



Environmental Horticulture Notes

EHN 102

GROWING SWEET POTATOES IN THE SACRAMENTO AREA

Sweet potatoes (*Ipomoea batatas*) are botanically unrelated to the Irish potato (part of the Solanaceae family, which includes tomatoes, peppers, eggplant, and the weedy nightshades). Irish, or “white”, potatoes are tubers (essentially just thickened stems), whereas the sweet potato is a true thickened storage root of a trailing vine closely related to morning glory (Convolvulaceae family). Sweet potatoes are native to tropical Central and South America. Because they are from the tropics, they will only produce a good crop in warm areas of California such as the Sacramento Valley. Most varieties are vigorous vines that trail several feet, and all varieties require about 100 days or more from planting to harvest. California is a major producer of sweet potatoes, with about 90% of the California crop being grown in Merced County.

Sweet potatoes are a warm-season, frost-sensitive crop that produces best when daily maximum air temperatures are between 85° and 95°F. Temperatures over 100°F are not harmful so long as the plants are adequately irrigated and temperatures drop to below 80°F at night, although growth may be slow above 100°F. Because they are very sensitive to even a light frost, sweet potatoes are planted in spring after any chance of frost has passed. For the same reason, the crop must be harvested before the onset of heavy frost and cold rains, since the roots may sustain chilling injury if they are subjected to temperatures below 50°F for even a few hours.

Sweet potato varieties, particularly those grown for market use, are classified as “dry-fleshed” or “moist-fleshed” depending on the feel sensation experienced in the mouth when eaten cooked or baked. The dry-fleshed varieties that have cream or tan skin and flesh, and that range in color from white to light tan or yellow, are referred to as sweet potatoes. Included in the dry-fleshed category are Japanese varieties that have purple skin and white flesh.

The moist-fleshed varieties with red or rose color skins and orange flesh are often marketed as yams; however, the true yam is an underground tuber and is in the Dioscorea family of perennial herbaceous vines that includes dozens of varieties, some of which can grow to over three feet long and weigh 30 to 40 pounds. True yams are not even distantly related to sweet potatoes; they originated in West Africa and are seldom grown in the United States except as exotic greenhouse specimens. The word “yam” comes from the African “nyami”. It was first used in Louisiana in the mid-20th century as a way to market local sweet potatoes as being different from the types grown in the northeastern states. All sweet potatoes that are labeled as “yams” in U.S. markets are required by the USDA to also be labeled as “sweet potatoes.”

Some sweet potato varieties have flowers that are similar to ornamental morning glories: funnel-shaped and about the same size and color, with most flowers being light lavender or pink. Not all sweet potato plants flower; it depends upon the variety. Some do not flower at all, some have a few flowers, and some flower profusely.



In much of Asia and West Africa, sweet potato leaves are used as spinach or chard substitutes in soups and stews or stir-fried as a vegetable. The leaves are best prepared when they are young and still tender.

It is common to spell sweet potato as two words, although the National Sweet Potato Collaborators Group and the National Sweet Potato Association in 1989 endorsed spelling sweet potato as a single word. Both spellings are considered correct, and this document spells sweet potato as two words.

VARIETIES

Sacramento County Master Gardeners have had success growing the following sweet potato varieties: 'Covington', 'Diane', 'Japanese', 'O'Henry', and 'Bonita'.

HOW TO GROW

Sweet potatoes need full sun and a long, hot, frost-free growing season. They grow best in light, sandy soils with a pH of 5.5 to 6.5, and they are sensitive to air temperatures below 50°F.

Grow sweet potatoes from certified disease-free slips (rooted cuttings – see illustration at right) from a garden center, mail-order nursery, or reputable grower. Unfortunately, many mail-order catalogs indicate that slips cannot be shipped to California due to quarantine regulations against the sweet potato weevil. As a result, sweet potato slips can be difficult to locate. Following is a list of sources where slips can be purchased. This list is not exhaustive, and no discrimination or endorsement is intended.



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2013, The Taunton
Press, Inc.,
Kitchen Garden
issue #12, January
1998.

SOURCES FOR SWEET POTATO SLIPS

Jim Alvernaz
Merced County sweet potato grower
P. O. Box 255
Livingston, CA 95334
(209) 394-3337 (cell phone)

Darren Greenfield, Manager
Weimar Farm
(Applegate/Grass Valley area)
darrentgreenfield@gmail.com

Sand Hill Preservation Center
1878 230th Street
Calamus, IA 52729
(563) 246-2299
www.sandhillpreservation.com

Victory Seed Company
P. O. Box 192
Molalla, OR 97038-0192
(503) 829-3126 (voice mail only)
www.victoryseeds.com

Sow True Seed
146 Church Street, Asheville, NC 28801
(828) 254-0708
www.sowtrueseed.com

Seeds 'n Such
P. O. Box 1
Graniteville, SC 29829
(803) 663-1501
www.seedsnsuch.com

GROWING YOUR OWN SLIPS

If you cannot obtain slips commercially, you can try starting your own. Purchase sweet potatoes that have been grown organically and that have not been treated with sprout inhibitors. If you grew sweet potatoes the previous year, you can start your own slips from saved roots using the method set out below.

Commercial growers use hotbeds (specialized nursery areas with appropriate heat and irrigation) to produce new plants for the production fields. Since home gardeners rarely have such growing areas, place sweet potatoes about 2 inches deep in a well-drained container filled with sawdust or a mixture of peat moss and soil. Use small or medium size, smooth sweet potatoes that are well shaped and free from disease and insect injury. The container should be kept in a warm place, about 75°F, and the bed should be kept moist. In about 6 to 8 weeks, sprouts about 12 inches long are ready for transplanting (these are the slips). Gently pull (do not cut) the sprouts away from the sweet potato starter root and transplant them (see "Planting" below). Several slips can be grown from each original starter root.

PLANTING

Prepare the soil by incorporating compost and a small amount of nitrogen fertilizer (too much nitrogen produces leafy growth at the expense of roots). Soil needs to be loose and friable with sandy to loamy sand being ideal; yield and root quality are poorer in heavy soils. Heavy, clay soils can result in the

formation of long or misshapen roots and reduced yield; harvesting is also difficult and can result in damage to roots. Thoroughly incorporating well decomposed compost can loosen and aerate clay soils to improve the likelihood for success.

When soil has warmed sufficiently to 65° to 70°F (about mid-May), set slips in raised beds or earthed-up ridges about 12 inches apart along the bed in rows 3 feet apart to allow for ample spreading. A ridge not only dries better in the spring but also warms earlier than an unridged area. Vines can also be grown on trellises (see “Care and Maintenance” below). Use a shovel or trowel to open the soil so slips can be set 6 to 8 inches deep. Insert the slips so that only stem tips and leaves are exposed, leaving at least 4 inches of the slip above the ground if possible. Apply water to each planted hole, then fill in the hole and firm the soil. Because the slips used for planting are often rootless, they are very sensitive to fertilizer burn, so including fertilizers in the transplant water is not recommended.

Slips should be planted as soon as possible after receiving them. If planting will be delayed, place the slips, root end down, in a plastic bag filled with damp wood shavings or shredded newspaper; the tops should be sticking out of the bag. Do not fully enclose the slips in the bag or store them in a jar of water or they will rot. It is fine if the slips do not have roots when they are received; when they are planted, roots will form along the nodes within a few days.

CARE AND MAINTENANCE

The soil should be kept moist, especially during the first 2 to 3 weeks after planting, but take care not to overwater. Frequent irrigation is needed until the vines are established; the plants require less moisture once they are growing vigorously. Drip irrigation, furrow irrigation, or hand watering can all be used to keep the plants well watered. Allow the ground to dry slightly between watering. Insufficient and infrequent watering can cause rough roots, whereas excess water can cause rotting. Wide fluctuations in soil moisture can cause the roots to crack.

A thick mulch helps retain moisture and reduce weeds. As the shoots grow, do not let them root at the joints (nodes). If they root along the shoots, mini-sweet potatoes will form throughout the bed and the sweet potatoes that form at the main plant will be small and yield may be decreased. Check the vines periodically and gently lift the plants to keep them from setting down roots along the vine. Vines can be trained up a trellis, which will eliminate the problem of the vines rooting at the nodes and will take up less ground space.

