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SOYBEAN VARIETY TRIALS IN WEST VIRGINIA, 1948-1957

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WEST VIRGINIA UNIVERSITY AGRICULTURAL EXPERIMENT STATION

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MORGANTOWN

Soybean Variety Trials in West Virginia - - 1948 - 1957

COLLINS VEATCH

THE purpose of this bulletin is to report comparative yields of soybeans grown for seed and hay production in variety trials at Morgantown and Point Pleasant from 1948-1957.

Soybeans (*Glycine max*) have been grown in West Virginia primarily as an annual forage crop rather than for seed production. They may be used to advantage for hay or silage, especially when grown with sudan grass. The Federal-State Crop Reporting Service estimated the 1954 acreage at 8,000, with a decline to 5,000 acres in 1957. This decline reflects in part the difficulty some farmers have encountered in curing the heavy stems when they did not have crushing rolls available.

Methods

The soybean seed and hay yield were obtained from two-row plots in a randomized block design. The center 16 feet of each 18-foot row was harvested for yield; one row was cut for hay when the pods were well filled and the other was harvested for seed when the pods were ripe. Plants from rows harvested for seed were stored in separate burlap bags in which they were threshed when dry.

The variety trials were conducted on the Agronomy Farm near Morgantown and the Ohio Valley Experiment Station Farm near Point Pleasant. The soil on the plots at the Agronomy Farm is a Rayne silt loam at an altitude of 1,200 feet. Lime was added as needed, and the plots were fertilized at the rate of 400 lbs. of 5-10-5 per acre. The soil on the Ohio Valley Experiment Farm is classified as Wheeling sandy loam at an altitude of 700 feet. Little if any fertilizer was applied to the soybeans at this location since they usually followed a heavily-fertilized crop.

New varieties and selections were added to these trials from time to time and some of the low-yielding varieties were discontinued. The average yield and least significant differences (L. S. D.'s) were calculated on the basis of all the varieties included in the trials and not just those shown in the tables.

Varieties

The distinguishing plant and seed characteristics of the soybean varieties reported in these trials are summarized in Table 1. The strains with a number following the variety name in Tables 2, 3, 4 and 5 are selections from the indicated variety such as, for example, Kingwa-1, and Viking-2.

The soybean varieties grown in the United States are classified into nine groups on the basis of the comparative length of growing season for the variety. The short-season varieties, grown in the northern states, are designated as group 0, whereas the long-season varieties, grown in the Gulf states, are designated as group VIII. The varieties reported in these trials are classified in groups I to IV.

Black-seeded types such as Kingwa are not used for commercial seed production. However, Kingwa does have leaf retention that is very desirable for hay production.

Discussion of Results

In comparing the yields, either seed or hay, of the various soybean varieties, it should be kept in mind that unless the difference in yield between two varieties is greater than the least significant difference (L. S. D.), the difference cannot be attributed to varietal characteristics alone. The differences within the range of the L. S. D. are attributed to factors that were not under experimental control.

The varieties are arranged in the tables in groups with respect to the number of years they have been grown; within these groups they have been arranged according to average yield.

The comparable average yield of each variety was calculated as indicated in Table 2. This is an attempt to calculate an average yield that will give a more accurate comparison between varieties that have not been grown for the same period of time.

SEED YIELD—MORGANTOWN

During the ten-year period 1948-1957, the average annual soybean seed yield of the variety trials at Morgantown varied from a low of 15.67 bushels per acre in 1953 to a high of 34.87 in 1952, with an over-all average of 27.81 bushels per acre (Table 2). Annual varietal yields varied from 12.0 bushels per acre for Kingwa in 1951 to 43.7 bushels per acre for Viking in 1952. Viking was the highest-yielding variety for this ten-year period, with an average yield of 30.1 bushels per acre. Viking was also the highest in yield for three years, 1952, 1954 and 1955.

