

Welcome
to the
Museum

ADMIT ALL

Arboretum

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Royal Botanic Gardens
Kew

Boreal Broadleaves

Although boreal forests, or 'taiga', are dominated by conifers, there is also a very small but hardy selection of broadleaved trees present, including poplars, willows and birches.

While generally short-lived species, rarely reaching 100 years, these trees have many characteristics that help them survive in the taiga. They can all grow, flower and fruit during the short summer, and then shed their leaves at just the right moment to prepare for the long winter. Their compact leaves have a small surface area, which means they can be produced quickly – ideally suited for a forest with a short growing season – and they are also able to withstand strong winds.

The broadleaved trees grow near water, making the most not only of the available moisture there, but also the light levels around lakes and rivers where there is no competition from the dense-leaved conifers. In the northern tundra, these trees are short and stunted but further south, towards the temperate broadleaved forest, they have straighter trunks and grow taller:

Key to plate

1: Speckled alder

Alnus incana subsp. *rugosa* Height: 22m

a) branch b) flower

2: Large-toothed aspen

Populus grandidentata Height: 25m

Leaf

3: American mountain ash

Sorbus americana Height: 12m

Leaves

4: Balsam poplar

Populus balsamifera Height: 30m

Flower

5: White birch

Betula papyrifera Height: 20m

a) trunk/bark b) male flower c) leaf

6: Moosewood

Acer pensylvanicum Height: 10m

a) leaf b) twig and buds c) trunk/bark





TEMPERATE CONIFER
FORESTS

Boreal Conifers

One of the most ancient tree species, conifers are synonymous with boreal forests. Densely packed green firs, spruces and pines all tower high above the dark, damp ground below, while in autumn, the larch brightens up the scene with a warm golden glow.

'Conifer' basically means 'cone-bearing' and, instead of flowers, these trees produce seeds in cones. Conifers are evergreen which means they start producing food as soon as they wake up after the winter and don't have to wait for new needles to grow. The larch is the odd one out. Being a deciduous conifer, it loses its needles each year. However, larches have delicate needles compared to evergreen conifers, so they are

quicker and easier to grow.

Although their growth is slow, conifers have adapted to be able to cope with the harsh weather. Their recognisable narrow, conical-shaped canopies are made up of flexible branches that sweep outwards. This design helps to shed heavy snowfall and reduce the potential damage to the branches from snow and strong winds.

Key to plate

1: Balsam fir

Abies balsamea Height: 20m
Seed cones and leaves

2: Black spruce

Picea mariana Height: 15m
a) seed b) seed cones and leaves

3: American larch

Larix laricina Height: 20m
Seed cones on branch

4: Lodgepole pine

Pinus contorta Height: 20m
a) female cone cross section
b) male cone c) mature seed cone

Redwoods

The majestic redwoods are record-breaking conifers and include some of the largest and tallest trees on Earth. One impressive coast redwood called 'Hyperion' has reached the dizzying height of just over 115m. The oldest specimen on record is estimated to be 3,500 years old.

The dawn redwood grows in China, while the giant and coast redwoods grow in North America. The North American species are never found together; the coast redwoods grow in the fog belts of the Pacific coastline and the giant redwoods in open groves further inland, on the western slopes of the Sierra Nevada mountains. Both trees have extremely wide trunks, defined by spongy, cinnamon-red bark, growing up to 60cm thick, and their evergreen branches start high up the trunk, which protects them from forest fires.

Unlike the two North American redwoods, the Chinese dawn redwood is a deciduous conifer with flat, feathery needle-like leaves and reddish-brown, fibrous bark. Incredibly, it was first discovered in 1941 as a 150-million-year-old fossil tree dating from the Mesozoic Era. A few years later, a living species was found in Central China. Seeds were collected and distributed to arboreta around the world, where they grow today.

Key to plate

1: Coast redwood

Sequoia sempervirens Height: 115m

a) tree b) leaves c) mature female seed cone

2: Dawn redwood

Metasequoia glyptostroboides Height: 50m

a) leaves b) mature seed cone

3: Giant redwood

Sequoiadendron giganteum Height: 115m

a) tree b) leaves and female cones

c) seed d) cross section of trunk



Habitat: Temperate Broadleaf Forest

Temperate deciduous forests make up some of the world's most dramatic biomes. These forests produce dainty buds at the start of the growing season, transforming to lush greens, then bursting into blazing reds, oranges, yellows and browns before their leaves drop, leaving bare, skeletal structures to face the cold months ahead.

These magnificent forests occur mainly in the mid-latitude parts of the globe, encompassing parts of the United States, Canada, Europe, China, Korea, Japan and Russia and South America. All of these regions have four seasons, with no season getting too hot or too cold.

Remarkably, all these forests share similar genera of tree species, which include oaks, maples, beeches and ashes, but also have their own native species in each region. Beneath these forest giants, smaller, shade-tolerant species such as dogwoods and sourwood fill the understorey and shrub layers, mingling with ferns and mosses to create perfect hidden habitats for birds and small mammals. The forest floor itself is full of insects and fungi, who enjoy the rich, fertile soil created by falling leaves and deadwood.

Key to plate

North American broadleaf forest

1: **Red oak**
Quercus rubra Height: 40m

2: **American beech**
Fagus grandiflora Height: 35m

3: **Pecan**
Carya illinoensis Height: 40m

4: **Flowering dogwood**
Cornus florida Height: 9m

5: **Osage orange**
Maclura pomifera
Height: 15m

6: **White sassafras**
Sassafras albidum
Height: 20m

