HORTICULTURE

SWEET POTATOES

The work in progress with sweet potatoes consists of:

1. Variety and Seedling Tests
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 Nutrients
9. Seed-Piece Method of Planting
10. Production of Seed Potatoes for Seed-Piece Planting
11. Effect of Ridge Heights, Nitrogen, and Dates of Harvesting on Yield.

Sweet Potato—Variety Test: This test, which formerly included 49 varieties, is being divided into two groups of 25 varieties each, the first to include those having desirable characteristics for table use and the second, those better suited for starch production. A seedling test also is in progress through which new varieties are being introduced. This work is being conducted jointly with the Office of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, United States Department of Agriculture.

Sweet Potato—Sources of Phosphoric Acid: There is only a slight difference in yields obtained from the various sources of phosphoric acid. Therefore, it appears that the cost of the material and the convenience of handling should be the determining factors in selecting the carrier to be used in a mixed goods for this crop. The amount of each carrier used in this test, together with corresponding yields, are shown in Table 35. The nitrogen and potash used in preparing the different combinations were the same in all instances so that the phosphate carrier was the only plant nutrient variable. In some phosphate carriers, the phosphoric acid content is so low 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: The comparatively high yields obtained from mineral sources of nitrogen during the relatively dry growing season of 1943 have reduced the difference in yield of No. 1 potatoes between these sources and the more generally used organic carriers to the extent that there is now no significant yield differences. Particularly is this true when nitrogen is derived from a single source and considered on a cost basis. (Note yield records in Table 36.) There are, however, indications, as shown in Table 40, that a combination of the two sources is preferable. The best mineral carriers seem to be nitrate of soda and sulphate of ammonia while the best organics are peanut meal, cottonseed meal, and tankage.

Sweet Potato—Sources of Potash: Of the sources of potash now commercially available, muriate seems to be the most desirable carrier for this crop.

Sweet Potato—Top Dressing Test with Nitrogen: Data resulting from this work indicate that the yield increase obtained from nitrogen used as a top dresser is largely in the form of jumbo or large potatoes. Under the con-

ditions of this test, the addition of nitrogen in this manner does not seem to be desirable in the production of table stock but may have a place in bulk production. The top dressings supplemented a preplanting application of 800 pounds of 4-8-6 fertilizer per acre.

Sweet Potato—Top Dressing Test with Potash: Yield responses from the various rates of top dressings used here indicate that 50 pounds of muriate is the most economical amount of potash that can be used in supplementing the 800 pounds of 4-8-6 fertilizer that was applied before planting.

Sweet Potato—Ratios of Mineral and Organic Nitrogen: In this test, slightly higher yields result from the use of a combination of mineral and organic carriers than from either source used singly.

Sweet Potato—Controlled Plant Nutrient Study: Of the secondary plant food elements—calcium, magnesium, sulphur, and chlorine—only sulphur has caused a decrease in yield, when omitted from the complete formula[1] used in this test. Neither calcium nor magnesium, when omitted, made any appreciable difference in yield. Chlorine, however, when omitted, gave an increase which indicates that under the conditions of this test its presence is objectionable.

Sweet Potato—Seed-Piece Method of Planting: The seed-piece method of planting consists of planting pieces of potatoes directly to the field rather than using draws or vines as is the customary practice. The value of this method seems to be two fold: First, it reduces labor cost in the planting operation, and second, it makes earlier planting of the entire crop possible, thereby giving a longer growing period and a resulting increase in production. The present indications are that the tip and stem ends of small potatoes are the most desirable seed-pieces and that the weight should not exceed one-half ounce each. The size of the seed-piece directly influences the resulting crop. A large portion of the crop produced from small pieces consists of strings and small and medium size potatoes while large pieces have the opposite effect and produce an excessive amount of oversize (mother) potatoes.

Data and observation thus far indicate that this method is not suitable for growing potatoes for table use. It does, however, seem well adapted where potatoes are to be hogged-off and appears to have possibilities where bulk production is desired.

