BULLETIN No. 183 JANUARY, 1915

ALABAMA

Agricultural Experiment Station

OF THE

Alabama Polytechnic Institute

AUBURN

Irish Potatoes

By

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1915
Post Publishing Company
Opelika, Ala.

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**In Co-operation with Alabama Girl's Technical Institute.

IRISH POTATOES.

BY

J. C. C. PRICE,

Associate Horticulturist.

The Potato (Solanum tuberosum) is a native of the New World and was originally found in Chili according to De Candolle. A wild form still exists there. The earlier travelers and explorers found the potato under cultivation by the South American natives. It was introduced into North Carolina and Virginia about the last of the 16th Century.

As a food product the potato ranks in importance next to rice, and has followed man into every civilized country. Besides consuming practically all the potatoes grown at home, the United States imports potatoes annually from Germany and other foreign countries.

The acreage given to the crop in the United States changes annually, due to fluctuations in price. This is unfortunate, and would not occur if growers kept up with general potato crop reports. If there is a shortage in the crop of the North, southern growers of early potatoes expect good returns the following season. They should, therefore, be informed regarding the northern crop and be guided accordingly. The quantity, quality and price of held-over potatoes play a large part in determining the prices of the spring crop of southern potatoes. The southern spring crop matures at a time when it cannot be left in the soil long without more or less loss from decay; therefore, it must be promptly harvested and shipped.

As a potato growing state Alabama ranks thirty-eighth. In 1909 the total crop was 1,128,564 bushels, the average yield being approximately seventy-eight bushels per acre. More Irish potatoes are shipped into the state than out of it.

SOIL.

The soil best adapted to early potatoes is a well-drained, loose, sandy loam that warms up very early in the spring. Such soils usually do not contain the required plant food, but this deficiency may be supplied by manures and other fertilizers.

On the richer soils larger yields are made and less fertilizer is required, but earliness is of more import-

ance than maximum yields. In order to make early potatoes, every factor that will cause rapid growth and quick maturity must be made use of, such as warm, well drained, dry soils, and fertilizers that take effect promptly.

No other widely grown crop is more particular about having a good seed bed than the potato. Before plowing, all debris that would hinder good cultivation should be removed. The land should be broken as soon as conditions will permit in late winter or early spring. The soil should be thoroughly and deeply ploughed, occasionally showing a little of the clay or subsoil; care should be taken, however, not to turn up too much at one time. If the land is underlaid by hardpan, this condition should be corrected by the use of a subsoil plow. If, after being ploughed, the soil is cloddy, or shows a tendency to bake, the surface should be thoroughly pulverized with a harrow or clod crusher. A good potato soil is not apt to show such a condition.

SOURCE OF SEED POTATOES:—It is generally recognized that northern seed make earlier potatoes, and some think that the use of seed potatoes from the North increases the yield. The greater part of the seed potatoes planted in the South comes from much cooler climates, notably, from Maine, Michigan and Wisconsin.

Experiments thus far have demonstrated that the source of seed has little to do with the yield, and but little with the earliness, if the seed potatoes be given the proper resting period. An imperfect resting period is the cause of poor stands and late crops resulting from the use of southern fall-grown seed. For several seasons experiments with five varieties comparing the source of seed have been conducted at Auburn. Maine seed afforded an average yield of 116 bushels per acre, while western seed of the same varieties gave an average of 114½ bushels per acre.

In 1911 it was possible to use seed from the spring crop of 1910, grown at the Station. The yield was fully as good as that from Maine seed of the same variety.

In other years an attempt was made to hold over the spring crop for planting the next February; but sprouting and shriveling ensued, leaving tubers in poor condition for planting, and resulting in bad stands. The conclusion drawn from these experiments is that

the source of seed is not of much importance. The main requisites of good seed are that it is mature; that it was produced by disease-free plants; that it has been given a sufficient resting period; and that it has been kept in a sufficiently cool place to prevent sprouting and without incurring danger of freezing. Seed poorly handled frequently give bad stands.