FERTILIZATION

Sweet potatoes have an extensive root system and make efficient use of soil nutrients. A soil test is the best guide for rates of fertilizer to use. However, in the absence of a soil test, a fertilizer containing moderate amounts of nitrogen (N) and relatively high proportions of phosphorus (P), and potassium (K), such as 5-10-10, can be used at the rate of about 3 pounds per 100 square feet. Many organic fertilizers or blends can also work well, and most provide slower nutrient release rates. For best results, apply half of the fertilizer about 14 days before planting. The second half of the fertilizer can be applied as a side-dressing after plants have begun new growth. Only moderate amounts of nitrogen are required by sweet potatoes. Excessive amounts may encourage excessive vine growth and result in cracked and misshapen roots and poor storage quality.

INSECT PESTS AND DISEASES

Because sweet potato transplants are vegetatively propagated, they are susceptible to the transfer of soil borne diseases, including soil rot (pox *Streptomyces ipomoea*), black rot (*Ceratocystis fimbriata*), and scurf (*Monilochaetes infuscans*). These diseases are best controlled by using disease-free slips and rotating beds to crops other than sweet potatoes. Acidic soil conditions (pH 5.5 to 6.5) help suppress pox.

Possible pests include aphids, flea beetles, and leafhoppers. Row covers will help control all of these. To avoid a buildup of nematodes, wireworms, and disease organisms in the soil, do not grow sweet potatoes in the same location two years in a row. Few chemicals are allowed for use on sweet potatoes grown in California. Fortunately, the crop does not have many pest problems. To control weeds, hand-weeding is

the best solution. If the vines are allowed to ramble, they will likely provide a thick enough cover to keep many weeds from germinating. As stated in "Care and Maintenance" above, a thick mulch can help reduce weeds by preventing weed seeds from germinating.

While sweet potatoes are not covered on the University of California Statewide Integrated Pest Management website (ipm.ucanr.edu), that website is a good reference for general pest control.

HARVESTING

Sweet potatoes are usually ready to harvest from 90 to 140 days after transplanting the slips, depending on the variety grown. Start checking the roots after about 90 days to determine their size; then continue to check periodically. Begin cutting back on water in late summer, typically 2 to 3 weeks before harvest, so that vines begin drying before they are removed and roots are harvested. Too much water late in the season may cause the developing roots to crack. They can be harvested when slightly immature ("baby bakers") if they are the desired size; otherwise, leave them in the ground until the roots are full grown and the vines begin to turn yellow. However, if a frost is about to occur, dig up the roots and store them at once in boxes in a warm, moist place. Ideally they should be harvested while the weather and soil are still warm, even if the vines have not started to turn yellow (at least a month before the first frost).

Vines can first be cut to remove most of the foliage. Use a shovel or spading fork to dig the roots, being careful not to bruise or cut them because damage will encourage rotting in storage. If the ground is dry and hard, especially if the soil is heavy clay, moisten the soil daily for 2 to 3 days so water can percolate deeply; then let the soil dry out for 1 to 2 days to make digging easier. The goal is to have the soil slightly moist, not wet, when digging the roots. Dig about 8 to 10 inches away from the main stem to avoid damaging the roots. Even a small wound can easily become infected with decay organisms. After they have been harvested, let the roots lie in the sun for 2 to 3 hours to dry thoroughly. The skin of freshly harvested sweet potatoes is very thin and easily bruised, so try to avoid brushing off the soil until they are dry. If the roots are especially dirty, they can be submerged in a bucket of water and the dirt/mud gently rubbed off; then let the roots dry thoroughly.

Harvested sweet potatoes range in size from very large (5 to 6 pound sweet potatoes are not unusual) to medium or small and in a variety of shapes. Unlike many other root vegetables, large sweet potatoes do not get very woody. They may, however, exhibit "veining" (see photograph at right). This should not affect the flavor, but you may want to cut out the "veins" as they can be tough.



Photograph by Dan Vierria

CURING

Newly harvested sweet potatoes are not very sweet. They require 1 to 2 months of curing and/or storage before they will develop the sweet, moist taste we expect (part of the starch content turns to sugar). Freshly harvested sweet potatoes can, however, be candied or made into pies. This is a good use for roots that may have been damaged during harvest. Sweet potatoes need to be cured if they are to be stored for long periods. The curing process allows any bruises or blemishes on the thin skin to dry so that rotting in storage is reduced. If the sweet potatoes are not intended for long-term storage, curing is not essential; however, storing freshly-harvested sweet potatoes for several weeks will improve the flavor.

