IN ILLINOIS sweet potatoes give more dependable yields than Irish potatoes and are more easily stored. Home gardeners in the northern tier of counties have fairly consistent success with them, but commercial production should be limited to the lighter textured soils of southern and central Illinois. Only well-drained sandy or light-textured soils will produce the high quality and smooth finish required for ready sale and high prices on the market. Furthermore the sweet potato is a warm-climate crop and needs four months of frost-free weather to attain the yields and maturity essential to profitable commercial production.
Well-drained Sandy Soils Are Best

As sweet potatoes are tolerant to a fairly wide range of soil acidity, applications of lime are not profitable except where tests indicate a pH of less than 5. Most of the commercial crop is grown on well-drained sandy soils. Sandy loams or silt loams are suitable, however, provided they are not compact. Impervious subsoils are unsuitable.

Soils of fine texture which are inclined to clod and become hard when dry generally produce either large misshapen roots or only limited root development and excessive vine growth. These effects, which are more marked toward the northern limits of culture, have been attributed to the texture of the soils or to their more abundant supply of nutrients and moisture.

Well-drained soils that warm up easily and are well aerated are preferable for sweet potatoes. Once established, the plants are very resistant to drought. The fact that planting on ridges frequently improves both yield and quality may be due to the higher temperatures and improved aeration of the ridges compared with level soil.

Fertilizers Improve Yields

Manure. On soils too low in organic matter to grow other vegetables satisfactorily, the sweet potato plant often produces well even without manure. It was proved, however, in early Illinois experiments that yields were increased by manure applied under the ridge and by cover crops plowed down. Ten tons of manure per acre placed under the ridges gave better results than the same amount broadcasted. But considering the present value of manure and the cost of applying it

ILLINOIS SWEET-POTATO CROP: 1931-1942*

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*Information received from office of A. J. Surratt, Senior Agricultural Statistician, ILLINOIS COOPERATIVE CROP REPORTING SERVICE, Springfield, Illinois.
compared with the value of the increased potato yield, most growers will find it more profitable to use available manure on other crops in the rotation.

**Rotation.** Sweet potatoes are grown as a field crop only once in a 3- or 4-year rotation. This rotation should include a soil-improving crop, preferably a legume. As with manure, other crops in the rotation may profit by the legume more than do sweet potatoes and probably should follow it. It may pay to lime for other crops, but as stated before, the sweet potato is tolerant to acid soil as low as a pH of 5.

**Commercial fertilizers.** These are commonly used, especially on sandy and sandy loam soils. (Two hundred bushels of sweet potatoes, not including the vines, contain an average of about 10 pounds of phosphoric acid, 30 pounds of nitrogen, and 55 pounds of potash.) If the soil is deficient in potash, up to 200 pounds of muriate of potash\(^1\) per acre may be applied. Only moderate amounts of nitrogen and phosphorus need be included unless there is a known deficiency.

As sweet-potato plants are easily injured by fertilizers, they should never be set where they come in direct contact with commercial fertilizer. Some authorities state that applying fertilizer in the row before making the ridge or in bands beside the row is usually better than broadcasting it, and that heavy applications in the row are unsafe. For safety it is best to mix the fertilizer thoroughly with the soil or apply it long before planting time.

**Seed Selection Is Highly Desirable**

Careful seed selection, tho not commonly practiced, is an effective way to reduce disease, increase yields, and improve type.

Seed should be selected in the field at harvest time. Individual hills are chosen for their high yield and for the size, shape, color, and uniformity of the roots. All potatoes in these hills may be saved for seed or only those which are 1 to 1½ inches in diameter. The selected potatoes are carefully stored and used to produce plants for the next season's crop.

**Seed Treatment Reduces Disease Losses**

All seed which show spots or other indications of disease should be discarded at bedding time. As an added precaution against losses from

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\(^1\)In New Jersey experiments, potash increased the total yield of sweet potatoes; in Missouri, the marketable yield. Increase in diameter and decrease in length were noted. In North Carolina tests, however, potash did not increase yield or improve shape.
disease, the seed should be treated with either a borax solution or a corrosive sublimate solution.