The quantity of seed required to plant an acre ranges from eight to twelve bushels. If large tubers are used, more will be required than when small ones are used. If the tubers are cut to one and two eye pieces, fewer bushels will be required than is indicated above. The width of rows and distances in the drills have considerable to do with the quantity required. Medium size tubers, cut to two eye pieces, are considered best. The tubers may be cut a few days before planting, or the same day. Most growers prefer to cut the tubers as they are planted. The potatoes should be cut lengthwise, dividing the seed end. The "seed end," or smaller end, contains the strongest eyes; therefore, each piece, as far as is practical, should contain some eyes from near the "seed end." A practice sometimes pursued is to plant the eyes of the potato and eat or feed the rest of it to stock. This should be discouraged, as it robs the young plants of reserve food which they should have.

Varieties.

It is hard to recommend one variety above another, as some are suitable for one locality and not for others. The Red Triumph, also called Bliss' Triumph, and Irish Cobbler are very popular in the South. The Cobbler is considered the best yielder, while the Triumph is a little earlier. There are later varieties that have given good yields. A few of them are Peerless, Burbank and Early Rose. Below is given a brief description of the best varieties.

Red Triumph:—Round, medium to large, skin red, thin, eyes large and deep set, flesh white, fine texture, good quality, extremely early, good yielder, recommended for the south.

Irish Cobbler:—Round, large to very large, skin creamy white, smooth, medium thin, eyes large, well formed, not very deep, flesh white, smooth texture, good quality, excellent yielder, very early, highly rec-

ommended, of better quality than Triumph and supplanting the latter in some sections.

PEERLESS:—Round, large, skin white, medium thick, smooth, eyes large, few, well developed, flesh white, fine texture, good quality, rather late, heavy yielder, recommended.

BURBANK:—Very large, oblong shape, skin white, medium thick, eyes few, large, well developed, flesh white, fine grained, good quality, has a tendency to crack on inside, heavy yielder, rather late in maturing.

EARLY ROSE:—An old standard, large, oblong, grayish white color, skin fairly smooth, eyes large, very deep, flesh tinged with pink, which is typical of variety, texture fine, good quality, good yielder, very early.

A number of varieties have been tried on the Station grounds, some were planted only one season, due to failure to secure seed. The yields for 1913 are smaller than for previous years on account of dry weather during the growing season. The yields are given in bushels per acre. See results below:

Variety tests of potatoes at Auburn.
YIELD PER ACRE IN BUSHELS.

NAME OF VARIETY	1910	1911	1912	1913
Peerless	195.5	198.9	-------	-------
Burbank	209.5	205¼	-------	40¼
Irish Cobbler	-------	299.37	193	27½
Bliss' Triumph	-------	251.84	304	32¾
Bovee	-------	100	-------	26
Isbell's First Early	-------	-------	47	-------
Improved Early Six Weeks	-------	-------	37.7	34¾
Admiral Dewey	-------	-------	43.5	-------
Early Ohio	-------	142	37.5	31
New Wonderful	-------	-------	37.5	-------
Pres. Roosevelt	-------	-------	51.5	-------
Early Michigan	-------	-------	59.3	-------
Isbell's Happy Medium	-------	-------	135	-------
Carmen	-------	-------	138¼	16½
Pure Early Rose	-------	-------	74¼	19½
Banner	-------	-------	165¼	-------
Burpee's Extra Early	-------	-------	276	-------
Dew Drop	-------	-------	83	44
Green Mountain	-------	-------	83	69½
Beauty	-------	50	83	38
Rural New Yorker	-------	-------	-------	47¾
Snowflake	-------	-------	-------	34¾
Sir Walter Raleigh	-------	-------	-------	44
Green Mountain, Jr.	-------	-------	-------	27
New Early Standard	-------	-------	-------	40½
White Star	-------	-------	-------	35
Early Houlton	-------	-------	-------	37¼

Fertilizers.

There are few crops that respond to fertilizers as quickly as the potato. To secure good results the fertilizer or manure must be applied judiciously. Fresh stable manure applied to the field at time of planting will greatly increase the diseases of the tubers. A good way to use such manure is to apply it to the soil the year previous to growing potatoes, and to grow first a crop of corn, peas, etc., so that the manure will have time to rot and to become thoroughly incorporated with the soil. If the manure is well rotted, it may be applied immediately to the potato field. A good practice is to apply it in the fall and winter and plough it under, thoroughly incorporating it with the soil.

Commercial fertilizer may be used with good results. It should be well balanced, containing the elements that may be deficient. A good proportion for most sandy soils is as follows:

8 per cent phosphoric acid.
4 per cent nitrogen.
10 per cent potash.

