MARYLAND COOPERATIVE EXTENSION
UNIVERSITY OF MARYLAND
COLLEGE PARK•EASTERN SHORE

Fact Sheet

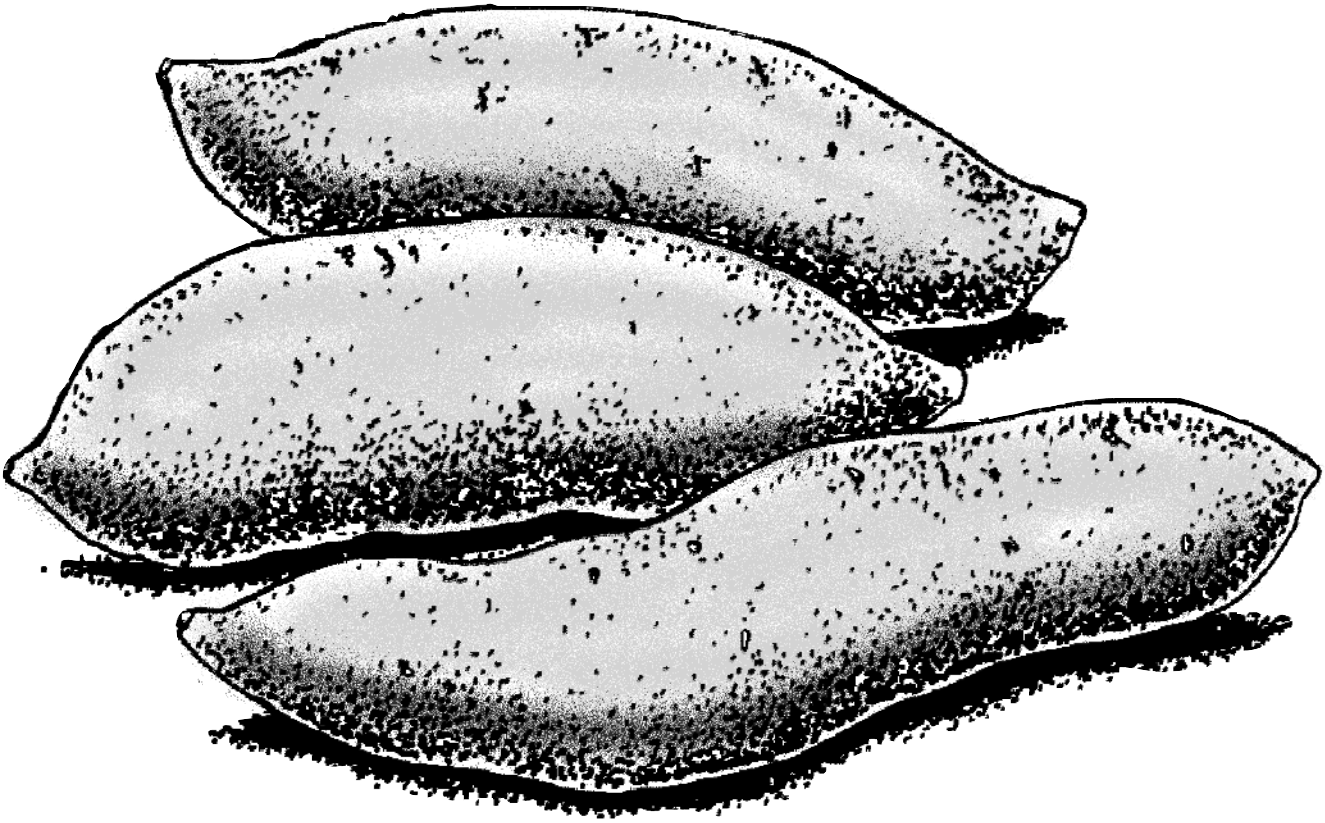
Fact Sheet 464

Growing Sweet Potatoes

Sweet potatoes *(Ipomoea batatas)* are grown in the South and mid-United States and other parts of the world. Believed to have originated in South or Central America, they were transported widely by early New World explorers and probably arrived in the mid-Atlantic region about 1600. Technically, the crop grown in the United States is a sweet potato and not a yam; they are totally different plants. The sweet potato is a dicot in the morning glory family and is actually a perennial grown as an annual. True yams have a similar shape, but they have a drier texture, starchier taste, and much less nutritional value. The term yam is commonly but incorrectly used in the southern U.S. for soft, moist types of sweet potatoes with high sugar content. Other types have firm, dry, mealy flesh when cooked.

Once a staple in the diet of many Americans, the per capita consumption of sweet potatoes has fallen dramatically from 13.9 pounds in 1949 to 4.3 pounds in 1992. This decline is attributed to the availability of less expensive similar foods, a decrease in rural population, and changes in consumer food preferences and eating habits.

