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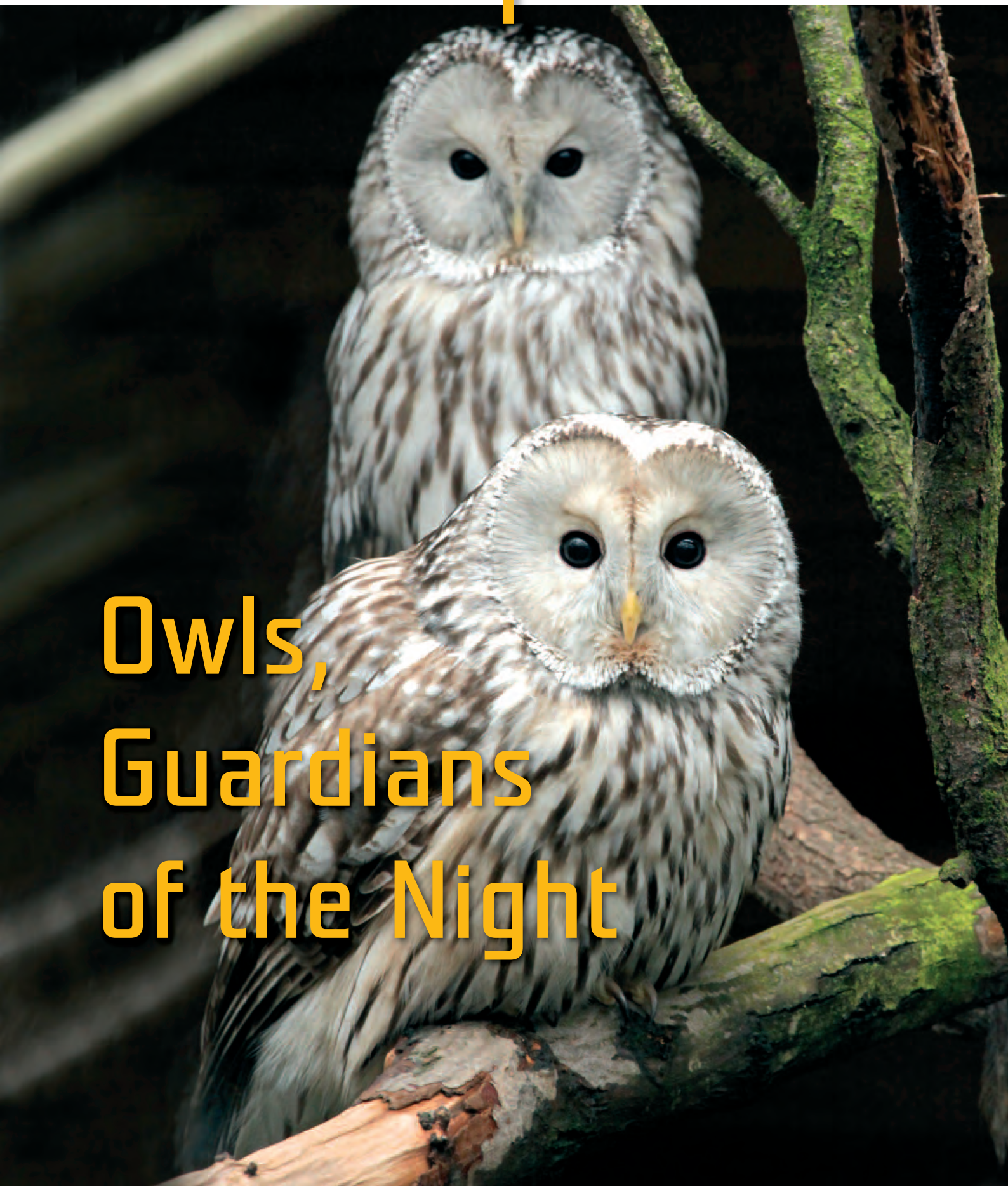

Owls, Guardians of the Night

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Editor:
Brno Zoo and Environmental Education Centre, semi-budgetary organization
U Zoologické zahrady 46, 635 00 Brno,
Czech Republic
IČ: 00101451
tel.: +420 546 432 311
fax: +420 546 210 000
e-mail: zoo@zoobrno.cz

Publisher:
Moravian Museum
Zelný trh 6, 659 37 Brno
Czech Republic
IČO: 00094862

Editor's office addres
Zoo Brno a stanice zájmových činností, p. o.
redakce Zooreportu
U Zoologické zahrady 46, 635 00 Brno,
Czech Republic
tel.: +420 546 432 370
fax: +420 546 210 000
e-mail: stuchlik@zoobrno.cz

Editorial board:
Ing. et Mgr. Lenka Blažejovská, Mgr. Jana Galová (children's supplement), Bc. Jana Hadová, MVDr. Martin Hovorka, Ph.D. (chairman of editorial board), doc. MVDr. Jiří Klimeš, CSc., RNDr. Bohumil Král, CSc. (specialist reader), Ing. Miroslava Piškulová, Bc. Eduard Stuchlík (editor manager), doc. Ing. Josef Suchomel, Ph.D., Mgr. Michal Vaňáč.

Emendation:
Rosalind Miranda

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Bc. Eduard Stuchlík

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Ural owls
Photo by Eduard Stuchlík

UNSALEABLE

EDITORIAL

Dear Readers,

In the owls' aviary and its surroundings, it is completely silent during the day. Sometimes orange irises within big eyes shine in the shadows beneath the shelter. Owls have a hypnotic look and, when twilight approaches, they utter a characteristic ululation, which may give someone goose bumps.

