NATURE IN THE HOCHWALD REGION

DISCOVERIES IN AND NEAR THE SUSTAINABILITY PARK

ARBORETUM EUROPAEUM
PARK DER NACHHALTIGKEIT

Publication information

Nature in the Hochwald region – discoveries in and near the Sustainability Park
Volume 144 -Documents and writings of the European Academy of Otzenhausen
Printed in Germany 2010, ISBN: 978-3-941509-09-2

Editors: Roswitha Jungfleisch, Kerstin Adam
Authors: Kerstin Adam, Christoph Kiefer, Dr. Hannes Petrischak
Design: Klaus Aulitzky, Kommunikation und Design, Merzig
Translation: Kerstin Adam, Therese Rose
Printing and processing: Merziger Druckerei und Verlag GmbH & Co. KG, Merzig, Germany
printed on paper from sustainable sources: FSC® C013945

We would like to thank Christoph Kiefer (SaarForst Landesbetrieb), Stefan Mörsdorf (Foundation ASKO EUROPA-STIFTUNG), Dr. Hannes Petrischak (Foundation Forum für Verantwortung) and Eva Wessela (European Academy of Otzenhausen) for their professional advice.

Furthermore, we are very grateful to Annetrud and Wilhelm Franke, Prof. Klaus Hahlbrock, Arno Krause, Klaus Wiegandt and other sponsors mentioned below for their financial support. Without them, the publication of this brochure would have been impossible.

energis

FORUM EUROPA

LOTTO Saartoto

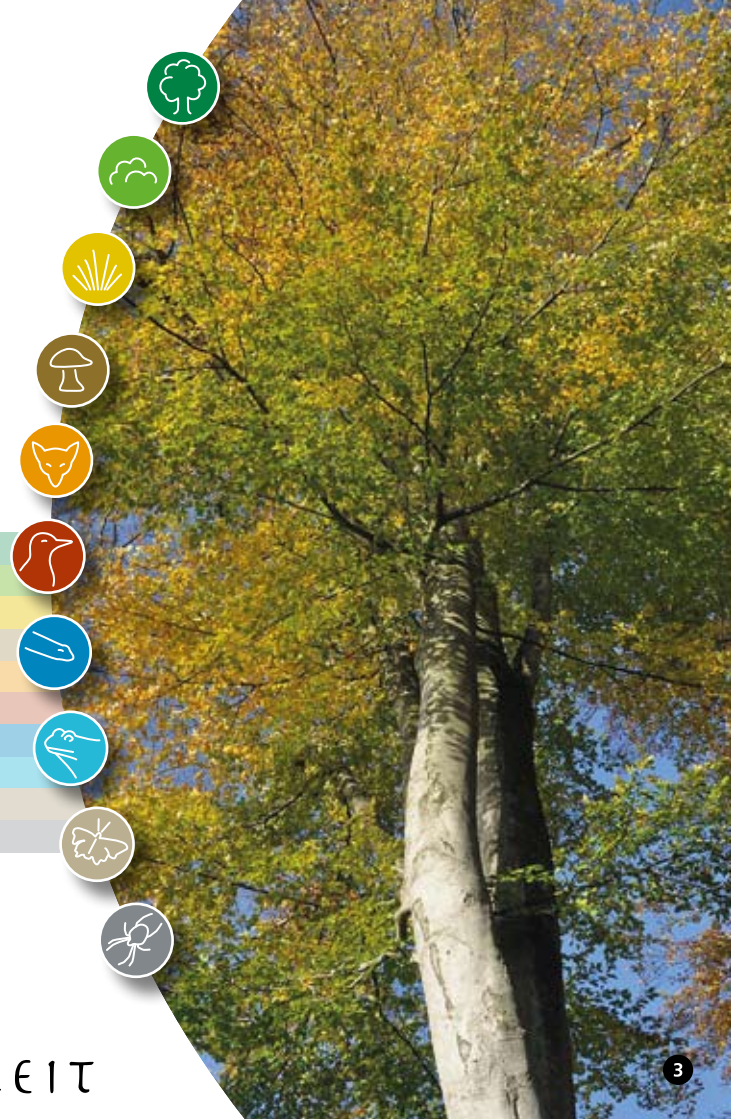
MBW LÜFTUNG+KLIMA

MDV Merziger Druckerei

Nonnweiler

ARBORETUM EUROPAEUM

Contents



Preface by the manager

Welcome to the **Arboretum Europaeum – Sustainability Park (Park der Nachhaltigkeit)** at the European Academy of Otzenhausen. It all started in 1994 with an idea for the use of a wind-thrown forest, which has since been developed into a park with plants from all over Europe and the world. Today there is a close connection between the philosophy of the park, of the adjacent Celtic sculpture trail **Cerda & Celtoi** and of the project **Encouraging Sustainability** within the framework of Education for Sustainable Development.

On the International Day of the Tree in 1994 members of the International Federation of Europe Houses founded the park under the name "Arboretum Europaeum". They brought trees from their home countries, which provided the basis of today's park. In 2008 the area was reshaped from scratch and equipped with resting places, which invite visitors to linger. On a tour through the park, visitors can also admire sculptures inspired by the Celts. The appearance and philosophy of these works are closely linked with the sculpture trail Cerda & Celtoi, which starts at the Arboretum and was created with the support of the European Academy of Otzenhausen. In 2008 the Arboretum was given the additional title "Sustainability Park", which refers to the initiative "Encouraging Sustainability".

This brochure invites you to discover the Arboretum and the adjacent woods. Enjoy your tour!

Roswitha Jungfleisch,
Manager of the European Academy of Otzenhausen
and of the association FORUM EUROPA e.V.,
Saarbrücken

Preface by the authors

The Arboretum Europaeum – Sustainability Park (Park der Nachhaltigkeit) is embedded in a forest landscape, which has been populated and shaped not only by characteristic animals or plants, but also, for thousands of years, by people. It was therefore obvious that this brochure should not be limited to the trees specifically planted at the Arboretum, but that it would make sense to include its surrounding area and larger contexts. We did not at all intend to design a nature or walking guide as a reference book. This brochure rather aims to encourage people to keep their eyes open in order to discover the woods and its secrets for themselves. For this purpose we made a – no doubt subjective – selection of animals and plants of the immediate surroundings, most of which you can discover yourself with a little luck. Every animal, every plant has a function in the forest ecosystem: it is a hunter, prey, competitor or beneficiary of other creatures. Some species have also shaped human cultural history, or their exceptional aesthetics and surprising biological interrelations arouse our fascination. In this brochure we have compiled exciting or curious facts, things worth knowing – and hope that they will give you a deeper understanding of the woods and its inhabitants and make you curious to find out more about them.

