

Taiga Biome

- The definition of Taiga is the coniferous forests extending across much of subarctic North America and Eurasia, bordered by tundra to the north and steppe to the south. The word taiga was originated from Russian and Turkic languages.
- The Taiga is also known as the boreal forest. It is characterized by coniferous forests. It is the largest terrestrial biome and makes up 29% of the worlds forest cover. It has a subarctic climate with a large temperature range.

Location

The Taiga region is located in the Northern Hemisphere. In the northern regions of North America, Europe, and Russia. It makes up 29% of the world's forest cover. Some areas where taiga can be found include: Canada's Northwest Territory, Scandinavia, Western Russia, British Columbia, Northern North America, Ontario, Manitoba, Northern Eurasia, New Brunswick, Lamar Valley in Yellowstone National Park, Banff National Park in Canada, Denali National Park in Alaska, Verkhoyansk in Russia, and Hamilton Inlet in Canada.



Climate

- Temperature:
 - Climate in the taiga is cold with annual temperatures 5 degrees Celsius to -5 degrees Celsius.
 - The winters are cold and long; summers are relatively short and cool.
- Precipitation:
 - Annual precipitation is about 20 cm per year to over 200 cm.
- Amount of Light:
 - Because of the tilt of the earth on its axis, in the taiga you'll find long nights in the winter and long days in the summer.
 - The taiga receives more light in the summer months and less light in the winter months.
 - Sunlight is more direct during the summer because it is the closest part of the earth to the sun.

Plant Life

Conifers are the most dominant plant species. Others include Fir Trees, Spruce Trees, Deciduous Larch, Norway and Siberian Trees, Pine Trees, Evergreen Trees, Broadleaf Deciduous Trees such as Alder Trees, Birch Trees, and Aspen Trees.

Other plants: Sphagnum Moss, Larix Larichina, Larix Dihurica, Lichens, Shrubs, Cotton Grass, Heath, Berries



Forms of Plant Growth

- Conical shape – helps shed snow and prevent loss of branches.
- Needleleaf - narrowness reduces surface area through which water may be lost, especially during winter when the frozen ground prevents plants from replenishing their water supply. The needles of boreal conifers also have thick waxy coatings--a waterproof cuticle--in which stomata are sunken and protected from drying winds.
- Evergreen habit - retention of foliage allows plants to photosynthesize as soon as temperatures are warm enough in spring, rather than wasting in the short growing season by growing leaves.
- Dark color - the dark green of spruce and fir needles helps the foliage absorb maximum heat from the sun and begin photosynthesis as early as possible.

ADAPTATIONS OF PLANTS

- Trees can reproduce by layering in muskegs
- Evergreen Trees: shed snow in winter (prevents them from breaking), do not drop their leaves in the winter so they do not have to regrow them in the spring, little sap in needles (helps prevent freezing),
- Carnivory, parasitism, and mycorrhizae are used by plants to compete for the small amount of nutrients in the soil
- Needle-like leaves limits water-loss through transpiration
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ENDANGERED PLANTS

- Labrador Tea
- Lady's Slipper Orchid
- Helleborine Orchid
- Longleaf Pine Tree
- Balsam Fir Tree



Animal Life



Predators:

- Bobcats
- Siberian Tigers
- Arctic Wolves
- Grizzly Bear
- Amur Tigers
- Arctic Fox
- Polar Bear
- Ermines (Short-Tailed Weasel)
- Wolverine
- Black Bear
- Coyote,
- Lynx, Timber
- Wolf, Fisher
- Pine Martin
- Mink
- Sable
- Gray Wolf
- Mountain Lion
- Raccoon



Animal Life Cont.

Herbivores:

