at date one (Figure 1) was highest when no Vapam was applied, regardless of when stand count was taken. Plant stand did not relate directly or indirectly to Vapam rate. Vapam at 0 gal/acre gave the highest plant stand with 60 gal/acre giving the second highest plant stand of the Vapam rates. Plant stands were significantly higher with 50 gal/acre compared to 75 gal/acre.

Plant stand at date two (figure 2) was equally effected at four weeks after emergence with Vapam at 50 an 75 gal/acre. Vapam at 50 and 75 gal/acre gave plant stands significantly greater than 0 and 60 gal/acre. Plant stands at 8 and 12 weeks after emergence were equally effected by 0, 50, and 75 gal/acres of Vapam. Thus, over an extended period of time 0 gal/acre of Vapam was equal to or better in maintaining plant stand when compared to the other rates of Vapam. As in planting date one, plant stand was not directly or indirectly related to Vapam rate.

Quality and quantity data was significant only at the planting date one (Figure 3-6). Sucrose was higher with Vapam at 75 gal/acre in comparison to all other rates at planting date one. Tons/acre at planting date one was highest at 0, 50, and 60 gal/acre. Sucrose/ton and sucrose/acre was equally effected by Vapam rate at date one. All quantity and quality data at planting date two was equally effected by Vapam rate.

Tachigaren

Tachigaren at all rates equally maintained plant stand at planting date one regardless of time after emergence (Figure 7). Plant stand was significantly greater with all Tachigaren rates in comparison to the check.

Tachigaren at 45 g/kg at planting date two maintained plant stand significantly higher than all other Tachigaren rates and the check regardless of time after emergence (Figure 8). Tachigaren at 15 and 30 g/kg equally maintained plant stand at planting date two and were significantly higher than the check.

Data for Tachigaren rates at planting date one and two, in comparison to the check for quantity and quality of sugarbeets are presented in Figures 9-12. Sucrose was equally affected by all Tachigaren rates at planting dates one and two. The check effect on sucrose was equal to that of Tachigaren, regardless of rate or date of planting.

Tons/acre at planting date one was equal to or better with the check in comparison to the Tachigaren rates. All Tachigaren rates were equally effective in influencing tons/acre at planting date one. Ton/acre at planting date two was equally effected by all Tachigaren rates. However, only Tachigaren at 45 g/kg was greater than the check.

Recoverable sugar per ton was equally effected by all Tachigaren rates and the check at planting date one. All Tachigaren rates were equally effective in influencing recoverable sugar per acre. However, only Tachigaren at 45 g/kg was greater than the check. This is probably due to the 3.2 percent higher sucrose with Tachigaren at 45 g/kg compared to check.

Recoverable sugar per acre at planting date one with the check was equal to that achieved with Tachigaren regardless of rates. Tachigaren at 30 and 45 g/kg at planting date two produced a recoverable sugar per acre greater than the check. However, only Tachigaren at 45 g/kg was greater than Tachigaren at 15 g/kg and the check. This is one of the reasons the companies involved in marketing Tachigaren have decided to market 45 g/kg over lower rates.

Maxim

Maxim at 25 and 50 g ai/kg maintained plant stand significantly higher than the check at planting date one (Figure 13). Maxim at 100 g ai/kg and the check equally maintained plant stand at planting date one. This indicates that Maxim at rates such as 100 g ai/kg may have a detrimental effect on plant stands compared to rates of 25 or 50 g ai/kg. However, this is confounded by the treatment of Maxim at 100 g ai/kg plus standard Apron rate which maintained plant stands equal to Maxim at 25 and 50 g ai/kg and greater than the check or Maxim at 100 g ai/kg. In this treatment Maxim was applied at 100 g ai/kg without a detrimental effect. Apron was included in the treatment which may have had a antagonistic effect on Maxim at 100 g ai/kg, in reference to its detrimental effect when applied alone. Apron at a 2X (double) rate plus standard Thiram rate was equal to the check in maintaining plant stand.

Maxim applied alone at all rates four weeks after emergence maintained plant stand significantly greater than the check at planting two (Figure 14). However, treatments with Maxim applied alone and the check equally maintained plant stand at 8 and 12 weeks after emergence. Treatment with Maxim at 100 g ai/kg plus standard Apron rate and 2X Apron rate plus standard Thiram rate compared to check equally maintained plant stand regardless of time after emergence. Thus, all rates with Maxim, and Maxim at 100 g ai/kg plus standard Apron rate, and 2X Apron rate plus standard Thiram rate and check equally maintained plant stand at the second planting date and 12 weeks after emergence. This indicates that these treatments would perform equally in maintaining plant over a full season growth when planted at a late (June 8) date.

All quantity and quality data at planting date one and two were equally maintained when considering the check, Maxim at 25, 50, 100 g ai/kg, Maxim at 100 g ai/kg plus standard rate of Apron, and 2X Apron rate plus standard Thiram rate. The plant stand at harvest time (12 weeks after emergence) at planting date one was adequate with all treatments to obtain optimum yields. The plant stand at the second planting date with above mentioned treatments at harvest time were equally maintained. Thus, these treatments at the second planting date had similar quality and quantity data.

Ridomil

Plant stands at planting date one and two showed Ridomil at 4.5 lb/A with a tolerant variety was the only Ridomil treatment significantly higher than the check. However, by 8 and 12 weeks after emergence the check had maintained plant stand equal to or greater than all treatment with Ridomil.

Quality and quantity data at plant date one were equally obtained when comparing the check to all treatments with Ridomil (Figure 21-24). These data at planting date two showed the check being equal to or better than the treatments with Ridomil.

Blue Circle Innoculant and ACH 205

Data at planting date one (Figure 25) showed ACH 205 and Blue Circle Innoculant Strain A to maintain plant stand greater than check regardless of time after emergence. Blue Circle Innoculant Strain B equally maintained plant stand compared to check at planting date one, regardless of time after emergence. Blue Circle Innoculant Strain A and B at planting date two at four weeks after emergence maintained plant stand greater than the check. However, at 8 and 12 weeks after emergence the check had maintained plant stand greater than both of the Blue Circle Innoculant Strains. ACH 205 compared to the check equally maintained plant stand, regardless of time after emergence.

All quantity and quality data at planting date one was non-significant (Figure 27-29). Sucrose percent tons/acre, and sugar/ton were significantly greater with the check when compared to Blue Circle Innoculant Strain A and B at the second planting date. Recoverable sugar/acre obtained with the check was equal to that obtained with Blue Circle Innoculant Strain A and greater than Blue Circle Innoculant Strain B. ACH 205 and check equally produced sucrose percent, tons/acre, recoverable sugar/ton and recoverable sugar/acre.

Summary

Recoverable sugar/acre is the determining factor of a treatments effectiveness since payment to growers is based on this factor. Generally, growers make decisions depending on potential returns from said treatments. Recoverable sugar/acre was non-significant at planting dates one and two when considering Vapam treatments. Thus, within the parameters of this test fumigation or Vapam was not effective in enhancing production.

Seed treatment needs to also be compared to the check, which is the present treatment. The seed treatment also needs to give an economic advantage over the check. Seed treatments at planting date one were non-significant when considering recoverable sugar per acre. Seed treatments at the second planting date produced recoverable sugar per acre equal to or less than the check, except with Tachigaren at 30 and 45 g/kg. These two rates of Tachigaren were significantly higher than the check. Tachigaren at 30 and 45 g/kg were 747 and 1,113 lb. recoverable sugar per acre, respectively. Tachigaren at 45 was 366 lb. recoverable sugar per acre higher than Tachigaren at 30 g/kg, but was not significantly higher. These two treatments appeared to be the only two treatments that gave on economic advantage over the check.

Table 1. Seed Treatment

Treatment	Description	
Tachigaren	0 g/kg	Treated and pelleted by Seed Systems
Tachigaren	15 g/kg	Treated and pelleted by Seed Systems
Tachigaren	30 g/kg	Treated and pelleted by Seed Systems
Tachigaren	45 g/kg	Treated and pelleted by Seed Systems
Maxim	25 g ai/100 kg	Treated and pelleted by Seed Systems
Maxim	50 g ai/100 kg	Treated and pelleted by Seed Systems
Maxim	100 g ai/100 kg	Treated and pelleted by Seed Systems
Maxim + Apron	100 g ai/100 kg + standard rate	Treated and pelleted by Seed Systems
2X Apron + Thiram	2X rate Apron + standard rate Thiram	Treated and pelleted by Seed Systems
Apron + Thiram (Check)	Standard rate Apron + Thiram	Treated and pelleted by Seed Systems
ACH 205	Tolerant variety	Treated with std. Apron + Thiram
B.C. Strain A	Microbial fungicide	Treated by Stine Seed Farms
B.C. Strain B	Microbial fungicide	Treated by Stine Seed Farms
Ridomil/Beta 2988	2.25 lb/A	Treated with std. Apron + Thiram
Ridomil/Beta 2988	4.50 lb/A	Treated with std. Apron + Thiram
Ridomil/ACH 205	2.25 lb/A	Treated with std. Apron + Thiram
Ridomil/ACH 205	4.50 lb/A	Treated with std. Apron + Thiram

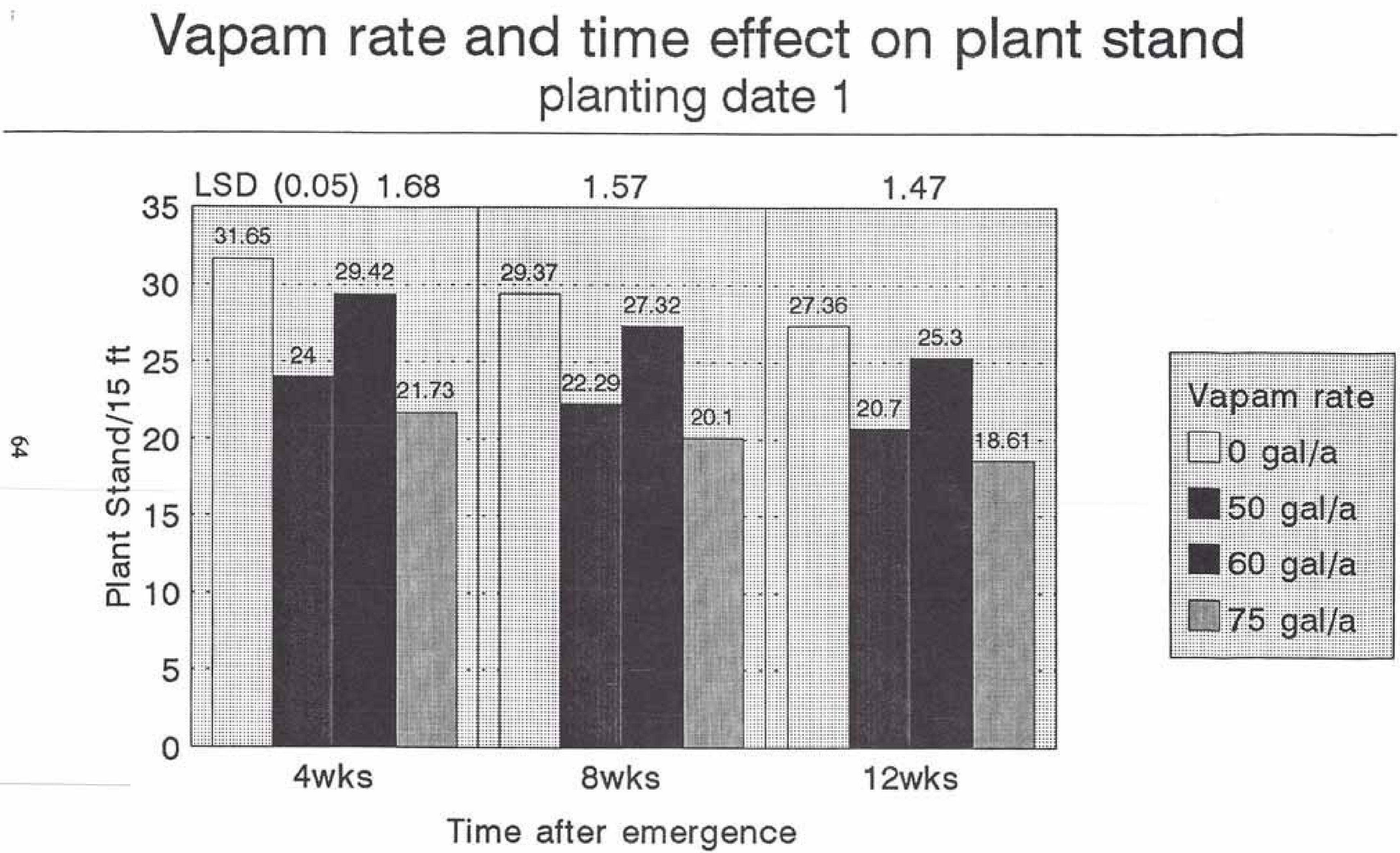

Vapam rate and time effect on plant stand
planting date 1
LSD (0.05) 1.68
1.57
1.47
Plant Stand/15 ft
35
30
25
20
15
10
5
0
31.65
24
29.42
21.73
29.37
22.29
27.32
20.1
27.36
20.7
25.3
18.61
4wks
8wks
12wks
Time after emergence
Vapam rate
0 gal/a
50 gal/a
60 gal/a
75 gal/a

Figure 1.

Vapam rate and time effect on plant stand
planting date 2

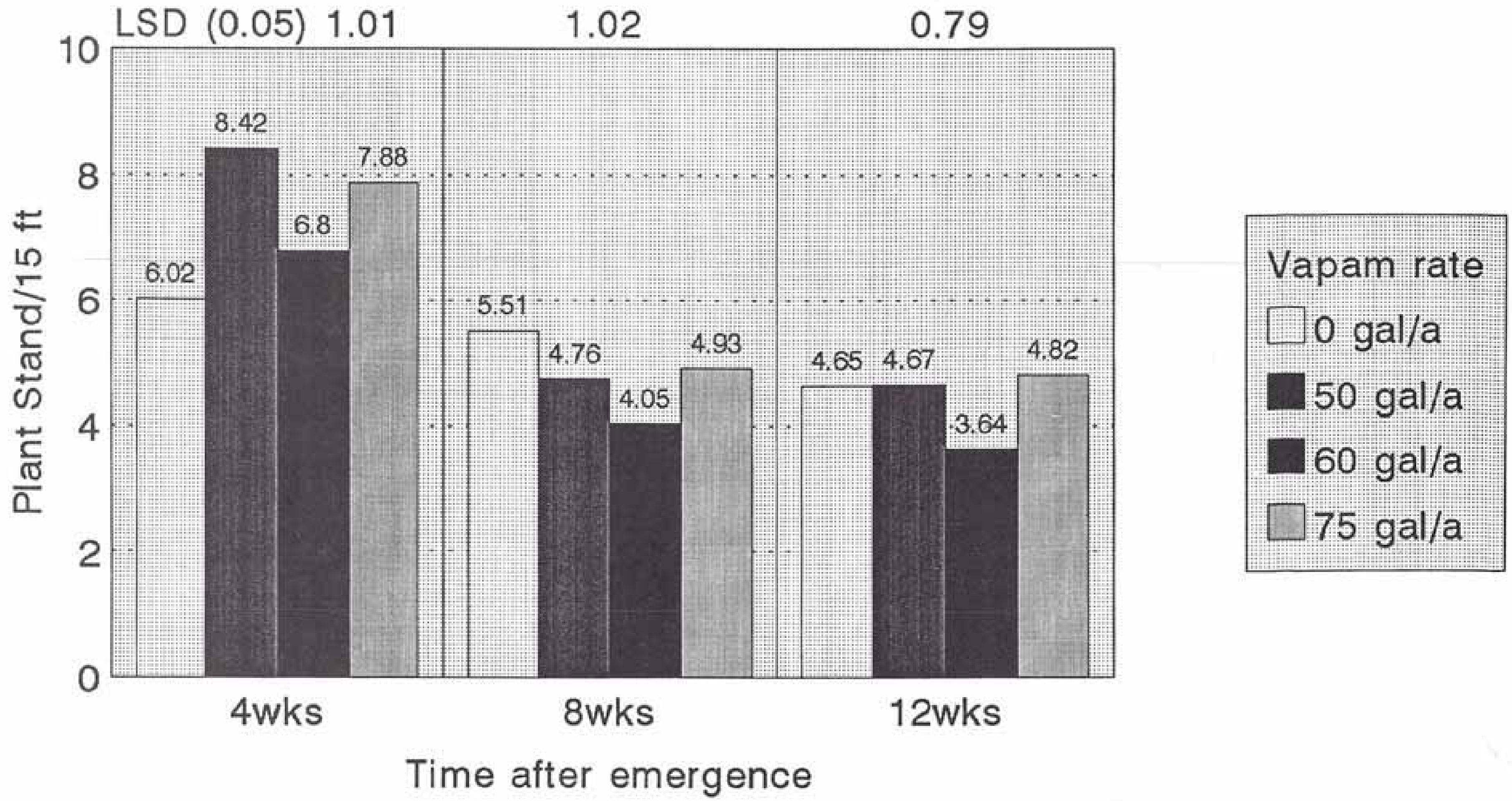


Figure 2.

