## Mixing Various Percentages of the Male Parent Seed With Male Sterile Seed for Hybridization and the Subsequent Effect on the Productive Ability of Hybrids

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Within the past few years, the seed growing agencies of the sugar companies have been faced with the possibilities of producing rather large quantities of commercial male sterile hybrid seed by the method of planting the male sterile line and its pollinator in alternate strips in the seed field. This method of production, because of the unplanted area separating the male sterile and the male lines, has proven to be considerably more expensive than the production of these hybrids by the method of mixing the planting stock of both lines and planting the seed field in the usual manner.

To determine the productive ability of hybrid seed produced by the method of mixing the planting stock, seed for a trial was produced in two small isolated plats at Salem, Oregon, *in* 1952. In each seed plot a four-row strip was planted to a mixture of the male sterile and male lines in a 1:1 ratio. A second four-row strip was planted to a mixture of the two lines in a 4:1 ratio. A third four-row strip was planted to the straight male sterile line. The strip of the straight male sterile line was planted to the straight male sterile line was planted to the sufficient plots with the mixtures on either side and it was considered that there would be sufficient pollen producers in the mixtures to provide pollen for the male sterile strip.

The male sterile lines used in both plots were developed by H. L. Kohls of Michigan State College. In one plot the male sterile line planted was that used to produce Hybrid 148, and in the other plot the male sterile line planted was that used to produce Hybrid 125. The percentage of male sterility in the parent for Hybrid 148 was 94 percent and the percentage for the parent for Hybrid 125 was 77 percent. The male sterile strips were not rogued.

The male line used in both plots was U. S. 226, a leaf spot-resistant variety used principally with U. S. 216MS to make the variety U. S. 216 x U. S. 226, which is used widely in the eastern areas.

The three lots of seed from each plot were harvested separately and delivered to Farmers & Manufacturers Beet Sugar Association for inclusion in variety test plots in the eastern sugar beet areas.

Tables 1 through 5 give the yield data secured from these variety tests. These data show that there is no significant difference in yield for the three methods of seed increase.

Plot Number	Variety	Plants/Acre	Ton/Acre	% Sugar	% Purity
21	50B3	20,036	11.50	19.81	79.58
22	H 125 x U. S. 226	13,799	9,79	16.23	65.88
23	H 125 x U. S. 226 (4:1)	16,857	11.87	19.40	78.35
24	H 125 x U. S. 226 (1:1)	19,051	12.05	19.84	77.82
25	Great Western 359	17.729	11.80	19.87	79.23
26	U. S. 216 x 226	18,688	11.49	19.57	77.80
51	H 148 x U. 5. 226	17.797	11.96	19.65	78.22
32	H 148 x U. S. 226 (4:1)	16.953	11.68	19.56	78.06
33	H 148 x U. S. 226 (1:1)	17,317	11.58	19.86	78.45
34	Ac. 345 A01-07	15,764	11.08	19.62	77.69
35	Ac. 345 B01-24	16.815	12.63	20.16	79.16
36	U. 8, 216 x 226	17.651	10.84	20.34	79.81

Table 1.—Harold Kohls Variety Tests—Michigan State College, East Lansing.

Table 2.—Farmers & Manufacturers Bees Sugar Association Variety Tests—Fred Black Farm, Bay City, Michigan.

Епіту		Acre Vio	h		Apparent Purity	Plants
No.	S. P. Variety and Local	Cross Sugar	Roots	Sucrose	Corff.	рег Асте
		Pounds	Tons	Percent		Number
4	H125 x U. S. 226 1:1	5.818	16.515	17.63	79.35	15,947
5	H125 x U. S. 225 4:1	5.851	16.272	17.97	79.79	16,303
3	H125 x U. S. 226 Hyb	5.881	16.644	17.71	79.95	15,947
7	H148 x U. S. 226 1:1	5,710	15.510	18.38	81.13	15,655
8	H148 x 1/. S. 226 4:1	5,809	14.732	17.96	80.69	16.076
6	H148 x U. S. 226 Hyb	5,551	5.Z51	18.16	82.12	15.460
1	Amer. 3 N	6,031	16.353	18.42	80.59	16.174
2	Midwest 111	4,852	19.144	18.47	B1.11	15.817
	U. S. 400	6.090				
	General Mean	5.625	15.552	18.09	80.59	15.922
5. E. '	Variety Mckn	217	0.536	0.27	0.76	786
S. E. Y	aticly as % of General Mea	n <b>5.85</b>	3.44	1.50	0.94	4.9
Dif. 1	sq. for Sig. (Odds 19:1)	N.5.	1.518	N.S.	N.5.	N.5.
		Variance	Table			

