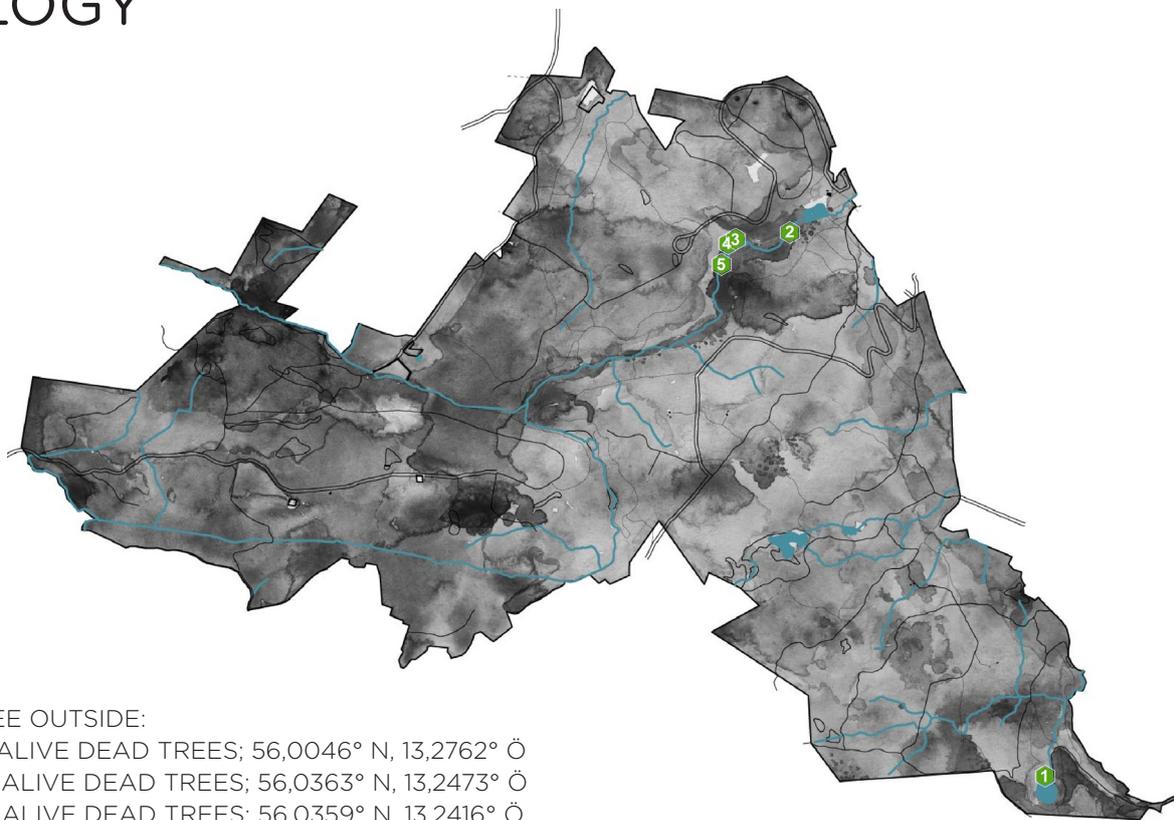


# BIOLOGY



## SEE OUTSIDE:

1. ALIVE DEAD TREES; 56,0046° N, 13,2762° Ö
2. ALIVE DEAD TREES; 56,0363° N, 13,2473° Ö
3. ALIVE DEAD TREES; 56,0359° N, 13,2416° Ö
4. KOPPARHATTEN MEADOW; 56,0361° N, 13,2465° Ö
5. LUSH VEGETATION; 56,0344° N, 13,2402° Ö

## LIFE AND DEATH IN SPLENDID UNION

Next time you walk past a dead tree in the woods take a closer look! It's teeming with life! On wood and bark, polypores and other fungi thrive together with lichens and mosses. Insect larvae gnaw their way through narrow passages whilst woodpeckers do their best to catch them.

In the national park's ancient forests, you'll find many rare species, not least among insects, fungi, mosses and lichens - thanks to weakened and dead trees.

Söderåsen is one of the country's foremost locations for many endangered woodland species. Thanks to a great extent to all the old, damaged and dead trees. Many rare beetles, mosses and larvae have been found as well as all of 1600 different species of fungi.

Imagine if you could crawl into the tree to see and hear everything that happens in there!