With regard to the comparable average yield, selection Ohio 6150-2 was highest with 30.4 bushels, and Viking, with 30.0 bushels, was second. Other varieties with comparable average yields over 28.0 bushels per acre in descending order were Perry, Clark, Mingo-2, Wabash, Mingo, Adams, Viking-2, Lincoln, and Selection 46-203-2.

SEED YIELD—POINT PLEASANT

During the ten-year period 1948-1957, the average annual soybean seed yield varied from a low of 16.55 bushels per acre in 1957 to a high of 36.41 bushels in 1954 at Point Pleasant, with an over-all average of 24.12 bushels (Table 3). The highest yield recorded at Point Pleasant during this ten-year period was for Kingwa-2, with 45.3 bushels per acre in 1954. The lowest yields occurred in 1957. This can be attributed to lack of sufficient rainfall. Perry, although grown for only six of the ten years, was the highest-yielding variety in these trials as indicated by the average yield of 27.5 bushels per acre. Perry was the highest-yielding variety in 1955 and 1956, second in 1952, and third in 1954.

Using the comparable average yield as a comparative measure, the Clark variety was high with a yield of 31.7 bushels per acre. The high comparable average yield of Clark is primarily dependent upon the high yield of 26.4 bushels per acre recorded in 1957 when the other varieties were exceptionally low in yield. As previously mentioned, the 1957 low yields have been attributed to low rainfall. However, it should be noted that in 1956 the Clark variety yielded 22.7 bushels while the trial average was only 20.86 bushels per acre. Perry ranked second in comparable average yield, Kingwa-2 third, Scioto fourth, and Wabash fifth.

HAY YIELD—MORGANTOWN

The average annual hay yield for the variety trials at Morgantown varied from a low of 1.65 tons per acre in 1957 to a high of 2.67 tons in 1949 and 1952, with an over-all average of 2.10 tons per acre (Table 4). Perry produced the highest average yield, 2.56 tons, and was the highest-yielding variety two out of the six years it was grown. Wabash was second in production, with an average yield of 2.41 tons and was the highest-yielding variety three out of the nine years that it was included in the trials. Perry was also high in comparable average yield with 2.49 tons per acre. In average yields the highest varieties in descending order were Perry, Wabash, Scioto, Kingwa-1, Kingwa, Kingwa-2 and Viking. In comparable average yields, the highest varieties in descending order were Perry, Scioto, Kingwa-1, Wabash, Kingwa-2, Kingwa and Viking.

HAY YIELD—POINT PLEASANT

The average hay yields for the trials at Point Pleasant varied from 1.63 tons per acre in 1950 to 3.99 tons in 1956, with an over-all average of 2.63 tons (Table 5). Variety yields varied from 1.22 tons for Harosoy in 1957 to 5.20 tons for Perry in 1956. Perry has been outstanding in hay production since it was included in these trials in 1952 and was the high-yielding variety four years out of six. Perry produced the highest average yield and the highest comparable average yield of 3.38 and 3.22 tons per acre, respectively.

In average yield the highest-yielding varieties in descending order were Perry, Clark, Kingwa-2, Viking-2, Kingwa-1, Wabash and Scioto. In comparable average yield the highest-yielding varieties in descending order were Perry, Scioto, Wabash, Clark, Kingwa-2, Viking-2, and Kingwa-1.

Recommendations

The later-maturing varieties (Table 1), groups III and IV, have consistently given the best yields of seed and hay in these trials.

The following varietal recommendations are based on the yields reported in this trial and the availability of seed. It is recognized that some old varieties and numbered selections cannot be recommended because seed is not available.