As a source of potash, sulphate of potash rather than muriate or kainit is preferred, since the sulphate does not contain chlorine, and, therefore, does not injure the quality of the tubers.

To use commercial fertilizers judiciously one should study the nature of the soil and vary the formula accordingly. A rich bottom will not need as large applications as the poorer soils. The amount needed will vary from 500 to 1500 pounds per acre.

As a rule for Alabama soils about 1000 pounds to the acre is recommended. The table below gives some results of experiments at Auburn with commercial fertilizers.

Most of the complete formulas were made up so as to analyze 8 per cent phosphoric acid; 4 per cent nitrogen; and 10 per cent potash, and the mixtures were applied at the rate of 1500 pounds per acre, at the time of planting.

On plot 1, the formula was approximately 6.5-3.25-8, but this mixture was applied in excess to give the same number of pounds per acre of phosphoric acid, nitrogen and potash as in the other formulas. While the

source of nitrogen was different, the quantity per acre was the same in each instance.

On plot 4, acid phosphate and cotton seed meal were applied at the rate of 750 pounds of each, or a total of 1500 pounds per acre.

On plots 9, 10, 11 and 12 the single fertilizers were used in the same amounts per acre as in the complete formulas.

Since nitrogen is the most expensive of the essential elements, the main object of these experiments was to find the best source of nitrogen for potatoes. In each of the first six formulas the form of nitrogen was varied. The comparisons are shown in the table below:

Acid phosphate and Thomas phosphate were compared as shown on plots 7 and 8. The average for two years shows only half a bushel difference per acre in the yields produced by these two phosphates.

Plot 6, which received a complete fertilizer containing dried blood used as the source of nitrogen, gave the highest average yield, with the highest average increase over the unfertilized plot.

Plot 4, fertilized with acid phosphate and cotton seed meal, in equal parts, gave second highest yield, with the second highest increase over the unfertilized plot.

Also observe that the omission of sulphate of potash on plot 4 did not reduce the yield as compared with that on plot 1, which received a complete fertilizer.

On plot 12, where potash was used alone, the average increase for two years, over the unfertilized plot was seventeen and a half bushels per acre.

On plots 7 and 8, acid phosphate was compared with Thomas phosphate. The 1912 results show Thomas phosphate in the lead, while the average for two years shows very little difference.

Comparing results on plot 9, 10, 11 and 12, on which the fertilizers were applied singly, cotton seed meal gave the highest average yield with also the highest average increase over the unfertilized plot.

Fertilizer experiments with Irish Potatoes at Auburn: bushels per acre.

Plot No.	Amt. fertilizer per acre	KIND OF FERTILIZER	1911 Yield per acre	1911 Increase over unfertilized	1912 Yield per acre	1912 Increase over unfertilized	1913 Yield per acre	1913 Increase over unfertilized	Av. 2 years Yield per acre	Av. 2 years Increase over unfertilized	Av. 3 years Yield per acre	Av. 3 years Increase over unfertilized
	Lls.		Bus.	Bus.	Bus.	Bus.	Bus.	Bus.	Bus.	Bus.	Bus.	Bus.
1	643	Acid Phosphate	151	55.4	173.9	94.8	72.6	38.9	123.2	66.9	132.5	63
	857	Cotton Seed meal										
	276	Sulphate Potash										
2	750	Acid Phosphate	196.3	100.7	172.4	93.3	93.3	59.6	132.9	76.5	154	84.
	300	Sulph. Ammonia										
	300	Sulphate Potash										
3	712½	Acid Phosphate	163	67.4	193.2	114.1	86.4	52.7	139.8	83.4	147.5	78.
	300	Cotton Seed meal										
	195	Sulph. Ammonia										
	288	Sulphate Potash										
4	750	Acid Phosphate	180.4	84.8	195.7	116.6	98.5	64.8	147.1	90.7	158.2	88.7
	750	Cotton Seed meal										
5		No fertilizer–Check	95.6		79.1		33.7		56.4		69.5	
6	728	Acid Phosphate			219.1	140	86.9	53.2	153	96.6		
	428½	Dried Blood										
	300	Sulphate Potash										
7	750	Acid Phosphate			70	—9.1	66.5	32.8	68.2	11.9		
	375	Nitrate Soda										
	300	Sulphate Potash										
8	706	Thomas Phos.			118	38.9	45.4	11.7	81.7	25.3		
	375	Nitrate Soda										
	300	Sulphate Potash										
9	750	Acid Phosphate			99.8	20.7	35	1.3	67.4	11		
10	428½	Dried Blood			163.3	84.2	42.8	9.1	103.1	46.6		
11	857	Cotton Seed meal			162	83	68.7	35.0	115.4	59		
12	300	Sulphate Potash			106.3	27.2	41.5	7.8	73.9	17.5		

