

BULLETIN

OF THE

AGRICULTURAL AND MECHANICAL
COLLEGE OF TEXAS.

AUGUST, 1915.

EXTENSION SERVICE

BULLETIN B 6

SWEET POTATOES FOR PROFIT

Simple Directions for Banking and Storing
Sweet Potatoes to Prevent Loss in
Marketing.

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Co-operative Extension Work in Agriculture and
Home Economics, Agricultural and Me-
chanical College of Texas and United
States Department of Agri-
culture Co-operating.

The object of this bulletin is to prevent by proper storing heavy losses in the marketing of sweet potatoes. As a rule in the early fall potatoes are forced upon the market at prices varying from 35 cents to 75 cents a bushel. By winter prices usually advance to 75 cents or \$1.00 and by spring often reach \$1.50. It is a conservative estimate that the producer by storing his potatoes for gradual marketing could obtain an increased price of 25 cents to 50 cents a bushel, and in rare cases as much as 75 cents a bushel, or a profit of 50 to 100 per cent.

The methods herein described have been thoroughly tested. In many parts of the South, including several points in East Texas, there are successful storage houses in which potatoes are preserved at great profit. Groups of farmers in co-operation, or business men who desire to promote the welfare of their rural communities, can well afford to make such investments. Persons with experience in methods of storage are invited to correspond with the undersigned with a view to developing and later publishing the completest information possible on this important subject.

In advance of the next planting season this department will issue an additional bulletin on methods of cultivation, and in the meanwhile will be glad to receive from potato growers any information concerning difficulties or problems they have encountered.

CLARENCE OUSLEY,
Director.

STORAGE OF SWEET POTATOES.

By Edwin Jackson Kyle, M. S. A., Dean of the School of Agriculture, and J. C. Olsen, Associate Professor, Agricultural Engineering.

In 1913 the United States produced 59,232,000 bushels of sweet potatoes. Of this amount Texas produced 4,000,000 bushels. From 1899 to 1909 the increase in production in the United States was 39.3 per cent, while the increase in value of the crop was 78.3 per cent. During the same period the increase in the production in Texas was only 12.4 per cent.

On the whole these figures are encouraging, but when we consider the rapid increase in the value of the crop, and the ease with which the sweet potato can be grown, there is little reason why the production, especially in Texas, should not have been much greater.

There are two factors that have retarded the development of the sweet potato industry in Texas. First, lack of a Northern market, due to the fact that the Yams, which are grown almost exclusively in Texas for an eating potato, are not popular in the North. Second, the great difficulty in keeping the potatoes after they are harvested; thereby forcing the growers to place their crop on the market immediately after it is harvested, which naturally means low prices.

The erection of storage houses in the potato growing sections of the State, whereby farmers can store from 500 to 2500 bushels of potatoes and keep them in good marketable condition from eight to ten months of the year, together with better cultural methods, will undoubtedly revolutionize the potato industry in this State.

The purpose of this bulletin is, first, to give full instruction on how to construct storage houses, the small type holding from 400 to 500 bushels and the larger from 2500 to 3000 bushels; second, how to keep potatoes for home use by banking.

If the farmers of a community will co-op-

erate in putting up one of these houses, they will undoubtedly find it to be of great service in enabling them to hold their potatoes until a satisfactory price can be secured.

The part of this bulletin relating to storage houses is a digest of Farmers' Bulletin No. 548, Storing and Marketing Sweet potatoes, by H. C. Thompson, Assistant Horticulturist, Bureau of Plant Industry.

BANKING SWEET POTATOES

Wherever a person has only enough sweet potatoes for home use the most economical and satisfactory method of storing is to bank them. Banking sweet potatoes in the South has been practiced for a great many years. Nearly every farmer varies some in the minor details on the construction of the potato bank, but the general principles are about the same.

In banking sweet potatoes, it is important to select a well drained location near the house. The surface of the ground should be cleaned free of grass and weeds and enough dirt shovelled on the place to raise it several inches above the surrounding ground.

