# Results of the KENTUCKY SOYBEAN VARIETY PERFORMANCE AND FERTILIZER TESTS 1959

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# RESULTS OF THE KENTUCKY SOYBEAN VARIETY PERFORMANCE, DATE OF PLANTING, AND FERTILIZER TESTS—1959

## Recommended Varieties:

CLARK, WABASH, LINCOLN - Northern and Eastern Kentucky
CLARK, PERRY, HOOD, OGDEN - Southern and Western Kentucky

## Recommended Soil Treatments

If soil tests indicate that the soil is moderately or strongly acid use ground limestone at rate of 2 or 3 tons per acre respectively; if low in available phosphorus use fertilizers to supply up to 80 pounds of $P_2O_5$ per acre; and if low in available potassium use fertilizers to supply up to 80 pounds of $K_2O$ per acre. Apply limestone and fertilizers either before or after plowing. To avoid injury to seedling soybeans, do not drill fertilizer in contact with the seed. Soybeans respond well to the use of needed lime and fertilizers on other crops in the rotation ahead of the soybean crop.

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The soybean variety tests reported herein were designed for the evaluation of varieties which are commonly grown or appear promising for use in Kentucky. The fertilizer test was designed to test the response of soybeans to the addition of lime, and potassium to the soil, either singly or in combination and according to the need as indicated by rapid chemical tests of the soil. The 1959 results of the uniform tests of experimental strains of soybeans conducted at Henderson and Lexington in cooperation with the U. S. Regional Soybean Laboratory, Urbana, Illinois, are reported in their current Progress Report.

The location of the various tests is indicated in Fig. 1. The Henderson county tests were located in the main soybean-producing area of the state on bottomlands of a stream which is tributary to the Ohio River. The Fayette county tests were located on bottom land soil of central Kentucky. The Caldwell county test was located on branch bottom soil.

## Methods Used

The variety tests were planted in 4-row plots with three replications and in a randomized block design. The rows were 19 feet long and 36 inches apart. A 16-foot section was harvested from each of the two center rows. Beans were planted at a rate of 12 seeds per foot of row. The fertilizer test at Henderson was planted with Clark variety in the same manner as the variety test at that location and the treatments were in quadruplicate.

The date-of-planting test at Lexington was designed to test the effect of early, medium, and late planting upon the yield and agronomic characteristics of the early, medium, and late maturing varieties-Shelby, Clark, and Hill. These varieties represent maturity groups III, IV, and V, respectively. A similar date-of-planting test was conducted at Henderson in 1958 and gave similar results as reported in Progress Report 77.

The attempt was made to follow best cultural practices at all locations.

Yields: Seed weights were recorded after the seed of all plots had reached a uniform moisture content. Then weights were calculated to bushels-per-acre basis.

Oil Content: Percent of oil was determined from a composite sample of seed from all replications in each test. Analyses were made at the Kentucky Agricultural Experiment Station chemical laboratory. Percent oil is expressed on moisture-free basis.

Seed Size is reported as weight in grams per 100 seeds.

Lodging notes were recorded at or near maturity according to the scale shown in footnote to each table.

Height of plants was determined as the average length of plants in a plot from ground to the top extremity at time of maturity.

Maturity is taken as the date when the pods are dry and most of the leaves have dropped. It is expressed as days earlier (-) or later (+) than Perry as a reference variety.

Seed Quality is rated from 1 to 5 according to the scale shown as a footnote to each table.

## Interpretation of Data

The difference in yield between varieties or soil treatments necessary for reasonable assurance that such an inherent yield potential exists, has been calculated and is given in a footnote to each table. Unless the yields of the two varieties or the two soil treatments being compared differ by as much as or more than the figures shown, little confidence can be placed in the apparent superiority of one variety or soil treatment over the other under the conditions of the particular test.

Data on agronomic characteristics other than yield have not been analyzed statistically; however, small differences between any two varieties or treatments are likely to be of little importance and should not be considered strongly indicative of a true difference.

