Nuts and Berries

Persimmon

Junior Varsity
Lake Shelbyville Eco-Meet 2025

US Army Corps of Engineers®

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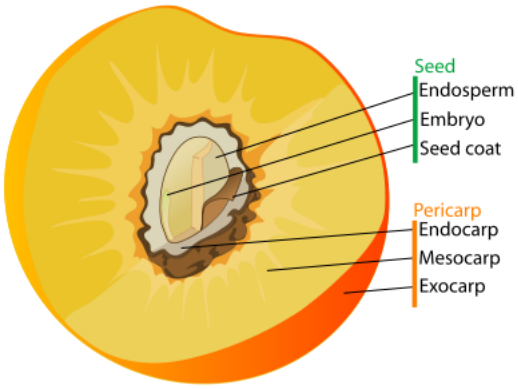
The forests and prairies of Illinois are lucky to play host to a wide variety of fruit bearing plants. These nuts and berries have fed and nourished generations of Illinoisans throughout the modern era and prehistory. This study guide aims to answer several basic questions: What are nuts and berries? How can they be differentiated? What are some common nut and berry fruit types in central Illinois? What makes nuts and berries important?

WHAT ARE NUTS AND BERRIES?

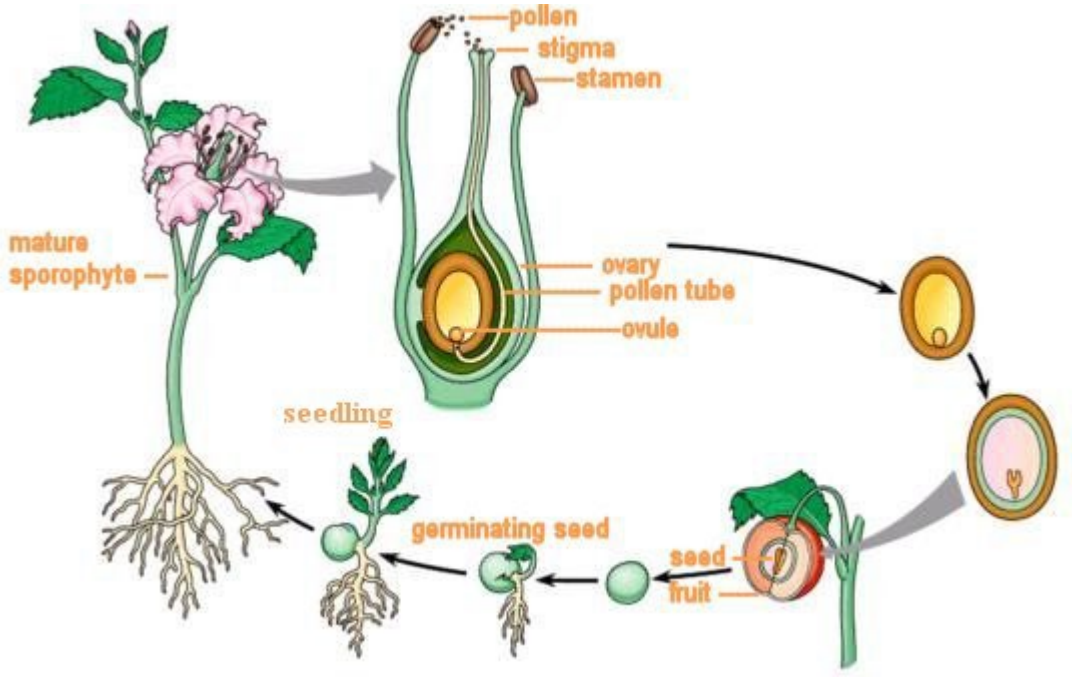
Both nuts and berries are a type of fruit. In botanical terms, a fruit is a mature ovary from a flower. Fruits are the means by which many plants distribute and disseminate seeds. Every fruit thus contains one or more seed. Seeds have the potential to germinate and grow into a new plant.

This botanical definition is significantly different than the "common" English/culinary definition of fruits. By scientific standard, many cereal grains, squash, pumpkins, and tomatoes and other culinary vegetables are botanically considered fruits, despite their often un-sweet flavor and/or non-fleshy composition.



The major difference between berries and nuts is the texture of the *pericarp* (the full developed ovary wall; also called the fruit wall, see diagram to side).

