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SOME TESTS IN THE CULTURE
OF PEPPERS

By J. W. LLOYD



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SUMMARY

Green peppers of the large type have become very popular for salads and for stuffing. Their culture is profitable where good yields can be secured. Under Illinois conditions, the use of large, well-grown, potted plants is favorable to early bearing and large total production. The tests reported in this bulletin were made to determine other factors affecting yields.

Altho the pepper plant will withstand considerable dry weather, the yields, as an average for five years, were increased about 15 per cent by supplementing the natural rainfall with overhead irrigation.

Neither the use of nitrogen in the form of nitrate of soda, nor of phosphorus in the form of bone meal, resulted in any consistent increases in the yields of peppers.

A comparison of six varieties indicated that Neapolitan Salad was the earliest, but that Sweet Mountain was the heaviest yielder. Chinese Giant was the poorest yielder.



FIG. 1.—SWEET MOUNTAIN PEPPER

This variety yielded an average of 3 pounds of peppers to a plant.

SOME TESTS IN THE CULTURE OF PEPPERS

By J. W. LLOYD, Chief in Olericulture

Green peppers of the large, mild or sweet type, used in salads and for stuffing, have increased greatly in popularity within the last few years. Their use in salads especially has recently become quite important, and they are shipped from the South to northern markets at seasons of the year when the northern home-grown product is not available. Illinois gardeners have had trouble in taking advantage of this increased demand, because of failure to get satisfactory yields. It is a common occurrence in the North for peppers to produce very few fruits until late in the fall, and then to be caught by frost with the main crop still on the plants too immature to be of value.

Some tests were therefore planned by this Station with a view to developing a method by which growers in Illinois would be enabled to produce larger yields before the close of the growing season. The tests were made on rich garden soil of the brown silt loam type, at Urbana, starting in 1919 and continuing thru the season of 1923. They included the growing of peppers with and without irrigation; with and without applications of nitrate of soda; with and without bone meal; as well as a comparison of different varieties.

Previous experience had shown that large, well-grown, potted plants have a much better chance of producing satisfactory yields before the close of the season than have plants that are small, young, or poorly developed at the time they are set in the field. A pepper plant normally continues to bear until killed by frost, and an early start gives it a longer bearing season. All the pepper plants used in the present tests were grown, therefore, from early-planted seed, and handled in a manner to put them in ideal condition when the time for setting in the field arrived.

METHOD OF CONDUCTING THE TESTS

The pepper seed was sown in flats in a warm greenhouse in March. As soon as the plants were large enough to handle to advantage, they were shifted to 2½-inch pots, and were later transferred to 4-inch pots. At the time they were set in the field the plants were large and well developed, usually showing buds and sometimes blossoms. These potted plants suffered very little check in growth when placed in the open ground.

Four rows of pepper plants were set in the field, two where they could be irrigated by the overhead Skinner system. The rows were

3½ feet apart and the plants were placed 2 feet apart in the row. The various lots were designated as follows:

- Lot 1. Not irrigated nor fertilized (check)
- Lot 2. Not irrigated, but fertilized with bone meal
- Lot 3. Irrigated but not fertilized
- Lot 4. Irrigated and fertilized with nitrate of soda

The object of making these combinations of treatments was to determine whether fruitfulness in the pepper could be stimulated by the use of phosphorus, which is supposed to increase the yields of fruit-bearing plants; or whether fruitfulness in the case of this plant might be associated with a strong vegetative growth. Irrigation was resorted to as one means of promoting vegetative growth. With a view to stimulating such growth still further, if possible, nitrate of soda was used in addition to irrigation on one of the lots.



FIG. 2.—TYPE OF PLANT USED IN THE TESTS. GROWN IN 4-INCH POT

Six varieties—Neapolitan Salad, Sweet Mountain, Crimson Giant, Magnum Dulce, Chinese Giant, and Ruby King—were included in the tests each year except in 1920, when Ruby King was omitted. Each variety was grown under each of the treatments mentioned.

In 1919 only 9 plants of each variety were grown under each treatment; in 1920 and 1921, 15 plants of each variety were used, and in 1922 and 1923, 20 plants of each variety.

The bone meal was applied at the rate of 2 ounces per plant, and was mixed thoroly with the soil at the time the plants were set. The nitrate of soda was used at the rate of 1 ounce per plant for the season, but was applied ½ ounce at a time. The first application was usually made about four weeks after the plants were set in the field, and the second application about three weeks later.

The peppers were picked when in the right condition for market, that is, when they appeared to have reached their maximum size but were still green. A number of pickings were required to harvest the crop. When the weather was warm and the peppers were developing rapidly, it was found necessary to pick over the plantation once a week to get the crop in optimum condition. When the weather was cooler, less frequent picking was necessary. The number of pickings each year was as follows: 1919, twelve; 1920, fifteen; 1921, twelve; 1922, nine; 1923, six.