SEED		HAY	
Morgantown	Point Pleasant	Morgantown	Point Pleasant
Perry	Clark	Perry	Perry
Clark	Perry	Wabash	Wabash
Lincoln	Wabash	Kingwa	Clark
	Lincoln		Kingwa

TABLE 1. ORIGIN AND SOME CHARACTERISTICS OF THE SOYBEAN VARIETIES INCLUDED IN THE TRIALS

MATURITY GROUP* VARIETY	ORIGIN	COLOR CHARACTERISTICS			
		FLOWER	PUBESCENCE	SEED COAT	HILUM
GROUP I					
Monroe	Mukden x Mandarin	Purple	Gray	Yellow	Colorless
GROUP II					
Hawkeye	Mukden x Richland	Purple	Gray	Yellow	Black
Mingo	Manchu	Purple	Tawny	Yellow	Black
Harosoy				Yellow	Colorless
GROUP III					
Adams	Illini x Dunfield	White	Gray	Yellow	Light brown
Lincoln	Mandarin x Manchu	White	Tawny	Yellow	Black
Scioto	Manchu	Purple	Tawny	Yellow	Black
Viking	Illini x Manchu	Purple	Tawny	Yellow	Black
GROUP IV					
Clark**	Lincoln x (Lincoln x Richland)	Purple	Tawny	Yellow	Black
Kingwa	Peking	Purple	Gray	Black	Gray to Black
Perry†	Patoka x L7-1355	Purple	Gray	Yellow	Light Brown
Wabash	Dunfield x Mansoy	White	Gray	Yellow	

*Soybean Culture and Varieties—U.S.D.A. Farmers Bulletin No. 1520, 1949.

**Clark Soybeans for Indiana—Station Bulletin 626, 1955.

†Perry Soybeans for Indiana—Station Circular 398, 1953.

TABLE 2. AVERAGE AND ANNUAL SEED YIELD OF SOYBEANS GROWN AT MORGANTOWN, 1948-1957

VARIETY	COMPARABLE** AVERAGE YIELD	ANNUAL YIELDS IN BUSHELS PER ACRE										
		1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	Average
Viking	30.0	31.0	34.0	25.3	15.8	43.7*	15.8	38.9*	38.9*	37.7	20.0	30.1*
Mingo	28.8	31.8	36.1	25.9	16.6	37.8	14.9	37.9	37.2	29.7	21.5	28.9
Lincoln	28.1	33.7*	36.4*	24.6	17.8	36.6	14.4	33.0	33.0	32.1	22.1	28.3
Scioto	27.8	31.3	34.4	28.9	16.7	35.8	14.4	27.6	27.6	36.8	25.6	27.9
Hawkeye	27.4	30.0	34.0	24.1	15.3	30.1	15.3	33.1	32.9	36.5	23.6	27.5
Kingwa	25.7	23.7	33.5	24.1	12.0	30.9	17.0	23.4	33.1	28.5	21.5	25.8
Wabash	28.9		32.9	38.8*	17.2	34.6	15.1	33.8	33.8	37.4	18.1	29.1
Adams	28.7		33.9	34.8	15.2	36.1	15.2	35.9	35.1	29.7	21.5	28.8
Ohio 6150-2	30.4*				15.6	37.3	17.8*	38.5	38.5	34.6	25.0	29.6
Mingo-2	29.3				16.7	35.0	14.4	36.9	36.9	39.4	21.6	28.7
Viking-2	28.6				17.8	38.5	12.9	37.0	37.0	34.1	18.3	27.9
46-203-2	28.1				17.8*	31.5	15.3	33.7	33.7	40.9*	19.5	27.5
Kingwa-1	26.6				15.6	31.0	16.7	32.7	31.9	32.8	21.6	26.1
Kingwa-2	26.1				12.5	31.9	16.0	33.5	32.6	31.8	20.3	25.5
Perry	29.5					34.2	17.4	25.0	24.6	37.4	26.5*	27.5
Clark	29.4									40.0	19.3	29.7
Harosoy	25.9									31.3	20.9	26.1
Monroe	22.2									28.2	16.5	22.4
No. Varieties		20	18	17	20	18	17	17	17	20	20	18
Average		27.72	32.96	28.35	15.82	34.87	15.07	34.09	33.84	34.38	21.75	27.81
L.S.D., .05		5.72	4.52	9.14	4.64	6.79	3.55	4.74	5.15	7.16	7.90	5.69

*High-yielding varieties.