The width of the bank at the base will, of course, depend to some extent upon the amount of potatoes to be stored. A bank six feet in diameter will permit the storing of from twelve to fifteen bushels of potatoes, if they are properly piled.

For best results a single bank should not contain more than twenty bushels of potatoes.

As soon as the ground has been cleared and drained, a layer of coarse straw, at least two inches in thickness, should be placed on the bottom of the bank. The potatoes should then be carefully piled on until they come to a point three or four feet high.

As soon as the pile has been completed, the potatoes should be covered with a coarse layer of hay or corn stalks, in which condition they should be allowed to stand for one or two days, so as to go through a sort of curing process, after which a layer of boards should be

laid on over the straw. The boards should then be covered with three or four inches of dirt, leaving a small air hole at the top. After the bank has stood several days, it will often be necessary to refill with dirt where it has settled.

The bank should be opened from only one side, and after opening the potatoes should be used without too much delay.

Extra care should be taken not to put in the bank any cut or bruised potatoes.

Seed potatoes should be stored in separate banks, and should not be opened until ready for planting.

Potatoes stored according to this method will not, as a rule, keep as well as when they are placed in well built storage houses, but when an individual has only a few bushels to be used for home use, he can often bank them with very good results.

SWEET POTATO HOUSE

To keep sweet potatoes in good condition after they are gathered, it is essential that they be thoroughly dried and cured after being put in the house and that a uniform temperature be kept after they are cured. These essentials can be secured in a storage house where artificial heat can be supplied. The house should be constructed in such a way that it can be thoroughly ventilated. These requirements are provided for in the type of construction shown in these drawings. A cheaper and less carefully constructed house will keep sweet potatoes, but the additional attention and fuel required would soon exceed the extra cost required for the better house. It is economy to build a substantial house at the start.

Size of House to Build.

The quantity of potatoes to be stored will decide the size of house to build. The plans shown in these drawings are for a house 20 by 40 feet. Such a house will store 2500 to 3000 bushels. The construction of this particular

house is discussed in the following paragraphs. The material for a smaller or larger house could very easily be figured out by following the general directions for this one.

House Should be built on Pillars.

The sweet potato storage house should be built on piers in order to allow a free circulation of air under it. The "dugout," a house built partly underground, should never be used in the South for storing sweet potatoes, due to the fact that it is practically impossible to keep this type of house dry enough to prevent the potatoes from rotting. Four rows of pillars should be built, one under each side and two through the center of the house, using concrete, brick or wooden blocks. This will place the rows 7 feet, 8 inches apart, and in the rows they should be 8 feet apart.

Floor Construction.

The sills should be 8 by 8 inches and the joists, which are placed 2 feet apart, should be of 2 by 10 inch material. Over the joists a rough floor of 1 by 4 or 1 by 6 inch boards should be laid, then a layer of heavy building paper, and over this matched tongue and grooved flooring.

Wall and Ceiling Construction.

The walls should be built by placing 2 by 4 inch studding every 2 feet. On the outside a layer of 1 by 6 inch sheathing should be nailed to the studding, then a layer of heavy building paper should be tacked to the sheathing, and over this drop siding or some other matched siding. On the inside of the building heavy building paper should be tacked to the studding and then covered with matched flooring. The walls should be tied together every four feet with 2 by 6 inch scantling. These scantlings should come over the partitions for the bins so they can be used for supports.

Roof Construction.

Use 2 by 6 inch rafters placed 2 feet apart.

Over the rafters a layer of building paper should be tacked, and over this the sheathing is nailed. Shingles, roofing paper, tin or galvanized iron can be used for the roof. Under the rafters a layer of building paper should be tacked and over this the matched flooring:

Ventilation.