How do owls differ from other birds of prey? The eyes of the owl function like binoculars equipped with a night-vision mode. They allow the owl to focus exactly on the position and direction of the prey's movement. In full darkness, an owl can also identify even the quietest sounds made by its prey. And owls fly in complete silence while hunting.
In this report, we pay special attention to the little owl. Brno Zoo started keeping owls in the late 1950s and 1960s. By 1960, or perhaps a little later, owls also nested in our zoo. These small owls were formerly a common part of the avifauna of the Czech Republic, but today they are among the rarest species, visible only in a few places within our country. That the species was almost on the brink of extinction ten years ago was an alarming situation, and was why Brno Zoo started participating in a long-term conservation project of little owls in South Moravia. We help them mainly by caring for their environment and by hanging nest boxes.

In this ZooReport, we also cover many current events.

This year, a number of bird species have reproduced in our zoo, but the biggest breeding success was the birth of the critically endangered spider tortoise from Madagascar.

We have not forgotten about the activities at the Environmental Education Centre Hlídka, which conducts several educational programs in the autumn including, among other things, a traditional public event called the Potato Show.

Snowy owl.

With regard to education, we successfully celebrated the fifth Science Day, which was widely attended by schoolchildren. This event, aimed at popularizing science, is organized in the zoo with the cooperation of students from the Secondary School of Chemistry. It also helps strengthen our relationship with the public.

For Brno Zoo, initiating the construction of the outdoor enclosure for chimpanzees has been an important achievement. The enclosure will occupy about 2,000 m^2 of forested hill area adjacent to the monkey pavilion. The chimpanzees will finally be able to enjoy a natural environment which will give them the opportunity to climb to the crowns of tall trees. The construction project will last a year and a half.

Bc. Eduard Stuchlík,
Chief Editor, Zooreport

Dear readers,
there has been the article Two Eagle Species Nest in South Moravia published in the last issue of the magazine Zooreport. Due to editorial intervention, we have not mentioned the references list and the contribution of David Horal and Tomáš Bělka in their previously published texts and articles. This has been corrected at http://www.zoo-brno.cz/en/about-zoo-brno/zooreport. We sincerely apologize to Mr. Horal, Mr. Bělka and to you.

Great Horned Owl (Bubo virginianus).

Owls Adapt Admirably to the Dark

Owls, which have long been regarded as the embodiment of wisdom, are the symbol of the Greek goddess of wisdom and power, Athena, from which the scientific name of the little owl (*Athene*) is derived. But they have also been the subject of various myths, prejudices, and superstitions. Visitors to Brno Zoo can find four species of owls – eagle-owls, great horned owls, Ural owls, and the great grey owl – in the lower part of the hill named Mniší hora. Their aviaries are in an inconspicuous low structure shrouded in the surrounding greenery. In addition, tawny owls are kept in the so-called Alley of Birds, located near the administrative building. Another species – the snowy owl – has a reserved aviary near the estate of the Kamchatka hunter of bears. We also breed little owls in an area off the exhibit path.

Owls (*Strigiformes*) belong to an avian order that is seen across all the continents except Antarctica. They inhabit various types of terrestrial ecosystems, from polar tundra through deserts and wetlands to tropical rainforests. The smallest owls (pygmy owls) measure less than 15 cm; the largest ones (eagle owls) up to 70 cm.

Owls catch small mammals, birds, and other small vertebrates and invertebrates, especially insects. Their typical features include large, forward-looking eyes, a hooked beak, and feet with sharp talons. They have a distinct and characteristic voice: Their hooting vocalizations that we can hear especially in the early spring are linked to the onset of their reproduction period. Owls are mainly active at night, and therefore have very sensitive hearing and sight; but they see well in the day, too. While in our country we can see hunting owls usually only at night or at dusk, in the tropics and subtropics we can often see them during the day. Also, northern species of owls commonly hunt in daylight, since the sun in spring and summer, which is their breeding season and thus the peak time of hunting, sets only for a short while or not at all in that part of the world.

Owls are sometimes referred to as nocturnal birds of prey. Diurnal birds of prey and owls have similar features (hooked bill, powerful claws), and they also eat very similar prey. Owls have managed to minimise food competition with diurnal raptors by taking advantage of the open temporal niche, i.e., by occupying another time 'space' in the given ecosystem. (The ecological notion of a niche is derived from the word *niche* in architecture, a recess in which the ancient Greeks and Romans placed the statue of the goddess of victory, Nike.) According to older, now outdated views, the similarity between owls and other birds of prey was not because of relatedness, but only because of convergent evolution (i.e., the fact that both unrelated groups

evolved in similar conditions). Such situations often cause genetically distant animals to resemble each other (for example, fish and dolphins). According to new findings, however, owls and diurnal birds of prey are the closest of relatives and are much closer to each other than, for example, typical diurnal birds of prey (*Accipitriformes*) and falcons (*Falconiformes*), which until recently were included in a single systematic group of birds of prey.

The owl order is divided into two families – barn owls (*Tytonidae*) and typical owls (*Strigidae*). While only 20 species belong to the first family, 217 species according to the latest data belong to the second. There are 237 species of owls in the world, ten of which have been recorded as nesting in our country. Over the past 20 years, nearly 40 species of owls new to science have been described worldwide. One reason is that they live very inconspicuously. The species are often very similar (so-called cryptic species), differing only in voice. Of our owls, only the common barn owl belongs to the first family, with all other owls in the Czech Republic belonging to the *Strigidae* family.

Owls possess forward-facing eyes that allow binocular spatial vision and accurate distance estimation. They are almost immobile in their orbits, which is compensated for by the enormous mobility of their necks, which allows owls to rotate their heads by more than 270 degrees. This is supported by a unique blood supply to the head, which is not interrupted even at extreme rotation.

Extremely soft feathers or the comb-like fringe on their first flight feathers allows the owls a completely silent flight. Therefore, the approaching owl does not alarm its prey and, at the same time, during the flight it can hear its victim's movements. The owl's facial disc forms a parabola that directs sounds to its ears. The ears have a slightly asymmetrical position. Based on the slightly different distance between the source of sound and the left and right ears, the owl can accurately focus on the sound, and so can capture, for example, small rodents in complete darkness and under the snow cover. However, it should be borne in mind that the prominent "ear tufts" on the head of the eagle owl or the long-eared owl are just extended feathers without the power of hearing.