**The Comparable Average Yield was calculated by adding the annual yields of a variety and dividing this by the sum of the average yields of all varieties for the same years. This gave the percentage rating. The average yield of all varieties for the entire period was multiplied by the percentage rating obtained for the variety; this gave the Comparable Average Yield of the variety.

TABLE 3. AVERAGE AND ANNUAL SEED YIELD OF SOYBEANS GROWN AT POINT PLEASANT, 1948-1957

VARIETY	COMPARABLE** AVERAGE YIELD	ANNUAL YIELDS IN BUSHELS PER ACRE										
		1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	Average
Scioto	26.4	32.0	26.1	27.7*	25.0	25.7	30.4	41.4	21.5	19.2	19.5	26.9
Lincoln	25.1	29.2	34.3	20.8	24.4	23.2	25.1	37.7	15.6	24.0	20.3	25.5
Kingwa	24.3	27.4	31.0	17.4	22.7	22.7	32.7*	38.1	18.4	20.6	15.9	24.7
Hawkeye	23.7	32.6*	30.5	22.0	27.2	22.3	17.9	34.0	19.7	20.7	13.7	24.1
Mingo	22.8	32.1	30.0	24.0	23.4	21.2	17.7	29.5	19.7	21.2	12.7	23.2
Wabash	26.3		35.0*	25.0	26.8	19.9	23.7	41.3	20.6	22.1	19.7	26.0
Viking	24.2		29.2	19.4	30.7*	20.8	22.5	32.9	20.7	22.9	16.6	23.9
Adams				20.8	24.3	25.0	21.0	28.8	24.0	18.1	13.0	21.9
Kingwa-2	27.5				26.8	27.0*	31.1	45.3*	20.0	19.8	15.1	26.4
Kingwa-1	25.0				18.6	18.0	31.8	44.9	17.5	19.4	18.2	24.1
46-203-2	24.2				25.0	21.5	28.2	33.0	20.9	18.1	16.0	23.2
Viking-2	23.5				26.6	19.2	26.2	38.4	17.0	14.4	16.4	22.6
Perry	28.8					26.2	29.3	42.0	24.2*	26.8*	16.6	27.5*
Ohio 6150-2	25.7					22.2	20.2	38.6	22.3	25.9	17.9	24.5
Mingo-2	22.0					19.0	23.0	29.0	21.9	20.3	12.9	21.0
Clark	31.7*									22.7	26.4*	24.6
Harosoy	25.5									23.8	15.7	19.8
Monroe	19.7									19.2	11.3	15.1
No. Varieties		11	15	17	16	18	17	17	17	19	18	
Average		20.07	30.41	22.20	24.1	21.76	24.55	36.41	18.07	20.86	16.55	24.12
L.S.D. .05		5.58	5.6	5.48	4.86	5.82	7.92	4.32	4.06	4.43	5.13	8.71

*High-yielding varieties.