The brochure fits in with the concept of "Education for Sustainable Development", which is the working basis of the cooperation partners and the origin of a variety of experience-oriented educational events. The *European Academy of Otzenhausen, FORUM EUROPA e.V., the foundations Forum für Verantwortung, ASKO EUROPA-STIFTUNG* and the regional forest authority *SaarForst Landesbetrieb* would be glad to welcome you, your friends, your business partners, your club, your class, etc. to these events. We also offer a "culinary programme" according to your wishes.

Dr. Hannes Petrischak, Kerstin Adam, Christoph Kiefer – authors (from left to right)


ZUCKERHUT-FICHTE

How it all started

Today's **Arboretum Europaeum – Sustainability Park**, bordering the northern edge of the Academy grounds, was created under the name of Arboretum Europaeum on March 26, 1994, International Arbor Day. Representatives of the International Federation of Europe Houses (FIME), some of whom dressed in their national costumes, planted the first 33 trees from their home countries ranging from the UK to Greece on the approx. 0.5-hectare area showing signs of storm damage. They wanted both to set an example of Europe growing together and to underline the significance of woods for a healthy environment.

Already in 1994 the organisers – apart from the European Academy of Otzenhausen, they were the community of Nonnweiler, the regional forest authority Saarländische Landesforstverwaltung and the regional hiking association Saarwald Verein – supported a request which is omnipresent today: to mobilise all means at our disposal to preserve unique natural landscapes for future generations. During the founding festivities they expressed their concerns with regard to the loss of biodiversity in European woods and declared these issues an important element of European educational policies. About twenty years later this theme has lost none of its relevance. This brochure is an example of how the European Academy of Otzenhausen is putting the objective of sustainable development into practice.

Geographical location and geophysical aspects

The European Academy of Otzenhausen is nestled in the forest landscape of the southern part of the Hunsrück mountain range, usually referred to as "Schwarzwälder Hochwald" or simply "Hochwald". It includes the southern foothills of the Rhenish Massif and passes directly into Prims-Nahe-Bergland, a low mountain range characterised by the Prims and Nahe Rivers. On the Saarland side, the highest parts of the submontane to montane ridge of the Hochwald, which runs from the southwest to the northeast, reach 695 m above sea level.

The Saar River meanders all over the lower western area, the Saar-Ruwer-Hunsrück, and the Saarschleife near Orscholz is the best known of the many river bends. In this region the Saar's banks are high and steep. Many creeks drain the Hochwald to the south and are tributaries of the Prims. The southern part of the Hochwald borders on the so-called "Rotliegend". This formation is characterised by many peaks and basalt, andesite and rhyolite massifs, all of volcanic origin and created in the Permian, a geologically restless period.

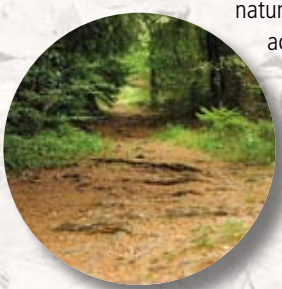
The Hochwald range is the first major obstacle to the humid westerly winds from the Atlantic Ocean and forces them to ascend. This causes heavy rainfall (annual precipitation up to 1,100 mm/43.3 inches), accompanied by high humidity and slightly lower temperatures. Prevailing wind directions are west and southwest.

Geology and soils

The Hochwald massif consists primarily of Taunus quartzite, sandstone (Hermeskeiler Sandstein) and Devon slate. Stony or sandy, low-nutrient acidic soils develop from the extremely weatherable parent rock made up entirely of quartzite. You often find slopes covered with stones and debris ("Steinrauschen"), which also served as principal material to build, for example, the Celtic Circular Wall, the so-called "Hunnenring".

Natural vegetation

The natural vegetation, which appeared after the end of the last Ice age, is a submontane mixed beech forest. The European beech would be the characteristic and dominant tree species under natural conditions. These natural beech forests are divided into several typical natural forest communities on low-nutrient, acidic parent rocks, primarily the so-called "Luzulo-Fagetum beech forests".



Forest development since the end of the last Ice age

After the end of the last glacial period, Europe was reforested in characteristic phases according to climatic developments. There was, for example, a hazel period, a period when pines prevailed, and a time of mixed oak forests, which lasted for several thousand years. Since about 3000 B.C. the European beech has been migrating from the south and has become the prevailing tree species under natural conditions. At the latest since the iron-age LaTene period, however, humans have been the greatest factor in shaping the landscape. They have been settling in our region in increasing numbers, clearing the forest and using it to produce firewood and timber or for forest pasturing or for leaf gathering or coppicing. This has brought about an extreme change in the natural vegetation of the sub-Atlantic beech forests.

The unrestrained plundering of natural woodland due to the energy crisis in the Middle and Early Modern Age finally entailed extensive reforestation primarily with undemanding conifer species. The high percentage of conifers in the Hochwald is therefore the result of forest history in the last 300 years.

Forest types in the vicinity of the Arboretum Europaeum

The Arboretum is part of a woods where you can study various forest types "on location" and witness their development in person. On a slope behind the Arboretum there is a dense spruce forest, the result of forestation with this tree species, which is actually not indigenous to the area. Natural spruce woods are predominant in forests further to the east; in Germany they are found only at higher altitudes of the country's low mountain ranges with their rather continental climate and in the Alps with their hard winters and late frosts. Their needles make them more competitive than deciduous trees. Spruces grow fast and produce a good yield of wood in a relatively short time, so that this tree species was planted in big and dense forests all over Germany in particular in the 19th century.

Certain spruce woods are, however, very vulnerable: The tall trees with their shallow surface roots cannot withstand storms very well. If they fall, they pull their neighbours down with them – and so deforested areas emerge very quickly. This provides favourable conditions for mass propagation of the dreaded bark beetle species, such as the European spruce bark beetle *(Ips typographus)*. The typical feeding traces can be found under the bark of infested trees: the female gnaws a broad gallery, where it lays its eggs. The galleries gnawed by hatched larvae branch off either side of the central gallery and end in the broader, so-called "sealed cells".

The particularly violent storms of the 1980s and 1990s such as Vivian and Wiebke (1990) have left their marks in Central Europe. The Arboretum, too, is a wind-thrown area dating from that time. The feltlike tufts of wavy hair-grass *(Deschampsia flexuosa)* cover its acidic and low-nutrient soil. Deforested areas in woods are characterized by a certain sequence of plants, which are predominant in subsequent years. This process is called succession. Apart from grasses, blossomy rosebay willowherb (fireweed) *(Epilobium angustifolium)* and digitalis (foxglove) *(Digitalis purpurea)* propagate at the start. The first trees to settle as pioneer species are, above all, birches *(Betula sp.)*, European mountain ashes *(Sorbus aucuparia)*, common aspen *(Populus tremula)* and goat willow *(Salix caprea*). You can trace this development in the Arboretum, especially if you follow the path leading to the right side of the Arboretum up the slope: on the right side there is such a developing woods in strong contrast with the dark spruce forest. Birches are extremely good at propagating in open






space: Every tree produces millions of airborne seeds, which are widely dispersed by winds. They need light in order to germinate. Under the birches, however, you can see young European beeches *(Fagus sylvatica)* growing, which have no trouble germinating in shady places. The European beech is the dominant tree in the Central European regions characterized by an oceanic climate with relatively mild winters and humid summers. It can live up to 300 years. Such a beech forest can be seen further up the slope in the area of the "Naturwaldzelle" (see signs). Here you can also find old trees dotted with woodpeckers' holes and infested by tinder fungus *(Fomes fomentarius)*.

