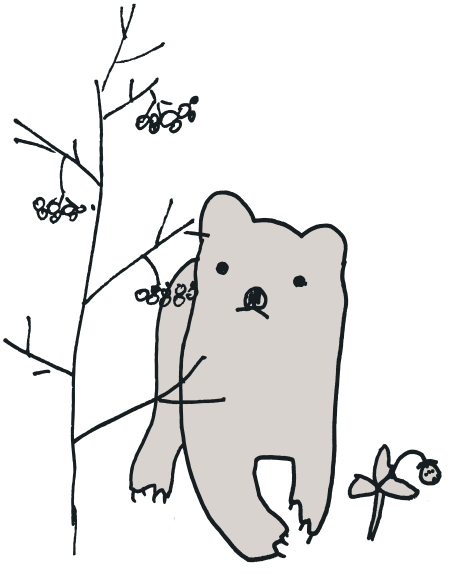
Estonian nature

An overview



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Eesti Instituut

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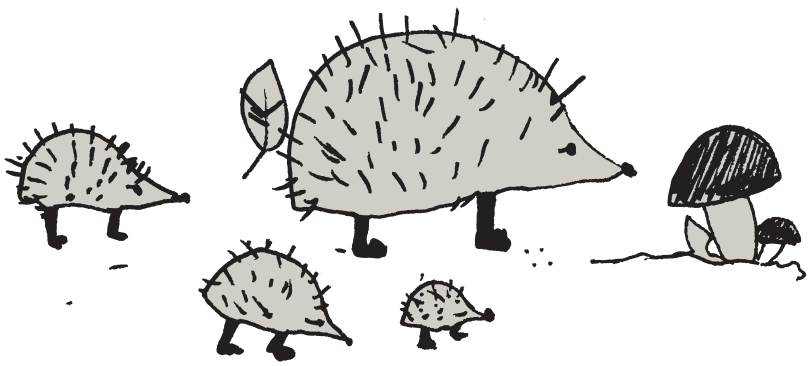
According to the census, Estonia's population in the year 2000 was 1 376 700, of whom over two thirds lived in towns. The overall population density in Estonia is 33 people per square kilometre. However, disregarding the urban population, the actual density in the countryside is only about 10 people per square kilometre.



The nordic latitude — warm summers, mild winters

A small country in Northern Europe with an area of 45 227 sq km, of which about one tenth (4133 sq km) is taken up by islands, Estonia forms the most western and maritime part of the large East-European Plain. Estonia's territory comprises 0.03 per cent of the world's land area, located between 57°30'34" and 59°49'12" N and between 21°45'49" and 28°12'44" E.

The climate in Estonia is determined by the country's location at the northwestern reaches of the Eurasian continent and the proximity of the North Atlantic. In the same way, local climatic differences are due, above all, to the vicinity of the Baltic Sea. Thus, summer temperatures are somewhat lower than the average for the latitude, but winter temperatures are considerably warmer.

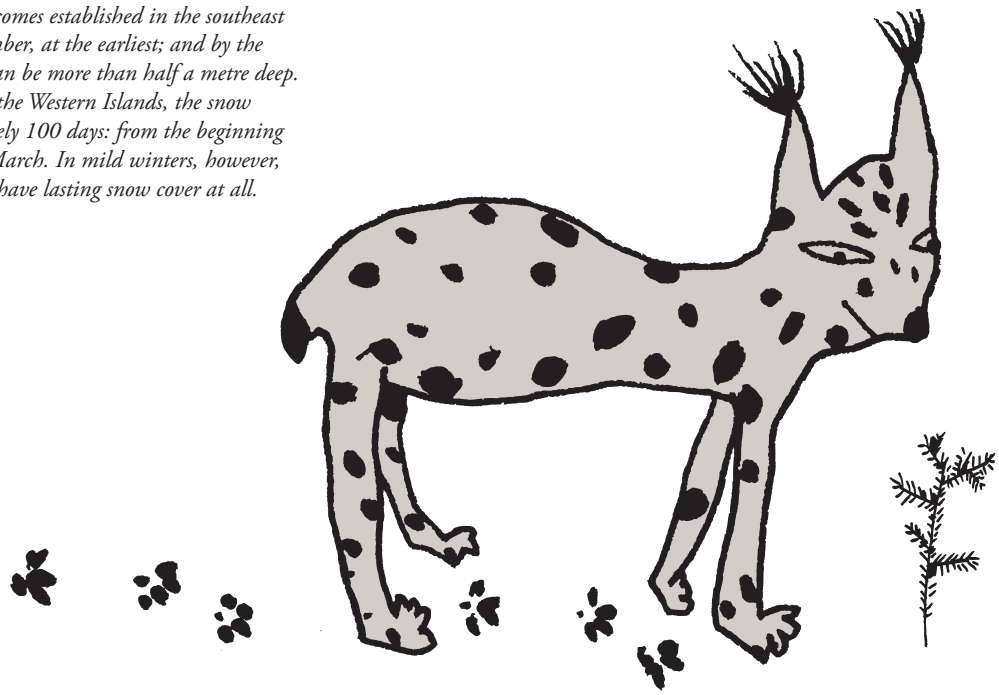
On average over the last 40 years, the length of seasons in Estonia can be regarded as follows: 160 days of summer, 112 days of winter and 93 days of spring and autumn. The average annual temperature is +5.4°C, the average of the coldest month, February, is –5.2°C and of the warmest month, July, +16.5°C.

