

Taiga

Introduction

The strip nearest to the temperate zones, in Eurasia and in North America, is the taiga, also known as coniferous forest, of fir and larch trees. This area is characterized by a rather rigid climate in winter, when the temperatures can drop to even -30°C and cool summers, when a maximum temperature of 20°C may be reached. The evergreen conifers thrive in the forests of the cold temperate regions, the trees have a conical shape and the leaves are needle shaped and have an outer wax coating. Evergreen conifers do not let much light reach the underbrush where only evergreen stumped shrubs, moss and lichens grow. Many animals have a thick fur coat while others hibernate in order to escape the intense winter; to survive, squirrels collect abundant supplies of nuts and berries in autumn.

Taiga biome

Conifer forest

Between the broad-leaved forest and the tundra is the taiga or conifer forest, stretching from northern Europe to Siberia and Canada, i.e. all over the northern part of the earth. Taiga is a Russian word that means "conifer forest". The climate in this area is fairly harsh in winter (the temperature may be as low as -30°C) and cool in summer (sometimes up to 20°C). The temperature in the Siberian taiga is often -60°C . The annual temperature range is wide.

The taiga in the world

The taiga is nowhere in the southern hemisphere, since there is no mass of mainland at the appropriate latitudes. In the northern hemisphere, instead, the taiga forms an uninterrupted belt all around the world, from Scandinavia to Asian Siberia and Canada.

This biome turns south into a deciduous forest, except in the central part of the continents, where it spills over into the step. Upper north, instead, is the bleak expanse of the tundra, and the border between the taiga and the tundra is often marked by birch woodland. The taiga is the largest uninterrupted forest area on earth; its average width measures 1,500 km and covers 8% of the lands above sea level. Rainfall is poor, generally about 400-600 mm, and decreases in the far north: sometimes just about 150 mm, like in many deserts. In southern Europe, conifer forests can be found between 1500 and 2000 metres a.s.l., and in many respects they resemble the taiga of northern plains.

Plants of the taiga

This biome contains a high number of arboreal species: mainly firs (*Abies and Picea*), pine trees, birches, and fewer larches, willows, alders and poplars. The genus *Picea* consists of firs that can grow to an impressive size (over 50 m) and have a thick evergreen foliage; in Italy, we have *Picea abies* (or *Picea excelsa*), and many other species can be found everywhere in the Northern Hemisphere (Eurasia and north-America). Like the *Picea*, also the genus *Larix* has also a circumboreal distribution (Eurasia and north-America), although in our regions it is represented by one species only, the larch (*Larix decidua*), which interestingly is the only conifer that sheds its leaves in winter (that's where the name **decidua** comes from).

Evergreens prevail, partly because in this biome the summer season is short. These plants start their photosynthesis as soon as the temperature begins to rise in springtime and make the most of the feeble northern sun. Conifer needles are very good at capturing light. This is why the soil is dark and unsuitable for the undergrowth to develop. In addition, mounds of dead needles prevent herbs and shrubs from growing since they acidify the soil and replenish it of resinous substances. Only where the sun can seep in can shrubs with fleshy fruits grow, for instance currants, raspberries and blueberries. In addition, the aciform (i.e. needle-like) leaves of the conifers can tolerate the cold. In some areas, the taiga leaves room to sedges, rushes and graminaceous plants (perennial herbaceous species that love wet soil). In the

moistest areas, there are mosses and liverworts and often sphagnum or peat mosses, which are responsible for the formation of peat-bogs.

Animals of the taiga

Mammals living in the taiga include foxes, lynxes, bears, minks, squirrels, while larger ones include grey wolves and their preys: caribou, reindeers and moose. In winter, wolves hunt these herbivores in packs, often dividing themselves into two groups to encircle their preys before attacking them. Sometimes, either group upsets the herd of preys, and the other one creeps up on them. Nevertheless, only the young, wounded or older specimens are taken, while adults are spared.

During the harsh winter, the majority of these mammals live within the forest, sheltered by the vegetation. The species that do not hibernate have adjusted somehow to move nimbly on snow. Reindeers and moose, for instance, have large and flat hooves on which they distribute their weight better. Similarly adjusted legs can also be found in Arctic hares, lynches and wood grouses.

The American beaver is a mammal living near water streams, where deciduous trees (trees that shed their leaves in some seasons), such as poplars, birches and willows, grow. Beavers are ecologically very interesting, since they can substantially change the vegetation; they feed on the bark of some types of trees, often causing them to die, and fell some trees to make liars and river dams. The entrance to their lair is always underwater, while the inner room is dry; the lair diameter can measure up to 1 m and 40-50 cm high. If steep banks are not available, beavers prefer to build "huts", which can sometimes be very big. Beavers are not only good at building liars and huts, but also to make canals to reach their feeding places under cover.

These rodents store wood inside their lairs to live on during the winter. Even when water is frozen, beavers live inside their lairs, protected by such predators as the wolverine, a fairly big predator that can climb up and drop unexpectedly on passing victims.