Duration of Tests: The results of evaluating varieties or soil treatments over a period of several years are more trustworthy than those from a single year. A given variety may be outstanding in performance one year and show less desirable characteristics another year. Results over a period of years tend to average these fluctuations. Yield data for more than a single year are given in the tables along with those of 1959 except for the date-of-planting test in Fayette county where this was the first year.

TABLE 1. - SOYBEAN VARIETY TEST, HENDERSON COUNTY, 1959- PERFORMANCE DATA AND RELATED INFORMATION. ALSO AVERAGE YIELD FOR 6 YEARS FOR MOST VARIETIES.

Cooperators: Ohio Valley Soybean Cooperative, Henderson; Owensboro Grain Co., Owensboro; J. S. Priest and Herman Wood.

Location: 7 miles S. E. of Henderson, Ky. near Airline Highway; Farm: J. S. Priest; Herman Wood, operator.

Soil: Silt loam (Falaya local alluvium) on drainage ditch - bottomland.

Soil Treatment: Limestone 2 T/A; Fertilizer 0-0-70 lb/A in 1958; none in 1959.

Date Planted: June 4, 1959. Killing Frost: November 4, 1959 Row Width: 36 inches

Comment: Test was planted about 2 weeks after optimum date. Soybeans came up a fair stand but grew under wet weather conditions until the latter part of August. Downy mildew (Peronospora manshurica) disease which thrived during the wet weather severely injured the earlier maturing varieties, resulting in many oospore encrusted seed and lower quality. 1959 was 2d year for test on this land.

| Variety | Yield-1959 1/ Bu/A | Rank | Maturity 2/ | Lodging 3/ | Ht. In. | Seed Qual. 4/ | Gm/100 Beans | % Oil Test | Yield, Bu/A Ave. 6 years. 1954-1959 |
|---|---|---|---|---|---|---|---|---|---|
| Shelby | 30.5 | 7 | -23 | 1 | 40 | 5 | 14.5 | 20.5 | --- |
| Lincoln | 25.9 | 8 | -22 | 1.2 | 38 | 5 | 13.5 | 20.1 | 32.9 |
| Clark | 33.5 | 5 | -11 | 1.5 | 39 | 4 | 14.7 | 20.8 | 41.4 |
| Wabash | 25.8 | 9 | - 8 | 1.8 | 38 | 3 | 12.0 | 19.4 | 34.4 |
| Perry | 34.7 | 4 | 9/25 | 1.2 | 39 | 3.5 | 14.9 | 19.2 | 37.5 |
| Dorman | 31.2 | 6 | +12 | 3.3 | 42 | 2 | 11.5 | 19.2 | 34.8 |
| Hood | 38.3 | 2 | +15 | 1.8 | 36 | 1.5 | 14.0 | 19.2 | 38.2 (4 yr. ave.) |
| Ogden | 35.3 | 3 | +18 | 1.7 | 40 | 3 | 14.1 | 18.6 | 32.4 |
| Lee | 39.3 | 1 | +34 | 2.3 | 35 | 2.5 | 12.5 | 17.2 | 36.2 (5 yr. ave.) |

1/ Mean data of 3 replicates for yield and performance. Oil content was determined from composite sameple of 3 replications. 1959 yield differences of less than 6.8 bu/A not significant (Odds:1).

2/ Days earlier (-) or later (+) than Perry.

3/ Rating scale plant lodging: 1= almost all plants erect; 2 = either all plants over slightly or a few down; 3 - all plants over moderately or 25%-50% down; 4 - either all plants over considerably or 50%-80% down; 5 = all plants down badly.

4/ Rating scale of seed quality: 1 = very good; 2 = good; 3 = fair; 4 = poor; 5 - very poor.

TABLE 2. - SOYBEAN VARIETY TEST - FAYETTE COUNTY, 1959 - PERFORMANCE DATA AND RELATED INFORMATION. ALSO AVERAGE YIELDS FOR 6 YEARS FOR MOST VARIETIES.