Fruit Formation



After pollination—where pollen from the stamen (the male part of a plant's reproductive system) reaches the pistil (the female portion) and connects to the ovule—a seed begins to develop inside the flower's ovary. As the seed matures, the ovarian wall begins to change form; it may become fleshy (as in berries) or turn into a hard outer coating (as with nuts). It is this ovarian wall that forms the fruit. In some plants, other parts of the reproductive body may ripen and fuse with the ovary (often the stamen or the flower's petals) to form the fruit; these are termed *accessory fruits*. Pears and strawberries are both examples of accessory fruits—in pears, the edible fruit is actually a swollen portion of the plant's stem, and in strawberries, the edible, fleshy portion of the fruit is the engorged receptacle (or base) of the flower.

WHAT IS A BERRY?

Botanically, berries are defined as a fleshy fruit which develops from a single ovary. Examples of fruits that meet this scientific definition of berries include: cranberry, grape, currant, mayapples, watermelon, and bananas. However this definition excludes raspberries, blackberries, and strawberries, which contain the fruit that have developed from several ovaries in a single flower (see raspberry example below).

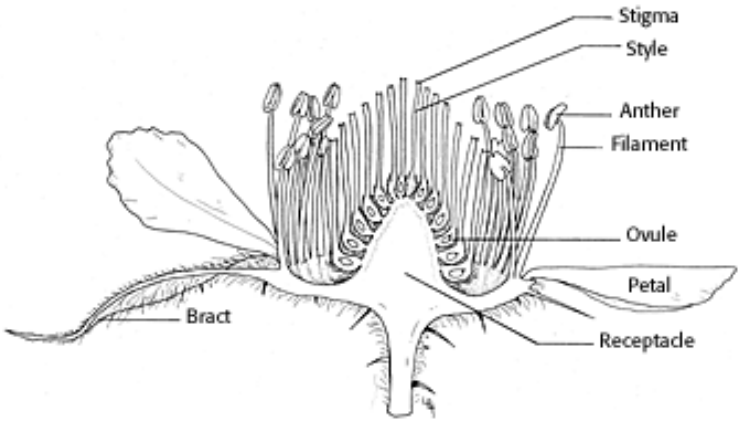
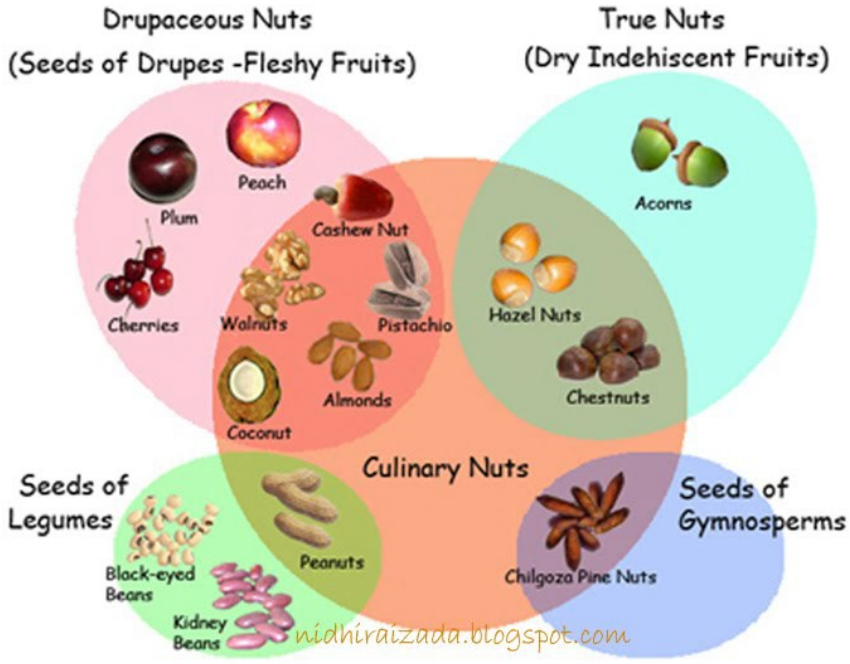


Figure 167. - Longitudinal section of 'Willamett' raspberry flower, x10.