Some undigested owl food is regurgitated in the form of so-called owl pellets. Examination of bones in the pellets can give detailed information not only about owl food, but also about the spectrum of small mammal species occurring on the site.

Worldwide, owls are threatened by habitat loss, especially forests. Pesticides, hunting, collisions with vehicles, high-voltage lines, fences, and other factors have also contributed to their decline. In our country, the main risks come from the transformation of agricultural landscapes, loss of nesting opportunities, and the unintentional traps left in agricultural holdings. The most endangered owls include some endemic tropical island species. At least six species of owls, unfortunately, have become extinct because of humans.

Doc. MVDr. Jiří Klimeš, CSc.
Head of International Cooperation

Great Grey Owl (Strix nebulosa).

Breeding of Little Owls in Brno Zoo

At present, our zoo has six little owls (*Athene noctua*). An adult pair – the male born in 2011, the female in 2013 – resides in one of the three aviaries in the little owls breeding facility, which was built in 2013 in a high part of the zoo near the Tropical Kingdom Pavilion but beyond the visitor routes. Four males were born to this pair on 27 May 2017, and they were then successfully bred. They were taken from their parents at the beginning of September and placed separately at different places in the breeding grounds. By then, the young birds were self-sufficient (the parents did not have to feed them) and had begun to defend their own territories, so they could no longer stay together with the adults.

Young little owls.
Photo by MUDr. Miluše Krauseová.

Twenty-one little owls hatched between 2000 and 2016 in Brno Zoo, twelve of which were later released into their natural habitat. This was done in accordance with the project Protecting Little Owls in South Moravia, for which Brno Zoo has been cooperating with the Czech Conservation Society since 2006.

Until 2013, we kept our little owls in the Alley of Birds, which has a number of expositions of various bird species near the zoo's administrative building. The three smallest aviaries were adapted specially for the breeding of little owls, and don't have visitor access. After these breeding grounds were set up, the success rate of breeding unfortunately dropped: With owls, reproduction may be hampered when the environment is changed. We tried to improve the breeding conditions immediately by changing the food composition. We added invertebrates (locusts and earthworms) to their feed, as these are an important food component for little owls in the wild, especially during the nesting season. For this purpose, we acquired a terrarium with live earthworms. Then, from 2014 onward, they also were given mice or day-old chicks.

In 2015 and 2016, the new breeding facility underwent several minor modifications. Each of the three aviaries, one for each pair, was divided by a mesh partition into two halves. We originally removed the partitions during the breeding season, but now we have secured them firmly, and we have placed two 50×50 cm double doors in each half. If the male starts to be aggressive with the female, she can easily escape into the other half of the aviary; or they can chase each other around. We also tripled the number of nesting boxes, so there are now three to four nesting boxes for each couple, and the birds can choose where they will nest or sleep. On the walls of the aviary, we have fixed four perches for each pair, where they can sit and rest. The interiors of the aviaries have been thickened with branches. And as early as 2014, we added a service corridor to prevent the little owls from escaping when the breeder enters the aviary.

In 2015, our zoo owned three couples of little owls, which only produced unfertilized eggs at that time. After the death of one male, his former mate was not re-partnered because of her advanced age. To help the owls reproduce, the remaining two couples were put together in the off-season in the aviary, but with bulkheads separating the males from the females. Thus could potential new partners get used to one another. In the spring of 2016, the newly selected couples were put together. The male of one pair was killed by his new partner, but the pairing of the other couple was successful. Of the remaining two fema-

Adult little owl in the background of the so-called Alley of Birds.

les, one had not nested in the last three years, and the other female had produced only two eggs. They were both of advanced age, so we transferred them to another zoo.

Thus, we had just one new couple. In the spring of 2016, she laid three eggs, from which two youngsters hatched. However, as this was the first nesting of this couple, they were not sufficiently synchronized, and neither of the chicks survived. However, the pairing itself was considered a success, as it is a prerequisite for future rearing. The rearing was successful the following year, for, as mentioned at the beginning of this article, this pair produced four chicks that hatched on 27 May 2017.

Little owls are small owls of the *Strigidae* family. They can grow up to 25 cm in length, mate for life, and are native to almost all of Europe (except the British Isles, where they were reintroduced, and Scandinavia). They also occur in North Africa and the Arabian Peninsula; and their habitat extends through Central Asia to Korea. The biotope of little owls is an open landscape with scattered trees, although they have also adapted to life in human settlements. They nest in the cavities of old trees or in stables and abandoned buildings. They are predominantly nocturnal and mainly hunt small rodents, small birds, and invertebrates.

The last few decades have witnessed a significant decline in the number of little owls in western and central Europe, the many causes of which are all related to changes in farming. As a result of landscape chemistry, the birds often cannot catch their prey (voles) because many types of grassland are not mowed and the voles cannot be seen in the high grass. The opportunities for nesting are also dwindling: Hollow trees are disappearing, and farm buildings are becoming less accessible. On the other hand, the number of predators (martens) is increasing. Additionally, little owls, which mostly fly close to the ground, often die after colliding with a moving car.

According to the latest estimates, only about one hundred couples of little owls are still present in the Czech Republic, and the species has come to the brink of extinction.

RNDr. Petr Suvorov, Ph.D.
Bird Breeding Curator

The little owls in the aviary in Brno Zoo.

A little owl in the aviary in Brno Zoo awaits release into nature.