Dried blood gave second highest yield. Acid phosphate alone afforded the lowest yield.

The rainfall at Auburn for the five months during which the spring crop is grown is given in the table below:

	Feb.	Mar.	Apr.	May	June	TOTAL
1912	5.01	9.62	10.13	2.46	7.08	34.30
1913	5.69	12.39	.90	2.12	5.11	26.21

The rainfall for March, 1913, was heavy and more than two-thirds of it fell within three days, and hence was largely lost by surface drainage. Notice that the rainfall for April and May in 1913 was very low compared with that in 1912. The shortage came when early potatoes most needed moisture.

Culture.

Before planting, the soil should be freshly harrowed. The rows should be made to suit the method of culture. When horse culture is used, the rows should be wider than when cultivated by hand. The usual practice is to make the rows 3½ feet wide and the hills 10 to 15 inches apart in the drills. The fertilizer may be distributed broad cast, or in the drills. When a small quantity is used, it is best to put it in the drills. When thus applied the fertilizer should be mixed with the soil by running a scooter plow in the furrow. The potatoes are cut and dropped twelve inches apart in the furrow and covered with soil to the depth of four to five inches. The depth of planting depends upon the system of culture and the time of year. Early planting should be deeper, as the plants should not appear above the ground until danger of frost is past. On a large scale the planting can be done by the use of potato planters. The small grower will seldom need to purchase expensive machines, except in cooperation.

Cultivation should begin as soon as the plants appear. It is often very important to harrow the field with a light weeder so as to break any crust that might have formed by the heavy spring rains. Crust formed on the surface may prevent good germination, causing the stand to be irregular. The best implement for regular cultivation is the five-tooth cultivator of the Planet, Jr., or Iron Age type, or the two-horse corn cultivator, equipped with narrow blades. The cultivation should be shallow to avoid hilling. Level culture is best on well drained soils. The old method of hilling is not recommended as it allows too much moisture to

escape. The main objects of cultivation are to conserve the moisture, keep down the weeds and liberate plant food. Let cultivation begin as the plants appear and continue at intervals of a week or ten days, until the vines begin to bloom or spread over the rows. Do not cultivate deeply nor so near the hills as to interfere with the root system. Deep culture near the rows breaks the roots and reduces the crop. Sufficient hilling may be allowed at the last cultivation to prevent the sun's burning of the tubers near the surface. As a rule the ridges should be only a few inches above the middles. Hilling increases the evaporating surface.

Insects and Diseases.

The chief insect enemy of the potato is the Colorado potato-beetle, known usually as the "Potato Bug." The adult beetles do very little harm, the young (larvae), however, are heavy feeders and soon defoliate the plants. The insect may be easily controlled, however, without any harm being done the plants. The best remedy is:

1 pound of powdered arsenate of lead.
3 pounds of quick lime.
50 gallons of water.

Mix the arsenate of lead with a small quantity of water. In another vessel slake the lime. Fill barrel two-thirds full of water, then strain the slaked lime, and dissolved arsenate of lead into the barrel through a wire gauze containing 18 to 20 wires to the inch. Add water to make 50 gallons.

A good practice is to destroy all rubbish piles about the field which may furnish hibernating places for insects.

The "Flea Beetle" sometimes injures the plants, biting small holes in the leaves. This insect is easily controlled by the use of arsenate of lead as given above.

The blights are frequently serious on the potato. The "early blight" causes the foliage to turn yellow, which results in the death of the plant before it is mature. The other form is known as "late blight" or rot. It affects the leaves and stems, causing them to turn black and die; later this disease causes the tubers to rot.