**Borax solution.** Immerse seed for 10 minutes in a solution made by dissolving 6 pounds of borax (sodium borate) in 30 gallons of water. Bed immediately after treatment. Rinsing is not necessary. The borax solution need not be renewed, as is necessary with the older (corrosive sublimate) method of treatment.

**Corrosive sublimate solution.** Soak seed for 8 minutes in a solution containing 1 ounce of corrosive sublimate (mercuric chloride, bichloride of mercury) to 8 gallons of water. (Some forms of corrosive sublimate are slow to dissolve in cold water but will dissolve quickly if placed in a gallon of hot water first, and then diluted to 8 gallons.) After treatment, bed seed immediately without rinsing. (Corrosive sublimate must be used in non-metal containers.)

For large quantities of seed, the solution should be renewed after the treatment of each 10 bushels. To renew it, add ½ ounce of corrosive sublimate and enough water to make 8 gallons of solution. After treating 50 bushels of potatoes, discard the original solution and make a new one.

**CAUTION:** Dispose of solution carefully, as it is very poisonous.

**Building a Hotbed**

Sweet-potato plants are grown from seed potatoes which are bedded in a greenhouse or hotbed 4 to 6 weeks before the time for setting the plants in the field. The hotbed should be located near the home, if possible, since an adequate water supply is essential and close attention is required to maintain the proper temperature and humidity while the plants are growing. An ideal location is on a gradual slope to the south or east, with buildings, trees, or other windbreak for protection. Such a location insures full exposure to sunlight, protection from cold winds, good draft if the beds are flue-heated, and adequate surface drainage.

**Manure-heated beds.** The use of fresh, rapidly fermenting horse manure is the simplest method of heating hotbeds. The present scarcity of horse manure and the high price if purchased makes its use impractical in many areas. The number of inquiries about its use indicate, however, that enough people are interested to justify a description of the procedure.

**Preparing the manure.** Start 3 or 4 weeks before the hotbed is to be used, or 8 to 10 weeks before field-planting time. Use fresh manure
from grain-fed horses. Choose manure which contains a fair amount of litter. Place it in a flat pile and water it to start it fermenting. As soon as the heating is well under way, mix manure thoroly two or three times and add water if too dry.

Dig a trench 12 to 18 inches deep, 6 feet wide, and long enough to produce the plants required. When the whole pile is steaming, place manure in the trench to a depth of 8 to 12 inches. Cover with a 3- or 4-inch layer of clean soil or sand.

Violent heating will usually occur in from 3 or 4 days to a week’s time. Delay planting until the temperature has receded to 80° or 85° F. In the meantime construct the frame, and cover the manure to protect it and to conserve the heat.

Making the frame. The frame is usually made of rough 1-inch lumber nailed to stakes driven into the soil along the edges of the bed. The front (to the south or east) should be at least 4 inches lower than the back. The ends and sides are banked with earth or straw to protect the bed from drafts and to conserve heat. (Beds of permanent construction, usually of cement, do not need banking.) The frames are covered with hotbed sash, canvas, or one of the various forms of treated muslin plastic sheets. Cross pieces are often used. These are notched-in flush with the edges of the bed and serve to stiffen the frame and to support the sash or prevent the canvas or muslin from sagging.

Flue-heated hotbeds. These are common in southern Illinois and are used for a number of crops, including sweet potatoes. They vary in length from 30 to 60 feet. Some are as long as 100 feet and are apparently quite satisfactory. They vary in width also but are usually 6 feet or multiples thereof. Materials often used are rough lumber from local woodlots for the frames, and flat rocks common to the region for flues and firebox. Glazed tile makes excellent flues, markedly superior to those made of rocks. Wood is used for fuel.