◂

The landing hole of the box can also be used while feeding growing youngsters. If the box is placed inside a building, the slab should be fastened to the outside of the wall. Photo by Libor Opluštil

▸

Protection of Little Owls in South Moravia

This paper summarizes the results of the project 'Protection of Little Owls in South Moravia' during the period from its establishment in 2006 to the end of 2016. The project is supported by the Ministry of the Environment, and is conducted in cooperation with Brno Zoo and the Czech Nature Conservation Union (ČSOP) in Břeclav. The protective actions of the project are carried out on several levels: searching for little owls in nature in South Moravia, production and installation of nesting boxes, reduction of risk factors in the landscape, maintenance of suitable biotopes, breeding of the species in Brno Zoo, and, to some extent, reintroduction of the species into the wild.

Population Monitoring

We searched for little owls especially in places where, according to our previous knowledge, they were most often found; that is to say, in mainly agricultural holdings, fruit orchards, and hollow trees. We paid special attention to the places where sightings of little owls had been confirmed in previous years, and also explored 5 to 10 km around these localities, because the little owl is a species that is faithful to its habitat, and young birds wander only a fixed distance from their nests. The locations of the finds were then mapped as a network of ornithological squares.

The little owl responded and came into view when a tape recorder, CD player, or mobile phone reproduced its call, or when its call was imitated. We also installed digital sound recorders in camouflaged cases (for instance, on a tree trunk). At appropriate places, we searched for indications of their presence such as vomit, feathers, or dung; and in some cases, we were able to observe little owls directly during the monitoring. The results of the mapping show that the little owl population is critically low in the monitored area. Little owls were found to occur only in three areas: in the vicinity of Měnín and Těšany villages in the Brno-venkov district, near Drnholec village in Břeclav district, and along the Austrian border in the area from Znojmo to the border of the Znojmo and Břeclav districts.

In the first two areas, although the little owls had adequate food and nesting opportunities, their sub-populations were not boosted between 2006 and 2015. Any increase in population barely covered the loss incurred by natural causes (predation) and anthropogenic effects (transport, electric poles, and unsecured ventilation shafts or chimneys, for instance). Given that their density of occurrence is very low in both these areas, the death of one individual from a couple may mean the complete loss of successful nesting. The third area – south of Znojmo – is likely to benefit from the proximity of a stabilized sub-

population of little owls around the Pulkava River in the Austrian territory. The landscape structure of the countryside seems to suit little owls. Whereas, in lower Austria, little owls are found in villages surrounded by vineyards and gardens, near Znojmo we found them exclusively in agricultural facilities. This is the result of a different landscape structure in both monitored areas.

Production and Installation of Nesting Boxes

Analysis of the field mapping shows that the residual population of little owls in South Moravia survives in the premises of agricultural holdings, and it has already disappeared from the free landscape (gardens, orchards, alleyways, and parks). Unfortunately, in these agricultural holdings, little owls are exposed to many risk factors, especially when nesting, such as beech martens and cats. To try to counteract this, over the course of 10 years, we manufactured, installed, and tested several types of nesting boxes. Even though we had to struggle with the fact that other species of birds also nested in some of these boxes, it seems that we finally managed to produce the appropriate type of box, and find the optimal way of installing it.

Most of the boxes were installed on farm buildings. In order to protect the boxes from predator attack, we provided them with a double inner partition or an outer sheet-metal collar, or we placed them on a smooth metal sheet, or a wooden or brick wall. Thus, the marten or cat cannot climb up to the box, nor can it jump onto it from, for instance, a nearby beam. Ideally, boxes are located in the interior of farm buildings. (The birds can fly into the building through a hole in the wall.) The boxes are better protected from the weather in the building, and experience shows that this type of box placement is best suited to this species. The general disadvantage of placing a box inside an agricultural holding is the fact that, once the fledglings begin to become self-sufficient, they will find themselves in an environment without growing vegetation, but will instead see only transport equipment and the like, and be exposed to predators.

A smaller number of boxes were placed on trees in orchards, gardens, or alleys near territories currently or previously occupied by little owls, where the risks for the birds were fewer. From experience gained abroad, we know that when little owl fledglings leave a box placed on a tree, they climb around the branches, practise their flying skills, and learn to understand their parents' alarm signals. In case of danger, they return to the box and gradually prepare for the moment when they will leave it permanently. However, as little owls have almost disappeared from our country, the tree boxes are now usually occupied by Eurasian tree sparrows and common starlings. In boxes installed on buildings, at least some little owls are nesting, which is why we need to maintain boxes both on trees and on buildings. At the end of 2016, we had 105 boxes in the field, of which 81 were on buildings, pillars, or metal constructions; and only 24 were on trees.

Identifying and Limiting Risk Factors

Unfortunately, the areas in which little owls currently occur are full of various risk factors. Little owls, like any cavity-inhabiting species, like to try out different cavities, and can get stuck there. In particular, unused chimneys and ventilators, metal hoppers, and agricultural and other machines present hazards. Drowning in tanks and containers with perpendicular walls in which different liquids are stored is also a threat. For example, a bird sitting at the edge of a rain tank that is not full can fall in and be unable to crawl up the smooth

After the front wall of the aviary was removed, the little owl could enter its surrounding areas: a mosaic of fields, forests, and meadows.

wall. Uncovered molasses containers are especially dangerous. They were the cause of death of many western barn owls and little owls who tried to catch insects or small birds stuck on the surface of the sticky fluid. The number of dangers that these birds, especially the youngsters, have to face after leaving the nest is large and is constantly increasing. Between 2006 and 2015, during the monitoring process, we attempted to identify and eliminate as many risk factors as possible. Small metal water tanks were covered with wire, perpendicular metal or plastic pipes were repositioned horizontally, and branches or islands made of polystyrene were placed on the surface of larger water and slurry tanks.

