

HARDWOOD SEED COLLECTION AND HANDLING

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There is a demand for good quality hardwoods now and the demand for hardwood seedlings is on the increase. We should grow high quality seedlings and to do this, we need to start with good seed. Seed source or geographic locality and the type of trees from which seed are collected are extremely important factors. Seed should come from well formed, vigorous trees of local origin wherever possible. Those who doubt this recommendation need only look at the current difficulties and failures of some hardwood plantations. Part of this difficulty is due to off-site plantings, but much of it is due to poor seed source of the stock used when the areas were planted. Trees grown from seed of distant, areas often suffer more damage from freezing, drought, insects, disease, or physiological disturbances. Often such trees are crooked and stunted. Some of these defects may not appear until 10 to 15 years after the seedlings have been planted.

The cost of seed is such a small part of the total cost of growing trees that sound economics dictates it is better to pay more for good seed of known origin and quality! When purchasing seed, the advertisement should specify collection areas, when collection can begin, species needs, etc. Where practicable, there should be a reciprocal agreement between State and Federal Agencies for seed in case either agency ran out of seed. If you do not or can not collect all of your seed needs, it is desirable to have a contract with a seed company or a private collector to supply your additional seed needs from specified areas and specified stands. We'll not attempt to go into the matter of specifications for selecting seed production areas and establishment of seed orchards at this time; however, this should be our ultimate goal for the production of hardwood seed, as well as coniferous seed. I'll be more specific a little later and talk about the collection and handling of hardwood seed. Our information on handling of hardwood seed is rather limited, but we can discuss and use what we do know about this subject for various species.

Yellow poplar

Yellow poplar normally produces a low percentage of viable seed. Usually only about 10 percent, and seldom more than 30 percent, of the samaras contain viable seed.

Yellow poplar trees begin bearing seed at an age of 15 to 20 years. Usually some seed are produced each year and the quantity and quality of these crops varies. Seed are mature from October through December, depending on the locality and the seed can be collected, usually, through most of December. Some say that the best seed come from the upper portion of the tree's crown. The fruit can be collected by hand, by use of hooks, or by following a logging operation. In early winter, if the weather is

dry, the entire "cone" or the seed can be shaken onto sheets. After collection, "cones" should be spread out to dry. After drying, and separation of the samaras from the center axis, further cleaning is impracticable.

Yellow poplar seed will retain its viability when stored dry at low temperatures, or for up to 3 years under moist conditions at a temperature just above freezing. Prior to seeding, yellow poplar should be stratified at least 60 days, and preferably for 90 days or longer. Stratification for 24 weeks at alternating temperatures is recommended by Boyce and Hosner. The temperature should alternate weekly at about 36° to 54°F.

Research at the Central States Forest Experiment Station showed that yellow poplar trees yield seed of low viability because of insufficient pollination. Most pollen is incompatible with styles of the same trees. Some cross-pollinations are no more effective than self-pollination; while for others, cross-pollinations may result in most of the seed being viable. Chances for good seed are better if they have been cross-pollinated. Little, if any, wind-pollination takes place. Most pollination is done by insects. The stigmas are receptive for only 12 to 24 daylight hours. Rain and other weather conditions unfavorable to insect flight can cause a reduction in the percentage of viable seed due to insufficient pollination.

Sweetgum

Sweetgum seed can be collected from standing trees by pulling or cutting off the fruit, or by following a logging operation. The fruit begins to turn yellow in late-September or in October. After the fruit has turned yellow, collection should begin immediately since the fruit balls soon open and release seed.

After collection, the fruit should be spread out to dry and open. After fruit opening, the seed can be shaken out and then cleaned by a fanning mill or specific gravity separator. There is usually a large amount of poorly developed seed and fruit parts which need to be removed. Sweetgum can be stored successfully for a number of years if seed are dry and held at a cold temperature. Some seed lots need stratification prior to sowing. Work at the Southern Hardwoods Research Laboratory indicates that a 2-weeks stratification may be enough, but 15 to 30 days stratification is recommended.

If you have difficulty in sowing stratified sweetgum seed, try adding a small amount of aluminum powder to the seed. This serves as a lubricant and prevents the seed from sticking together. Seedling density should be about 25 to 30 per square foot of bed space.

Sycamore

Sycamore seed can be collected in much the same way as sweetgum seed except that you do not have to be as prompt after the seed are mature. The fruit balls will persist on the tree for most of the winter; however, late fall or early winter collection is recommended. The Southern Hardwoods Laboratory found that seed allowed to remain on the trees did not germinate as well as seed collected early and stratified artificially. The seed or balls should be spread or placed in trays to dry. After the balls are dried, they can easily be rubbed from the heads. The fuzzy material or tawny hairs can be removed by rubbing the seed over screens or placing in an agitator, such as the "Easy-Flo" fertilizer spreader. John Little at the Winona Nursery in Mississippi has used this method successfully and recommends it. It may be advisable to check the seed's germinability before and after cleaning by this method to determine whether there has been any damage to the seed. Dry sycamore seed has been stored successfully at the Seed Laboratory at 20°F. for a 5-year period. Sycamore may need up to 30 days stratification for best germination.

Oak

Acorns should be shaken from the trees or picked up soon after they fall to the ground. They should be treated immediately to kill any weevil infestation. During the past year the Eastern Tree Seed Laboratory conducted a study to determine how much pure methyl bromide could be applied to oak seed without a substantial loss in germination. The species used were white, cherrybark, and northern red oak. Rates of 0, 2, 4, 6, 8, and 10 pounds per 1,000 feet cubic volume of space were applied to the acorns immediately after collection. We used drums and computed volume and amount of methyl bromide to apply to obtain these dosages. The fumigation temperature was 77°F. and the acorns were fumigated for 4 hours. We noted a small loss in viability at the 2 pound level. At the 4 pound level and above, viability was greatly reduced. It may be advantageous to use 2 pounds and fumigate for 2 hours at this temperature, however, we do not know if this schedule will definitely kill all the weevils. Weevils have been controlled by submerging acorns in water at 120°F. for 20 minutes; however, this is not recommended unless you have good temperature control. Don't let the water temperature go above 120°F.

White oak acorns should be planted immediately after collection and treatment for weevils since they normally germinate soon after falling to the ground. If it is necessary to store them, they should be kept in a moist condition at a temperature just above freezing.

Store red oak acorns in a moist media at 33° to 38°F. over winter and plant in the spring. Acorns should be planted and covered from 1/2-inch to 1-1/4 inches deep, depending on the acorn size.

Black walnut

Walnut can be collected in the fall or early winter. The nuts should be from well-formed trees. One can stratify the nuts over winter or plant them in the fall. It is not necessary to dehusk walnuts if they were gathered before the husk dried. They should be planted in drills or rows 6 to 8 inches apart with about 15 nuts per linear foot and then covered with about 2 inches of soil. Of course, another way is to clean the nuts and stratify them over winter. Then the following spring the stratified nuts are distributed to planters for direct sowing in the field. Specific directions should be included with the nuts to state that they should be planted immediately, or stored at a temperature slightly above freezing until ready to plant. Also, directions on how to plant the nuts should be included with each shipment.

Summary

Good seed is basic to production of good hardwood seedlings. This requires close supervision of seed collection and handling methods to insure that requirements of the species are met. The demand for hardwoods is increasing and we must know in greater detail how best to handle and treat seed of each species if we are to supply the most desirable trees.