



# Woody Seed Collection

Conservation Practice Information Sheet (IS-MO612sc)

## Woody Seed Collection Guide

### Why collect seed for woody plantings?

The use of seedlings is a common method of establishing woody species. Because of the increased demand for these seedlings, many species are in chronic short supply. One alternative is to collect and directly plant seeds of the desired plants instead of seedlings. Direct seeding has the potential to reduce seeding establishment costs and may increase the quality of seedlings that eventually develop. This information sheet has been prepared to aid in the collection of quality woody plant seed and to minimize the risk to that seed quality during handling, storage, transportation, and seeding.



### Selecting Collection Sites

Seed should be obtained from seed sources developed from tree improvement programs or from natural sources collected within 100 to 150 miles of the seeding location. In selecting potential parent trees or stands, consideration of the outward appearance, form or growth (phenotype) is important. When the seed crop allows, collection should be from the best possible healthy phenotypes and away from sources exhibiting disease and insect problems. These issues are very critical when dealing with major timber species such as walnut, pecan, Northern red oak, and white oak or when traits such as heavy fruit production of specific plant color are desired. Trees and plantations of unknown origin should be avoided for seed

collection unless knowledge of their attributes indicates otherwise. Collect species that are growing in their typical habitat. Isolated trees or groves should be avoided because of the possibility of non-viable seed resulting from poor pollination or the possibility of excessive in-breeding.

#### Important Summary Points – Collection Sites

- Collect seed from multiple individuals (15-25 if possible)
- Choose healthy, vigorous growing trees
- Collect from trees that are well formed
- Collect from canopy trees
- Avoid isolated trees
- Collect species in normal/typical habitats

### Scouting for Seed Crops

Flowering is the first indicator of a potential seed crop. Without flowers there will be no seed. Casual observations can appraise the effects on potential seed production and also give an indication of how widespread any detrimental effects might be on developing seed. In most species fruit matures the same season that flowering occurs. A notable exception is the red oak group, which takes two years for its seed to mature. With many species, development of fruit set to fruit maturity is accompanied by a more or less steady increase in fruit size, allowing progress to be monitored. However, oak acorns show little size increase until mid-summer and are thus very difficult to observe from the ground until well into the growing season.

As fruit maturity approaches, scouting should include sampling seed/fruit from the potential parent trees for soundness. This can be done by cutting or cracking a sample of seeds and inspecting for hollow, insect damaged or otherwise abnormal seeds. By doing this, any trees with a high percentage of unsound seed can be eliminated from the collection activities.



# Woody Seed Collection

*Conservation Practice Information Sheet* (IS-MO612sc)

In general, the larger the seed crop, the higher the quality of the seed. Thus, for species where the seed can be stored for long periods, it is very desirable to take advantage of the periodic “bumper” seed crops. Species of this type include pine, ash, sweetgum, dogwood, redbud, black locust, sumac, holly, blackhaw, hackberry, redcedar and river birch. Other species such as oak, hickory, walnut, butternut, hazelnut, and maple can not be stored for long periods, making seed availability dependent on the annual seed crop.

## Seed Collection

Once scouting has revealed the potential presence of a seed crop of sufficient quantity, a number of things should be considered in planning the collection.

**Site preparation:** Several things can be done prior to seed maturity to greatly increase the efficiency of collection activities. For species that are collected from the ground, any cleaning of the area under the canopy of the trees will be helpful. The removal of understory trees and brush, mowing of herbaceous plants, and removing sticks and leaves by rake or blower will make the collection more comfortable to perform and make the seed easier to find and pick up from the ground.



**Collection:** The time period available for collection varies widely by species and from season to season. For many species the collection period is a function of how fast wildlife is consuming it rather than the development of the seed itself. In other species seed dispersal occurs soon after fruit maturation, narrowing the collection window considerably. For yet others, such as sycamore, holly and hackberry, seed is retained on the tree until well into the winter, allowing a long collection season.

Collecting before the seed is mature is the quickest way to turn a good seed crop into a poor seed crop. However, some species must be collected somewhat immature before seed dispersal (i.e. sweetgum) or to lessen the amount lost to consumption by wildlife (i.e. hazelnut, paw paw). Seed maturity can be checked by cutting the seed and inspecting the center (endosperm). If the seed has a well-defined seed coat and the endosperm is generally white, firm and fills the seed cavity, the seed is probably ready for collection. In addition, visible changes in fruit color, especially for fleshy fruits, can be used as a guide in determining fruit maturity.

Careful timing of acorn collections is important. Frequently there is a heavy crop of acorns in early autumn consisting of aborted, unsound acorns. The mature, sound acorns will not begin falling until some 2 to 4 weeks later. Sample early acorn collections frequently for maturity and soundness. Sound acorns will exhibit a bright white to orange (depending on species), firm endosperm that fills the seed coat. Another good indicator of the general quality of acorns is the cap scar. Sound, mature acorns will be free of the cap or easily removed from the cap (except bur oak and overcup oak) and the cap scar will be distinct and exhibit a bright, clean color.