Vapam rate and time effect on sucrose

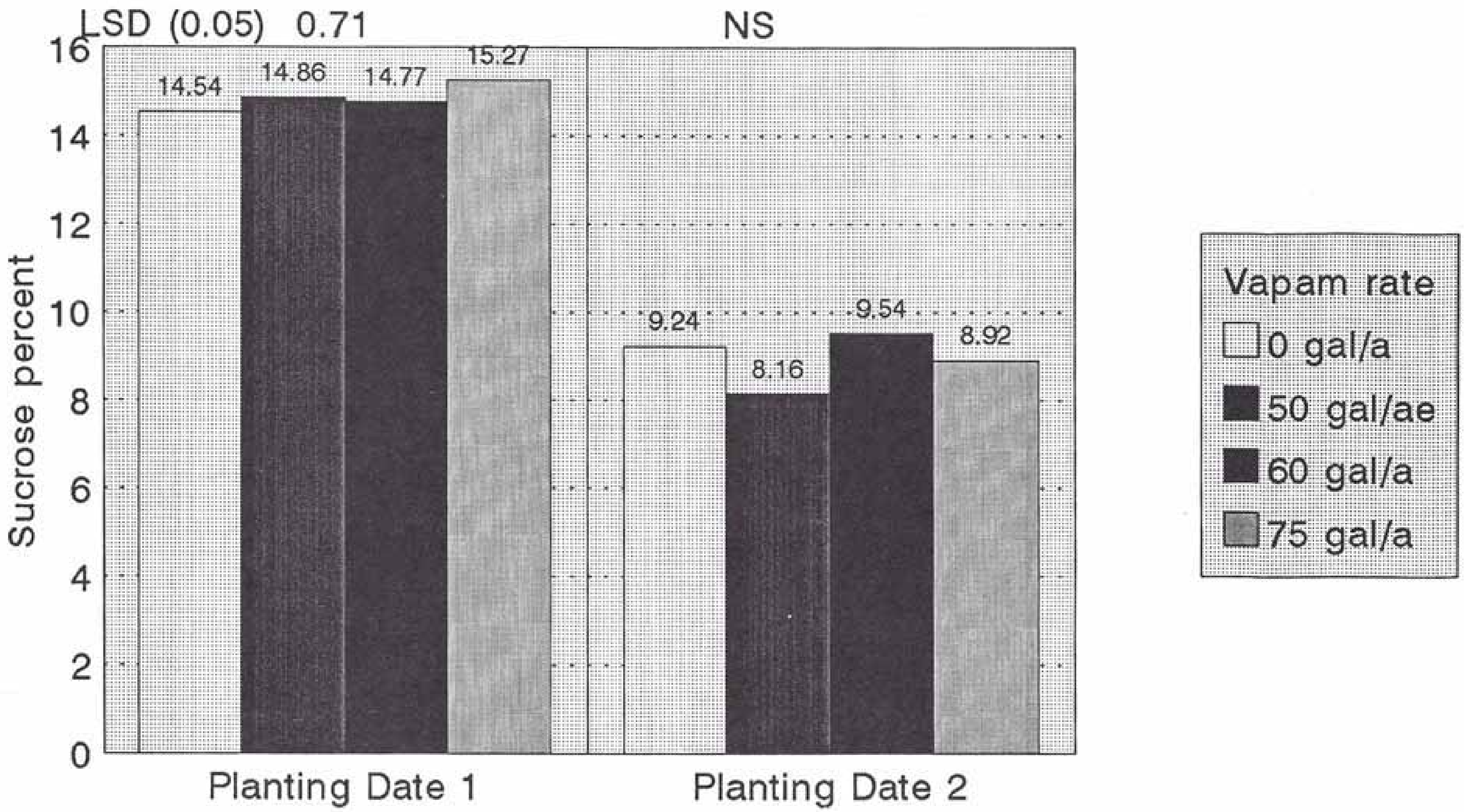


Figure 3.

Vapam rate and time effect on tons/acre

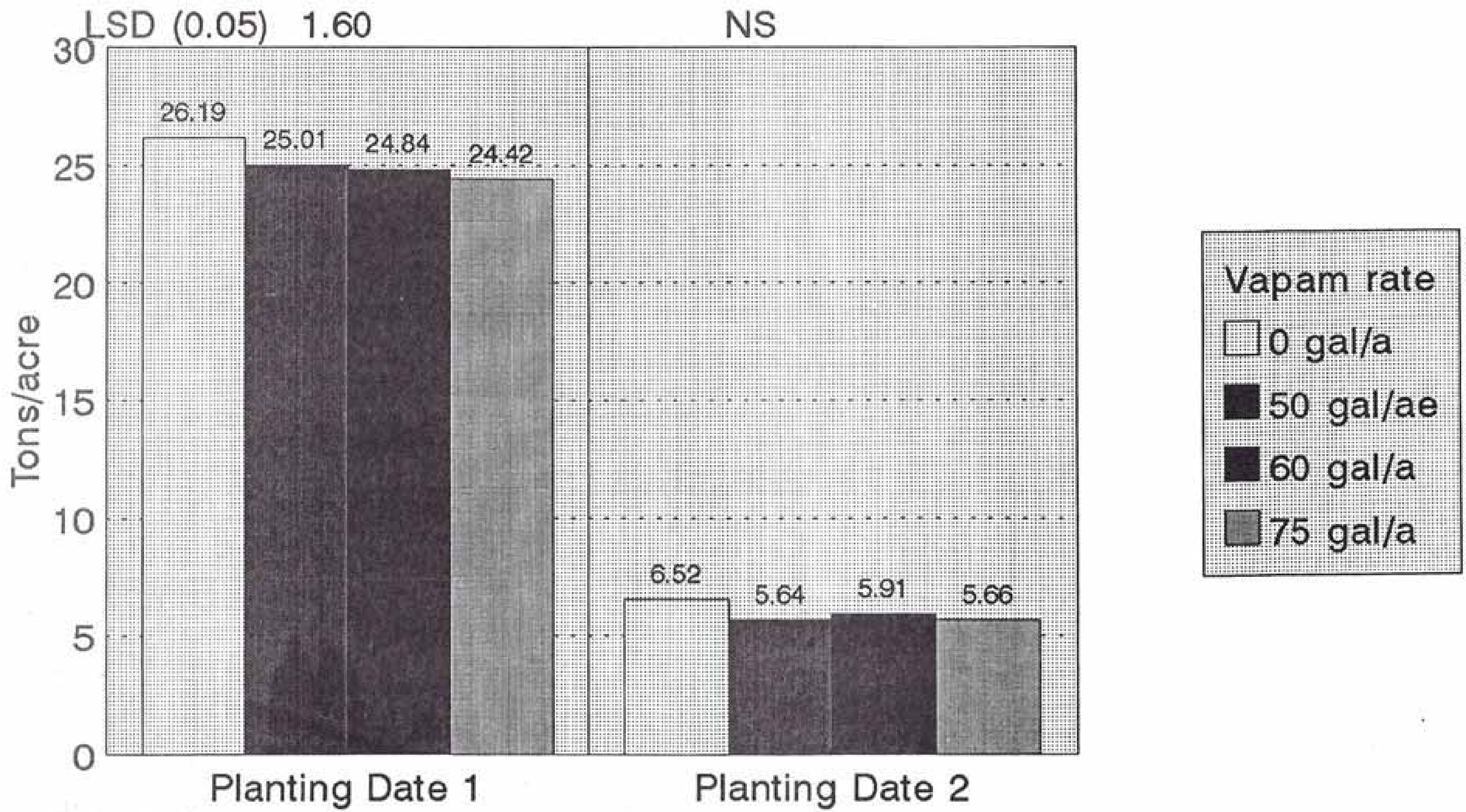


Figure 4.

Vapam rate and time effect on recoverable sucrose/ton

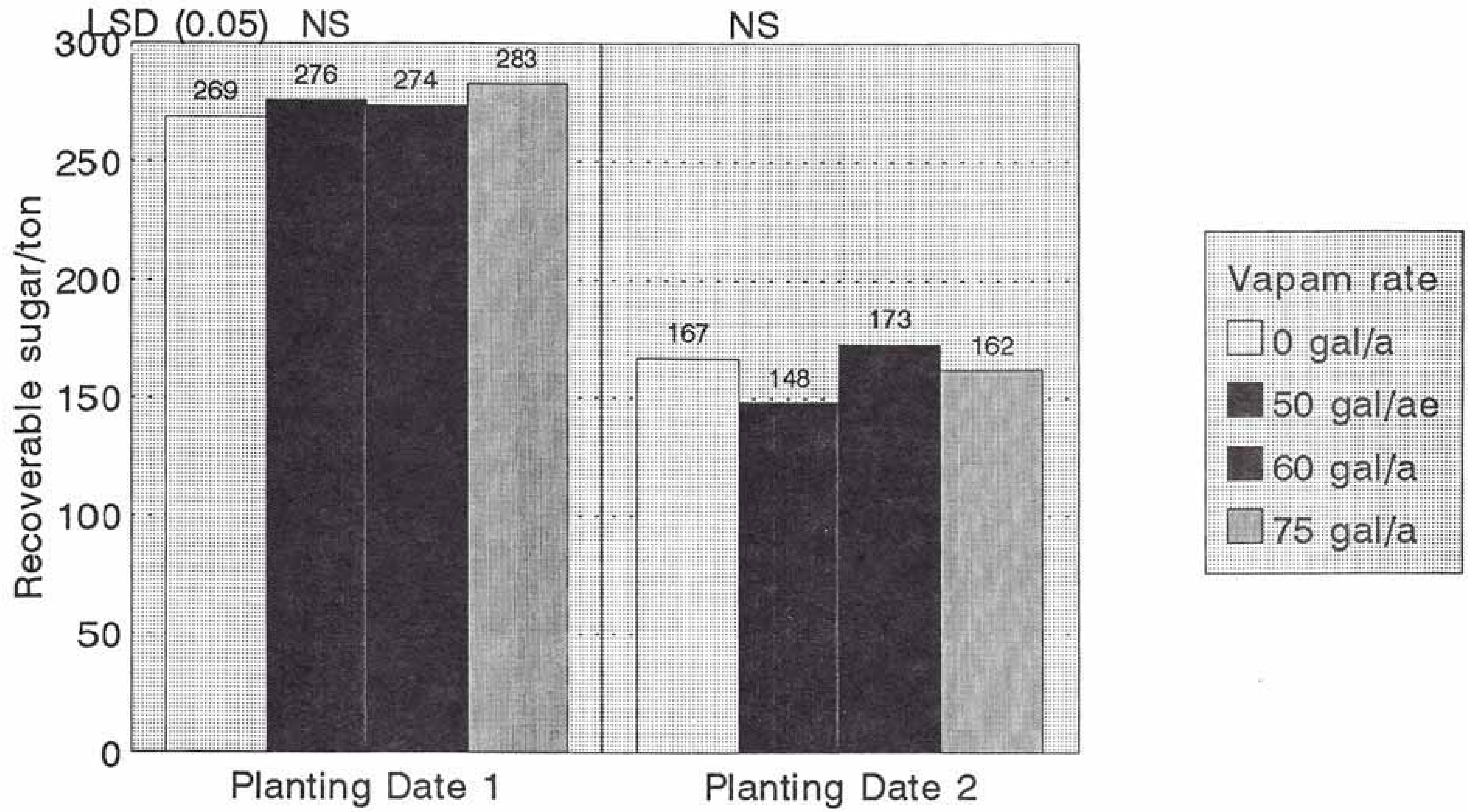


Figure 5.

Vapam rate and time effect on recoverable sucrose/acre

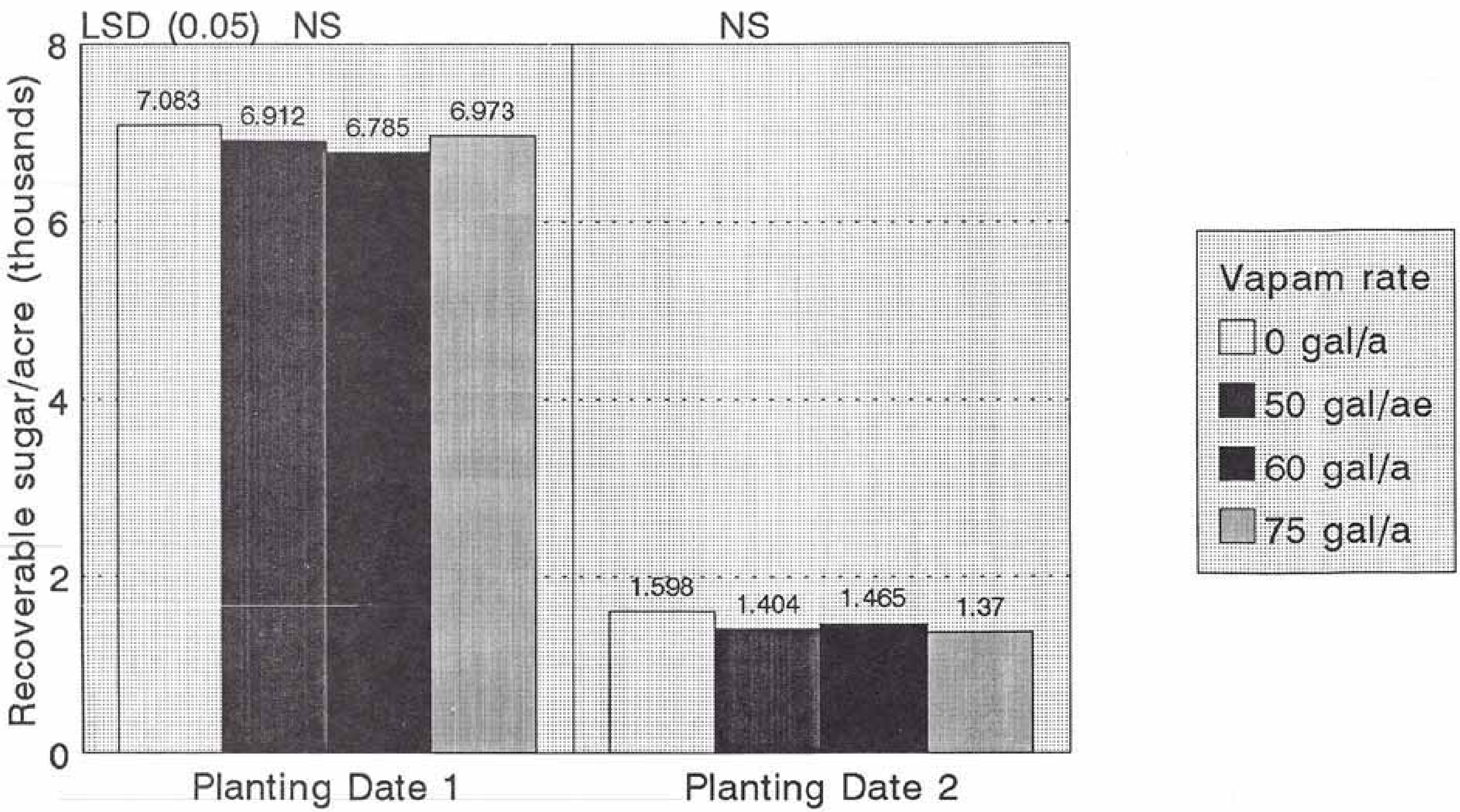


Figure 6.

Seed Treatment and time effect on plant stand

planting date 1

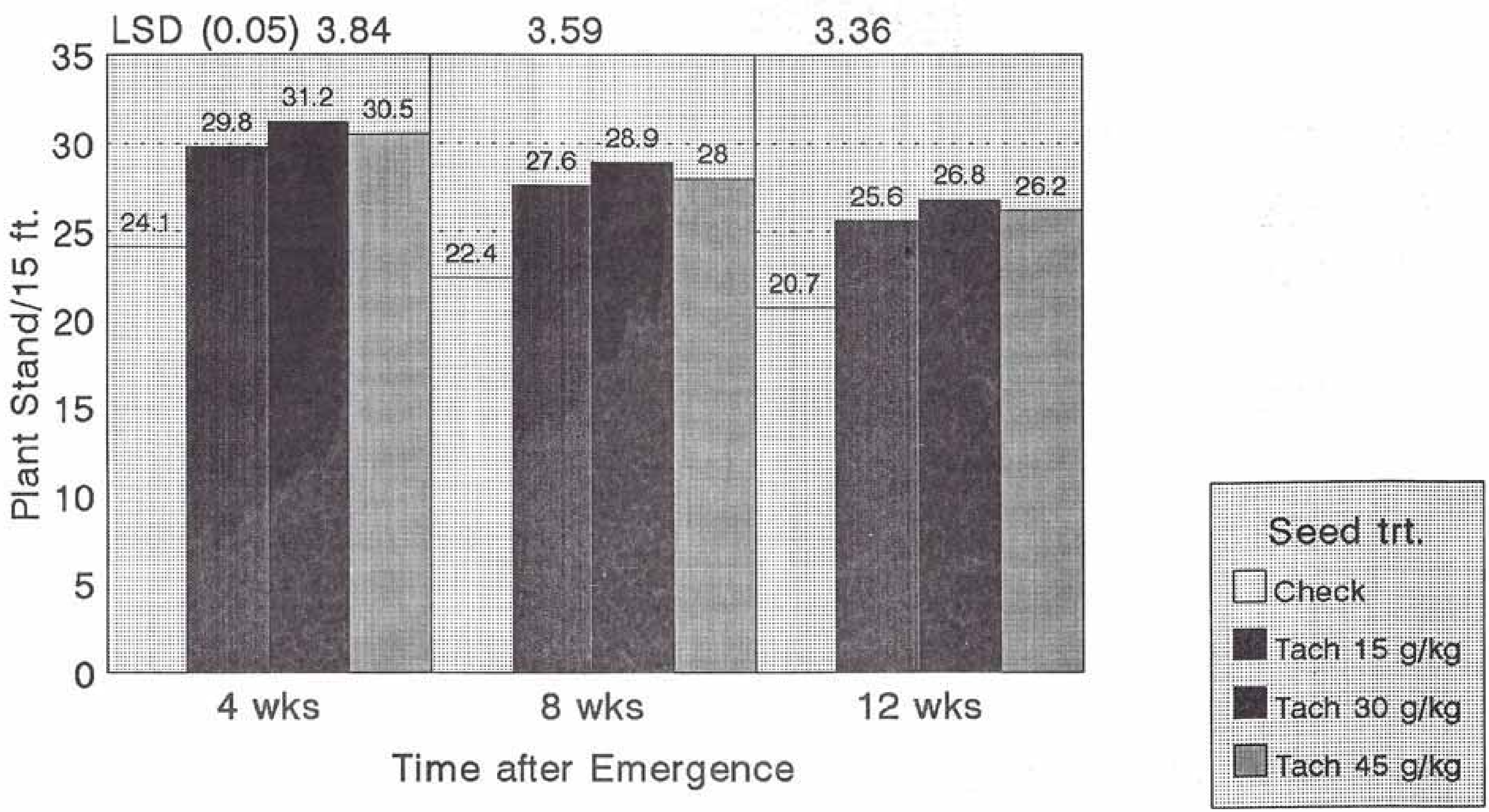


Figure 7.

