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Pekwa — a New Soybean

BY R. J. GARBER AND M. M. HOOVER



A Field of Pekwa Soybeans Grown on the Agronomy Farm at Morgantown in Cultivated Rows, to be Harvested for Seed

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Pekwa—a New Soybean

by R. J. GARBER and M. M. HOOVER

IN 1921 a pure-line selection of soybeans which carried the nursery history number I-21-7 was grown for the first time in the rod-row trials on the Agronomy farm at Morgantown. A few years earlier, because it seemed to possess marked ability to retain its leaves, the parent plant from which this selection was derived was harvested along with many other plants from a commercial lot of the Peking variety. This characteristic has been transmitted to all its descendants; it therefore serves to distinguish them from most other varieties and selections. This new strain of soybeans has been named Pekwa* to suggest its origin.

DISTINGUISHING CHARACTERISTICS

In addition to retaining its leaves until the pods are ripe, Pekwa has several characteristics which make it desirable for forage purposes. Perhaps the best way to describe the new form is to compare it with Wilson, one of the varieties most widely grown in West Virginia.

Data in Table 1 relate to yield of seed and of air-dry hay, to height of plant, and to days to mature hay and grain for the two varieties, Pekwa and Wilson, grown under comparable conditions on the Agronomy farm for a ten-year period, 1921 to 1930, inclusive. In three of the ten years Pekwa yielded somewhat more seed, in one year the same amount of seed, and in the other six years somewhat less seed than did Wilson. The difference between the average yields of the two varieties for the ten-year period is only 0.5 of a bushel—a difference which, since not significant, may be disregarded. Somewhat similar results were obtained relative to yield of air-dry hay, except that in this case Pekwa produced slightly the greater average yield, although the difference again is too small to be of any practical significance. The tests carried out on the Agronomy farm indicate that Pekwa has about the same yielding ability, both of hay and of seed, as Wilson.

The data in Table 1 show that Pekwa is taller and slightly later in maturing than Wilson. The difference between the varieties with respect to the average heights taken just before the plants were

*The name was suggested by D. R. Dodd, formerly assistant agronomist of the West Virginia Agricultural Experiment Station. It is derived from a combination of the first syllable of "Peking", and "wa", suggesting "W. Va.", and is pronounced "Peekwa".

TABLE 1.—Yield per acre of seed and forage, height of plant, and number of days to mature *Wilson* and *Pekwa* soybeans grown on the Agronomy farm at Morgantown from 1921 to 1930, inclusive

Variety	Item	Year grown											Average	Difference	Odds*
		1921	1922	1923	1924	1925	1926	1927	1928	1929	1930				
<i>Wilson</i>	Yield of seed in bushels	31.7	22.6	29.9	25.6	23.1	28.3	17.6	32.9	25.9	16.6	25.4	0.5	2	
	Yield of seed in bushels	37.8	20.3	25.3	20.3	21.3	28.3	17.3	32.7	27.6	18.0	24.9			
<i>Wilson</i>	Yield of air-dry hay in tons	2.30	1.99	2.31	2.13	2.02	1.73	1.29	1.98	2.56	1.54	1.99			
	Yield of air-dry hay in tons	2.82	2.16	2.49	2.01	2.33	1.75	1.49	2.20	1.99	1.57	2.08	0.09	5	
<i>Wilson</i>	Height of plant in inches	38.6	42.2	52.9	43.8	41.4	34.2	33.8	45.1	36.7	30.2	39.9			
	Height of plant in inches	43.5	42.8	57.0	48.0	44.0	36.8	35.0	47.0	39.8	33.0	42.7	2.8	8939	
<i>Wilson</i>	Days to mature grain	121.5	125.8	138.6	132.4	130.5	146.4	134.0	136.4	132.9	127.0	132.5			
	Days to mature grain	130.0	129.0	147.0	134.0	132.0	142.0	134.0	137.0	143.4	131.0	135.9	3.4	33	
<i>Wilson</i>	Days to mature hay	103.5	99.0	106.0	101.0	100.0	99.0	96.0	96.9	99.0	101.0	100.1			
	Days to mature hay	110.5	106.0	117.0	106.0	104.0	102.0	102.0	99.0	99.0	101.0	104.6	4.5	457	

*Calculated according to student's method.