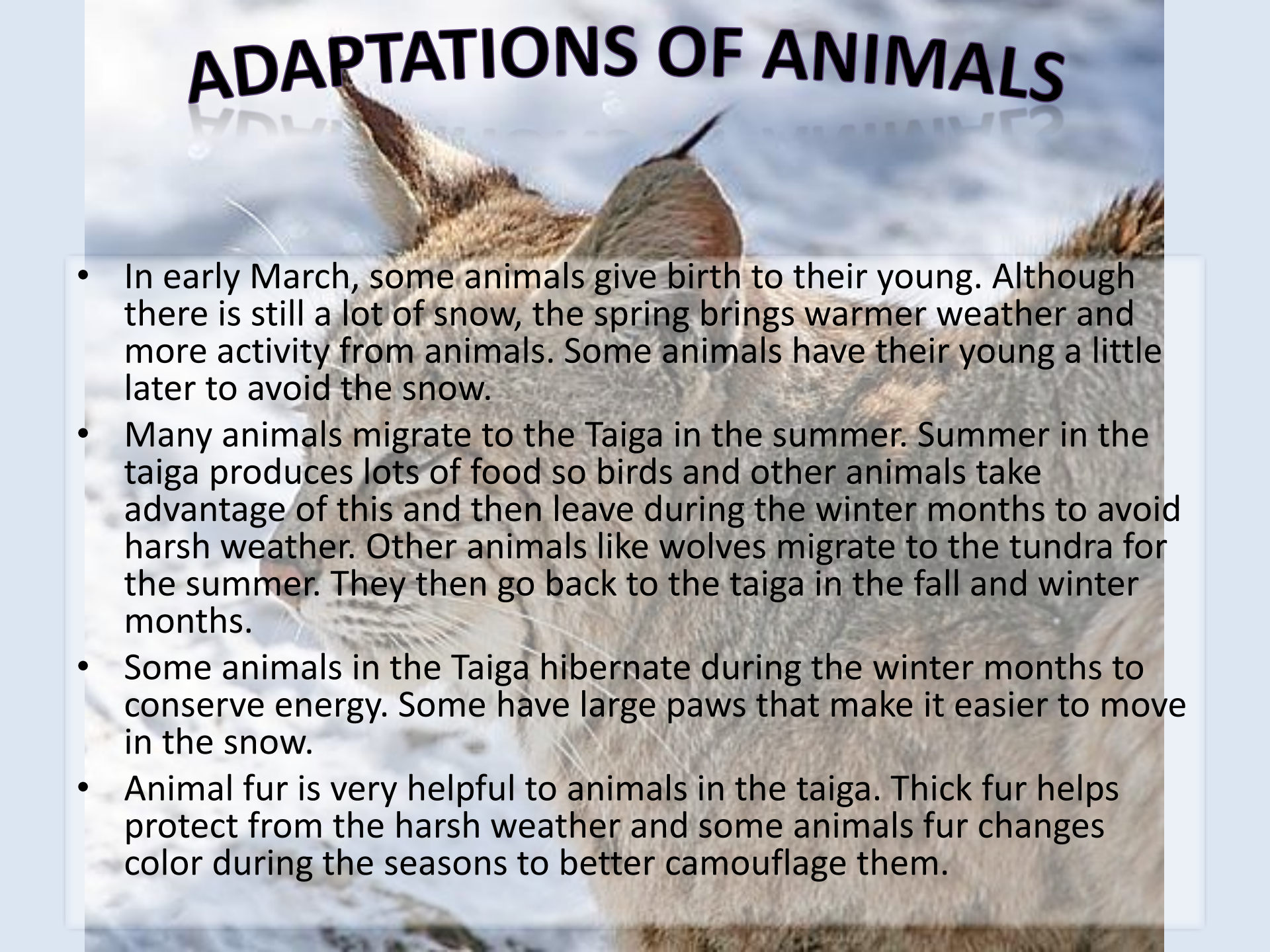
- Moose
- Snowshoe Hare
- Deer
- Elk
- Porcupine,
- Caribou
- Harlequin Duck
- Musk Ox
- Snowy Owl
- Squirrels
- Chipmunks
- Moles
- Arctic Hare
- Bighorn Sheep
- Dall Sheep
- Lemming
- Quoll
- Reindeer



- Snow Goose
- Insects
- Bald Eagle
- Chickadee
- Woodpecker
- Warbler
- Beaver
- Deer Mouse
- Muskrat
- Northern River Otter
- Groundhog
- Striped Skunk
- Little Brown Bat
- Wood Bison
- Over 200 species of Birds



ADAPTATIONS OF ANIMALS



- In early March, some animals give birth to their young. Although there is still a lot of snow, the spring brings warmer weather and more activity from animals. Some animals have their young a little later to avoid the snow.
- Many animals migrate to the Taiga in the summer. Summer in the taiga produces lots of food so birds and other animals take advantage of this and then leave during the winter months to avoid harsh weather. Other animals like wolves migrate to the tundra for the summer. They then go back to the taiga in the fall and winter months.
- Some animals in the Taiga hibernate during the winter months to conserve energy. Some have large paws that make it easier to move in the snow.
- Animal fur is very helpful to animals in the taiga. Thick fur helps protect from the harsh weather and some animals fur changes color during the seasons to better camouflage them.

