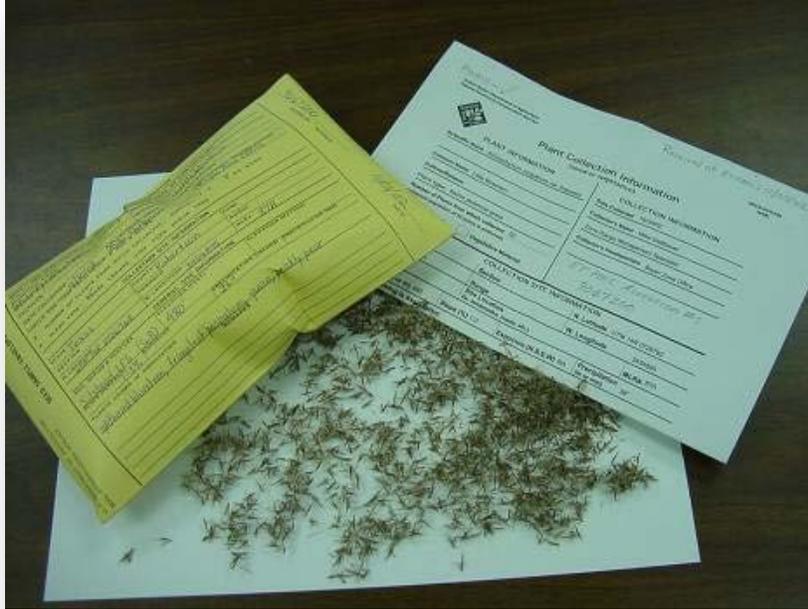

Collecting Seed Materials

Plant Materials Technical Note



Introduction

Plant collections are the basis for evaluations and released material from the NRCS Plant Materials Centers. Plant species with the potential to address conservation needs are identified and collected by NRCS personnel and private individuals. The purpose of this technical note is to provide information on proper seed collection techniques.

Steps for Collecting Seed

1. Identify the Species

- Identify the species in the field. If necessary, obtain assistance from a specialist to confirm the identification. Refer to the Texas NRCS Plant Materials website (www.tx.nrcs.usda.gov/technical/pmc) for specific information about plants to be collected.
- Research the plant species to determine the estimated time of flowering and seed maturity. Know what the seed looks like: its appearance, size,

shape, and location on the plant. Also, find out if the seeds easily shatter or if they are especially vulnerable to disease and insect damage.

2. Locate Collection Sites

- When researching the plant to be collected, find out the preferred soils and moisture regimes. This will aid in locating collection sites.
- The preferred locations for collection are undisturbed areas, woods (for shade tolerant species), railroad right of ways, power line right of ways, and known prairie remnants. Roadsides and highway medians are not preferred because those areas may have been seeded with commercial materials in the past.
- Identify the seed collection sites by marking on a map or noting GPS coordinates for future reference. Collection sites for the same species should be at least ½ to 1 mile apart.

3. Monitor the Collection Sites

- For some plant species, the window for seed collection is narrow; therefore monitoring the collection site is an important key to good seed quality. Collecting immature seeds increases the chance of low viability. On the other hand, waiting too long for seed harvest may result in loss from seed shattering. A general rule of thumb is most seed will mature within 4 to 6 weeks after bloom.
- Be aware of the different stages of growth for the collection plant. Growth stages are the clues to use when estimating a time for seed collection. For example, in grasses there are four stages of growth; vegetative, stem elongation, reproductive, and seed ripening. The major characteristic of the vegetative stage is the appearance and growth of leaves. Stem elongation or “jointing” is when the tillers begin to grow in response to photoperiod. Eventually they differentiate into vegetative and reproductive tillers. The reproductive stage begins at boot, when the seedhead is ready to emerge from the tiller, and continues through bloom and pollination. Following pollination, the final stage of seed ripening



begins. During this last stage, the plant uses most of its nutrients for seed development and growth.

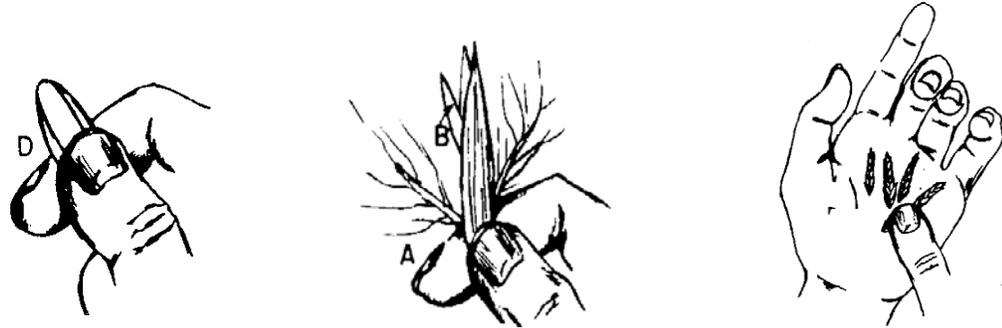
- Grass seed usually mature four to six weeks after pollination is complete. Weather influences seed maturity. Dry, warm growing conditions encourage earlier maturity while wet, cold conditions slow down seed maturity.
- Forbs follow similar stages of growth and seed development.
- After pollination, the seed develops through four stages. The first is the “milk” stage. In this stage, the seed is easily squeezed between the fingers and produces a milky substance. There is no structure to the endosperm. The next is the “soft dough” stage. During this stage, the endosperm of the seed will be soft and resembles bread dough. Next, the seed matures to the “hard dough” stage. When the seed reaches this stage, the endosperm is difficult to squeeze with the fingers. There is structure and integrity of the endosperm. **At “hard dough” stage, the seed is mature enough for harvest.** The final stage is full maturity. At this stage, the seed cannot be dented with a thumbnail or easily split.



