Controlled *Populus* breeding was initiated a century ago by **Henry** (1914); over time, the technique was refined through the work of several poplar breeders:

Stout & Schreiner, Wettstein-Westersheim, Al'benskii & Delitsina, Johnson, Skinner, Heimburger, Pauley, Mohn, Hanover, Bergman & Lantz, Mulhe Larsen, Farmer & Nance, Jokela, Hall, Zsuffa, Vallée & Joennoz, and others.

Branch collection

Collection of reproductive material: staminate and pistillate inflorescences. Cold storage (+4°C to -4°C) before greenhouse forcing.

Branch pruning & processing

Shoot pruning/ thinning of floral buds. Dormant oil treatment.

A technique for controlled reproduction of poplars in Québec

Forcing of males

Water culture with air bubbling

Growth conditions: under shade (white plastic) and with high humidity

Gradual increase of T from 10°C to 20°C over a 3-week period

Basal disks are cut from the floral cuttings once a week, after cleaning and disinfection of the pails, with a fresh water change.

Pollen processing & storage

Pollen collection/

Black plastic bag/

Pollen gathering twice daily

Pollen processing and conservation: sieves, drying phase over Drierite at 4°C

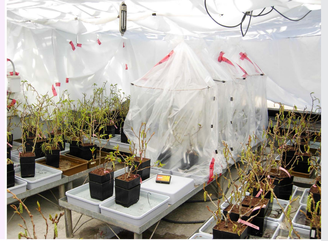
Forcing of females

Ventilated (filter paper window) plastic tents are used to isolate female branches and prevent open pollinations.

Several females are grouped in the same tent and pollinated by a single male.

Growth conditions: under shade (white plastic) and with high humidity

Gradual increase of T from 10°C to 20°C over a 2-week period

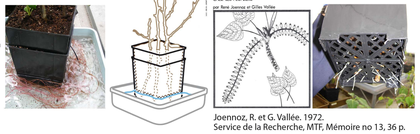


Aerated tub water is replenished regularly; the water is changed after cleaning the tub once the pollination is over, the tent removed, and the pruning of excess vegetative shoots has started.

Plançon-en-pot method

Joennoz & Vallée, 1972

The bases of floral cuttings, stuck in pots over an aerated water tub, are maintained in bubbling water while rooting occurs on the upper part of the stem in the peat:vermiculite:Turface substrate.



Joennoz, R. et G. Vallée. 1972. Service de la Recherche, MTF, Mémoire no 13, 36 p.

Pollination

Lycopodium spores can be added to bulk up low-yield pollen lots as needed.

Pollen lots are rehydrated in a humid environment just before use.

Pollen is applied twice a day with a cotton ball while the flowers are receptive.

The ball, lightly dusted with pollen, is shaken over the receptive inflorescences, creating a pollen cloud that pollinates a maximum number of flowers.

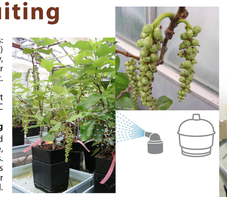
Fruiting

Growth conditions: under shade (white plastic) with high humidity, and gradual transfer to full light.

T day/night 20-24°C/12-18 °C

Seed collection and processing

Seed catkins are collected when capsules initiate dehiscence, and air-dried at room temperature for 2 days. Seeds and unshed capsules are then stored over Drierite in a desiccator at 4°C for an additional 2-4 day period.



Long-term seed storage

Once shedding is complete, dried seeds are processed without removing the cotton fibers, labelled, and stored at -19°C for long-term conservation in glass containers, or kept at 0-4°C until sowing.

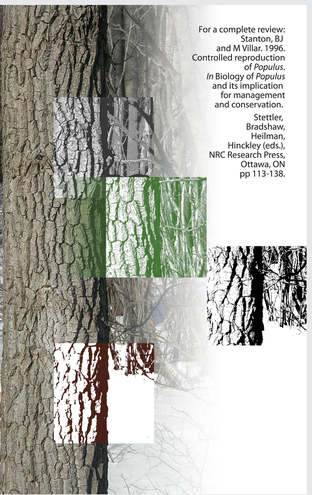
Sowing

Germination and culture

Seeds are top-dressed with a light sand layer over a peat:vermiculite:Turface substrate (7:1:2).