## TREES FOR TIMBER AND TREES OF BIOLOGICAL VALUE - WE NEED BOTH!

Trees for timber products are felled when they are far from being fully-grown. They harbour a small number of species, which are not so fussy about where they live or what they eat. Trees of biological value must be allowed to age and die. These trees are vital to many specialised species, which are highly particular about their habitat and food. Since their needs vary, all types of decaying wood are needed:

coarse and fine, sunlit and shaded, fallen and standing, old and young ...

Some larvae live solely on tree-stumps that are really ancient, frequently more than 150 years old. In modern forestry trees are felled when they are 80-120 years old, and there is a lack of rotting timber. This is detrimental to fungi and insects that are dependant on decaying wood, and can alter the number of insect-eating birdlife. Specialised and demanding species do not survive in forests such as these. Tree-felling also changes the exposure to sun and wind. Something that can have a negative impact on dehydration sensitive larvae, fungi and mosses.

## INSECTS

Insects such as beetles, butterflies, flies and ants all go through a larval stage before becoming adult. An insect has six legs and its skeleton outside the body. Spiders have eight legs and are therefore not insects.

Several rare species of insects live in Söderåsen's dead and dying trees. Many live in the organic residue that collects in cavities, and under bark, for example. Organic residue is a mix of gnawed chippings, decayed timber and other biomass material such as fungal remnants, leaves, twigs, dead small animals and faecal matter. Different species thrive in different types of organic residue and in different locations: at the bottom, high up, damp or dry.

## **FUNGI**

What we see is the fruiting body. Most of the fungus grows below ground or in tree trunks in the form of thin strands. Fungi are important for the decaying process and create habitats for other species. Some fungi live in symbiosis with trees, where the fungi receive sugar in exchange for water and nutrients. The sugars are produced by the trees through photosynthesis.

Many fungi can be found only at locations where ancient trees have been for a long time. Areas of ground with a high pH value - often in relation to alkaline bedrock - are frequently "hot-spots" for rare fungi. Even well-established meadow and grazing land with a rich vascular plant flora is important for certain sensitive species which often disappear if the land becomes overgrown.

It is difficult to inventory fungi as a number of species only create spore capsules every 25 years.

## **MOSSES**

Mosses live on the ground, as well as on stones and trees. They are often green and soft with many small leaves coming from a common stem. They lack roots and get their nutrition from rainwater and the air.

Mosses have spores instead of seeds, but they can also reproduce through a part of the moss breaking off and creating its own moss plant.

## **LICHENS**

Lichens are double organisms, which consist of a fungus - the visible part - in symbiosis with an alga. The fungus absorbs water, and the alga produces sugar through photosynthesis. Lichens come in an enormous variety of colours and shapes but are commonly seen as light or dark patches on trees and stones.

Depending on their appearance they are sorted into crust, leaf and bush larvae. Many larvae are sensitive to environmental changes and are therefore valuable indicators of the state of nature and the environment.

## **TINDER FUNGUS - A DOOR-OPENER**

A weak tree will often be victim to fungus attacks. Tinder fungus is common on old beeches and plays an important role as a decomposer. The fungus breaks down the wood and makes it brittle. The tree then becomes a good habitat for many of the rare species in the forest. Maybe you will find some of them here.

Wood consists to a great extent of lignin and

cellulose. The tinder fungus breaks down the brown lignin to extract nutrition and leaves the white cellulose. Other fungi leave the brown part of the wood instead.

Several insects live on and in bracket fungi. Certain of them develop inside the fungus whilst others eat it or its spores. Long gnaw trails can be found on the underside of bracket fungi, where beetles have feasted.

## **TREE LUNGWORT**

Tree lungwort grows on old deciduous trees in half-open terrain with high, constant air humidity. It is beautiful and large, growing to several decimetres in diameter. When thriving, it grows red, disc-like fruiting bodies on the green leaves.

## **PYRENULA LICHEN**

The crustaceous lichen *Pyrenula nitida* grows on the smooth bark of many of the old beech trees in the national park. It thrives in damp, shady places.

## **BITTER SCALEWORT**

Bitter scalewort is a rare moss that grows on calcium-rich rock and old beeches. It is recognisable by its strong pepper taste. The richest occurrence in Sweden is in Söderåsen National Park.

## **CRISPED NECKERA**

Crisped neckera moss grows on old beeches or dry, calcium-rich, shady rock-faces. It thrives in species-rich environments with high biological values.