Seed Treatment and time effect on plant stand
planting date 2

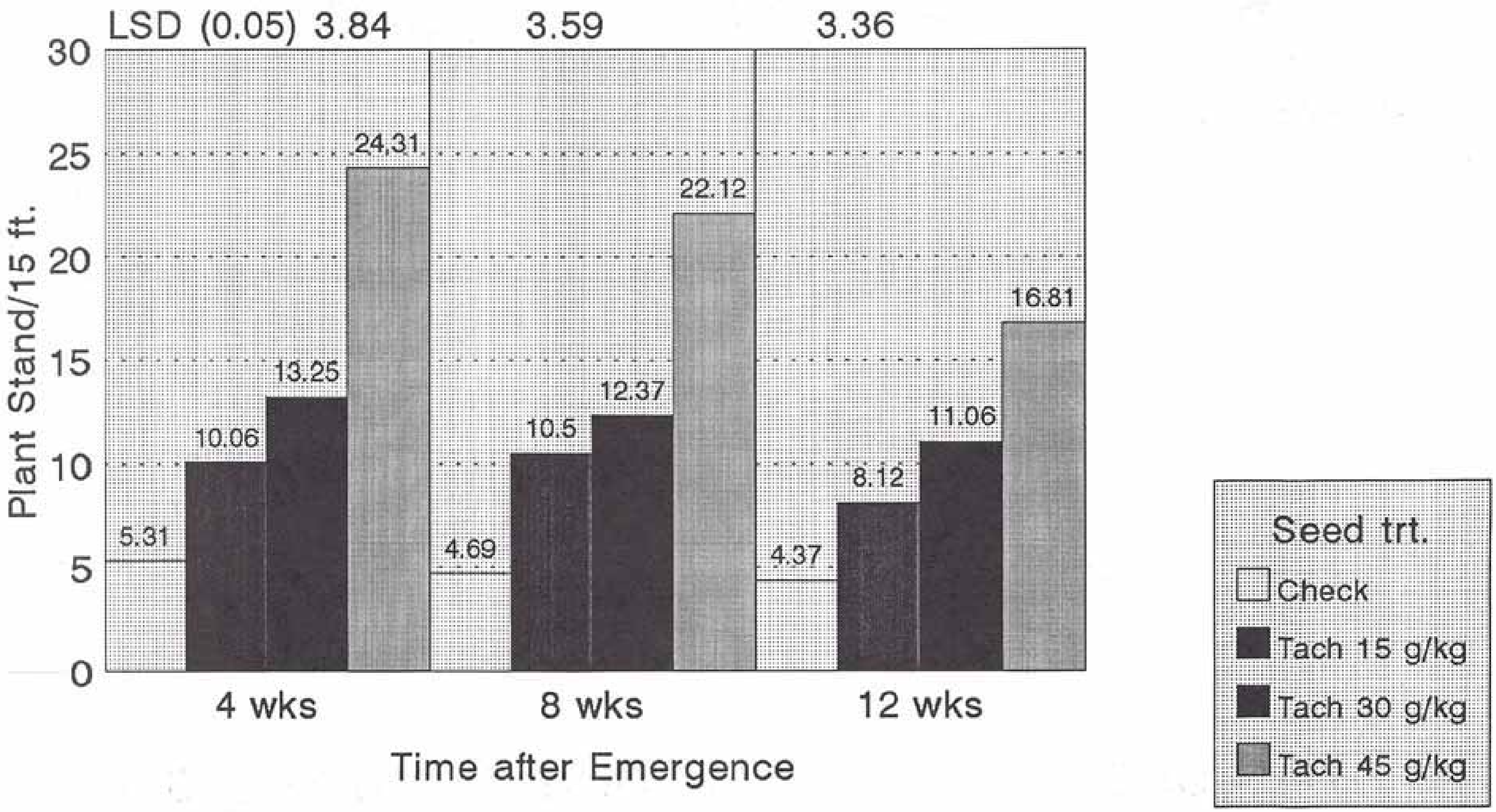
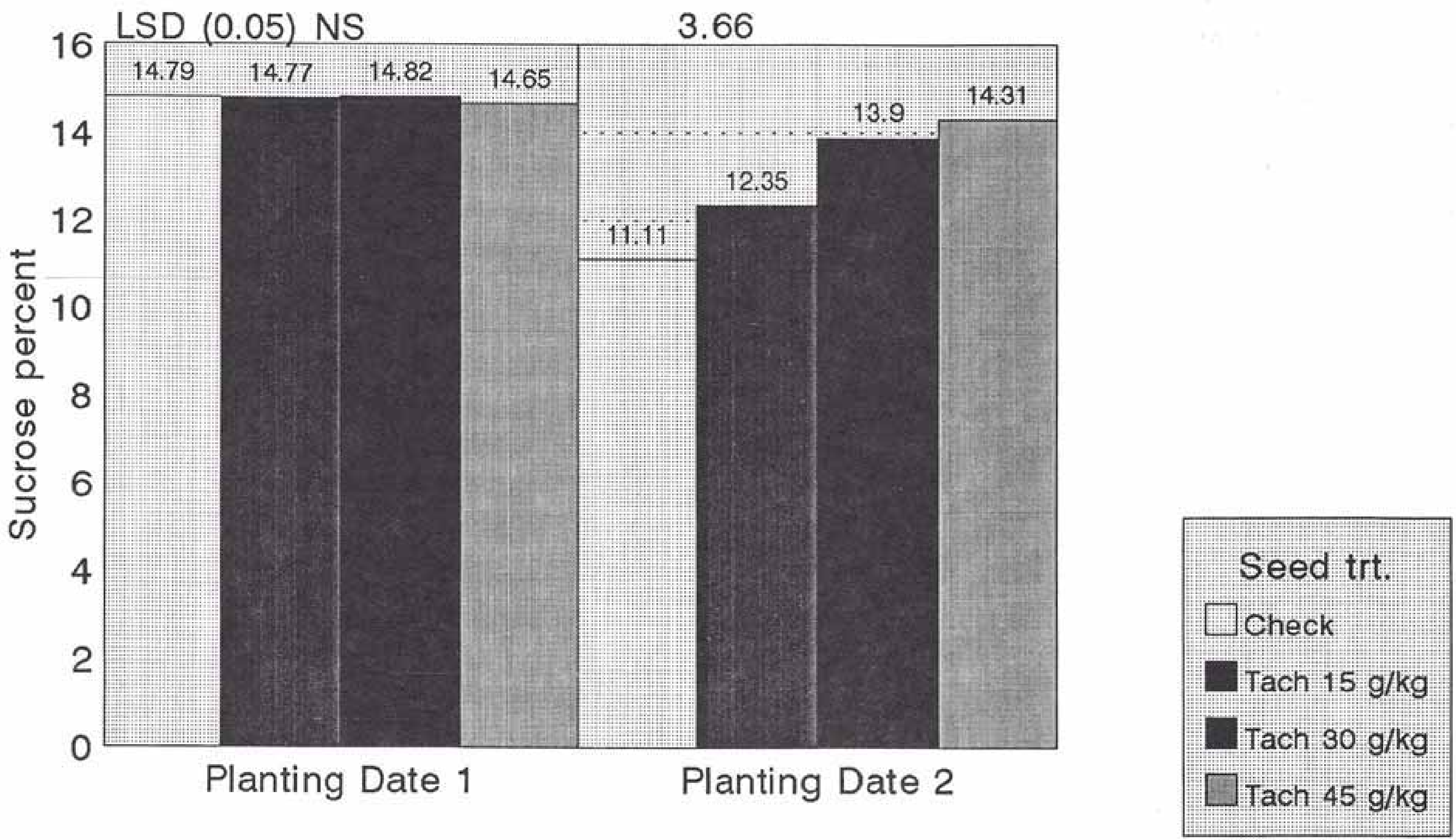


Figure 8.

Seed Treatment and time effect on sucrose



Fugure 9.

Seed Treatment and time effect on tons/acre

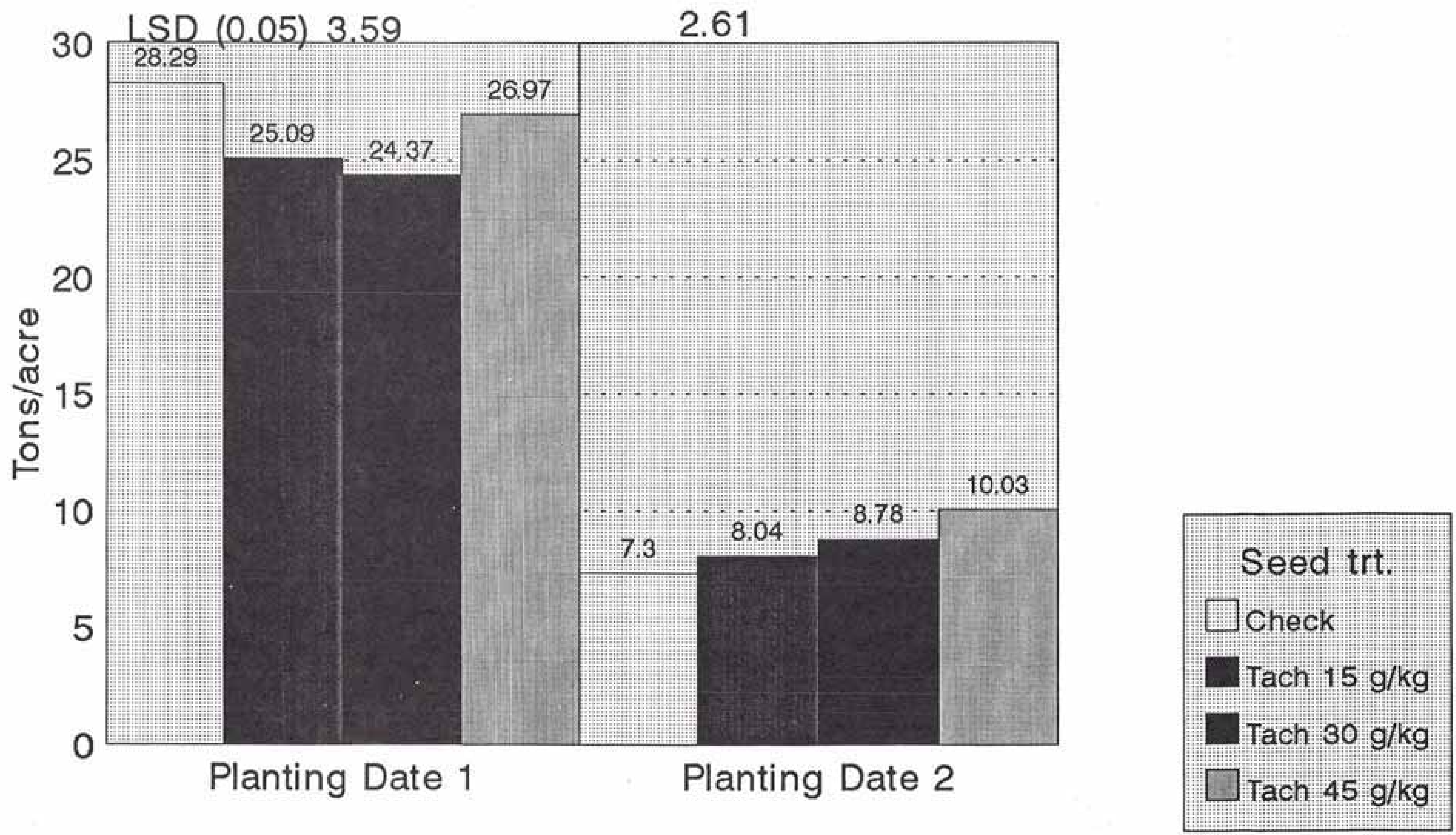


Figure 10.

Seed Treatment and time effect on recoverable sugar/ton

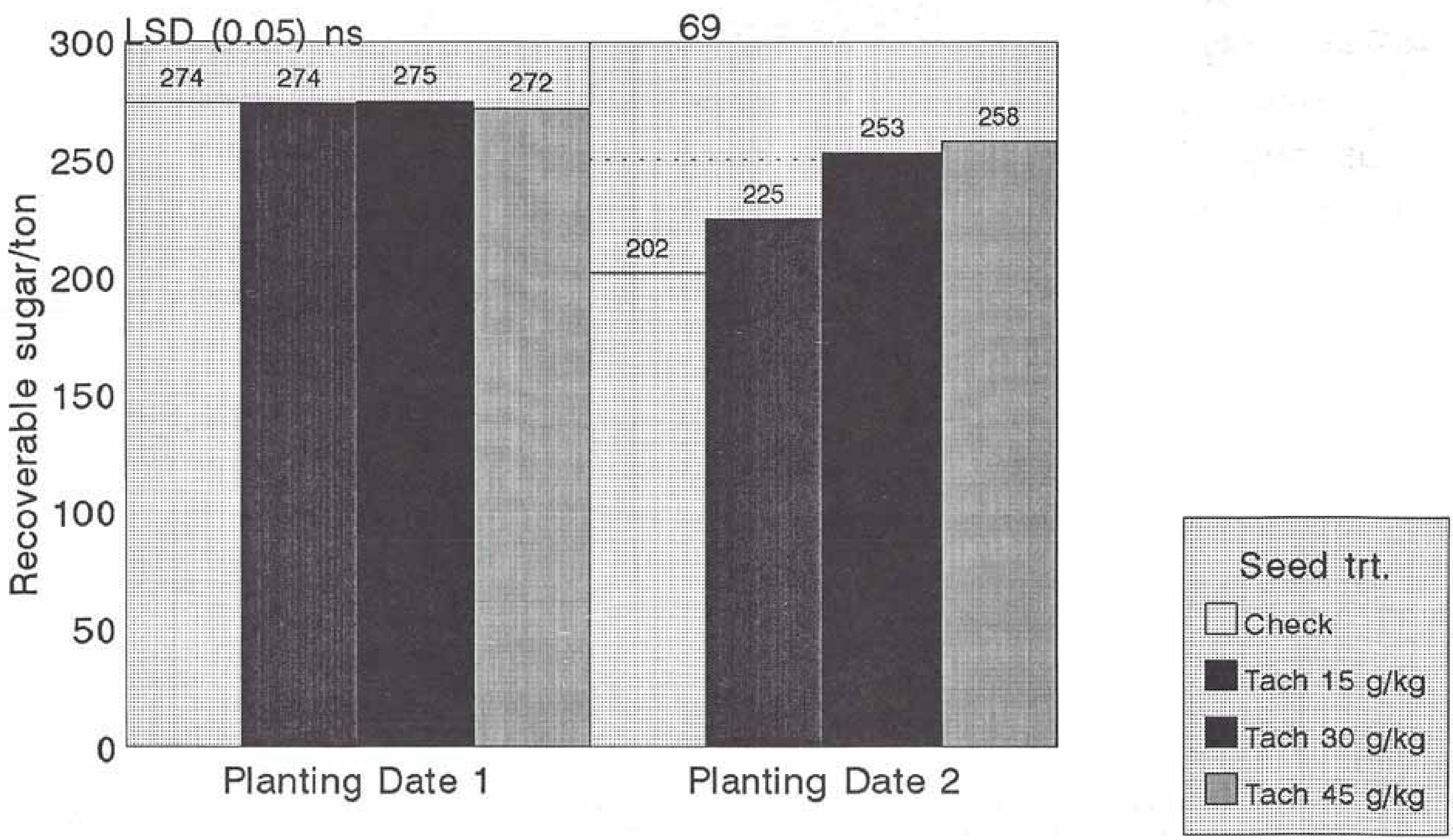


Figure 11.

Seed Treatment and time effect on recoverable sugar/acre

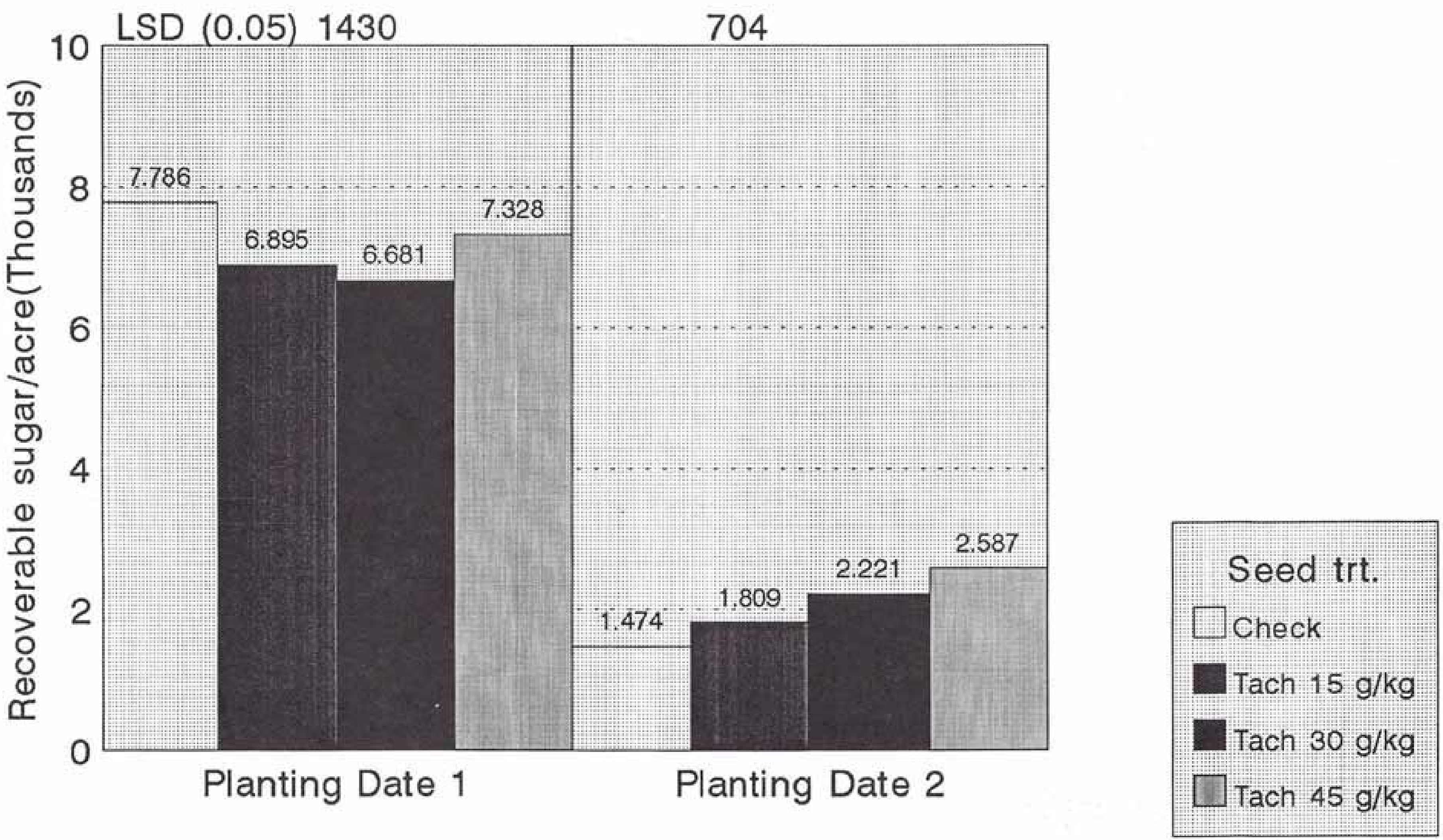


Figure 12.