For more than half of the days in the year, cyclones formed near Iceland cause cloudy, windy and rainy weather in Estonia. The mean annual precipitation is 550–650 mm, ranging from 500 mm on some islands, to almost 750 mm in the southern uplands. Rainfall is heaviest at the end of summer and least in the spring.

The high latitude makes the rotation of seasons and the interchange of light and dark periods of the year well pronounced in Estonia — the maximum length of a summer day on the north coast is 18 hours 14 minutes, whereas during the shortest day in winter the sun appears for a mere 6 hours 3 minutes. Moreover, the long twilight makes the transition between day and night rather smooth and the nights around Midsummer's Day shorter still.

Because of the influence of the warm Gulf Stream, the prevailing winds in Estonia blow from the southwest and west. However, severe weather conditions, such as tempests and whirlwinds, are rare: the last hurricane raged through Estonia in January 2005 when the speed of wind reached 38 metres a second.

Permanent snow cover becomes established in the southeast at the beginning of December, at the earliest; and by the end of March, the snow can be more than half a metre deep. Apart from the coast and the Western Islands, the snow cover lasts for approximately 100 days: from the beginning of January to the end of March. In mild winters, however, much of Estonia does not have lasting snow cover at all.



Flat countryside, varied landscapes

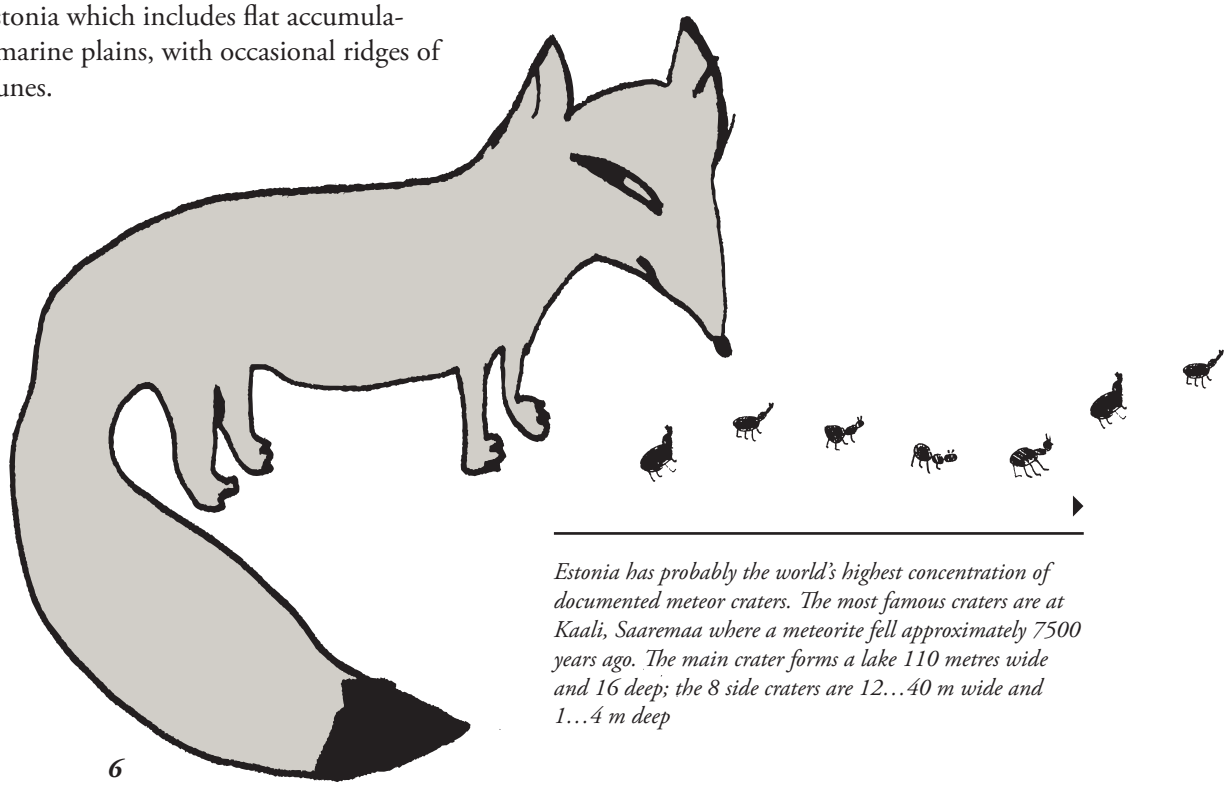
As a part of the East–European Plain, Estonia is characterised by a flat surface topography: over 60 per cent of the country's territory lies at an absolute height of 0 to 50 metres and only one tenth has an elevation over 100 metres above sea level. Thus, the local scenery is rather poor in vertical majesty.