## **CORAL-TOOTH FUNGUS**

The beautiful coral-tooth fungus grows on dead deciduous trees, both standing and fallen. Like many other fungi, animals and plants it is declining due to the lack of dead wood.

## **LARGE BLACK LONGHORN BEETLE**

The large black longhorn beetle larvae live in weakened or dead beeches, preferably in high stumps. They gnaw tunnels in the wood for three years or more. They pupate in early summer, and around midsummer we can see the beetles in flowers or slowly crawling around their tree stump.

## **TANNER BEETLE**

The tanner beetle's larvae live in the roots of old trees. After a few years, the larvae crawl out into the soil, pupate and then become large, strong and nocturnally-active beetles with thick antennae. A distinctive feature is the spikes on the thorax, between the head and the abdomen.

### HOW CAN WE HUMANS HELP THE ANIMALS?

One way is to manage our meadows to stop them from becoming overgrown and turning into forests. Many insects eat pollen and nectar from the meadow flowers. In return, they help the plants with pollination. When the insect flies between the flowers it carries with it pollen from the stamen (male organ) to the pistil (female organ). This pollination is a pre-condition for fertilization.

The varied nature at Söderåsen makes the insect fauna unusually rich, and is good evidence that everything is connected and that all species have their role to play.

### INTERVIEW WITH THE LARGE BLACK LONGHORN BEETLE:

Hello! As a larva, I lived in an ancient tree and ate wood. Now, I get pollen and as much good, sweet nectar as I want from the flowers in the meadow. So thanks for all the flowering meadows!

### STONEWALL: STONE-DEAD?

No, there's lots of life in a stone wall, which stores warmth and provides protection. Here, cold-blooded creatures such as lizards and snakes compete for space with rodents, snails and insects. Many birds build their nests in the walls, too. The dry, warm stones are home to many lichens, and flowers appear early along the sunny side of the wall.

### HAS THERE BEEN A MOUSE AROUND HERE?

Mythical masters of the air

In Sweden, we have observed 19 species of bats. Most bats weigh only a few grammes. They hibernate, hanging upside-down in caves, hollow trees or attics. Nearly a quarter of all the world's mammals are bats.

Bats are flying mammals that eat insects. They have poor eyesight but excellent hearing, which they use to find their prey. They send out a signal and wait for the echo. In this way they can locate the prey.

Their young are born in the middle of the summer and are quite undeveloped. They suck fast to the mother's one nipple. When the female goes out at night to hunt, she hangs the baby up on the wall.

### WHO HAS PLOUGHED UP THE GROUND?

Wild boars are shy, and often you only see the tracks of their rampage. They grub around in the soil for something to eat. They rub themselves against trees and roll around in mud pools.

The grubbing shifts the layers of soil in much

the same way as the farmer's plough. This helps some seeds to grow. The wild boar also carries seeds and spores in its fur.

The first signs of wild boars were detected in the national park after the turn of the millennium. Since then their numbers have increased significantly.

In summer an adult wild boar will eat around 4 kg daily, and a piglet around half that. They need more in the winter. If their access to food is good they will eat until they can hardly move.

### CROCODILES! HERE?

A master swimmer that likes to be in or close to water.

Grass snakes vary from green or grey to brown in colour and have a white or yellow collar behind the head. They can grow up to 130 cm long. The grass snake is shy and has no poisonous fangs. Its saliva contains venom which it uses to paralyse its prey with. The saliva cannot penetrate human skin, and as the grass snake doesn't have any poisonous fangs it is harmless to man. If it feels threatened it makes a fast retreat, but can also 'play dead', lying on its back with its tongue hanging out. If you try and turn it upright it will roll back.

Please look at the grass snake but leave it alone. Even if it is harmless it can ruin your clothes with a foul-smelling secretion from scent-glands around its anal opening.

In July and August the female lays 15-30 eggs that are surrounded by a parchment-like, white shell. The eggs are laid in a warm location, such as a dungheap, or collections of rotting vegetation where the heat generated enable the eggs to develop under a relatively high temperature. The female does not guard the eggs or rear the hatchlings. The grass snake normally lays one batch each summer.

Just like the birds it lays rather undeveloped eggs which take a relatively long time to hatch.

### DOG POO? OR IS IT ...

Swan poo and dog poo are fairly similar, but the swan's excrement is greenish, as it is a plant-eater.