Suitable Biotopes and their Maintenance

By monitoring the residual population of little owls in South Moravia, we identified several localities at which we could maintain a good habitat by mowing the grass to suit the needs of the birds. These included, for example, farm premises in the village of Těšany, where little owls still nest; or the high apple orchard in Podolí, with its hollow trees which are suitable for the eventual reintroduction of little owls. During the 2015 nesting season, we mowed the grass in a mosaic pattern in unused areas at both of these sites so that little owls could easily access food (insects, annelids, and small rodents). Regular annual mowing will also ensure the diversity of plant communities and their associated animal species (from insects to small mammals). Practical experience regarding maintenance of grassy habitats on farm and orchard premises will be useful in the planning and implementation of protective measures for little owls.

Reintroduction of Bred Birds

Over the course of our project, we have released fourteen little owls into the wild. Twelve of them hatched at Brno Zoo, while two were bred privately. In 2011, we launched six little owls in the Křepice cadastre in the Břeclav district, and four at Brno Zoo. In 2012, in close cooperation with the Wildlife Rescue Centre Bartošovice, three more were released in Mankovice village in the district of Nový Jičín; and in 2013, one more was released in the village of Bartošovice, also in the Nový Jičín district.

In 2006, workers at the Rajhrad Prey Birds Conservation Station made three mobile aviaries for Brno Zoo which were designed for the reintroduction of little owls. These aviaries consist of modules that can be combined according to need. Members of ČSOP Břeclav placed one such aviary containing six young little owls that had been reared in Brno Zoo in a field of a Křepice farm in the summer of 2011. They also put in a box for little owls and a case adapted for live mice so that the birds could learn to hunt them before they were released. The workers mowed the grass around the aviary, and secured the water tanks with floating islands of polystyrene. They then released this group, continuing to track the site and replenish the live mice in the feed box, which was transferred to an open area on the company premises. On 4 October 2011, breeders released four more little owls, two bred in the zoo and two bred privately, from other aviaries located in Brno Zoo, which had received the approval of the Department of the Environment of the South Moravian Regional Authority to release these ten birds.

In the years 2012 and 2013, we launched four more little owls bred at Brno Zoo, this time into the Protected Landscape Area of the Odra River Basin. These birds were equipped with miniature transmitters that did not affect them in any way, but which allowed us, with our colleagues from Bartošovice station, to track them by means of telemetry as they wandered through the countryside. On the basis of this field research, we proved that little owls bred in captivity can survive in the wild for several months after release; and that, in subsequent years, they can form couples that nest and breed with wild little owls.

Reintroduction of little owls bred in captivity is certainly one of the ways in which the population of this bird in the Czech Republic can be restored. Nevertheless, protecting the habitats of little owls in their natural surroundings and providing them with nesting boxes remain our primary goals.

Mgr. Libor Opluštil,
The Czech Union
of Nature Conservation
Basic Organization of Břeclav

A New Exposition of Anacondas – Bigger and More Beautiful

When we brought three one-year-old green anacondas (*Eunectes murinus*) to the zoo in 2004 and placed them in one of the vivariums in the Tropical Kingdom Pavilion, we knew that in the future we would need an enclosure big enough for huge snakes, as they can grow up to nine metres long. That future moment happened on October 10, 2017.

They were relocated just a few metres from their original enclosure, which was only 4.5 m². A spacious aqua-terrarium, the second largest in the pavilion, was empty after the breeding of northern caiman lizards. We renovated it this year with water now occupying a larger part of the 17 m² floor plan. An artificial tree trunk, a waterfall, and some living plants, bromeliads in particular, are located on the heated shores.

Transporting the two females and one male, although over a short distance, was demanding because of their number, size, and weight. These anacondas, which were 1.5 m when they arrived in Brno, are already about four metres long. The anaconda is mostly an underwater snake. The breeder brought the snake out of the water, but everybody's help was needed to place it in a sail which was hung on the weighing scale. They then put the snake on the ground, measured it, and placed it back in the sail, which was carefully transferred to the new aqua-terrarium.

Our anacondas came from a private breeder, and were born in 2002 in the same litter. When we weighed and measured them before placing them in their new home, one female weighed 58.5 kg and measured 4.5 metres; the other weighed 34.1 kg and measured 3.4 m; and the male weighed 18 kg and measured 2.65 m.

The maximum weight of a green anaconda rarely exceeds 180 to 200 kg. The circumference of its body can be compared to an adult man's chest. Along with reticulated pythons, these anacondas are the longest snakes in the world, some growing to over nine metres.

The green anaconda is coloured gray or olive green to yellow, with round black or black-lined yellow spots. It lives in the rainforests and flooded savannas of the northern part of South America, and near rivers and wetlands. During the floods, anacondas are active; but when the marshes dry up, they fall into a period of inactivity. They prey on big fish, turtles, caimans, birds, and mammals such as peccaries or capybaras. The victim is suffocated by constriction. Sometimes they simply hold the prey underwater for a while.

Visitors can see our three adult green anacondas in the Tropical Kingdom Pavilion in a large aqua-terrarium with a floor plan of 17 m².

Bird Nursery at Brno Zoo

Our collection of birds this year was reminiscent of a miniature nursery. Here, we describe five of the most interesting species that have recently reproduced.

For the third time, we managed to breed western plantain-eaters (*Crinifer piscator*). Whereas only one of the two chicks survived from the first rearing in 2015, this year the parents raised two females and a male. Each time one of the parents left the nest to turn over the responsibility for feeding and warming their offspring to the other, the timid young birds suddenly became defiant and tried to intimidate the breeders by extending their wings, which was a good sign. Approximately one month after the birth, the youngsters began to fledge, gradually leaving the nesting basket to start climbing in the surrounding branches. In their nests in the wild in Africa, western plantain-eaters inhabit thick-growing scrub, so moving around in the vegetation of the exposition area suited them. They are skilful birds with long, muscular legs with which they pass through shrubs as if they were swimming. If they are exposed to stress, they vomit the food they have eaten. However, we are now able to keep these demanding birds in good shape. We are justifiably proud of our birds.