Thorough ventilation is very necessary in a storage house. For this purpose three windows on each side and a door in each end have been provided. Also there are two ventilators, each 8 by 8 inches, in the roof and six ventilators, each 12 by 12 inches, in the floor. The windows should be 18 to 24 inches above the floor, and they should be made to close tightly whenever necessary. The roof ventilators should be provided with a roof to keep out rain and a shutter which can be closed in cold weather.

Bin Construction.

The bins are so constructed as to permit a free circulation around the potatoes. For this house the most convenient arrangement can be secured with a row of bins on each side of a central alley. The bins are 4 feet wide, 7 1-2 feet long, and 8 feet deep. An air space is provided between the walls and bins for free air and circulation. The construction here described allows a 4-inch air space between bins, a four-inch space, under bins and 6 inches between the bins and outside walls. For corner and middle supports, 2 by 4 inch scantlings should be set up, the lower end nailed to the floor, and the upper to the cross pieces use for tying the sides together. Over the supports 1 by 4 inch boards should be nailed, leaving a 1 inch space between them. The ends of the bins parallel with the outside wall of the house must be built first, because there is not room enough to work between the bin and the outside wall. In making the floor, 2 by 4 inch scantlings should be cut to go across the bin and placed on edge, one near each end and one in the center. To these

should be tacked 1 by 4 inch boards, leaving a 1 inch space between them. The bin floor should not be fastened to the floor of the house. If left loose it can be taken out when the house is cleansed and disinfected in the summer. Both sides of the scantlings between the bins should be slatted up in order to leave an air space.

Material for Large Sweet Potato House.

Size of house, 20'x40'; capacity, 2500 to 3000 bushels.

Lumber.	Board Feet.
Sills, 10 pieces 8"x8"x16'".....	853
Joist, 21 pieces 2"x10"x20'".....	700
Studding, 23 pieces 2"x4"x18'; 8 pieces 2"x4"x12'; 8 pieces 2"x4"x14'; 4 pieces 2"x4"x0'; 4 pieces 2"x4"x 12'	480
Rafters, 42 pieces 2"x6"x12'".....	504
Ties through building, 10 pieces 2"x6"x20'	200
Plate, 4 pieces 2"x4"x20'	53
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Total dimension lumber.....	2,790
Sheathing (not including that on inside walls and ceiling)	3,200
T. & G. flooring (for floor, inside walls and ceiling)	3,400
Drop siding	1,600
Lumber for bins, 15 pieces 2"x4"x16'; 30 pieces 2"x4"x18'; 562 pieces 1"x4"x16'	3,250
Finishing lumber, 4 pieces 1"x6"x18'; 8 pieces 1"x6"x16; 4 pieces, 1"x6"x 12'; 4 pieces 1"x4"x16'; 2 pieces 1"x4"x18'; 4 pieces 1"x4"x12'; 6 pieces 1"x6"x14'	
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Total lumber	14,725
5,000 square feet building paper, galvanized iron roofing, 42 sheets 2'x12'; 42 sheets 2'x10'; 6 check rail windows 8 light, 10"x12".	
Hardware: 50 lbs. 20d common nails; 25	

1bs. 10d common nails; 100 lbs .8d common nails; 50 lbs. 10d galvanized nails; 75 lbs. 8d galvanized nails; 24 bolts 3-4"x18"; 3 pair 7" tee-hinges; 6 pair 6" tee-hinges; 1 stove.

Piers: Using concrete, 10 sacks cement; 2 cubic yards sand; 4 cubic yards gravel or broken stone. Using brick, 1,000 brick; 6 sacks cement; 3-4 cubic yard sand.

Chimney: 400 brick; 3 sacks cement; 1-4 cubic yard sand.

Material for Small Sweet Potato House.