Like all birds, the swan has only one opening for urine and faeces; the cloaca. Fertilisation and egg-laying also take place through this opening. The vent is an opening that birds have, along with sewer animals, reptiles and fish. Did you know that the swan was used as a table decoration during the middle ages and the renaissance?

### WHAT? PIXIE CAPS ...

In the spring the female beech gall gnat lays her 200-300 eggs in the beech tree's leaf buds. Around the eggs beech purses are formed; small callouses that look like red or green Santa hats. At first they are green, then turn yellow with a reddish sunny side. The males of the species are smaller and lighter in colour. The larvae hatch, but continue to live in the beech purse. They pupate in the spring and after two or three weeks a new beech gall gnat sees the light of day. The adult gnat is between 3 and 4 millimetres in length. They neither sting like mosquitoes or bite like midges.

### FROM GRANITE TO GRAVEL

The majority of Söderåsen's bedrock consists of gneiss and granite. This basement rock is more than 1 600 million years old. In places it is cut by younger volcanic rocks such as diabase and basalt.

The upper part of the bedrock has been crushed and ground down into soil and gravel by the inland ice masses. Crushed basement rocks give a poor, sandy moraine, but along the dikes of volcanic bedrock the soil layer is instead rich in chalk and nutrients.

### PLANTS FROM THE AGE OF THE DINOSAURS

Ferns are prehistoric plants and thrive in the joint valleys of the national park. Skäralsdalen is often called "The valley of the ferns". The long beech-fern, the common polypody, the lady-fern and the narrow buckler-fern can be found in abundance here. The rarest of all is the Braun's holly fern. It is thought not to be found anywhere else in Sweden. But did the dinosaurs eat ferns?

The plants tell us about the ground and the history of the earth

If the ground is covered by mouldy leaves and bilberry shrubs you will know that the soil is poor, originating from acid and nutrient-poor primary rock; gneiss and granite. Lush growth, with a profusion of dogs' mercury, woodruff or ramsons tell us that the soil is calcareous and nutritious, originating from volcanic rock; diabase and basalt. Even land snails and certain mosses are favoured and the fungi flora is very rich with many rare species.

There's a bit of a Sherlock Holmes in all of us!

### SUNSHINE AND WARMTH OR COOLING SHADE

There's something here for every taste. Heat-loving creepy-crawlies and lichens live among the open, warm craggy rocks or on

the ancient sunlit trees in the glen. Mosses and other species preferring a cooler, more humid climate choose the shady side of the slopes or the darker forest.

Where can you find the purse-web spider and beech fern?

### THE PURSEWEB SPIDER

The Purseweb spider is the only bird spider in the country. *Atypus affinis* translates conveniently to "the different one living close by". It builds tunnels among stones in its habitat and catches food in them. The tunnels are 'wallpapered' with spiderweb inside.

The Purseweb spider hides inside the tunnel and waits for a fly to land. Then it uses its venomous sharp claws to strike through the tunnel wall and into the prey which is paralysed by the venom injected into it. The spider then opens its home tunnel and pulls the prey inside. The paralysed prey is left for a while whilst the Purseweb spider spins a web across the opening that has been made. After that, the spider settles in the underground sections of the tunnel and sucks the prey dry.

In the autumn the sexually mature males depart their tunnels to seek out the females. After mating, the male and female stay together for a while. The male subsequently dies. The female lays 80 to 150 eggs around 10 months following mating. The female weaves a special webbing sack for the eggs. The sack is positioned in the home tunnel's upper part close to ground level. The young hatch out at the end of the summer. During the following winter the female stays alone with her young. And in the following spring the young spiders leave the mother's tunnel.

### THE LONG BEECH FERN

The Long Beech Fern (*Phegopteris connectilis*) is a relatively low-growing, fragile fern with long, crawling earth stems. The lowermost pair of small leaves are angled backwards, forming a characteristic "V"-shape.

It grows in shady, damp forests, river banks and around marshland borders. The first description was published by Linnaeus in 1737. The family name *Phegopteris* stems from the Greek word *fegos* (beech, oak), and *pteris* (fern), and alludes to it thriving in damp, shady forests, often under deciduous trees such as the beech.

Ferns have spores instead of seeds. They are found in small yellow-brown collections on the underneath of the leaves. Ferns dominated the flora on land from the Carboniferous age (350 million years ago), and over the subsequent 100 million years.