Birds and small animals of the taiga

Most of the birds that live in the taiga migrate south during the winter, while two species (the European red crossbill and the white-winged crossbill) have adapted to resist this season, feeding on one of the most abundant and nourishing products of this biome: conifer seeds (pine kernels). Pine kernels are enclosed within strong woody cones and can only be pulled out by skilfully using the crossbills' adapted beak: the European red crossbill (Scandinavia and Russian Confederation) and its American counterpart, the white-winged crossbill, have beaks that criss-cross at the tip, which are therefore extremely useful to pull out conifer kernels. Other common animals are ants, wood wasps, xylophagous beetles (i.e. that feed on wood) and flies. Specially harmful for some trees are some species of butterfly larvae, commonly known as processionary moths.

The taiga is a young biome

The taiga is a young biome, since in many areas of the world ice withdrew from the boreal region relatively recently. 14,000 years ago the temperate regions began to lose most of their ice, while taiga areas remained covered in ice until relatively recently, and at the highest latitudes ice still covers some parts of the region, for instance Norway and the north-west of north-America.

The importance of a forest

After heavily exploiting its own natural resources for years, Russia is beginning to understand the ecological importance of its own forests. The about-turn in the management of this heritage over the last decade has now led to many changes: there are now over 140 state natural reserves, whose reproduction plans have in some instances ensured the survival of some animal species, including the European bison. Scientifically, study missions have been organised; four to Siberia alone (1996, 1998, 1999 and 2000), as part of EU-funded research plans. The areas involved in this plan are located approximately 600 km north of Krasnoyars, near the village of Zotino (61°N; 89°E), standing on the banks of the river Jenissey, 160 m above the sea level. The study of the ecology of these forests has involved the installation of stations for

monitoring gas exchanges between carbon dioxide and steam as well as studying the energy balance of the different types of forests; the development of transects for studying the composition and structure of the forest, along with analyses of the soil for reconstructing the different stages of after-fire secondary successions.

Man and taiga

Richness of the taiga

Man settled where the climate was milder and caused great agricultural changes (especially in central-northern Europe), sometimes dramatically decreasing conifer forests.

Humus-rich soil is excellent for farming. Corn, barley, oat, sugar beets, sunflowers and potatoes are grown there, while breeding concerns cattle, sheep and horses.

Forests are also commercially exploited to make timber and cellulose pulp.

Birches provide light and easily workable timber (excellent to make Russian dolls and balalaikas) and produces a very strong and light cellulose, used to make airmail paper. In the Siberian taiga, Russians are building roads and railways to connect the dwellings of the personnel in charge of digging precious ores or extracting oil and natural gas..

The last reindeer-men

In the north-west of Mongolia, west of lake Kovsgol, where the tundra leaves room to the cold taiga, lives a small and extremely old nomadic people which support themselves only on reindeer rearing, its population now just 180. These people live off a symbiotic relation with their animals, so much so that the Mongolians named them *Tsaatan*, i.e. reindeer-men, from *tang*, people, and *Tsaa Buga*, snow deer; while they call themselves Taiganà, or taiga men.

These people's lives actually depend entirely on reindeers, whose meat and milk are the staples of their diet. Reindeer milk is very nourishing: its fat content is almost four times that of cow's milk and supplies 2,000 calories per litre. In addition, it preserves part of the vitamins ingested by the animals as they graze. Reindeer meat, cut into strips and sun-dried, is stored to be eaten at any time, cooked into a soup with water and rancid butter.

Nevertheless, before eating reindeer meat, men have to officiate a rite of reconciliation with the soul of the animal, offered up to meet man's needs.

As well as the meat, the hide of these animals is also used to make footwear and headwear, while the horns are used as a precious medium of exchange to buy the few other things the *Tsaatans* need: tea, flour, tools and ammunition.

Since the mid-Nineties, the life and culture of these few people have been seriously threatened with extinction. The reindeers have been affected by a sort of parasite disease that kills them rapidly. The number of these animals has dwindled from over 500 in 1995 to less than 300 today, and the infection is showing no signs of stopping. The *Tsaatans* can no longer eat the infected meat of the animals, not to aggravate the type of brucellosis that is now affecting 40% of the population, and the milk, which is now in short supply, must be left to the younger animals. Many associations have got busy trying to prevent these people disappearing, by developing a plan for shooting down those animals that are by now hopelessly sick, treating those that can be treated, reclaiming lands and buying at least 1,000 reindeers to replenish the *Tsaatans*' precious livestock.

The products of the taiga

The taiga contains a lot of oil and natural gas fields. Today, Norway is the greatest oil exporter in Europe and one of the main suppliers of natural gas to Europe.

Siberia contains large reserves of coal, oil, methane, iron, silver, gold, diamonds, uranium and many ores.

In Canada, mining accounts for over 30% of the entire economy

Another economic activity is the fur trade, which in Canada involves 3% of the population. Squirrel, fox, mink and ermine furs are economically very attractive.

The fishing industry produces salmon and other fish, basically for local consumption.