

HORTICULTURE

SWEET POTATOES

The work in progress with sweet potatoes includes:

1. Variety Test.
2. Sources of Phosphoric Acid.
3. Sources of Nitrogen.
4. Sources of Potash.
5. Top Dressing Test with Nitrogen.
6. Top Dressing Test with Potash.
7. Ratios of Mineral and Organic Nitrogen.
8. Controlled Plant Nutrient Study.
9. Cooperative Sweet Potato Project.

Sweet Potato—Variety Test: A sweet potato study including 49 varieties is being conducted cooperatively with the Office of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, United States Department of Agriculture. In this test there is no indication of a variety superior to Porto Rico for table use. There are, however, indications that some may be better for starch production than Triumph, which is now in general use for that purpose. In a sweet potato seedling test one selection (L-126) seems to be especially well adapted as a table variety. It is productive, well-shaped, attractive in appearance, and high in vitamins. Seed stock is being increased for further observation and study.

Sweet Potato—Sources of Phosphoric Acid: Since yields from the various sources of phosphoric acid do not vary widely, the plant food cost of the phosphate is perhaps the determining factor in selecting the carrier to be used in sweet potato fertilizer. The amounts of each carrier used in this test, and also corresponding yields, are shown in Table 41. The nitrogen and potash in all instances are derived from the same sources so that the phosphate carriers are the only plant nutrient variables in the test. Some of the carriers are so low in phosphoric acid that it is necessary to compute the plant food requirements in pounds per acre rather than on a ton basis.

Sweet Potato—Sources of Nitrogen: In this test all fertilizer is applied in a single application, previous to planting. Because of less leaching of organic sources during a long growing season, such carriers as cottonseed meal and tankage are producing higher yields than mineral sources, as will be observed in Table 42. However, work with ratios of mineral and organic carriers indicates that a combination of the two (Table 46) will give slightly increased yields, with a reduction in the cost of nitrogen. Peanut meal and uramon also are included in the test and are showing to good advantage.

TABLE 41.

SWEET POTATO—SOURCES OF PHOSPHORIC ACID

Average Yield for Years 1935 to 1942, Inclusive

Fertilizer: 800 Pounds per Acre, 3.29% Nitrogen, 8% Phosphoric Acid from Sources as Indicated, and 6% Potash (equivalent to the old formula of 8% Phosphoric Acid, 4% Ammonia, and 6% Potash)

Variety: Porto Rico

Average Date Planted: April 14

Average Number of Growing Days: 193

Source of Phosphate	Amt. Used per Acre (Lbs.)	Phosphoric Acid Content* (%)	Yield in Bushels per Acre					Total
			No. 1's	No. 2's	Strings	Jumbos	Rot	
Soft Phosphate** -----	1066	6	179.82	29.58	23.78	8.70	--	241.88
Ammoniated Superphosphate	427	15	179.63	37.94	24.11	18.45	--	260.13
Triple Superphosphate ---	137	46.8	175.67	31.07	26.21	15.58	--	248.53
Basic Slag -----	800	8	173.67	31.21	22.76	18.41	--	246.05
Superphosphate -----	400	16	170.81	35.17	22.62	16.31	--	244.91
Dicalcium Phosphate -----	160	40	167.27	38.35	24.79	17.88	--	248.29

* Since the analysis of different batches of materials may vary from time to time, the percentages of "available" phosphoric acid used in this table are approximate for all sources except soft phosphate and basic slag. In these last named materials the figures representing the phosphate content are arbitrary, because manufacturers or distributors furnished only data on the total phosphoric acid contained.

** So far as these tests are concerned, the terms soft phosphate and colloidal phosphate may be used interchangeably.

TABLE 42.

SWEET POTATO—SOURCES OF NITROGEN

Average Yield for Years 1933 to 1942, Inclusive

Fertilizer: 800 Pounds per Acre, 3.29% Nitrogen from Sources as Indicated, 8% Phosphoric Acid, and 6% Potash (equivalent to the old formula of 8% Phosphoric Acid, 4% Ammonia, and 6% Potash)

Variety: Porto Rico

Average Date Planted: April 17

Average Number of Growing Days: 198

Source of Nitrogen	Yield in Bushels per Acre					Total
	No. 1's	No. 2's	Strings	Jumbos	Rot	
Cottonseed Meal ----	160.07	28.94	24.00	4.47	.36	217.84
Tankage -----	159.20	28.71	24.20	5.13	.45	217.69
Sulphate of Ammonia	154.09	29.00	19.97	4.47	.41	207.94
Nitrate of Soda -----	153.56	34.41	22.91	6.65	.86	218.39
Calnitro -----	149.68	25.07	20.11	8.05	.23	203.14
Cyanamid -----	137.27	28.73	21.99	3.37	.23	191.59

Sweet Potato—Sources of Potash: Since there is only a slight difference in production of No. 1 potatoes from the two high yielding sources, it therefore appears that the unit cost of potash is the determining factor in selecting the potash carrier to be used in sweet potato fertilizer. In view of the fact, however, that kainit has almost disappeared as a commercial product, muriate is considered the best available source of potash for this crop.

