

Trembling aspen (At) - *Populus tremuloides*

Tree Species > Trembling aspen



Page Index

Distribution
Range and Amplitudes
Tolerances and Damaging
Agents
Silvical Characteristics
Genetics and Notes

BC Distribution of Trembling aspen (At)

Range of Trembling aspen



Trembling aspen is a characteristic species of the montane boreal and cool temperate forests of BC. The picture shows excellent stem form in a mature trembling aspen cohort.

Geographic Range and Ecological Amplitudes

Description

Trembling aspen is a medium-sized (<40 m tall), deciduous broad-leaved tree, at maturity with a short, rounded crown, smooth, cylindrical stem, and greenish gray, furrowed bark. Many kinds of wildlife use the foliage, twigs, and buds for food. The wood is light and soft and used for lumber, oriented strand-board, and pulp.

Geographic Range

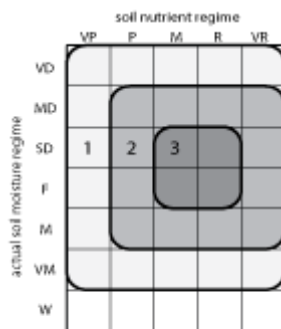
Geographic element:

North American transcontinental-incomplete

Distribution in Western North America:

north in the Pacific region; north, central, and (south) in the Cordilleran region

Ecological Amplitudes



generalized edaphic amplitude of trembling aspen according to actual soil moisture and nutrient regimes

Climatic amplitude:

(alpine tundra -) subarctic - subalpine boreal - **montane boreal** - **cool temperate** - (cool mesothermal)

Orographic amplitude:

submontane - **montane** - (subalpine)

Occurrence in biogeoclimatic zones:

(SWB), (ESSF), MS, **BWBS**, **SBS**, (SBPS), (BG), (PP), **IDF**, ICH, (CDF), (CWH)

Edaphic Amplitude

Range of soil moisture regimes:

(very dry) - moderately dry - **slightly dry** - **fresh** - moist - (very moist)

Range of soil nutrient regimes:

(very poor) - poor - **medium** - **rich** - very rich

The nutrient amplitude of trembling aspen is similar to that of white spruce; however, trembling aspen returns to the soil greater quantities of nutrients (especially nitrogen, calcium, and magnesium) through its litterfall than white

spruce does, thus improving humus form quality of the sites in which it grows. As a result, Moder humus forms develop in aspen-dominated ecosystems compared to the Mors that develop in white spruce-dominated ecosystems. Consequently, a small proportion of aspen trees in white spruce stands is recommendable for improving decomposition and mineralization of surface organic materials, and hence, increasing the level of plant-available soil nutrients.

Tolerance and Damaging Agents

Root System Characteristics

In upland, freely drained soil, trembling aspen develops a heart root system. The shallow and extensive laterals have cord-like branch roots that undulate and meander for great distances without tapering. These roots are the main producer of suckers, particularly when they are close to the soil surface. Sinker roots occur as frequently as every meter on the lateral roots, and may descend to a depth of 3 m. Roots are associated with ecto- and endo-mycorrhizae.

Tolerances

tolerance to	tolerance class	comments
low light	L	possibly higher in saplings that have developed from root suckers, perhaps due to juvenility
frost	H	a major species in boreal climates
heat	M	frequent on insolated sites
water deficit	L	frequent on dry sites
water surplus	H	tolerates flooding and a strongly fluctuating water table well
nutrient (mainly N) deficiency	M	infrequent in acid, very poor soils

Damaging Agents

damaging agent	resistance class	comments
snow	M	high snowfall will break branches instead of boles
wind	M	high winds will break the boles rather than uproot trees
risk class		
fire	M	it regenerates even at fire intervals as short as 3 years
insect	L	not a serious concern; defoliators (e.g., Malacasoma spp., Choristoneura spp.); wood-boring insects (e.g., poplar borer, Agrilus spp.); sucking insects (aphids and leafhoppers)

fungi	M	butt and root rots (e.g., aspen root rot); cankers (e.g., Ceratocystis spp., Cytospora spp.); leaf rust fungi (Melampsora spp.); not a serious concern – aspen and poplar leaf and twig blight
other agents	L	not a serious concern; browsing, barking, and bark-eating by mammals

