

# Aspen Seed Collection and Extraction

Martin Y. P. Fung and Barbara A. Hamel

*Reclamation research associate and greenhouse technologist, Syncrude Canada Ltd.,  
Fort McMurray, Alberta, Canada*

*Aspen (Populus tremuloides Michx.) seeds can be collected when about one-third of the capsules within a cluster have partially opened but before the cotton begins to well out. For optimum viability, the seeds must be extracted within 1 week of collection. Seeds contained in sealed jars and stored at -20 °C remained viable after 2 years. Tree Planters' Notes 44(3): 98-100; 1993.*

Until a decade ago, aspen (*Populus tremuloides* Michx.) was considered a weed tree. Dramatic increases in its utilization by the pulpwood and lumber industries have brought the species recognition as commercially important. Consequently, interest in aspen ecology, management, and regeneration has escalated significantly in recent years.

Although aspen regenerates very effectively by root suckering, it can also be propagated readily from seeds. This method of forest regeneration is important to help preserve genetic variability and promote widespread dissemination and colonization of new areas through wind-dispersed seeds. Also, propagation from seeds is still the most economical method for large-scale seedling production in greenhouses. At the Syncrude oil sands mining site in Fort McMurray, Alberta, aspen makes up 50% of the 250,000 tree seedlings grown and planted annually for the reclamation of disturbed lands.

## Aspen Fruits

Aspen is dioecious, with flowers borne on catkins. Flowering occurs in spring just before leaf emergence. The fruits are individual solitary capsules that are borne on the female catkins. Before the leaves are fully expanded, the capsules split into two parts to expose the tiny tufted seeds for wind dispersal.

Good seeds are derived from mature capsules that are plump and rounded at the base and have erect points (Schier et al. 1985). Capsules that are somewhat flattened and taper rather evenly from base to point do not contain viable seeds.

## Seed Collection

The time of flowering is not a reliable predictor for scheduling seed collection (Schier et al. 1985). The exact time of seed maturity varies slightly from year to year, depending on sites, age of trees, and local weather conditions. Precise timing of seed collection is crucial. The goal is to harvest seeds as close to maturity as possible. If the fruits are picked prematurely, the seeds do not ripen and viability is poor (Schreiner 1974). On the other hand, aspen seeds dehisce rapidly upon maturation, and one windy day can disperse the whole crop. Therefore, intensive monitoring of the seed maturation progress is critical because the range of appropriate collection time may be as narrow as 48 hours.

At Syncrude, we begin collecting seeds when about one-third of the capsules within a cluster have split at the point, but before the cotton begins to well out (figure 1). In Fort McMurray (57° 02' N, 111° 36' W), this occurs between mid to late May. The seeds collected at this stage will mature fully and viability usually approaches 100%.

The capsules can be harvested by either chopping down branches laden with catkins or felling the entire tree. Next, we recommend dislodging the capsules from the catkins because the stems will interfere with the seed extraction process. This is accomplished by grasping the catkins with one hand, starting at the top, and gently pulling downwards along the stem. Position a container below to collect the capsules as they drop.

When picking is completed, take the capsules to a shelter and place them in large shallow tubs for further ripening. Spread the capsules in single layer to ensure proper ventilation to prevent mold infestation. Place a plastic mesh over the tubs and store at room temperature, away from full sunlight, for 3 to 5 days. By then the tubs will be filled with cotton, and seed extraction must begin immediately.

## Seed Extraction

The following seed extraction procedure has been used by Syncrude with consistent success:

Assemble a set of 30-cm diameter sieves (as shown in figure 2), starting with a pan at the bottom followed in ascending order by 60-, 40-, 20- and 10-mesh sieves. Lift up the top sieve and fill the 20-mesh sieve with cotton containing seeds. Reposition the top (10-mesh) sieve.



Figure 1 - *Aspen capsules ready for picking.*

Attach a vacuum cleaner hose to the posterior socket of the canister and blow at the cotton through the top sieve with a side-to-side motion followed occasionally by a circular motion until most of the aspen seeds have been dislodged. The air stream velocity can be adjusted either with the vacuum speed control mechanism or simply by applying adhesive tape around the nozzle to constrict the opening. It is not necessary to extract all the seeds because those seeds

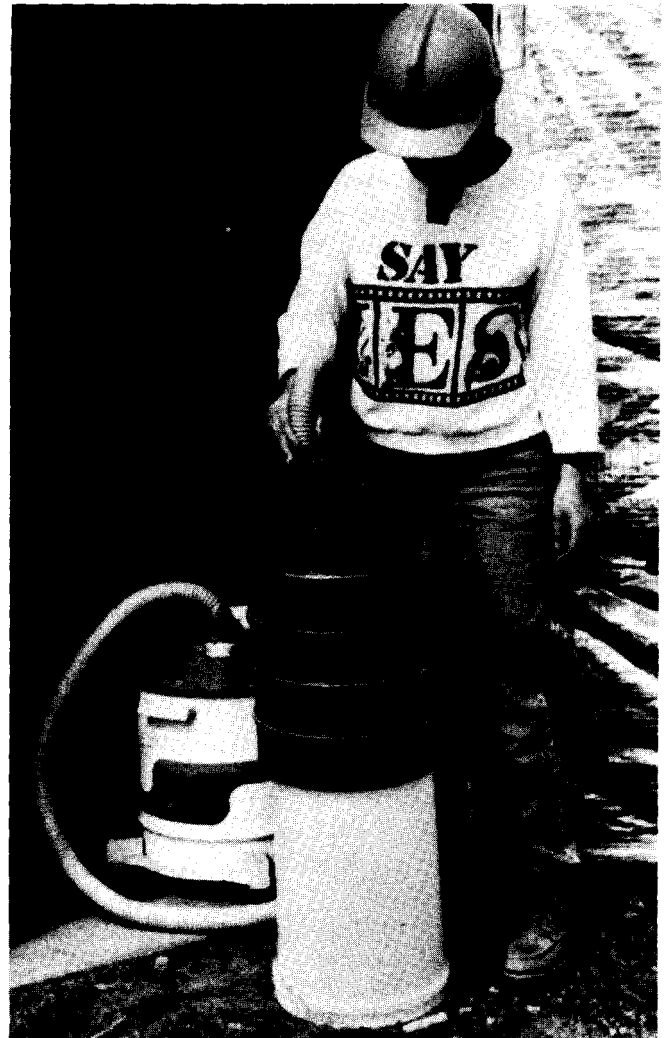


Figure 2 - *Extracting aspen seeds using sieves and a vacuum cleaner.*

that are difficult to dislodge are usually non-viable. Seeds will gather in the 60- and 40-mesh sieves. However, the seeds trapped in the 40-mesh are generally superior in terms of cleanliness, size uniformity, and viability.

Even though no seed will be found in the bottom pan, it is advisable to have it in place because it redirects the air stream upwards, causing the cotton to tumble, and thus facilitates seed separation. In addition, the pan eliminates dust turbulence during the extraction process.

### Seed Viability and Storage

Aspen seeds deteriorate rapidly upon maturity. Thus, it is imperative that the seeds are extracted and stored within 1 week of collection, after which the viability declines sharply. Our tests showed that seed viability had greatly diminished when the seeds were left in the tubs for 4 weeks before being extracted. After extraction, no further seed cleaning or drying is necessary. Immediately decant the seeds into suitable jars, seal tightly, and store at -20 /C. By using this method, our aspen seeds lasted for at least 2 years without significant loss of viability.

### Literature Cited

- Schier, G.A.; Shepperd, wD.; Jones, J.R. 1985. Regeneration. In: DeByle, N.V; Winokur, R.P, eds. Aspen ecology and management in the western United States. Gen. Tech. Rep. RM-119. Fort Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station: 197-208.
- Schreiner, E.J. 1974. *Populus L.*: poplar. In: Schopmeyer, C.S., tech. coord. Seeds of woody plants in the United States. Agric. Handbk. 450. Washington, DC: USDA Forest Service: 645-655.