The smooth-skinned, blocky-shaped sweet potato offers very good nutrition. It is an excellent source of beta-carotene (about 16 milligrams [mg]). A medium sweet potato (5 inches long and 2 inches in diameter, about 4.6 ounces) provides the following nutrition: 130 calories, 0 fat, 17 mg sodium, 350 mg



potassium (10%), 28 grams of total carbohydrate (10%), 3.4 grams of dietary fiber (14%), 26 micrograms folate (6.5%), 2 grams of protein, over 500% of vitamin A (for both men and women), 47% of vitamin C, 4% calcium, and 3.4% iron (based on a 2,000-calorie dietary requirement).

Yields of marketable roots will depend largely on cultivar, soil type, planting date, rainfall, and pest pressure. The average yield for Maryland farms is 16,500 pounds (165 cwt) per acre.

Cultivars

Although many cultivars are available, only a few are accepted in the commercial markets, since uniform shape, size, and color are desired. In addition to these characteristics, growers want cultivars to yield well, produce transplants easily, show insect- and disease-resistance, store well, and have a skin that will not damage easily during harvest. Currently 'Beauregard' and 'Hernandez' are the most widely planted in Maryland. Other cultivars include 'Jewel', 'Centennial', 'Goldstar', and 'White Hayman'. These cultivars have the following characteristics:

'Beauregard'—the most widely grown cultivar in the mid-Atlantic region; rose skin; orange flesh; resistant to soil pox; slow sprouting; high percentage of nice roots; stores well.

'Hernandez'—burnt orange skin; deep orange flesh; purple stems; resistant to root knot, soil pox, and Fusarium wilt; might have raised spots on skin or black flecks from wet soil; late, sporadic sprouting; poor taste; very uniform shape.

'Jewel'—copper skin; deep orange flesh; resistant to root knot nematode; mutates readily; may crack with variable soil moisture; stores well; attractive shape; high percentage of nice roots.

'Centennial'—light copper skin; deep orange flesh; large leaves, and vines that cover the ground quickly; mutates for skin and flesh color; poor sprout potential; good tolerance to Fusarium wilt, internal cork, and wireworms; roots are often long and slender.

'Goldstar'—copper skin; deep orange flesh; root knot and Fusarium resistance; sizing can be a problem if roots are set late in the season; early, prolific sprouting; stores well; good baking quality.

'White Hayman'—one of several older cultivars; produced for local sale; certified seed probably not available; probably susceptible to nematodes, diseases, and insects.

Field Preparation

Good quality sweet potatoes can be produced on many different soil types, but the well-drained, moderately deep, fine sandy loam and sandy loam soils are the most desirable. Sweet potatoes grown on heavier soils might crack from excessive moisture or have more soil on them if harvested during wet weather.

Crop rotation is an important tool in controlling pests. A minimum of two years between sweet potato crops is recommended. Sweet potatoes can follow most agronomic or other vegetable crops especially when weed, soil insect, and disease pests are not serious. Do not plant sweet potatoes immediately after legumes or sod. The nitrogen from legumes can cause excessive vine growth and poor root size. Insect pressure might be excessive after sod. Use of a cover crop before and after the crop is recommended. Sample soils annually for nematodes. Plow at least 6 to 7 inches deep when soil is fit and with adequate lead time so that plant residues will decompose.

Soil fertility testing every one to three years is a very important tool in producing quality sweet potatoes. Follow the soil test recommendations. Maintain soil pH in the 5.8 to 6.2 range for maximum yields, unless pox has been a problem in the past. Excessive nitrogen or phosphorus is costly to apply, and excessive applications will not enhance yields. Nitrogen applications are usually about 50 to 75 pounds per acre. The usual recommendation is to broadcast and disk in about one third of the nitrogen and all of the phosphorus and potassium before transplanting. Apply the remaining nitrogen as a sidedress when the vines start to run.

Transplant Production

Maryland Cooperative Extension educators recommend that inexperienced growers purchase transplants from a supplier or

another grower who produces quality, disease-free plants. Sweet potatoes are propagated vegetatively by either producing transplants from roots or by planting vine cuttings. With either method it is important that the grower have a "seed program" to examine "seed" roots and only use roots that are true to cultivar type: well-shaped, free of diseases such as rots or scurf, and free of insects and root mutations. Roots for propagation should be selected from hills that have all of these characteristics plus high root yields.