During the late glacial and post-glacial period, i.e. approximately 12 000–9000 years ago, a considerable part of Estonia was flooded by the waters of the large ice–dammed lakes and the Baltic Sea. Much of the West Estonian mainland and islands have emerged as a result of the gradual uplift of the earth's crust. The process is still in progress: the northwestern part of Estonia is rising at an annual rate of 2.5 millimetres. Most of the land 'gained' thus far, forms the what can be termed Lower Estonia which includes flat accumulative and marine plains, with occasional ridges of coastal dunes.

The central part of North Estonia is dominated by the creviced heights of the Pandivere Upland (highest point at 166 metres above sea level); the rest is taken up by a flat limestone plateau which is characterised by extensive alvars — dry areas with very thin or virtually absent soil cover over bedrock.

The northern edge of the plateau falls abruptly to the sea, forming a coastal cliff which stretches for kilometres along the southern shore of the Gulf of Finland.

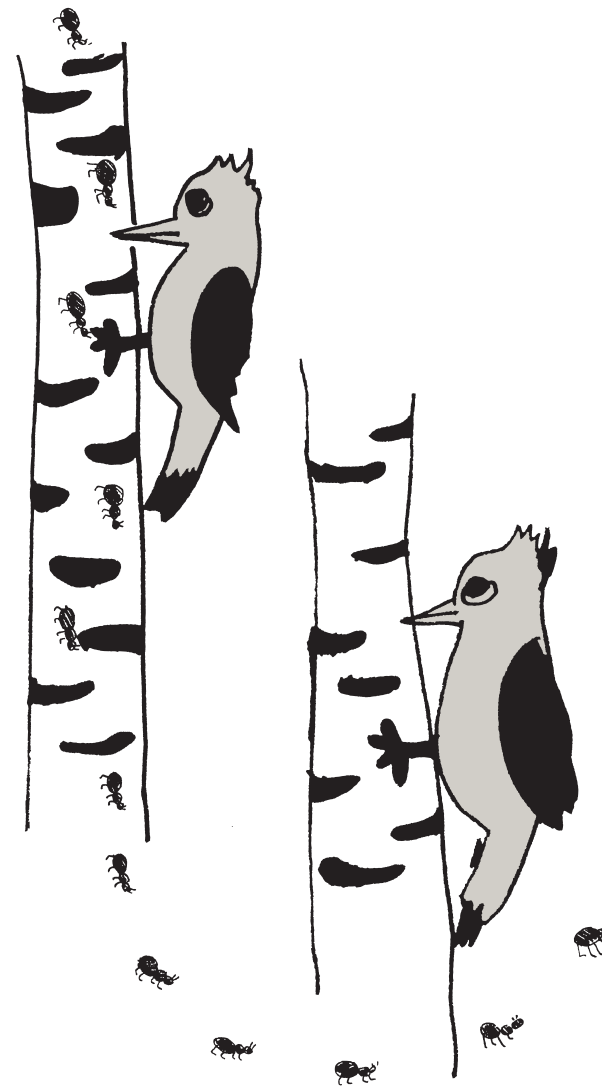
The numerous bedrock scarps in the western part of the mainland and on the islands of Saaremaa and Muhu represent another limestone escarpment, the West–Estonian Clint.



Estonia has probably the world's highest concentration of documented meteor craters. The most famous craters are at Kaali, Saaremaa where a meteorite fell approximately 7500 years ago. The main crater forms a lake 110 metres wide and 16 deep; the 8 side craters are 12…40 m wide and 1…4 m deep

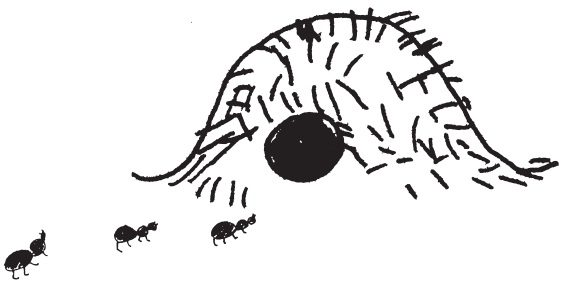
While the most remarkable features of the country's topography — the uplands, ancient valleys, depressions, and the Clint — were already formed before the advance of the glaciers, Estonia acquired the majority of its landforms — from drumlins and moraine plains to kame fields and eskers — through the movement and accumulative activities of continental ice.