TABLE 2.—Yield per acre of seed and forage of *Wilson* and *Pekwa* soybeans grown at the Lakin Experiment Farm from 1922 to 1930, inclusive

Variety	Item	Year grown											Average	Difference	Odds
		1922	1923	1924	1925	1926	1927	1928	1929	1930					
<i>Wilson</i>	Yield of seed (bushels)	35.4	35.4	31.0	27.9	30.1	29.5	34.9	33.5	31.8	32.2	1.0	6		
	Yield of seed (bushels)	31.5	36.1	28.5	27.2	31.0	26.9	38.5	32.5	28.3	31.2				
<i>Wilson</i>	Yield of hay (tons air-dry)	2.79	2.21	2.80	2.41	2.38	2.07	3.18	2.83	2.71	2.60				
	Yield of hay (tons air-dry)	3.06	2.42	2.67	2.52	2.51	2.22	3.33	2.92	2.66	2.70	0.1	38		

cut for hay is 2.8 inches. Considerable variation was recorded with regard to number of days to mature. The variations may be attributed largely to seasonal influence. The average number of days to mature grain for Pekwa was 135.9, and for Wilson, 132.5, a difference of 3.4 days. The average number of days to mature hay for Pekwa was 104.6 days, and for Wilson, 100.1 days. The differences between the two varieties with respect to average height of plant and number of days to mature hay are real differences inherent in the varieties and cannot be attributed to chance fluctuations. The differences in number of days to mature seed for the two varieties during the several years of the tests were less consistent than the differences in number of days to mature hay. The time of cutting for hay may have been determined somewhat more definitely than the time of cutting for seed.

YIELDS AT LAKIN EXPERIMENT FARM

In Table 2 are recorded the yields of seed and of hay of Pekwa and Wilson soybeans grown under comparable conditions in varietal experiments at the Lakin Experiment farm. With respect to yield of seed, Wilson again averaged somewhat greater yields than did Pekwa, but the differences throughout the several years were not entirely consistent. A small difference in average yield of air-dry hay was obtained in favor of Pekwa, but the difference, although of some statistical significance, is very small. In general the results obtained at Lakin were similar to those obtained on the Agronomy farm at Morgantown, indicating the similar yielding ability of Pekwa and Wilson.

RETENTION OF LEAVES

In order to ascertain more accurately the relative ability of Pekwa to retain leaves as compared with Wilson, two tests were devised in 1931 on the Agronomy farm at Morgantown. Both tests were applied to plants cut at the proper stage for hay and cured in the sun until they were considered ready to store in a mow.

One test consisted of determining the "pull" necessary to detach the leaf (including petiole) from the plant. The pull was determined by placing a plant on the platform of a dial balance which permitted direct readings in grams, and weighing the downward pull necessary to detach the leaf. From four to six leaves were removed from different parts of each plant examined. A wide variation was found, but in general the plants from the Pekwa variety retained their leaves with more tenacity than did comparable plants from the Wilson variety. The results of this test are shown in Table 3. The difference between the averages is not very significant statistically, even though it is relatively great (484.8 ± 283.8).

The other test consisted of subjecting small bundles of partly-cured plants of Pekwa and Wilson soybeans to a mechanical beating

with the spokes of a wagon wheel revolved by a motor. The device is shown in Figure 1. The bundles were secured on the table, at equal distances from the axle, in such a way as to let the tops of the bundles project between the spokes of the wheel. The wheel was revolved at a fair rate of speed for a period of from 3 to 5 minutes.

