



László Zvekanovics (1958-2011) environmental and work safety engineer, mechanical engineer, the Head of Security Technology of DDC Group. As an employee of DDC he was involved in many areas of operation in the past thirty years. He contributed to the introduction of state-of-the-art, innovative security technology and environmental control systems as the Head of Environmental Protection, and later as the Head of Security Technology. These systems made the environmentally conscious operation of the Beremend and the Vác plants possible. During his plant visits, he held lectures in a very friendly, understandable and enthusiastic way, which helped his audience understand the technological processes of the cement industry. As editor, he supervised the compilation of those tender documents with which DDC was awarded the Environmental Savings Award by the Association of Environmentally Conscious Corporate Management (KÖVET) in 2006.



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**Chief Editors:**

**János Szarkándi, President and CEO**  
**Mária Petrillák, Head of Communications**

**Editing, professional counseling, graphic design, printing:**

**Extrabold Kft.**

**The content of this publication was proof-read in terms of forestry and biology by:**  
**Gábor Tímár, PhD, forest engineer**

**Photos:**

**Arcus Photo Studio, Ipoly Erdő Plc., HeidelbergCement Group, Istockphoto, Szabolcs Csizsár, Dr. Levente Ábrahám, Gábor Vasuta**

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**Published in 2011**

# The future is in our hands

Responsible thoughts on biodiversity





**We dedicate our publication to the memory of the late Director of Security Technology of DDC Group, Mr. László Zvekanovics.**



## Dear Reader,

Humanity can thank the forests for a great deal. Forests provide us with natural resources every day: clean air, food, herbs, paper, firewood and timber for construction. All of this has been available to us for ages. Moreover, they give shelter to most of the countless plant and animal species in our diverse world, so they are perhaps the most important natural resource for us to protect.

Similar to our natural resources, industrial culture, which also relies on the forests, is just as diverse and indispensable to us. The domestic forests now covering more than 20 percent of Hungary's territory, have been expanding as a result of adopting the policy of sustainable modern forestry. Furthermore, the yield of fell is increasing by 3 million cubic metres a year, thanks to balanced wood cutting.

DDC Group was focusing on sustaining the diversity of nature in 2010 when it published a brochure dedicated to the International Year of Biodiversity. This year we continue to issue a range of our publications, with a brochure related to the International Year of Forests.

The plants of DDC Group produce cement by using the limestone found in Mounts Szársomlyó and Naszály. Cement has always been a key element in building our civilization and creating our living quarters and neighborhoods. We quarry in our mines by using technology that was carefully designed with consideration given to environmental impact. Our goal is to sustain the conditions of existence for the natural world around us, so our colleagues continuously work on the restoration and reforestation of the quarried areas.

We depend on forests and wood in many of aspects of our lives. Let us think of all of those medicines, books, furniture and many foods that are partly or wholly made from the treasures found in the forests. We jeopardize not only our irreplaceable natural resources, but our own lives if we don't use all of these treasures given to us carefully, with responsibility, and with awareness of their importance.

We would like to draw our readers attention to this connection, and also emphasize our philosophy and policy that are in harmony with the above mentioned.

I wish you a pleasant journey in the forest of photos and thoughts you will find in the following pages!

City of Vác, October 2011

A handwritten signature in black ink, appearing to read 'János Szarkándi'.

János Szarkándi  
President and CEO



How does the process take place?

# **Photosynthesis a continuous miracle**



**Plants, including trees, produce oxygen indispensable to us as part of their basic function. All of the species of Earth depend on this process for survival.**

Photosynthesis is an essential process through which light or solar energy is converted to chemical energy. For this to take place, carbon dioxide, water and sunlight are required. Plants absorb carbon dioxide through their stomas found on their leaves, and through these same pores they release oxygen as a result of the process. Water is absorbed from the ground by thin root-branches, and is transported up to the leaves through specialized plant cells. Carbon dioxide and water absorbed are then converted to sugar (glucose), oxygen and water.

The valuable energy from sunlight is absorbed by a pigment, determining the green colors of plants. This substance can be found in one of the cell organoids, a green plastid called chloroplast which is the site of photosynthesis.

Photosynthesis is a two-part process: a light phase and a dark phase. In the light phase, light energy is converted to chemical energy. With the help of the released energy, sugar is produced from carbon dioxide during the dark phase, where light is not needed. This sugar is the basic element necessary for the life and proper functioning of plants. As part of this process oxygen is released into the air: this way plants contribute to the usability of air for animals and people.

Oxygen is needed to burn nutrients and thus to release energy for both plants and animals.



## **Did you know that**

the oxygen level of the atmosphere was as high as 38 percent approximately ten thousand years ago?

Due to forced deforestation this value now approximates 21 percent, which can further decrease to 17 percent during times of smog in our cities.



# Annual rings

## What life did the tree have, when did it live and for how long?

The cross-section of the trunk of a tree is basically the diary of its life. To those who are experts in reading it, the annual rings tell everything about what happened to it. The trunk cross-section gives information about the tree's age, what pests and illnesses harmed it, and whether all necessary nutrients (minerals, water, sunlight) were available to it for healthy development, so that it could reach its maximum growth potential. Let us take a closer look at the structure and the inner processes taking place in a tree trunk.

In the trunk of a tree there are very narrow pipes that absorb and transport the nutrients. When the tree begins to grow again in the spring after the long winter months, wider pipes are formed. During less rainy periods and when the tree gets prepared for its winter resting time, new narrow pipes form. The part of the cross section of the tree trunk which contains the wide pipes appears light, while that part with narrow pipes looks darker. The lighter part, which reflects the growing phase in spring is also thicker. The darker part provides structural support for the tree. These two parts together constitute one annual ring and the plant grows a new one every year. A narrow ring implies unfavorable circumstances for growing while a thicker one shows that that year, life conditions were good for the tree.

The two kinds of wood layers visible in the cross-section of a tree trunk are the younger, mostly lighter outer layer and the older, darker inner layer. The outer part is called sapwood and the inner one is called heartwood or duramen. The lighter part is where the principal functions of the tree take place. As the tree grows, heartwood loses its flexibility, its pipes get clogged and are not capable of conducting water anymore. This thicker part which is more resistant to pests and diseases provides the tree's firmness. Heartwood is the more valuable section when it comes to human use.

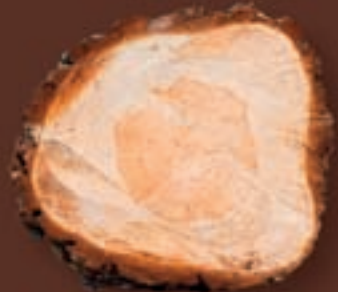




Hornbeam



Larch-tree



European Black Pine



Oak-tree

## Did you know that

if we stretched our lungs fully out, they would cover an entire tennis court?





# Our National Parks

We are preserving the ecosystems of the national parks for our present and the future generations, and that is why land use is strictly restricted within them. The parks' mission is not only environmental protection, but they also offer unparalleled opportunities for free time activities, scientific research and educational work.

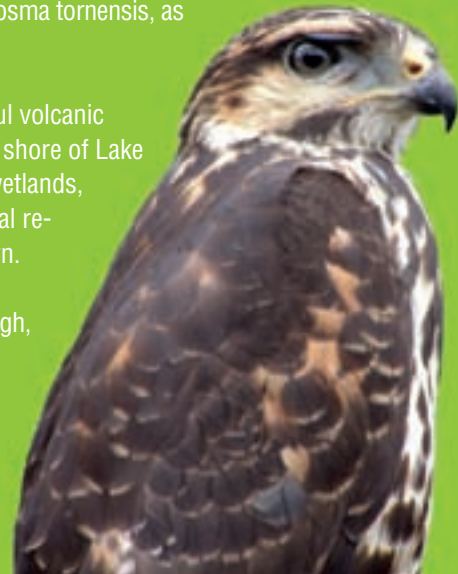
National Park	Founded	Area (km <sup>2</sup> )	Headquarters
Órség National Park	2002	cca. 440	Óriszentpéter
Balaton Uplands National Park	1997	569,95	Csopak
Danube-Ipoly National Park	1997	603,14	Budapest
Körös-Maros National Park	1997	501,34	Szarvas
Danube-Dráva National Park	1996	494,79	Pécs
Fertő-Hanság National Park	1991	235,88	Sarród
Aggtelek National Park	1985	198,92	Jósvafő
Bükk National Park	1976	402,63	Eger
Kiskunság National Park	1974	567,61	Kecskemét
Hortobágy National Park	1973	805,49	Debrecen



**Aggtelek National Park** It is the first national park in Hungary established to protect geological resources such as karst surface features and the famous dripstone caves. Significantly valuable plant and animal species have their habitat in its territory, for example *Onosma tornensis*, as well as the wolf and lynx.

**Balaton Uplands National Park** Strikingly beautiful volcanic cones and mountains along the Badacsony-Szigliget line near the shore of Lake Balaton can be found here. The area's waterbird population, the wetlands, and the basalt mountains in the Káli Basin are all significant natural resources. The lavender field on Tihany Peninsula is also well-known.

**Bükk National Park** Its plateau, more than 800 meters high, is surrounded by steep rock cliffs (e.g. Bél Stone, Pes Stone, Tar Stone, Red Stone) and offers a breathtaking view. In the heart of the plateau 850 caves are hidden, including the deepest in Hungary, the István-lápai cave which is 254 meters deep and 6700 meters long.





National parks  
in Hungary



**Danube Dráva National Park** This national park was previously planned to be established in cooperation with Yugoslavia. Europe's largest area of connecting floodplain forests, Gemenc can be found here, which is a treasure trove of domestic animal species. It is also the habitat of many rare plant species such as Hungarian Hawthorn, Royal Fern and *Myricaria germanica*.

**Danube Ipoly National Park** This national park is among the richest in plant and animal species, many of which have their only habitat here. The highest point of the park is the 938-meter mount called Csóványos. Its famous gorges, Holdvilág rift, Sala-basina rift, and Rám ravine were formed by erosion.

**Fertő Hanság National Park** Lake Fertő is the third largest lake in Central Europe, and the westernmost representative of continental flatland salt waters. It is significantly rich in water species, and was designated a biosphere reserve in 1979.

**Hortobágy National Park** Hortobágy Park is Hungary's first national park. It was elected to be part of the World Cultural and Natural Heritage sites in 1999. Hortobágy is Central Europe's largest steppe, the whole territory of the park is a biosphere reserve and many of its water species are internationally protected.

**Kiskunság National Park** Its most valuable regions are the alkaline deserts in the Danube valley, its lakes, the sand-hills in the sand ridge between the Danube and the river Tisza, its moors, the dead channels and floodplain forests of the Downer-Tisza Region, the Bácska sand-hills, as well as the loess banks of the Danube-valley. Two-thirds of its territory was designated a biosphere reserve in 1979.

**Körös Maros National Park** One of this national park's highest priorities is to protect a population of plants that can only be found within its territory, namely that of *Adonis x hybrida* and *Salvia nutans*. Several rare animal species' habitat can also be found in this national park: *Gortyna borelii* butterflies, *Hygromia kovacsí*, *Pilemia tigrina*, *Catopta thrips* and bustard, a robust population of which has its habitat in the northern part of Békés county.

**Órség National Park** Thanks to its special alpine climate, the mosaic-like landscape, many habitats, and its careful long-running farming system, many species live within the boundaries of this national park. Some of the most valuable habitats are the bog-moss moors and pine-tree forests. Conservation of the Muraköz breed horse which is at risk of becoming extinct is also among the tasks of the Órség National Park.

A biosphere reserve is an ecological area designated for conserving within the framework of UNESCO Programme on Man and the Biosphere (MAB). Within the Statutory Framework of the World Network of Biosphere Reserves, biosphere reserves are established to promote and demonstrate a balanced relationship between humans and the biosphere. In order that these reserves can represent ecological variety, they can cover both land, waterside and sea area ecosystems. Biosphere reserves are organized into three zones: the outmost buffer zone is where farming and other activities are organized by taking into consideration the area's geographical conditions and capacities. The transition area is where human presence is allowed but within strict constraints. The innermost and most valuable zone is the core area of the reserve where no farming or other human activities are allowed. This is the place for conservation of the natural resources. The biosphere reserves are intended to fulfil the function of conservation of natural resources and the bio- and genetic diversity of landscapes and species. They also ensure sustainable development and provide support for research and education related to conservation and development.

# Treasures near

The plants of Duna-Dráva Cement Ltd. can be found in the territory of national parks exceptionally rich in natural resources. That is why it is highly important to the company to apply cutting edge, innovative and environmentally friendly technology in production.

## The Vác Forestry

The annual yield of tree felling by the Forestry is 20,000 cubic metres. They also plant saplings in place of the trees that were cut. The most valuable growing stock can be found on the northern part of Naszály mount where large clear-cuts are performed but the renewal system is run handling the forest as a permanent one which means the forests are renewed in only small areas ( leaks ) at a time. Bilging a leak is similar to when an old tree with large foliage falls, creating living space for smaller,



newer trees. This is done by cutting four to five trees among a one- or two-level stock of the same age. This leak allows light to get to the ground while the saplings growing from the acorn fallen on the ground can get more water.

New leaks are bilged by the foresters every five years, and thus they get a forest structure nearest the natural one which is multi-level and of varying age. Creating the Gyada Natural Trail in 2005 was the first significant ecotouristic development of the forestry. Later they established a centre for tourists in Katalinpuszta, an ornithological trail, and another trail for kindergarteners and preschoolers called 'Be a little forester yourself!'

## Szársomlyó Conservation Area near the town of Beremend

The greatest mount of Hungary's southernmost mountain range, Villány, is called Szársomlyó. Szár means bald in old Hungarian. Having a rocky surface, Hungarian folklore tradition calls it a mount plowed by the devil. Almost the whole area of Szársomlyó is under protection and its ecology is of exceptional value.

Both the northern and the southern parts of this steep mountain have their special and very different microclimates. Precipitation, the amount of sunlight, temperature and the strength of the wind are all significantly different on its two sides. On its peak are cracks formed during the formation of mountains, and the thermal waters gushing out of the cracks like geysers formed two hydrothermal funnels (vertical shaft caverns). On the southern area of the mount which has a sub-mediterranean climate, botanical rarities have their habitat e.g. the Hungarian *Vincetoxicum pannonicum*. The northern part is covered with a forest of Silver limes, Hornbeams and Oak trees. The undergrowth consists of the rare *Ruscus hypoglossum*, *Ruscus aculeatus* and *Helleborus odoratus*, whose flowers are green or yellow-green. The most valuable treasure is the increasingly protected *Colchicum hungaricum* Janka which lives on the rocky meadows of the mount. The mediterranean characteristics are clearly expressed in the animal life of Szársomlyó as well. We may often encounter *Gnaptor spinimanus*, *Eresus cinnabarinus* that have red abdomens, and the rare domestic reptile, the increasingly protected Caspian whipsnake. The region's rare bird is the Rock Bunting.

### The Villány Church Hill Conservation Area

In the yard of the stone quarry on the hill formerly known as Limestone Hill (Mészhegy), fossils of exceptional petrographic value, from the Jurassic and Pliocene periods can be found on the rock wall.



On the Church Hill, geological excavations have been conducted since 1910, resulting in the discovery of fossils of twenty-seven animal species, including those of wild horses and wolves from North America.

### Areas along the river Dráva

The geological landscape of this area has been formed by the rivers Danube and Drava. Almost the whole territory of the Danube-Drava National Park can be found on the former and present floodplains of these two rivers. *Myricaria germanica*, which is a relative of *Tamarix*, can only be found in Hungary along the Drava river. The sole habitats of *Anemone trifolia*, *Dentaria trifolia*, and *Lamium orvala* are found only on the Órtilos hill country in our homeland. The diverse animal stock of this territory consists of nearly 4500 species. The habitat of the only robust population of the insect *Platyphylax frauenfeldi* (Trichoptera) can be found on the floodplains of the Drava, which means that this river still has clean waters. This insect is increasingly protected in our country. Our fishes called *Hucho hucho*, *Zingel zingel*, *Thymallus thymallus*, and *Acipenser nudiventris* are also increasingly protected.

# The king of the Hungarian forests

The red deer: according to certain estimations, its population numbers approximately one million in Europe. The natural conditions of the Carpathian basin are so favorable for this species that its stock in Hungary has become world famous. The deer is one of the mythical animals of the Hungarians, which had an active role in the belief system of our ancestors. It was the deer ( the miraculous deer ) that led the Hungarians from the area called Etelköz (now in Ukraine) to as far as the Carpathian Basin, finding here a rich and protected land in which to settle down.

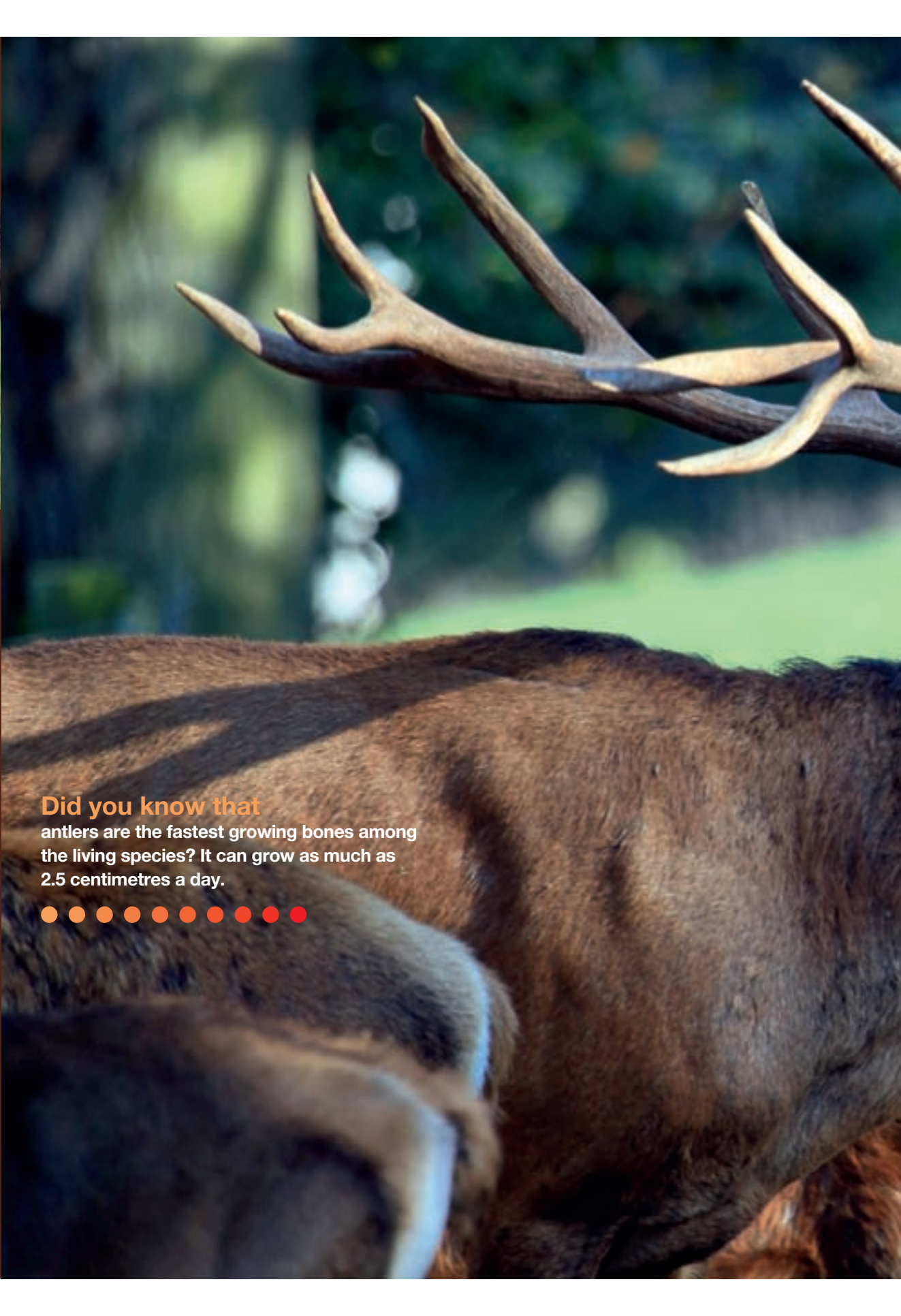
## Its ornament is its fate



Stags estimate each other's power by listening to each other's voice and sizing up their horns, therefore only stags of the same strength fight one another. The prongs of the antlers work like shock-absorbers, preventing the animal from getting injured seriously. As stags grow and their antlers get stronger and increasingly beautiful, they become a more valuable prize in the eyes of hunters.

**The fully grown stag's antler develops in 120-150 days, growing many branches, and reaching a weight of more than 12 kilos. Each antler grows from an attachment point on the skull called a pedicle.**

While an antler is growing, it is covered with skin, which supplies oxygen and nutrients to the growing bone. We call this skin velvet because it has a velvety feel to it. Stags are careful not to hurt the velvet and bone as these are very sensitive to injury; even touching tree branches is avoided. Around the fifth month of growth, the antler achieves its full size, and the velvet dies gradually. The stag keeps rubbing his antlers against young trees and bushes, and also stabs the ground to get rid of the velvet. A careful observer can see the remains of this velvety skin and blood in it on these plants. After the breeding period, due to the changes in the stag's hormone system, the antlers fall off and the remaining wound heals quickly. In the first year it is only the two brow antlers that grow and that is why we call a stag calf *spitty* or *broachy* in Hungarian. Later the stag will be called *double*, *sixfold*, *eightfold*, or *tenfold* according to the number of branches his antlers have. Those antlers are called *even* where the number of branches are the same on both sides. If the number of branches is different on the two antlers, then they are called *odd*, and we count that antler that has more branches as two or double. Accordingly, those antlers are called *odd twelve* where one of the antlers has six and the other has, let us say, only four branches. Those branches that are on the top constitute the part called *crown*. The endings of a good quality antler are polished, and they have a yellowish white or ivory color, while lesser quality antlers are off-white or grey. The quality of an antler is not determined by the number of branches, it is its size and weight that matter most. In case there are no branches beside the brow antlers, or there is no crown on the top, the stag becomes very dangerous as its stabbing can even be lethal. Such stags are called *murderers* in many places. Very rarely, a stag doesn't produce any antlers and they are called *antlerless deer*. Another rarity is when a female deer has antlers.



**Did you know that**

antlers are the fastest growing bones among the living species? It can grow as much as 2.5 centimetres a day.









# Less carbon dioxide please!

**Conservation of forest habitats, as well as their ecologies is considered especially important in the environmental protection policies of HeidelbergCement, one of DDC's main owners.**

In our industrialized world, human activities go hand in hand with increasingly high carbon dioxide emission. Carbon dioxide is absorbed largely by the trees in a forest, and they produce life giving oxygen in exchange. Due to deforestation, fewer and fewer trees are available to process carbon dioxide, therefore it is essentially important for all energy consuming industries such as the cement industry to do their best to lessen the levels of greenhouse gases. HeidelbergCement is a pioneer in this effort: the level of its net carbon dioxide emissions has decreased by nearly 20 percent in the past twenty years. Approximately 3-4 percent of the carbon-dioxide emitted by human activities is a by-product of cement plants. Only one-third of this level comes from burning fuel, while the remaining two-thirds are the result of processing of limestone used as raw material. DDC's goal is to decrease the controllable proportion, the one-third resulting from the burning of fuel. In order to make this happen, alternative fuels and renewable energy sources are used for production, which are regarded as waste by other industries. They prove excellent energy sources, resulting in significant fossil fuel savings.

During cement production limestone and clay are mixed and then transported to the raw mill, and later to the heat-exchanger (tower) where the raw meal, which was previously preheated and then dried, will be cooked into clinker in the kiln at a temperature of 1450°C. After it cools, the clinker is ground into fine powder. At this stage, complementary materials are added to the clinker to supplement it. By using complementary ingredients in the process, fewer raw materials, and less fuel and electric power are needed to produce the same amount of cement, resulting in a reduction in the amount of carbon dioxide emitted.



## Waste management

DDC, together with HeidelbergCement, is working on increasing the efficiency of its energy use and on decreasing the amount of hazardous waste emissions from its production process. By converting waste and other industrial by-products into energy, DDC uses fewer natural energy sources. Moreover, DDC's plants also contribute to the neutralization of by-products from other industries and communal waste.



### Did you know that

by using one kWh of solar or wind energy, we save the emission of one kilogram of carbon-dioxide?



# Tree types in our forests

As for plant geography, Hungary belongs to the zone of deciduous forests and the Central-European flora zone. The prevalent vegetation is Pannonicum, but there are also other regional vegetations such as that of the Carpathian, Alpine and West-Balkan. Accordingly, the ecology of our forests is very diverse too.

## Did you know that

former wet lands and most parts of our Great Plains (Alföld) that are still sometimes flooded with internal water used to be covered, mostly with oak tree forests?





The type of forest covering a certain area is significantly determined by its elevation above sea level. On hilly lands and at the foot of mountains above 250 meters it is mostly oak tree types that are found, which are then replaced by hornbeams above 400 meters. Above 600 meters, beech trees become more prevalent in the forests. Our natural pine forests cover very small areas. Alongside the rivers, gallery forests can be found, the main types of which are willow trees and poplars at lower heights, and further away from the rivers, oak and ash-trees; along the brooks, alder-trees constitute our forests. Lands without an outlet and lands with stagnant waters are covered with fenwood, and their main trees are alder and ash-trees. The given height values don't represent sharp borders, as other environmental factors also play a role in the development of plant communities e.g. the amount of water available to a certain land, the area's steepness, its orientation (cardinal point), as well as its petrographical characteristics and soil properties. These natural conditions could result in the development of forests of entirely different structure and composition from the above mentioned. These are, for example, the steep, southern sides of an area with thin soil where karst bush forests can be found, or the deep valleys where canyon forests are prevalent.

# Which tree types constitute our forests?

## History of our forests

Before significant landscape changes took place, 85 percent of Hungary's territory had been covered with forests. This percentage is now only 20 percent. The present picture, state and composition of our forests has been shaped by not only natural conditions but also by human activities throughout the centuries. At the beginning, deforestation took place by burning trees so that people could create plough lands, meadows and pastures. Later, wood-cutting became more extensive as timber was needed for fortresses, other human settlements, for burning charcoal, cooking pearl-ash, as well as for heating glass-works and lime-kilns.



Turkey Oak

11,1%



Acacia

23,9%



Oak

20,8%



Ennobled Poplar trees

6,8%



Beech

5,9%



**Pine**

**11,6%**



**Hornbeam**

**5,1%**



**Domestic Poplar trees**

**3,9%**



Other deciduous trees 10,9%



**Did you know that** an 8 million-year fossilized Taxodium (a flood-tolerant Cypress type of tree) forest was discovered in the mine of Bükkábrány in 2007? This trove is unmatched in the world.





# Famous trees

Trees have long been engaging the imagination of man. They are our links between heaven and earth and the earth and its depths, and attaining even the age of Methuselah, they are our silent story-tellers. Let us look at just a few examples.



## **The one-thousand year-old Oak**

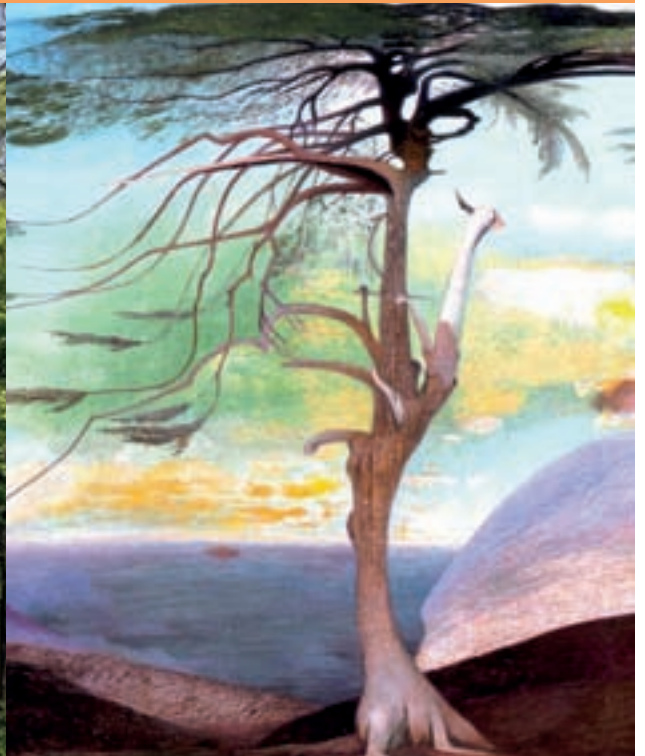
The age of Pedunculate oak or English oak near the border of the town of Zsennye is unknown but is estimated to have been a sapling during the rule of our first king Stephen I. It was dying for a long time and succumbed finally to windstorms in the past few years. It stood 23 meters with a circumference of more than 10 metres.

## **The tree called The devil's yoke**

This is a uniquely shaped beech tree standing close to the town of Sümeg. Its trunk is bifurcated and these branches join again at a height of two metres. Further up, it divides into three branches. The tree is approximately 200 years old, the circumference of its trunk is nearly three metres, while its height is 31 metres.

## Did you know that

relatives of the barren ancient maple tree in the Mátra mountains have recently been discovered in the town of Aldebró? Experts of the Vácrtót botanical garden are trying to germinate their seeds, though it is well-known that the 90 percent of the little saplings will take after the common Field Maple and only the 10 percent will resemble their parent tree.



### The ancient maple tree in the Mátra mountains

This tree resides 600 meters from the town of Parádsasvár. No others like it exist. It shares no apparent characteristics with present tree relatives. It appears similar to maple trees of the Miocene epoch, 5-20 million years ago. It is uncertain if the tree is a separate species, or a variant of the Field Maple, resembling its ancestors.

### The lonely cedar tree

This was painted by Tivadar Csontváry-Kosztka in Lebanon in 1909. Many think that it was his loneliness, while others think that it was the Hungarians past that he expressed in this painting. The foliage of a young cedar tree is tapered or umbel-shaped, while older trees have irregular foliage which can be massive, especially in the case of a lone cedar. Its branches grow mostly in the horizontal direction; the old trees' branches expand widely while their ends bend downward.

# The living waters in our forests

Proper water supply is necessary for sustaining the life of our forests. Trees not only use water from precipitation absorbed by the ground, but they are also in close connection with the streams flowing in their surrounding area.

## Ecology of the springs

Most of the time under normal circumstances, springs come forth through the ground, often making their surroundings soggy and swampy. The fresh cold water, rich in oxygen, creates favorable conditions like humid air and muddy, peaty soil, for certain species to multiply. Such microenvironments can most often be found in our beech and hornbeam-oak forests.



**Impatiens noli-tangere**  
(touch-me-not)

## Impatiens noli-tangere (Touch-me-not Balsam)

This curious flowering plant's habitat is in soggy-soiled forests. Its name comes from its seed capsule's explosive response to touch, spreading seeds many metres. This plant is easy to recognize by its horn-shaped yellow flowers ending in a spur. It flowers from June till August. Since it spreads rapidly, thanks to forcefully exploding pods, we can often find touch-me-nots when hiking in a shadowy forest during summer.

## Streams in our forests

Brooks, streamlets and creeks cross throughout our forests. At certain elevations, streams are surrounded with carpets of moss, even the scarce sedge, watercress and the *Chrysosplenium alternifolium*. One of the rare subspecies of the well known and more common Marsh marigold lives in such areas as well.

Many snail and shellfish species live in the clean waters of our brooks: *Bythinella austriaca* living on mountains, *Sadleriana pannonica* living in the Bükk mountains and the tiny shellfish found in the fine wash of the brooks. Larvae of crabs, mayflies, stoneflies, dragonflies, and caddisflies can also be found in the silent and undisturbed waters in the forests.



**Marsh marigold**

Forest brooks are home to many scarce fish species: lamprey eels (*Danubian brook lamprey* and *Eudontomyzon danfordi*) choose them as their habitat, and Common minnow, *Barbus peloponnesius*, and Stone loach all love the living conditions of the forest. The brown trout enjoys cold waters rich in oxygen, especially likely to be found in brooks with fast currents on mountains of medium height. Even small mammals live in forest waters: water rats choose brooks and springs as their habitat, and we can find otters in forests during their migration period.

Fire salamander



Lamprey eel



Otter



Caddisfly

## Did you know that

the secretion of the glands of Salamanders can cause mucous membrane inflammation in humans and strong muscle convulsions and hyperventilation in all mammals? This animal comes out of its hiding place usually nocturnally, when it hunts for insects, snails and worms.





# The grey hunter has come back

Wolves live in the imagination of every one of us. Akela in *The Jungle Book* by Kipling made his way into our hearts with his mysteriousness, loyalty and persistence. The wolf is the ancestor of the oldest friend of humans, the dog. The question as to how our relationship developed has many theories. One is for sure: dogs have been close to man for ages, almost since the very start. When we look into the eyes of our dogs we can see the glance of the wolf as well. When they are sniffing about looking for something, when they are chasing wild game, the grey hunter shows in them. Our bred pets are perhaps their closest related living creatures from nature, and that is why it is so important to understand their ancestry. If we handle our environment with care, we may encounter them again, as the old friend seems to have come back in Hungary.

# The grey hunter has come back



Wolves used to live all over the Northern hemisphere. They have kept people spellbound and in fear. They have been hunted out of pride and for defense. Eventually, through domestication, they slowly evolved into our mates in the form of dogs. Until recently, due to being hunted, wolves habitats had been shrinking to smaller and isolated areas.



The presence of wolves in Hungary between 1987 and 2001

Their original habitat stretched throughout the whole territory of Eurasia and Northern America, now however, their population has become isolated. They can be found in greater numbers in Eastern Europe on our continent. Due to age-old hunting and persecution, their habitat has receded to heights of between 600 2400 meters in Southern and Central Europe, where they most commonly live in forests and on mountains; in the north their habitat can be found on tundra. Wolves also like moorish, swampy areas.

From the mid-1940s wolves were considered extinct in Hungary. Since the late 1980s however, some of them have occasionally entered our country from beyond the northern and southern borders.

The frame of mind of our society has gradually been changing due to industrial and natural disasters that have occurred since the 1980s. As a result of the environmental protection and nature conservation programs, the living conditions of endangered species have been improved even if not evenly in all areas. Thanks to these projects, the population of the grey wolf as well as its living space is expanding nowadays.

## The grey wolf's looks

Its appearance – size, color, the quality of its coat – varies according to its habitat. The environmental conditions, including the climate, the availability of food and its composition, all influence the appearance of this animal. Our wolf has grey fur, weighs between 30 and 60 kilos, and its trunk is between 100 and 170 cm long. Its tail is short, relatively thick and has a black end. The hair on the side of its ears is also black. Males are bigger and stockier than females, and the weight of wolves living in the north is greater than that of the southern animals. Their color also changes according to their habitat: from south to north they turn from off-yellow to dun/fallow-grey and finally grey and white in the northernmost areas.

## A varied diet

Wolves are not picky at all: they eat small mammals, deer, wild hogs, moufflons, middle-sized predatory mammals, amphibians, insects, fruits, and domesticated animals as well if available.

## Living in packs

Their “society” has an advanced pecking order. Every one of the wolves has a certain place in their community. The pecking order can only be changed when one of the wolves passes away or gets very old. Aggression is very rare in the packs; the ranking order is defined by imitated fights. This precise, genetically determined order is not an order for its own sake. Successful hunting and reproduction, which is necessary for sustaining their community can only be ensured by such strict regulation. Every one of the animals has its own well-defined place in this mechanism, and these roles complement, and are based on each other. Packs of wolves are higher in number in the northern areas. The size of a pack, just like the wolves’ appearance, is influenced by the size and the ability of a specific territory to sustain its species. In Southern Europe it is common that wolves live as couples, where the size of their territory averages fifteen square kilometers. On the other hand, the territory of a pack in the north can be as large as one-thousand square kilometers. The leaders of the pack, procreating the progeny are the dominant, so-called alpha couple. They mark the borders of the territory with odor traces (urine and excrement). This same behavior is one of the characteristics of their domestic relatives too. In defining, marking and keeping a certain territory, making sounds also has an important role. Howling apparently serves also as a type of communication between groups. According to certain observations, howling can be heard from a distance of 15 kilometres. Only those wolves who belong to a certain pack and who have lived on a certain territory for a long time communicate with howling: migrating wolves do not send out signals like this. When raising wolf cubs, wolves very rarely howl to protect their surroundings. Fights between packs are common in the form of border skirmishes, and occur very often.



**Did you know that the environmental value of a wolf can be as much as 250,000 forints, while this amount is 500,000 forints in the case of a lynx?**







# Top 9

According to a survey conducted by international scientists of the UN, the effects of climate change on ecological diversity can be the most severe in the case of Hungary.



While in other countries, only certain regions are ranked as most ecologically vulnerable, almost the whole territory of Hungary belongs to this category. Other countries and regions falling into the same category are: South-East Europe, Belgium and South-Africa.

The most severe climate problems that can be expected to occur in Hungary are as follows:

## 1. Certain lands are turning into desert

Due to the increasingly dry summers, the Hungarian Great Plains (Alföld) could become a steppe, or a desert, and the forests of our indigenous, dying trees could be replaced by meadows and bushes. This phenomenon can already be seen on the sand-ridges of the southern parts of the Great Plains.

## 2. Decreasing amounts of internal water

As a result of the dry weather, the levels of internal water that have already decreased drastically due to improper water management, can decrease even further. This phenomenon adversely affects those living on the farms of Bács-Kiskun county.

### **3. Changing agriculture**

Species to be grown in the future can be selected according to their ability to tolerate draught better. For example, the grapevine in the coat-of-arms of the town of Mórahalom is only history now as wine cultivation has become impossible in this area due to the dry weather.

### **4. Securing food**

Due to changing weather, Hungary may need to import food to an increasing extent.

### **5. Floods and inland waters**

Dry summers can be followed by winters with high precipitation which can fall intensely in a short period of time. This phenomenon may result in more frequent and severe flooding.

### **6. New, aggressively expanding species**

Due to the lack of severe winter frost, certain pathogens can over-proliferate, and stay unusually active during these months. The harm they do to the flora and fauna will grow accordingly. Also, other non-indigenous animal and plant species can appear in our country, which do not fit within the evolved ecology. As a result, our indigenous species may be squeezed out of their habitats or may die out.

### **7. Health effects**

Heart patients, the elderly, patients with allergies, as well as children under four are especially vulnerable to climate changes, as they are less able to tolerate these changes due to possible lack of adaptability and immunological strength. The changing flora and fauna may change the amounts and the composition of pollens as well, and thus allergy seasons can become longer. Moreover, non-native bacteria and viruses can appear, which our bodies are unprepared to resist.

### **8. Economic effects**

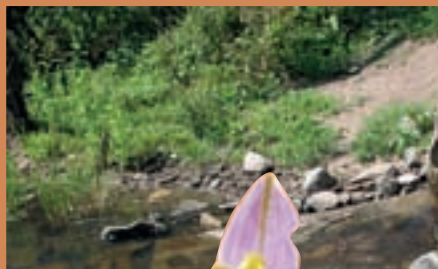
During extremely dry periods, the ability to manage increased workload declines, productivity falls, and consequently the country will have lower GNP and GDP.

### **9. Climate refugees**

When climate change affects people's daily lives, we may expect unpredictable social changes.



# Forestation in practice



Quarrying, which goes hand-in-hand with cement production, upsets the balance and harmony of a landscape and its ecology. DDC and HeidelbergCement conduct quarrying operations with a comprehensive plan which covers the re-plantation of the quarry area and its full maintenance following. In the process of quarrying, hollows are formed in the mountain-side, which must be filled before forestation, and returned to its original state. The goal is to create habitats similar or almost identical to those that had been there before quarrying began, and which can offer a home and shelter to indigenous species.



## Soil protection

Soil is the outermost, fertile, 0.1-1.5-metre thick layer of the earth's crust. The top level of the dark-colored soil is rich in humus and is finely but densely wired with roots. In the case of forest soils, there are two more layers between the humus soil and the basic rock level, which constitute the largest part of the soil. Roots are scarce here, and on the bottom of this layer the soil is mixed with basic rock.

This soil is fully removed during quarrying. In order that the recultivation of this area can be conducted smoothly, the soil must be treated with special care. An area must be created to store the temporarily removed soil somewhere as near to the quarry as possible. During the restoration period the state of the soil is thoroughly checked. This work can only be done under proper weather conditions: when the soil is neither too dry nor too wet and sticky.

## Manmade or natural forests?

One of the main questions about replantation is whether we should leave it to nature, or we should help and accelerate this process by artificial plantation. This decision is greatly influenced by whether we want to use the forest for soil protection, wood-cutting, or we want to create a natural environment. Monoculture farming used to be the preferred method for plantation of forests for wood-cutting. A few decades ago, however, it became clear that even in the case of sustaining forests solely for farming reasons, it is useful to enhance biodiversity to the maximum extent. If, in addition to new species, indigenous trees are also replanted, and wood-cutting is organized in smaller areas, the forest regenerates at a faster pace and develops in a healthier way. In the recultivation of environmentally protected areas, e.g. Szársomlyó or Naszály mountains, people involved should be even more careful. In such cases, after artificially creating favorable environmental conditions, it is advisable to let nature take its course.

During the process of natural regeneration, fast-growing trees with a short life expectancy emerge first and need a lot of light. The bigger, shade-tolerant trees grow in the shadow of the first generation of pioneer trees, and slowly become prevalent. In such naturally developing forests, not only are the trees varied, but the world of insects and birds shows greater diversity, and many types of mammals can be found.

A young girl with brown hair is shown in profile, blowing on a dandelion seed head. The background is a bright green field. The text 'Models to be followed' is overlaid in a large, bold, yellow font at the top left.

# Models to be followed

DDC is a member of an international joint venture which considers sustaining and even expanding biodiversity (i.e. the variety of species) as its goal. Forests offer home to a number of animal and plant species, and therefore this joint venture makes considerable effort not only to mitigate the emission of chemicals harmful to forests and to protect the present forest areas, but is also involved in replantation of trees within the framework of its quarry-recultivation project.

## Benelux states

HeidelbergCement launched a carbon-dioxide offsetting program called Carbon Neutral Initiative in May of 2010. The goal of this project is not only to reduce emission as much as possible in the cement industry, but also to contribute to the conservation of our environment. In line with this aim, the company supports projects that promote emission reductions and have a positive impact on the ecosystem of our planet. The first such investment supported by HeidelbergCement was the building of a cycle path made of carbon neutral, 100 percent recyclable concrete.

## Spain

The Valdilecha quarry close to Madrid is one of the biggest quarries of Hanson Hispania, which is a construction material supplier with an output of 1.5 million tons per year. Hanson Hispania is one of the acquisitions of HeidelbergCement. The area of the quarry is being gradually returned to nature: as part of the long-term recultivation program, the quarry pit which is 270,000 square metres, 7 million cubic metres, and 40 metres deep will be filled with non-hazardous material suitable for plantation in the next twenty years.

## China

The cement plant in Guangdong is run with a newly developed technology that aims to process both industrial and communal waste, enabling neutralization of more than 250 tons of waste water sludge a day. The sludge is first dried by using the heat surplus arising in the clinker kilns, and then is used as an alternative fuel. The beneficial result is not only waste water sludge being used, but reduction in traditional fuel usage.

## Tanzania

Tanzania Portland Cement Company, under public-private partnership (PPP), started quarry recultivation in the area of Dar es Salaam, in cooperation with the local authorities. The old quarry's area is 73 hectares, and the aim of the forestation is to prevent soil erosion, as well as to increase the amount of inland waters. One of the main elements of this project is the founding and operation of a tree-nursery where 100,000 saplings will have been grown by 2013. A part of the saplings will be planted on the quarry area, while others will be granted to the smaller villages in the region, and the greater part will be planted in a larger, urban forest.

## Hungary

Duna-Dráva Cement Ltd. spends approximately 10 million forints per year on the restoration of natural plants living in quarrying areas. This amount has covered the cost of plantation of trees and bushes in the quarries and their surroundings, covering an area of more than 100 hectares in the past few years. Besides this recultivation activity, the company also contributed to forestation around the Vác plant. Moreover, DDC organized plantation of many hundreds of trees and bushes for local pupils on the Gyada Natural Trail in April 2007, and in the area of the Deákvár Reservoir in Vác in the spring of 2008.



# Between two waters

**Mangrove is the most unique forest in the world. Its name doesn't come from a plant, but from a group of plants which live in the tidal zones of tropical seas at the mouths of rivers. Their habitats have been shrinking due to human expansion.**

## Pangea's offspring

The most important, basic plant species came to exist in an ancient period of our planet's history when every present continent was part of one ancient continent called Pangea. We can deduce this fact with little doubt because the basic plants constituting all of the mangrove forests (even those situated very far apart from each other) in the tropics, are the same three species everywhere: red, yellow and white mangroves. These plants haven't changed since their genesis, but during the 65 million years after the continents separated, they have formed different ecosystems with new and different species depending on the local conditions.

## What makes them unique?

Among the higher-order plants, only this group of flora could adapt to the conditions of salt water. The complex tissue system and structure of continental plants are the result of their effective nutrient absorption. This complexity and size is unattainable to sea plants, and can be explained by a simple physical phenomenon: liquids, together with the dissolved nutrients in them always flow from places of thinner concentration to thicker ones. The liquid concentration in cells of continental plants is approximately the same as the salt concentration of sea waters, but thicker than that of the liquids in their environment. Therefore the flow of nutrients dissolved in liquids in the soil clearly goes in the direction of these plants' cells. The dynamics of the absorption of nutrients in the sea plants is slower due to the fact that the concentration of liquids in their environment and that of their cells are roughly the same. That is why their structures cannot be as complex as their continental relatives. Unlike any other continental plants, the mangrove cleverly solves this problem. Mangroves get their nutrients from seawater but have a large amount of foliage exposed to the air: with the help of their huge foliage, they constantly evaporate water, thus ensuring a strong suction force within their tissues. This suction force eliminates the problem of stagnation between two places of equal concentration. Although these plants belong to the deciduous species, they are always green, and thus the process above can take place continuously all year round. This constant evaporating method could evolve only within the climatic conditions of the tropics. Another problem these populations have to cope with is oxygen-poor soil. To counter this, mangroves grew breathing roots that also help to provide the plants' firmness.

## The delicate balance

The sole nourishment for species living in swamp forests is plant foliage. They consume only a part of the plants to ensure their own and their environment's reproduction. The balance is perfect: only one half of every leaf is missing, but the other half is left, and therefore ventilation can continue. Fallen leaves are immediately used by the rich wildlife such as worms, crabs, molluscs and fish. Nutrient processing is extremely efficient: 1000 kg of leaves can feed 100 kg of herbivorous molluscs, fish and crabs, which altogether provide 10 kg of primary predators with food, and allows the survival of 1 kg of top predators among the birds or fish.



**Did you know that**  
the tsunami in 2004 could have been less destructive  
if humans hadn't rooted out the mangrove forests  
on the sea beaches, which could have moderated  
the strength of the tides?

