

# Populus tremuloides

**COMMON NAMES:** Trembling aspen, Aspen poplar, White poplar

**FAMILY:** Salicaceae [Willow]

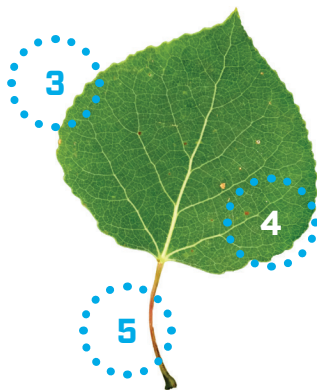
## SPECIES IDENTIFICATION

### GENERAL ID

A slender, deciduous tree usually reaching 20 m, sometimes 30 m tall.<sup>1</sup> Bark is smooth, greenish white and does not peel into sheets, developing dark furrows around the trunk and base of branches with age. Buds are not resinous or aromatic.<sup>2</sup> Usually found in stands formed by root suckering.



- 1 Smooth Aspen bark
- 2 Furrowing



- 3 Very finely toothed margins
- 4 Oval to circular, rounded base
- 5 Flattened stalk



Aspen stand

### LEAVES

Leaves are oval to circular with a rounded to nearly heart-shaped base. The margins are nearly entire but finely toothed. Leaves are typically 2-7 cm long and nearly hairless. Leaf stalks are flattened which causes the leaves to tremble in the breeze.

### HABITAT

Found in all ecoregions and is widely distributed in Alberta. Often a dominant woody species in open forests and aspen parkland communities and a successful pioneer species on disturbed areas.<sup>3</sup> Associated species include *Corylus cornuta*, *Viburnum edule*, *Alnus viridis*, *Cornus sericea*, and *Salix bebbiana*. This species can adapt to a wide range of soil conditions but does best in moist, well-drained loam soils.<sup>4</sup> Trembling aspen is very shade intolerant.

## LOOKS LIKE

- ***Populus balsamifera* (Balsam poplar)** - this species has very resinous buds that are aromatic. Leaf stalks are rounded.
- ***Populus deltoides* (Western cottonwood)** - this species has blades that are more triangular with a heart shaped base. Cottonwood trees also have distinctly lobed margins.

Note: *Populus tremuloides* hybridizes with several other poplar species including *P. balsamifera*, *P. deltoides*, *P. grandidentata*, and *P. Alba*,<sup>5</sup> which can make some individuals difficult to identify.

## FLOWERING

Catkins are dioecious, usually flowering in April. A week of warm weather (12°C and above) typically induces flowering.<sup>3</sup> Flowering time may vary depending on region or occur earlier due to warming trends.<sup>6</sup> Fruit or capsules appear May to June. Seed dispersal time is usually short, about 2 weeks.

### MALE CATKINS

5-14 stamen on a stalked basal disk, stacking to form a fuzzy catkin 2-3 cm long.<sup>7</sup> Pink when first appearing around April before opening of leaves. Release of pollen gives yellow-green appearance mid-April to May. After pollen release, catkins shrivel, turn grey and drop off.

### FEMALE CATKINS

Develops after male catkin. Two stigmas per flower on a basal disk. Flowers stack to form catkin 4-10 cm long.<sup>7</sup> Pink with white-tufted ends when immature. After fertilization, catkins elongate and develop teardrop-shaped capsules that become bright green as they mature (late May to early June). Mature 4-6 weeks from flowering.<sup>3</sup>



Male catkins on branch



Fertilized female catkins on branch



Fertilized seed in catkin fluff



Cleaned Aspen seed

## SEED

Seed capsules are an elongated tear-drop shape, 3-5mm long.<sup>2</sup> Seeds are purplish to brown, tiny and numerous. They are fringed with white tufts of fine hair (pappus).

## SEED COLLECTION AND PROCESSING

### SCOUTING

Female Aspen catkins are distinct after fertilization and develop with leaf flush. It is suggested to scout early in the season, use GPS to track the location of the patch, and flag trees to improve efficiency when seed is ready for collection.

### SEED COLLECTING

Harvest female catkins when the capsules are starting to open, typically early June. Harvest branches with pole pruners, or fell the tree with a chainsaw, remove catkins and place in paper bags for transport back to the seed cleaning facility.

#### ASPEN (*P. TREMULOIDES*): WAIT OR HARVEST? A VISUAL GUIDE



Wait, or harvest and allow to open at facility



Harvest



Harvest carefully and clean ASAP

There are two good ways to store seed for transport:

1. Place catkins into a small paper bag, leaving some air space. Fold the bag top over to close and place into a larger paper bag. Continue until large bag is full of smaller bags, taking care to maintain air spaces. Do not compress the bags.
2. Place a thin layer of catkins into an onion bag. Lay the bag flat on the ground, lift the one side and sprinkle an even layer into the onion bag. Fold the onion bag in half and place into a large paper bag. Continue stacking onion bags until the bag is full, layering cardboard or extra bags between the onion bags to maintain air spaces and prevent compaction.