The broad forest paths are fortified with nutrient-rich materials. Along the paths you can regularly find plants such as wood avens *(Geum urbanum)*, greater plaintain (*Plantago major)* and raspberries *(Rubus idaeus)*, which indicate the presence of nutrients.

Near-natural forest management

Some years ago the focus of forest management in Saarland shifted from clear cutting to natural forest management. This sustainable form of forest management is characterised by its particular closeness to nature. In the long run, it is more successful commercially than conventional forest management according to age groups. Natural forest management rejects the practice of clear cutting; trees are harvested individually or in small groups. Saplings of different species populate these clearings on their own (so-called natural rejuvenation). If the density of wildlife (herbivores) is low, mixed forests including trees of different species and age groups can grow, which are stable and rich in species. Since these forests need no manual reforestation and require less care, they are more successful than the so-called monocultures even in economic terms.

In the context of its educational programme, the European Academy of Otzenhausen offers guided tours through the woods (in English or German). Just give us a call.

PARK DER NACHHALTIGKEIT

European mountain ash
(Sorbus aucuparia)

Despite the similarity of their pinnate leaves, the European mountain ash (or: European rowan) is not related to ashes, but belongs to the rose family as do apples and cherries. Many mammals, birds and insects love their bright red fruits, the rowanberries, which, in autumn, can be seen from afar. Since the seeds pass through the digestive tract without damage or are buried (and then forgotten) in the soil as food for the winter, animals take care of spreading the seeds. Just like birches, European mountain ashes are one of the first trees to colonize open spaces (pioneer trees).

Crabapple *(Malus sylvestris)*

The crabapple is probably the original form of the apples cultivated today. Like all apples it belongs to the rose family. Even today it plays an important role in apple cultivation, since it is robust and resistant to low temperatures. Its small and bitter fruits are not to humans' taste, but animals such as bees, birds and mammals appreciate them very much. Crabapples therefore increase the diversity of species in our forests.

Sweet chestnut *(Castanea sativa)*

People especially enjoy the fruits of the sweet chestnut (or: European/ Spanish chestnut) in the winter, when they are roasted and sold under the name of "maroni". Already in prehistoric times people ate these chestnuts, which served as an important food plant in southern Europe particularly in the Middle Ages. Originally native to the Caucasus, this fruit tree was spread by the Romans all over their Empire as far as Britannia. By the way, the sweet chestnut is not related to the horse chestnut, but to beeches and oaks.

Oak *(Quercus sp.)*

Celts and Germanic people considered oaks sacred trees, and they are still regarded as a national symbol in today's Germany. Since oak wood is hard and resistant to rotting, it is used in a variety of ways, for example as veneer or in the production of furniture. Already in antiquity, its fruits, acorns, served as a source of food for pigs, which were driven into the forests for feeding purposes (this is how wood pasture, a historical land management system, developed). In hard times acorns provided coffee and flour substitutes for people, too. The huge trees are guarantors of the diversity of species: their crown is host to several hundreds of insect species.

Alder buckthorn *(Rhamnus frangula)*

The bark of an alder buckthorn gives off a faintly foul odour, hence its German name "Faulbaum" (rotten tree). Another German name would be "Pulverholz" (gunpowder wood), since its wood was formerly used as a basis for the production of gunpowder. The alder buckthorn is an important food source for animals such as brimstone butterflies. People, however, shouldn't touch these fruits: They can be very poisonous.

European beech *(Fagus sylvatica)*

Under natural conditions, the European beech is the dominant tree species in our forest ecosystems. Its German name "Rotbuche" (literally red beech) does not refer to reddish leaves (this would be characteristic of a copper beech), but to its reddish wood. Its fruits, the beechnuts, can be slightly poisonous to humans, but they are an important food source for the forest dwellers, in particular wild boars, birds, mice and squirrels. The latter contribute to spreading beech seeds, since they bury them as winter food and often leave them uneaten, so that in the spring seedlings sprout up from the ground.

Maple *(Acer sp.)*

Maple species occur not only in the woods, but often also in towns (Norway maple, *Acer plantanoides*). Norway maple is resistant to air pollution and a winner of climate change in the northern hemisphere, because it survives well through dry periods. Its seeds have a very special aerodynamic shape, which makes them rotate like propellers as they fall. This reduces the falling speed, so that the wind can carry the seeds over a longer distance.

Birch *(Betula sp.)*

The extremely light birch bark reflects the sunlight, so that after severe frost, it "defrosts" more slowly and evenly – a clear advantage of this deciduous tree with the northernmost range. Birches are considered harbingers of spring. However, for a growing number of allergy sufferers, their catkins blossoming starting in late March are a source of discomfort rather than joy. Birches are pioneer trees and provide a habitat for many bird and insect species, fungi, lichens and mosses.

Lime/Linden *(Tilia sp.)*

If in the spring the air is filled with an intensive scent and the humming of bees, bumblebees and flies, a lime tree is often not far away. Lime-blossom honey, but also lime-blossom tea as a cure for colds, are just two examples of how humans benefit from lime trees. Lime wood served as extraordinary carving material to make altars and statues of saints, but also musical instruments. People often met under a lime tree, the centre of their village. German terms such as "Dorflinde" (literally: village lime), "Gerichtslinde" (literally: tribunal lime) or "Tanzlinde" (literally: dancing lime) refer still today to the various occasions. The common lime *(Tilia europaea)* is a hybrid between the small-leaved lime and the large-leaved lime. It is nowadays often grown as a roadside tree.

Goat willow *(Salix caprea)*

Goat willows start blossoming in early March and are therefore at the top of the menu of many insects, such as bees and butterflies, in early spring. This pioneer plant provides a habitat for over 100 butterfly species, whose caterpillars eat the leaves.

Ginkgo *(Ginkgo biloba)*

Today you will find ginkgos in particular in cities and parks all over the world, since they are resistant to air pollution and other damage. This trait helped them survive for millions of years: The first ginkgo trees existed already 200 million years ago. They are therefore also called living fossils. They originate from China and have unique fan-shaped leaves. Fossils indicate that in the course of evolution, these leaves evolved from slit leaves shaped like a fork. Ginkgos represent their own plant class closely related to conifers. It was nominated as tree of the millennium.

