VEGETABLE RESEARCH AND INFORMATION CENTER

Vegetable Production Series

SWEET POTATO PRODUCTION IN CALIFORNIA

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PRODUCTION AREAS AND SEASONS

California has three main production areas for sweet potatoes (*Ipomoea batatas*): Merced, Fresno, and Stanislaus Counties. Merced County accounts for nearly 80 percent of the California production. However, sweet potatoes can be grown nearly anywhere in the agricultural production areas of California.

Hot beds for producing transplants are begun from the last week of February through March. Transplanting starts in the last week of April and continues until late May. Although harvests can start as early as mid-July, crop yields from early harvests are low. Less than 10 percent of the acreage is harvested by the last week of September, when harvest for storage begins. Harvest is usually completed by the first week of November.

SWEET POTATO ACREAGE AND VALUE

Year	Acreage	Average yield (*tons/acre*)	Gross value / acre
1996	9,600	11.25	$4,860
1995	9,600	10.00	$6,600
1994	8,200	10.25	$5,884

Source: California Agricultural Resource Directory 1997 (Sacramento: Calif. Dept. of Food and Agriculture, 1998).

CLIMATE

Sweet potato is a warm-season crop that produces best in temperatures from 85° to 95°F (29.7° to 35.3°C). Temperatures over 100°F (37.9°C) are not harmful, but growth is slowed (sweet potatoes grow year-round in the tropics). Because they are very sensitive to even a light frost, sweet potatoes are planted after any chance of frost has passed. Sweet potatoes must be harvested before any heavy frosts occur in the late fall because the roots that extend out of the ground are easily damaged by frost.

VARIETIES, PLANTING TECHNIQUES, AND SOILS

Three types of sweet potatoes are grown: red- or rose-skinned, orange-fleshed, and tan- or white-fleshed. Most packers have a supply of all three types. Garnet (red-skinned) is marketed mainly in California, where red-skinned potatoes are preferred and usually demand a higher price. Many growers prefer Beauregard (rose-skinned) because it yields and packs out significantly more tons per acre than Garnet. Beauregard is marketed in most areas of the country and is slowly replacing Garnet. Orange-fleshed sweet potatoes, also called "yams," have a moist texture after being cooked. The tan- or white-fleshed sweet potatoes, usually the dry-fleshed Jersey types, are commonly called "Sweets." Hanna and Golden Sweets are the major sweets varieties, and they have a darker flesh when cooked. Sweets usually constitute less than 15 percent of the total production in California.

Sweet potatoes are transplanted from plant propagules called slips. Medium-sized potatoes are started in a hot bed that can be heated by decomposing buried cotton gin trash, or they can be started in cold beds without heat. Plastic tunnels are used to cover both types of beds. It takes approximately 400 to 500 pounds (182 to 227 kg) of medium-sized potatoes to furnish slips for 1 acre (0.4 ha) of crop, depending upon the variety. Slips are planted 9 to 12 inches (23 to 30.5 cm) apart on beds that are 38 to 44 inches (96.5 to 112 cm) wide and 300 to 600 feet (91.4 to 182.9 m) long.

Soils selected for sweet potato production are generally sandy to loamy sand in texture; yield and root quality are poorer in heavy soils.

IRRIGATION

Most sweet potato fields are furrow-irrigated for the season, but some drip irrigation is being used. Slips are watered when they are transplanted, and the field is usually irrigated shortly after transplanting. Irrigation frequency may be weekly or more often after plants are fully established. Irrigation usually lasts from 2 to 4 hours. After the furrow is filled up, the water is shut off to prevent the soil from being oversaturated. Irrigation is discontinued 2 to 4 weeks prior to harvest to toughen the potato skin and minimize harvest loss.

FERTILIZATION

Phosphorus (P), potassium (K), and zinc (Zn) fertilizers should be added preplant or after transplanting if need-

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ed, as determined by soil tests. Some growers apply fertilizers in the transplant water. Most of the nitrogen (N) required by the crop is applied after transplanting; rates of 100 to 150 pounds per acre (112 to 168 kg/ha) of N are required. If P is needed, 80 to 120 pounds per acre (90 to 134 kg/ha) of P is applied; if K is needed, 100 to 120 pounds per acre (112 to 134 kg/ha) is applied. Occasionally, water-run applications of N are used. This must be done with care during the late season because too much N can cause excessive growth and splitting of the potatoes. Fertilizer should be placed 9 to 10 inches (23 to 25.5 cm) on each side of the plant row and approximately 1 to 2 inches (2.5 to 5 cm) below the bottom of the furrow.