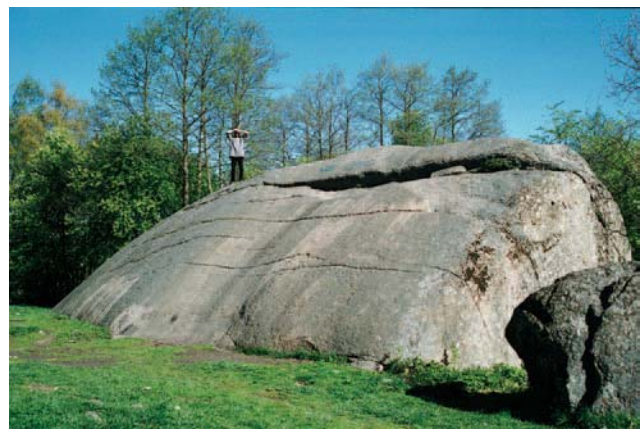
Both the highest and topographically most variegated region in Estonia is the southeast. The undulating till plains of the Sakala Upland, the wooded moraine hills of the Otepää (217 m), Karula (137 m) and Haanja Heights with numerous lakes and rivers lend the scene picturesque mildness. It may well sound incredible, but at 318 metres, Suur Munamägi ('Great Egg Hill') in the Haanja Upland is the highest point not only of Estonia but of all the Baltic countries.



Karst formations can be found on several North and West Estonian alvars. During the spring floods at Tuhala karst field, water from an underground river flowing in a karst cave starts to pour out through Kata Nõiakaev ('witch's well').

The highest point of the Baltic Clint is at Ontika in the northeast where the 56 metre high escarpment offers beautiful views of the sea.





Together with numerous others, the Muuga Kabelikivi ('chapel boulder') in Harjumaa, east of Tallinn, was carried to North Estonia by the glaciers. The biggest of what can be termed erratic boulders, it measures 19 metres long and 7 metres tall, with a diameter of 56 metres. It is the rock types that betray the Scandinavian origin of the boulders.

Proximity to the sea

The influence of the maritime location can be observed in virtually every aspect of Estonian nature. The country has 3794 km of coastline, 2540 km of it on the islands. The land border, in comparison, is mere 633 km.

The coast varies from the sheer limestone cliff in the north to sandy beaches and shelving coastal meadows in the west.

The majority of islands belong to the West Estonian Archipelago; the largest islands are Saaremaa (Ösel) with 2671 sq km, Hiiumaa (Dagö) with 989 sq km and Muhu (Moon) with 200 sq km. The sea between these islands and the Mainland — Väinameri ('sea of straits') — is very shallow (less than five metres deep on average) and rich in shoals.

The water of the Baltic Sea is brackish: its average salinity (8 to 10 per mil) is only one fourth of that of the sea in general. As Estonia is situated far from the Danish Straits which operate as a sluice for salty ocean water, the salinity of its coastal waters is lower still. It is not surprising, therefore, that most Estonian freshwater fish (about 30 species) also inhabit the sea.

Such large bodies of brackish water are rather unique in the world, and the Baltic Sea with its 373 000 sq km is the largest of them.

Because of this isolation from the ocean, tides are virtually absent (less than 10 cm) in the Baltic Sea. The fluctuation of the sea level (max. 2.5 m in Estonia) is due to the strong prevailing winds. The waves in the Baltic Sea are usually less than one metre high, but during extraordinary storms they may be up to 10 metres in the open sea.

The sea is warmest in July and August: +15 to +17°C away from the coast and up to +26°C in small, shallow bays.

Osmussaar (Odinsholm) off the northwestern coast is one of the 1520 islands which dot Estonia's littoral, making up approximately one tenth of the country's territory. Only 400 of these, however, can be called real islands (with an area of at least one hectare), the rest being no more than islets and reefs at times flooded by high water.

The Väinameri and the Gulf of Pärnu start to freeze at the end of November; permanent ice cover on the straits between the islands and the mainland is formed by mid-January. The Gulf of Finland and the Livonian Bay freeze over only in exceptionally cold winters.

The ice cover of coastal waters lasts on average for three months. The thickness of the ice can reach 0.8 m by mid–March. Thawing usually takes place in April. In mild winters the western coasts of the islands and the northwestern coast of Estonia stay free of ice.

As there are relatively few forms of life which have adapted to the brackish water, the Baltic is poor in the number of species, but rich in the number of individuals, yielding almost one per cent of world's annual fish catch. Estonian coastal waters are also very important reproduction and nursery areas for many fish species.

Pushed far ashore by the sea, frozen into most fanciful shapes on the cliffs and in cascades, the ice is the number one attraction of Estonia's seashore in winter. The Pakri peninsula in the northwest.