Wollemi pine *(Wollemia nobilis)*

The wollemia was thought to have died out two million years ago. In 1994 it was rediscovered in the Wollemi National Park (hence its name) in Australia. It is one of the world's oldest and rarest trees, of which 100 are estimated to occur in nature. It is a living fossil, too, which was widespread throughout the south of the ancient supercontinent Gondwana ages ago.

Fir *(Abies sp.)*

Celtic and Germanic peoples regarded firs as magic trees, and already in pre-Christian times fir branches were set up in homes at the time of the winter solstice. The first Christmas tree is said to have been set up in Strasbourg in the 16th century. Firs belong to the pine family. In the early phase of the forest decline the European silver fir *(Abies alba)* was one of the worst affected tree species. It also often suffers from browsing by deer. Since their natural enemies are not present, the deer proliferated – and they prefer to nibble off fir shoots.

Pine *(Pinus sp.)*

Most pine species are very hardy and resistant. Since they furthermore grow fast and their wood can be used in many different ways, the pine is one of the most important species used for commercial forestry all over the world. In Germany, too, there are several purely pine or spruce forests. The practice of growing just one plant over a wide area is called monoculture. Monocultures bring financial advantages over the short and medium term, but they are greatly detrimental to nature: Many animals cannot survive here, pests can reproduce unhampered, and the soil is ultimately leached, so that other trees have problems growing again in the area.

Norway spruce *(Picea abies)*

The Norway spruce (or European spruce) is the most important tree used for commercial forestry in Germany. Its wood is above all used as construction timber and in the paper production. Spruces, too, are often grown in monocultures with all the inherent disadvantages (see section on pine). Originating from northern regions, spruces are among the losers of climate change: hot summers and dry weather affect and weaken the trees, and their major enemy, various bark beetle species, freely proliferates under these conditions.

Tip: Walk to the small spruce monoculture behind the Arboretum Europaeum and compare the animals and plants you find there to those in other sections of the wood. Also take a look at the crowns.

Common yew *(Taxus baccata)*

Long ago Germanic tribes used the hard wood of the common yew to produce bows. It was in such demand that the yew population increasingly diminished over the centuries, so that yews are protected today. Furthermore humans chopped down the slowly growing yews because of their toxicity among other reasons. Almost all parts of the plants are very poisonous not only to humans, but also to animals such as horses and cows. Today the evergreen plants are primarily grown as hedges or in cemeteries.

Holly *(Ilex aquifolium)*

The European holly is the only evergreen deciduous tree in Central Europe and occurs in regions influenced by the Atlantic. It grows in mixed forests, but is also planted in parks and gardens. Humans should not consume its leaves or fruits, whereas birds like to feed on its fruits in winter. After the first frost holly berries lose their toxicity for birds and remain on the tree ready to eat. Hollies are protected.

Bilberry *(Vaccinium myrtillus)*

Bilberries are small shrubs which grow to no more than 60 cm high. Their roots, however, are almost double this length and grow up to one meter into the ground. The bilberry is typical of low-nutrient, acidic soils, covering large areas of such soil. Both humans and many forest dwellers highly appreciate its delicious blue fruits. In winter, wild game improves its menu with bilberry sprouts, but in the warmer seasons as well, bilberries are an important food source for the caterpillars of certain rare butterfly species.

Elderberry *(Sambucus sp.)*

There are over 30 elderberry species around the world, three of which grow in Germany. Black elder, often just called "elder" or "elderberry", is one of the most common shrubs in Central Europe, since it is hardy and undemanding. Elderberry occurs as a shrub or as a small tree and has been used for centuries in the field of natural healing, for dyeing textiles or as food. You should be careful when eating raw berries, whose toxic substances degrade only when heated. Elderberry juice made from these berries is a mucus-dissolving agent and has been used up to this day to treat colds, but also stomach troubles.

Wavy hair-grass
(Deschampsia flexuosa)

Wavy hair-grass belongs to the same grass family (true grasses) as our grains such as wheat, rye, corn and rice. However, people do not use it for nutritional purposes, but for decoration. Wavy hair-grass is found nearly everywhere in the world. Its roots can reach down almost 1 m in the ground. In nature grasses generally play an important role beyond feeding purposes: Their roots also keep the soil together and prevent wind or water, for example, from carrying it away (erosion protection).

Bush grass/Wood small-reed
(Calamagrostis epigejos)

If, due to external impacts (such as storms or clear cutting), trees must give way to large open spaces, it often does not take much time until, among other plants, bush grass occupies the area. Bush grass is a typical pioneer after clear cutting, and it also grows in sparse forests or on their edges. It can grow almost as tall as a man and spreads underground through runners. These runners grow so close together that they can prevent forest rejuvenation (i.e. the settlement of new plants).

Mosses

Mosses developed about 400 million years ago from the algae growing in the intertidal zones. There are approximately 16,000 species, which can be divided into the three classic groups hornworts, liverworts and bryophyta (mosses). You can find them in all climate zones from the desert to the Arctic. They are generally small, slowly growing plants. They are weak competitors and therefore occupy areas avoided by other plants, such as extremely cold, hot, dark, wet or low-nutrient locations. They are particularly sensitive to air or water pollution and climate change and quickly reveal changes in their habitat. Such plants are called bioindicators.

Ferns

Ferns are closely related to clubmosses *(Lycopodiaceae)* and horsetails *(Equisetum)*. They have been in existence for over 300 million years. In the Carboniferous tree-like ferns formed vast forests, whose remains can still be found today as coal. Beds of hard coal often show the imprints of ferns, clubmosses and horsetails that lived at that time. Most ferns have deeply cut fronds, some of which are pinnate. There are about 50 different fern species in Central Europe, most of which live in rather shady, humid forests. Dryopteridaceae ferns *(Dryopteris carthusiana)*, lady ferns *(Athyrium filix-femina)* and various wood ferns *(Dryopteris sp.)* are the most important domestic representatives. Bracken *(Pteridium aquilinum)* is found all over the world. Dried and processed, it is used as animal litter in doghouses, where it is very useful in fighting all kinds of stinging pests.

Tinder fungus
(Fomes fomentarius)

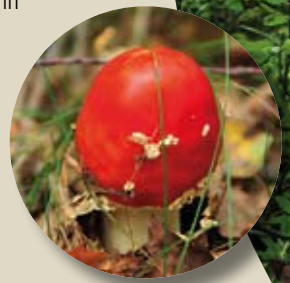
Even "Ötzi the Iceman", the mummy from the Copper Age found in a glacier, carried tinder with him – the center layer of the tinder fungus, which has been processed into a basic material for lighting fires from time immemorial. Tinder fungi have no stem and grow directly on deciduous woods and deadwood. They can grow to over 50 cm (20 in.) wide and 20 cm (8 in.) thick and are weak parasites, i.e. they take advantage of damage to their host plants in order to settle down. They cause wood rot in infested trees, which can even result in the tree's snapping.

