MARYLAND COOPERATIVE EXTENSION
UNIVERSITY OF MARYLAND
COLLEGE PARK•EASTERN SHORE

Fact Sheet

Fact Sheet 465

Growing White Potatoes

Potatoes have been gro
North America for several
hundred years. Because
large yields could be
achieved on small areas
of land, potatoes quickly
became a popular crop.
Potatoes are high in comp
carbohydrates and low in
ing them popular with to
health-conscious consume
Maryland farmers conside
ing into additional vegetable crops, production of potatoes for direct marketing might be an option to consider.

Unlike most vegetables produced for local markets, potatoes can be sold throughout the year if stored properly. A grower who can produce and store high quality and different or unusual varieties of potatoes can market them along with other commodities throughout the year.

Types and Varieties

Potatoes are available in several skin and flesh colors, and specialty types might become popular if marketing efforts are made by growers. As markets are developed for specific types, production can be expanded to accommodate the market demand.

The following varieties have been grown for many years and are still recommended for Maryland:

'Superior'—Early season; suitable for table stock; resistant to scab; verticillium wilt susceptible;

'Katahdin'—Late season; good yield potential; resistant to leaf roll; susceptible to scab; and

'Kennebec'—Medium to late season; good yield potential; tolerant to leaf blight; susceptible to ver-

wilt; does not store
particularly well.

These varieties
have been grown for
a number of years and
have proven perfor-
mance in Maryland.
ility of seed stock
ies should be good.
plant only certified
e problems.
-skinned and white-fleshed. In order to find varieties that might provide a special niche in the local market for your operation, first talk to potential buyers to determine their needs, then try potential new varieties on your own farm to find the ones best suited to your location.

Field Selection

In order to produce good yields of high quality potatoes, select sites with well-drained, loamy soil. Soils that are loose and easily tilled produce well-shaped tubers that are easier to harvest. Tight or heavy soils tend to produce misshapen tubers that mature more slowly than in a lighter soil, and harvest is more difficult. Planting in wet soils often results in poor emergence, and many times the tubers harvested from these fields do not store well.

Sites that are highly susceptible to erosion should be avoided because of the tillage required prior to planting and the soil disturbance at harvest. Cover crops such as rye or wheat will often help to protect the soil during the winter. Rye or wheat should be planted at a rate of 100 to 120 pounds per acre by mid-October. If seeding of a cover crop is delayed beyond mid-October the soil

protection from the cover crop will be reduced, but the cover crop will still be of some benefit.

Proper crop rotation can greatly enhance potato quality by helping to reduce disease, insect, and weed problems and can help increase soil organic matter content.

Sites with inherently lower pH are better suited for potato production than soils with a high pH. Although potatoes grow well at higher pH, a disease called scab is more likely to cause an infection of the tuber when the pH is above 5.5. Therefore, the pH for white potatoes should be held below 5.5 if common scab is a problem.

Field Preparation and Fertilization

Once a field has been selected it is essential that the soil be tested. As noted, high pH can result in disease problems from scab. If lime is required to raise the pH, it is better to apply the lime before the rotation or cover crop is planted. Apply the lime on a regular basis, if needed, in small amounts to maintain the pH in the range of 5.0 to 5.5 if common scab is a problem.

Follow recommendations from the soil tests to help achieve high yield. The crop will require 125 to 150 pounds of nitrogen per acre, with 50 pounds being broadcast and disked in prior to planting and the rest being band-placed with the planter. It is very important that nitrogen not be overapplied because excessive rates can depress yields, delay maturity, and decrease the quality of the tubers. Phosphorus, potassium, and magnesium are also important nutrients and should be applied based on soil tests. Growers with lighter soils should reduce the application rate at planting and apply the balance of the fertilizer as an early sidedress before plants are 8 inches tall.

Prior to planting, the field should be plowed, disked and harrowed, leaving the surface fairly smooth, yet loose. Be sure to check field records for previous use of residual herbicides that could harm the potato crop. Any restrictions on planting certain crops after herbicide applications are listed on herbicide labels.

Planting and Spacing

Potatoes should be planted between March 10 and April 5 in most of Maryland. At planting, soil temperatures should be at least 45 to 50°F at a depth of 2 to 3 inches. Best emergence is usually attained when soil and seed are at 55 to 60°F. Generally it takes about two weeks for sprouts to break through the soil surface, so frost should not be a problem.

Space seed pieces 6 to 14 inches apart in the row with 32 to 36 inches between the rows. Precise spacing will depend on size of seed pieces and the accuracy of the planting equipment. Closer spacing should be used for larger cut seed pieces and wider spacing for whole seed (also referred to as B-sized tubers).

Seed potatoes should be given a warming period of two to three weeks at 65 to 70°F before planting to encourage rapid emergence. Seed pieces should weigh 1 1/2 to 2 ounces and have at least one eye. Blocky pieces generally result in better yields than thin pieces, and pieces with fewer cuts are preferred. Seed should be treated immediately after cutting. For each 100 pounds of seed, dust with 1 pound of:

Captan 7 1/2% dust, or
Polyram 7% dust, or
maneb 8% dust, or
Topsin 2 1/2% dust.

If not planted immediately, seed should be stored under high humidity conditions at 60 to 70°F to promote suberization or healing of the cut surfaces.

Cultivation and Hilling

Timely cultivation will help to control weeds and thus reduce competition for water, nutrients, and sunlight. It can also improve aeration and help to incorporate herbicides. An additional important benefit of cultivation is protection of the developing tubers from the sun by forming hills over the rows. Hills that are large and wide are generally better than tall, narrow ones. The top of the hill should be 6 to 8 inches above the seed piece.

Irrigation Management

Water applied as irrigation must be carefully managed. Water stress, irregular irrigation or rainfall, or excessive amounts of water can cause tuber problems such as hollow heart, cracking, knobbiness, and other abnormal shapes. If irrigation is available it is important that the crop be evenly watered on a regular basis.

The goal of irrigation management should be to maintain adequate soil moisture throughout the growth of the crop while avoiding moisture extremes and excessive fluctuations of soil moisture. Water must be applied prior to water stress. Large amounts of water applied during hot summer weather can greatly increase the chance of disease occurrence.

Pest Management

The first step in dealing with any pest problem is proper identification, because effective and economical control strategies for weeds, insects, diseases, and nutritional disorders depend on proper diagnosis. Once the cause has been identified, an integrated approach can be followed to reduce the impact of the pest or disorder. Recommendations for specific pests and disorders can be found in current revisions of EB 236, "Commercial Vegetable Production Recommendations," which is available from your local Maryland Cooperative Extension office.

Weeds

Field history can provide a great deal of information on anticipated weed pressure and help in selecting an herbicide program using both preemergent and postemergent materials. Field history can also help track crop rotations, which can be used to help reduce insect and disease problems.

Diseases

Disease organisms can be carried in seed pieces. Always buy certified seed to reduce this possibility. Crop rotation will also be of benefit, as will selection of disease-resistant varieties when available. The fungicides available for protecting potatoes from fungal diseases are generally protectants. As such, fungicides need to be applied before a disease organism becomes established; they are not effective in eliminating a disease.

Check EB 236 carefully for the listing of potato diseases and the recommendations for chemicals to reduce losses from them.

Insects

A number of insects damage potato, including Colorado potato beetle, flea beetle, leafhopper, European corn borer, several types of aphids, and potato tuberworm. Insecticides are available for growers who wish to use them. Sampling techniques and economic thresholds for insecticide application are given in EB 236, along with cultural strategies and recommended insecticides that can be used to reduce losses.

New strains of some potato varieties are being developed that carry the Bt gene. This gene genetically alters the plant to produce a protein that is toxic to Colorado potato beetle, so foliar insecticides for that beetle would not be needed. If you grow these potatoes, be sure to follow recommended strategies for resistance management.

Harvest and Storage

Since potato tubers are living tissue, they will respire, giving off carbon dioxide, moisture, and heat. For maximum storage life, harvest tubers after they have matured. This usually occurs after the vines have died. Killing potato vines before harvest with a vine dessicant might be necessary in many situations to stop tuber growth, stabilize tuber solids, and promote skin set. Most varieties require ten to fourteen days or longer after vine kill before they are ready to harvest. Tubers harvested after the vines have matured and died have a firmer skin, are more resistant to bruising, and respire at a slower rate.

Care should be taken not to cut or damage the tubers during harvest. They should not be exposed to light for prolonged periods, or they may begin to develop green color.

The quality of tubers in storage will not improve; therefore, it is a good idea to grade out any tubers with obvious damage or rot symptoms before they go into storage. In order to achieve best storage results, tubers should go through four separate periods in storage. First is the curing period immediately after harvest. During this period the tubers heal and their skin sets and thickens. This is accomplished by maintaining a temperature of 50 to 60°F, a relative humidity of 95 percent, and good air circulation through the potatoes. The curing period usually takes ten to twenty-one days.

Next is the cooling period, which requires gradually lowering the storage temperature 3 to 5°F per week until a temperature of 38 to 40°F is reached. This leads to the holding period, where the temperature should remain from 38 to 40°F with a relative humidity of 90 to 95 percent. It is important that temperature not vary more than 2 to 3°F. If these three periods are managed properly, the tubers can remain in good condition up to forty weeks. The final step is the removal period.

Before the tubers are removed from storage the temperature should be warmed to 45 to 50°F. This procedure will help prevent injury from handling.

Marketing

With increased interest from area grocery store chains there is the possibility that larger growers or a number of smaller growers could work together to sell to local stores in the chain. Grading and packaging would be critical to the continued success of this type of venture. It might also be possible to market stored potatoes along with other produce to restaurants throughout the harvest season. This could help to strengthen the relationship with the chef, especially when main-season produce comes in.

New potatoes are also popular at roadside stands and farmers' markets. Grading and packaging are less of an issue here, but quality must be superior in order to get consumers to think of buying their potatoes at the stand instead of the grocery store. Specialty shaped, sized, or colored potatoes often require hand harvest and have lower yield poten-

Costs and Returns

Costs per acre

Item	Amount	Cost
Potato seed	1,300 lb. @ $16.00/cwt.	$208.00
Fertilizer	1,000 lb. of 10-20-20 @ $0.14/lb.	140.00
	100 lb. of urea @ $0.17/lb.	17.00
Pesticides		
Admire 2F	13.25 oz.	58.38
Asana XL	7 oz.	7.23
Bravo 720	1 pt., 3X	19.56
Dual 8E	2 pt.	17.50
Lorox 50DF	1 lb.	11.91
Manzate 200	2 lb., 3X	199.80
	Total cash costs per acre	$679.38
Returns		
Yield of 20,000 lb. per acre @ $0.12 per lb.	$2,400.00	
Return above cash costs	$1,720.62	

Note: In addition, there will be costs that must be considered: labor, equipment, irrigation, containers, land, etc.

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Growing White Potatoes

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