Scientific Name: *Populus balsamifera* L **Family:** *Salicaceae*

Common Names: balsam poplar, black poplar

***Populus balsamifera* seeds**

Plant Description

Tree up to 25 m tall with broad crown and dark furrowed bark; twigs brown; buds coated with a viscid gum; leaf blades 6 to 12 cm long, ovate to ovate-lanceolate, rounded to cuneate or somewhat cordate at base, deep green above, silvery whitish or pale brownish beneath, margins crenate-serrate; petioles 2 to 5 cm long (Moss 1983). Plants live to 70 years (Government of the Northwest Territories n.d.).

Fruit: Mature catkins 10 to 13 cm; capsules ovoid, larger hairless, 6 to 7 mm long, splitting into 2 parts when mature (Farrar 1995).

Seed: Approximately 2.5 mm long, light golden brown, lance shaped, covered in white fluff (Farrar 1995).

Habitat and Distribution

Found in river valleys, moist rich low lying ground (Farrar 1995).

Seral Stage: Shade intolerant, early successional species (Tannas 1997, USDA NRCS n.d.).

Soil: Does well in a variety of soil types in a pH range 4.5 to 7 (USDA NRCS n.d.). It has no salinity tolerance (Hardy BBT Limited 1989, USDA NRCS n.d.).

Abundant soil moisture needed but stagnant brackish water intolerable (Rook 2002).

Distribution: Alaska, Yukon, southern District of Mackenzie to Hudson Bay, Newfoundland south to California, Utah, Wyoming, southern Saskatchewan, southern Manitoba, Great Lakes (Moss 1983).

Phenology

Plants flower in April; seeds ripen in May and June (Young and Young 1992).

Begins to flower at 8 years (Harris 1990); 8 to 10 years (Government of the Northwest Territories n.d.).

Pollination

Wind pollinated (Plants for a Future n.d.).

Seed Dispersal

Wind dispersed.

Genetics

2n=38 (Moss 1983).

Symbiosis

Forms mycorrhizal associations. In particular, ectendomycorrhizal association is made with E-strain

fungi including an extensive Harig net between cortical cells and vascular cylinder (Siemens and Zwiazek 2008).

Seed Processing

Collection: Collect when green and allow capsules to open by drying (Young and Young 1992).
Seed Weight: 0.24 g/1,000 seeds (Royal Botanic Gardens Kew 2008).
Harvest Dates: End of May to early June, as soon as first fluff is in the air. Collect May 15 to May 31 (Formaniuk 2013).
Cleaning: Vacuum screening has been used to pull fluff from seeds.
Storage Behaviour: Orthodox; seeds can be dried, without damage, to low moisture contents; their longevity increases with reductions in both moisture content and temperature (Royal Botanic Gardens Kew 2008).
Storage: Stored at -10°C in sealed containers (Zasada and Densmore 1980).
Optimum relative humidity appears to be 10% (Royal Botanic Gardens Kew 2008).
Longevity: Seeds lose viability quickly (Young and Young 1992). Was found to retain viability for up to 3 years (Zasada and Densmore 1980). Palamarek (pers. comm.) found balsam poplar seed retained viability for 4 to 6 years.

Propagation

Natural Regeneration: Spreads by seed and vegetative means (Burns and Honkala 1990).
Germination: Fresh seed got 98% to 100% germination within 3 days at temperatures between 5 and 25°C. They do not show any kind of dormancy and will germinate in temperatures from 2 to 40°C (Burns and Honkala 1990).
Pre-treatment: No pre-treatment required (Burns and Honkala 1990, Formaniuk 2013, Young and Young 1992).
Direct Seeding: *Populus balsamifera* seeded on the Clover Bar Landfill in Edmonton had 11% survival after the first year (Smreciu 1997).
Vegetative Propagation: Can be propagated by either softwood or hardwood cuttings (Plants for a Future n.d., Wick et al. 2008).
Greenhouse Timeline: Grow for 120 days before harvest (Formaniuk (2013).

***Populus balsamifera* has resinous, aromatic buds**

Aboriginal/Food Uses

Food: Cambium can be scraped off and eaten; also used as a starvation food (Marles et al. 2000, Turner 1997, Wilkinson 1990). Catkins are high in Vitamin C and can be eaten raw or added to soup or stew (Gray 2011).
Medicinal: Sap can be drunk to treat diabetes and high blood pressure. Sap and bark boiled together were used to treat asthma. Extract can be rubbed on to treat skin diseases as well as to relive teething pain in babies. Also to treat heart problems, stomach aches and to draw out infections from sores (Marles et al. 2000).
Inner bark tincture is a natural remedy for fevers, rheumatism, arthritis and diarrhoea (Gray 2011).

Resin from buds used to treat sore throats, coughs, lung pain, and rheumatism (Rook 2002) and to treat snow blindness (Wilkinson 1990).
Other: Wood is not very strong but was carved into toy boats, paddles, pack-saddles, and cradleboards (Marles et al. 2000, Wilkinson 1990).
Ash used to make a soap substitute (Wilkinson 1990).
Roots split to make rope (Wilkinson 1990).

