



## Department of Horticulture

Purdue University Cooperative Extension Service • West Lafayette, IN

# Potatoes

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The potato, *Solanum tuberosum*, is an annual, cool-season plant belonging to Solanaceae, the Nightshade family. The Irish (white) potato, a longtime favorite of home gardeners, is so named for the potato famine which occurred in Ireland during the 1800's. Both red and white skinned potatoes are commonly grown. Other colors, including blue, pink, and yellow, are also naturally occurring, but seldom grown. Optimum yields of potatoes are achieved during a long, cool growing season, making them best suited to the northern tier of United States. However, satisfactory yields can be achieved in Indiana by following recommended practices.

The potato has good nutritional value. One medium sized potato (about 1/3 pound) supplies 35% of the U.S. recommended daily allowance of Vitamin C, 6% protein, and 10% iron, as well as other vitamins and minerals, yet only has 100 calories. The edible portion of the plant, the tuber, is an underground modified stem structure; the "eyes" are the buds which sprout shoots.

## What to Plant

Potatoes are usually started from "seed pieces" of the tuber due to the undependable nature of seed production and the variability of seed-grown plants. Some potato cultivars such as Explorer may be available from true seed but require a rather long growing season. Starting true seed indoors about 6 weeks prior to outdoor planting is advisable to get a head start on the growing season. Yield is typically low compared to cultivars started from tuber seed pieces, making true seed cultivars mainly of interest for container culture rather than high production.

Use only healthy, certified disease-free tubers of known origin for "seed." Do not use tubers purchased for table consumption, because these are usually treated with a growth inhibitor to prevent sprouting. Cut the tubers into seed pieces about 1-2 ounces each, making sure that each piece has at least one bud (eye). Plant the pieces immediately after cutting, and avoid exposure to sun and wind. Seed pieces can be dusted with either captan or zineb fungicide, but such treatment is not necessary. Plant the seed pieces 9-12 inches apart in furrows 2-3 inches deep. Allow 24-36 inches between rows.

If planting must be delayed for several hours or longer, the surfaces of cut seed pieces should be allowed to suberize or heal before planting. Store the cut pieces at 60-70°F and 85% relative humidity. The seed will be ready to plant in 7-10 days. Small potatoes of 2-3 ounces (B size) can be planted without cutting and offer more protection from disease. Potato "eyes" (small tuber sections containing a single bud), offered by some garden suppliers, are acceptable but tend to produce lower yields.

Certified disease-free seed potatoes can be purchased either locally or through mail-order firms. Local garden suppliers usually carry only a small number of cultivars, while mail-order companies may offer cultivars which are not available locally. The following cultivars are recommended as being particularly adapted to Indiana.

## Cultivars

### Red

Red Norland: Light red skin, round to oblong tubers with white flesh, smooth skin, shallow eyes. Early Season.

Dark Red Norland: Improved red color. Early - Mid Season.

Red Pontiac: Thin skin, crisp white flesh, large yields, tolerates heavy soil. Mid-Season.

### White

Superior: Round tubers, large spreading plants. Early - Midseason

Gold Rush: Oblong - long tubers, dry white flesh. Mid Season

Katahdin: White, round, thin-skinned, good drought resistance. Mid - Late Season

Kennebec: Round to oblong, large tubers. Mid - Late Season

## Others

Yukon Gold: Yellow flesh and skin, good sized tubers, also small plant size allows closer spacing. Early season.

Purple Chief: Purple skin with white flesh, large, long tubers, mid-late season.

All Blue: Blue skin and flesh. Late Season

Fingerling types: vigorous vines produce long, narrow tubers, generally late-season.

Butterfinger: crescent, russet skin, yellow flesh, high starch.

Rose Finn Apple: Rosy skin with intense yellow flesh tinged with red, firm, waxy texture.

Russian Banana: Yellow skin and flesh, firm texture.

## Planting

A well-drained, loamy soil is ideal for potato production. Heavy clay or poorly drained soils tend to produce misshapen tubers. Sandy soils tend to be droughty, leading to premature plant death. Soil pH should be maintained below 5.2 if possible to prevent infection of potato scab disease.

Work the soil deeply before planting. A soil test for fertilizer requirements is advised if none has been taken in the past 3-4 years. In the absence of a soil test recommendation, work in 2-3 pounds of a balanced, low analysis fertilizer such as 12-12-12 per 100 square feet.

Potatoes can be grown in 5-gallon size or larger containers as long as well-drained and well-aerated soil is used and drainage holes are provided at the bottom of the containers. Container soil tends to be warmer and dries out faster than the soil in traditional garden plots. Due to their smaller size, plants started from “eyes” or true seeds are better suited to container culture than those grown from seed pieces.