Seed Treatment and time effect on plant stand

planting date 1

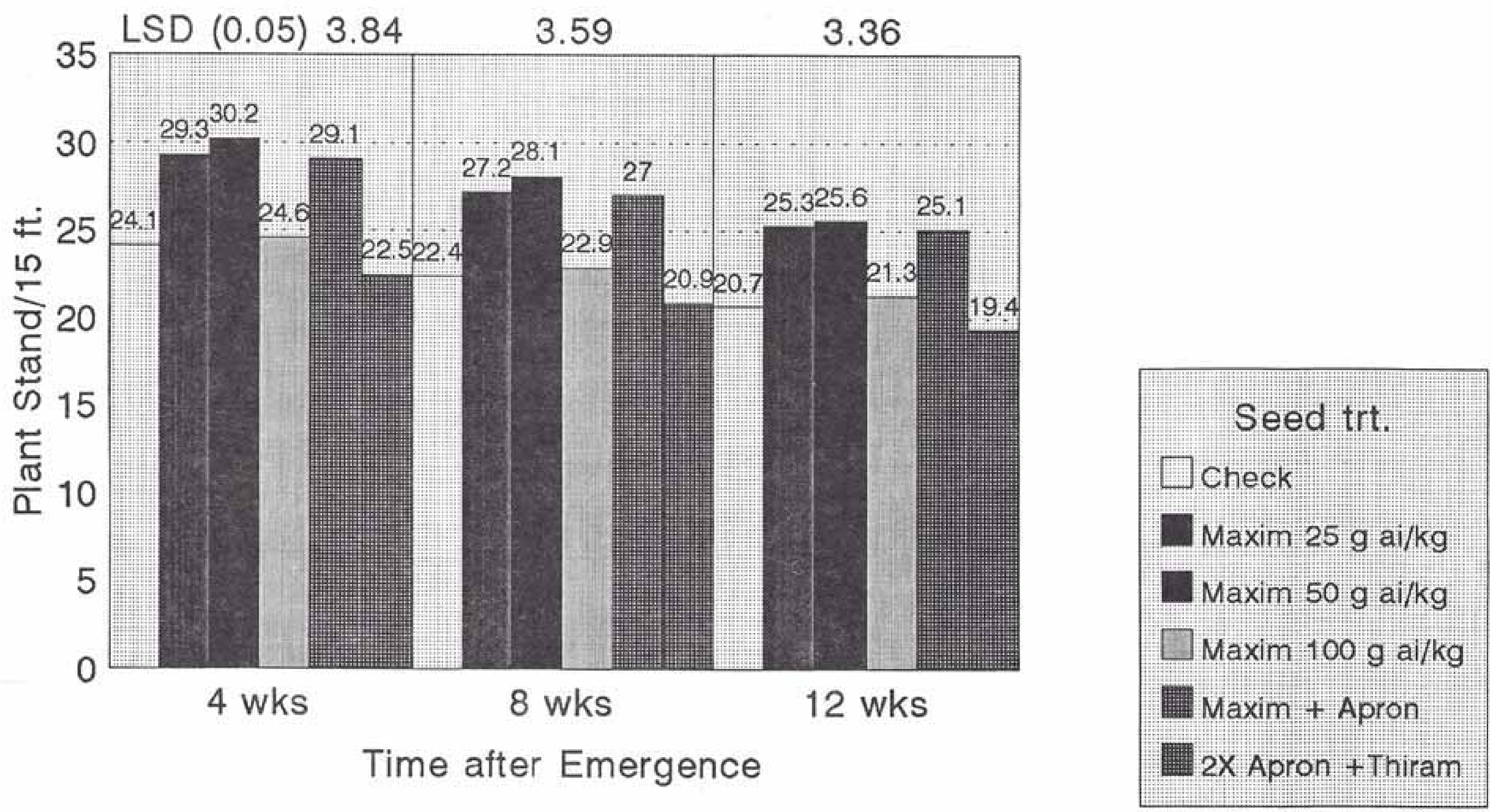


Figure 13.

Seed Treatment and time effect on plant stand
planting date 2

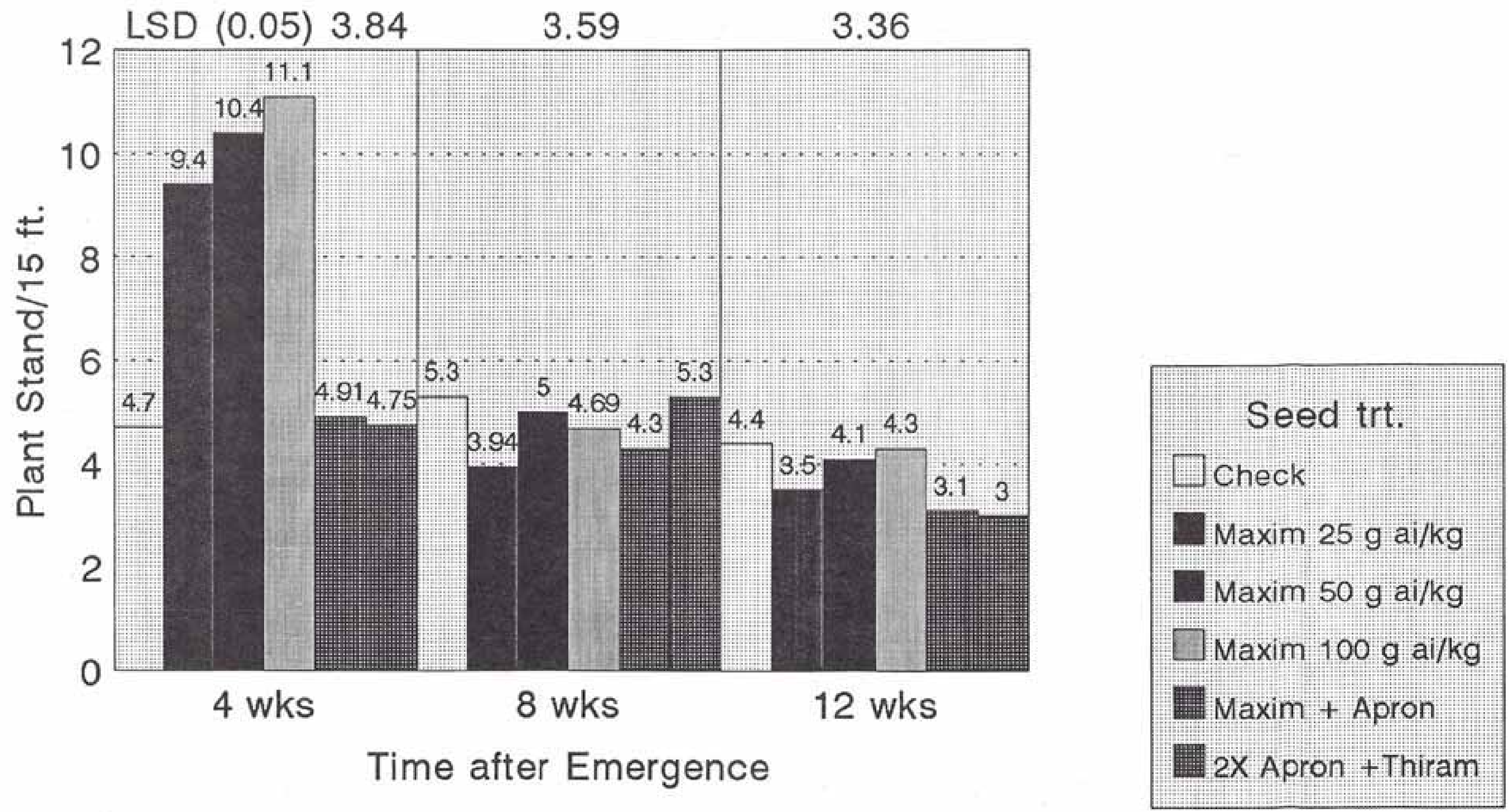
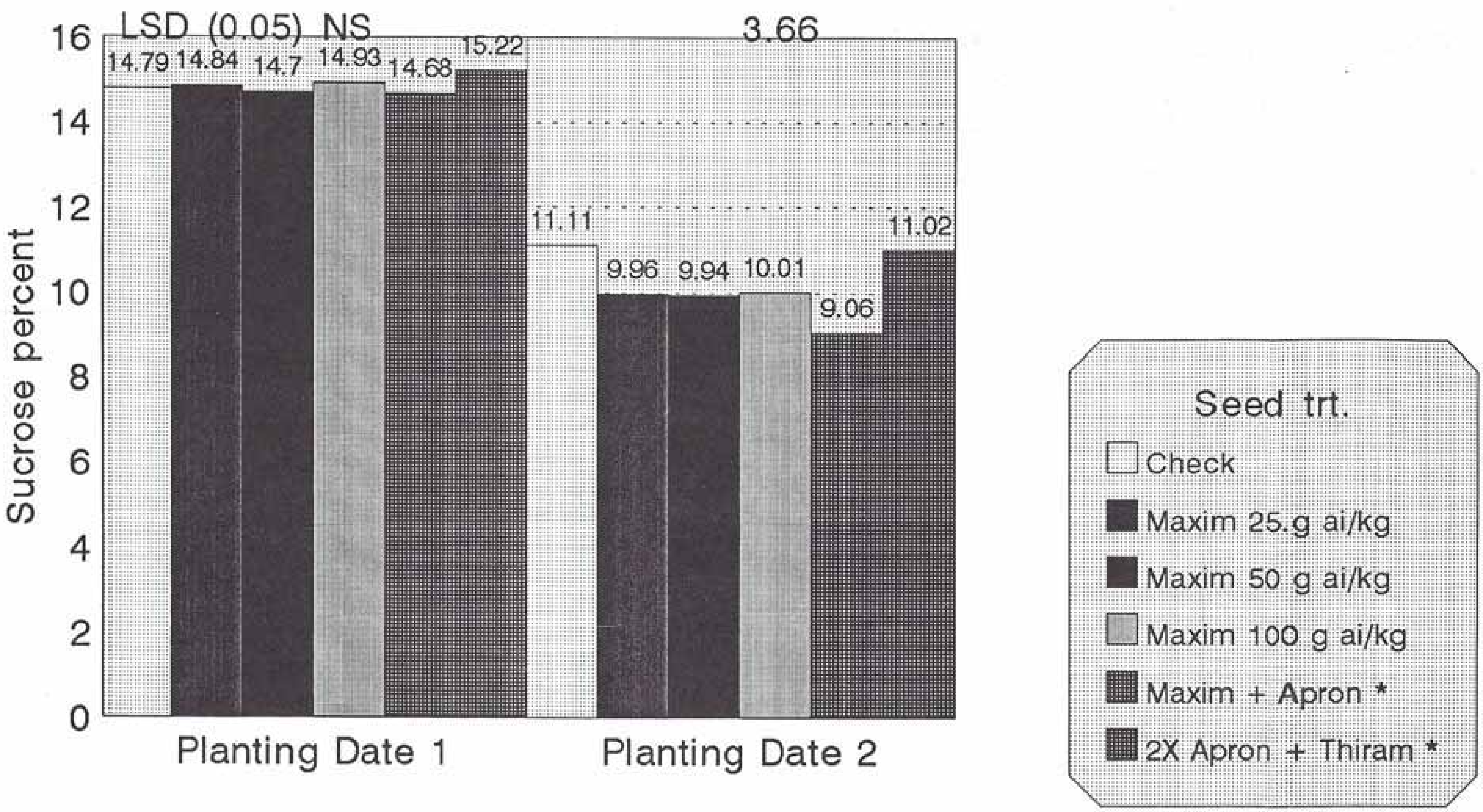


Figure 14.

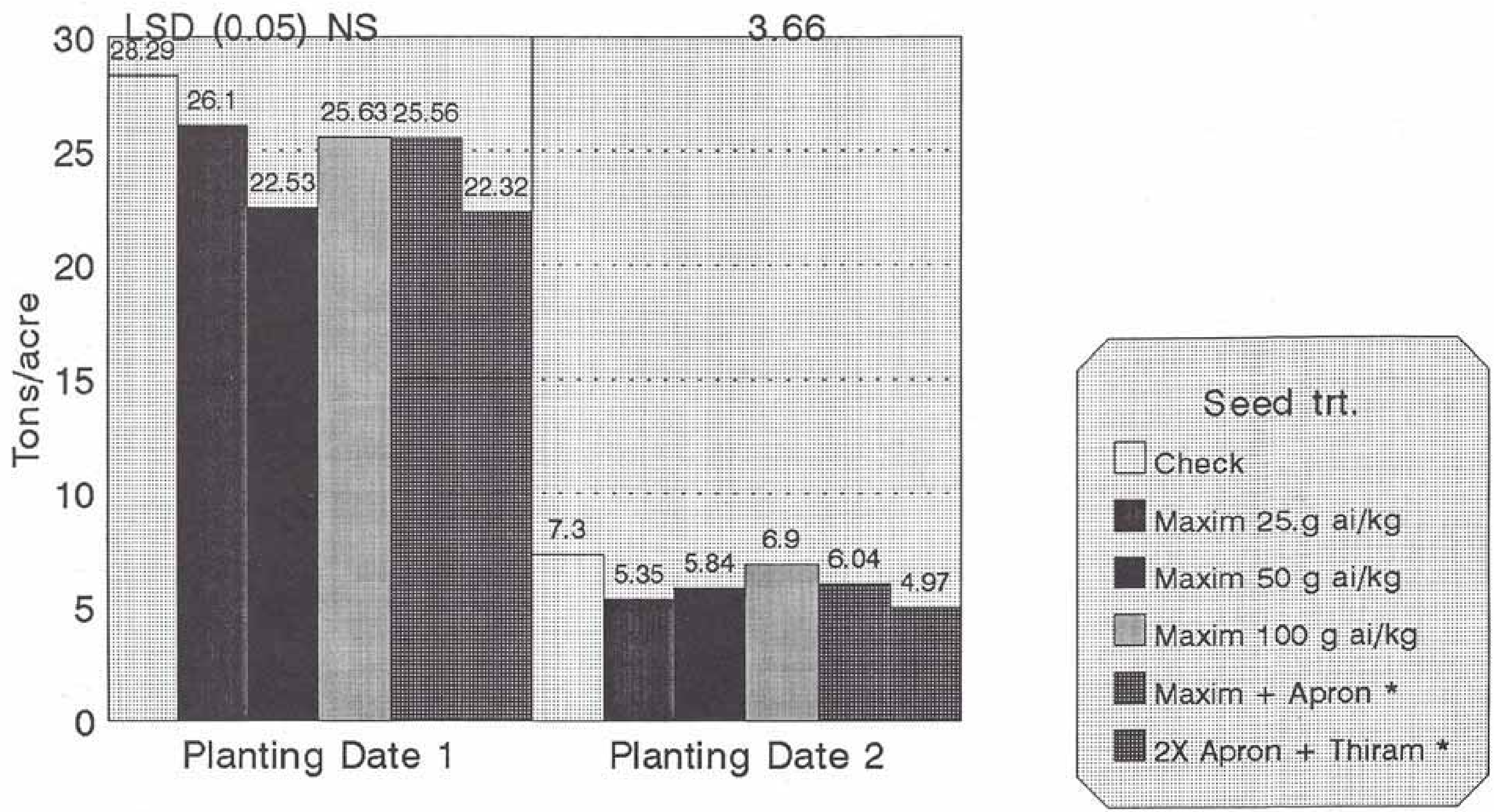
Seed Treatment and time effect on recoverable Sucrose



*=Refer to table 1

Figure 15.

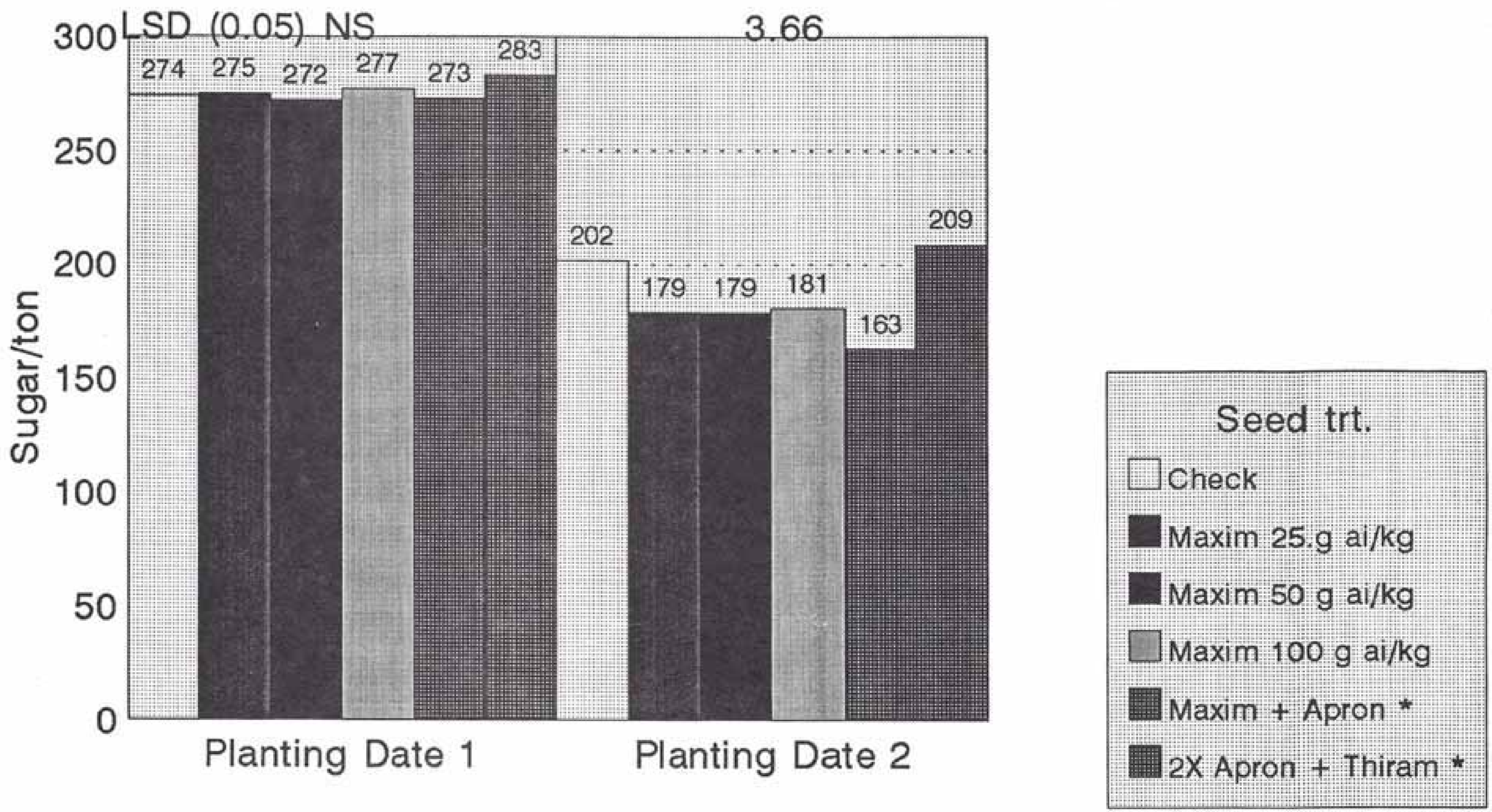
Seed Treatment and time effect on recoverable tons/acre



*=Refer to table 1

Figure 16.