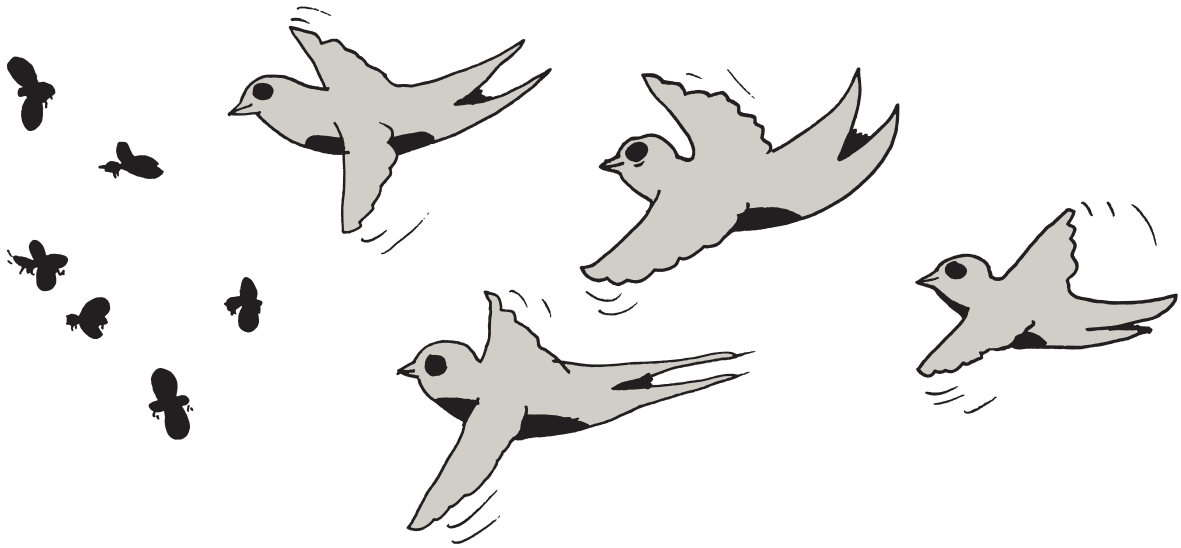
Lakes and rivers

There are some 1450 natural and man–made lakes in Estonia (6.1 per cent of the nation's territory). The two largest of them, Lake Peipsi (the fifth largest in Europe; 3555 sq km, shared with Russia) and Võrtsjärv (270 sq km) together make up 88.8 per cent of Estonia's lake areas. Of all the other lakes, only 45 have an area of more than 100 ha.

The number of lakes is highest in the valleys of the southeastern uplands: Haanja, Otepää and Karula Heights have all more than 25 lakes per 100 sq km; among them the deepest, Rõuge Suurjärv (38 m). Another lake district can be found around Kurtna in the northeast, where there are as many as 41 lakes in 30 sq km.

Of the more than 7000 rivers, streams and drainage ditches, which are divided between the basins of the Gulf of Finland, the Väinameri together with the Livonian Bay, and Lake Peipsi, only nine are over 100 km in length. The longest, at 162 km, is the Võhandu River in the southeast, followed by the Pärnu, Põltsamaa and Pedja rivers. However, the average run-off of the short but wide Narva River, which connects Lake Peipsi with the Gulf of Finland, is greater than the average run-off of all other rivers combined.

Although lesser in extent than in most of Western and Central Europe, Estonia's natural stream network is still significantly altered as a result of amelioration. Larger rivers and streams have often been dredged and straightened.



The North Estonian rivers flowing into the Gulf of Finland form scenic waterfalls as they spill over the edge of the Clint, while rivers of South Estonia, such as the Võhandu, Ahja and Piusa, have cut themselves picturesque valleys with high outcrops of red sandstone.

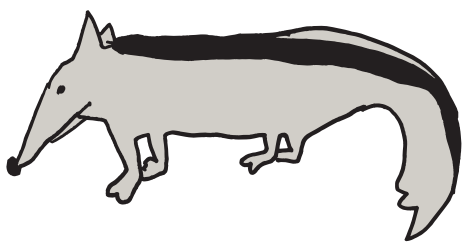
Mosaic of forests, meadows and marshes

Almost half of Estonian territory is under forest and woodlands; the area of forest stands has more than doubled during the last 50 years and is still growing. Estonia is situated on a border area where the coniferous Euro–Siberian taiga opens onto a European zone of deciduous forests. There are about 80 native and more than 800 introduced tree and bush species recorded. Scots pine is the most common tree in Estonian woods — dominant in 41 per cent of forests, followed by birches (silver and downy birch) — 28 per cent, Norway spruce — 23 per cent, alders (grey and common alder) and aspen.

Forests and woodlands are not evenly distributed in Estonia. The largest forests can be found in the northeast and in Mid-Estonia — a zone stretching from the northern coast to the Latvian border.

In many locations in Estonia, for instance in Hiiumaa and in the northeast, large tracts of old-growth forests, long disappeared from most of Western Europe, have been preserved.