In this cross-section of a raspberry flower, the clearly-labeled stigma, style, and ovule form the pistil (the female portion of the flower), while the pollen-bearing anther and filament make-up the stamen (the male portion of the flower). Each fertilized ovule will develop into a seed, making this raspberry an *aggregate fruit* instead of a berry.

Most berries are bright colored and many have developed a sweet flavor, which appeal to animals, who help disperse the seeds inside the berry through their fecal matter (or *scat*).

WHAT IS A NUT?



An Euler Diagram showing the overlaps between the True Nuts and Non Botanical Nuts in the Culinary sense

This diagram provides some examples of the difference between botanically termed “true nuts” and other fruit types that are often mistakenly referred to as nuts.

In botanical terms, a nut is a simple dry fruit with a single seed in which the ovary wall becomes very hard. Nuts are a combination of the seed and fruit—the fruit does not open up to release the seed, and the seed remains attached. Common examples of nuts include: hazelnuts, chestnuts, and acorns. Nuts should not be confused with legumes (another classification of fruit), like peanuts, which contain more than one seed per fruit or shell.

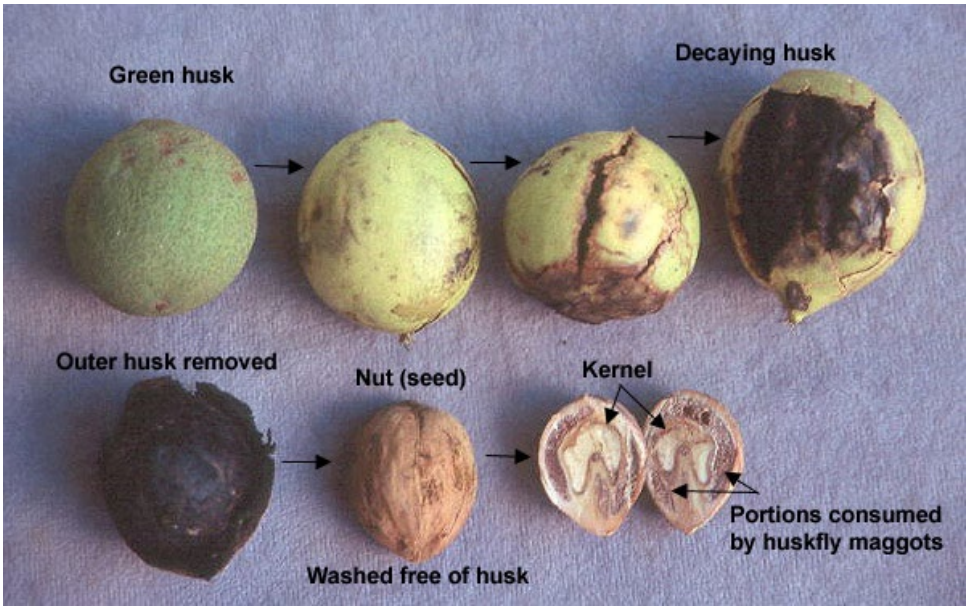
WHAT IS THE SIGNIFIGANCE OF NUTS AND BERRIES?

As fruits, nuts and berries provide protection for the seed(s) which they encase. Fruits are the primary method by which plants distribute their seeds, and ensure future survival of the species. Many edible fruits (especially berries and drupes (another classification of fruit, distinguished by a hard, stone-ey center, that includes peaches, olives, and cherries)) have developed symbiotic relationships with animals and humans, who place a high value on their unique flavor. A symbiotic relationship is an ecological term for an interaction between two (or more) different species where all species benefit from the relationship. A symbiotic example involving fruit: a raccoon eats a raspberry, and is nourished by the fruit's nutrition; after the raspberry has progressed through the raccoon digestive system, the seeds are excreted (away from the original mother plant) in the animal's feces, a natural fertilizer.