A plan for making a hotbed similar to many in use in southern Illinois is as follows: On a south or east slope, mark off an area 6 feet wide and 60 feet long with one end a few feet higher than the other. Set a row of posts along each 60-foot side. If 12- or 16-foot lumber is used, set posts 4 feet apart, center to center. To prevent heaving, set them 2½ feet deep. If the bed runs east and west, let posts extend 18 inches above ground level on the north side and 12 inches above on the south side. Build walls along the sides and ends of the bed by nailing boards to the inside of the posts. Let the walls extend slightly above the posts.
Beginning far enough beyond the end of the bed to allow for chimneys, dig two trenches close to the edges of the bed and wide enough to hold 6-inch tile. The tile should have 1 foot of rise to each 25 feet of run from the firebox to the chimney. It should lie about 1 foot below the surface of the hotbed soil at the chimney end of the bed and about 18 inches below at the firebox end.
How to Grow Sweet Potatoes

Build a firebox at the low end of the bed. Make it at least 2 feet high for convenient firing. (There should be enough slope to the site to permit bringing the bottom of the firebox above ground level.) To insure free movement of the heated air out thru the flues, make the top and sides of the firebox flush with the tops and outer edges of the flues. Cover the top of the firebox, first, with sheets of boiler plate or iron bars and stone, and then with 2 feet of soil to conserve heat.

Angle the flues (see plan), limiting the width of the firebox to 3 feet. The 3-foot width will prevent sagging of the roof—a frequent source of trouble for Illinois growers—and will still leave an opening 2 feet high, 3 feet wide, and 5½ feet deep, ample size for firing with cordwood.

Get a piece of sheet iron as large as the firebox opening. Place it at the firepit entrance to be used when needed as an aid in draft control. Provide space in front of the firebox and at a lower level for convenience in firing and for drainage. Bank the sides and ends with soil to protect the bed from drafts and to conserve heat.

Chimneys at the high ends of the flues may be made of boards or of tile. If made of tile, an elbow is used to bring the tile above the surface. Frequently, when fires are started in the spring, flues are found blocked by rabbits or other animals. This blocking may be prevented by plugging the flues after the fire is allowed to go out or by placing coarse wire over the ends of the tile when the bed is built.

Bedding Seed and Managing Hotbed

One bushel of good seed should produce 2,500 to 3,000 plants from two or three pullings. Three to four bushels, then, will usually produce enough plants for an acre if two or three pullings are made. If only one pulling is to be made, 6 or 8 bushels will be needed to furnish enough plants to set an acre. The hotbed space required for a bushel of seed varies from 15 to 20 square feet for seed of medium size to 25 to 30 square feet for small seed.

Choose a mild day for planting, since chilling may injure the potatoes badly. Place them in the bed in a single layer with about ½ inch space between them (this spacing is to prevent spread of disease from one root to another and to avoid overcrowding the plants).

Chicken wire spread over the seed before they are covered with soil will hold them in place. With this arrangement, the plants can be pulled rapidly even by unskilled workmen; yet the pulling will not seriously interfere with the continuous production of plants in the beds.
Cover the bedded potatoes with 4 or 5 inches of light clean soil, sand, or a mixture of sand and soil. Clear sand is best. If heavier soil must be used, spread an inch of sand over the surface to conserve moisture and prevent crusting. Thoroly water the bed as soon as the seed are covered. Frequent watering is usually not necessary until the plants are up and the leaves are formed. Choose mild days, when the beds can be uncovered without injury to the plants. As the plants increase in size, water them more frequently, often daily. More water is required in the flue-heated beds than in beds in which manure is the source of heat.

Hotbed temperatures should be 80° to 90° F. at the start, gradually decreasing to 70° to 75° at planting time. In the manure-heated beds the temperature is controlled by ventilation. Any bed requires attention to prevent wide fluctuation of temperature, especially during changeable weather. The plants must be conditioned, too, to outdoor environment. At least 10 days before transplanting time the beds should be opened and left open whenever the weather permits.

Pulling and Handling the Plants

A good sweet-potato plant is 4 to 6 inches high and stocky, and is well supplied with roots and leaves. When plants reach this stage, they should be pulled. Only those that are large enough should be taken.

To pull a plant easily without damaging other plants, place one hand on the soil surface above the plant roots, and with the other hand give the plant a sharp upward tug. Sometimes several plants attached at the base all come up together. Separate them and discard the small ones unless there is a shortage.

Pulling plants as soon as they are ready stimulates growth in the smaller ones which are left in the bed and also permits a planter to accumulate a quantity for setting when field and weather conditions are favorable. Some growers dip the roots of the plants in a thick paste of clay and water to keep them from drying out during transplanting. For added protection the plants are kept shaded or the tops covered with moist burlap or canvas.