Birch bolete *(Leccinum scabrum)*

As its name implies, the birch bolete is found near birch trees. The mycelium (root-like network of filaments) is very closely connected with the roots of the tree. This form of symbiosis, which is typical of the beneficial interrelation of many tree and mushroom species, is called mycorrhiza. The birch bolete provides the birch tree with nutrients and water. In exchange, it receives metabolites produced by the tree during photosynthesis which it cannot produce itself. The birch bolete is widespread and always welcome on the table – although responsible mushroom pickers just leave it where it is, because it is protected!

Fly agaric *(Amanita muscaria)*

Almost everyone is familiar with the strikingly red, sometimes also orange white-spotted fly agaric mushroom, which is considered to be a symbol of luck. In summer and autumn it grows in conifer and deciduous woodlands, preferably also near birch trees, with which it lives in symbiosis. In the past and in some cultures it was used as a psychoactive agent. Its dangerous poison is composed of various ingredients and affects the nervous system. It can trigger perception disorders and fits of rage and, in extreme cases, even be fatal. The fly agaric owes its name to its function as a natural insecticide – it was sliced and soaked in sugared milk, which absorbed the toxic substances. This cocktail meant a quick death to flies that drank it.



Red fox *(Vulpes vulpes)*

The red fox is Europe's most abundant wild dog. However, its hunt behaviour (stalk and jump) is catlike rather than doglike; "in cat style" it also prefers to be solitary instead of living in a pack. In a worldwide comparison, red foxes occupy the most widespread territory of all larger predators living in the wild. Red foxes are very flexible synanthropes and can often be encountered in town, but they also live in forests, grasslands or fields. In captivity they can live up to 14 years, whereas in the wild very many animals do not survive their first years of life (car accidents, diseases, hunting).

Wildcat *(Felis silvestris)*

Hikers have very little chance of discovering a wildcat in the Hochwald: It is one of the rarest and most timid inhabitants of our region. The destruction of its habitat has made the European Wildcat very rare in Germany, and in addition to that it was confused with feral cats and shot. It has managed to survive in certain scattered areas. These small populations are, however, threatened by inbreeding. This has led to attempts to reconnect their separate habitats.

Roe deer *(Capreolus capreolus)*

Roes are part of the deer family, of which they are the most abundant representatives in Central Europe. They doubtlessly belong to the winners of the change in the last few centuries: Due to their adaptability, they are comfortable in forests, park-like landscapes and open spaces and are, in comparison, hardly timid with humans. Animals which have few or no problems in adapting to man-made changes and benefit from them are called synanthropes. Since the natural enemies of roes (wolf, lynx) were largely displaced from Germany, their population grew significantly. This makes it necessary to hunt them to maintain the balance in nature and to ensure the natural rejuvenation of indigenous trees.

Pine marten *(Martes martes)*

Pine martens preferably live in deciduous or mixed forests and keep away from human settlements – contrary to their cousin, the stone marten *(Martes foina)*, which now and then cripples cars parked outside. Pine martens prefer to stay in trees and are excellent climbers, can jump up to four meters across and walk head-first down trunks. They were hunted due to their coveted fur.

Hazel dormouse

(Muscardinus avellanarius)

The nocturnal hazel dormouse lives in mixed forests and prefers hazels – hence its name. It is an excellent climber and spends most of its time in trees. This is in line with its penchant for spending the night in lofty heights, at least in frost-free periods: its basket nests are as big as a fist and hang approximately 2 m above the ground. However, it moves to a frost-proof nest, such as a burrow, to hibernate from November to April.

Microbats *(Microchiroptera)*

There are approximately 900 bat species around the world, 30 of them in Central Europe. Micro- and megabats are the only mammals with the ability to fly. Dracula's harmless cousins are nocturnal and find their way even in absolute darkness: microbats emit calls inaudible to human ears and in this way perfectly determine, by echolocation, not only their own position, but also that of their prey (insects). Despite this fact, they are not blind, but can see in black and white. Bats are highly social animals, which live and hunt in groups. They spend the day – and the period of hibernation – in caves and crevices, but also in attics. Especially in our region abandoned bunkers were converted from their original purpose and prepared in such a way that by now even some rare bat species have made their new homes there.

Chaffinch *(Fringilla coelebs)*

The chaffinch belongs to the family of finches, which includes approximately 200 species. It is the most common finch species in Central Europe, a very good singer and, as all songbirds, has extremely powerful lungs (in relation to its size) and an excellent sense of hearing. Depending on its habitat, its song varies in "regional dialects". Songbirds can move their lateral eyes in different directions independently from one another. So they keep an overview of everything happening around (but not directly behind) them without moving their heads. Finches are vegetarians and love seeds, fruits and buds.

Great tit *(Parus major)*

The great tit is the largest and most widespread of all tit species in Europe. Its high adaptability and learning ability have smoothed the way for it to live in various habitats: forests, open spaces, gardens and parks. Great tits feed on insects and spiders as well as on seeds and are also often guests at winter feeders provided by humans. Once great tits have established their territory, they will defend it year-round for their entire lives.

Woodpeckers (Picidae)

When the woods echo with drumrolls, then woodpeckers are often nearby. Germans often call them "carpenters of the woods", because they hammer on trees and deadwood in order to excavate nest cavities, to perform courtship and especially to look for food. Woodpeckers principally feed on insects, which they get out from under the bark of trees. Woodpeckers have particularly strong claws, so that they can hold onto the trees while hammering and climb up the trunk. They also have a special tail for balance. Some woodpecker species can hammer up to 20 times a second and over 10,000 times a day. Despite this extraordinary stress they don't get headaches, because their body is perfectly adapted to their way of living. In Central Europe you most frequently see woodpeckers of the dendropocus genus. The biggest forest-dwelling woodpecker is, however, the black woodpecker *(Dryocopus martius)*, whose characteristic rain call is a reliable weather forecast.

Eurasian jay *(Garrulus glandarius)*

When it feels in danger, the "guardian of the woods" (its German nickname) loudly takes action. Jays emit loud rasping screeches as alarm calls – warning also against humans. This member of the crow family is omnivorous, not disdaining the eggs and chicks of other species. However, it prefers acorns, beechnuts, nuts, chestnuts, etc., which it buries for food during winter. It therefore contributes to the spreading of tree species.

Pigeons (Columbidae)

Pigeons are found nearly everywhere in the world. These very adaptable birds live in very different habitats and have already become a nuisance in some cities, where their natural enemies are absent. There are over 300 pigeon species. Pigeons have a particularly small head and primarily feed on all kinds of plants and seeds. A special characteristic is their crop milk, which both females and males produce during the breeding period. It is a nutritious liquid, which pigeons develop in their two-part crop to feed their young. Both sexes also take turns incubating the eggs and brooding the young.