Note: Regardless of which method is used, it is crucial that the catkins remain cool and well ventilated to preserve the viability of the seed. For this reason, storage in buckets or similar closed containers is not recommended.

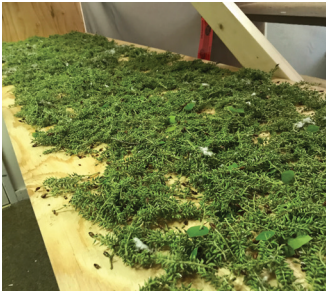
### INTERIM STORAGE

Loose catkins can be stored in a 4°C cooler or in a fridge for up to a week before spreading out to dry and “fluff up.” Catkins on cut branches can be stored for 2 weeks in a 4°C cooler or fridge.



### SEED RIPENING

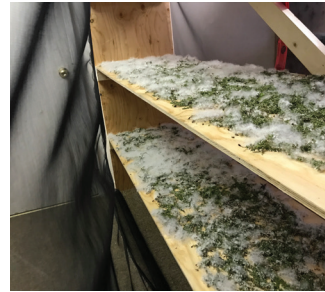
Spread catkins out in a thin layer in a container or shelf topped with mesh screening to allow air circulation. A thick layer will inhibit the “fluffing out.” Simple, stackable racks built with screen on the bottom and top allows the most airflow and will speed up the ripening process. Keep air moving with a fan set to low to further speed the process. When catkins appear to have opened fully, and much of the pappus has loosened, seed is ready for the extraction process.



Catkins before fluffing



Catkins before fluffing



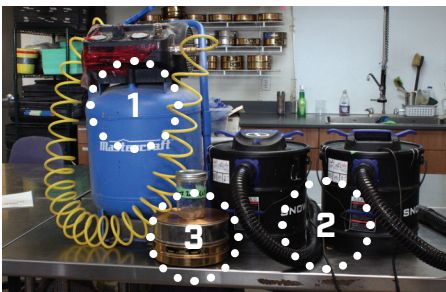
Catkins after fluffing



Catkins after fluffing

### SEED EXTRACTION

This method uses 2 vacuums (one ash vacuum, one “Shop Vac”), and ideally an air compressor, a selection of soil sieves, and a column blower.



- 1 Air compressor
- 2 Ash vacuums
- 3 Soil sieves



Using ash vacuum to collect loose seed and pappus



Vacuum empty pappus with second vac

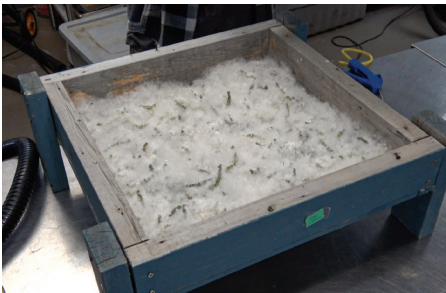
Carefully remove the screen from the top of the container/rack and gently vacuum up the loose seed and pappus from the catkins using the ash vacuum. The empty pappus will accumulate around the air filter and seed will fall to the bottom of the ash vacuum canister. Every few minutes, turn off the ash vacuum and turn on the “Shop-Vac.” Unlock the lid to the ash vacuum and open it just enough to fit the “Shop-Vac” hose. Vacuum up the empty pappus. Remove the lid of the ash vacuum and pour the accumulated seed into a bowl or jar for temporary storage.

Note: It is important to pause vacuuming periodically and remove the empty pappus. This will prevent the cannister from overfilling, causing the seed to wrap around the filter and mix with the pappus again. The size of the ash vacuum used will determine the time between emptying the canister to maintain seed separation from the pappus during this step.

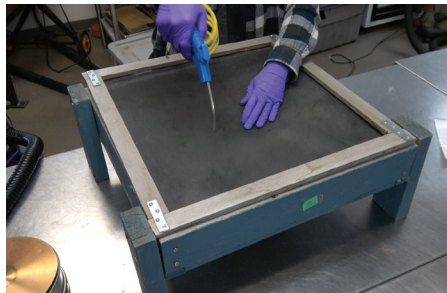
When finished vacuuming up loose seed and pappus, there are two options:

1. Flip over catkins, gently agitate, and wait overnight for the catkins to continue to open. Repeat the process until catkins no longer “fluff-up.”
2. Use an air compressor, or a clean “Shop-Vac” set to blow, and blast catkins with air. This will agitate the catkins and release additional seed and pappus. Repeat the process until no more seed and pappus is released.