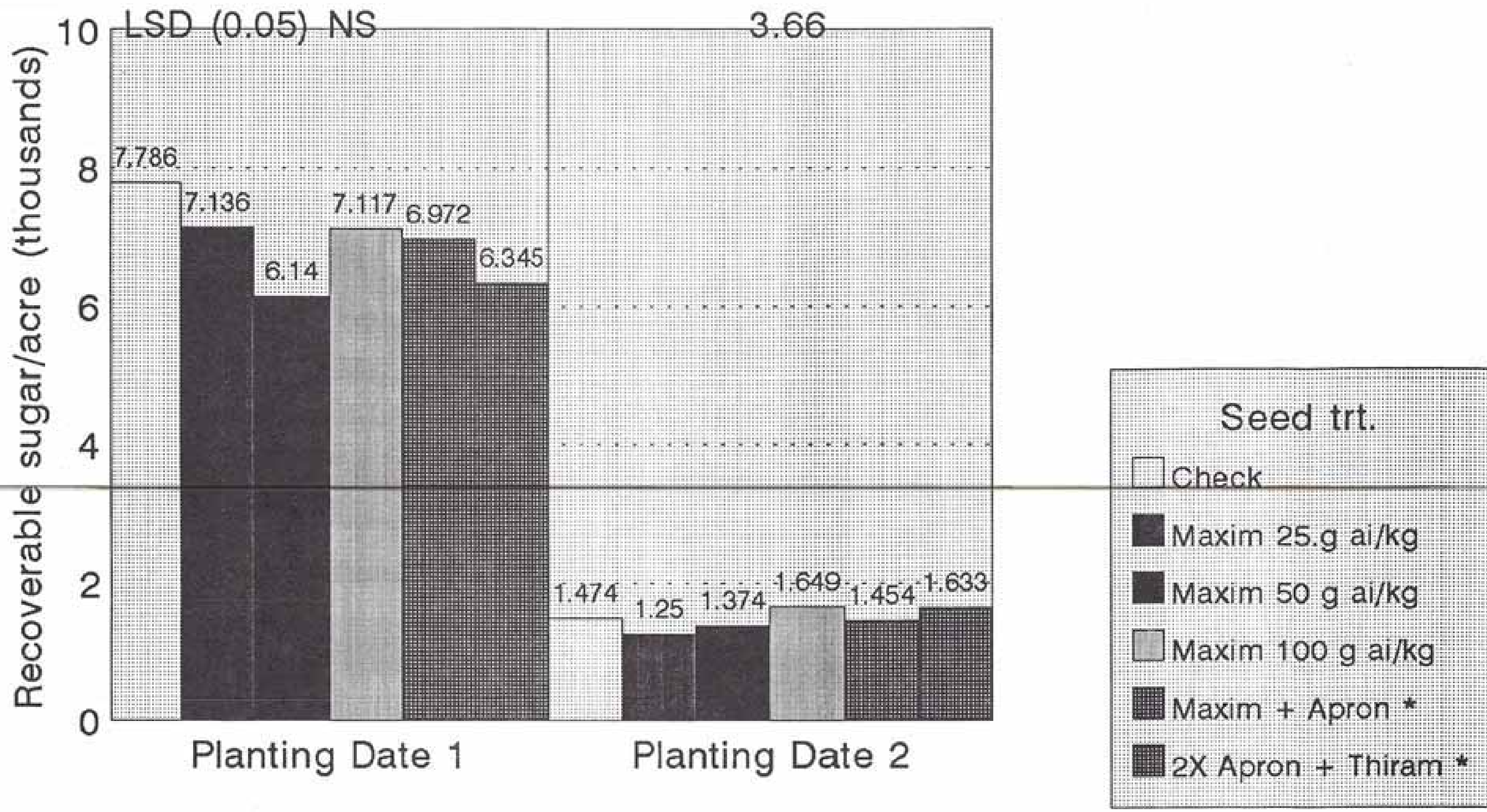
Seed Treatment and time effect on recoverable sugar/ton



*=Refer to table 1

Figure 17.

Seed Treatment and time effect on recoverable sugar/acre



*=Refer to table 1

Figure 18.

Seed Treatment and time effect on plant stand
planting date 1

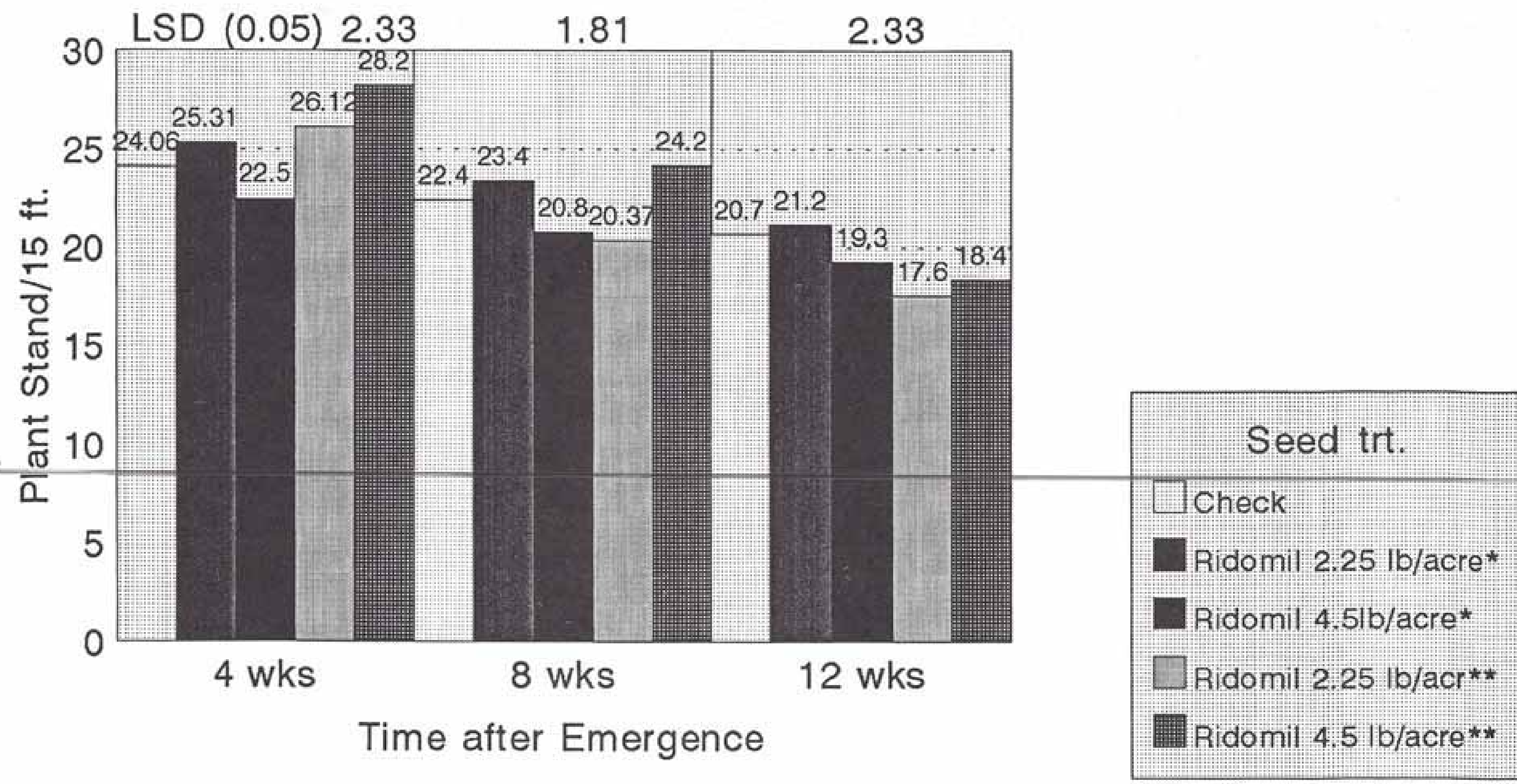
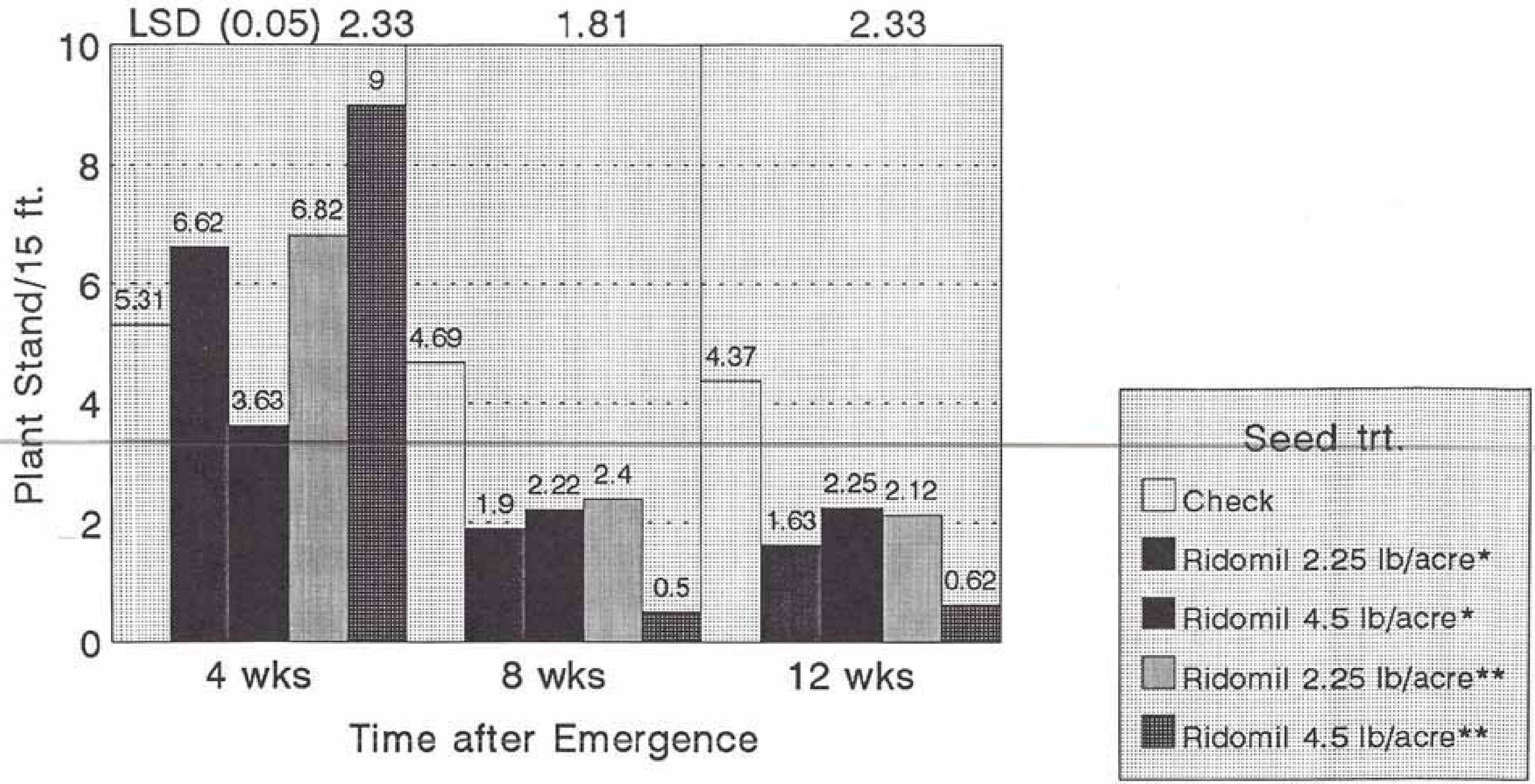


Figure 19.

*=susceptible variety **=tolerant variety

82

Seed Treatment and time effect on plant stand
planting date 2



*=susceptible variety **=tolerant variety

Figure 20.

Seed Treatment and time effect on sucrose

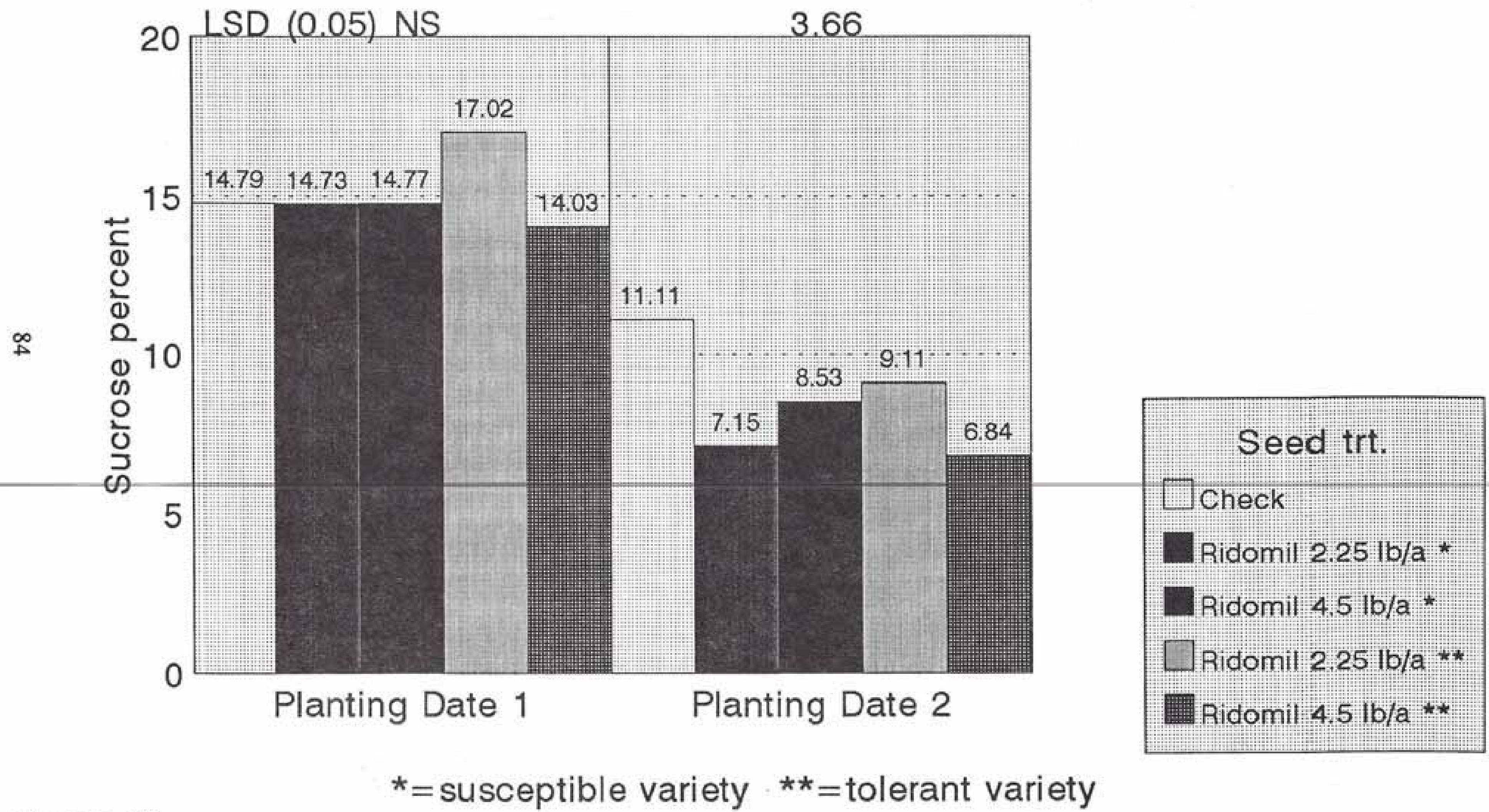
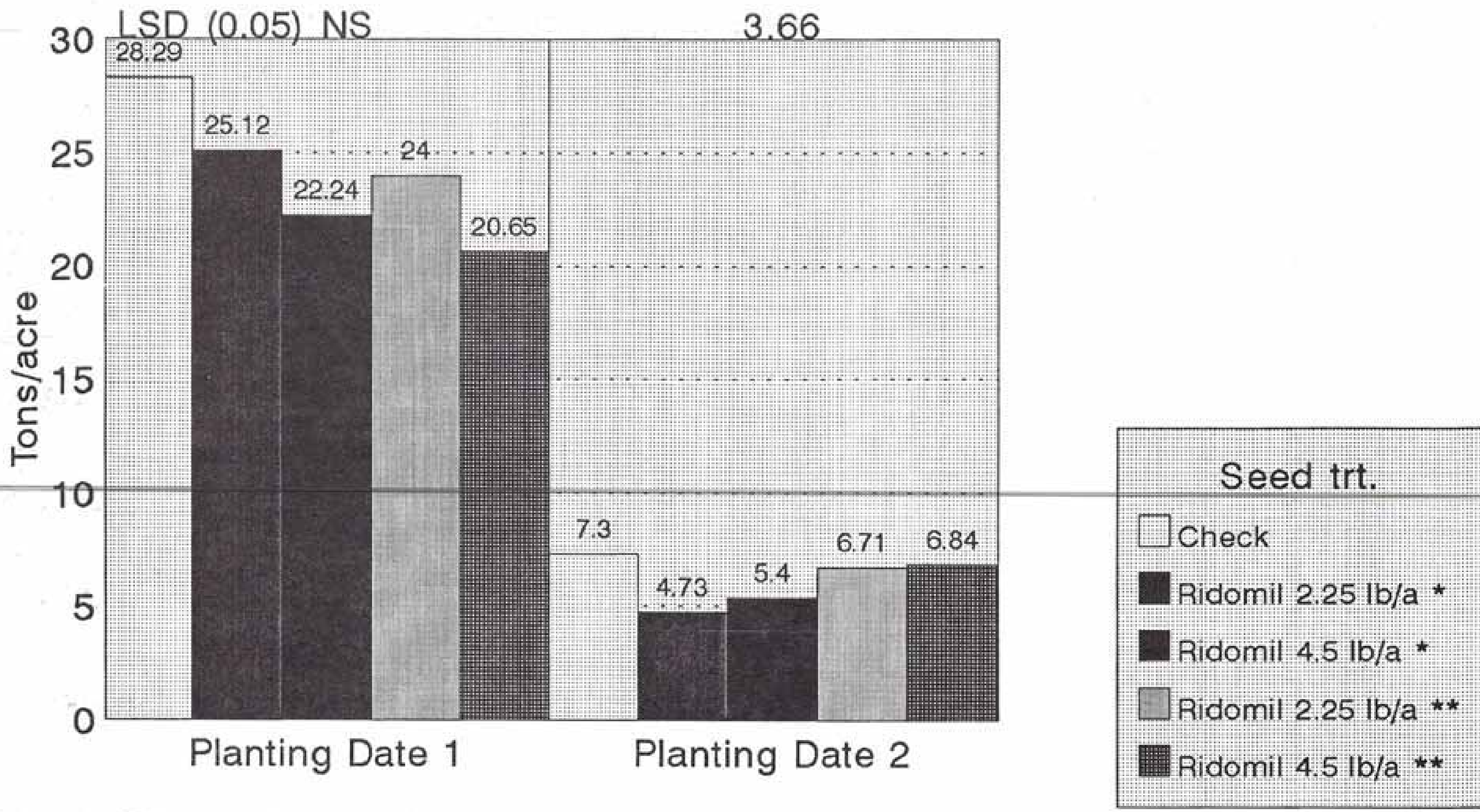


Figure 21.