In 1923 the weather was very cool and the crop was cut off by frost on September 12. In the other years, picking was continued into October. Dates of planting, transplanting, and harvesting are given in Table 1.

TABLE 1.—DATES ON WHICH PEPPERS WERE PLANTED AND HARVESTED

	1919	1920	1921	1922	1923
Seeded.....	Mar. 19	Mar. 5	Mar. 19	Mar. 7	Mar. 9
Shifted to 2½-inch pots.....	Apr. 11	Mar. 29	Apr. 12	Mar. 23	Apr. 2
Shifted to 4-inch pots.....	May 10	Apr. 25	May 5	Apr. 17	Apr. 23
Set in field.....	June 13	May 28	June 1	May 24	June 2
First picking.....	July 7	June 25	June 24	June 27	July 2
Last picking.....	Oct. 8	Oct. 9	Oct. 8	Oct. 9	Sept. 12

YIELDS INCREASED ABOUT 15 PERCENT BY IRRIGATION

Whenever the rainfall was insufficient to keep the peppers well supplied with moisture, the two rows planted near the irrigation pipe were thoroly watered. The results of irrigation are indicated in Table 2.

In 1919 all varieties produced larger yields without irrigation, and in 1920 the average yield was slightly greater from the non-irrigated plants, owing to the relatively light yield of one variety under irrigation. In the other three years, however, the yields of all varieties were greater from the irrigated plants; and the five-year average for all varieties shows an increase in yield of 15 percent apparently due to irrigation.

NITRATE OF SODA FAILS TO INCREASE YIELD

For all varieties during all five years, in 20 trials out of 29, the nitrated plants yielded less than the plants without nitrate (Table 3). Four of the varieties, as an average of the five years, yielded less with the nitrate treatment than without it; the other two varieties yielded slightly more with nitrate. The five-year average yield for all varieties combined was slightly in favor of the plants that were grown without nitrate.

It is quite evident that the yielding propensities of the plants were not improved by the applications of nitrate of soda.

BONE MEAL GIVES NO CONSISTENT GAINS

Under the conditions of this experiment, no consistent advantage was derived from the use of bone meal (Table 4). In 1921 the yields

TABLE 2.—YIELDS OF PEPPERS FROM IRRIGATED AND NON-IRRIGATED PLANTS
Ounces per plant

Variety	Irrigated						Non-irrigated					
	1919	1920	1921	1922	1923	Average	1919	1920	1921	1922	1923	Average
Neapolitan Salad...	31.2	31.4	49.5	40.2	23.0	35.0	66.7	27.1	42.2	31.3	15.8	36.6
Sweet Mountain...	58.4	26.8	78.3	73.9	24.4	52.3	70.3	40.3	52.6	42.3	18.8	44.8
Crimson Giant...	48.7	35.9	52.9	33.5	11.9	36.5	62.7	32.8	18.8	22.7	11.0	29.6
Magnum Dulce...	42.2	35.8	41.7	38.4	13.7	34.3	51.6	35.3	35.4	28.4	12.6	32.6
Chinese Giant.....	24.0	23.5	57.6	32.5	1.1	27.7	40.2	21.8	19.3	18.4	.9	20.1
Ruby King.....	35.5	....	64.1	59.6	18.3	44.3	66.0	....	38.8	26.3	10.8	35.4
Average.....	40.0	30.7	57.3	46.3	15.4	38.3	59.6	31.4	34.5	28.2	11.6	33.2

TABLE 3.—YIELDS OF PEPPERS GROWN WITH AND WITHOUT NITRATE OF SODA: PLANTS IRRIGATED
Ounces per plant

Variety	Treated with nitrate						Untreated					
	1919	1920	1921	1922	1923	Average	1919	1920	1921	1922	1923	Average
Neapolitan Salad..	37.4	34.5	45.7	36.6	16.0	34.0	31.2	31.4	49.5	40.2	23.0	35.0
Sweet Mountain...	53.1	37.2	82.3	64.1	20.5	51.4	58.4	26.8	78.3	73.9	24.4	52.3
Crimson Giant...	39.3	39.5	52.3	20.7	9.8	32.3	48.7	35.9	52.9	33.5	11.9	36.5
Magnum Dulce....	30.0	28.7	57.9	38.1	10.7	33.1	42.2	35.8	41.7	38.4	13.7	34.3
Chinese Giant.....	32.9	29.3	54.5	28.9	.9	29.3	24.0	23.5	57.6	32.5	1.1	27.7
Ruby King.....	51.0	....	63.2	56.3	12.5	45.7	35.5	....	64.1	59.6	18.3	44.3
Average.....	40.6	33.8	59.3	40.8	11.7	37.6	40.0	30.7	57.3	46.3	15.4	38.3