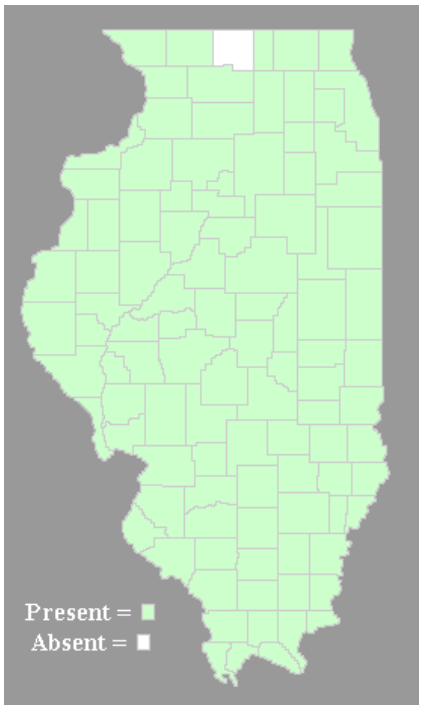
Symbiotic relationships with plants the produce nuts and berries are especially important from a human perspective. For centuries, humans have relied on the healthy properties of nuts and berries as an important source of food. Native Americans would harness the impressive nutritional value of acorns (which can contain up to 18 percent fat, 6 percent protein, and 68 percent carbohydrate as well as vitamins A and C and many amino acids: National Archives, Native American Acorn Culture) by grinding them into flour and making a mush or bread. Early European settlers, too, would collect the forests' bounty by harvesting berries found in the forest. Today, the fruit industry in America employs thousands and generates millions of dollars in revenue.

The following list provides a brief introduction to some common nut- and berry-producing plant species that can be found in the local area. Most are native; however, some have been introduced and are specifically cultivated for human consumption. Eco-Meet participants should focus their studies on fruit identification and the information included in the *Notes* section of each listing, along with the above introductory information. This information has been adapted from the Illinois State Museum's *Forest Tree Guide* (accessible online at http://www.museum.state.il.us/muslink/forest/htmls/trees.html), the Illinois Department of Natural Resources' *Forest Trees of Illinois* Guide Book (2009 Edition), and the Univeristy of Illinois Extension Office's urbanEXT gardening reference program.

BLACK WALNUT



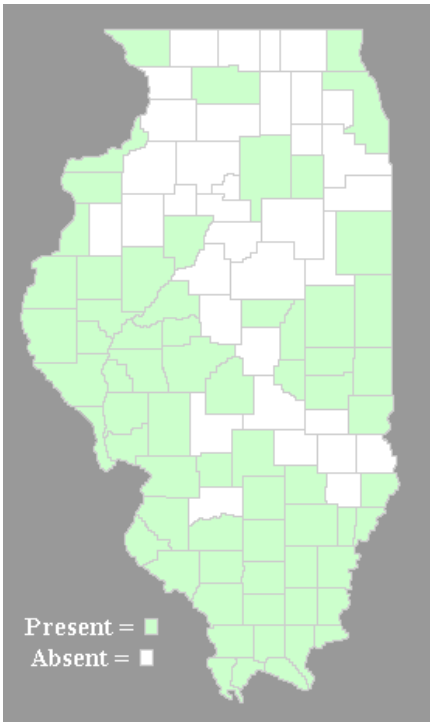
Fruits are borne singly, or in pairs. They are spherical, up to 2 inches in diameter, with a thick, warty husk that covers the fruiting body (unlike the black hickory, in which the husk is split into four sections when the fruit is ripe). The nut husk is very hard and the seed wonderfully sweet (The walnut grown commercially in California is Juglans regia. Native black walnut is also very tasty - particularly when made into a paste and eaten on a sandwich with honey, as one would peanut butter). The seeds (nuts) have prominent longitudinal grooves and are warty and dark brown. They ripen in October - November. Before it reaches full maturity, the outer husk is distinctively green and secretes a black, sticky liquid that easily stains hands and clothing.



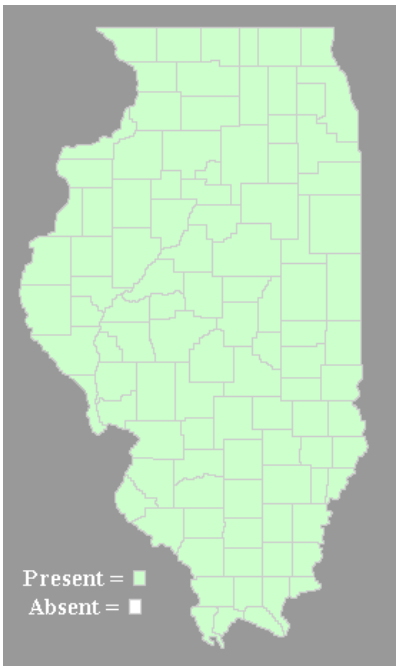
PIGNUT HICKORY

Shown with full husk and husk partially removed.