Location: Lexington, Ky. Farm: Experiment Station - Agronomy Farm. Fertility Level: High.

Soil Type: Guthrie silt loam -tile-drained bottomland. Soil Treatment: 400 lb/A 12-12-12 fertilizer.

Date Planted: May 22, 1959. Killing Frost: October 28, 1959. Row Width: 36 inches.

Comment: Soybeans were planted near optimum date, came up good stands and made good growth during moist weather of June, July and August but fruiting of late maturing varieties was greatly hampered by extremely dry weather of September and early October. In the first 4 of the 6 years the tests had been located on upland soil (Maury Silt Loam).

| Variety | Yield - 1959 1/ Bu/A | Rank | Maturity 2/ | Lodging 3/ | Ht. In. | Seed Qual 4/ | Gm/100 Beans | % Oil 1959 Test | Yield, Bu/A Ave. 6 yr. 1954-59 |
|---|---|---|---|---|---|---|---|---|---|
| Shelby | 29.2 | 3 | -23 | 1.7 | 39 | 2 | 12.8 | 19.0 | --- |
| Lincoln | 28.7 | 4 | -22 | 2 | 40 | 2 | 12.4 | 20.1 | 27.4 |
| Clark | 32.2 | 1 | -10 | 2 | 40 | 2.5 | 13.9 | 19.9 | 30.1 |
| Wabash | 27.7 | 5 | - 8 | 2 | 41 | 2 | 13.3 | 20.2 | 25.9 |
| Perry | 31.4 | 2 | 9/25 | 1.3 | 40 | 3 | 16.1 | 20.0 | 28.4 |
| Dorman | 22.4 | 6 | +12 | 5 | 52 | 2 | 10.4 | 19.0 | 24.1 (4 yr. ave) |
| Hood | 19.8 | 7 | +15 | 1.8 | 42 | 2.5 | 11.4 | 17.5 | 28.2 (4 yr. ave) |
| Ogden | 14.9 | 9 | +18 | 2 | 46 | 4 | 10.8 | 18.0 | 19.9 |
| Lee | 15.5 | 8 | +36 | 3 | 46 | 2.5 | 8.7 | 17.3 | 22.9 (4 yr. ave) |

1/ Mean data of 3 replicates for yield and performance. Oil content from 3 replications composite sample. 1959 yield differences of less than 3.3 Bu/A not significant. (Odds 19:1).

2/ Days earlier (-) or later (+) than Perry.

3/ Rating scale of plant lodging: 1 = almost all plants erect; 2 = either all plants over alightly or a few down; 3 = either all plants over moderately or 25%-50% down; 4 = either all plants over considerably or 50% to 80% down; 5 = all plants down badly.

4/ Rating scale of seed quality: 1 = very good; 2 = good; 3 = fair; 4 = poor; 5 = very poor.

TABLE 3. - SOYBEAN VARIETY TEST, CALDWELL COUNTY, 1959 - PERFORMANCE DATA AND RELATED INFORMATION.

Co-operators: West Kentucky Experiment Substation - Leo Link.
Location: Princeton, Kentucky.
Soil: Silt loam - Bottomland.

Soil Treatment: None in 1958 and 1959; Limed and fertilized liberally in past.

Date Planted: June 5, 1959. Killing Frost: October 28, 1959. Row Width: 36 inches.