TABLE 4.—YIELDS OF PEPPERS GROWN WITH AND WITHOUT BONE MEAL: PLANTS NOT IRRIGATED
Ounces per plant

Variety	Treated with bone meal						Untreated					
	1919		1920		1921		1922		1923		Average	
	Early	Total	Early	Total	Early	Total	Early	Total	Early	Total	Early	Average
Neapolitan Salad..	51.5	24.0	48.4	28.3	16.3	33.7	66.7	27.1	42.2	31.3	15.8	36.6
Sweet Mountain....	61.6	39.2	59.0	36.0	17.8	42.7	70.3	40.3	52.6	42.3	18.8	44.8
Crimson Giant.....	52.2	29.1	32.7	26.1	8.8	29.7	62.7	32.8	18.8	22.7	11.0	29.6
Magnum Dulce.....	47.3	27.9	43.4	25.1	10.2	30.7	51.6	35.3	35.4	28.4	12.6	32.6
Chinese Giant.....	31.5	14.5	20.4	16.9	1.9	17.0	40.2	21.8	19.3	18.4	.9	20.1
Ruby King.....	55.3	....	44.3	23.8	22.3	36.4	66.0	....	38.8	26.3	10.8	35.4
Average.....	49.9	26.9	41.3	26.0	11.2	31.7	59.6	31.4	34.5	28.2	11.6	33.2

TABLE 5.—VARIETIES OF PEPPERS COMPARED AS TO EARLY YIELDS AND TOTAL YIELDS: PLANTS GROWN WITHOUT IRRIGATION AND WITHOUT SPECIAL FERTILIZER TREATMENT
Ounces per plant

Variety	1919		1920		1921		1922		1923		Average	
	Early	Total	Early	Total	Early	Total	Early	Total	Early	Total	Early	Total
	Neapolitan Salad...	11.0	66.7	10.2	27.1	3.5	42.2	4.9	31.3	4.2	15.8	6.7	36.6
Sweet Mountain....	5.1	70.3	3.4	40.3	3.9	52.6	3.7	42.3	6.4	18.8	4.5	44.8
Crimson Giant....	6.1	62.7	6.1	32.8	0.0	18.8	.1	22.7	3.7	11.0	3.2	29.6
Magnum Dulce....	.9	51.6	1.0	35.3	.8	35.4	.4	28.4	3.9	12.6	1.1	32.6
Chinese Giant.....	.8	40.2	.4	21.8	0.0	19.3	.2	18.4	0.0	.9	.3	20.1
Ruby King.....	4.8	66.0	....	....	3.6	38.8	2.1	26.3	2.7	10.8	2.6	35.4
Average.....	4.8	59.6	4.2	31.4	1.9	34.5	1.9	28.2	3.5	11.6	3.1	33.2

were distinctly better from the plants treated with bone; but in all other years the average yields, including all varieties, were lower from the bone-treated plants than from the untreated plants. Furthermore, the five-year average yield for all varieties combined was slightly greater from the untreated plants.

COMPARISON OF VARIETIES FOR EARLY AND LATE USE

Marked differences were discovered in the yields of the six varieties of peppers included in these tests.

For the sake of making a fair comparison of the varieties, early yields and total yields of all six varieties as grown without irrigation or special fertilizer treatment, are tabulated in Table 5. All peppers harvested before August 15 were considered "early." Ordinarily only a relatively small proportion of the crop was picked before that date. Some varieties, however, produced a much larger yield of early peppers than did other varieties. Neapolitan Salad was the outstanding variety so far as earliness was concerned, while Chinese Giant and Magnum Dulce were notably deficient.

So far as total yields were concerned, Sweet Mountain outyielded all the other varieties, its average yield for the five-year period as grown under all four treatments being more than double that of Chinese Giant, the lowest yielding variety. Furthermore, Sweet Mountain was second only to Neapolitan Salad in average yield of early peppers. Since Neapolitan Salad is of rather small size and suitable only for salad, rather than being adapted also to stuffing, Sweet Mountain is the better variety for general use, both early and late, when grown on brown silt loam under the conditions obtaining in the corn belt. It is of course possible that Chinese Giant might do relatively better on some other soils or under other conditions. The important point brought out by these tests is that there are great differences in yields of different varieties, and each gardener should grow a variety that will give large yields under his soil and climatic conditions.

CONCLUSIONS

1. It is feasible to grow peppers on brown silt loam as ordinarily fertilized for market gardening purposes, without special treatment with commercial forms of nitrogen or phosphorus.

2. Peppers will withstand considerable dry weather, tho the yields may be somewhat increased by an abundant supply of moisture.

3. Treatment with nitrate of soda in addition to irrigation seems to be detrimental to the yield.

4. Varieties of peppers differ widely in productiveness. Under the conditions of these tests, Sweet Mountain proved to be a much heavier yielder than any of the other five varieties tested.



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