A Rose is a Rose, but Berries are not always Berries

The principal “false berries” of the fruit trade are in the rose family (Rosaceae):

All of these fruits are aggregate fruits.

Strawberries occur wild in Eurasia and the Americans.

Our most commonly cultivated species of *Fragaria* was produced in 1750.

The rose family also contains blackberries and raspberries.

Species of *Rubus* occur natively in North America, Europe and Asia.

In raspberries, receptacles of these fruits are not swollen and remain on the plant when the cap is pulled free.

The “berries” are subsequently hollow.

The principal raspberries grown commercially:

Blackberries adhere to the receptacle which leads to fruits with a solid center.
Blueberries and cranberries are actually berries and belong to the heath family (Ericaceae) and genus *Vaccinium*.

Both crops have been domesticated within the last 200 years.

Blueberry plants have small urn-shaped (urceolate) flowers that are characteristics of several members of the heath family.

The two most widely cultivated species of blueberries
Blueberries and Cranberries, Fruits of the Heath Family (Ericaceae)

The two most widely cultivated species of cranberries

Flooding prevents winter desiccation, protects plants from freezing, helps regulate fruiting times and facilitates harvesting.

Because the amount of anthocyanin is proportional to the amount of sunlight received, water harvesting allows more exposure to light for the cranberries.

**Grapes**

The most widely cultivated species of grape is *Vitis vinifera* in the family Vitaceae.
Grapes

Grape vines were cultivated by at least 8000 B.C.

The Greeks began to raise grapes during the first century B.C.

There are at least 175 table grape cultivars.
Grapes

The most important native New World grape is *Vitis labrusca*, the fox grape.

Early settlers in the northeastern part of the United States selected the Concord and Catawba grapes from this species.

Raisins are grapes that have been carefully dried.

**Currants**

Although Zante grapes are used to produce dried “currants” found in U.S. grocery stores,

**Gooseberries**

A relative of currants, the green or red gooseberry (*Grossularia*), resemble a striped grape.
Olives

Olives have been an extremely important fruit and oil source in Mediterranean people for more than 5000 years.

Olives are native to the region bordering the Mediterranean Sea where olives still grow wild today.

![Olives diagram](http://members.bib-arch.org/)

Only 1-2% of the world’s olive crop is eaten as fruit.

Kiwi Fruit

Kiwis are a new addition to U.S. supermarkets.

Kiwi fruit, or Chinese gooseberry, is in the genus *Actinidia* (Actinidiaceae) and native to Asia.

![Kiwi fruit image](http://members.bib-arch.org/)

Brandishing long sticks, three men knock olives from a tree and a fourth collects them in a basket in this scene on a sixth-century B.C. Greek black-figure amphora.

![Kiwi fruit image](http://members.bib-arch.org/)

Because kiwi vines are dioecious, both male and female plants are needed for fruit production. The female flowers (left) have a large ovary surmounted by a branched stigma and shorter anthers. On the right is a male flower with numerous large anthers.
Temperate Nuts

We commonly call any oily seed that we eat raw or toasted a “nut.”

However, botanically it may not be a true nut.

A nut is a dry, indehiscent fruit with a very hard shell (pericarp).

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<th>TABLE 4.1 Fruit Types with Examples</th>
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<tr>
<td>TYPE</td>
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<td>Multiple</td>
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Chestnuts and filberts (hazelnuts) are true nuts.

Almonds, pecans, pistachios and walnuts are drupes.

Peanuts are not true nuts, but legumes in the bean and pea family.
Temperate Nuts

The edible portion of all “nuts” is the embryo or seed.

Chestnuts, hazelnuts, pecans and walnuts are borne on trees native to deciduous forests of Eurasia and North America.

All of these trees are:

The tree flower before leaves emerge in the spring with male flowers in catkins and female flowers in solitary or small clusters.

Walnuts and pecans belong to Juglandaceae or walnut family.

Walnut trees inhibit the growth of other plants that surround them.

This type of inhibition is called allelopathy.

Allelopathy is caused by chemicals in the leaves that are leached out and soak into the soil.
Temperate Nuts

Pecans are in the genus *Carya*.

*Carya illinoinsensis* is native to Mexico and the U.S. Southwest.

Pecans are extensively grown in the southeastern part of the U.S.

American chestnuts, *Castanea dentata* (Fagaceae), were common in the northeastern United States before 1900.

About 1890, the chestnut blight, caused by the fungus *Cryphonectria parasitica*, arrived in the U.S. from Asia.
Temperate Nuts

Between 1904 and 1950, the disease killed or infected virtually all of the U.S. nut bearing trees.