Last year, after a long gap, we had small Congo grey parrots (*Psittacus e. erithacus*), and this year we managed to also breed the popular blue-and-yellow macaws (*Ara ararauna*). Our zoo has kept this species for a long time. The male, named Pedro, is over thirty years old. His partner, the female Koko, came to the zoo in 2012 as a four-year-old chick that was used to humans. Their coexistence at first did not seem too harmonious: the aging Pedro had to get used to the young Koko. She liked to spend long periods of time with people, so we keepers had to minimize contact with her so that she could concentrate on Pedro. As early as 2016, the pair began gradually to become friendly, and they partnered despite the great age difference. In the box they were offered, Koko laid several unfertilized eggs. Only after we changed the type of box in May this year did we finally succeed in obtaining three fertilized eggs. Both birds aggressively defended the nesting box and attacked the breeder. Three chicks hatched. The youngest was very weak, and died after a few days. Its older siblings quickly grew and, during our checking of the box, made it clear that they did not like our interference. Therefore, we limited our checking times. During the summer, the plumage of the youngsters changed to adult feathers and, when they finally climbed out of the box, they began to explore their surroundings. Their parents gradually stopped feeding them, but the appetite of the chicks continued to increase. The youngsters have been on the threshold of independent living since October, and we will provide them with new housing soon.

Blue-and-Yellow macaws chicks. Photo by Petr Suvorov

◂

Western plantain-eater chicks. Photo by Petr Suvorov ▸

A laughing kookaburra (*Dacelo novaeguineae*) was born this year for the first time in the history of Brno Zoo. In recent years, its breeding in Brno has been subjected to several trials. The nine-year-old female lost her partner, and the selection of a replacement was a complex process. Laughing kookaburras exhibit a high degree of individuality, and finding two compatible individuals can be very difficult. If the birds are not compatible, they can end up giving each other serious injuries. When the female rejected a third male after the death of her partner, we considered giving up the search. The light at the end of the tunnel came from an offer from the private breeder Magdaléna Žohová, who has been engaged in breeding laughing kookaburras for several years. She was willing to give our female a choice of three young males. Eventually, the shy female selected one of them and they coupled. After the nest box was installed, it took only a few weeks for the her to occupy it, and then lay and sit on her eggs. But the first attempt did not work out: She cast the newborn chick out of the box. The second attempt was better: Very unusually for laughing kookaburras, she laid some eggs on the ground, hidden between plant pots at the bottom of the exposition, and she sat firmly on them for a whole month. Two youngsters hatched. The parents carefully took turns at feeding duty, bringing tiny insects and mouse pups to their chicks. Both youngsters grew very fast. After a couple of months, they were only distinguishable from their parents by fine waves and a slightly darker shade on the bright parts of their bodies. The two young males will remain in the company of their parents for a while before they find a new home.

The aviary that connects both floors of the 'U Tygra' restaurant is reserved for Prevost's squirrels at the bottom, and several bird species in the upper section. Common emerald doves (*Chalcophaps indica*) have reproduced here for the second time. The male came from Prague Zoo after the floods in 2013. Because he thrived in our aviary, he is staying there permanently. One year later, a young female from Ostrava arrived and, in 2015, they had two chicks, a male and a female that are currently waiting here for a new home. A couple of crested partridges (*Rollulus rouloul*) from Děčín Zoo started living in this aviary in 2013. The female has been laying a relatively large number of eggs since then, but only a few of them have been incubated until they hatched. This year, our crested partridges raised one male that hatched in May. Both parents cared for the chick, which is quite unusual among game fowl. Whenever the breeder entered the aviary, the female would start to give warning signs, and sometimes she attacked the breeder. The little male grew up quickly and fledged. He moved to his new home in Bojnice Zoo in October.

RNDr. Petr Suvorov, Ph.D.
Bird Breeding Curator

Common emerald doves (female on the left, male on the right).

"How King Kaštánek Won Princess Duběnka"

Among over twenty educational programs offered to the public by the Ecological Education Centre Hlídka, some are seasonal. There are three that are linked to autumn: 'About Greedy Caterpillar Božena,' 'Autumn Paints,' and 'How King Kaštánek Won Princess Duběnka.'

The autumn wind is "cooked" with a colourful array of fragrant ingredients such as fallen leaves, autumn fruits, and flowers. Everything is sprinkled with a pinch of cinnamon and well mixed.

This last program is a simple fairytale. The multi-headed dragon Bouřlivák kidnaps the beautiful Princess Duběnka, and the young King Kaštánek decides to rescue her. Fortunately, the dragon does not have any dastardly intentions toward the princess. He promises that if Kaštánek succeeds in fulfilling the tasks set by each of his six heads, Duběnka will be returned alive and healthy. However, defeating Bouřlivák is not at all easy. One of his heads boasts a rational mind, and the other five each represent one of the five senses, but with a much more heightened sensitivity.

King Kaštánek therefore asks the children for help to be able to fulfill the dragon's tasks. For example, the Koukalka head asks children for art; the Čichalka head asks them to distinguish scents and to cook fragrant autumn wind; and the Mlsalka head checks their taste buds. The Ušatka head wants to listen to a song accompanied by an orchestra of nature-provided musical instruments. The children must prove to the Hmatalka head not only their ability to distinguish objects by touch, but also their dexterity, for example by having to move about with a chestnut balanced on their heads. The smart head Rozumína will then test the children's knowledge about autumn and the changes that this season causes in nature.

After Kaštánek and the children fulfil all of Bouřlivák's tasks and prove to him that Kaštánek really deserves to be king, the princess is released and the adventure ends – of course, with a royal wedding. If it is not raining, the entire program is conducted outside, on the terrace of the Centre and in Špilberk Park. The colourful autumn trees of the park form an impressive backdrop for the fairy tale.