Comment: Soybeans were planted about 2 weeks after optimum date, came up good stands but grew off slowly during the month of dry weather following emergence. Wet-weather conditions which prevailed during the 6-week period beginning July 17 favored downy mildew disease and resulted in poor quality of beans of the early maturing varieties. Light but nearly adequate rainfall in September and October and late frost date favored better than average production of late maturing varieties.

| Variety | Yield -1959 1/ Bu/A | Rank | Maturity 2/ | Lodging 3/ | Ht. In. | Seed Qual. 4/ | Gm/100 Beans | % Oil | Yield, Bu/A Av. 2 yrs. 1958-59 |
|---|---|---|---|---|---|---|---|---|---|
| Shelby | 31.9 | 8 | -14 | 2.3 | 46 | 4 | 16.2 | 20.4 | --- |
| Lincoln | 30.0 | 10 | -13 | 2 | 45 | 4 | 14.5 | 19.6 | 28.3 |
| Clark | 33.8 | 4 | - 7 | 2 | 43 | 3 | 15.9 | 19.1 | 31.1 |
| Wabash | 32.9 | 5 | - 9 | 3 | 49 | 2.5 | 12.9 | 18.8 | 32.0 |
| Perry | 36.9 | 3 | 10/2 | 3 | 50 | 2.5 | 15.8 | 20.7 | 32.9 |
| Hill | 32.0 | 7 | ƒ10 | 2.3 | 39 | 2 | 10.5 | 17.2 | 29.5 |
| Dorman | 37.7 | 1 | ƒ10 | 4.7 | 52 | 1.5 | 11.2 | 19.1 | 29.0 |
| Hood | 30.7 | 9 | ƒ21 | 3.8 | 44 | 1 | 13.8 | 18.6 | 27.0 |
| Ogden | 32.9 | 5 | ƒ26 | 3.7 | 49 | 2 | 14.3 | 20.0 | 25.7 |
| Lee | 37.5 | 2 | ƒ34 | 4.7 | 47 | 2 | 12.1 | 18.2 | 31.0 |

1/ Mean data of 3 replicates for yield and performance. Oil content was determined from composite sample of 3 replications. Yield differences of less than 4.6 bu/A not significant (Odds 19:1).

2/ Days earlier (-) or later (ƒ) than Perry.

3/ Rating scale plant lodging: 1 = almost all plants erect; 2 = either all plants over slightly or a few down; 3 = all plants over moderately or 25%-50% down; 4 = either all plants over considerably or 50%-80% down; 5 = all plants down badly.

4/ Rating scale of seed quality: 1 = very good; 2 = good; 3 = fair; 4 = poor; 5 = very poor.

TABLE 4. - SOYBEAN DATES-OF-PLANTING TEST, FAYETTE COUNTY, 1959 - PERFORMANCE DATA AND RELATED INFORMATION.

Location: Lexington, Ky. Farm: Kentucky Experiment Station - Agronomy. Fertility Level: High.

Soil: Guthrie Silt Loam - tile-drained bottom land.

Soil Treatment: Fertilizer 400 lb/A 14-14-14 Killing Frost: October 28, 1959. Row Width: 36 in.

| Planting Date and Variety | Yield Bu/A 1/ | Days to Mature 2/ | Lodging 3/ | Ht. In. | Seed Qual. 4/ | Gms/100 Beans | % Oil |
|---|---|---|---|---|---|---|---|
| May 23 | | | | | | | |
| Shelby (early maturity) | 33.4 | 104 | 2 | 42 | 2 | 12.9 | 20.2 |
| Clark (med. maturity) | 34.4 | 117 | 2 | 41 | 2 | 14.5 | 21.6 |
| Hill (late maturity) | 24.6 | 134 | 3.5 | 38 | 2 | 9.2 | 17.7 |
| June 13 | | | | | | | |
| Shelby (early maturity) | 32.4 | 100 | 2 | 35 | 4 | 15.1 | 19.7 |
| Clark (med. maturity) | 36.6 | 105 | 2 | 35 | 3.5 | 16.3 | 21.9 |
| Hill (late maturity) | 25.7 | 119 | 3 | 36 | 2 | 8.5 | 17.5 |
| July 4 | | | | | | | |
| Shelby (early maturity) | 25.2 | 91 | 1 | 26 | 2 | 12.9 | 19.5 |
| Clark (med. maturity) | 23.3 | 100 | 1 | 23 | 2 | 12.7 | 19.7 |
| Hill (late maturity) | 22.0 | 113 | 2 | 29 | 3 | 8.1 | 16.2 |