**See Table 2.

TABLE 4. AVERAGE AND ANNUAL HAY YIELDS OF SOYBEANS GROWN AT MORGANTOWN, 1948-1957

VARIETY	COMPARABLE** AVERAGE YIELD	ANNUAL YIELDS IN TONS PER ACRE											
		1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	Average	
Scioto	2.38	1.93	3.17*	2.10	1.94	3.35	1.68	2.47	3.06	2.20	2.03	2.39	
Kingwa	2.26	1.93	3.03	2.10	1.63	2.54	1.78	2.46	2.89	2.27	2.09*	2.27	
Viking	2.16	2.06*	2.94	2.41	1.80	2.37	1.89	2.20	2.38	2.15	1.54	2.17	
Mingo	2.01	1.89	2.48	2.36	1.60	2.57	1.29	1.96	1.83	2.26	1.99	2.02	
Hawkeye	1.93	1.63	2.54	2.09	1.61	2.36	1.41	2.11	1.83	2.32	1.50	1.94	
Lincoln	1.88	2.22	2.70	1.76	1.66	1.93	1.57	2.15	1.55	1.73	1.59	1.89	
Wabash	2.32		2.81	2.51*	1.67	3.19	1.72	2.68*	2.90	2.74*	1.51	2.41	
Adams	1.96		2.46	2.31	1.52	2.52	1.50	1.99	2.18	2.12	1.74	2.04	
Kingwa-1	2.36				1.66	3.06	2.02*	2.42	2.64	2.65	1.97	2.35	
Kingwa-2	2.28				1.69	2.80	1.91	2.45	2.76	2.49	1.74	2.26	
46-203-2	2.13				1.54	3.00	1.69	1.98	2.89	2.11	1.54	2.11	
Viking-2	2.10				1.99*	1.96	1.75	2.15	2.54	2.37	1.82	2.08	
Mingo-2	1.94				1.54	2.57	1.36	2.04	2.03	2.43	1.46	1.92	
Ohio 6150-2	1.89				1.55	2.24	1.80	1.94	1.74	2.12	1.71	1.87	
Perry	2.49*					3.55*	1.86	2.48	3.23*	2.45	1.78	2.56*	
Clark	2.05									2.25	1.57	1.91	
Monroe	1.80									2.24	1.13	1.69	
Harosoy	1.42									1.12	1.53	1.33	
No. Varieties		20	18	17	20	18	17	17	17	20	20	18	
Average		1.74	2.67	2.15	1.66	2.67	1.70	2.25	2.41	2.26	1.65	2.10	
L.S.D. .05		.55	.35	.51	.37	.56	.24	.33	.42	.40	.55	.87	

*High-yielding varieties.

**See Table 2.

TABLE 5. AVERAGE AND ANNUAL HAY YIELDS OF SOYBEANS GROWN AT POINT PLEASANT, 1948-1957

VARIETY	COMPARABLE** AVERAGE YIELD	ANNUAL YIELDS IN TONS PER ACRE										
		1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	Average
Scioto	2.95	2.73	3.20	1.96	3.42*	1.89	3.13	3.72	1.93	4.61	2.09*	2.93
Kingwa	2.81	2.78*	3.21	1.63	3.13	1.80	3.05	3.92	1.92	4.27	2.14	2.79
Lincoln	2.48	2.33	3.02	1.57	2.20	1.90	2.93	3.68	1.57	3.28	2.13	2.46
Hawkeye	2.45	2.49	2.36	1.49	2.40	1.87	2.79	3.61	2.17	3.49	1.64	2.43
Mingo	2.40	1.95	2.62	1.59	2.26	1.77	2.61	3.59	2.12	3.62	1.77	2.38
Wabash	2.93		3.07	2.21*	3.12	1.80	3.32	4.17*	2.33	4.90	1.59	2.95
Viking	2.68		3.40*	1.58	2.91	1.83	3.05	3.64	1.97	3.81	2.11	2.43
Adams	2.46			2.21	2.08	1.92	3.03	3.23	2.18	3.26	1.63	2.44
Kingwa-2	2.90				3.22	2.26	3.28	3.70	2.04	4.58	2.11	3.03
Viking-2	2.88				3.06	1.92	3.67	3.55	2.08	4.22	2.55	3.01
Kingwa-1	2.85				3.03	1.97	3.18	3.98	2.11	4.24	2.33	2.98
46-203-2	2.53				2.18	1.79	3.59	3.65	2.27	3.58	1.41	2.64
Perry	3.22*					2.38*	4.01*	3.90	2.36*	5.20*	2.43	3.38*
Ohio 6150-2	2.65					1.84	3.11	4.04	2.08	3.66	1.98	2.79
Mingo	2.52					1.79	2.94	3.55	2.24	3.86	1.50	2.65
Clark	2.91									4.45	2.14	3.29
Monroe	2.29									3.53	1.66	2.59
Harvey	1.96									3.21	1.22	2.22
No. Varieties		11	15	17	16	18	17	17	17	19	18	18
Average		2.28	2.97	1.63	2.65	1.89	3.13	3.74	1.87	3.99	1.96	2.63
L.S.D. .05		.78	.63	.34	.58	.35	.58	.61	.61	.67	.47	.98

*High-yielding varieties.

**See Table 2.