HORTICULTURE

SWEET POTATOES

The following work is in progress with sweet potatoes:

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 projects

Sweet Potato—Variety Test: The sweet potato variety test has been combined with a more extensive study of sweet potato varieties and seedlings and is being conducted jointly with the United States Department of Agriculture and other experiment stations in the sweet potato belt, for the purpose of finding the most desirable varieties for table use, the manufacture of starch, and for dehydration. In the work previously done with varieties, Porto Rico was considered the best potato for home consumption and for shipping to distant markets.

Sweet Potato—Sources of Phosphoric Acid: Data resulting from a 7-year study of sources of phosphoric acid show a difference in yield of only 10 bushels of No. 1 potatoes per acre between the highest and lowest producing carriers. Since yields from these sources do not vary widely, the cost of the phosphate carrier becomes an important factor in selecting the source to be used in sweet potato fertilizer. The amount of each carrier used in this test is shown in Table 46. The nitrogen and potash in all instances are derived from the same sources so that the phosphate carrier is the only plant nutrient variable in the test. Some of the phosphate sources are low in phosphoric acid, consequently it is necessary to compute the plant food requirements on the basis of pounds per acre rather than on a ton basis.

TABLE 46

SWEET POTATO—SOURCES OF PHOSPHORIC ACID

Average Yield for Years 1935 to 1941, 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**
Days Required to Mature: 192

SOURCE OF PHOSPHATE	Amt. Used Per Acre	Phosphoric Acid Content*	YIELD IN BUSHELS PER ACRE					
			No. 1's	No. 2's	Strings	Jumbos	Rot	Total
	(Lbs.)	(%)						
Ammoniated Superphosphate	427	15	171.93	33.55	24.90	16.19	.77	247.34
Soft Phosphate**	1066	6	170.94	23.52	24.59	5.96	.46	225.47
Triple Superphosphate	137	46.8	167.78	25.13	26.74	14.13	.98	234.76
Basic Slag	800	8	165.55	24.88	23.22	16.06	.55	230.26
Superphosphate	400	16	161.40	30.34	23.24	15.37	.86	231.21
Dicalcium Phosphate	160	40	161.16	34.34	25.55	16.48	.19	237.72

*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.

Sweet Potato—Sources of Nitrogen: Organic sources of nitrogen such as cottonseed meal, peanut meal, and tankage are producing higher yields of No. 1 potatoes than the mineral sources such as nitrate of soda and sulphate of ammonia. This may be attributed to the fact that the organic carriers supply nitrogen more continuously throughout the long growing season of this crop than do the mineral carriers. However, work with ratios of the organic and mineral sources indicate that no sacrifice in yield results from a combination of the two, while the cost of the nitrogen in the fertilizer may be reduced. All sources are applied in a complete fertilizer before planting. Yields are contained in Table 47. Peanut meal has been included in the test only two years but during that time has shown about the same yield response as cottonseed meal.

TABLE 47

SWEET POTATO—SOURCES OF NITROGEN

Average Yield for Years 1933 to 1941, 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 18**

SOURCE OF NITROGEN	YIELD IN BUSHELS PER ACRE						Days Required to Mature
	No. 1's	No. 2's	Strings	Jumbos	Rot	Total	
Cottonseed Meal	160.49	25.64	24.54	4.30	.40	215.37	187
Tankage	160.17	24.97	24.53	4.88	.50	215.05	187
Nitrate of Soda	151.19	31.00	22.72	6.56	.95	212.42	187
Sulphate of Ammonia	151.12	25.88	19.87	7.43	.45	204.75	187
Calnitro	148.93	25.28	20.34	8.23	.26	203.04	187
Calcium Nitrate*	142.66	23.65	24.45	4.67	.34	195.77	193
Cyanamid	136.85	26.39	21.90	3.29	.25	188.68	187

*Seven-year average (1933 to 1939 inclusive)

Sweet Potato—Sources of Potash: There is a difference in yield of No. 1 potatoes of about 0.4 bushels per acre between the highest and lowest producing carriers shown in Table 48, while in quality there are no apparent differences in the potatoes resulting from the use of these materials. It therefore appears that muriate is the most desirable source from which to obtain potash in sweet potato fertilizer. Yields from the various carriers used in this test are shown in the accompanying table. All of the potash was applied in a complete fertilizer before planting.

TABLE 48

SWEET POTATO—SOURCES OF POTASH

Average Yields over an Eleven-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**

SOURCE OF POTASH	YIELD IN BUSHELS PER ACRE						Days Required to Mature
	No. 1's	No. 2's	Strings	Jumbos	Rot	Total	
Kainit	163.33	28.69	22.04	13.40	.43	227.89	183
Muriate of Potash	163.17	25.88	23.74	6.14	.58	219.51	183
Manure Salts*	155.52	32.26	23.48	9.71	.91	221.88	183
Sulphate of Potash	152.93	25.48	22.69	4.20	.26	205.56	183
Sulphate of Potash Magnesia	149.11	23.64	22.51	3.59	.33	199.18	183

*Ten-year average.

Sweet Potato—Top Dressing Test With Nitrogen: Yields resulting from a nitrogen top dressing test with sweet potatoes indicate that the returns, after taking into consideration the added cost of the material and labor involved, are too insignificant to warrant the recommendation of this practice. The fertilizer applied before planting consisted of 800 pounds of a 4-8-6 per acre. Resulting data are shown in Table 49.

TABLE 49

SWEET POTATO—TOP DRESSING TEST WITH NITROGEN

Average Yield for Years 1936 to 1941, 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 7**

TOP DRESSING*	YIELD IN BUSHELS PER ACRE						Days Required to Mature
	No. 1's	No. 2's	Strings	Jumbos	Rot	Total	
Check (no top dressing)	196.39	19.06	21.52	7.05	.71	244.73	206
100 Lbs. Nitrate of Soda	192.10	20.88	22.64	20.16	.79	256.57	206
200 Lbs. Nitrate of Soda	202.26	19.94	21.76	21.28	.94	266.18	206
100 Lbs. Nitrate of Soda and 50 Lbs. Muriate of Potash	198.91	20.56	22.86	29.16	.73	272.22	206

*Top dressing applied at first cultivation.

Sweet Potato—Top Dressing Test With Potash: In this test 800 pounds per acre of a 4-8-6 fertilizer is applied before planting and top dressings of varying amounts of potash are made at the first or second cultivation. Yield responses from the various treatments indicate that profitable returns may be expected from 100 pounds of muriate per acre. These data indicate that on the average soils of the Coastal Plain the total potash in sweet potato fertilizer could be economically increased to 12 per cent or to about 100 pounds of actual potassium per acre.