INTEGRATED PEST MANAGEMENT

Weed management. Preplant herbicides are not commonly used for sweet potato. Weed control is by cultivation and hand-weeding. Grasses, the most difficult weeds to manage, can be controlled with registered herbicides. Consult your farm advisor or pest control adviser for details and follow pesticide label directions.

Disease identification and management. Because sweet potato transplants are vegetatively propagated, they are susceptible to the transfer of many soilborne diseases, including soil rot (pox, *Streptomyces ipomoea*), black rot (*Ceratocystis fimbriata*), and scruff (*Monilochaetes infuscans*). These diseases can be best controlled by using disease-free seed (roots) or cutting transplants above ground. Once the soil is infested with black rot, rotation to crops other than sweet potatoes for 3 years can be effective. Soil pox must be controlled by registered chemicals or by the use of resistant varieties.

Insect and pest management. Wireworms (*Limonius* spp.) must be controlled if the problem arises. Armyworms (*Spodoptera* spp.) can occasionally be a problem. The morning glory leafminer (*Bedellia somnulentella*) is a problem if the plants are infested when small and before storage roots have formed.

Other pests. Root knot nematode (*Meloidogyne* spp.) must be controlled if present in soils to be planted with sweet potatoes. Soil fumigation may be used for control. Some varieties, such as Beauregard, are more susceptible than others.

HARVESTING AND HANDLING

Sweet potatoes, which bruise easily, are harvested by hand with mechanical aids. Vines are mechanically removed. Large tractor-drawn platforms that have a digger chain running in the center are commonly used to lift the sweet potatoes out of the ground. The sweet potatoes are then carefully removed from the chain by hand and placed either in wooden boxes holding 40 to 50 pounds (18 to 23 kg) or in a bin that measures 4 feet by 4 feet (1.2 m by 1.2 m) and holds 1,000 pounds (454 kg).

POSTHARVEST HANDLING

Because at least 90 percent of the crop must be stored before packing, sweet potato postharvest handling requires a large investment in specialized equipment, boxes, and storage facilities. After harvesting, sweet potatoes are transferred to storage where they should be rapidly cured at 85°F (29.4°C) for 4 to 7 days at a relative humidity of 85 to 90 percent. Curing allows cuts and scrapes that occurred during harvest to heal, thus preventing the entrance of decay organisms. After curing, the potatoes must be stored at a temperature of 55° to 60°F (12.8° to 15.6°C) for long-term storage at a relative humidity of 85 to 90 percent.

At packing time, sweet potatoes are dumped into a water tank to be washed, then dried while traveling through a heated tunnel. They are graded into three sizes. U.S. No. 1 is a uniform size, 3.5 inches (9 cm) maximum diameter, 1.75 inches (4.4 cm) minimum diameter, and no less than 3 inches (7.5 cm) or greater than 9 inches (23 cm) long; they may weigh no more than 20 ounces (567 g). U.S. No. 2 ("mediums") may be misshapen, with a minimum diameter of 1.5 inches (4 cm). Jumbos weigh more than 20 ounces (567 g) and are true to type. U.S. No. 1's command the highest price, followed by Jumbos and then U.S 2's. Other grades such as "rounds" and "longs" may be packed by the shipper.

The graded product is then hand-placed in 40-pound (18-kg) fiberboard cartons for marketing. Sweet potatoes are sensitive to ethylene and should not be shipped or stored with ripening fruits and melons that produce ethylene. They are also sensitive to chilling injury and should not be stored below 54°F (12.2°C). Storage at freezing temperatures will severely injure sweet potatoes; the damage usually does not show until the product is returned to a warmer temperature.

MARKETING

Most California-grown sweet potatoes are marketed on the West Coast, Texas, and Canada. Shipments to other states occur when southeastern states are in short supply. A large portion of U.S. No. 1 sweet potatoes are marketed on major holidays (Thanksgiving, Christmas, New Years, and Easter), although sweet potatoes are available in the market year-round. Sweet potato consumption is higher during the cooler part of the year. Grades other than U.S. No. 1's are cheaper and are often purchased by the knowledgeable consumer of sweet potatoes, since their eating quality is as good as the higher-priced No. 1's.

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