Wildlife/Forage Usage

Wildlife: Moose, deer and snowshoe hare browse this species (Harris 1990).
Provides shelter for wildlife as well as an important food source for beavers (Eaton et al. 2013, Tannas 1997).
Livestock: Poor forage; not utilized if better food sources are available (Tannas 1997).
Grazing Response: Increaser, a very aggressive competitor in their adapted ranges (Tannas 1997).

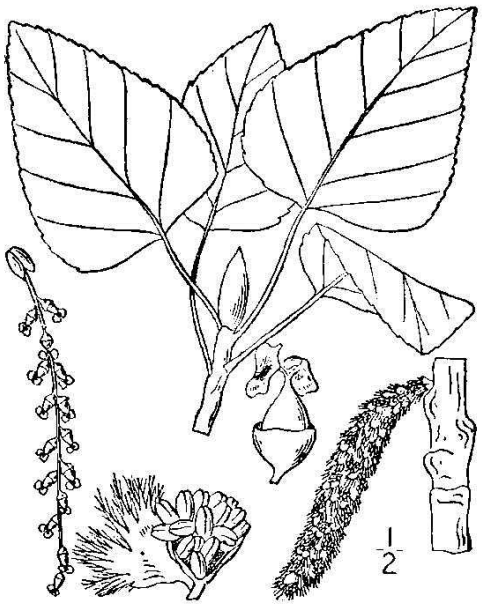
Reclamation Potential

Populus balsamifera can quickly colonize after natural or human disturbances and grow rapidly where light, exposed mineral soil, and moisture are readily available as well as provide cover for other slower growing plant species (Burns and Honkala 1990).
P. balsamifera can be used to stabilize river banks and maintain river islands, recolonize sites disturbed by fire or logging, and has been successful at naturally colonizing borrow pits and abandoned coal mine sites (Harris 1990).
"Northwest" hybrid was the best poplar after six years (tallest, largest stem, highest vigour and lowest dieback) on amended tailings sand near Fort McMurray. Survival after four years on amended tailings sand was 60 to 70% under moderate to heavy ground cover. Growth of the container stock averaged 14 cm/year during this period (Hardy BBT Limited 1989).

Commercial Resources

Availability: Plants are commercially available in Alberta (ANPC 2010).

Cultivars: There are horticultural cultivars; none are suitable for reclamation in Alberta.
Uses: Used for firewood, windbreaks, boxes, plywood, lumber, particle board and pulpwood (Borealforest.org n.d., Harris 1990, Tannas 1997).



Populus balsamifera: **Leaves, male and female catkin.**

Notes

Northern-most occurring of all North American hardwoods (Rook 2002).
P. balsamifera is listed as 91% intact (less occurrences than expected) in the Alberta oil sands region (Alberta Biodiversity Monitoring Institute 2014).
Plants are subject to attack by the large aspen tortrix (*Choristoneura conflictana* (Walker) when they are epidemic (Cerezke 1992).

Photo Credits

Photo 1: Matt Lavin Wikimedia Commons
http://commons.wikimedia.org/wiki/File:Populus_balsamifera_%285002985204%29.jpg
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References

Alberta Biodiversity Monitoring Institute, 2014. The status of biodiversity in the oil sands region of Alberta. Alberta Biodiversity Monitoring Institute, Edmonton, Alberta. 47 pp. http://www.abmi.ca/FileDownloadServlet?filename=The%20Status%20of%20Biodiversity%20in%20the%20Oil%20Sands%20Region%20of%20Alberta_2014_Supplemental%20Report.docx&dir=REPORTS_UPLOAD [Last accessed June 16, 2014].

ANPC (Alberta Native Plant Council), 2010. Native Plant Source List. http://www.anpc.ab.ca/assets/ANPC_2010_Native_Plant_Source_List.pdf [Last accessed October 24, 2013].

Borealforest.org, n.d. *Populus balsamifera* Balsam Poplar. IN: Common tree species of the northwest forest. Faculty of Natural Resources Management, Lakehead University, Thunder Bay, Ontario. http://www.borealforest.org/trees/tree11.htm [Last accessed October 24, 2013].

Burns, R.M. and B.H. Honkala (Technical Coordinators), 1990. Silvics of North America: 1. Conifers; 2. Hardwoods. Agriculture Handbook 654. U.S. Department of Agriculture, Forest Service, Washington, DC. Vol.2. 877 pp.

Cerezke, H.F., 1992. Large aspen tortrix. Forestry Canada, Canadian Forest Service, Northwest region, Northern Forestry Centre, Edmonton, Alberta. Forestry Leaflet 21.

Eaton, B., T. Muhly, J. Fisher and S-L. Chai, 2013. Potential impacts of beaver on oil sands reclamation success – an analysis of available literature. OSRIN Report No. TR-37. 65 pp. http://hdl.handle.net/10402/era.32764

Farrar J.L., 1995. Trees in Canada. Fitzhenry & Whiteside Limited, Markham, Ontario. 502 pp.

Formaniuk, S., 2013. "It's all in the timing". Canadian Reclamation 13(2): 26-31.