Seed Treatment and time effect on tons/acre



*=susceptible variety **=tolerant variety

Figure 22.

Seed Treatment and time effect on recoverable sugar/ton

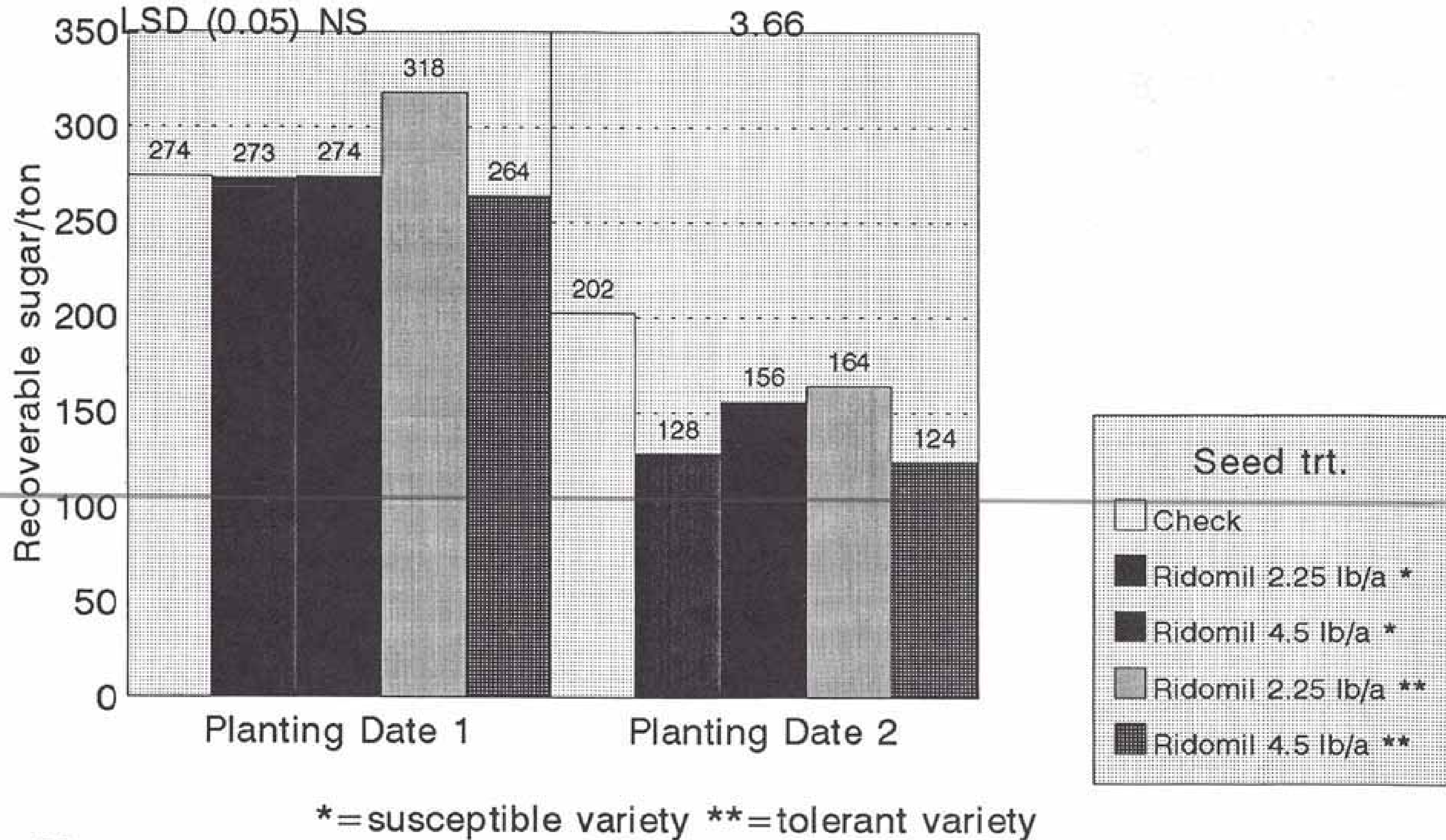


Figure 23.

Seed Treatment and time effect on recoverable sugar/acre

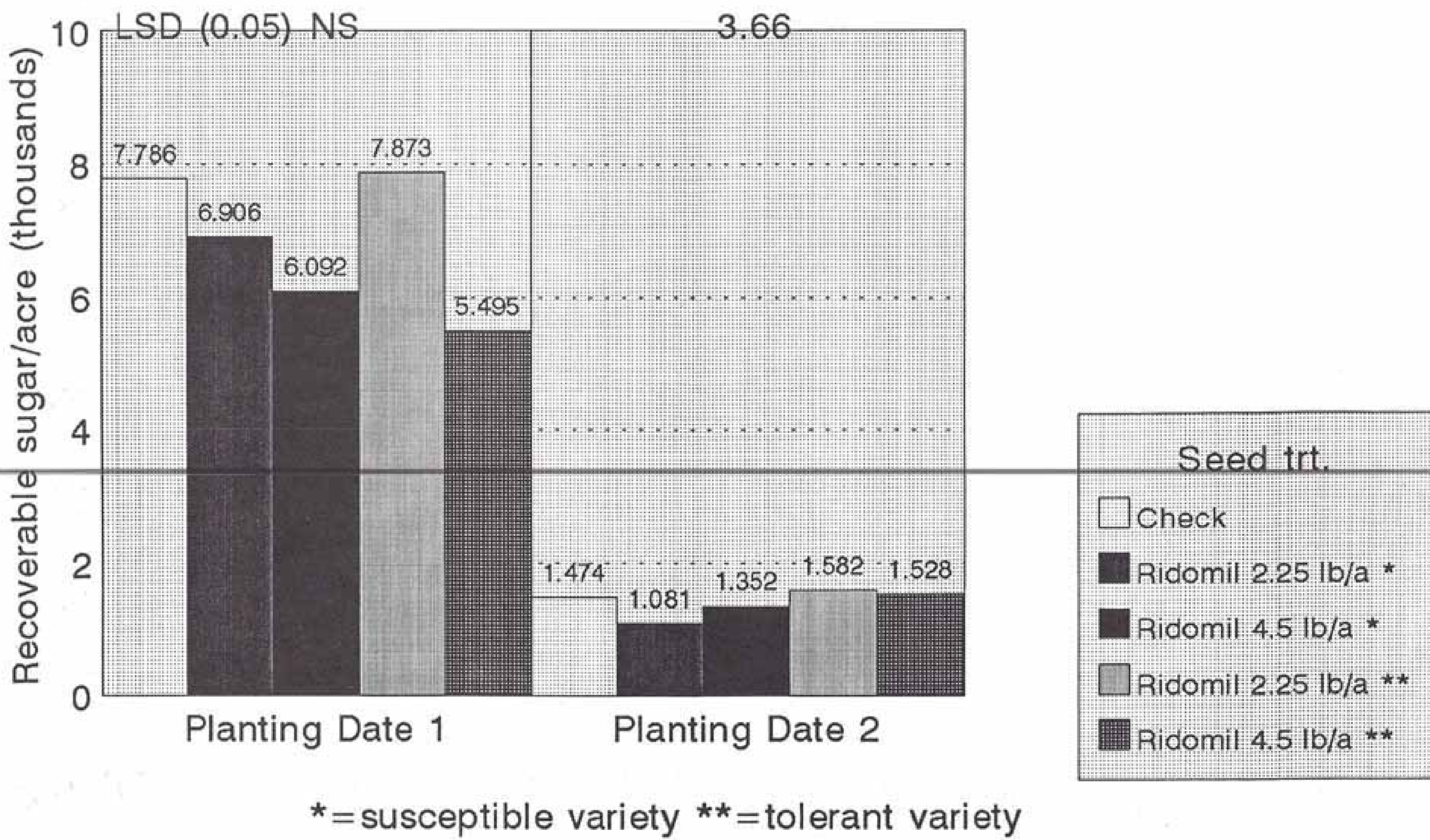


Figure 24.

Seed Treatment and time effect on plant stand

planting date 1

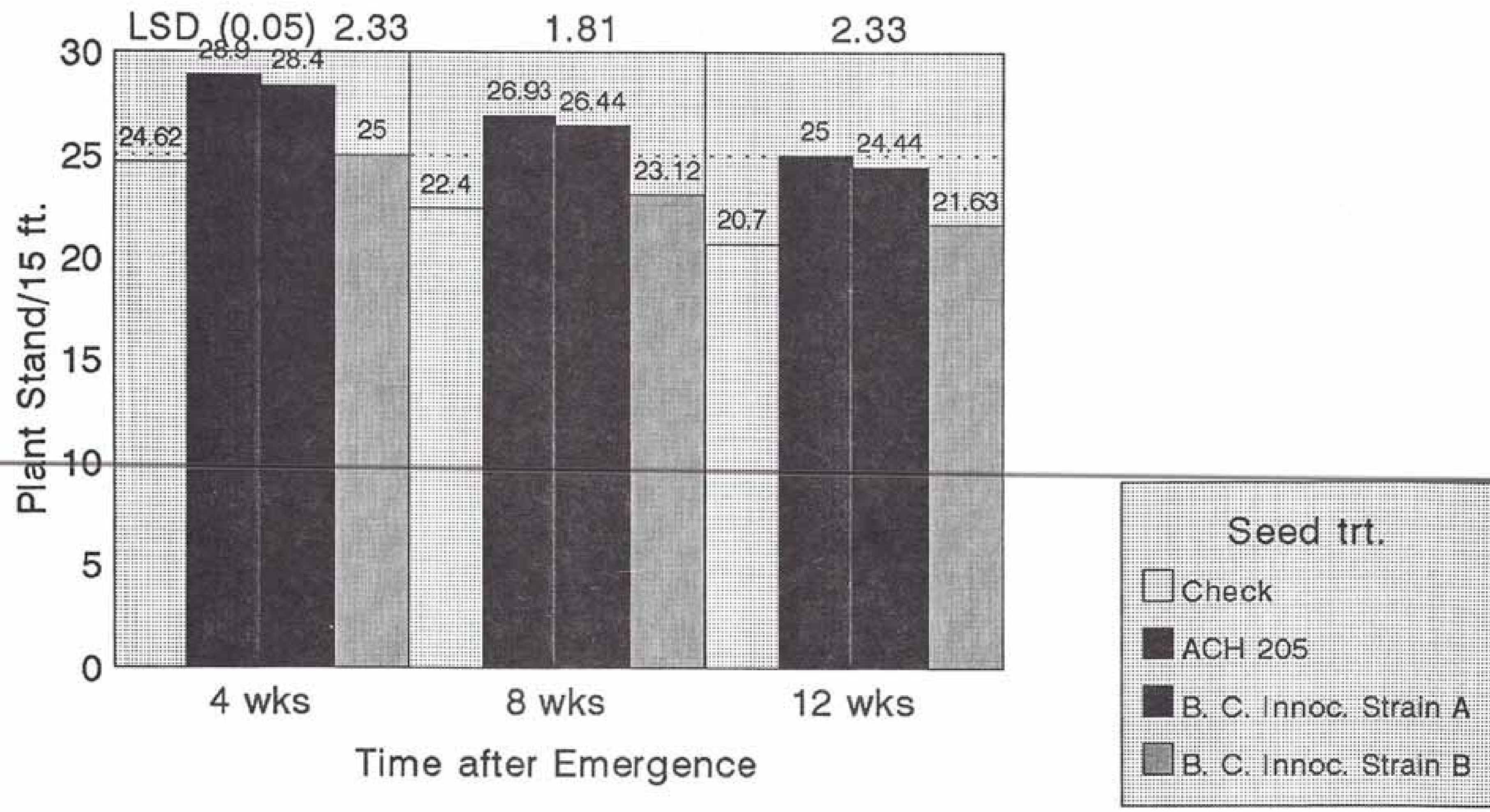


Figure 25.

Seed Treatment and time effect on plant stand
planting date 2

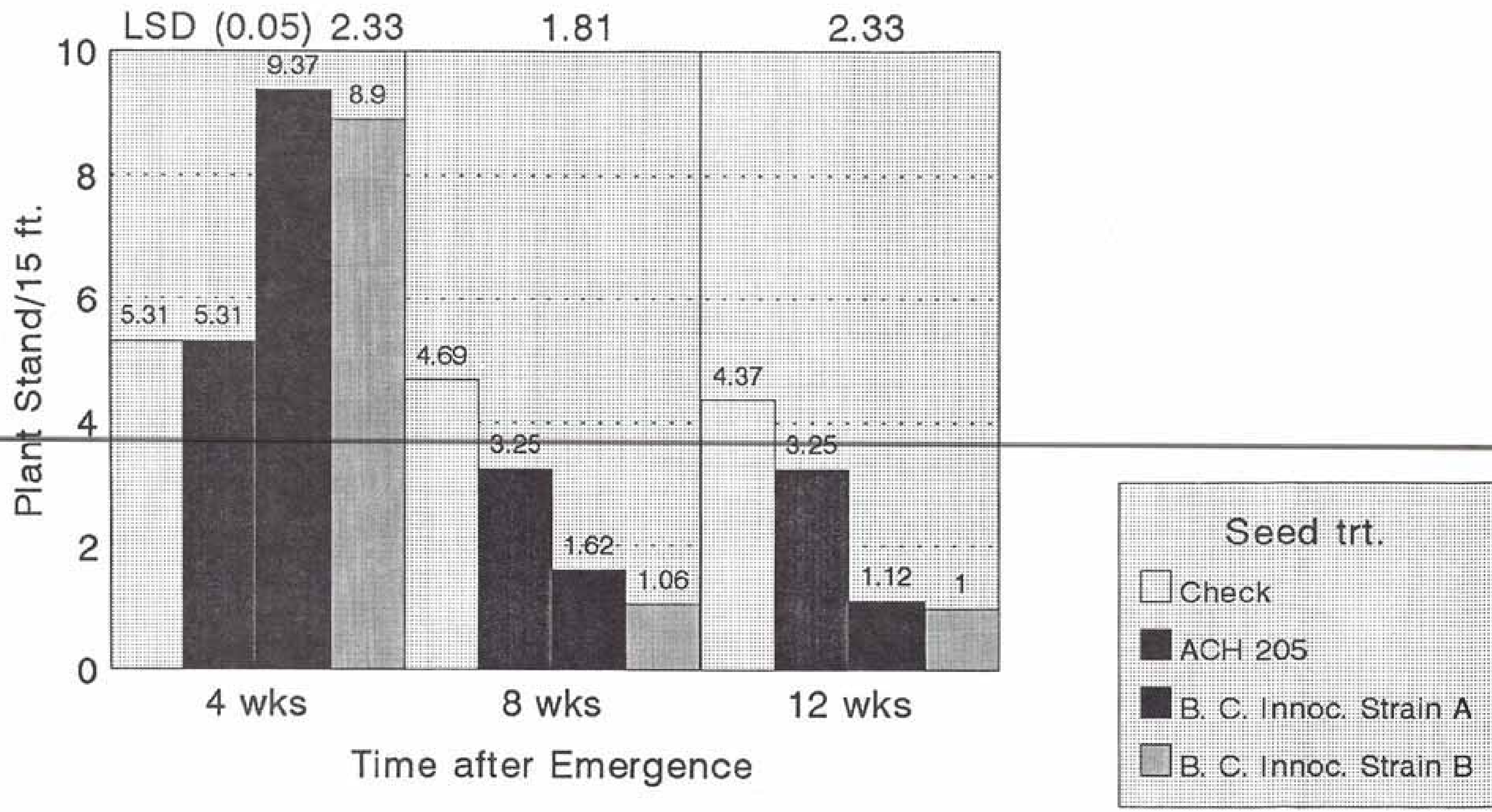


Figure 26.