Southern-grown plants are preferred by some growers. The prevalence of disease in southern plant-growing areas, however, makes it advisable to buy only certified stock. Plants can be shipped long distances if the roots are packed in sphagnum moss and the tops kept dry.

The plants should be set as soon as possible after arrival. At times weather and soil conditions delay transplanting. If plants from the South are on hand or if those in the bed must be pulled because of
crowding, they may be held for several days by heeling them in; that is, by spreading them out along a shallow, slanting trench and covering them up to the leaves with loose moist soil. The area used should be protected and the plants covered during periods of adverse weather.

There appears to be little difference in the yields from first, second, and third pullings when all the plants are similar in size and are transplanted at the same time. This does not mean, however, that transplanting should be delayed if plants are ready and the field soil is in condition.

**Soil Preparation and Plant Setting**

Since first plantings are not made in southern Illinois until late April, and in northern counties until middle or late May, there is ample time for soil preparation. Late planting permits working the soil when it is in good condition. Early plowing is advisable, and disk ing at intervals is recommended in order to conserve moisture and get rid of weeds. If commercial fertilizer is used, it should either be placed in the furrows made to mark the location of the ridges or be broadcasted and worked in considerably in advance of planting.

The height of the ridges and the distance between them will depend on the soil and the locality. On heavy soils, in poorly drained areas, and in the north, ridging is very important. The ridges are usually made with a turning plow, two furrows being thrown together, or with a sweep, commonly called a hiller. It is best to make the ridges when the soil surface is moist, as this prevents their having a dry core. The width between ridges varies from 3 1/2 to 4 1/2 feet, depending on the height desired. The ridges are rounded by implements drawn along straddling the ridge, or are flattened by floats which cover several rows at a time. If conditions are favorable to weed growth, the ridges should be gone over again before planting time.

A rain between ridging and planting is ideal unless excessive. It helps to further settle the soil and insure moisture for the young plants. Half a pint of water poured around the roots of the newly set plants will help them to get close contact with the soil, thus hastening recovery and promoting the rapid, vigorous early growth which most growers consider essential to good yields.

Spacing between plants varies from 12 to 18 inches or more, depending on soil fertility and on the variety. Wider spacing is commonly used on poor land and for varieties such as Puerto Rico (Porto Rico) and Nancy Hall, which produce heavy vine growth.

Altho transplanting machines which can be used on ridges have been developed, home gardeners and many commercial growers plant by
hand. Hand-planting methods are as variable as the implements used. The dibble, trowel, tongs, or spade may be used. A light spade is popular in some areas. The planters work in pairs. One thrusts the spade into the top of the ridge at an angle and moves the handle forward. Into the wedge-shaped opening so made, the other thrusts a plant and holds it in place as the spade is removed. As the planter with the spade steps forward to make the next hole, he places his foot close to the plant already set and thus firms the soil.

**Early Cultivation Important**

Sweet potatoes should be cultivated often enough to control the weeds. Usually the first work after the plants are set is to run a sweep or cultivator between the ridges to renew them and control weeds. The soil is always worked toward the ridge unless weeds or grass are especially bad. In that case, a portion of the soil may be turned away from the ridge with a plow or cultivator and turned back at the next cultivation. Two or three hand hoeings are needed to cut the grass and weeds on the upper edges and tops of the ridges.

As the season advances, the plants gradually cover the area on and between the ridges, making late cultivation unnecessary. The occasional large weeds that have been missed should be pulled or cut by hand. Pruning excessive vine growth reduces yield. Lifting the vines to prevent rooting at the nodes does not increase yields, and since it cannot be done without some injury, it is comparable in effect to pruning.

**Varieties Popular in Illinois**

Altho there are many varieties of sweet potatoes, only a few are commercially important and only a few have qualities which recommend them for home use. Some people prefer the varieties with dry, mealy flesh, and others like the so-called moist type, "yams."

