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Chicks and Babies:
Conservation Breeding in Budapest Zoo



ZSOLT KOVÁCS—MÁRTA SZABON

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Introduction

It is not only for what we do that we are held responsible, but also for what we do not do.

Protagoras

In the 21st century, city dwellers long more than ever for the company of animals. Our mere biological existence impels us to interact with creatures other than humans and hence the number of zoos is constantly growing: today, they number over ten thousand worldwide. Visited by more than seven hundred million people annually, these parks are the most significant cultural and touristic attractions everywhere.

Contemporary zoos have a complex mission. Through their animal ambassadors they tell townfolk about the disappearing harmony between man and nature, while they also serve as recreational, ecological–environmental and learning centers, aid the survival of species in need, and represent cultural spaces nurturing our heritage.

The approximately 1000 leading zoological institutions in the world place great emphasis on conservation, education and science. They constitute a tight network, form bonds and alliances, and carefully exchange their holdings. By coordinating global captive breeding efforts they seek to save more than 300 endangered animal species from extinction and preserve their genes. Conservation-oriented zoos tend to keep representatives of rare species rather than common ones.

The largest live collection in Hungary, Budapest Zoo, has a very wide range of animals – even by international standards – maintaining 10,354 specimens of 1072 species, as well as 117 not individually registered breeding groups. These include some seldom seen exotics such as



golden-bellied mangabeys, huge flocks of flamingos and pelicans, venomous snakes, breeding groups of gorillas, orangutans, dholes, tigers, giraffes, as well as families of antelopes and gazelles. Taking the year 2013 alone, one can see impressive results. It was a real “baby boomer year”, with a very high number of births and hatches. Members of 50 different species successfully reproduced, resulting in a total of 248 baby animals. We had an elephant calf, several Siberian tiger, Persian leopard and Indian lion cubs, and infants of black and ring-tailed lemurs, night and squirrel monkeys and Javan langurs. Our two-toed sloths, naked mole rats and common gundis also breed with regularity.