Associated tree species and successional role

In British Columbia, trembling aspen grows in prevailing even-aged, pure stands, and, in later successional stages with many shade-tolerant conifers. Trembling aspen may be a pioneer (primary succession) species but it is present most frequently in early and intermediate stages of secondary succession. On some sites, the process of replacing aspen may be as long as 1,000 years. The presence of uneven-aged aspen stands in western North America suggests that under certain conditions, aspen may be self-perpetuating without major disturbance, i.e., it may actually be a climax species. In the absence of replacement by shade-tolerant tree species, pure aspen stands gradually deteriorate to an open-canopy, shrub-dominated woodland, with a few scattered aspen suckers.

associated tree species	occurrence class	major area of occurrence
white spruce (& hybrids)	H	mainly in BWBS and SBS
lodgepole pine	M	mainly in BWBS and SBS
common douglas	M	in interior populations
subalpine fir	L	mainly in BWBS and SBS
paper birch	L	throughout the range of aspen except in SWB and ESSF
black spruce	L	mainly in BWBS
balsam poplar & Black cottonwood	L	throughout the native range of aspen

**Silvical
Characteristics**

characteristic	interpretive class	comments
reproduction capacity	H	vegetative reproduction from root suckers and stump sprouts; considering vegetative reproduction, the minimum age for seed crop is about 10 years
seed dissemination capacity	H	dispersed by wind and water
potential for natural regeneration in low light	L	practically nil; essentially, an exposure-requiring species
potential for natural regeneration in the open	H	considering vegetative reproduction; sucker regeneration is proportional to the degree of cutting and burning
potential initial growth rate (<5 years)	H	about 30 cm in the first growing season from root suckers, >50 cm/yr thereafter
response of advance regeneration to release	na	advance regeneration does not develop in the absence of adequate light
self-pruning capacity in dense stands	H	probably the highest among BC hardwoods
crown spatial requirements	M	probably the narrowest among BC hardwoods
light conditions beneath closed-canopy, mature stands	H	associated with well-developed understory vegetation
potential productivity	H	site index (50 yr @ bh) close to 35 m on the most productive sites
longevity	L	<200 years; the recorded maximum: 226 years; pathological rotations are between 50 and 120 years

Genetics and Notes

Genetics

In aspen, the clone is a biological entity — a multi-stemmed individual that may be thousands of years old. Trembling aspen is known to hybridize naturally with several *Populus* species.

Notes

Trembling aspen can produce in a relatively short time (about 50 years) high yields of wood. Considering its productivity, vegetative reproduction, and low risk of being affected by damaging agents, it is a suitable species for intensive management on some montane boreal sites. This option may be more feasible than expensive conversion of pure aspen stands to conifers. The species displays wide genetic diversity including polyploidy, which may be used in future breeding programs to produce individuals with superior form, wood properties, and growth rate. More detailed silvics information is given by:

DeByle, N.V. and R.P. Winokur. (editors) 1985. Aspen: ecology and management in the western United States. Gen. Techn. Report RM-119, USDA For. Serv., Fort Collins, Colorado. 283 pp.

Navratil, S. and P.B. Chapman. (editors) 1991. Aspen management for the 21st century. For. Can., Northern Forestry Centre, Edmonton, Alberta. 174 pp.

Perala, D.A. 1990. *Populus tremuloides*. Pp. 555-569 in R.M. Burns and B.H. Honkala (technical coordinators) Silvics of North America, Vol 2. Agri. Handbook 654, USDA For. Serv., Washington, D.C.

Peterson, E.B. and N.M. Peterson. 1992. Ecology, management, and use of aspen and balsam poplar in the prairie provinces. Special Report 1, For. Can., Northern Forestry Centre, Edmonton, Alberta. 252 pp.

Peterson, E.B. and N.M. Peterson. 1995. Aspen's managers handbook for British Columbia. FRDA Report 230, B.C. Min. For., Victoria, B.C. 110 pp.