Three other commercially important species:

*Castanea sativa*  (European chestnut)

*Castanea crenata*  (Japanese chestnut)

*Castanea mollissima* (Chinese chestnut)

Chestnuts are produced by a single flower, but 3 flowers are grouped in an inflorescence surrounded by spiny, fleshy bracts.

Temperate Nuts

Hazelnuts or filberts, occur natively across the north temperate zone.

Only the European species, *Corylus avellana* (Betulaceae), is extensively cultivated as a crop.
Temperate Nuts

In ancient times, filberts were considered to have special powers that allowed detection of water. Divining rods are still made from hazelnut wood.

Temperate Nuts

Among the temperate nuts, almonds are unique because they belong to the rose family (Rosaceae).

Almonds have a mesocarp that expands little as the fruit matures. Removal of the leathery exocarp and mesocarp leaves the familiar “nut” inside the “shell” (endocarp).

Like apricots and peach seeds, almond seeds contain amygdalin, a cyanide producing compound that has a characteristic “almond” flavor and odor.

Almonds are native to central Asia where they have been cultivated for thousands of years.
Temperate Nuts

Monks brought almonds to North America during the Spanish mission period.

Large scale production did not begin until 1900.

California produces 80% of the world’s almonds

Pistachios are also an important “nut” crop in California.

Pistachios are small, dioecious trees that are native to the eastern Mediterranean region and central Asia.

They have been cultivated for more than 3000 years.
Study outline- Chapter 4-Fruits and Nuts of Temperate Regions

What is the definition of a fruit?

Distinguish between agamospermy vs. parthenocarpic (examples)

How are different fruit types classified?

Distinguish between simple vs. compound ovary.

Explain the Foliar Hypothesis; How does it relate to the concept of the carpel?

Understand the difference between simple, aggregate and multiple fruits. Know examples.

Distinguish between a superior and inferior ovary. Know examples.

What are the three layers of the pericarp?

Distinguish between indehiscent and dehiscent fruits.

Know examples of legume, follicle and capsule (dehiscent), and nut, achene, caryopsis (grain), samara and schizocarp (indehiscent).

Know examples of simple fleshy fruits- berry, drupe, hesperidium, pepo and pome.

Know the different fruits of the rose family (Rosaceae)- Malus (apple); Pyrus (pear); Cydonia (quince); Prunus domestica (plum); Prunus avium and Prunus cerasus (cherries); Prunus persica (peach); and Prunus armenica (apricot).

Know the origin of the rose family fruits above.

What are the principal “false berries” in the fruit trade from the rose family (Rosaceae)?

Know the origin of the strawberry (Fragaria), raspberries (Rubus idaeus; Rubus occidentalis), and blackberries (Rubus spp.).

What is the morphological difference (in the receptacle) between raspberries and blackberries?

What true berries belong to the heath family (Ericaceae)? What is the origin?

What type of soil would you find blueberries and cranberries?

What is the characteristic flower of the blueberry?

What are the widely cultivated species of blueberries and cranberries?

How does flooding help the cranberry harvest?

What is the most widely cultivated species of grape (Vitaceae)?

Why is the fox grape (Vitis labrusca) important?

What is the difference between a dried “currant” in the U.S. (grape family) and a currant in Europe (gooseberry family)?

Where did olives originate? What are the vast majority of olives used for?

What is the definition of a nut?

Which types of “nuts” are true nuts? Which types of “nuts” are drupes? Which type of “nuts” is a legume?

Name the family that includes walnuts and pecans.
What are the two most common types of walnuts? What is the origin of each species?

What is allelopathy? How does allelopathy relate to walnuts?

What is the most important species of pecan?

What happened to the American chestnut trees (*Castanea dentata*) (*Fagaceae*) in the U.S.?

Name the family that includes almonds (*Prunus dulcis*). What is the origin?

What part of the almond do we eat?

How did large scale production of almonds begin in California?

Where did pistachios originate? What type of fruit?

**Rosaceae**
*Malus* (apple)
*Pyrus* (pear)
*Prunus* domestica (plum)
*Prunus avium; Prunus cerasus* (cherries)
*Prunus dulcis* (almond)
*Fragaria* (strawberry)
*Rubus* spp. (blackberry)
*Rubus occidentalis* (black raspberry)
*Rubus idaeus* (red raspberry)

**Ericaceae**
*Vaccinium corymbosum* (high bush blueberry)
*Vaccinium angustifolium* (low bush blueberry)
*Vaccinium macrocarpon* (cranberry)

**Vitaceae**
*Vitis* (grape)

**Grossulariaceae**
*Ribes* (currant)

**Oleaceae**
*Olea* (olive)

**Juglandaceae**
*Juglans regia* (Persian walnut; English walnut)
*Juglans nigra* (black walnut)
*Carya illinoiinensis* (pecan)

**Fagaceae**
*Castanea dentata* (American chestnut)