The best treatment for blights is to spray thoroughly with Bordeaux Mixture, using the 4-5-50 formula. Dissolve four pounds of copper sulphate in twenty-five gallons of water, best done by placing the Copper Sul-

phate in a gunny sack and suspending in the water. Slake the lime, and dilute to make twenty-five gallons of water. Pour the two solutions together in a third vessel. Strain through a 20-wire mesh to free the solution from lumps. It is then ready for use as a spray. As many as five or six applications should be given, spraying every week or ten days. The first spraying should be given when the plants are from 4 to 6 inches high. Arsenate of lead may be added to the Bordeaux Mixture, thus making the mixture a combined insecticide and fungicide.

To reduce diseases use only clean seed, discarding all tubers showing signs of decay, and burn diseased foliage.

Another serious disease of the potato is the "Potato Scab," which appears as rough corky spots on the surface of the tubers. This disease lives in the soil and on stored potatoes, whence it is transmitted to the new tubers. The common method of eradication is to treat the seed before planting, with a disinfectant, such as formalin, or corrosive sublimate, as follows:

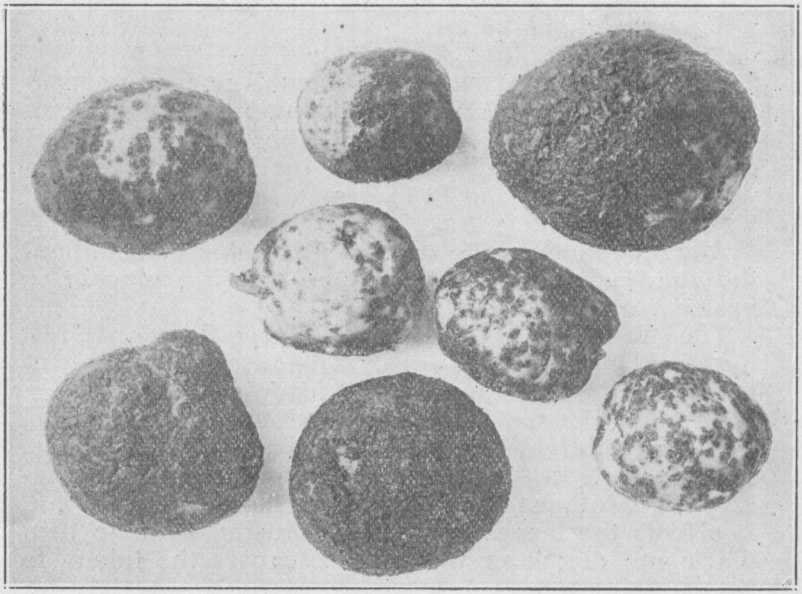

FIG. 1.—POTATO SCAB.

Photo furnished by Bureau of Plant Industry, U. S. Department of Agriculture.

1 pint of formalin.
30 gallons of water.
Soak seed two hours prior to cutting.
Or the following:
2 oz. of corrosive sublimate.
16 gallons of water.
Soak seed one and a half hours prior to cutting.

Both of these solutions are poisonous and should be handled with great care, and kept out of reach of children and live stock.

In spraying potatoes great care should be exercised to cover all parts of the plant with the mist. It is just as important to spray the under side of the foliage as

FIG. 2.—SPRAYING POTATOES.
A cheap and efficient outfit for spraying potatoes.

the upper side. Unless the spraying be thoroughly done one cannot expect the best results. Spraying is for prevention of disease rather than for cure. It should, therefore, be done at the proper time. For small areas, (a few acres) a barrel pump is all that is necessary. Consult catalogues of spray pump manufacturers for such machines or for larger ones.

Harvesting.

Potatoes are dug by hand or by horse power. The best implements for hand digging are the pronged hoe and the spading fork. These answer where there is only a very small crop to be harvested and where labor is cheap. The tubers are turned out and picked up by hand.

The horse-power methods make use of plows or potato diggers. There are several types of diggers that have proved satisfactory. The best types do not have mold boards, but have iron or steel fingers instead, which allow the soil to pass through, leaving the potatoes on the surface.

The one-horse turning plow is frequently used, but it is a poor implement for this work, as it cuts a large number of the tubers and leaves quite a quantity hidden in the earth. The single stock, or plow with a broad shovel, is sometimes employed, but has the same disadvantage as the turning plow.