The fruits are egg-shaped and 1/2 to 1 1/4 inches long. The nut husks are brown, somewhat warty, and split into four sections as in the shagbark, but are much thinner shelled than in the shagbark hickory. The pignut hickory is a mast producing species. (It produces large nut crops at irregular intervals, even though some nuts are produced each year). The pignut hickory is often kept as an ornamental tree, due to it's tolerance for drier soils. Wildlife, especially squirrels and domestic swine, eat the nuts.



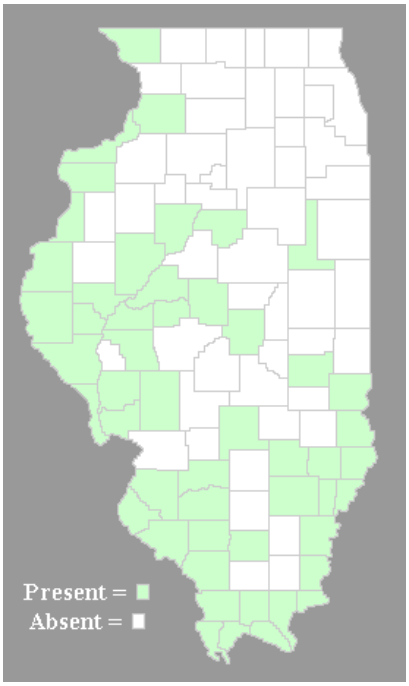
SHAGBARK HICKORY



Hickory nuts are up to 2 inches across, with a thick yellowish green to brownish/bronze husk that is split into 4 quarters by fissures that run all the way to the rounded base. The nut meat is light brown, sweet and, like the pecan (Carya illinoienis) edible and of considerable commercial value. The nuts are high in fat and protein content, and are an important food source for wildlife, such as squirrels, opossums, wild turkey, and ducks.

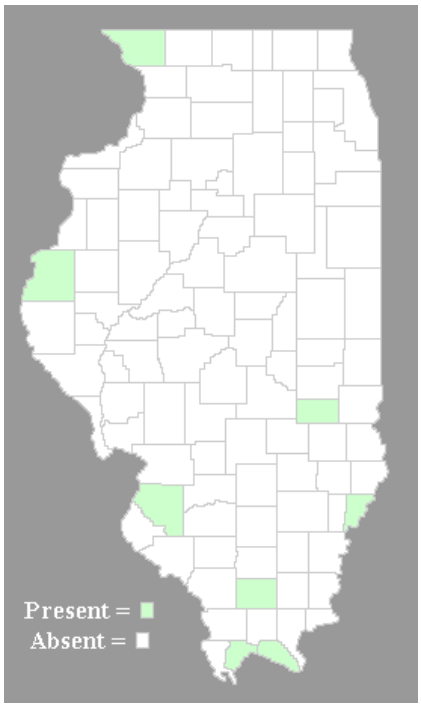
PECAN

Pecans are ellipsoid, pointed at the tip, about 2" long, 1" across, and oblong in shape. Along the length of each fruit, there are 4 short thin wings and usually splits nearly to the base. The husk surface is thin, smooth, and hairless; it is initially light green but later becomes brown or black. A mature fruit partially divides into 4 segments (along its wings) to release the nut. The nut surface is reddish-brown with black streaks and smooth; the interior of the nut has sweet edible meat.