Government of the Northwest Territories, n.d. Balsam poplar (*Populus balsamifera*). IN: NWT Species Monitoring – Infobase. http://nwtspeciesatrisk.com/en/Infobase?page=Infobase [Last accessed January 6, 2014].

Gray, B., 2011. Balsam poplar *Populus balsamifera*. IN: The Boreal Herbal: Wild Food and Medicine Plants of the North. Aroma Borealis Press, Whitehorse, Yukon. pp. 256-258.

Hardy BBT Limited, 1989. *Populus balsamifera*. IN: Manual of plant species suitability for reclamation in Alberta - 2nd Edition. Alberta Land Conservation and Reclamation Council Report No. RRTAC 89-4. pp. 336- 339. http://hdl.handle.net/10402/era.22605 [Last accessed November 21, 2013].

Harris, H.T., 1990. *Populus balsamifera* subsp. *Balsamifera*. IN: Fischer, W.C. (compiler). The fire effects information system. United States Department of Agriculture, Forest Service, Intermountain Research Station, Intermountain Fire Sciences Laboratory, Missoula, Montana. http://www.fs.fed.us/database/feis/plants/tree/popbalb/introductory.html [Last accessed October 24, 2013].

Marles, R.J., C. Clavelle, L. Monteleone, N. Tays and D. Burns, 2000. Aboriginal plant use in Canada's northwest boreal forest. Natural Resources Canada and Canadian Forest Service. UBC Press, Vancouver, British Columbia. 368 pp.

Moss, E.H., 1983. *P. balsamifera* L. Balsam poplar. IN: Flora of Alberta. A manual of flowering plants, conifers, ferns, and fern allies found growing without cultivation in the province of Alberta, Canada. 2nd edition. University of Toronto Press, Toronto, Ontario. pp. 197-198.

Palamarek, D., 2011. Provincial Seed Officer, Alberta Tree Improvement and Seed Centre, Alberta Sustainable Resource Development, Smoky Lake, Alberta. Personal communication.

Plants for a Future, n.d. *Populus balsamifera* - L. IN: Plants For A Future, Dawlish, Devon, UK. http://www.pfaf.org/user/Plant.aspx?LatinName=Populus+balsamifera [Last accessed October 24, 2013].

Rook, E.J.S., 2002. *Populus balsamifera* Balsam Poplar. IN: Plants of the North. http://www.rook.org/earl/bwca/nature/trees/populusbal.html [Last accessed October 7, 2013].

Royal Botanic Gardens Kew, 2008. *Populus balsamifera* L. IN: Seed Information Database. http://data.kew.org/sid/SidServlet?ID=18502&Num=33k [Last accessed October 7, 2013].

Siemens, J.A. and J.J. Zwiazek, 2008. Root hydraulic properties and growth of balsam poplar (*Populus balsamifera*) mycorrhizal with *Hebeloma crustuliniforme* and *Wilcoxina mikolae* var. *mikolae*. Mycorrhiza 18: 393-401.

Smreciu, A., 1997. Clover Bar Landfill Site Revegetation and Naturalization Phases 1, 2 and 3a 1994 – 1997 Final Report. Prepared for City of Edmonton, Asset Management and Public Works Department, Waste Management Branch. 118 pp + appendices.

Tannas, K., 1997. Common plants of the western rangelands. Volume 1 – Grasses, grass-like species, trees and shrubs. Lethbridge Community College, Lethbridge, Alberta. 311 pp.

Turner, N.J., 1997. Balsam poplar *Populus balsamifera* L. ssp. *Balsamifera*. IN: Food plants of Interior First Peoples. Royal British Columbia Museum Handbook, Victoria, British Columbia. pp. 156-157.

USDA NRCS, n.d. *Populus balsamifera* L. balsam poplar. IN: The PLANTS Database. National Plant Data Center, Baton Rouge, Louisiana. http://plants.usda.gov/core/profile?symbol=POBA2 [Last accessed October 24, 2013].

Wick, D., J. Evans, T. Luna, J. Hosokawa, J. Lapp and S. Corey, 2008. Propagation protocol for vegetative production of container *Populus balsamifera* L. *trichocarpa* (T. & G. ex Hook.) plants (3 L containers); USDI NPS - Glacier National Park, West Glacier, Montana. IN: Native Plant Network, University of Idaho, College of Natural Resources, Forest Research Nursery, Moscow, Idaho. http://www.nativeplantnetwork.org/Network/ViewProtocols.aspx?ProtocolID=168 [Last accessed December 5, 2013].

Wilkinson, K., 1990. Balsam poplar, tacamahac, black cottonwood, balm-of-Gilead, black poplar *Populus balsamifera*. IN: Trees and shrubs of Alberta. A habitat field guide. Lone Pine Publishing, Edmonton, Alberta. pp. 66-67.

Young, J.A. and C.G. Young, 1992. Seeds of woody plants in North America. Dioscorides Press, Portland, Oregon. 407 pp.

Zasada, J.C. and R. Densmore, 1980. Alaskan willow and balsam poplar seed viability after 3 years storage. Tree Planters' Notes 31(2): 9-10.