Producing transplants from roots is the primary method of propagation in the mid-Atlantic region. Using certified seed is recommended. Suppliers can be found advertising in trade publications, exhibiting at trade shows, and through your local Extension office. The amount of seed stock needed to produce plants for one acre of production depends upon the variety, root size, conditions of the bed, whether roots are presprouted, the conditions at the time of harvesting of seed roots, and the proper curing and storing of the seed stock. The cultivars 'Beauregard', 'Jewel', and 'Centennial' are not strong transplant producers, and they might benefit from presprouting treatment for seed roots to help produce the maximum number of transplants. To presprout, hold roots at 75 to 85°F, 90 percent relative humidity, and adequate ventilation for three to four weeks. Bed the roots when the sprouts are 1 to 1½ inches long and the roots are about ¼ inch long.

The number of transplants needed to plant an acre depends upon the spacing between rows and the spacing of the plants within the row. Table 1 gives the amount of seed stock of a good transplant-producing variety needed to produce transplants for one acre.

The location of the plant bed is one of the most important factors in producing quality plants and sweet potatoes. Select a site that 1) has sandy to sandy loam soil that is well-drained, 2) has not had sweet potatoes grown there for a minimum of three years, and 3) has clean water readily available for irrigation. Allow 20 to 30 square feet per bushel for seed stock that is 1 to 2 inches in diameter and 12 square feet per bushel for 2- to 3-inch diameter roots. A 28- to 48-inch wide bed is commonly used to allow access to manage the bed and harvest transplants. Workers tend to damage fewer transplants and mother roots with narrower beds. Use of a registered herbicide and nematicide will help control the most prevalent pests.

Table 1. Bushels of presprouted seed stock needed to plant one acre at several given row spacings.

Row Width (inches)	Plant spacing (inches)	Plants needed	Bushels of seed stock needed	
			1-2 in. dia.	2-3 in. dia.
36	9	19,360	19.4	32.4
	12	14,600	14.6	24.3
40	9	17,424	17.5	29.3
	12	13,100	13.1	21.8
44	9	15,840	15.9	26.6
	12	11,900	11.9	19.8

Bed seed stocks in early April. To prevent weak plants, allow adequate space around the seed roots. Roots that are 1 to 2 inches in diameter should have 1 inch or more between them, and larger seed roots should be spaced so that roots do not touch. Cover bedded area with 1 to 3 inches of clean sand. Fertilize bed area with 5 ounces per square yard (9 square feet) of 10-10-10 fertilizer. Excessive fertilizer could cause tender, brittle plants. Next, cover the bed with a floating row cover or clear plastic. Remember, bedded seed roots are alive and require adequate ventilation to allow for exchange of oxygen and carbon dioxide. Clear plastic should be ventilated within four to five days of covering by punching ½-inch holes at 4-inch spacings. This is critical if bright sunshine occurs after bedding. Increase the size or number of holes in the plastic as needed to prevent overheating of the transplant bed.

Manage the bed by keeping it moist (not wet) and at a temperature between 75 and 85°F. Monitor the beds daily to determine the need to irrigate, cover, or treat for insect pests. Remove the cover during warm days when the plants begin to emerge throughout the bed and cover at night to prevent cold damage. Cold-injured plants usually produce lower yields with more poorly shaped roots. Transplants are ready when they are 8 to 12 inches long and have eight or more leaves. It is recommended that sprouts be cut at the soil line to help prevent the spread of disease that might occur when plants are pulled. Try to avoid contact between the cut transplants and the bedding soil. Do not use the bedded seed

stock for any other purpose; destroy the beds to minimize the spread of disease.

Field Planting

Begin planting one to two weeks after the frost-free date or when soil temperatures are at least 65°F. Using a transplanter on preformed ridges 8 to 10 inches high, plant as soon as possible after removal of transplants from the bed. The transplanter should apply 1½ to 2 ounces of water per plant. Do not dip plants in water. An 8-inch transplant should be planted at least 3 inches deep to ensure best plant survival and yield.

Sweet potatoes grow best when temperatures are between 70 and 85°F. They are sensitive to air pollutants such as sulfur dioxide. Marketable roots can form even during moderate drought because they have a rooting depth of 48 inches or more. The crop will be ready to harvest ninety to 150 days after transplanting (depending on variety, about 120 days for 'Jewel').

Cultivate the crop several times to ensure adequate weed control in the row middles. It is important to disturb the runners before they establish roots at the nodes. When rooting occurs, yields are reduced.

Pest Management

Refer to the most current version of EB 236, "Commercial Vegetable Production Recommendations" for specific pest management strategies. (See References.) Always read pesticide labels and use pest control products as labeled. Maryland Cooperative Extension educators recommend that growers scout their fields periodically to determine the levels of insect and disease damage so that appropriate controls can be applied when pest thresholds are exceeded.