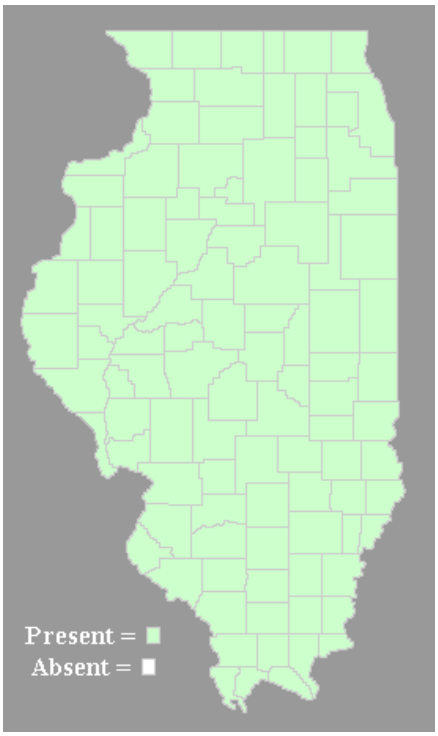
AMERICAN CHESTNUT

Fertile female flowers develop into nuts that are surrounded by spiny husks spanning 2-2½" across. Each husk contains 1-3 nuts (rarely 4-5 nuts), dividing into 4 parts during the autumn to release them. Mature nuts are about ¾" long, dark brown or reddish brown, and globoid-ovoid in shape with slender beaks. Often, 1-2 sides of each nut are flattened by the proximity of adjacent nuts. The meaty interior of each nut is mild and sweet.



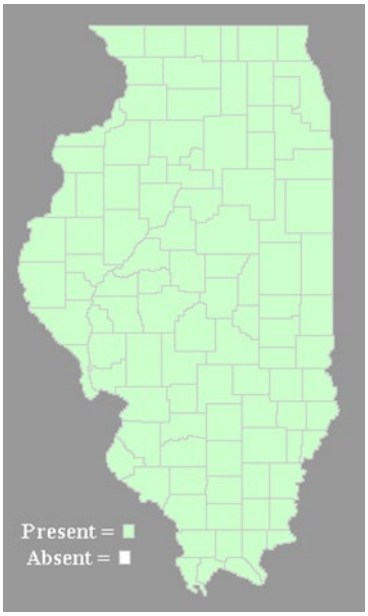
BUR OAK

The acorns of the Bur Oak are particularly distinctive. Individual nuts are usually borne singly, oval, 1½–2½ in. long and similarly across; they are initially green but become brown to grayish brown at maturity. Nuts mature in a single year and usually germinate during the fall of the same year. The large cup covers 3/4 of the acorn and is hairy, with a profuse fringe of longer hairs on the lowermost scales. The starchy meat of the nuts is low in tannins and potentially edible.

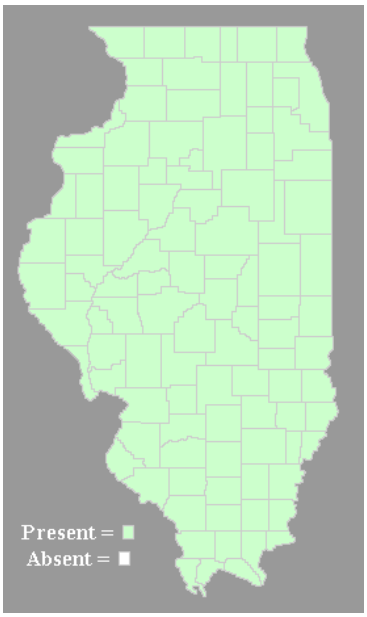


BLACK OAK

The nut has vertical lines that look like fine pin stripes running the length of the nut. Approximately 1/4 to 1/3 of the nut is enclosed by the cup, which is dull brown and hairy, with a small fringe at the bottom where the scales are not pressed up against the nut. The acorn is bitter, but a good food source for many songbirds, game birds, mice, raccoon, and deer. Acorns are produced once every two years.



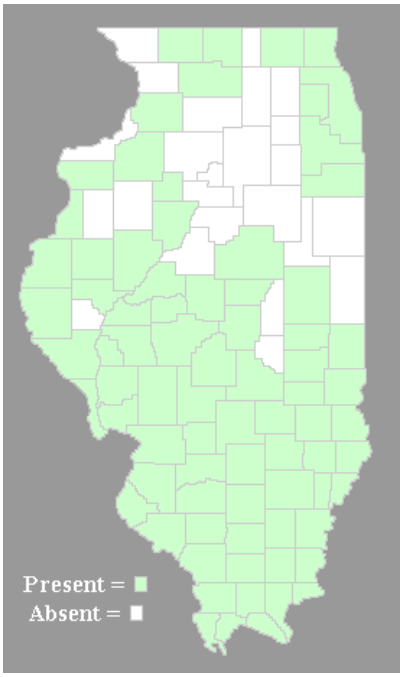
WHITE OAK



Acorns from the Illinois state tree are produced when the tree is about 20 years old. They are borne either singly or in twos and occasionally threes. They are oblong and approximately 1/4 inch long, with the "cup" covering the top third of the nut. The nut is shiny and light brown to greenish brown and the cap is light gray and slightly hairy. The number of acorns produced varies from year to year, with larger crops occurring during "mast years", every four to ten years. The acorns provide a valuable food source for many birds and mammals.