### Important Summary Points – Seed Collection

- Harvest only mature seed from ripened fruits
- Collect fruits from all parts of the crown
- Avoid early, fallen fruits (usually defective)



# Woody Seed Collection

*Conservation Practice Information Sheet*      **(IS-MO612sc)**



**How to collect:** Equipment for collection is open to imagination and ingenuity. Hand picking from shrubs and small trees such as redcedar, hazelnut, dogwood and redbud is very effective. Raking under nut trees, where good ground preparation has been done, is helpful. If ground preparation was not accomplished ahead of time, rakes or backpack blowers can be used to expose heavy seeds such as acorns, pecans and walnuts for hand picking. Other alternatives include spreading cloths or nets under species such as mulberry, redcedar, dogwood, and hackberry and flailing the limbs to dislodge the

fruit or collecting seed from downed logging slash and tops.

Heating is the number one enemy of all collected seed/fruit. If at all possible, plant immediately. If not, then between collection and use, heating must be prevented. Place collected fruit in canvas bags, extract the seed as soon as possible after collection and place in cold storage until sown. Proper handling and storage is critical.

**Play it safe!** Safety is of paramount importance and amateur collectors should be careful in collection activities. Think about safety and vary the precautions you take to suit site conditions, tree species and collection methods. Make sure that all equipment is in top condition and properly serviced. It is advisable to work as a team, wear safety goggles, appropriate clothes, safety hat and footwear; and take a first-aid kit.

- Important Summary Points – How to Collect**
- Always label seed collections
  - Seeds are living organisms – handle with care
  - Do not allow seed to dry out or over heat
  - Use safe collection techniques
  - Plant as soon as possible after collecting

Seeds can often be collected safely from the ground or by using a stepladder, but if you plan to climb high trees, take extra care. For some people, tall trees may be too difficult to collect seed from safely and should be left to professional seed collectors.

## Seed Handling and Storage

Handling and storage of seed need not be an overwhelming task. Keep in mind that a seed is a living organism and the same situations that harm other living things (too hot, too cold, too dry, lack of oxygen, rough handling, etc.) will also harm the seed. For purposes of storage and handling, seeds/fruits can essentially be divided into two groups: fleshy and non-fleshy.

**Fleshy:** Begin processing the fruit soon after collection to avoid the damaging process of fermentation. Fleshy fruits should first be soaked in water to soften the pulp. After soaking, the fleshy material can be hand squeezed, mashed by a wooden block, rolling pin, or removed with a fruit press. After maceration, the loosened seed must be separated from the pulp. Screens or water flotation methods are effective. The pulp and empty seeds will float and can be skimmed off. After separation, wet seed must be surface dried.



If refrigeration is not available, fleshy fruits should be kept spread in thin layers preferably on screens in a cool, well ventilated location.



# Woody Seed Collection

Conservation Practice Information Sheet (IS-MO612sc)

If this is impractical, place them loosely in open weave bags in a cool location with adequate space between the bags for good air circulation. Inspect the bags frequently for signs of heating. If heating occurs, spread the seed immediately, even if it has to be on a parking lot or shop floor. Seeds can also be stored over winter by burying them 1-2 feet underground, either in 4-6 mil polyethylene bags or loose. Black walnut should be treated as fleshy fruit. The husk should be removed as soon as possible to avoid overheating and seed damage. Hulled walnut seeds can be floated to separate the filled seed from the unfilled. Most of the bad seed will float.

**Non-fleshy:** Seeds of many dry fruits must be separated from a pod or capsule. Extracted seed should then be air dried. Spreading the seed in thin layers outdoors on canvas or plastic sheeting is fast and economical. To prevent mold and loss of seed viability, the drying area should be protected from the elements. Acorns can be cleaned and separated satisfactorily by floating them in water (This will not work with bur oak or overcup oak). Acorn caps should be removed prior to floating. Skim off debris and empty floating seeds.

All seeds should be spread and allowed to dry as soon as possible after collection. If transportation to the planting site is not practical soon after surface drying, acorns should be bagged in polyethylene bags of 4-6 mill thickness and placed in a cool location with sufficient space between bags to allow free air movement. If at all possible keep white oak species below 40 degrees Fahrenheit, but above freezing, to slow germination. Excessive drying is as deadly to acorns, pecans, walnuts, and hazelnuts as is overheating. As with fleshy seeds, if refrigeration is a problem, non-fleshy seeds, can be stored over winter by burying them 1-2 feet underground. Acorns from the white oak group can only be stored successfully for 2-3 months under most circumstances. Germination with this group is very difficult to delay.

Hazelnuts require some special handling also. Because of losses to wildlife, hazelnuts have to be collected while the husks are still quite green. When collected green, they are subject to excessive heating if not allowed to dry sufficiently. They should be spread thinly and stirred frequently until the husks are cured. Place the dehusked seed in 4-6 mil poly bags and keep cool with good air circulation. Silver maple should be handled similar to hazelnut, but for a different reason. Silver maple has a thin seed coat that allows moisture to escape relatively rapidly.



However, if the seed is not dried sufficiently before bagging, it will over heat in a matter of hours, even in cold storage. The greatest danger of heating is past when the seed coat has dried to a uniform light tan and the wing is slightly brittle. Even then, the seed should never be packed tightly into a container.

### Important Summary Points – Seed Handling and Storage

- Surface dry seed before placing in storage
- Store seed in 4-6 mil polyethylene bags
- Label bags
- Keep seed cool
- Allow air movement between seed bags

*This information note is adapted from information on seed collection by William G. Yoder, retired, Missouri Department of Conservation.*

The United States Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs and marital or familial status. (Not all prohibited basis apply to all programs). Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact the USDA TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint, write the Secretary of Agriculture, USDA, Washington, DC 20250, or call 1-800-245-6340 or (202) 720-1127 (TDD). USDA is an equal opportunity employer.