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Mean yields (bu/A) for Dates-of-Planting and Varieties used

| Variety | Planting Date May 23 | June 13 | July 4 | Variety Means |
|---|---|---|---|---|
| Shelby (early maturity) | 33.4 | 32.4 | 25.2 | 30.3 |
| Clark (med. maturity) | 34.4 | 36.6 | 23.3 | 31.4 |
| Hill (late maturity) | 24.6 | 25.7 | 22.0 | 24.1** |
| Date Means | 30.8 | 31.5 | 23.5** | |

1/ Yield & performance data are the mean of 4 replications. Oil content was determined from composite sample of 4 replications. Experimental design was split-plot. Yield differences required for significance: Date Means = 4.0 bu/A (odds 19:1); and 6.0 Bu/A (odds 99:1); Variety Means = 2.4 bu/A (odds 19:1) and 3.2 bu/A (odds 99:1). Thus, only latest date of planting, or use of Hill variety resulted in significantly lower yields.

2/ Days from planting to maturity.

3/ Rating scale plant lodging: 1 - almost all plants erect; 2 - either all plants over slightly or a 3 - all plants over moderately or 25%-50% down; 4 - either all plants over considerably or 50%-80% down; 5 - all plants down badly.

4/ Rating scale of seed quality: 1 - very good; 2 - good; 3 - fair; 4 - poor; 5 - very poor.

TABLE 5. - SOYBEAN YIELD IN LIME & FERTILIZER TEST. HENDERSON COUNTY
1958 & 1959

Information on location, co-operators, fertility level, soil type and killing frost date are same as shown in Table 1.

Variety used: Clark

Results of soil test before soil treatment: moderately acid (pH 5.9)

P = High; K = Low

Date planted: May 17, 1958 June 4, 1959 Row Width: 36 inches

Method of Treatment: In 1958 ground limestone and potash fertilizer were applied broadcast on proper plots after plowing, then disked in lightly to incorporate with soil, just ahead of planting. Phosphate fertilizer treatment was not included because soil tested high in P. None was used in 1959.