Northern goshawk *(Accipiter gentilis)*

The northern goshawk is a bird of prey, which feeds on small to medium-size birds and mammals. It is a sit-and-wait predator, i.e. it hides camouflaged and waits for prey in order to attack from a short distance. Thanks to its enormous agility even in a confined space, it can fly, swerve and catch its prey among the trees very quickly. It prefers to live in natural forests. Some goshawk pairs have also settled down in a few cities – among them Saarbrücken, by the way. As with all birds of prey, the vision of goshawks is highly acute and they can also distinguish colours.

Owls (Strigiformes)

Almost all owl species are crepuscular or nocturnal. Owls have a large wing span and special plumage, so that they can fly and attack their prey (small animals) silently. Due to their big eyes, they have a sense of depth perception and can estimate speeds. Owls are unable to move their eyes to the side, but must turn their head to look sideways – and can do so very well (reaching a total 270° field of view). Their large round heads, big eyes, fluffy plumage and often plump bodies make it easy to identify owls. Other birds often react aggressively to owls when they discover them in their hiding places during the day. This behaviour is called mobbing. From time immemorial owls have been playing an important role in religious beliefs, legends and tales and have been worshipped or dreaded, admired or persecuted.

Tawny owl *(Strix aluco)*

If the long drawn-out "hooo-hoo-hoo" of an owl is meant to create a scary atmosphere at night in a film, the call of the male tawny owl will often be played. In nature, you hear him often during courtship in October/November and then again from January until March, the peak of courtship. Once a tawny owl has found a suitable partner, the pair will stay together for the rest of their lives. They rigorously defend their territory and above all their young – the latter also against humans. Tawny owls are very adaptive and sometimes brood even in abandoned rabbit burrows, in towns and near human settlements. This middle-sized owl species occurs all over Europe; its distribution stretches to western Siberia and Iran.

Eurasian eagle owl *(Bubo bubo)*

Native to Eurasia and North Africa, the Eurasian eagle owl is the largest owl species in its range. Since it was formerly considered a pest, it was nearly eradicated in Central Europe almost a century ago. Thanks to breeding programmes and protective measures its reintroduction has been a success story. In Germany, it therefore no longer lives primarily in the Alps and low mountain ranges, but is gradually taking possession of the lowlands. In a soundless gliding flight eagle owls hunt small to medium-size mammals, but also other owl species or (sleeping) diurnal birds. Eagle owls are very agile and can catch up with fleeing birds even in dense forests. On the ground they are swift enough to catch a mouse even on foot.

Common lizard *(Zootoca vivipara)*

The common lizard is our smallest lizard species. Its light to dark brown body is often decorated with lines of fine light and dark spots. Contrary to the wall lizard and the sand lizard, which are likewise native to the Saarland and require warm to hot weather, common lizards can also be found in chilly wooded areas. They love to bask in the sun on deadwood at the edges of forests or in clear-cut areas. While other lizards lay eggs, common lizards give birth to live young, which break free from the tender egg membranes at birth (vivipara = viviparous). In early summer the portly bodies of pregnant females are particularly noticeable.

Slow worm *(Anguis fragilis)*

The limbless slow worms are not worms or snakes, but are closely related to lizards. In particular in spring and autumn you can see them sunbathe at the edges of forests or in clearings. Since they also enjoy sunning themselves on forest paths or streets, they are unfortunately often run over by cars or even crushed by hikers. They nevertheless feel comfortable in the vicinity of human settlements and even live in near-natural gardens. Slugs are among their favourite meals. In spring males sometimes fight fiercely over females. Just like the young of common lizard, their young hatch from thin egg membranes. In October many slow worms gather together in suitable hiding places to hibernate.

Common frog *(Rana temporaria)*

This widespread frog species is often found in deciduous and mixed forests and, apart from hibernation and the mating seasons, lives most of the time on land. In order to spawn, common frogs seek out a wide variety of bodies of water, such as ditches and ponds. During the mating season the males emit growl-like croaks and grasp females under their forelegs. Females often lay masses of egg clusters in March and April. They hibernate at the bottom of bodies of water, in the mud or under stones.

Common toad *(Bufo bufo)*

Common toads prefer forests as a summer habitat. In order to defend themselves, they secrete a toxic substance through their skin, which includes wart-like parotoid glands. During the first mild nights at the end of winter common toads make their way to their spawning waters. Since the number of migrating individuals is huge and they must often cross roads, many animals are unfortunately run over by cars. If possible, males seize females already during migration and make them carry them to the water. The black tadpoles show a striking swarming behaviour in the waters. Common toads hibernate in caves and crevices and they therefore often turn up in window wells in autumn.

Fire salamander
(Salamandra salamandra)

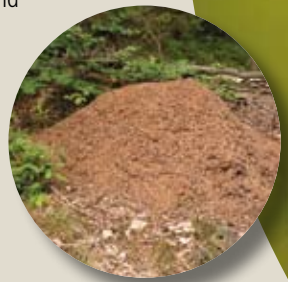
The black and yellow fire salamanders feel at home in humid deciduous forests in hilly or mountainous country. They are nocturnal and, in the daytime, retire to their hiding places under wood, dead leaves or in burrows and holes. In October they withdraw to frost-free places, but can also turn up during mild winter nights. Behind their eyes there are highly visible poison glands, which can extrude a toxic substance if the animal feels threatened. The females do not lay eggs, but in spring deposit larvae in quiet areas of clear creeks.

Dung beetle
(Anoplotrupes stercorosus)

On forest paths you encounter these shimmering black or metallic blue beetles very often. They are magically attracted by odours such as horse dung or dead slugs. If their search for such scented objects is successful, they dig tunnels with lateral expansions in the soil. They fill these tunnels with the dung, on which its larvae will later feed.

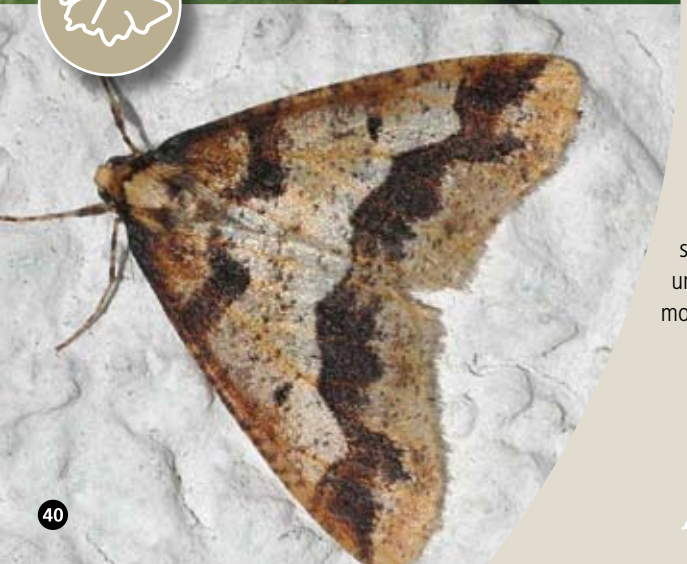
Wood ant *(Formica sp.)*

In sunny, protected places on the edges of woods (above all coniferous forests), it is impossible to overlook the mounds, which sometimes measure several meters in height. The surface of the mounds is for the most part covered by spruce needles. The underground section of the nest extends almost the same length into the ground. It is a multi-chamber nest, where the brood is raised by worker ants. For defence purposes, worker ants bend their abdomens forward and spray formic acid. In spring/summer, young queen ants and the winged males swarm to take their nuptial flight. Wood ants are considered useful, since they catch large numbers of insects.