Diseases can be minimized by using resistant cultivars, maintaining soil pH at 5.5 if pox is a problem, using clean sand or sterilized soil in the transplant bed, and rotating fields. Post-harvest diseases can be minimized by avoiding injury during harvest, followed by immediate curing and proper storage.

Damage from insect pests is mostly from root-damaging wireworms, flea beetle larvae, cutworm larvae, cucumber beetle larvae, and white grubs. A soil insecticide applied before transplanting can help control these pests. Application of a foliar insecticide during the growing season can help control the adult beetles. Monitor adult beetles by using yellow beetle traps to determine activity levels.

Weed control options are limited to cultivation and a small number of herbicides. Also, the competition offered by vigorous vine growth that covers the soil surface quickly will help reduce weed pressure.

Harvesting, Storing, and Marketing

Sweet potatoes are harvested when the roots reach a marketable size. The crop does not show any ripening or maturity indications on aboveground parts, so check frequently to monitor root development. A potato plow or mechanical harvester is commonly used to lift the roots or move them to the soil surface where they can be picked up by hand and placed into baskets, boxes, or bins for removal from the field. Using care during harvesting and grading can greatly reduce storage diseases by minimizing injury to the tender outer skin. Do not allow roots to hit the bottom of the harvest containers; place the first ones gently into the container. Do not allow harvested roots to be exposed to frost or freezing temperatures.

Sweet potatoes can be sold ungraded, or grading can be done in the field or at a washing/grading area. Roots are usually graded as Jumbo's, No.1's, No. 2's, and culls. No. 1 sweet potato roots are between 1¾ and 3½ inches in diameter, between 3 and 9 inches in length, fairly well-shaped, and fairly clean. No. 2 roots should be at least 1½ inches long, not dirty, and can be of any shape.

Freshly harvested roots are sometimes sold as "green" sweet potatoes; however, these will not keep for very long. Sweet potatoes can be stored in baskets or bulk bins for long periods if they are cured and stored properly. Curing and storing should be done in a room or building that provides proper and controlled temperature, humidity, and ventilation throughout the fall and winter months. Curing should be done immediately after harvest at 80 to 85°F with a relative

humidity of 90 percent for four to eight days. During the curing process the skin develops a waxy-like layer that helps prevent loss of moisture and invasion of disease organisms. Cured roots can be washed, graded, and packed anytime after curing. Store the cured roots at a temperature of 55°F and a humidity of 85 percent, if possible. Never expose sweet potatoes to temperatures under 55°F to avoid chilling injury.

The peak market is usually during November and December. However, sweet potatoes can be marketed throughout the year with proper curing and storage. For consumer sales, select a container size appropriate to your clientele's needs. Small quantities of sweet potatoes are often sold by weight.

Growers who are producing vegetables for farmers' markets and roadside stands may find that sweet potatoes fit well in their production and marketing programs. Unlike some other vegetables, sweet potatoes can be stored, which offers the possibility of marketing after the traditional season has ended.

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Sweet potato budget to produce one acre.

Description	Unit	Quantity	Cost/Price Per unit	Per Acre	Your Figures
Gross Income					
#1 Sweet potato	50 lb box	350	6.00	2,100.00	
Expenses					
Variable Costs					
Cover crop	bu	2	9.00	18.00	
Plants	1,000 plts	15	20.00	300.00	
Fertilizer					
Nitrogen	lb	70	.25	17.50	
Phosphate	lb	0	.24	0	
Potassium	lb	100	.14	14.00	
Lime	ton	.5	30.00	15.00	
Pest control Mocap 6EC/Devrinol/Poast	acre	1	105.00	105.00	
Crop supplies					
Field baskets	bskt	350	1.7/bskt	595.00	
Mkt. boxes	box	350	1.00/box	350.00	
Curing	acre	1	20.00	20.00	
Irrigation	—	—	—	—	
Hauling	acre	1	40.00	40.00	
Labor					
Planting	hr	20	7.00	140.00	
Harvest	hr	70	7.00	490.00	
Subtotal—Variable Costs				2,104.50	
Interest on Variable Costs ($2,104.50 @ 10% for 6 months)				105.23	
Total Variable Cost plus Interest				**2,209.73 ***	
Cost per box (350 boxes @ 50 lb)				**6.31**	

Income Analysis

Quantity	price/box 6.00	8.00	10.00	Net Income over Variable Costs 6.00	8.00	10.00
300	1,800	2,400	3,000	(410)	190	790
350	2,100	2,800	3,500	(110)	590	1,290
400	2,400	3,200	4,000	190	990	1,790

* This cost figure does not include land rental, taxes, insurance, machinery costs, storage, or marketing costs.

Mention of trade names does not constitute endorsement by University of Maryland Cooperative Extension.

Growing Sweet Potatoes

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