Eastern gamagrass seed in hard dough stage

- If the seed is flat or does not have an endosperm, then it is either not filled or has just finished pollination. Therefore, don't collect the seed at that time.
- Grass seedheads usually ripen from the top downward. Harvest seed when the tips of the seedheads begin to shatter. Seed shatter can be determined by lightly striking the seedhead against the palm. If the seed shatters easily, it should be collected.

- There are several ways to check seed maturity for grasses. Which method is used will depend upon the species. For individual seeds, use the thumb and forefinger nails to squeeze the base of the seed. Another way is to rub out the seed in the palm of the hand. (See below)



- A good indicator of seed maturity for forbs is the appearance of the seedhead. An immature seedhead has a greenish appearance and the petals are not dried out, therefore they are not ready for harvest.



4. Collecting Mature Seed

- Seed should be collected when the endosperm is in the “hard dough” stage.
- Know if the collection species produces seed determinately or indeterminate. Determinate flowering and seed maturity means the seed on a plant mature in a uniform manner. This trait is common in agronomic crops. However, most native plants are indeterminate in their flowering and seed maturity. Indeterminate plants have different stages of seed

development on the same stem. One example of an indeterminate species is little bluestem (*Schizachyrium scoparium*). On one stem, there may be maturing seed, while other seed are being pollinated. This trait extends the amount of time viable seed can be harvested. Collect from indeterminate plants several times during seed ripening to harvest early, middle, and late maturing seed.

- If it is not possible to make repeat visits to a collection site, harvest seed when the largest amount of seed or seedheads have matured to the proper stage of seed development.
- Harvest seed from a representative sample of plants at the collection site. Don't collect seed from just the largest or most robust looking plants. This will increase the genetic diversity of the seed collection.
- Space collection sites at least 0.5 mile to 1 mile apart.
- Collect seed from at least 30 plants if possible. Don't collect all the seed from a site, this ensures some seed remains for reseeding.
- **Collect more than simply a handful of material. Usually half to ninety percent of the weight of a collection is inert matter, such as leaves, sticks, and immature seed.**

Methods of Seed Harvest

- Three methods of collecting grass seed are hand stripping, cutting off the seedheads from the stem, or shaking the seed off the stem. When hand stripping, collect some stems between the fingers and move upward as the seeds are pulled off the rachis. Gloves may be worn to protect the hands. After collecting the seed or seedheads, store them in a paper or cloth bag.
- When collecting forb species, harvest when seedheads are dried and petals have dried around the seedhead. A dry stem is a good indicator that seed is no longer receiving moisture from the plant and is fully mature. Harvest by cutting off the seedheads and letting them dry or hitting the seedheads against the side of a box and letting the mature seed fall to the bottom. If possible, make multiple collections over the course of 2-4 weeks from the site to increase the chances of collecting viable seed.



Mature purple coneflower seedhead

- Some plants produce seed in pods. These pods will twist and throw their seeds when the temperature and humidity are correct. These species should be harvested when the pods are slightly immature and allowed to dry in a closed paper bag.
- When harvesting seed, check for the presence of insect and disease damage. Insect damage is evident by the entrance and exit holes in the seed. If 50% or more of the seeds are damaged, do not make the collection. Fungal disease can be on the seedhead or individual seeds. Signs of ergot include a black powder on seedheads, orange tumors in individual seeds, or a sticky sap known as honeydew on the seedheads. Watch for unusual looking growths or white powdery substances on the seedheads. If there is a lot of fungus present, do not collect the seed.

5. Seed Handling after Harvest

- Use paper or cloth bags to hold the seed. Leave the top of the bag open when drying the seed sample. Freshly collected seed samples are high in moisture. Porous bags allow air to dry the sample. Plastic and nonporous containers trap moisture, thereby encouraging seed mold and spoilage. Do not place the sample in direct sunlight to dry. The seed may overheat and kill the endosperm. If the sample is large, spread the collected material out on a shallow tray for air drying.
- After the seed is dry, send the collection to the requesting Plant Materials Center. Include the corresponding ECS-580 with the seed collection bag. This form is available for download at the Texas NRCS website under Plant Materials at: www.tx.nrcs.usda.gov/technical/pmc/pm_forms.html.

References:

Davison, J. 2003. A Field Guide for Collecting Native Seeds in Nevada. Univ. of Nevada Cooperative Extension.

Moore, K.J. and L.E. Moser. 1995. Quantifying Developmental Morphology of Perennial Grasses. *Crop Sci.* 35:37-43.

St John, L., D. Ogle, J. Scianna, et al. 2009. Technical Note Plant Materials No.1 Plant Materials Collection Guide. USDA-Natural Resources Conservation Service.

US Dept. of the Interior National Park Service. 2004. Technical Bulletin 03-1 Native Seed Collection and Handling.

USDA - United States Forest Service. Developing Native Plant Materials for restoration[Online] Available at: www.fs.fed.us/wildflowers/nativeplantmaterials/collecting.shtml (accessed 26 August 2009) USDA United States Forest Service, Washington, DC