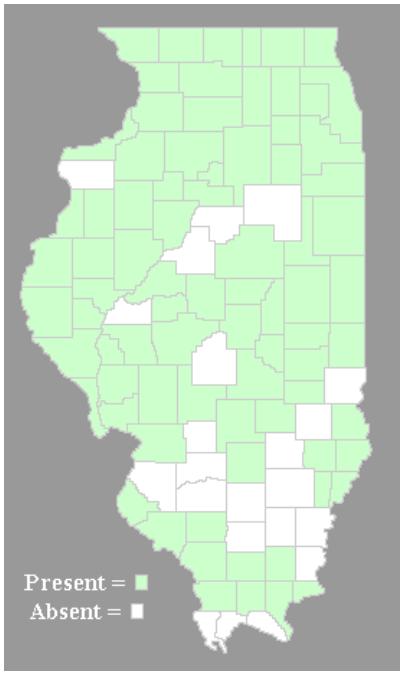
PIN OAK

The acorns are 1/2 inch long and up to 1/2 inch across, and are borne singly or in groups of up to four. They can occur with or without stalks, and are nearly hemispherical in shape, the cup being thin and saucer-shaped. The nuts are often striate, and the cups are reddish brown and finely hairy or hairless. Pin Oak trees are frequently identified by their distinctively small acorns.



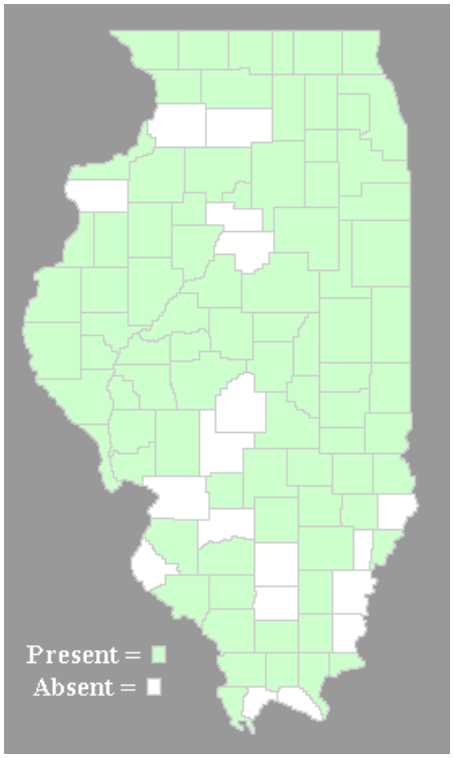
RASPBERRY

Raspberries are not true, botanical berries, but rather aggregate fruits. Highly diversified, raspberries can be grown from the Arctic to the equator; there are over 200 raspberry species currently on record. Fruits can be yellow, orange, red, purple, or black—Illinois varieties, however, are commonly red or black. The floral receptacle remains on the plant once the fruit has been harvested, leaving a hole in the bottom of the raspberry.

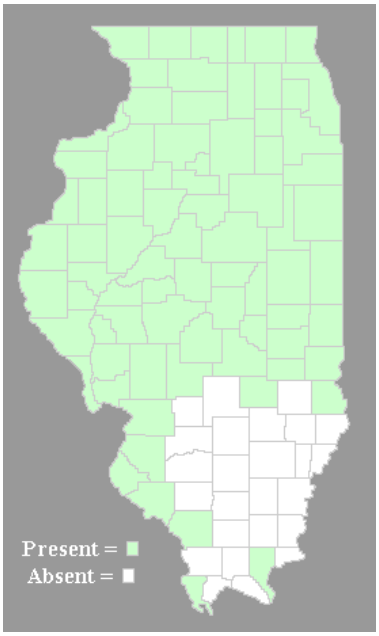


BLACKBERRY

Like, raspberries, blackberries are an aggregate fruit, and thus a “culinary,” but not scientific, berry. Blackberries have perennial roots, but biennial canes, meaning that, although the plant survives year-after-year, the above ground stems (called “canes”) have only a two year life cycle. Blackberries can be distinguished visually from raspberries by there elongated shape and the presence of the receptacle after the fruit has been picked, and thus, there is no whole in the center of a blackberry. They are seedy and have a sweet flavor when fully ripened.