Endangered Animals

- Beavers
- Wood Bison
- Siberian Crane
- Amur (Siberian Tiger)
- Grizzly Bears
- Red Fox
- Whooping Crane
- Amur Leopard
- European Mink
- Przewalski's Horse
- Boreal Caribou



Sample Energy Pyramid

Humans, Wolves, Fishers, Coyotes,
Grizzly Bears, Black Bears, Lynx
TERTIARY

Owls, Arctic Fox, Red Fox, Weasels,
Marten, Sables, Fishers
SECONDARY CONSUMERS

Red Squirrel, Snowshoe Hares, Grouse, Woodland Caribou,
Moose, Voles, Shrews, Lemmings, Beaver
PRIMARY CONSUMERS

Arboreal Lichens, Berries (blueberries, raspberries, cranberries,
crowberries), Mosses (reindeer moss, club moss), Dwarf
Willow, Wild Lilly of the Valley, Shingleaf, Twinleaf,
Aspen, Paper Birch
PRODUCERS

AIR SALINITY



- The air in the taiga has little pollution and is very good except when affected by human activity. Human activity puts more pollution into the air than anything natural in the Taiga.
- Trees in the taiga are common which puts a lot of oxygen into the air and removes large amounts of carbon dioxide.

Soil

- Because it is close to the tundra biome, some parts of the taiga have permafrost. Parts that do not have permafrost have a hard layer of rock that is close to the surface. Like permafrost, this rock prevents water from escaping the surface and leaves the soil soggy in the spring and summer seasons.
- Since coniferous trees are the dominant plant in the taiga, the soil is mainly needles. These needles are waxy and fragrant and take a long time to decompose. As they decompose they release acid into the soil. It forms very slowly in the taiga because of this. Soil that is formed has a very high acid content. As a result, the soil is very infertile and very few plants can grow. Podzolization occurs because of the acid in the soil.
- The main soil type in the taiga is spodosol.
- Nutrient levels are generally poor but in areas with lots of organisms, decayed matter can give it more nutrients.

LAND FORMATION

- The landscape of the taiga is very unique. It has only a few species of trees that are unique to its location. Eastern Asia has larches and spruce trees, Western North America has jackpines and spruces, and in Eastern North America, the balsam fir is the dominating tree. These trees are accompanied by other small plants on the forest floor.
- The ground in the taiga is made up of different bog stages. One area may be a small clear water lake, while another place may be a shallow pond covered in water plants.
- Muskeg can also be found in the taiga. Muskeg is ground covered in moss, grass, and even trees, that looks solid but is actually wet and has a jello-like consistency. An example of muskeg is the Drunken Forest in Manitoba, Canada. When you step on certain mats of moss on the floor, the trees begin to move. This happens because trees in the muskeg have very shallow roots. Also because the ground is so saturated with water, that when the ground is disturbed, a ripple moves through the soil, and the trees move.

Threats to the Taiga



- Air Pollution from Power Plants
- Radioactivity from Atomic Power and Weapons Testing
- Water Pollution
- Disrupting of Habitats
- Commercializing of Northern Shipping Routes
- Mineral/Gas/Oil Extraction
- Global Warming
- Logging
- Flooding
- Fires
- New Threats to Endangered Species

Human Activity in the Taiga

- Small communities live in the taiga and use its resources in the forestry and mining industries. They rely on one area for all of their resources and they are eventually overused. Native people also consider the boreal forests their home.
- Other industries that put the taiga in danger are logging, and hydroelectric development. 90% of all logging that is done is by using clear cutting and using heavy machinery. This harms the environment and any wildlife living nearby.
- Waste from power plants also has a damaging effect.
- Hydroelectric development has lead to the flooding of large areas. This has caused the landscape to change and has also produced methyl-mercury and acid rain.



Impact on Global Climate

- The Boreal forests hold large amounts of carbon, and their biomass is so huge and so vital that during the growing seasons, the worldwide levels of carbon dioxide fall and the worldwide levels of oxygen rise. But the world's knowledge of the taiga's importance in the carbon cycle and the control of greenhouse gases is relatively small when compared to other biomes such as the rainforest. More and more scientists are beginning to research the taiga, such as the BOREAS Project in Canada.
- The Boreal Ecosystem-Atmosphere Study (BOREAS) is an experiment in the northern boreal forests of Canada. Its goal is to improve our understanding of the boreal forests -- how they interact with the atmosphere, how much CO² they can store, and how climate change will affect them. They want to learn to use satellite data to monitor the forests, improve computer simulation and weather models so scientists can anticipate the effects of global change. So far the group has learned about the composition of the soil, the water and energy balance, evaporation, and climate in the taiga.

ECOLOGICAL STANDPOINT



- Because of the climate, soil, and other conditions, the Taiga is home to fewer plant and animal species than other biomes. Plants have less energy available to them because of the low position of the sun and the soil which contains few nutrients. Since the plants don't have as much energy, the consumers that eat the plants have less energy available to them as well. Also many areas in the Taiga are wet and resemble a bog. Plants have a hard time finding nutrients here and trees do not have sturdy soil to hold their roots.

SOURCES

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