The potatoes are gathered in one-half bushel and bushel baskets, and emptied into bags and barrels which are used for shipping the product to market. They should be picked up promptly, as it is not desirable to allow them to lie for any length of time in the hot sun.

Grading is usually done in the field by experienced hands. Screens or rotary cylinders are used, being so arranged as to allow all tubers under a certain size to pass through, and the large ones to roll off into bags, or barrels. For potatoes harvested prematurely, this screening is not satisfactory, as it bruises the tubers badly.

For shipping, the ventilated barrel is most commonly used, while bags, hampers and crates are used for express shipments. Most potato planters grow the spring crop for early market; consequently they do not wait for the crop to fully mature. As soon as the tubers are large enough they are dug and put on the market.

Shipping.

The size and kind of shipping package depends upon the crop handled and the distance of shipment. The packages are not standard for handling the early crop. The barrel is nearest to being standard, and is supposed to hold three bushels, but frequently it holds only eleven pecks.

When the industry has developed in any locality sufficiently to allow of car-load shipments, it is possible to ship to the most northern markets at less cost. Where there are a number of growers at one point they may form a "Shippers Association" combine their shipments, and realize a greater profit. The officers of the association watch the grading and keep in constant touch with the markets by wire. In this way the best markets may be found. A common practice is for the manager to ship the car to himself at some nearby point, and while the car is moving to that point, the shipper receives telegrams from what he believes to be the best commission houses. By the time the car is nearing the diverting point, the place of destination is decided upon and the car is re-billed to it. In this manner the car is put into the best markets and better distribution is secured, with its attendant advantages.

Quite frequently the associations may have buyers come to them, and their product is then sold f. o. b. shipping point. Selling in this manner has many advantages. It saves the grower much expense and the risk of selling in glutted markets. In this manner the market is brought to the grower instead of the grower to the market.

The prices of potatoes change from year to year, due to the quantity and quality of old potatoes held over in storage, and the size and quality of the new crop. The 1914 crop was a rather large one, much of which has doubtless been stored, and hence may come in competition with the spring crop in the South. Early potatoes of good quality and size usually command a good price, often as much as $5.00 to $6.00 per barrel, while the average price is $2.00 to $3.00 per barrel.

Frequently the farmer wishes to keep some of his spring crop for home consumption. In order to do this he must have a place to store them. If a cool, dry, airy, dark place can be provided, potatoes will keep quite easily. The basement of a bank barn is a very good place for storing potatoes. Light must be excluded and there must be enough moisture to prevent shrinkage, with sufficient air circulating to prevent rotting.

The Fall Crop.

The fall crop is important, but little has been done, however, to determine the best methods of culture. Getting seed potatoes to germinate is the chief obstacle. The usual custom is to use small potatoes from the spring crop. These are placed on the ground in thin layers in the shade, then covered with gunny sacks or sand and kept moist. When the time for planting comes tubers that have begun to sprout are taken up and planted without being cut in pieces, care being used not to break off any of the sprouts.

The soil for the fall crop should be kept in a good state of cultivation so as to preserve the moisture. This is done by breaking the ground early in the spring and pulverizing it to prevent the loss of moisture by evaporation. The ground may be first planted in some spring crop, such as beans, that could be given continuous cultivation.

The fall crop should be planted about July first to fifteenth, in the northern part of Alabama, and August fifteenth to September first, in the southern part of the State. The best time at Auburn, is about July fifteenth to twentieth.

In planting the fall crop it is best to make the furrows rather deep so as to be able to cover the tubers from four to five inches and leave the furrows partly filled or the surface practically level. S metimes the soil is firmed with a light roller so as to press the soil closely about the potato, which favors germination.

The culture should be given with an implement that will thoroughly pulverize the soil and leave the land level.

There is considerable difference of opinion as to the best variety to use for the fall crop. In South Alabama, the growers use seed from the spring crop, while in North Alabama, many of the growers prefer to use Lookout Mountain, which is solely used for the fall crop. Some growers report excellent yields from the Lookout Mountain variety, while others obtained only low yields. The tubers from this variety are often small and irregular.

The Lookout Mountain variety is unsuitable for the spring crop. When planted at the proper time for the fall crop (late in June or early in July) the tubers mature late in the fall.

If tubers are stored in a cool place they keep in sound condition until the following May or June, at which time sprouting begins.