Seed Treatment and time effect on sucrose

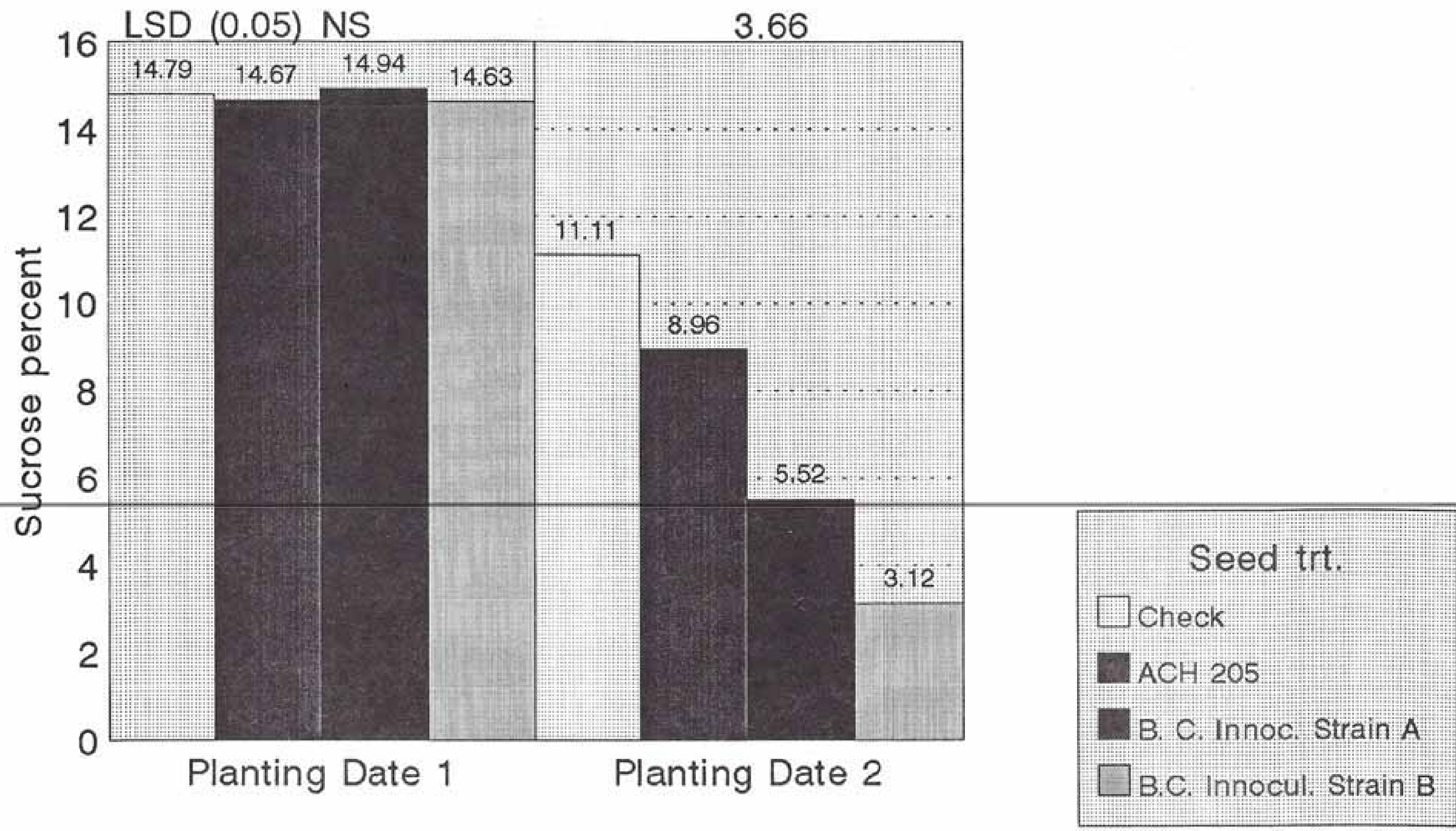


Figure 27.

Seed Treatment and time effect on tons/acre

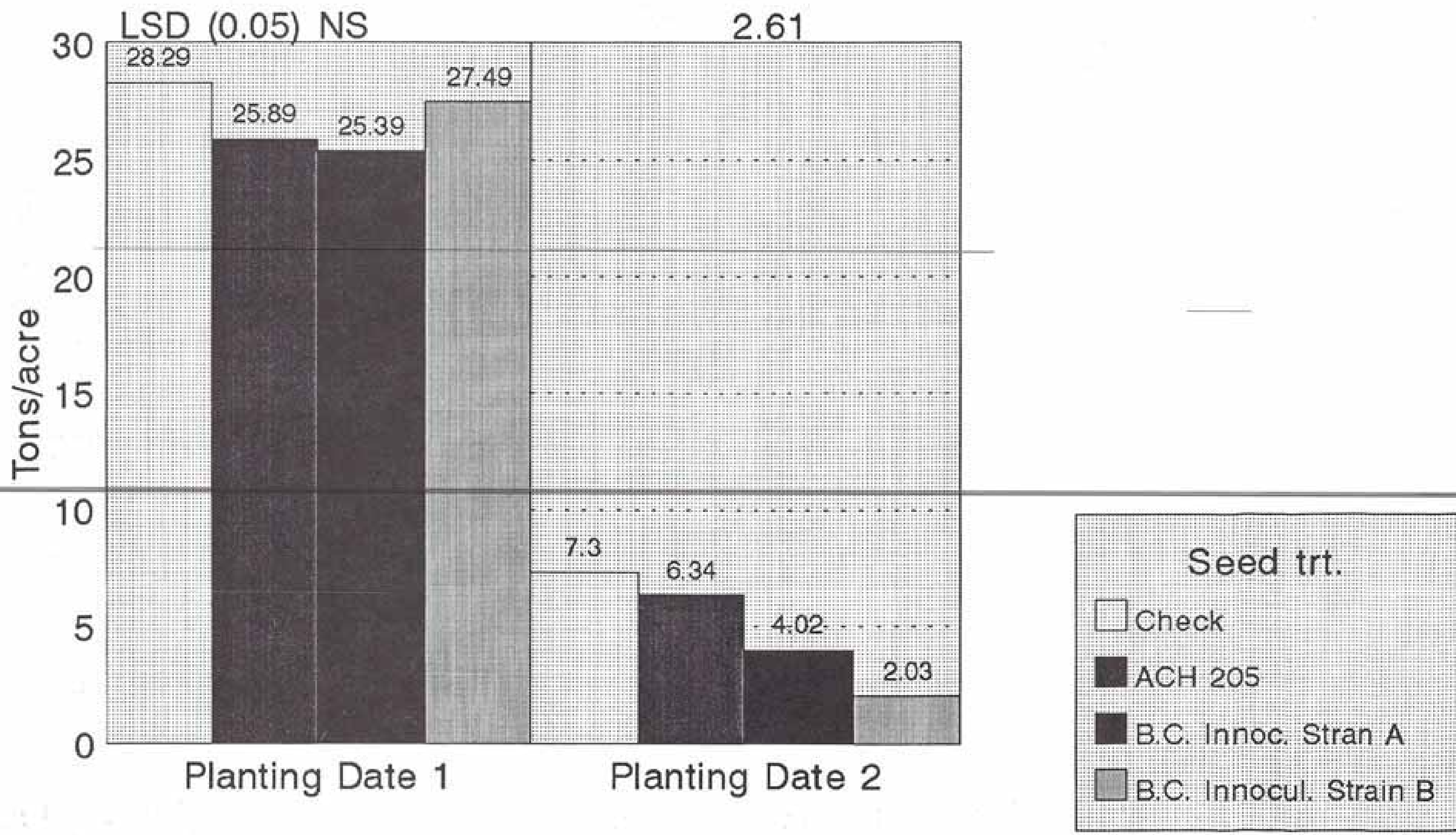


Figure 28.

Seed Treatment and time effect on recoverable sugar/ton

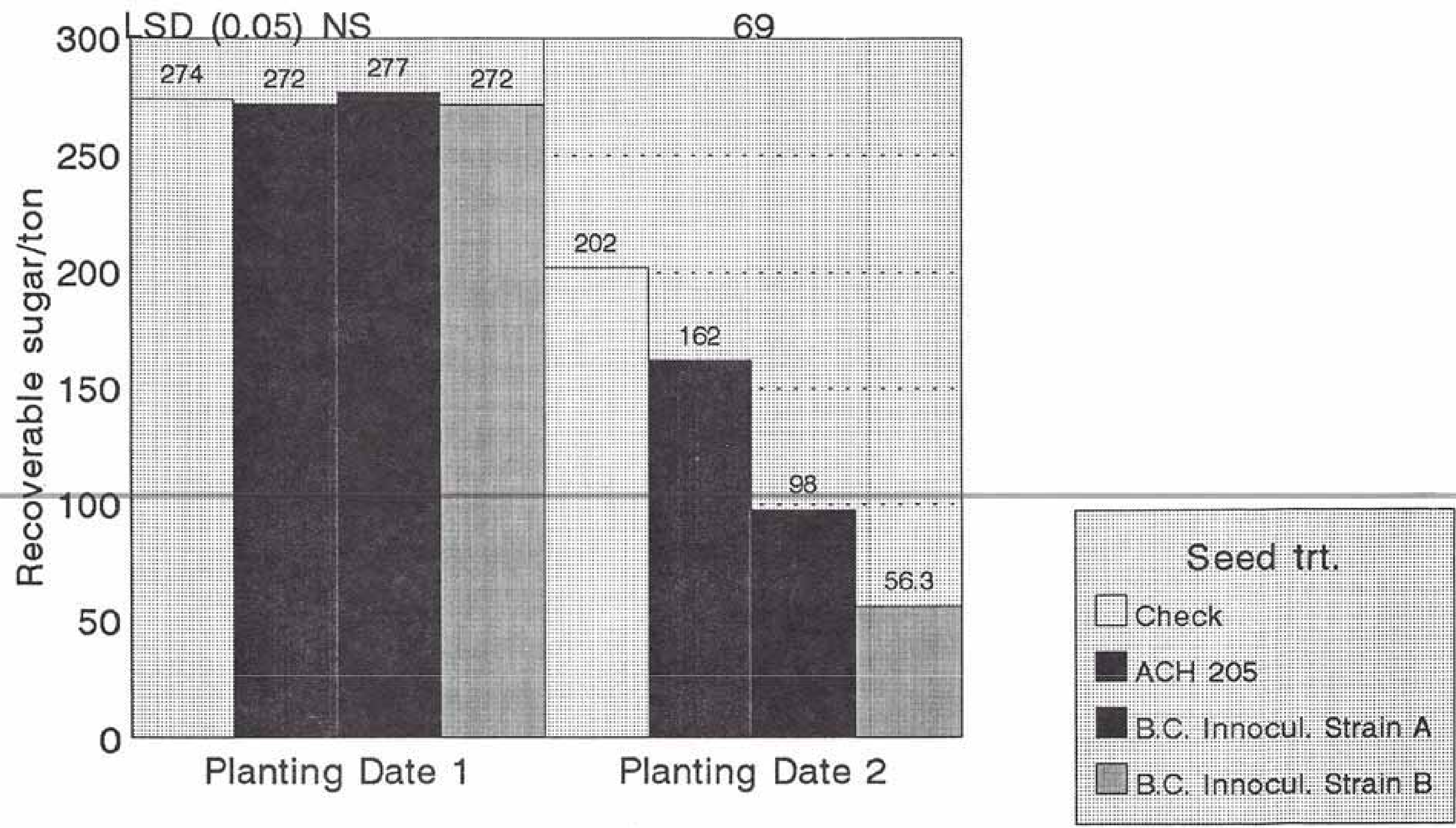


Figure 29.

Seed Treatment and time effect on recoverable sugar/acre

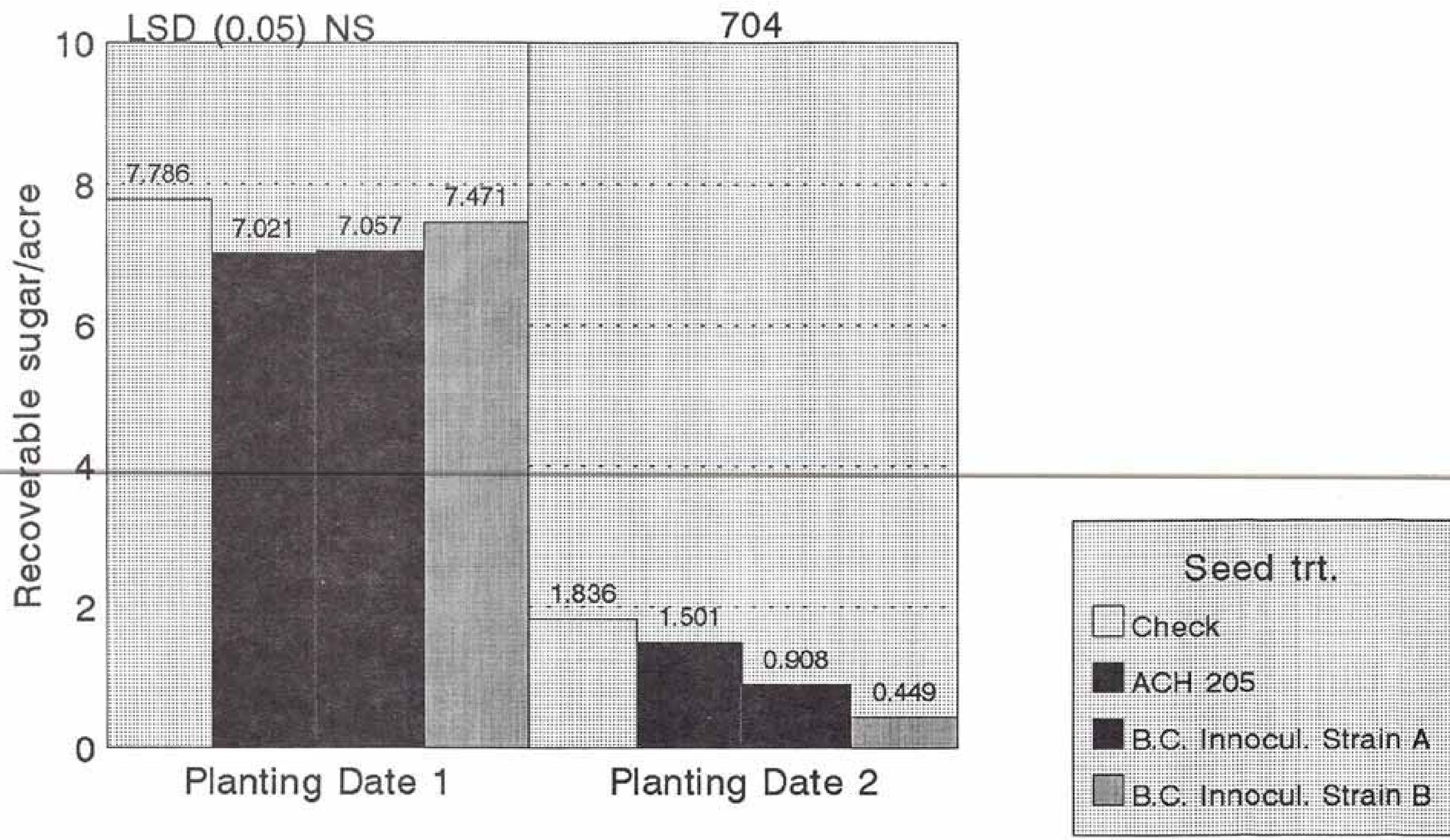


Figure 30.

DELAYED CONTROL OF COVER CROP

OBJECTIVE:

Evaluate control of cover crop (wheat, oats and peas) over time.

EXPERIMENTAL PROCEDURE

Wheat, oats, and peas were seeded in designated plots for each cover crop. Each crop was duplicated three times within each of four replications. Each crop was treated with a designated herbicide at two, four and six weeks. Oats and wheat were treated with Poast at 1.5 pts/acre plus Sunit (oil). Peas were treated with Stinger at .25 pts/acre. Plots that were planted to peas were treated with Roneet and Eptam at 2 lbs. per acre of each. Plots planted to oats and wheat were not treated with a pre-emergence chemical. Yield data was not obtained due to excessive precipitation received on plot area.

RESULTS AND DISCUSSION

Wheat and oat control were equally controlled within each time after emergence. Control was significantly reduced over time interval. This data indicates oat and wheat control should be achieved within two weeks after sugarbeet emergence.

Pea control with Stinger was equal to that achieved on oat and wheat with Poast at two weeks after sugarbeet emergence. However, at four and six weeks after emergence the peas were better controlled than the oats and wheat.

Stinger control for peas were significantly higher at two weeks compared to four and six weeks after sugarbeet emergence. These data indicate that peas should be controlled within two weeks after emergence for optimum control with Stinger. One should note that 85 percent control (which may be adequate) was achieved at four weeks after emergence, although it is not known whether or not a yield reduction would have occured. Pea stand was reduced slightly by pre-emergence herbicides. In 1993 tests will be conducted with Eptam alone, Roneet alone, Eptam plus Roneet and no herbicide to determine herbicide influence on peas. Yield data will also be attempted in 1993 to determine effect of time of control on yield.

Table 1. List of treatment and wheat, oat, and pea control over time.

COVER CROP	TREATMENT	RATE	WEEKS AFTER EMERGENCE 2	4 (% CONTROL)	6
OATS	POAST + SUNIT	1.5 PT + 1 QT	97	60	20
WHEAT	POAST + SUNIT	1.5 PT + 1 QT	98	57	25
PEAS	STINGER	.25 PT	100	85	75

* Sunit = Methylated seed oil
+ = Tank mix

Table 2. Stage of cover crop and sugarbeets.

WEEKS AFTER SUGARBEET EMERGENCE	OAT AND WHEAT LEAF STAGE	PEAS INCH HEIGHT
2	3 - 4	3
4	10 - 12	6
6	BOOT STAGE	10

COMMON LAMBSQUARTER, REDROOT PIGWEED, AND EASTERN BLACK NIGHTSHADE CONTROL WITH POSTEMERGENCE HERBICIDES

Procedure

'ACH 198' sugarbeet was seeded in 22 inch rows May 5. The first half of split treatments was applied 3:00 pm May 14 when the air temperature was 70°F, relative humidity was 65%, wind velocity was 5 to 10 mph, soil moisture was good, and sugarbeet, eastern black nightshade, common lambsquarters, and redroot pigweed were in the cotyledon stage. The second half of split treatments was applied 5:00 pm May 20 when the air temperature was 75°F, relative humidity was 75%, wind velocity was 15 mph, soil moisture was good, sugarbeet was in the cotyledon stage, eastern black nightshade was 1 to 2 inches tall, and common lambsquarter and redroot pigweed were in the cotyledon stage to 1 inch tall. All herbicides were applied in 8.5 gpa water at 40 psi through 8001 nozzles to the center four rows of six row plots. Common lambsquarters, redroot pigweed, and eastern black nightshade control were evaluated June 12.

Results and Discussion

Common lambsquarter control was highest with treatments including NA307. NA307 applied alone or with Stinger or DPX-66037 equally controlled lambsquarter. Betanex plus Stinger and DPX-66037 applied sequentially or in split applications controlled lambsquarter equally and greater than all other treatments except when NA307 was part of the treatment. Lambsquarter control with Betanex was significantly increased with the addition of Stinger and or DPX-66037.

Redroot pigweed was equally controlled by all treatments that include NA307. However, NA307 plus Stinger or DPX-66037 controlled redroot pigweed better than all other treatment that did not include NA307. Betanex control of redroot pigweed was not significantly increased by Stinger or DPX-66037 unless all three herbicides were applied together.

Eastern black nightshade was best controlled by treatments including NA307, and Betanex applied with DPX-66037 and Stinger in a split application. Betanex plus DPX-66037 gave 91% control, but was significantly lower than NA307 plus DPX-66037. All other treatments gave significantly less control than the above mentioned treatments.