			Mean S	iquares .	
Source of Variation	D/F	Gross Sugar Pounds	Roots Tens	Sucrose Percent	Apparent Purity Coeff.
Between rows	5	1.028,724	.9111	1.6570	7.6255
Between varieties	7	372.334	8.4375	.6288	4.7150
Remainder-Error	35	281,602	1.7206	.4402	5.4529
Total	47				
Calculated F. Value <sup>1</sup>		1.32	4.90**	1.43	1.37

<sup>1</sup> Designated F. Values at 5 percent level with \*, and 1 percent level with \*\*. (Results above are given as 6-plot averages)

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Table 3.—H. W. Bockstahler and G. J. Hogaboam, U. S. D. A., Michigan State College Variety Test—E. J. Krauss Farm, Findlay, Ohio.

Entry		Acre Yie	ld.		Apparent Purity	Plants
No.	S. P. Variety and Local	Gross Sugar	Runts	Sucrose	Coeff.	per Acre
		Pounds	Tons	Percent		Number
7	H125 x U. S. 226 1:1	6,718	17.554	19.18	81.22	14.650
8	H125 x U, 5, 226 4:1	6,490	17.218	18.89	81.78	14.073
5	H125 x U. S. 226 Hyb	7,402	18.398	19.17	82.49	14,223
r	11148 x U. S. 226 1:1	6,656	17.612	18.94	81.05	14,105
2	H148 x U. S. 226 4:1	6,420	16.951	18.93	81.21	14,351
6	H148 x U. S. 226 Hyb	6,021	15.925	18.89	80.37	14,489
3	Acc. 1241 (50B3-0)	6.014	15.568	19.39	82.08	15.450
4	U. S. 216 x 226	6,238	15.290	19.24	80.67	13.945
	General Mean	6,403	16,814	19.08	81.36	14.411
S. F. 1	ariery Mean	333	0.836	0.22	0.68	569
S. E. V	ariety as 7% of Genera Mean	5.20	4.97	1.16	0.83	3.95
Diff. n	eq. for Sig. (Odds 19:1)	N.S.	N.5.	N.S.	N.S.	N.S.
		Variance	Table			
· —				Mean Squ	AFC%	

Source of Variation	· D/F	Gross Sugar Pounds	Ronts Tons	Sucrose Percent	Apparent Purity Coeff.
Between columns or bloc	ks 7	4,182.675	36.7205	.9914	3.8978
Between rows	7	1.151.343	8,8939	.4419	1.5401
Between varieties	7	1.335.131	9.7582	.2935	4.0470
Remainder-Error	42	887,913	5.5916	.3885	3.6521
Total	63				
Calculated F. Value <sup>1</sup>		1.50	1.75	0.76	1.11

<sup>1</sup> Designated F. Values at 5 percent level with \*, and 1 percent level with \*\*. (Results above are given as 8 plot averages)

72

## PROCEEDINGS—EIGHTH GENERAL MEETING

Table 4.—H. W. Bockstahler and G. J. Hogaboam, U. S. D. A., Michigan State College Variety Test—W. H. Sabroske Farm, Fremont, Ohio.

