



Propagation of Fruit and Nuts by Seed

B. Dean McCraw

Professor

Extension Tree Fruit and Pecan Specialist

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Although most of the fruit and nut trees do not bear fruits true to variety when propagated by seeds, seeds may need to be planted in order to get the understock on which to propagate the wood of better varieties. Certain treatments need to be given to most of the seeds in order to get them to germinate. In some cases, a hard seed-coat may hinder germination. One of the following three treatments will usually make the seed-coats permeable to water: (1) soaking in sulfuric acid, (2) soaking in hot water or immersing the seed for a short period in boiling water, and (3) mechanical scarification.

Of all of the causes of natural delay in seed germination, dormancy of the embryo is most common. A seed with a dormant embryo must complete a process of "after-ripening" before it acquires the ability to germinate. After-ripening takes place only at the proper temperature and in the presence of abundant supplies of moisture and air (oxygen). For most of the native trees and shrubs in Oklahoma, an average temperature of 41°F is favorable to after-ripening.

In practical handling of dormant seed, after-ripening is done by "stratification," i.e. by mixing the seed with moist sand, sawdust, or peat moss. The latter, peat moss, is preferable because it has a very large water-holding capacity, and yet while moist (not wet), it does not interfere with aeration of the seed.

After being thoroughly mixed with the stratification medium, the seed is placed in baskets, crates, jars, or any other convenient container. The seed container is stored in a place where the temperature, through a definite period of time, will be maintained within the range effective in after-ripening. Standard bushel and half-bushel baskets, glass jars, and tin cans are very convenient. For the sake of reducing the chances of infection, line the inside of a basket with clean paper before placing stratified seed into it. Stratified seed should never be packed tightly because this will interfere with good aeration.

After the mixture of seed and stratification medium is in a container, it is advisable to put an additional layer (1/2 inch thick) of pure peat moss, sand, or sawdust on the top of the mixture and to cover the container with paper. This will help in keeping the seed moist throughout the period of stratification. Properly stratified and well-covered seed kept at a low temperature should remain moist for at least two or three months.

Large quantities of stratified seed can be kept in a cold room or in a cellar. When neither of these is available, the seed can be buried outdoors on the north side of a building.

Small quantities of seed that are commonly handled by home gardeners can be placed in small jars and kept in a refrigerator or ice box.

The length of the stratification period varies with seed of different species. The recommendation made for each species is only an average and not an exact, standard period.

For the seed of some species, fall planting is a satisfactory substitute for stratification and saves time, labor, and space in cold storage. For these species, fall planting is effective if the seeds remain moist and are well protected from rodents and if the temperature in the winter stays low for a sufficient length of time.

Nuts

Hickories (*Carya spp.*) The seeds of most hickories are dormant, requiring stratification for various periods of time. Stratification requirements depend on the species and, to some extent, on the origin of the seed. The approximate stratification requirement of nuts of the most common Oklahoma hickories is three months at 33°F to 50°F. Fall planting of hickory nuts is used very successfully, provided that the nuts are well protected against rodents and severe freeze.

Pecans (*C. illinoensis*) The pecan differs from other hickory nuts in its characteristics and requirements. It does not fall into dormancy but can germinate at any time when conditions are favorable. Despite this difference, pecan seed is commonly stratified or kept in cold storage at high humidity through the winter and planted in the spring of the year. This prevents the nut from becoming rancid and from losing its viability. And at the same time, the possibility of the pecan germinating out of season is excluded. If planted during the fall and winter, the non-dormant pecan will usually germinate the following spring.

Black Walnuts (*Juglans nigra*) Black walnut, when ripened and shed from the tree, is dormant. The seed coat, though extremely hard, permits the kernel to absorb water rather freely. By the time the kernel after-ripens and is ready to resume growth, the hard seed coat cracks along the edges and, thus, presents no obstacle to the growing embryo. Black walnut after-ripens in stratification at 33°F to 50°F in two or three months. Many propagators prefer fall planting, but in Oklahoma the winter temperature may not stay low enough for the sufficient length of time.

Small Fruit

Blackberries (*Rubus spp.*) Blackberry seed, due to the dormancy of its embryo, requires stratification at 33°F to 35°F before being planted. The stratification requirement varies considerably with sometimes as long as five to six months being necessary. The average is approximately three months. September is suggested as the best time for planting.

Treat dry seed with acid for about 30 minutes. Commercial varieties of blackberries are commonly propagated by root cuttings or tip layering.

Grapes (*Vitis spp.*) Grape seed requires stratification at 37°F, varying in length from 90 to 140 days.

Because of the great variation of grape seedlings, seed cannot be relied upon to produce a vineyard of the desired variety. Commercial varieties of grapes are propagated by cuttings and grafting and sometimes by budding and layering.

Tree Fruits

Apple (*Malus spp.*) The seed of apple is used primarily for the production of root-stocks, since apple varieties do not come true from seed. The seed of apples is dormant and requires stratification at 34°F to 40°F for a period of two to two and a half months for the completion of after-ripening. From the time of its extraction from the fruit, the seed should be kept continuously moist. Excessively prolonged drying results in the loss of seed vitality.

Cherry (*Prunus spp.*) The seeds of all common species of cherries have a period of dormancy. Various species and varieties of cherry differ somewhat in their stratification requirements. Some complete after-ripening in a course of four weeks while others require as long as 14 or more weeks under the same conditions. The after-ripening seeds germinate, and the seedlings grow freely at a temperature close to freezing. Therefore, a long period of stratification cannot be recommended.

The following schedule is probably the safest:

Species	Period (days)	Temperature
<i>P. mahaleb</i>	88	37° F
<i>P. avium</i> (Mazzard)	100-125	37° F
<i>P. serotina</i> (Black)	30-60	30°-50° F

While in stratification, cherry seed must be under frequent observation, particularly during the last part of the recommended stratification period. If the completion of after-ripening occurs too far in advance of the time of planting (as evidenced by cracking of the seed coat), the temperature of stratification should be lowered to 31°F to 32°F for the rest of the stratification period.

Plum (*Prunus spp.*) Plum seed requires stratification. The exact period for plums varies with the species as well as with individual lots. The common wild plum of Oklahoma (*Prunus angustifolia*) is usually well after-ripened after stratification of 60 to 90 days at 34°F to 40°F. Plum seed germinates freely at a low temperature once the after-ripening is completed. Therefore, make periodic observations of stratified seed and lower the temperature if germination starts too soon.

Peach (*Prunus persica*) & Apricot (*Prunus armeniaca*) At the time of ripening, as much as fifty percent of the seed may be dormant. In commercial nursery practice, peach stones are commonly planted in the fall of the year. They usually germinate freely the following spring because fall planting provides the proper conditioning. However, one can expect somewhat better results if the seeds are stratified over winter under controlled conditions and planted in the spring. The most favorable stratification temperature for the peach is between 32°F and 45°F. At this temperature, the seed after-ripens in approximately 75 to 100 days.

Persimmon (*Diospyros virginiana*) Propagation of persimmon is considered difficult and germination of its seed uncertain. The seed is dormant when ripe. The cause of the dormancy lying in the embryo. Stratification at a low temperature for a period of 20 to 40 days or fall planting of unstratified seed has been reported effective in breaking dormancy and forcing germination.

Based on original material prepared by E. L. Whitehead

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