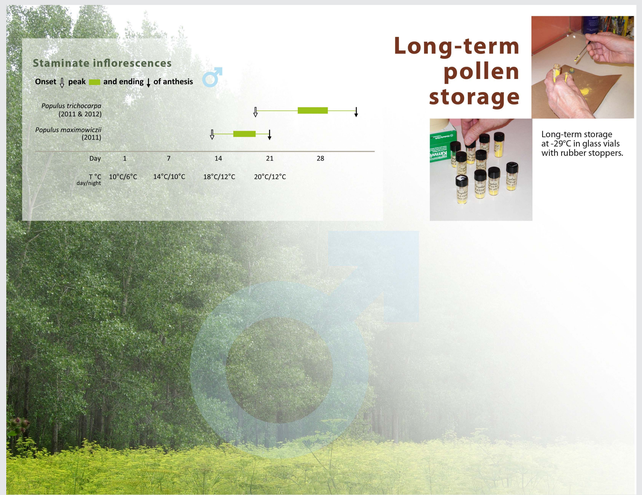
Growth conditions: shade-greenhouse with very high humidity for a 2-6 day period.

The tiny seedlings are then transferred to full light with regular misting under long days, with a 24°C/18°C day/night temperature regime.



For a complete review:
Stanton, BJ and M Villar. 1996. Controlled reproduction of *Populus*. *In* Biology of *Populus* and its implication for management and conservation.

Stettler, Bradshaw, Heilman, Hinckley (eds.), NRC Research Press, Ottawa, ON pp 113-138.

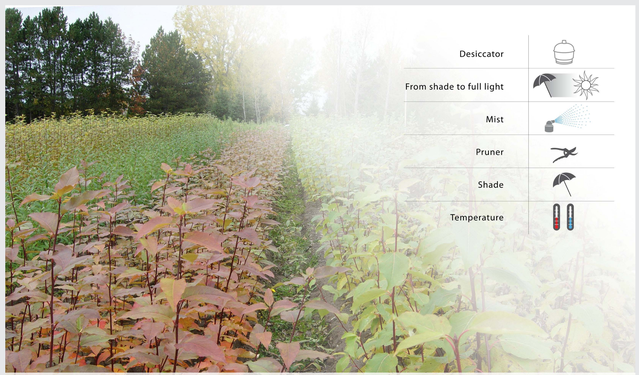


Staminate inflorescences

Onset ♂ peak and ending ↓ of anthesis

Long-term pollen storage

Long-term storage at -29°C in glass vials with rubber stoppers.



Desiccator

From shade to full light

Mist

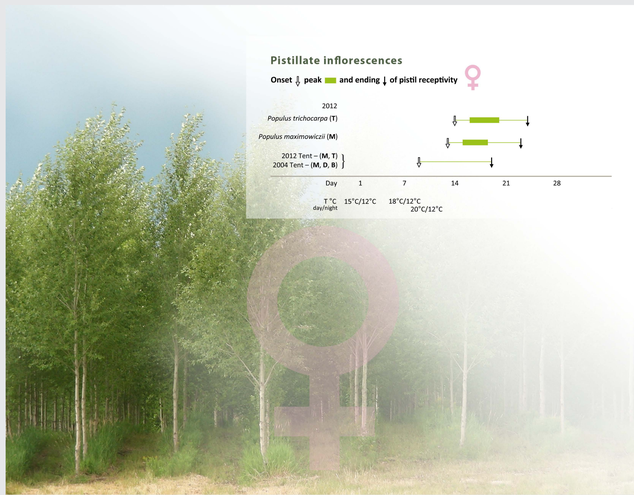
Pruner

Shade

Temperature

DIRECTION DE LA RECHERCHE FORESTIÈRE

Ressources naturelles et Faune
Québec



Pistillate inflorescences

Onset ♀ peak and ending ↓ of pistil receptivity

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