After the roots are harvested and thoroughly dry, put them in a warm, humid place (80° to 90°F at 85% relative humidity, if possible), or carefully lay the roots out in a warm, dry, and well-ventilated area for 1 to 2 weeks to cure and until all skin wounds have healed.

Commercial sweet potato growers have curing rooms with heaters, humidifiers, and evaporative coolers to maintain proper temperatures and humidity. Providing such curing conditions can be rather daunting for home gardeners, so listed below are some suggestions for curing sweet potatoes at home. Several of these suggestions are courtesy of the Santa Clara County Master Gardeners who conducted a sweet potato trial in 2006. Sweet potatoes need to be handled gently, so be careful when placing the roots into containers (avoid throwing or dropping them) so that they will not become bruised, which will keep them from storing well and can trigger them to start decaying.

- Put sweet potato roots in a paper bag with a wet paper towel, close the bag, and cure them in a hot attic for 2 weeks. Then store them in a cool room at 60°F until ready to use.
- Place sweet potatoes in a large plastic container with damp towels, keeping the damp towels from touching the sweet potatoes. Place the container in a sunny location for 10 to 14 days, rewetting the towels if they become dry.
- Cure the roots in a warm, humid place (about 80°F) for 10 to 14 days. Then wrap each root in newspaper and store at 55° to 60°F, taking care not to injure the roots.
- Place roots in a single layer in a container on the floor of a greenhouse where the temperature ranges from 80° to 90°F during the day and no lower than 50°F at night. Let them cure for 10 to 14 days.
- Lay roots in a container placed near a furnace vent for warmth. If the temperature near the furnace vent is between 65° and 75°F, the curing period should last 2 to 3 weeks. To maintain high humidity, cover the container with paper or heavy cloth. The roots can also be packed in perforated plastic bags which will keep the humidity high, yet allow excess moisture to escape.
- Place a heater in a pantry or small room and adjust the temperature to about 85°F; place a bucket of water in the pantry/room as well. Gently place the sweet potato roots in well-ventilated boxes and place the boxes on a small table or platform above the heater (several boxes can be stacked). A week of curing is sufficient with this method. **Caution: be sure the heater is not near flammable items and that safety precautions are taken to avoid overheating of the heater, which can cause a fire. The heater should be placed on a non-flammable surface.**

STORING

When the roots are cured, they can then be stored in a dry, dark, well-ventilated place at 55° to 60°F for several months. Sweet potato roots are very sensitive to chilling injury at temperatures below 50°F, so do not store them at lower temperatures or quality will deteriorate. Symptoms of chilling injury include fungal decay, internal pulp browning, and root shriveling. Storing them in an unheated garage or storage shed may be too cold during the winter months. Try wrapping cured sweet potatoes in newspaper and storing them indoors in a box beneath a bed, in a closet, or in an unheated room where room temperatures are slightly cool. Storing the roots in temperatures warmer than 65°F can cause the roots to sprout. Check stored roots periodically and remove any that begin to decay or show other signs of deterioration.

SOURCES AND ADDITIONAL INFORMATION

- UC Davis, Vegetable Research and Information Center, Home Vegetable Gardening (vric.ucdavis.edu/veg_info_crop/sweetpotato.htm)
- UC Davis, Vegetable Research and Information Center, Sweetpotato Production in California, Publication 7237 (anrcatalog.ucdavis.edu/pdf/7237.pdf)
- UC Davis, Postharvest Technology, Sweet Potato: Recommendations for Maintaining Postharvest Quality (postharvest.ucdavis.edu/pfvegetable/SweetPotato/)
- University of Illinois Extension Online (urbanext.illinois.edu/veggies/sweetpotato.cfm)
- Purdue University Cooperative Extension Service, Department of Horticulture, "The Sweet Potato", November 2001 (hort.purdue.edu/ext/HO-136.pdf)
- Santa Clara County Master Gardeners Sweet Potato Trial (2006) (mastergardeners.org/projects/mcclellan/2006/sweet_potato.html)
- Sweet Potato Council of California (cayam.com/growing.html)
- *Sunset Western Garden Book of Edibles*, 2010, Sunset Publishing Corporation
- *Edible Landscaping*, Rosalind Creasy, 2010, Sierra Club Books

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