Treatment*	Rate	Colq cntl	Rrpw cntl	EBNS cntl
	(lb/A)	-----	(%)	-----
Betanex/Betanex	0.25/0.33	64	73	58
Betanex + Stinger/Betanex + Stinger	0.25+0.09/0.33+0.09	72	76	79
Betamix + Stinger/Betamix + Stinger	0.25+0.09/0.33+0.09	65	70	68
Betanex + H-273/Betanex + H-273	0.25+0.25/0.33+0.33	67	60	39
Betanex + DPX-66037/Betanex + DPX-66037	0.25+0.0156/0.33+0.0156	73	78	91
DPX-66037 + X77/DPX=66037 + X-77	0.0156+.25%/0.0156+.25%	38	55	84
Betanex + Stinger + DPX-66037/Betanex + Stinger + DPX-66037	0.25+0.09+0.0156/0.33+0.09+0.0156	81	84	95
Betanex + DPX-66037/Betanex + Stinger	0.25+0.031/0.33+0.19	84	86	96
NA307/NA307	0.45/0.45	91	91	96
NA307 + Stinger/NA307 + Stinger	0.45+0.09/0.45+0.09	95	95	95
NA307 + DPX-66037/NA307 + DPX-66037	0.45+0.0156/0.45+0.0156	95	97	100
DPX-66037 + Stinger/DPX-66037 + Stinger	0.0156+0.09/0.0156+0.09	59	61	84
HIGH MEAN		95	97	100
LOW MEAN		38	55	39
EXP MEAN		73	77	72
C.V. %		6	6	5
LSD 5%		6	7	6
LSD 1%		8	9	9
# OF REPS		4	4	4

*NA307 = desmedipham+phenmedipham+ethofumesate, 1:1:1
X-77 = non-ionic surfactant from Valent

VELVETLEAF CONTROL WITH POSTEMERGENCE HERBICIDES

Procedure

'KW 2398' sugarbeet was seeded in 22 inch rows May 2. The first half of split treatments was applied 3:00 pm May 15 when the air temperature was 75°F, relative humidity was 65%, wind velocity was 10 mph, sugarbeet was in the cotyledon to 2 leaf stage, and velvetleaf was in the cotyledon stage. The second half of split treatments was applied 3:00 pm May 20 when the air temperature was 73°F, relative humidity was 67%, wind velocity was 10 to 15 mph,
sugarbeet was in the 2 to 4 leaf stage, and velvetleaf was in the cotyledon stage to 1.5 inches tall. All herbicides were applied in 8.5 gpa water at 40 psi through 8001 nozzles to the center four rows of six row plots. Velvetleaf control was evaluated June 10.

Results and Discussion

Velvetleaf control is usually not obtained with much success or regularity. However, in the last two years of weed control research there have been a group of treatments that have obtained success with consistency. Those treatments for the overwhelming part have included DPX-66037.

The only treatment other than those including DPX-66037 which gave an adequate control of velvetleaf was NA307. This was probably due to the ethofumosate part of the mixture since the desmedipham and phenmedipham (Betamix) part only gave 5 percent control when applied with Stinger. Stinger applied with either Betamix or Betanex has given good, but not consistent control of velvetleaf in the past. This experiment produced control of velvetleaf 13 percent or less by Betamix, Betanex, and Stinger combinations.

The treatment that gave the highest control (100 percent), although not significantly greater than some other treatment, was when NA307 was applied with DPX-66037. DPX-66037 alone with surfactant X-77 gave 81 percent control. Velvetleaf control was significantly increase when Betanex plus Stinger or NA307 was included in the treatment with DPX-66037.

Thus, to obtain velvetleaf control equal or greater than 95 percent DPX-66037 needs to be applied with NA307, or Betanex plus Stinger. Velvetleaf control greater than 70 percent was obtained only when DPX-66037 or NA307 was included in the mixture. All other mixtures provided inadequate control of 13 percent or less.

Treatment*	Rate	Velvetleaf control
	(lb/A)	-- (%) --
Betanex/Betanex	0.25/0.33	6
Betanex + Stinger/Betanex + Stinger	0.25+0.09/0.33+0.09	13
Betamix + Stinger/Betamix + Stinger	0.25+0.09/0.33+0.09	5
Betanex + H-273/Betanex + H-273	0.25+0.25/0.33+0.33	0
Betanex + DPX-66037/Betanex + DPX-66037	0.25+0.0156/0.33+0.0156	73
DPX-66037 + X77/DPX=66037 + X-77	0.0156+.25%/0.0156+.25%	81
Betanex + Stinger + DPX-66037/Betanex + Stinger + DPX-66037	0.25+0.09+0.0156/0.33+0.09+0.0156	95
Betanex + DPX-66037/Betanex + Stinger	0.25+0.031/0.33+0.19	96
NA307/NA307	0.45/0.45	74
NA307 + Stinger/NA307 + Stinger	0.45+0.09/0.45+0.09	81
NA307 + DPX-66037/NA307 + DPX-66037	0.45+0.0156/0.45+0.0156	100
DPX-66037 + Stinger/DPX-66037 + Stinger	0.0156+0.09/0.0156+0.09	74
HIGH MEAN		100
LOW MEAN		0
EXP MEAN		58
C.V. %		10
LSD 5%		9
LSD 1%		12
# OF REPS		4

*NA307 = desmedipham+phenmedipham+ethofumesate, 1:1:1
X-77 = non-ionic surfactant from Valent

COMMON SUNFLOWER AND REDROOT PIGWEED CONTROL WITH POSTEMERGENCE HERBICIDES

Procedure

'ACH 194' sugarbeet was seeded in 22 inch rows May 8. The first half of split treatments was applied 2:30 pm May 22 when the air temperature was 65°F, relative humidity was 57%, wind velocity was 15 to 20 mph, sugarbeet was in the cotyledon to 2 leaf stage, common sunflower, redroot pigweed, and common lambsquarters were in the cotyledon stage. The second half of split treatments was applied 5:00 pm May 27 when the air temperature was 77°F, relative humidity was 72%, wind velocity was 10 mph, sugarbeet was in the 2 to 4 leaf stage, common sunflower was 2 to 3 inches tall, redroot pigweed was in the cotyledon stage to 2 inches tall, and common lambsquarters was 1 to 2 inches tall. All herbicides were applied in 8.5 gpa water at 40 psi through 8001 nozzles to the center four rows of six row plots. Sugarbeet injury and common sunflower and redroot pigweed control were evaluated June 17 and June 27. Common lambsquarters control was evaluated June 17. Yellow foxtail control was evaluated June 27.

Results and Discussion

Sugarbeet injury was high for most treatments at this experiment. This can be attributed to the unusually cold temperatures after the second application of the split application. Temperatures dipped to a brisk 45 degrees the weekend after the second application. Sugarbeet plants were not able to metabolize the herbicides active ingredients properly. Sugarbeet injury was the greatest with treatments including NA307. Betamix and Betanex gave 25 percent sugarbeet injury and were not increased by DPX-66037 or Stinger when added individually. DPX-66037 and Stinger did not injure sugarbeets when applied alone or together. However, Sugarbeet injury was significantly increased when Stinger and DPX-66037 were added to Betanex together or in a split application. Sugarbeet injury decreased over time and ranking of treatments remained the similar.

Common sunflower control on June 17 was greatest when either Stinger or DPX-66037 were included in the treatment. All other treatment were by far unsatisfactory. Control exceeded 90 percent except when DPX-66037 and NA307 were applied alone.

Common sunflower control on June 27 was acceptable only when Stinger was applied in the treatment. Treatments including DPX-66037 which were acceptable on June 17 had decreased to unacceptable levels of 55 percent or less by June 27, ten days later. The treatments have a unmistakable separation in which treatments including Stinger gave 100 percent control and all others gave 55 percent or less.

Redroot pigweed control on June 17 was best when NA307 was applied in the mixture. Control with Betanex tended or did increase by adding DPX-66037 or Stinger to the mixture. The treatment that did not include NA307 that tended to give the highest control

Redroot pigweed control with Betanex on June 27 tended increase by adding Stinger and did increase by adding DPX-66037 to the spray. The highest control tended to be with Betanex plus DPX-66037 at the first split application and Betanex plus Stinger at the second split application. Control was acceptable with treatments including NA307. Control with NA307 tended to increase with the addition of DPX-66037 (90 percent) and tended to decrease with the addition of Stinger (79 percent) compared to NA307 alone (83 percent).

Common lambsquarter control was evaluated only on June 17. Control was best achieved with NA307 alone or with DPX-66037 or Stinger. Stinger or DPX-66037 did not significantly increase control by NA307. Common lambsquarter control by Betanex was significantly increased with the addition of Stinger or DPX-66037. Treatments with NA307 were the only treatments to exceed 80 percent and infact were 97 percent or greater.

Yellow foxtail control tended to best with NA307 alone or Betamix with DPX-66037 and Stinger in a split application. Betamix plus DPX-66037 and NA307 plus DPX-66037 gave statistically similar control, 81 and 80 percent respectively, compared to NA307 alone or Betamix with DPX-66037 and Stinger in a split application. Control by Betanex tended to be increased with the addition Stinger or DPX-66037.

Treatment*	Rate	June 17 Sgbt inj	Cosf cntl	Rrpw cntl	Colq cntl	June 27 Sgbt inj	Cosf cntl	Rrpw cntl	Colq cntl
	(lb/A)	(%)							
Betanex/Betanex	0.25/0.33	25	25	76	59	14	22	66	69
Betanex + Stinger/Betanex + Stinger	0.25+0.09/0.33+0.09	25	91	84	69	11	100	70	78
Betamix + Stinger/Betamix + Stinger	0.25+0.09/0.33+0.09	25	91	80	79	13	100	74	68
Betanex + H-273/Betanex + H-273	0.25+0.25/0.33+0.33	30	10	71	51	25	30	64	66
Betanex + DPX-66037/Betanex + DPX-66037	0.25+0.0156/0.33+0.0156	26	91	82	61	10	40	81	86
DPX-66037 + X77/DPX=66037 + X-77	0.0156+.25%/0.0156+.25%	0	86	35	25	0	46	31	21
Betanex + Stinger + DPX-66037/Betanex + Stinger + DPX-66037	0.25+0.09+0.0156/0.33+0.09+0.0156	38	98	88	71	21	100	70	81
Betanex + DPX-66037/Betanex + Stinger	0.25+0.031/0.33+0.19	38	96	79	69	15	100	86	95
NA307/NA307	0.45/0.45	51	81	97	97	28	27	86	83
NA307 + Stinger/NA307 + Stinger	0.45+0.09/0.45+0.09	51	97	98	98	24	100	68	79
NA307 + DPX-66037/NA307 + DPX-66037	0.45+0.0156/0.45+0.0156	50	98	98	98	31	55	80	90
DPX-66037 + Stinger/DPX-66037 + Stinger	0.0156+0.09/0.0156+0.09	0	98	45	23	0	100	24	18
HIGH MEAN		51	98	98	98	31	100	86	95
LOW MEAN		0	10	35	23	0	22	24	18
EXP MEAN		30	80	78	67	16	68	67	69
C.V. %		11	6	7	8	56	12	11	15
LSD 5%		5	7	7	8	13	12	10	15
LSD 1%		7	10	10	11	17	17	14	20
# OF REPS		4	4	4	4	4	4	4	4

*NA307 = desmedipham+phenmedipham+ethofumesate, 1:1:1

X-77 = non-ionic surfactant from Valent

WILD BUCKWHEAT CONTROL WITH POSTEMERGENCE HERBICIDES

Procedure

'KW 2398' sugarbeet was seeded in 22 inch rows May 3. The first half of split treatments was applied 2:00 pm May 21 when the air temperature was 75°F, relative humidity was 65%, wind velocity was 15 mph, soil moisture was good, sugarbeet was in the 2 leaf stage, and wild buckwheat was 1 to 2 inches tall. The second half of split treatments was applied 4:00 pm May 25 when the air temperature was 70°F, relative humidity was 70%, wind velocity was 5 to 10 mph, soil moisture was good, sugarbeet was in the 4 leaf stage, and wild buckwheat was 1 to 3.5 inches tall. All herbicides were applied in 8.5 gpa water at 40 psi through 8001 nozzles to the center four rows of six row plots. Wild buckwheat control was evaluated June 10.

Results and Discussion

Wild buckwheat tended or was best controlled when either Stinger, H-273, or NA307 was included in the mixture. These treatment gave 85 percent control or better.

Stinger with Betanex gave only 74 percent control. Stinger with Betamix gave 16 percent greater control at 90 percent. This indicates that Betanex did not add to the control of wild buckwheat but Betamix did add to the control. Wild buckwheat control with Stinger plus Betanex was not increased by the addition of DPX-66037, and actually tended to be decreased to 70 percent. Stinger with DPX-66037 gave even less control at 66 percent. The least control was obtained by DPX-66037 plus surfactant X-77 at 63 percent.

Betanex plus H-273 gave adequate control of wild buckwheat at 88 percent. NA307 alone or with DPX-66037 controlled wild buckwheat similarly to Betanex plus H-273 at 85% and 89 percent, respectively. NA307 plus Stinger tended to give the best control at 95 percent.

Thus, wild buckwheat was best controlled when either Stinger, H-273, or NA307 was in the mixture. The best individual or single component control was obtained with NA307. The greatest control tended to be with NA307 plus Stinger.

Treatment*	Rate	Wild Buckwheat control
	(lb/A)	-- (%) --
Betanex/Betanex	0.25/0.33	64
Betanex + Stinger/Betanex + Stinger	0.25+0.09/0.33+0.09	74
Betamix + Stinger/Betamix + Stinger	0.25+0.09/0.33+0.09	90
Betanex + H-273/Betanex + H-273	0.25+0.25/0.33+0.33	88
Betanex + DPX-66037/Betanex + DPX-66037	0.25+0.0156/0.33+0.0156	66
DPX-66037 + X77/DPX=66037 + X-77	0.0156+.25%/0.0156+.25%	63
Betanex + Stinger + DPX-66037/Betanex + Stinger + DPX-66037	0.25+0.09+0.0156/0.33+0.09+0.0156	70
Betanex + DPX-66037/Betanex + Stinger	0.25+0.031/0.33+0.19	72
NA307/NA307	0.45/0.45	85
NA307 + Stinger/NA307 + Stinger	0.45+0.09/0.45+0.09	95
NA307 + DPX-66037/NA307 + DPX-66037	0.45+0.0156/0.45+0.0156	89
DPX-66037 + Stinger/DPX-66037 + Stinger	0.0156+0.09/0.0156+0.09	66
HIGH MEAN		95
LOW MEAN		63
EXP MEAN		77
C.V. %		16
LSD 5%		17
LSD 1%		23
# OF REPS		4

*NA307 = desmedipham+phenmedipham+ethofumesate, 1:1:1
X-77 = non-ionic surfactant from Valent

DISEASE INDEX SUMMARY 1992

Three remote weather stations were used to monitor climatic conditions that influence cercospora leaf spot. These data are used in conjunction with data from Table 1 to determine a cercospora leaf spot daily infection value. Disease index values (DIV) of six or greater for a two day total are considered favorable for cercospora leaf spot. Installations were two miles south of Sacred Heart, nine miles north of Clara City, and one and a half miles east and one half mile north of Hector piling station. The stations monitor air and soil temperature, relative humidity, leaf wetness and precipitation.

The recorded data was used in a cercospora computer model developed by Shane and Teng of the University of Minnesota. This program gives the sugarbeet grower an indication of the probability of leaf infection. The model uses temperature, relative humidity and time to determine probability of leaf infection. The placement of the canopy sensor is important to accurately model the cercospora leaf spot disease.

Sugarbeet fields are highly variable in spore number; thus, the model should be used in conjunction with field disease monitoring. The data for 1992 for Clara City, Renville, and Hector are presented in figures 1-9.

During harvest, temperature probes were placed in the crown of topped and untopped sugarbeets. The resulting data were used to aid the Agricultural staff in decisions on management of harvest and pile storage.

RESULTS AND DISCUSSION

Relative cool temperatures (approximately 15 degrees below normal) during the growing season resulted in relative low disease index values (DIV). Cercospora was sited in mid July and the disease was kept under control with a modest spray program. The 1992 cercospora leaf spot spray program was one of the more forgiving programs in years. This was due to the lack of the disease overall. This can be seen in the generally low DIV's (Figure 1-9).

The cercospora leaf spot modeling should be used as a management to reduce the influence of leaf spot on quality and quantity of sugarbeets. The cercospora leaf spot model along with field monitoring and advice from Southern Minnesota Sugar Cooperative's Agricultural staff should result in a successful control season.

Table 1. Daily infection condition values based on numbers of hours of high relative humidity hours of high relative humidity and mean temperature.

Hours	Daily Infection Condition Values																																	
24	1	2	4	5	5	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
23	1	2	3	4	5	6	6	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
22	1	1	3	5	5	6	6	6	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
21	0	1	2	4	4	5	5	5	5	5	5	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
20	0	1	2	3	4	5	5	5	5	5	5	5	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
19	0	0	1	3	4	5	5	5	5	5	5	5	5	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
18	0	0	1	2	3	4	4	4	4	4	4	5	5	5	5	5	5	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
17	0	0	1	2	3	4	4	4	4	4	4	4	5	5	5	5	5	5	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
16	0	0	0	2	3	4	4	4	4	4	4	4	4	4	4	4	5	5	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
15	0	0	0	1	3	4	4	4	4	4	4	4	4	4	4	4	4	5	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7
14	0	0	0	1	3	3	3	3	3	3	3	4	4	4	4	4	4	4	5	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7
13	0	0	0	0	3	3	3	3	3	3	3	3	4	4	4	4	4	4	5	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7
12	0	0	0	0	2	2	3	3	3	3	3	3	3	4	4	4	4	4	4	5	7	7	7	7	7	7	7	7	7	7	7	7	7	7
11	0	0	0	0	2	2	3	3	3	3	3	3	3	3	3	3	3	3	4	5	6	7	7	7	7	7	7	7	7	7	7	7	7	7
10	0	0	0	0	2	2	2	2	2	2	2	3	3	3	3	3	3	3	4	4	6	6	7	7	7	7	7	7	7	7	7	7	7	7
9	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	4	5	6	6	6	6	6	6	6	6	6	6	6	6	6
8	0	0	0	0	1	0	2	2	2	2	2	2	2	2	2	2	2	2	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5
7	0	0	0	0	1	0	2	2	2	2	2	2	2	2	2	2	2	2	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4
6	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4
5	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	89	90	91	92	93

Average Temperature (Fahrenheit)