Owing to abundant precipitation and slight run-off, Estonia is rich in wetlands. There are some 165 000 marshes greater than one hectare in area, of which 132 peatlands are larger than 1000 ha. The total area of marshes and swamp forests measures 1 009 101 ha which is over one fifth of the country's territory. Only Estonia's northern neighbour, Finland, has a higher percentage of peatland.

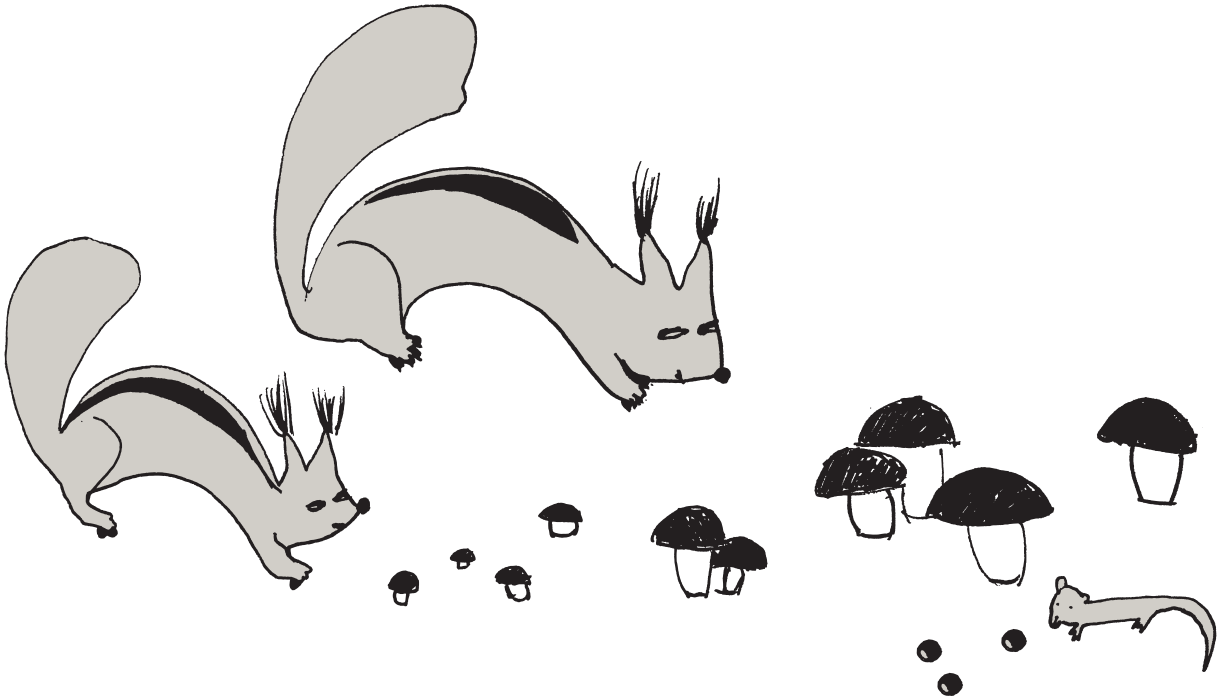


The oldest marshes have an age of about 10 000 years, more intensive paludification started 8500–8000 years ago, whereas the intensive terrestrialisation of lakes began only about 6500 years ago.

Starting from nutrient-rich fens and evolving through the transitional marshes, the development of a swamp finds its final form in a raised marsh, a bog — an amazingly autonomous and resilient ecosystem. A bog consists mainly of peat mosses (Sphagnum) which get all the minerals they need from precipitation and dust particles.

As the peat mosses grow annually at a rate of 1–1.5 mm, it has taken thousands of years for the bogs in Estonia to develop peat deposits with an average thickness of five to seven metres. The thickest peat layer — 17 m — is recorded in Vällamäe bog near Suur Munamägi in the southeast.

In spite of large tracts of intact nature, Estonian flora as a whole is being strongly influenced by human activity. For instance, the vegetation of grasslands, varying from floodplain meadows on the riverbanks to the dry alvars, has been formed under the long–lasting and steady impact of haymaking and pasturing.



The once widespread broad–leaved forests of trees like oak, linden, elm, ash or maple, have survived only in small scattered pockets on the islands and in western Estonia. Relics from the climatic optimum, they form the richest forest communities of plants, fungi and animals.

Approximately two thirds of the marshes in Estonia began as lakes which were gradually turned into quagmires by the spreading shoreline vegetation. The rest of Estonia's swamps were formed by an opposite process, the paludification of mineral land.

Plants — ice-age relics among the newcomers

Estonia is traversed by an important European bio-geographical borderline which divides the area into two large provinces. The northern and western parts of the country with their characteristic calciphilous plant communities of alvars, fens, wooded meadows and broad-leaved forests belong to the Mid-European province while the east, where acid soils promote the development of acidophilous plants and pine as the main forest-forming tree, belongs to the East-European province. There are as many as 538 species of higher plants for which Estonia is the distribution limit, be it northern, southern, western or eastern.