Sweet Potato—Production of Seed Potatoes for Seed-Piece Planting: This consists of planting vine cuttings about the middle of July. They should be planted on new land or on land that is thought to be free of sweet potato diseases. Plants should be spaced 4 inches in the drill and should receive only about 400 pounds of fertilizer per acre. Plant on ridge of medium height and harvest before frost. For two reasons it seems advisable to use the above cultural practices in growing seed-pieces for this method of planting: First, the resulting crop consists almost entirely of strings and small potatoes, which is the best source of seed-pieces, and second, by using seed stock grown from vines, there is a possibility of holding diseases in check.

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[1]The complete formula referred to above contains: 32 pounds of nitrogen, 64 pounds of phosphoric acid, 48 pounds of potash, 60 pounds of calcium, 20 pounds of magnesium, 48 pounds of sulphur, and 20 pounds of chlorine per acre.

TABLE 35.

SWEET POTATO—SOURCES OF PHOSPHORIC ACID

Average Yield for Years 1935 to 1943, 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*					
			No. 1's	*No. 2's*	*Strings*	*Jumbos*	*Rot*	*Total*
Soft phosphate**	1066	6	184.80	32.01	24.66	7.73	1.46	250.66
Ammoniated superphosphate	427	15	182.86	38.33	24.64	17.06	2.26	265.15
Triple superphosphate	137	46.8	179.64	32.39	27.00	14.54	1.14	254.71
Basic slag	800	8	176.55	31.67	24.64	18.05	.92	251.83
Superphosphate	400	16	176.31	36.11	23.39	14.63	1.65	252.09
Dicalcium phosphate	160	40	170.92	38.20	25.75	17.27	1.65	253.79

* 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 36.

SWEET POTATO—SOURCES OF NITROGEN

Average Yield for Years 1933 to 1943, 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: 195

Source of Nitrogen	*Yield in bushels per acre*					
	No. 1's	*No. 2's*	*Strings*	*Jumbos*	*Rot*	*Total*
Cottonseed meal	155.84	29.97	25.87	4.06	.32	216.06
Tankage	154.27	30.91	26.44	4.82	.41	216.85
Sulphate of ammonia	149.45	30.86	21.42	4.23	.37	206.33
Nitrate of soda	151.33	36.32	24.43	6.11	.78	218.97
Calnitro	144.26	28.24	21.61	7.64	.21	201.96
Cyanamid	132.61	30.07	23.65	3.26	.21	189.80

TABLE 37.

SWEET POTATO—SOURCES OF POTASH

Average Yields over a Thirteen-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 14**
Average Number of Growing Days: 183

Source of Potash	*Yield in bushels per acre*					
	No. 1's	*No. 2's*	*Strings*	*Jumbos*	*Rot*	*Total*
Kainit	165.25	33.57	26.26	12.16	.....	237.24
Muriate of potash	160.77	30.34	26.91	5.94	.....	223.96
Manure salts*	155.52	32.26	23.48	9.71	.91	221.88
Sulphate of potash	150.64	30.46	25.01	4.84	.....	210.95
Sulphate of potash magnesia	148.48	29.01	24.90	3.50	.....	205.89

* Eleven-year average.

TABLE 38.

SWEET POTATO—TOP DRESSING TEST WITH NITROGEN

Average Yield for Years 1936 to 1943, 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 15**
Average Number of Growing Days: 197

*Top Dressing**	*Yield in bushels per acre*					
	No. 1's	*No. 2's*	*Strings*	*Jumbos*	*Rot*	*Total*
Check (no top dressing)	180.93	26.44	23.30	5.36	.57	236.60
100 Lbs. Nitrate of soda	181.05	27.71	22.97	15.18	1.60	248.51
200 Lbs. Nitrate of soda	190.42	27.64	21.76	16.06	2.45	258.33
100 Lbs. Nitrate of soda and 50 Lbs. Muriate of potash	197.54	26.25	20.56	22.95	2.92	270.22

* Top dressing applied at first cultivation.