TABLE 43.

SWEET POTATO—SOURCES OF POTASH

Average Yields Over a Twelve-Year Period

Fertilizer: 800 Pounds per Acre, 3.29% Nitrogen, 8% Phosphoric Acid, and 6% Potash (equivalent to the old formula of 8% Phosphoric Acid, 4% Ammonia, and 6% Potash). The potash is derived from sources as indicated.

Variety: Porto Rico

**Average Date Planted: April 12
Average Number of Growing Days: 184**

Source of Potash	Yield in Bushels per Acre					
	No. 1's	No. 2's	Strings	Jumbos	Rot	Total
Kainit -----	167.16	31.29	24.19	13.07	--	235.71
Muriate of Potash ---	164.50	28.61	24.19	6.43	--	223.73
Manure Salts* -----	155.52	32.26	23.48	9.71	.91	221.88
Sulphate of Potash ---	154.79	28.16	22.53	5.17	--	210.65
Sulphate of Potash Magnesia -----	150.67	26.63	22.61	3.74	--	203.65

* Eleven-year average.

Sweet Potato—Top Dressing Test with Nitrogen: Data in Table 44 indicate that for bulk production, nitrate of soda may be used as a top dresser to good advantage, although for table production its use does not seem to be advisable.

TABLE 44.

SWEET POTATO—TOP DRESSING TEST WITH NITROGEN

Average Yield for Years 1936 to 1942, Inclusive

Fertilizer: 800 Pounds per Acre, 3.29% Nitrogen, 8% Phosphoric Acid, and 6% Potash, (equivalent to the old formula of 8% Phosphoric Acid, 4% Ammonia, and 6% Potash). Applied before planting.

Variety: Porto Rico

**Average Date Planted: April 12
Average Number of Growing Days: 201**

Top Dressing*	Yield in Bushels per Acre					
	No. 1's	No. 2's	Strings	Jumbos	Rot	Total
Check (no top dressing)	190.44	23.29	21.60	6.13	--	241.46
100 lbs. Nitrate of Soda	185.52	25.50	21.88	17.35	--	250.25
200 lbs. Nitrate of Soda	194.33	24.23	21.57	18.35	--	258.48
100 lbs. Nitrate of Soda and 50 lbs. Muriate of Potash -----	195.96	24.97	21.36	24.99	--	267.28

* Top dressing applied at first cultivation.

Sweet Potato—Top Dressing Test with Potash: Yield responses from the different rates of potash top dressings indicate that for both table use and bulk production at least 50 pounds per acre may be profitably applied, although increases in yield result from as much as 200 pounds per acre (Table 45).

TABLE 45.

SWEET POTATO—TOP DRESSING TEST WITH POTASH

Average Yield for Years 1933 to 1942, Inclusive

Fertilizer: 800 Pounds per Acre, 3.29% Nitrogen, 8% Phosphoric Acid, and 6% Potash (equivalent to the old formula of 8% Phosphoric Acid, 4% Ammonia, and 6% Potash). Applied before planting.

Variety: Porto Rico

Average Date Planted: April 13

Average Number of Growing Days: 200

Top Dressing*	Yield in Bushels per Acre					
	No. 1's	No. 2's	Strings	Jumbos	Rot	Total
Check (no top dressing)	194.29	30.73	19.00	27.52	.78	272.32
50 lbs. Muriate of Potash	204.83	29.77	19.79	30.04	.77	285.20
100 lbs. Muriate of Potash	206.40	32.09	19.66	31.18	.86	290.19
200 lbs. Muriate of Potash	209.30	32.31	19.50	34.83	.69	296.63

* Top dressing applied at first cultivation.

Sweet Potato—Ratios of Mineral and Organic Nitrogen: Data resulting from this test show that the most economical source of nitrogen for sweet potato production consists of a combination of mineral and organic carriers.

TABLE 46.

SWEET POTATO—RATIOS OF MINERAL AND ORGANIC NITROGEN

Average Yield for Years 1933 to 1942, Inclusive

Fertilizer: 800 Pounds per Acre, 3.29% Nitrogen from Sources as Indicated, 8% Phosphoric Acid, and 6% Potash (equivalent to the old formula of 8% Phosphoric Acid, 4% Ammonia, and 6% Potash).

Applied before planting.

Variety: Porto Rico

Average Date Planted: April 10

Average Number of Growing Days: 206

Ratio of Nitrogen	Yield in Bushels per Acre					
	No. 1's	No. 2's	Strings	Jumbos	Rot	Total
1/3 Nitrate of Soda and 2/3 Cottonseed Meal	202.70	33.55	22.18	19.30	.31	278.04
Cottonseed Meal	199.73	31.60	23.03	14.95	.65	269.96
1/4 Nitrate of Soda, 1/4 Tankage, 1/4 Cottonseed Meal, and 1/4 Sulphate of Ammonia	190.25	35.44	22.34	19.43	.86	268.32
2/3 Nitrate of Soda and 1/3 Cottonseed Meal	189.59	33.19	22.92	21.05	1.57	268.32
Nitrate of Soda	188.92	33.42	21.88	25.16	.86	271.24