TABLE 3.—Weight in grams of “pull” necessary to detach leaves of certain field-cured plants of Pekwa and Wilson soybeans

Variety	Frequency classes in grams																	Total	Average			
	150	250	350	450	550	650	750	850	950	1050	1150	1250	1350	1450	1550	1650	1750			1850	1950	2050
Pekwa						3	5	14	6	15	14	9	8	15	7	3	5	0	1	105	1244.8±	198.1
Wilson	1	1	8	11	8	5	21	10	7	14	10	5	2	0	1	1			105	760.0±	203.2	

In some tests the Wilson bundles received the downward stroke of the spoke and the Pekwa bundle the upward stroke. In other tests the position of the varieties was reversed. In all these treatments the Pekwa variety retained a greater percentage of its leaves than did Wilson. Figures 2 and 3, respectively, show typical bundles before and after treatment. The difference in leaf retention is particularly apparent at the outer exposed surfaces of the bundles.

Figure 4 shows the difference with respect to retention of leaves at maturity between Pekwa and Wilson. When this photograph was taken the plants were ready to harvest for seed.

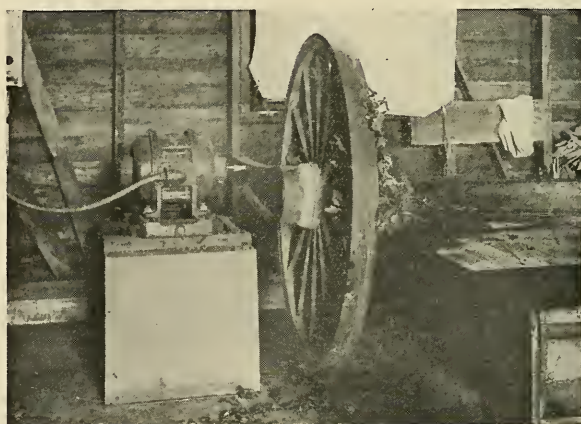


Fig. 1—Device for testing leaf retention of Wilson and Pekwa soybeans

QUALITY OF HAY

Pekwa has a finer stem, which may be inclined to vine slightly more than Wilson. The combination of fine stems and retention of leaves makes Pekwa superior to Wilson in quality of hay.



Fig. 2—Bundles of Pekwa (left) and Wilson (right) before flailing them with the spokes of a wagon wheel



Fig. 3—The same bundles shown in Figure 2, after flailing them with the spokes of a wagon wheel. Note the relative number of leaves on the bundles, particularly near the outer, exposed surfaces. Pekwa on left, Wilson on right

FLOWER AND SEED

The flower of Pekwa is purple and may easily be seen when the plants come into bloom. The seed is black and somewhat smaller than that of Wilson. As an average of several counts, Pekwa contained 295 seeds per ounce, whereas Wilson contained 244 seeds per ounce.



Fig. 4—Mature Wilson (left) and Pekwa (right) soybeans ready to harvest for seed. Note the difference in leaf retention

SUMMARY

A new variety of soybeans named Pekwa* has been developed by the West Virginia Agricultural Experiment Station. The new form originated from a single plant selected from the Peking variety. Pekwa has about the same yielding ability as Wilson, although the latter is a few days earlier in maturing. Pekwa retains its leaves longer than most varieties. This characteristic, together with its fine stems, combines to make it very desirable for hay.

*Another pure-line selection made from the Peking variety in 1921 has been tested rather extensively in West Virginia and to some extent elsewhere. It has been grown under the nursery history number I-21-8. This selection is very similar to Pekwa in every respect except that it usually matures a few days later and is not quite as uniform as Pekwa. A comparison of the yielding ability of these two strains may be made from data presented in W. Va. Agr. Exp. Sta. Bul. 243.

A few years ago seed of selection I-21-8 was sent to the Indiana Experiment Station to be included in varietal trials. It has proved well adapted to southern Indiana and is being increased for distribution in that state. This selection has been named Kingwa. The name is a combination of the last syllable of Peking, and "wa", suggesting "W. Va."