The number of vascular plant species growing in Estonia totals ca 1440 (together with subspecies of some genera, ca 1540). Due to the milder climate of western Estonia, ¾ of the total number of species are found in the coastal lowlands and islands. This also includes the only local endemic species — Saaremaa yellow rattle — which grows in the western part of the island of Saaremaa.

About one fourth of Estonian plant species are habitants of marshes. Owing to their stability as habitats, the bogs also contain many relict species that once colonised the tundra–like landscape which emerged from under the withdrawing ice. Of the forest–tundra plants, inhabiting Estonian bogs, the shrub–like dwarf birch and the cloudberry are most common.

Fungi are found in all natural and ruderal habitats of Estonia, being particularly widespread in forests, meadows and bogs. The best mushroom forests, where there can be found as many as 400 edible fungi, are situated in the north and southeastern Estonia, as well as in Saaremaa.

Among the grasslands, which cover about one fourth of the territory, are wooded meadows, one of the most unique types of Estonian plant communities, where tens of species of rare northern orchids can be found. 74 species of higher plants growing on one square metre of Vahenurme wooded meadow in southwest Estonia, is among the highest numbers recorded in the whole of Europe.

Estonian fauna — recent and numerous

Estonian fauna is relatively young as it evolved only after the last glacial period. As in the case of flora, among the animals inhabiting Estonia there are many rare and endangered species, some of them relics of colder climatic periods of the past.

As in any other temporal climate, the largest number – reaching tens of thousands – of species is that of the invertebrates. Among vertebrates, 350 animal species live and breed in Estonia, about 10 of which are a danger to the local fauna as invading alien species.
It is difficult to divide the 82 species of fish living in Estonia into fresh-water and sea species, as most of them inhabit both the inland waters and the brackish coastal sea. In addition, there are a couple of species of sea–inhabiting salmonids which migrate to the rivers during the spawning–time. The number of Atlantic salt water species which have adapted to the low salinity of the Baltic Sea — i.e. the Baltic herring, the sprat, the flounder — is rather small. There are no endemic fish in Estonia and the sole arctic relic from the former phases of the Baltic Sea is the four horned sculpin.

Again, similarly to plants, many animals in Estonia are on the northern, southern, western, or eastern border of their area of propagation. This is the case with the majority of 11 species of amphibians recorded in Estonia. Some of them, like the common frog, the moor frog, the common toad, or the common newt are quite widespread, while others — the crested newt, the green toad, the natterjack, or the pool frog — are more rare and consequently under protection.

Reptiles are represented by three species of lizards and two species of snakes in Estonia. Both of the most widely distributed species, the common lizard and the common viper, prefer moist environs — bogs, wet meadows and forests, and the proximity of water. The other species of snake, the grass snake, is most abundant in the more open and human-influenced landscape of the western mainland and the islands as well as the coast of the Gulf of Finland. The aforementioned reptiles, together with the snake-like blindworm and the still rarer sand lizard, have all been included in the list of protected species.

Emperor moth (Eudia pavonia) is one of the larger butterflies (Macrolepidoptera) living in Estonia.

The best habitats for amphibians in Estonia are, interestingly enough, a couple of small islands, like Ruhnu and Manilaid off the southwest coast and Piirissaar in Lake Peipsi, the latter having an estimated 40 kg of amphibians per one hectare.

A paradise for migratory birds

Birds were probably the first creatures to arrive in Estonia after the last glacial period. Since then, Estonia forms an important link in a migratory track of a variety of Arctic water birds flying every spring northwards to their nesting places and every autumn back to their southern wintering areas.

Of the 357 recorded bird species, 221 breed in Estonia (207 regularly). In winter Estonia has 153 bird species and 212 migratory species.

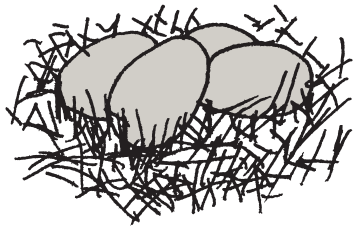
The first migrating birds to arrive in March are the common starling, rook and northern lapwing; the last species, like reed warblers, do not reach Estonia before the second half of May.

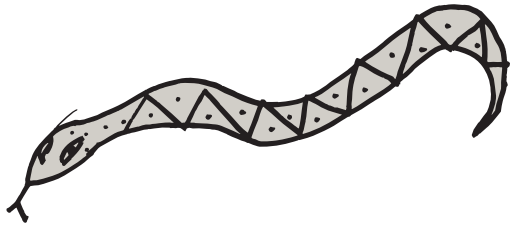
It is during the period from the end of April to the beginning of July that the bird life in Estonia is at its peak. By August the first breeding birds start the journey back to the South. The autumn migration lasts, however, for much longer; during the milder winters some species can leave Estonia as late as December. Or not leave at all, which is the case with a growing number of once migratory species, e.g. the blackbird or the mute swan.