This program is most often used by nursery schools, but it is also suitable for school children under the age of eight. For older children, we put less emphasis on the fairytale atmosphere. The plot remains the same, but with modifications: The tasks are more demanding, and the children have more to learn. Even older schoolchildren like this fairy tale, and their teacher is often involved in the tasks, too.

Before the orchestra performance, the players tune their natural musical instruments (nuts, chestnuts, and sticks).

Mgr. Monika Chudárková
Lecturer at the Environmental Education Centre Hlídka

Potato Show and Tree Show

The Potato Show is one of the popular autumn events organised for children and adults by the Centre for Environmental Education Hlídka. Every year, it is held on the second Friday in October. Visitors to the Potato Show engage in physical activities, try their hand at games and art, and taste yummy potato specialties and other autumnal delights from the grill, which is installed at centre of the terrace. In fact, potatoes grilled in foil are a local delicacy.

One of the eight games at the Potato Show: the transfer of potatoes to children's carts.

On October 13 this year, many participated in the events organised at centre's training room: Children and their parents made objects from pottery, fashioned figurines from mashed potatoes, and used raw potatoes to make prints on paper. Visitors to the show were also challenged by eight activity games. Children ran along an obstacle course holding a potato on a spoon between their knees and under their chin. Other games included carrying potato bags on children's garden carts, and looking for potatoes in a designated area. They also played potato-style *pétanque,* or 'feed a little pig,' by throwing potatoes or chestnuts into the open mouth of a dummy pig. The most challenging game was playing mini-golf with potatoes instead of golf balls. The players received a stamp on their card for each post at which they succeeded. A fully filled card served as a tasting ticket.

The Centre's staff also had an exhibition on the terrace promoting regional products, which included numerous varieties of potatoes.

The Centre, along with the non-profit organisation NaZemi, also organised the Tree Show in mid-October, this year's theme for which was the Banana Story. The exhibition was comprised of fourteen panels which were hung on the old trees below Špilberk Castle, and dealt with the very hard, underpaid work of Panamanian and Costa Rican farmers. The way out of their difficult situation could be the development of a certification which would mark items that give their producers a better deal with the Fairtrade symbol.

Mgr. Monika Chudárková,
Lecturer of the Environmental Education Centre Hlídka

While activity competitions were held on the terrace, visitors to the Potato Show could try their hand at arts and crafts in the Centre's classroom, such as using potato print to embellish fashion design.

Fifth Edition of Natural Sciences Day

Natural Sciences Day is a science-popularization event organised by students of the Brno School of Chemistry together with the zoo educators at Brno Zoo. This year's edition was the fifth one and, as always, was given at two different times in the year: The spring event is intended for the general public, and is not a competition; whereas teams of second-grade pupils can enrol in an autumn contest with students of multi-year high schools.

On October 11 this year, 97 teams from 35 schools visited the zoo to compete. When they registered at the zoo entrance, we told them the competition rules and gave out competition sheets. Each group of high-school students was assigned one guide who accompanied them throughout the competition. The first team entered the zoo area at 8:32 a.m., while the last team set off at 10:34 a.m. The children were tested at six sites, each of which focused on a subject (geology, physics, vertebrate zoology, invertebrate zoology, chemistry, and botany), all of which were connected by the central theme of 'colours and shapes.' Students at each site were given a professional lecture and demonstration, after which they filled in their competition sheets. They had to answer three questions after each demonstration, and these were graded, earning them one, two, or three points for each question.

As every year, the events at the chemical site had the character of an appealing show, which was watched with interest even by ordinary zoo visitors. A team of high-school students in white coats was led by their teacher, chemist Mgr. Radek Matuška, who was dressed in a yellow jersey. They were occasionally covered with smoke which was released during chemical reactions accelerated by a catalyst. The chemistry events focused on light absorption in a variety of environments. A powerful laser lit inflated coloured balloons. The white, orange, and light blue balloons stayed inflated for the entire morning, but the black ones burst in each demonstration, showing that they were the most efficient in absorbing energy from light. Another experiment showed acidity (pH), based on anthocyanins, which are the pigments present in plant cell vacuoles. Acidic solutions of anthocyanins are red, whereas neutral solutions are violet, and alkaline solutions are blue. Even a small amount of anthocyanin added to a test solution significantly changes its colour. 'Can you tell us in which plants and plant parts we find anthocyanins?' was one of the questions in the competition. (The answer is that pigments reacting to acidity and alkalinity of solutions are found in the cell vacuoles of red cabbage leaves, blueberries, blackberries, privet, or red cabbage heads.)

The subject of anthocyanins also came up at the botany site. It has been said, for example, that anthocyanins change the colour of flowers as they develop. Also, the autumnal red colouring of leaves is caused by anthocyanins. This site made it clear that plant dyes are divided into lipid-soluble dyes (lipochromes) and water-soluble dyes (hydrochromes).

The environment of the zoo inspired the organizing high-school students to enhance the program after the competition with commentated feeding sessions at three places: the enclosures of the ring-tailed lemurs, the Katanga lions, and the maned wolves.

The teams could win up to six points at each of the five sites. For the first time in the five-year history of this event, one of the teams received a full score: students from the Bishop Grammar School in Brno. In second place was the Grammar School from Captain Jaroš Avenue in Brno, and in the third place was the Elementary School at Sirotkova Street in Brno-Žabovřesky.

A competition for teachers took place for the first time. At each station, one question was asked for a single

Commented feeding of the Katanga lions.

Students of the Secondary Industrial School of Chemistry and their teacher (in a yellow T-shirt) at Natural Sciences Day demonstrate how chemical reactions occurring in some materials change their colour or shape.

point. Only some of the 35 teachers present competed, but we definitely plan to make this a tradition. The three winners received paper bags with the Natural Sciences Day motif. First place was shared by Eva Štěpánková from Matyáš Lerch Grammar School and Jakub Rajsigl from the Elementary School on Jasanová Street in Brno-Jundrov. Alena Šullová from the Elementary School in Rousínov won third place.

We congratulate all the winners, and look forward to the sixth edition of Natural Sciences Day, which will take place on May 1 and October 10, 2018.

Marek Sláma,
Student of the Faculty of Science
at Masaryk University and
a co-organizer
of the Natural Sciences Day

In the ring-tailed lemur enclosure, students of the Secondary Industrial School of Chemistry comment on their feeding.

A critically endangered spider tortoise was hatched at Brno Zoo on Juni 26, 2017. The photo is from the end of October.

A Critically Endangered Spider Tortoise is Born in Brno

A spider tortoise (*Pyxis arachnoides brygooi*) was hatched in Brno Zoo in Juni this year. This young, beautiful, but critically endangered terrestrial turtle was the first reared individual of this subspecies in any Czech or Slovak zoo.

The spider tortoise lives in dry sparse forests and shrubs in the southwest of Madagascar, and has three subspecies, of which Brno Zoo has the northern one. All of these subspecies are threatened by the loss of their habitat, because the natives chop down trees to burn in order to cook their food. Another danger is presented by illegal traders who capture and export spider tortoises from the island as a reptilian rarity. Their beautiful carapace is also used to make ornaments.

The six males that Brno Zoo has been breeding since 2004 are from a contraband shipment that was stopped at the airport in Vienna. Completion of a breeding pair was not easy: For example, in 2015, not a single female of the northern subspecies was being kept in any European zoo. Therefore, we turned to the North American Zoo and Aquarium Association, which operates a spider tortoise rescue program, and its coordinator approved the transfer of a suitable female to Brno. She was loaned to us in 2015 for an indefinite period by Canada's Toronto Zoo. Last year, the new Brno pair first mated, and the female, which had not yet had any young, carried two eggs on September 7, 2016. We placed both in an incubator. The embryo in one egg did not develop fully, but the second egg hatched on Juni 26, 2017.

This species grows to a body length of 15 cm. It consumes different kinds of grasses, succulents, opuntias, thistles, and cattle dung (including larvae). The exact life expectancy of this gem of a species is not exactly known. It typically lives 50 to 70 years, but may even reach a hundred.

Red-Handed Tamarin Twins have been Reared

The parents of twin red-handed tamarins born at our zoo on August 23 this year are called Henry and Belle. The male was born in Hodonín Zoo in 2011; the female, who is three years younger, was privately bred. The exposition of our red-handed tamarins is close to the lower station of the zoo train, and was created in 2013 by adapting the first aviary at the so-called Birds' Alley. To the original cage, we added warm quarters with a glazed front wall. At the end of summer, visitors awaiting the train could usually see the two baby monkeys sitting on the back of an adult tamarin, who was most often their father. The mother reserved her energy for breastfeeding, although sometimes the parents each carried one on their backs. The twins gradually gained independence, and the periods during which the youngsters jumped off the backs of their parents and ran alone started increasing. Vaccination and sex determination were conducted only after the twins were weaned, which happened two to three months after their birth. However, the primate babies will remain in contact with their mother until they reach adulthood.

The red-handed tamarin male with the twins on his back.

Chimpanzee Fáben.

Construction begins on a new home for our chimpanzees

Construction on the outdoor chimpanzee enclosure in Brno Zoo was officially initiated by Martin Ander (Deputy Mayor of Brno), Martin Hovorka (Zoo Director), and Martin Stančík (the construction officer overseeing the project). The laying of the foundation stone was held on September 13, 2017 near the enclosure of the meerkats, and it is there that this new exposition will be linked to the main zoo area. We expect the construction to be completed in the spring of 2019.

Our zoo has hosted chimpanzees since the 1960s. Currently, we have two females and one male. Both females arrived in Brno from the Pilsen Zoo in 2013. It is thought that Gina was born in 1975. She was a former circus star who had been reared by humans. Mary was born in 1995 at the Krakow Zoo. The male, Fáben, has lived in Brno since 1996. He was born in 1979 at the Kolmarden Zoo in Sweden.

These chimpanzees are sure to impress all our visitors, especially when they can move into their new spacious enclosure, which will allow them to move about freely. The new quarters will also benefit the four educational programmes on apes that we offer at the zoo. The first half of each programme is held at the Audiovisual Hall in the Administration Building, after which the zoo educator takes the students to the animal enclosure to allow them to observe the animals' behaviour. Chimpanzees are our closest relatives, so the zoo guides often stop by this enclosure, not only as part of these programmes but also during regular excursions. A competition involving both pupils and chimpanzees is highly popular: Both sets of participants are given bags of peanuts to see who can open the bags first. Of course, the chimpanzees usually win, but only because they cheat: They tear the bags apart with their teeth!

Our current group of chimpanzees have been living together for four years. Since their first days of coexistence, Gina and Mary have welcomed Fáben, and their harmonious relationship has deepened with time. Fáben's non-conflicting attitude has helped this bonding. Five times every day they are fed: Gina first, then Mary, and finally Fáben. Each of them takes the food to a corner, and they eat together calmly and happily. In the morning, they receive food suitable for omnivorous primates, including fruit. Afternoon meals consist of vegetables such as lettuce, bell peppers, or carrots. Even though these have all already been washed, the chimpanzees first scrape the carrots with their teeth and spit out that outer layer before eating the tasty inside.

The present chimpanzee outdoor range was created by combining three cage exposures, but its size is still inadequate. The to-be-built natural range will not only allow us to house more chimpanzees, but it will also bring about a radical change in our chimpanzee breeding practices. Their new living space will be closer to that of their original habitat.

Chimpanzee Gina.


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ALL OUR FRIENDS SUCCESS
AND ALL GOOD THINGS IN
2018