Comma *(Polygonia c-album)*

The orange top side of its wings is a shining eye-catcher, but when it folds its wings, the comma becomes invisible. Characteristic marks are the white, comma-shaped C on the underside of its wings (hence its name) and their distinctively ragged edges. The pretty butterfly, which often occurs on the edges of forests or in clearings, is a true connoisseur: In autumn the comma is magically attracted by overripe windfall in orchards and meadow orchards.



Winter moths

These moths are active at an unusual time of the year: in November and December. At night the males fly toward lights and settle in their vicinity. During the day you therefore often see them remain calmly on house walls which were lit at night. The wings of females are only tiny stumps, so that they cannot fly. They climb up trees. In spring their caterpillars can cause enormous damage to forest and fruit trees. There are several species, the most common being the winter moth *(Operophtera brumata)*, the mottled umber *(Erannis defoliaria)* and the scarce umber (*Agriopis aurantiaria)*. In woods winter moths often live among the tortrix moth *(Tortrix viridana)*.

Common brimstone *(Gonepteryx rhamni)*

Thanks to an anti-freeze agent in its blood, the common brimstone can overwinter unscathed even in the snow on branches or dry leaves. In March it is one of the first heralds of spring, flying at the edges of forests or in gardens. In spring its caterpillars feed on the young leaves of alder buckthorns. The common brimstone estivates in the hottest period of the year. It can live as long as 11 months and is therefore "Methuselah" among domestic butterflies. Females in flight can be confused with cabbage butterflies.

Speckled wood *(Pararge aegeria)*

Their territory is where the sunlight penetrates through gaps in the canopy of trees and shines on the ground: male speckled woods occupy small clearings and launch quick airborne assaults on any intruder – including falling leaves. However, when a female comes his way, the speckled wood performs a courtship display hopefully and follows her into the underbrush. The pattern of dark and lightcoloured spots on their wings is good camouflage in the interplay between light and shade.

Wood cricket *(Nemobius sylvestris)*

On warm August, September and October days, in particular on sunny spots along the forest paths in the Arboretum, you can hear a purring song, reminiscent of Morse signals. It is created when male wood crickets rub their short forewings against each other. It is extremely difficult to locate the animals of 1 cm in length. It takes a lot of patience to see them finally scurry across crushed leaves. They can very well run and jump and hide cleverly among the dry leaves on the soil. The females' shade of brown is a bit lighter than that of their male counterparts. The females' ovipositor, an organ used for laying eggs, is about 5 mm long.

Hoverfly (Syrphidae)

Hoverflies can – as their name suggests – "hover" in the air, flapping their wings at lightning speed. They imitate combative insects such as bees, bumblebees and wasps, which guarantees them good protection from many predators. This form of imitation is called mimicry. Hoverflies are frequently found on thistles and umbelliferous plants in flower-rich forest clearings. The larvae of some hoverfly species are useful devourers of aphids, other live in the mud or bore into rotten wood.

Sheetweb weavers (Linyphiidae)

Sheetweb weavers make horizontal sheet webs, which you can often discover in the woods in the tufts of wavy hair-grass or in the branches of trees and bushes. They are particularly striking when covered by morning dew. Inconspicuous threads lead upward from the web. Insects that fly into these threads fall down onto the web. The spider lurks under the web and grasps its prey through the web. Sheetweb weavers include approximately 400 hardly distinguishable species and are therefore the most species-rich spider family in Central Europe.

Sheep Tick *(Ixodes ricinus)*

Ticks love weedy, shrubby and damp woods. They wait on grasses and ferns for passing animals to pick them up. They then creep to a suitable place of the body (warm, moist and thin areas of skin) and insert the front part of their body into the skin. Their hosts are creatures such as lizards, mice and men. A female larval, nymph-stage and adult tick must suck blood for several days in each of these stages before it can lay up to 3,000 eggs. Ticks can, however, also fast for over a year. They are feared as carriers of bacteria causing lyme disease and of viruses causing tick-borne encephalitis (TBE). If you are bitten by a tick, the best way to protect yourself from these pathogens is to take the ticks off with tweezers within 24 hours without pressing the contents of their intestines into the wound.

Following the Celts' footsteps

Two mighty Celtic warriors created by Welsh artist David Lloyd stand guard at the entrance of the Arboretum. In terms of appearance and theme they fit into another project: the Celtic sculpture trail Cerda & Celtoi, which links the Academy and the huge Celtic circular wall of Otzenhausen, the so-called Hunnenring.

Our region was inhabited by the Treveri tribe, who were renowned not only for the outstanding quality of the weapons and tools they forged. In addition, large stud farms, which had been operated in the territory of the Treveri until the end of the Roman imperial era, impressively underline their reputation as horse breeders and fearless horsemen. What is more, the Treveri constructed and maintained the huge circular wall until shortly before our calendar began. Today this wall is one of Germany's largest Celtic monuments, and there is some evidence that it had been the seat of powerful Celtic princes.

Many of the myths circulating today regarding the "typically Celtic" understanding of nature and religion, however, belong to the realms of fantasy. But it is certain that natural objects including trees played an important role in the Celts' religious beliefs. Described as deeply religious, the Celts often held their ceremonies in sacred places such as groves (mostly oak groves, "Drunemeton") or rivers and springs, which they considered to be

inhabited by spirits (Lucan). The mistletoe and the oak associated with this plant played a key role. There are likewise indications that other trees and bushes such as beeches, elms, ashes, yews and hazels were (sometimes locally) worshipped. Other forest dwellers such as wild boar and stags were assigned to certain gods.

Apart from their religious significance, woods were also of enormous economic importance for the Celts. Forests provided the wood for the construction of buildings, ships or tools. Enormous herds of pigs were kept in oak woods and fed not only the local population: their meat was exported as far as today's Italy.

The construction of huge fortifications such as the Hunnenring and the extraction and working of iron on location required enormous quantities of wood, which was taken from local forests. We should therefore not succumb to the romantic idea that the surroundings of the Hunnenring were as charming and wooded in the Celtic era as they are today.

The woods had rather fallen victim to economic pursuits and have been recovering only over the course of time. It is, however, impossible for archaeologists to define exactly the extent of deforestation around the circular wall.