Size of house, 10'x18'; capacity, 450 bushels. Lumber.	Board Feet.
Sills, 2 pieces 6"x8"x18'	144
Joist, 10 pieces 2"x0"x10'.....	167
Studding 11 pieces 2"x4"x16'; 8 pieces 2"x4"x14'; 2 pieces 2"x4"x18'.....	175
Rafters, 10 pieces 2"x4"x14'	93
Ties through building, 2 pieces 2"x4" x10'	33
Plate, 2 pieces 2"x4"x18'	24
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Total dimension lumber	636
Sheathing (does not include any on in- side wall and ceiling)	1,000
T. & G. flooring (for floor, inside walls and ceiling)	1,075
Drop Siding	670
Lumber for bins, 8 pieces 2"x4"x18'; 3 pieces 2"x4"x16'; 82 pieces 1"x 4"x12'; 32 pieces 1"x4"x16'.....	626
Finishing lumber, 6 pieces 1"x6"x18'; 4 pieces 1"x6"x16'; 2 pieces 1"x6" x14'	118
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Total lumber	4,125

1,700 square feet building paper; galvanized iron roofing, 20 sheets 2'x7'; 2 check rail windows 8 light, 10"x12".

Hardware: 15 lbs. 20d common nails; 25 lbs. 10d common nails; 15 lbs. 8d common nails;

20 lbs. 10d galvanized nails; 20 lbs. 8d, galvanized nails; 6 bolts 3-4"x18"; 4 pair 6" tee-hinges; 3 pair 7" tee-hinges; 1 stove.

Piers: Using concrete, 3 sacks cement; 1-4 cubic yards sand; 1-2 cubic yard gravel or broken stone. Using brick. 250 brick; 1 1-2 sacks cement; 1-8 cubic yard sand.

Chimney: 400 brick; 3 sacks cement; 1-4 cubic yard sand.



Varieties of Sweet Potatoes for Market.

The varieties of sweet potatoes to grow depend on the market to be supplied. The northern and eastern markets demand a dry, mealy potato, such as the Big-Stem Jersey, including, the so-called Improved Jersey, Yellow Nansemond, early Carolina, Gold Coin, and others. The markets of the South demand a moist, sweet root. Among the varieties most in demand in the South are the Nancy Hall, Dooley Yam Pumpkin Yam, and Triumph.

Harvesting Sweet Potatoes.

Careful handling is one of the essentials in keeping sweet potatoes, and there is no more important place to practice it than in the field at digging time. The implement used to dig sweet potatoes should be one that does not cut or bruise the roots. After the potatoes are plowed they should be scratched out by hand and allowed to remain exposed long enough to dry off. The digging should be done, if possible, when the weather is bright and the soil is dry.

The potatoes should be graded in the field in order to reduce the cost of handling to a minimum. These lots should be stored in different bins. By following this method it will not be necessary to grade the potatoes at the storage house and will thus save time and reduce the cost of handling. The potatoes should be poured into the bins as carefully as possible to prevent bruising.

Care of Sweet Potatoes in Storage.

Each year after the sweet potatoes have been marketed the house should be thoroughly cleansed and disinfected before using again. All dirt and refuse should be cleaned out and all parts of the interior sprayed or washed thoroughly with a solution of formalin (1 pint of formalin to 10 to 15 gallons of water). Diseased roots should not be thrown on the manure pile or on land to be used for sweet potatoes, the safest plan being to burn them.

In filling the storage house the workmen should begin at the back end of the bins and pour a layer of potatoes about 2 feet deep in

all the bins rather than fill one bin at a time. If the bins are 8 or 10 feet long it is a good plan to divide them into two parts. By nailing cleats to the middle support of the bins, the partition can be raised as the bins are filled. The partition boards should have some space between them to allow free circulation of air. A 1-inch block between the boards will be satisfactory to separate them. By dividing the bins in this way the back of the bin can be filled without walking over the potatoes in the front part. When taking the potatoes out those in one section of a bin can be removed without disturbing the remainder. This is very important where the potatoes are sold in small quantities.

While the potatoes are being brought in, a fire should be kept up in the storage house to dry off the moisture. A temperature of 80 to 85 degrees F., with plenty of ventilation, should be maintained for 10 days or 2 weeks, depending on weather conditions and the variety of potatoes. Ventilation is absolutely necessary, and even if it is possible to keep the temperature up to 80 degrees F. it is necessary to leave the ventilators open, so as to drive out the moisture-laden air. The house may be closed at night, and should be kept closed on cloudy days, but if moisture begins to deposit on the walls or ceiling the house should be opened and a fire started to drive off the moisture. The air inside the house should be kept warmer than the outside air during the curing period. This will prevent moisture from being deposited on the walls. As the air warms it expands and takes up the moisture. When it cools it contracts and gives up its moisture. This makes it important to get the moisture-laden air out of the house by ventilation. When the potatoes are thoroughly dried or cured the temperature should be gradually reduced to 55 degrees F. and kept as near that point as possible during the remainder of the storage period. If the temperature goes below 48 degrees a fire should be made and the house opened in the middle of the day whenever the temperature on the outside is

high enough. When the temperature goes above 60 degrees F. the house should be opened in the cool of the day to lower the temperature to 54 or 55 degrees and then closed. The house should have some ventilation every day. In mild weather the ventilators in the roof may be partly open all the time, but they should be closed in cloudy or cold weather.

Marketing Sweet Potatoes.

One reason why Southern farmers have not received good prices for their sweet potatoes is that they have not used proper methods of handling and marketing. In many cases the potatoes are badly bruised and cut in digging, are put in bags or rough barrels without grading and are rushed on the market when there is an oversupply. The secrets of success in getting high prices are (1) to carefully grade, clean and pack the product and (2) to put it upon the market when there is a good demand.

When the potatoes are marketed they must be carefully graded, no matter how well it has been done when they were put in the house. The market demands a medium sized, uniform type of sweet potato, free from bruises or decayed spots. In grading, the large, overgrown, and the crooked, broken, or bruised roots should be kept at home for feeding or for canning. The best potatoes will bring the higher price when separated from the culs.

After carefully grading the potatoes they should be put in clean, neat, attractive packages. Bags should never be used, as the potatoes become badly bruised when handled in this way. The standard veneer potato barrel with a burlap cover is usually used in summer or autumn, but for winter shipment the double-headed stave barrel or tight box is used. The smaller type of package, such as the bushel hamper, bushel box, or basket, is becoming more popular each year. A neat and attractive package of well-graded potatoes will bring a good price almost any time, even when the market is over-stocked with inferior goods.

Potatoes shipped during the winter must be protected from the cold. When a sweet

potato becomes chilled its quality is impaired and decay soon sets in. In cold weather the package should be covered with paper and the cars heated to prevent chilling the potatoes. Some find it advantageous to line their baskets and barrels with paper.

Sweet Potato Grades.

The Office of Markets and Rural Organization of the United States Department of Agriculture assisted in the establishment of the following temporary grades for the shipment and marketing of sweet potatoes by the Russellville, Ark., sweet potato growers at a meeting held on December 11, 1915:

Prime (or No. 1 Bakers).

This grade will include all potatoes of one variety from 2 to 3 inches in diameter, with none over 7 inches in length, all to be fairly uniform in shape, clean, bright, natural color, and sound. This grade must be free from bruised, scarred, irregular, crooked, rotten, or diseased potatoes.

Choice (or No. 2 Bakers).

This grade will include all potatoes of one variety from 1 3-4 to 3 inches in diameter, with none over 8 inches in length, all to be clean, bright, natural color, sound and free from rot or disease. This grade may include crooked and irregular potatoes.

JUMBO.

This grade may include all potatoes of one variety over 3 inches in diameter, with none over 8 inches in length, all to be clean, bright, natural color, sound, and free from rot or disease.

SEED STOCK.

The seed stock ordinarily takes all sound potatoes, free from rot or disease, cuts or bruises, and less than 1 3-4 inches in diameter.

The jumbo grade is not recommended for shipment to the northern or eastern markets, as they do not desire potatoes of its specifications. However, potatoes of this grade should find a ready sale in the South, where they may be used for such purposes as pie-baking and canning.