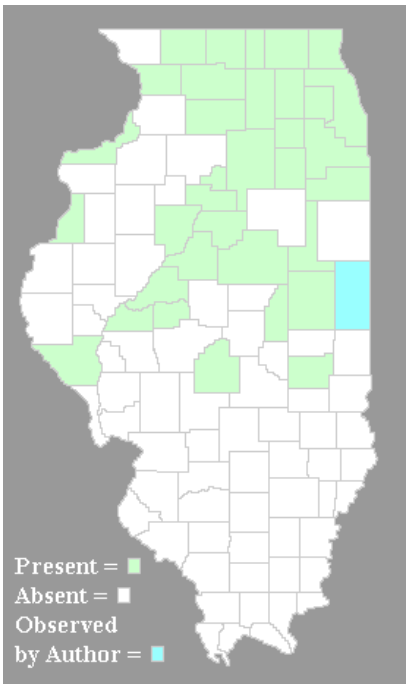


AMERICAN GOOSEBERRY



Gooseberries are true botanical berries. The fruit, borne singly or in pairs, is a berry with many small seeds at the center. A gooseberry may be green, greenish-yellow, or shades of red from pink to purple as it reaches maturity. American gooseberry fruits are smaller than their European counterparts (up to 1/2 inch), perfectly round, all becoming pink to wine-red at maturity. Skin color is most intense in full sunlight. Berries generally drop when overripe. The fruit has a flavor all its own, the best dessert cultivars as luscious as the best apple, strawberry or grape. (From the California Rare Fruit Grower's Assoc.)

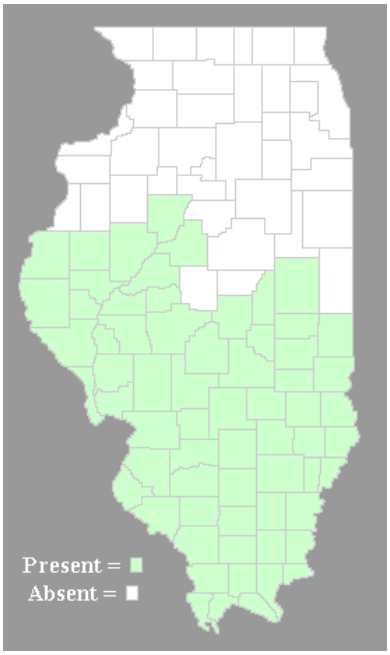
WILD BLACK CURRANT



Wild Black Currant fruits are true botanical berries. Immature currant berries are green and develop a darker, black-ish color. Individual berries are typically 1/3 of an inch across, ovoid in shape, and shiny. Each fruit contains multiple seeds. Berries form in drooping clusters that often ripen from top-to-bottom, encouraging birds to eat the darker, riper fruit first. While more common in the northern portion of Illinois, Wild Black Currants can be found in some central Illinois forests.

PERSIMMON

A persimmon is a true botanical berry, despite its larger size. Both a male and female tree (as persimmon flowers are single-gendered) must be present in order for fruit to be produced. Before completely ripe, the persimmon fruit is green and contains significant amounts of tannin, an extremely bitter tasting chemical. As the fruit matures, it develops an orange color and a sweeter flavor, prized by many chefs. The seed from a persimmon fruit is also palatable, and was ground and used as a substitute for coffee by Civil War soldiers. The fruit is round or oval and typically ranges from 1-3 inches in diameter—mature coloration ranges from the typical orangey-yellow to a slight blue-ish tint. Fruit ripens in early- to mid-fall. Persimmons are common in the area, especially around fence rows.



MAYAPPLE

The mayapple fruit is a true botanical berry. Contrary to its name, Mayapples do not actually fruit in May, but rather later in the summer season. Mayapples are edible when fully ripe, although they can be toxic in large quantities and when premature. A single fruit is produced per plant and grow under the plant's large leaves, making the ripe "apple" often difficult to spot. Fruits are smaller than 2 inches in diameter, fleshy, and contain multiple seeds. Ripe mayapples are yellow in color.