Forest species constitute about a half of Estonian birds. The richest in both the number of species and individuals are the broad-leaved deciduous and mixed forests, where the average density of breeding pairs varies from 550 to 1700 per sq km. Forest birds are mainly passerines: finches, thrushes, warblers, robin, pipits, etc. Chaffinches and willow warblers are probably the most numerous birds in Estonia.

In spite of being relatively poor environmentally, bogs form one of the most interesting habitats for birds. Among the birds which find the bogs congenial as nesting places are some relic tundra species as the European golden plover and the whimbrel. Unfortunately, many typical tundra species, like the willow grouse, the peregrine falcon and the black–throated diver, which were all characteristic exhibits of Estonian bog wildlife, have disappeared as nesting birds during the last decades.

Estonia's shallow coastal waters and seashore wetlands are among the most important resting and recreation areas for whooper swans, Bewick's swans and many duck species in the whole Western Palearctic zone. Among the estimated three to four million water birds migrating through Estonia twice a year, the long-tailed ducks with a little more than one million birds are the most numerous.





It is the small islets and skerries, however, that can be called bird paradise. Undisturbed by man and protected from most smaller predators by the sea, they are real nesting sanctuaries for a diversity of gulls, terns, ducks and waders.

Due to the vast preserved natural landscapes, the swamplands in particular, large raptorial birds, such as the golden eagle, white-tailed eagle, osprey, spotted eagle and eagle owl have made Estonia their home. Altogether 770-900 pairs of eagles nest in Estonia. Another rare and very elusive bird species inhabiting the large forests is the black stork.

Thanks to the protective measures for both birds and their habitats, several species in decline in Western Europe have increased in number in Estonia, e.g. the corncrake and the white stork whose nests on old chimney stacks and telegraph poles are an inseparable part of the Estonian landscape in the summer.

The majority of breeding bird species are migratory. Among the resident species which can survive the harsh winters, the capercaillie, black grouse, magpie, woodpeckers, tits, etc., are the most typical.

The indented seashore provides habitats for different groups of birds. Thus the waders make up more than half of the breeding birds of the salt marshes and coastal meadows. Another interesting community is the one amongst large reed plains on the western coast and islands where coots, bitterns, water rails, etc. are common.

Ural owl is one of the 222 bird species taken under national protection, or included in the Red Data Book, in order to protect the diversity of Estonian bird fauna. About one hundred bird species mentioned in the European nature conservation programme Natura 2000 live in Estonia.

Survivors from a former Europe

Sixty-four species of mammals have been recorded in Estonia, three of them have been introduced: the racoon dog, the American mink and the muskrat. The European beaver, hunted to extinction by 1871, was reintroduced in the 1950s and a vital population of about 17 000 animals exists once again in Estonia. Another reintroduced mammal is the red deer with a present population of about 1500.

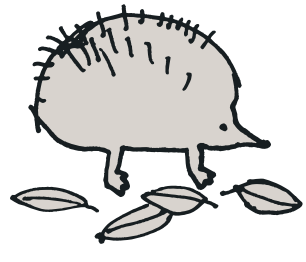
Although not as many as 1100, as estimated by over-enthusiastic hunters, there are still hundreds of lynx dwelling in the large forests of Estonia, together with ca 140-150 wolves (after the breeding period), 550 brown bears and many more smaller carnivores.

An attempt has been made in Estonia in recent years to disperse the population of wolves, encouraging their spread in areas where their colonies have disappeared, and restricting their numbers in other places where it is too high (e.g. in Central Estonia). Although the number of wolves has fluctuated considerably during the past decades, (500-600 in 1995 to 50-100 in 2002/2003), their population is predicted to somewhat increase and stabilise in the coming years.

Estonia is the home of several rare mammals, the most endangered of them being the European mink, several species of dormouse and the flying squirrel. The latter has become a symbol of the old-growth forest, one of the most important monuments to Estonian nature.

The indigenous brown bear population has managed to survive in the extensive forests and bogs of northeastern and southwestern Estonia, in spite of the fact that the expansion of intensive agricultural land use and the simultaneously excessive hunting of large carnivores at the beginning of the 20th century brought the species to the brink of extinction. Today, Estonia boasts one of the strongest brown bear populations in Europe, coming third after Romania and Slovenia, based on the number of bears versus land area.

Several islets in the Väinameri and on the western coast of Saaremaa are important whelping grounds for Baltic Sea seals. The size of the highly mobile grey seal population is impossible to determine; about 10 000 inhabit the Baltic Sea. There are approximately 1500 endangered ringed seals currently living in Estonian waters. Both species are under protection.



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