Entry		Acre Vie	el ci		Apparent Purity	Plants
No.	8. P. Variety and Local	Gross Sugar	Roots	Sucrose	Coeff.	per Acre
		Pounds	Tons	Percent		Number
5	H125 x U. S. 226 1:1	8,164	23.508	17.34	B0.85	14,124
2	H125 x U. S. 226 4:1	8,050	24.000	16.78	76.96	13.650
7	H125 x U. S. 226 Hyb	7.866	23.295	16.85	78.45	12,374
5	E1148 x 17. S. 226 1:1	7,650	22.268	17.16	79.59	13.492
3	H148 x U. S. 226 4:1	7,766	22.596	17.19	79.82	12.982
в	H148 x U. S. 226 Hyb	8,106	29.558	17.36	79.90	13,870
1	Acc. 1241 (50B3-0)	8,058	22,900	17.59	81.37	14.610
-1	U, S. 216 x 226	7,498	21.320	17.56	79.84	14,066
	General Mean	7.895	22.903	17.25	79.85	13,649
5. E. V	Variety Mean	290	0.774	0.19	0.76	581
S. E. V	Variety as % of General Meas	n 3.67	5.38	1.12	0.95	4.25
Diff, r	eq. for Sig. (Odds 19:1)	N.5.	N.S.	0.55	N.S.	N.S.
•	· · · <u> </u>	Variance	Table			

			Mean S	quares	
Source of Variation	D/F	Gross Sugar Founds	Roots Tons	Sucrose Percent	Apparent Purity Coeff.
Between columns or blocks	7	2,778,665	22.2829	.9608	18.8025
Between rows	7	1.376.315	11.5719	.3396	9.8202
Between varieties	7	445,960	5.6209	.6921	6.5292
Remainder-Error	42	670.909	4.7919	.2966	4.6161
Total	63				
Calculated F. Value <sup>4</sup>		0.66	1.17	2.33*	1.42

<sup>1</sup> Designated F. Values at 5 percent level with \*, and 1 percent level with \*\*, (Results above are given as 8-plot averages) AMERICAN SOCIETY OF SUGAR BEET TECHNOLOGISTS

	. Fast Grand I	Forks, Minnesota (	A)				
Nine Blocks-73 feet by 20	Inches, or 1/958						
Variety	T/A <sup>1</sup>	°₀ Sugar'	Lbs. Sugar/A.	Rank			
H-125 x U. S. 226	15-92	16.72	5,359.54	(2)			
I to I ratio	15.47	16.62	5.291.81	(4)			
4 to 1 ratio	14.98	t6.48	5.079.14	(5)			
Am No. 3 N	16.08	17.48	5.782.38	- iú			
Am No. 3 LSR <sup>9</sup> Average of 9 blocks Comments—Good Test	15.46 L	16.93	5,387.13	(3)			
	East Grand i	Forks, Minnesota (	B)				
Three Blocks-73 fect by 2				_			
Varlety	T/A)	% Sugart	Lhs. Sugar/A.	Rank			
H-148 x U, S. 225	14.39	16.95	4.878.21	(\$)			
to   ratio	15.23	15.90	5.147.74	(3)			
4 io 1 marto	14.55	17.25	5.013.95	(1)			
Am. No. 3 N	16.08	17.48	5,782.98	(1)			
Am. No. 5 LSR <sup>3</sup> Average of 3 blocks Comments—Good Test	15.46	16.93	5,987.19	(2)			
	Rocky Fo	rd, Colorado (C)					
Eight Blocks—90 feet by 22	2 inches, or 1/264	A.					
ariety	<b>T/A</b> <sup>1</sup>	% Sugar	Lbs. Sugar/A.	Rank			
(-148 x U. 5, 226	10.74	13.70	2.942.76	(5)			
to 1 ratio	13.45	15.60	5,658.40	(1)			
to 1 ratio	13.38	13.20	3,532.32	(2)			
Am. No. I	12.39	13.60	3.370.08	(3)			
m. No. 2	11.51	I4.30	3.234.66	(4)			
<sup>1</sup> Average of 8 blocks Comments+-Not very r	eliable because o	f a heavy infestatio	on of penalodes.				
	Rocky Fo	Rocky Ford, Colorado (D)					
Four Blocks—90 feet by 22		A.					
Variety	T/A <sup>1</sup>	1% Sugar <sup>1</sup>	Lbs. Sugar/A.	Rank			
H-125 x U. S. 226	9.28	10.50	1,948.80	(5)			
to I ratio	9.54	11.60	2.213.28	(3)			
to I ratio	9.17	11.20	2.054.08	(4)			
m. No. 1	10.36	18.60	2,817.92	- 23			
				(2)			

74