In Otzenhausen today you can discover one of the loveliest forests of Saarland, which is populated by plants and animals beyond the ones described in this brochure. You can also take a step back in time when thousands of years ago this country was the heartland of one of the greatest Celtic tribes and boasted one of the largest strongholds of the Celtic world – the Hunnenring. Today you will still find a reflection of that great era.

The European Academy of Otzenhausen offers three-hour-guided tours along the sculpture trail to the Hunnenring (in English, German or French), if you wish including a "culinary programme". Just give us a call.

SKULPTURENWEG
CERDA CELTOI

"Encouraging sustainability" – Book series and educational offer on the future of the Earth

Forests fulfil numerous functions in the Earth system and significantly help preserve our basis for life. However, menacing catchwords such as climate change, scarcity of resources and species extinction have become omnipresent and indicate that we humans are changing the Earth system so drastically that we are depriving ourselves of that basis.

For years scientific studies have been underlining our exorbitant consumption of resources and energy and the growing and threatening climate and biospheric changes. These facts have insufficiently penetrated public awareness so far. The educational initiative "Encouraging Sustainability", sponsored and organised by the two foundations Forum für Verantwortung, ASKO EUROPA-STIFTUNG and the European Academy of Otzenhausen, aims to intensify public discourse and to show options for action with a view to shaping the future in a positive way.

In 13 books on central themes related to sustainability (English version available at Haus Publishing London), renowned scientists present the current state of research in a language that can be understood by anyone. The Wuppertal Institute for Climate, Environment and Energy developed six instructional modules with reference to these books, which provide qualified teaching material for educational programmes.

In order to raise awareness of sustainability issues amongst individuals and groups of civil society, to stimulate their readiness to support sustainable development and to show options for action with a view to changing our lifestyles and consumption patterns, the "Encouraging Sustainability" initiative offers varied educational programmes organised at the European Academy of Otzenhausen and based on the books and teaching materials. The educational offers are aimed at all persons who are ready to assume responsibility in society, who want to become informed and commit themselves. They include all age groups from young people to senior citizens.

Detailed information (available in German and English):
www.mut-zur-nachhaltigkeit.de.

The Arboretum Europaeum and the surrounding woods can be included in seminars on sustainable development. Guided tours can be organised on request. Don't hesitate to contact us.

Europäische Akademie Otzenhausen

Forum für Verantwortung Stiftung

ASKO EUROPA STIFTUNG

List of photos

Europeam Academy of Otzenhausen
page 4 (portrait)
page 6 (creation of Arboretum)
page 9 (forest path)
page 11 (wood, new life)
page 46

Valeri Braun
page 6 (sweet chestnut)
page 7 (common yew)
page 11 (maple)
page 12 (new life, tremella)
page 14 (European mountain ash, crabapple)
page 15 (oak, acorns)
page 16 (alder buckthorn, new European beech)
page 17 (maple in autumn)
page 19 (ginkgo, wollemi pine)
page 23 (bilberry, elderberry)
page 25 (mosses)
page 26 (tinder fungus)
page 27 (small fly agaric)
page 33 (northern goshawk)

SaarForst Landesbetrieb
page 11 (old oak)
page 32 (woodpeckers)

Hannes Petrischak/SusImages GmbH
page 3 (European beech)
page 7 (sweet chestnut)
page 12 (mosses)
page 13 (wood)
page 15 (sweet chestnuts)
page 16 (beechnuts)
page 21 (spruce branch, spruce cones)
page 22 (common yew, holly)
page 23 (bilberries)
page 27 (birch bolete)
page 28 (red fox)
page 30 (nest of a hazel dormouse)
page 35 (Eurasian eagle owl)
page 36 (common lizard, slow worm)
page 37 (common frog, spawn, common toads)
page 38 (fire salamanders)
page 39 (dung beetle)
page 40 (comma, winter moths)
page 41 (common brimstone, speckled wood)
page 42 (wood cricket, hoverfly)
page 43 (sheetweb weaver)

Klaus Aulitzky
page 1 (front page)
page 2 (detail gate)
page 5 (authors)
page 6/7 (5 details)
page 8 (wood)
page 24 (wavy hair-grass)
page 25 (ferns)
page 39 (anthill)
page 44 (sculptures)

Freelance photographs
Rainer Koch (www.naturfotografen-forum.de): page 29 (pine marten)
Dieter Bark: page 30 (hazel dormouse)
Marko König: page 30 (microbat)

Archive www.fotolia.de
Uwe Wittbrock: page 8 (foxglove)
Daniel Schoenen: page 10 (wood)
Uwe Wittbrock: page 11 (trunks, spruce seedling)
Bea Tuerk: page 17 (birch catkins)
Soja Andrzei: page 17 (birch)
Roman Ivaschenko: page 18 (lime)
Liana M.: page 18 (goat willow)
Michael Bauer: page 20 (pine branch)
Andreas F.: page 20 (pine wood)
Uwe Wittbrock: page 21 (spruce needles)
Photonz: page 21 (spruce trunk)
Rostlina: page 22 (fruits of the common yew)
Marek Mierzejewski: page 27 (fly agarics)
Jens Klingebiel: page 28 (red fox in winter)
Eder v. Ravenstein: page 29 (roe deer)
Nicolas Larento: page 29 (roebuck)
Arokhy: page 31 (female chaffinch, great tit)
K. U. Häßler: page 31 (chaffinch)
Lothi: page 32 (Eurasian jay)
Reisbegeleider: page 33 (pigeon)
Peter Grell: page 34 (long-eared owl)
Obzession: page 34 (barn owl)
Martina Berg: page 35 (tawny owl)
Annett Goebel: page 39 (wood ant)
Scarlett 61: page 40 (caterpillar)
Klaus Rose: page 43 (sheep tick)

Archive www.fotonatur.de
Holger Duty: page 17 (maple)
Tanja Askani: page 34 (young owls)
Hans-Wilhelm Grömping: page 36 (common lizard)

Archiv ewww.wikipedia.org*
Rasbak: page 14 (mountain ash flowers)
Nicolai Schäfer: page 20 (fir)
Jürgen Howaldt: page 22 (holly fruits)
Christian Fischer: page 24 (bush grass/wood small-reed)
Stefan Reicheneder: page 28 (wildcat)
** licensed under CreativeCommons-Lizenz by-sa-2.0 / 3.0*

Community of Nonnweiler
page 8 (Celtic circular wall "Hunnenring")
page 45 (aerial view of the Hunnenring and the lake)

Feld für EAN-Code

MIX
Papier aus verantwortungsvollen Quellen
FSC® C013945
www.fsc.org

Europäische Akademie Otzenhausen

Contact:
Europäische Akademie Otzenhausen gGmbH
Europahausstraße 35
66620 Nonnweiler
Tel. 06873 662-445
www.eao-otzenhausen.de

Partners:

FORUM EUROPA

Forum für Verantwortung Stiftung

SaarForst Landesbetrieb