# Black cottonwood (Act) - *Populus trichocarpa*



**Page Index**

**BC Distribution of Black cottonwood (Act)**

Range of Black cottonwood


An immature stand of black conntowood adjacent to the Chilliwack River. Black cottonwood and balsam are distinguished from other tree species by the highest rate of early growth

## Geographic Range and Ecological Amplitudes

### Description

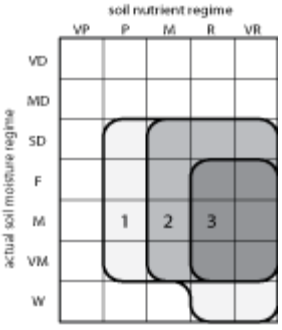
Black cottonwood is a medium- to large-sized (exceptionally over 60 m tall), deciduous broad-leaved tree, at maturity with a narrow, sometimes columnar crown, with a few thick ascending branches and dark gray, irregularly shaped furrows. Many kinds of wildlife use the foliage, twigs, and buds for food. The wood is light and soft and is used for lumber, veneer, and pulp.

### Geographic Range

Geographic element:
Western North American/Pacific and Cordilleran

Distribution in Western North America:
north, central, and south in the Pacific region; central and south in the Cordilleran region

### Ecological Amplitudes



generalized edaphic amplitude of black cottonwood according to actual soil moisture and nutrient regimes

**<u>Climatic amplitude></u>:**
(subalpine boreal) - montane boreal - cool temperate - cool mesothermal
(absent or marginally in hypermaritime climates)

**<u>Orographic amplitude</u>:**
submontane - montane - (subalpine)

Occurrence in biogeoclimatic zones:
(lower MH), (lower ESSF), (MS), BWBS, **SBS**, (SBPS), (BG), (PP), IDF, **ICH**, CDF, CWH

**<u>Edaphic Amplitude</u>:**

Range of soil moisture regimes:
slightly dry - **fresh - moist - very moist** - (wet)

Range of soil nutrient regimes:
(poor) - medium - **rich - very rich**

The edaphic amplitude of black cottonwood is very similar to that of balsam poplar. The major ecological difference between the two species is in their

climatic requirements. While balsam poplar is mainly a subarctic or boreal tree, black cottonwood grows mainly in temperate and mesothermal climates, only marginally in subalpine boreal climates.

## Tolerance and Damaging Agents

### Root System Characteristics

On floodplains, the root system of black cottonwood is multi-layered, owing to the deposition of new soil by periodic flooding. Although early root development is downward, subsequent growth progresses upward as root development occurs on the buried stem. Lateral root spread can be >15 m. Roots are associated with ecto- and endo-mycorrhizae.

### Tolerances

| tolerance to | tolerance class | comments |
|---|---|---|
| low light | L | a very intolerant, exposure-requiring species |
| frost | M | lower in coastal populations |
| heat | M | absent on insolated sites |
| water deficit | L | absent on water-deficient sites |
| water surplus | H | tolerates flooding and strongly fluctuating water table well; intolerant of brackish water |
| nutrient (mainly N) deficiency | L | absent in acid, very poor soils |

### Damaging Agents

| damaging agent | resistance class | comments |
|---|---|---|
| snow | M | high snowfall will break branches rather than boles |
| wind | H | high winds will break the boles rather than uproot trees |
| | **risk class** | |
| fire | L | fire risk in cottonwood stands is very low |
| insect | L | not a major concern |
| fungi | L | not a serious concern [heart rots (e.g. brown stringy trunk rot of hardwoods)]; leaf rust (Melampsora spp.) |

| | | |
|---|---|---|
| other agents | L | not a major concern; browsing by large ungulates; root browsing and girdling by voles and mice |

**Associated tree species and successional role**

In British Columbia, black cottonwood grows predominantly in even-aged, pure stands, and, in the later stages of primary succession on floodplains, with many shade-tolerant conifers. Black cottonwood is a pioneer species (primary succession) on floodplains, and is present in early seral and mid-seral stages of secondary succession on floodplains and upland sites.

| associated tree species | occurance class | major area of occurance |
|---|---|---|
| western redcedar | M | generally replacing black cottonwood in the final stage of primary succession in cool temperate and mesothermal climates |
| sitka spruce | M | only in maritime climates |
| red alder | M | floodplains in southern coastal B.C |
| white spruce (& hybrids) | M | mainly in boreal climates |
| trembling aspen | L | mainly in boreal and cool temperate climates |
| lodgepole pine | L | cool temperate and montane boreal climates |
| black spruce | L | BWBS |
| bigleaf maple | L | southern coastal B.C |
| grand fir | L | southern B.C |
| subalpine fir | L | mainly in ICH |

**Silvical Characteristics**

| characteristic | interpretive comments class | |
|---|---|---|
| reproduction capacity | H | a high potential for vegetative reproduction from root and stump sprouts; the flowering stage is reached at an age of about 10 |

| | | |
|---|---|---|
| | | years |
| seed dissemination capacity | H | dispersed by wind and water |
| potential for natural regeneration in low light | L | practically nil; a shade-intolerant and exposure-requiring species |
| potential for natural regeneration in the open | H | especially on mineral soil; segments of stems and buried branches greatly contribute to regeneration |
| potential initial growth rate (<5 years) | H | up to 2 m in one growing season in cuttings |
| 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 | if initial stand density is high |
| crown spatial requirements | H | short but wide crown is necessary to support rapid growth |
| light conditions beneath closed-canopy, mature stands | H | associated with well-developed understory vegetation |
| potential productivity | H | site index (50 yr @ bh) >30 m on productive sites |
| longevity | L | generally <200 years |

## Genetics and Notes

### Genetics

Black cottonwood exhibits considerable variation throughout its range. Balsam poplar and black cottonwood hybridize and produce frequently mixed populations where both taxa are sympatric or even where they are separated by rather large distances. This hybridization may be considered intraspecific (see balsam poplar).

### Notes

Bell, D.S. 1990. Populus trichocarpa. Pp. 570-582 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.

Black cottonwood produces in a short time (?30 years) high yields of wood suitable for mechanical pulping. Considering its productivity, vegetative reproduction, and low risk of being affected by damaging agents, it is a suitable species for intensive management on flooded sites. More detailed silvics information is given by: