References

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1) Determinate-Dt_2 effects on soybean characteristics.

Bernard (1972) studied a gene, $\underline{Dt_2}$, which hastened the termination of apical stem growth and decreased both plant height and number of nodes per plant. In a 'Harosoy' background, a $\underline{Dt_2}$ isoline had a 15% reduction in height and was three days earlier maturing but was similar in yield to Harosoy. There was some reduction in weight per seed associated with the $\underline{Dt_2}$ effect. We have worked with the $\underline{Dt_2}$ gene in a Harosoy background and have obtained an even greater effect on plant height, maturity, and weight per seed but yet have maintained yield. It appears that there might be another gene involved which interacts with $\underline{Dt_2}$.

The cross, L62-361 ($Harosoy^6$ x T117) x L59-738 ('Harosoy 63'), was made at Harrow in 1965 to combine $\underline{Dt_2}$ with $\underline{Rps_1}$. In selecting for a resistant, determinate line, we selected for maturity as close to Harosoy 63 as possible. Another line was selected which was six days earlier than L62-361. These two determinate lines, OX708 and OX719, were tested with Harosoy 63 at Harrow and Woodslee (1971-73) and at Ridgetown (1974) in replicated row tests. Results are given in Table 1.

A growth analysis test was conducted at Harrow in 1973 with samples taken every two weeks beginning July 3 (25 days after planting). On July 16, OX708, OX719, and Harosoy 63 averaged 8, 6, and 3 flowers per plant, whereas on July 30 they averaged 35, 30, and 20 flowers per plant. There were no

differences (from 9 to 10 flowers) on August 13, at which time maximum plant height had been reached. Results of the sample for this date are given in Table 2, along with the average results for two samples at maturity. OX708 differed significantly from OX719 in being earlier maturing and having less weight per seed. In other characteristics these two lines were fairly similar but OX708 tended to differ more from Harosoy 63 than did OX719.

We postulate that OX719 received $\underline{Dt_2}$ plus another gene from L62-361 and that OX708 received $\underline{Dt_2}$ from L62-361 but a different allele from L59-738 for the other gene. On the basis of this hypothesis, OX708 and OX719 have been backcrossed to L59-738 for further study; the cross with OX708 should not segregate for maturity within the $\underline{Dt_2}$ class whereas the cross with OX719 should segregate.

The "early-determinate" characteristic of OX708 has distinct effects on leaf and podding characteristics compared with Harosoy 63. Early-determinate has been combined with $\underline{ln}$ for further study in relation to narrow leaflets and 4-seeded pods. We have used OX708 in a number of crosses and will attempt to select early-determinate strains as a means of increasing the yield-maturity index.

Table 1

Row test results for $\underline{Dt_2}$ isolines of Harosoy 63

	Yield kg/ha	Days to mature	Yield maturity index[a]	Lodging 1 = Erect 5 = Flat	Plant height cm	g/100 seeds
			Harrow and Woodslee, 1971-73			
OX708	3216	114	28	1.9	93	18.1
OX719	3215	117	27	1.6	91	19.2
Harosoy 63	3048	121	25	2.6	106	19.6
L.S.D.(.05)	N.S.	1	2	0.3	5	0.7
			Ridgetown, 1974			
OX708	2986	123	24	1.5	96	15.9
OX719	3188	127	25	1.2	99	17.9
Harosoy 63	2946	131	22	1.7	114	18.8

[a]Yield-maturity index = yield (in kg/ha)/days to mature.

Table 2

Growth analysis results for $\underline{Dt}_2$ isolines of Harosoy 63

	August 13 (76 days after planting)				At Maturity			
	OX708	OX719	Harosoy 63	L.S.D. .05	OX708	OX719	Harosoy 63	L.S.D. .05
Plant height, cm	105	108	116	6	100	104	116	9
No. of pods/plant								
1-seeded	2	2	1	-	3	3	2	-
2-seeded	9	9	6	-	9	9	7	-
3-seeded	11	10	10	-	8	7	8	-
Total	22	21	17	-	20	19	17	-
Pod dry wt, g/plant	3.0	2.6	2.0	0.5	9.9	10.2	10.8	N.S.
Leaves/plant	8.0	7.4	8.0	N.S.	-	-	-	-
Leaf area, cm^2/plant	1180	1254	1402	125	-	-	-	-
Leaf area index	4.4	4.9	5.4	0.6	-	-	-	-
Leaf area ratio	4.04	3.48	3.44	0.46	-	-	-	-
Nodes/plant	-	-	-	-	14	14	15	-
Pods/node	-	-	-	-	1.5	1.4	1.2	0.16
Beans/node	-	-	-	-	3.2	3.0	2.8	N.S.
Yield, kg/ha	-	-	-	-	2880	2770	2870	N.S.

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1) Soybean gene resources recently received from China.

Forty soybean cultivars were received from the Peoples Republic of China in a number of exchanges between June 1973 and June 1974. The first eight cultivars that we received were grown in row tests at Harrow, Woodslee and Ridgetown in 1975, along with 'Harlon,' 'Harosoy 63,' and 'Harcor.' These eight, plus the next seven that we received, had been tested in hill plots at Harrow in 1974, along with Hardome, Harlon, Harosoy 63, and 'Harwood.' The highest and lowest cultivar values are given for each of a number of characteristics within each group of cultivars as an indication of the potential value of the new germplasm. The Chinese cultivars did not exceed those from Harrow in productivity. Although plant height tended to be shorter, lodging was more of a problem with the Chinese cultivars in row culture than with the Harrow cultivars.

Of the 40 cultivars, some were determinate and 12 had narrow leaves, in contrast to the indeterminate Harrow cultivars which have broad leaves. Only four cultivars carry Rps_1 resistance to race 1 of Phytophthora megasperma var. sojae, with none having specific resistance to the new races. However, of the eight cultivars grown in 1975 at Woodslee where race 6 is prevalent, all were as field tolerant as Harcor which was considerably better than Harlon and Harosoy 63. This germplasm is being tested as a source of polygenic variability for resistance to phytophthora rot.