Dry-fleshed varieties include **Yellow Jersey**, **Big Stem Jersey**, **Gold Skin** and **Muscatine No. 1**. These have been popular in the northern states for years, but the moist types are finding an increasingly ready sale on northern markets. Of these, the **Nancy Hall** and **Puerto Rico** are the most popular in Illinois. The **Puerto Rico**, tho not grown as extensively as **Nancy Hall**, is preferred by some of the large purchasing agencies of the state. **Triumph** is an intermediate type not grown extensively.

1Beetles may attack the foliage, and the grubs may tunnel into the roots. The damage, however, is rarely severe enough to justify spraying or dusting. Control measures are given in Illinois Circular 514.
None of the above varieties mature early enough to be especially desirable for northern areas, but none are so late that they will fail to produce a crop under favorable conditions. No variety is usually as good when grown in the north and on heavy soil as when grown on sandy soil where there is a longer growing season and higher night and day temperatures.

Harvesting the Crop

Time. It is only in southern Illinois that the growing season is long enough for the yellowing of the vines to indicate maturity. In other areas growth is usually ended abruptly by killing frosts. Light frosts will not materially injure the potatoes, but if the vines freeze there is danger that decay may penetrate down to the roots and affect both flavor and keeping quality. If digging must be delayed after the tops are frozen, the safe procedure is to cut the vines at the soil surface as soon as possible. Ideal harvest conditions include a reasonably dry soil, temperatures high enough to prevent chilling, and wind and sun to hasten drying of the potatoes after they are removed from the soil.

Equipment. Small plantings are usually dug with hand tools. It is well to start some distance from the crown of the plant, especially when digging Nancy Hall or Puerto Rico, as these varieties tend to form scattered potatoes. The best way to determine the proper distance is to dig a few hills.

In large fields the potatoes are plowed out. Special plows with rolling colters are made for this purpose. A small stubble plow equipped with a colter and with the moldboard removed is sometimes used. These special plows loosen the soil and cut the vines. The potatoes are then scratched out by hand and left exposed long enough to dry before they are placed in containers for market or storage.

Seed selection. If seed is to be saved, medium-sized, well-shaped potatoes should be selected from productive hills that are free from disease. Those selected should be carefully stored for the next season’s crop. Grading as the crop is picked up saves extra handling. The Illinois and U. S. grades of No. 1, No. 2, or Fancy may be used. The term Unclassified indicates that no grade standard has been followed.

Handling. For home use and for market, careful handling is important. The potatoes should not be thrown or dropped into the containers. Broken skin, bruises, and mechanical injuries of any kind not only spoil the appearance of the potatoes, but may cause serious losses if the crop is stored. A good practice is to place the potatoes in slatted crates or baskets in which they are to remain in storage.
Storage Places and Temperatures

**Curing.** The first step in storing potatoes is commonly called *curing.* Essentially this means reducing the weight of the potatoes 6 to 8 percent in 1 to 3 weeks.

While potatoes are being cured, the room temperature should be kept at 80° to 90° F. and the relative humidity should not be higher than 70 percent. This usually requires artificial heat and considerable circulation of air. After the potatoes are cured, the temperature should be held at 50° to 55° F. and the humidity at 75 to 85 percent for the rest of the storage period.

**Bins or crates.** Bin storage causes less shrinkage than storage in crates but slightly increases decay. Bins should be narrow and well-ventilated and not over 6 feet deep. Great care must be taken to avoid bruising the potatoes when emptying them into the bins. Thoro sterilizing of storage containers and space each year is advisable.

**Home storage.** Care in harvesting and handling potatoes for home storage is even more important than for the commercial crop. In home storage it is not feasible to maintain the high temperatures and low humidity required for curing the commercial crop. Cuts and bruises will not heal as quickly on uncured potatoes; therefore losses from decay will be greater. Sweet potatoes for home storage, then, should be sorted in the field and placed in well-ventilated containers in which they are to remain for the storage period. Damaged potatoes should be kept separate and used first.

The furnace room in the average home makes a good storage place. The floor, however, may be too damp and cold for sweet potatoes. Storage on shelves is best, or in suspended containers. A splint bushel basket slightly pinched together will fit up between the floor joists and can be held in place by hanging the handles over nails driven into the joists. The mean temperature in such a location will usually be above 55° F., but aside from causing greater shrinkage will be quite satisfactory.