

## THE STORAGE AND TREATMENT OF HARDWOOD SEED

Albert Engstrom, Assistant Director, Forestry Division  
Oklahoma State Dept. of Agriculture, Oklahoma City, Okla.

The many species of hardwood seeds display a wide spectrum of storage and treatment requirements. Each species must be treated individually. Fortunately, most hardwoods in Oklahoma are consistent seed producers and it has rarely been necessary to collect more than 2 year's supply.

Over the past 30 years, our Oklahoma nurseries have grown at least 25 species from seed. This report will cover lightly the most important species in our nursery program.

## SYCAMORE

During the winter, the fruits are gathered from the tree and from the ground under the tree. They are macerated slightly, dried, and the wooley chaff is fanned off. Since seed crops are usually abundant, we have made no effort to store sycamore seed. Fresh seed are sown each year. Broadcast sowing is on freshly prepared seedbeds, which are kept moist until germination is complete.

## MULBERRY

Ripe fruit can be shaken from trees or flayed onto tarpaulins spread under the trees. The seed is small, but fresh fruit is heavy. Extraction factor is only about 2 percent.

We have found that the best equipment for cleaning mulberry seed is the Dybvig Seed Cleaner, manufactured by the Dybvig Nurseries at Colton, South Dakota. This machine is merely a small tub, similar to an old washing machine. The dasher is fastened to the rotating bottom, which is a flat plate adjustable for height clearance. A batch of fruit is placed in this tub with a bucket of water. By close adjustment, the pulp will be broken up and oozes away, leaving clean seed behind. The seed are dried and fanned to clean.

Fresh seed germinates most promptly, but stored seed can be sowed 3 to 4 weeks earlier than fresh seed. This is an advantage. Cold storage has been satisfactory for 2 years. Stored seed seems to deteriorate, but tests have not been made to determine this.

Either row-crop culture or seedbed culture is satisfactory. Larger seedlings can be grown from row crops, but it is sometimes difficult to obtain the desired density. Mulberry has an extremely tough root system requiring unusually sharp undercutting equipment.

## CATALPA

Seeds are collected by snipping off the trees with hand pruners. The easiest time to collect is after leaf fall. Collection can continue through much of the winter months until capsules begin to open on the trees.

Cleaning is mostly a hand job, accomplished by flaying and stomping on a pile of capsules. Screen out hulls and sticks. Final cleaning is done by fanning in a clipper mill. Hulls fall in the seed box and the seeds fan off.

We store seed in bags at room temperature until sowing. There is obvious deterioration when seed are stored for more than a year. Cold storage has not been explored.

We grow in 21-inch rows by sowing 20 to 40 seeds per linear foot in a band 3- to 4-inches wide.

#### BLACK LOCUST

Ripe pods are stripped off trees by hand. Pods usually open before leaf fall so collection should be completed by this time. The seed are cleaned with a macerator or hammer-mill operated at a slow speed. Fanning is with the conventional Clipper Fanning Mill.

Dry storage at warehouse temperatures have been successful for periods up to 5 years. Normally, seed crops are adequate each year to give us a fresh supply, so we use new seed when possible.

Before sowing, we scarify the seed with concentrated sulphuric acid for 1-hour by putting the seed in a conical pile on the floor, pouring the acid over them, and stirring them with a shovel. Then we wash the seed thoroughly and dry before sowing. We prefer row-crop culture as seedlings develop better than when in beds.

#### BLACK WALNUT

Most black walnut collections have been made by nursery crews from nearby private woodlands without cost. Since it has become evident that we should obtain seed only from carefully selected trees, our seed cost will rise, but walnut products have become so valuable we must do all possible to improve quality.

We stratify unhulled nuts in moist sand as soon as collected. In Oklahoma, the stratified nuts begin sprouting about the last two weeks of March. They are then removed from stratification, washed and floated; then, packaged in polyethylene-lined boxes with liberal amounts of sphagnum for shipment. Nuts are sold direct to planters with directions for immediate planting. Rodent losses may be high unless protection is given. Oklahoma's experience with seedlings was not satisfactory. It appeared virtually impossible to prevent a form of mold and root rot on seedlings after dipping. Growth after field planting was very slow. Seedlings grown from planting stratified nuts on the site where it could remain to grow as a large tree seemed to consistently produce better trees.

#### CHINESE ELM

If seed supply is short, we gather from standing trees as soon as the seed begins to turn a straw color. If we have a good supply, it is much more economical to wait until seed fall and sweep up seed from street curbs. Thus, several hundred pounds can be gathered in a few hours. However, this practice entails considerable risk because at this season heavy rain storms and high winds can wipe out the seed crop in an hour's time.

The seed are cleaned by drying thoroughly on trays, macerating to remove the wings, and fanning over a Clipper Fanning Mill. Fresh seed can be sown after drying with wings attached, but if the seed are to be stored, they should be dewinged, fanned, put in suitable containers, and placed in cold storage. We have stored Chinese elm seed this way for as much as 6 years with very little apparent loss in germination capacity.

We sow in 21-inch rows, spreading the seed in a band 3- to 4-inches wide at the rate of about 30 seeds per linear foot. Desired density should be high enough to produce about 10 useable seedlings per linear foot of row.

#### OSAGE ORANGE

Osage orange seed are gathered when the fruit falls after the first frost. The fruit is heavy and very bulky. A thousand pounds of fruit will usually yield less than 300 pounds of seed.

The collected fruit is stored over winter in a pile in a place reasonably protected from birds and rodents. This allows the fruit to "over-ripen." This seems to be necessary to produce well-matured clean seed. Seed that are extracted from freshly picked fruit have a tendency to become musty and will mold: whereas, seed extracted from "over-ripened" fruit will remain clean, have a richer color, and will germinate promptly. In the spring, shortly before sowing, the seed are cleaned and washed by maceration and floatation. After drying and fanning, it is ready for sowing. Extra seed can be stored in bags in cold storage.

Fresh seed germinate quickly: whereas, stored seeds germinate more slowly. Since seed crops are abundant, we rarely sow year-old seed but we have some available just in case there should be a crop failure.

Cold storage has been successful, 'but prolonged cold storage for several years has not been tried.

We sow the seed in 3- to 4-inch bands in 21-inch rows. Early sowing (late-March) is usually quite successful. Since we began using freshly cleaned seed, stored in the "over-ripened" fruit stage over winter, we have had consistently good success with this species.

#### COTTONWOOD

We gather catkins from small branches-cut off with a pole pruner. A few of the catkins should be bursting at collection time. Ripening time varies from tree to tree so collection may continue for several weeks if necessary.

The catkins can be dried for a day or so before cleaning. More of them will open if macerated. Other procedures may be better than ours, but we macerate the catkins to break them open, then fan and screen the seed. The seed are soft and fragile and, of course, are quite perishable so they are sowed promptly.

We sow fresh seed by broadcasting and water promptly. Keep seedbed moist (almost wet) until germination is complete.