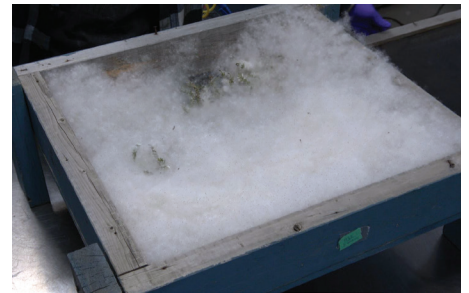
Note: this technique will not work on a shelf as the catkins will blow away. This is best suited for catkins in a rack or in a bin with a screen placed on top.



Catkins before air compressor



Using air compressor and covered rack to loosen seed and pappus



Catkins after air compressor

To remove any chaff or pappus remaining in your extracted seed, use various sizes of soil sieves or a column blower.

Note: be careful if using a column blower as seeds are very small and can easily be blown away with the chaff.

## STORAGE

Dry cleaned seeds to 15-25% Equilibrium Related Humidity (% ERH) at 20-30°C or 4-8% moisture content and store in an airtight container or sealable bag at -20°C for best seed longevity. Depending on the local climate (relative humidity in particular), drying may be possible on a bench top. If located in a humid area, the use of desiccant or a dry room/chamber may be necessary.

## FIELD EXTRACTION

If catkins are completely open and fluff is flying everywhere, field extraction can be considered. The process remains the same (see Seed Extraction), with the additional need of a generator or deep cycle battery with a power inverter to run the vacuums.

## BRANCH COLLECTIONS

If target catkins are underripe and later collection in the area is not possible, branch collection may also be done. The process is similar (see Seed Collection), however catkins are left on their branches and wrapped in a large “silvi-cool” tree planting tarp for transport.

Once at the seed cleaning facility, branches are treated like cut flowers. Trim ends down to a manageable size and place the cut ends into buckets or bins of water. Every few days, trim the bottom of each branch to ensure proper uptake of water. This will keep the branches alive while catkins continue to develop. When catkins are mature and starting to open, remove from branches, allow to “fluff up” completely and extract as normal.



# CENTRE FOR BOREAL RESEARCH

## TECHNICAL NOTE #34

PLANT AND SEED TECHNOLOGIES - AUGUST 2020

For more information on best practices for collection and seed registration, refer to “Technical Note #15: Seed Collection, Processing and Storage” by the NAIT Centre for Boreal Research.

## REFERENCES

1. Moss EH. 1983. Flora of Alberta. 2nd ed. Revised by Packer JG. University of Toronto Press.
2. Johnson D, L Kershaw, A Mackinnon, J Pojar. 1995. Plants of the Western Boreal Forest. Lone Pine Publishing: Edmonton, AB
3. Perala DA. 1990. *Populus tremuloides* Michx. Quaking aspen. Salicaceae Willow family. In R.M. Burns and B.H. Honkala (tech. cords.). Silvics of North America. Vol. 2, Hardwoods. pp.523-534. U.S. Dep. Agric. Handbook. 654.
4. Wright EF, CD Canham, KD Coates. 2000. Effects of suppression and release on sapling growth for 11 tree species of northern, interior British Columbia. Canadian Journal of Forest Research, Vol 30, 10: pp 1571.
5. Brayshaw, TC. 1965. Native Poplars of Southern Alberta and Their Hybrids. Canadian Department of Forestry Publication 1109.
6. Beaubien E and A Hamann. 2011. Spring Flowering Response to Climate Change between 1936 and 2006 in Alberta, Canada. BioScience. Vol 61, 7: pp 514-524.
7. Nagaraj M. 1952. Floral Morphology of *Populus deltoides* and *P. tremuloides*. Contributions from the Hull Botanical Laboratory 639. Botanical Gazette. Vol 114, 2: pp 222-243.

### VISIT OUR WEBSITE

**nait.ca/borealresearch**  
**ISSN 2371-462X**

### CONTACT US

boreal@nait.ca  
780.648.2600

### AUTHORS

Ryan O'Neil, Rielle Massey, Jean-Marie Sobze, Catherine Brown, Mary Fleming,  
Centre for Boreal Research, NAIT.

**Photos:** Centre for Boreal Research, NAIT.

Thank you to Natural Sciences and Engineering Research Council of Canada (NSERC) for financial support.



**APPLIED  
RESEARCH**



**ESSENTIAL  
TO INDUSTRY**

**nait.ca/borealresearch**