Early-season potato cultivars should be planted as soon as the soil is dry enough to work in early spring. Late-season cultivars should be planted later in spring, until about mid-June, so that tubers will develop during the cool fall season. Late cultivars are recommended if winter storage of potatoes is desired.

## Summer Care

Hilling the soil up around the plants after they emerge will help protect the tubers from “sunburned” or greened skin. Gradually build up a ridge 4-5 inches high as you culti-

vate to control weeds. Maximum tuber formation occurs between 60 and 70°F, and tubers will not form when soil temperatures are above 80°F. Watering during dry periods will help to ensure uniform tuber development and will also help cool the soil. Be sure to soak the soil to a 6-8 inch depth when you water. Apply a summer mulch around the plants to help control weeds, conserve soil moisture, and cool the soil.

## Fruit Set

Under certain environmental conditions, some cultivars of potatoes will produce a number of small, green fruits that resemble tomatoes (a close relative) on the above-ground part of the plant. However, potato fruits are poisonous due to the presence of a substance called “solanine.” Fruit production in potatoes is variable year to year and may never occur on some cultivars. The seeds contained inside the fruit will produce a potato plant, but such plants will likely show considerable variation from the parent cultivar and will require a very long growing season to produce mature tubers.

## Insects and Diseases

Flea beetles, Colorado potato beetles, leafhoppers, and wireworms are the most common insect pests of potatoes. (See E-21 for more information.)

<<http://www.entm.purdue.edu/Entomology/ext/targets/e-series/EseriesPDF/E-21.pdf>>

Potato scab is a disease common to some cultivars which are grown in alkaline soil. Early blight and late blight are also common diseases of potatoes in Indiana. Plant certified, disease-free tubers of cultivars with good scab resistance. Lowering pH to a range of 5.0-5.5 will decrease the incidence of scab infection. Have your soil tested to determine its current pH, and apply sulfur to lower pH if necessary. Table 1 offers guidelines for sulfur application rates. (See BP-8 for more information)

<<http://www.agcom.purdue.edu/AgCom/Pubs/BP/BP-8.html>>

Table 1. Pounds of sulfur per 100 square feet required to lower soil pH to 5.5.			
Current Soil pH	Soil Type		
	Sandy	Loam	Clay
8.5	5	6.5	8
7.5	2	3.0	4
6.5	1	1.5	2

## Harvest

For “new” potatoes, tubers can be dug before maturity throughout the summer and early fall. For storage, harvest mature potatoes after the tops have yellowed and begun to dry. Do not leave the tubers in the ground after the plants die back, because they may rot or resprout new stems if weather is warm and moist. Lift the tubers with a potato fork or garden spade, taking care to avoid injuring the tubers. Sort through the tubers at digging time; those with cuts, bruises, or diseases should be discarded or used immediately. To prepare potatoes for storage, cure them for a week or two at 65-70°F and 85-90% relative humidity to allow the skin to toughen and wounds to heal.

## Storage

After curing, store the tubers in complete darkness at 40-45°F and 90% relative humidity. Potatoes can be stored from 2-9 months, depending on the cultivar and storage conditions. Late cultivars generally can be stored for the longest period. Prolonged exposure to temperatures below 40°F causes the starch of the potato to convert to sugar, resulting in a peculiar sweet flavor. This conversion can sometimes be reversed by placing the tubers at 70°F for a week before using. Prolonged temperatures above 45°F result in sprouting.

## Sunburn or Greening

Potato tubers will produce chlorophyll and turn green when exposed to light. Exposure to light also leads to production of solanine, a toxic alkaloid. The amount of solanine produced increases with the length of exposure and intensity of the light. Potatoes will turn green and accumulate solanine if grown too close to the soil surface and/or stored under even low light conditions. Although it is the solanine and not chlorophyll that is toxic, most of the solanine is concentrated in the skin of the tuber, so that peeling the green portion away should remove most of the toxin. Sprouting eyes or buds also are high in solanine and should be removed before eating. Do not rely on cooking to destroy solanine.

## Sprout Prevention

Storing potatoes at the proper temperature is the most practical way for homegrowers to prevent sprouting in storage. Commercial growers often use a chemical sprout inhibitor. Maleic hydrazide (MH-30) should be applied according to label directions, 4-6 weeks before the expected harvest date. This material must be applied while the tops are still green, so that the chemical can be translocated through the stem down to the tubers. Obtaining small, home-grower sized packages of this chemical will be difficult. Tubers which have been treated to prevent sprouting cannot be used for "seed" for next year's crop.

*Janie Nordstrom Griffiths assisted in the revision of this manuscript.*