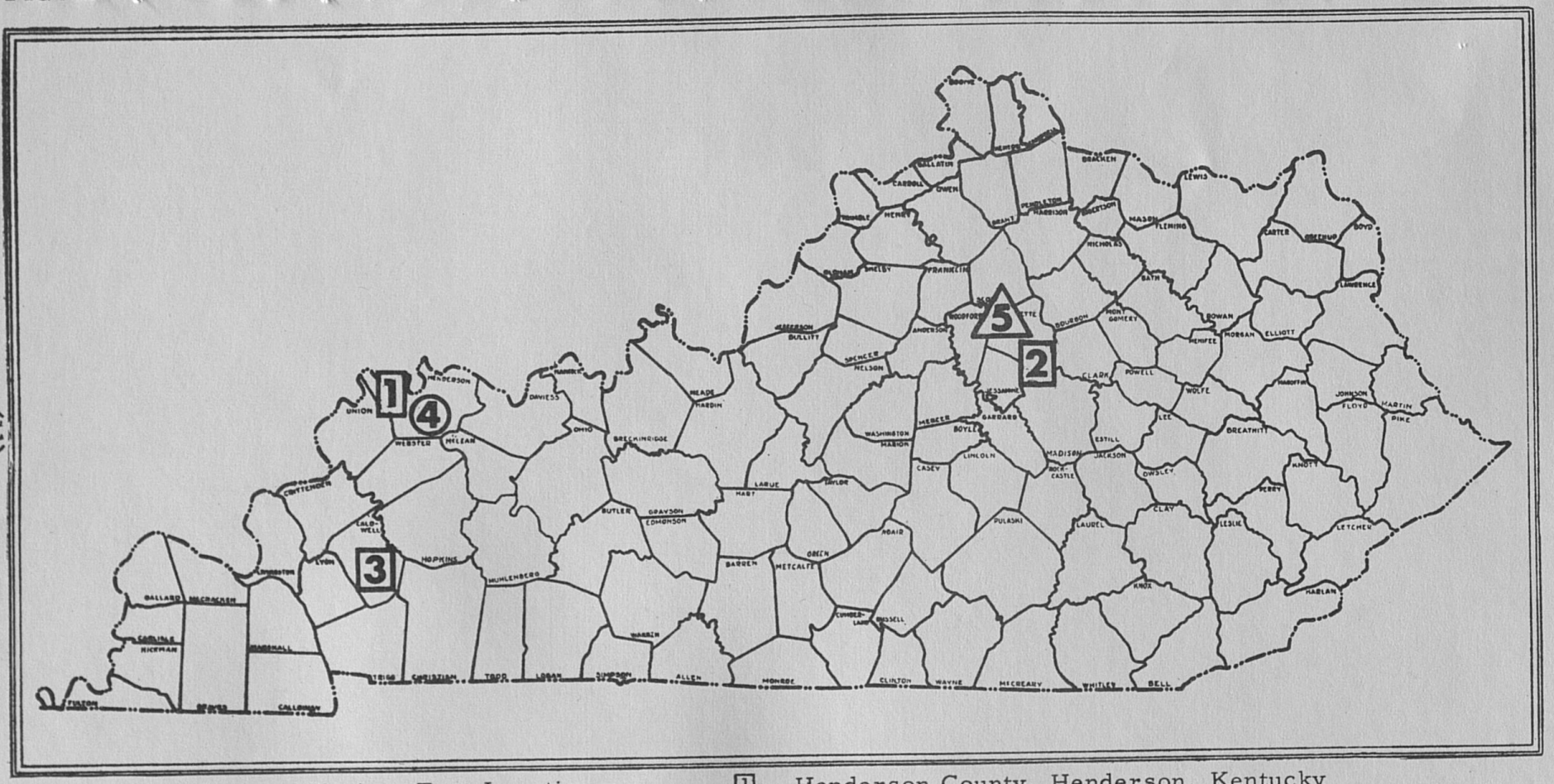
Comment: In 1958 soybeans were planted about 1 week before optimum date. They came up good stands and grew under excellent conditions of weather and culture. Plants of all treatments matured at about the same time - September 16 and varied little in height or other visible characteristics.

In 1959 - Soybeans were planted about 2 weeks after optimum date; came up good stands but grew under unfavorable wet-weather conditions during most of the summer. Downy mildew caused some injury to plants and lowered seed quality to some extent. Plants matured about September 24, 1959.

| Treatment | | Rate/Acre | | Direct Effect 1958 | Residual Effect 1959 |
|---|---|---|---|---|---|
| Limestone, tons | Fertilizer, lb N - $P_2O_5$ | | $K_2O$ | | |
| 0 | 0 | 0 | 0 | 40.2 | 35.7 |
| 2 | 0 | 0 | 0 | 43.9 | 33.9* |
| 0 | 0 | 0 | 80 | 43.8* | 39.6* |
| 2 | 0 | 0 | 80 | 45.1* | 38.9* |

Yield differences of less than 3.8 bu/A in 1958 and of less than 2.9 Bu/A in 1959 were not significant (Odds 19:1). Thus potash treatments with or without limestone resulted in significant yield increases in comparison to the untreated check in both years but limestone alone did not in the first year and resulted in a significant decrease in the second year.

FIGURE 1. LOCATION OF TESTS




Soybean Variety Test Locations:

[1] Henderson County, Henderson, Kentucky

[2] Fayette County, Lexington, Kentucky

[3] Caldwell County, Princeton, Kentucky

Soybean Fertilizer Test Location:

(4) Henderson County, Henderson, Kentucky

Soybean Date-of-plant Test Location:

△5 Fayette County, Lexington, Kentucky

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