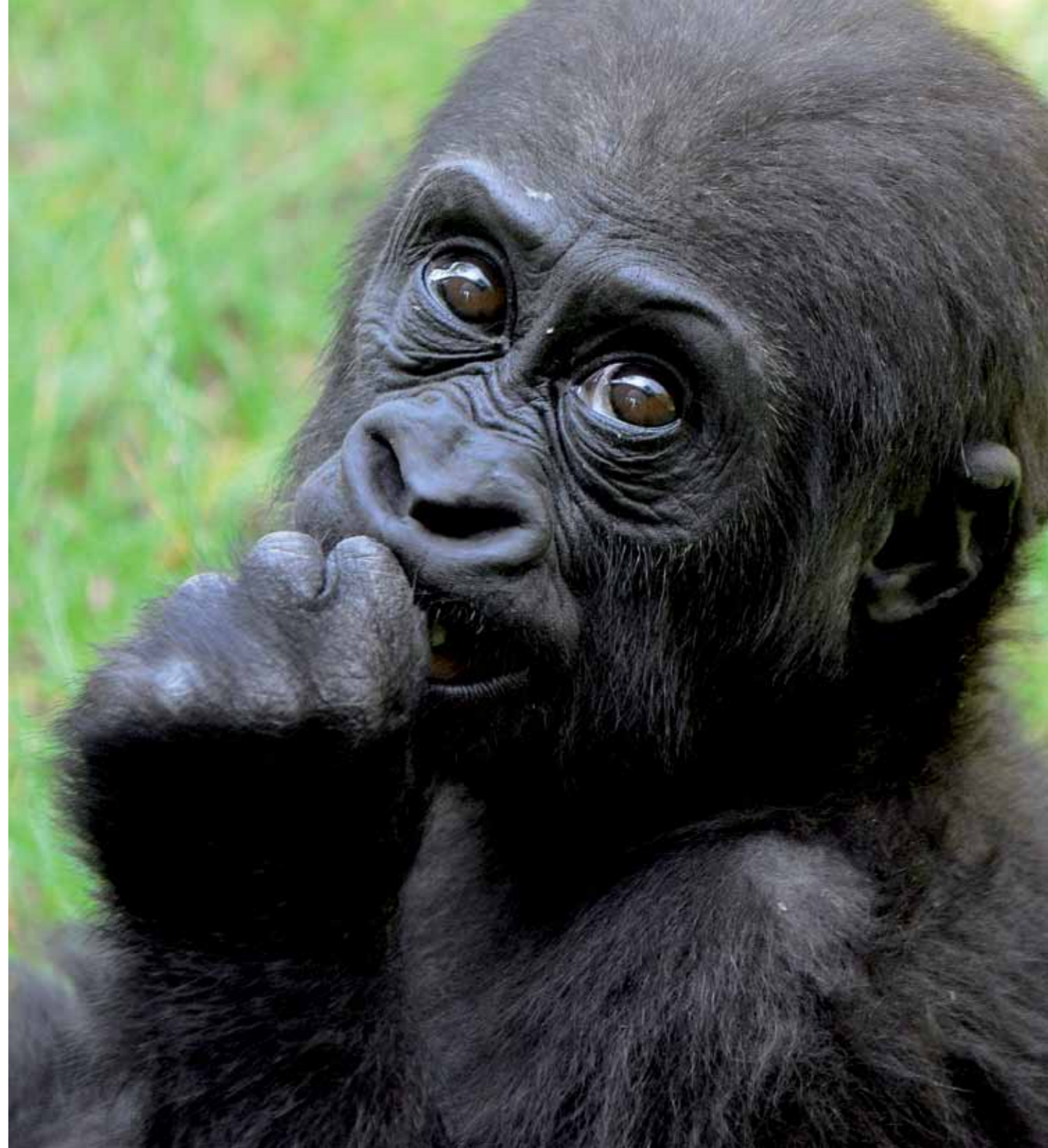
The largest international response was evoked by the successful artificial insemination of a square-lipped rhino, a world first (two calves were thus produced), and the breeding of common wombats at the end of 2012. The latter event was special because wombats last reproduced in a European zoo 20 years ago. However, we can also be proud of the numerous individuals of protected native species rescued and treated, in addition to the young produced within the framework of a European conservation breeding programme. In 2013 more than 2000 small mammals, birds and reptiles required our assistance. The animals rehabilitated at either the Rescue Center or the Bird Rescue Station of the Zoo were subsequently released into their original habitats in close cooperation with national park authorities and conservation groups.

Conservation projects are not a solo project. Strong international cooperation between scientists, zoo professionals and conservationists is needed to change the fate of an endangered species and reverse processes that often appear hopeless. Such cooperation must not be a flash in the pan: threatened species can only be saved from extinction by the involvement of professionals, a continuous, concerted effort and decades-long captive breeding. Budapest Zoo is involved in the conservation of 70 species; this book is mainly about them.

Zoo Books for Nature is a series that aims to raise awareness of the hands-on conservation of species that have disappeared from large parts of their ranges. We also want to underline the importance of preserving biodiversity, as its loss increases the vulnerability of the entire biosphere and adversely affects the future of humanity and the quality of life on Earth.

Any species saved from extinction by the national and international cooperation of zoo professionals, scientists and conservation organisations is a symbol. It shows that disappearing wildlife can indeed be preserved. It is worth fighting for the continued survival of species because they can be saved if enough people want it and do their best. Therefore, I recommend this book to all nature and animal lovers who, apart from a keen interest in rare and unusual creatures, want to know more about how such endangered species can be rescued – and perhaps even want to help us to achieve our goals...

Prof. Dr. Miklós Persányi
Director-General of the Budapest Zoo



Organisations involved in Conservation breeding

The next chapters deal with declining (sub)species monitored by the International Union for the Conservation of Nature (IUCN) and maintained in Budapest Zoo as part of conservation breeding programmes. Most of them reproduce regularly and currently have young ones. Furthermore, several successful rescue operations are described to give an overview of the species that have reserved a place in our contemporary Noah's ark.

Explanation of abbreviations

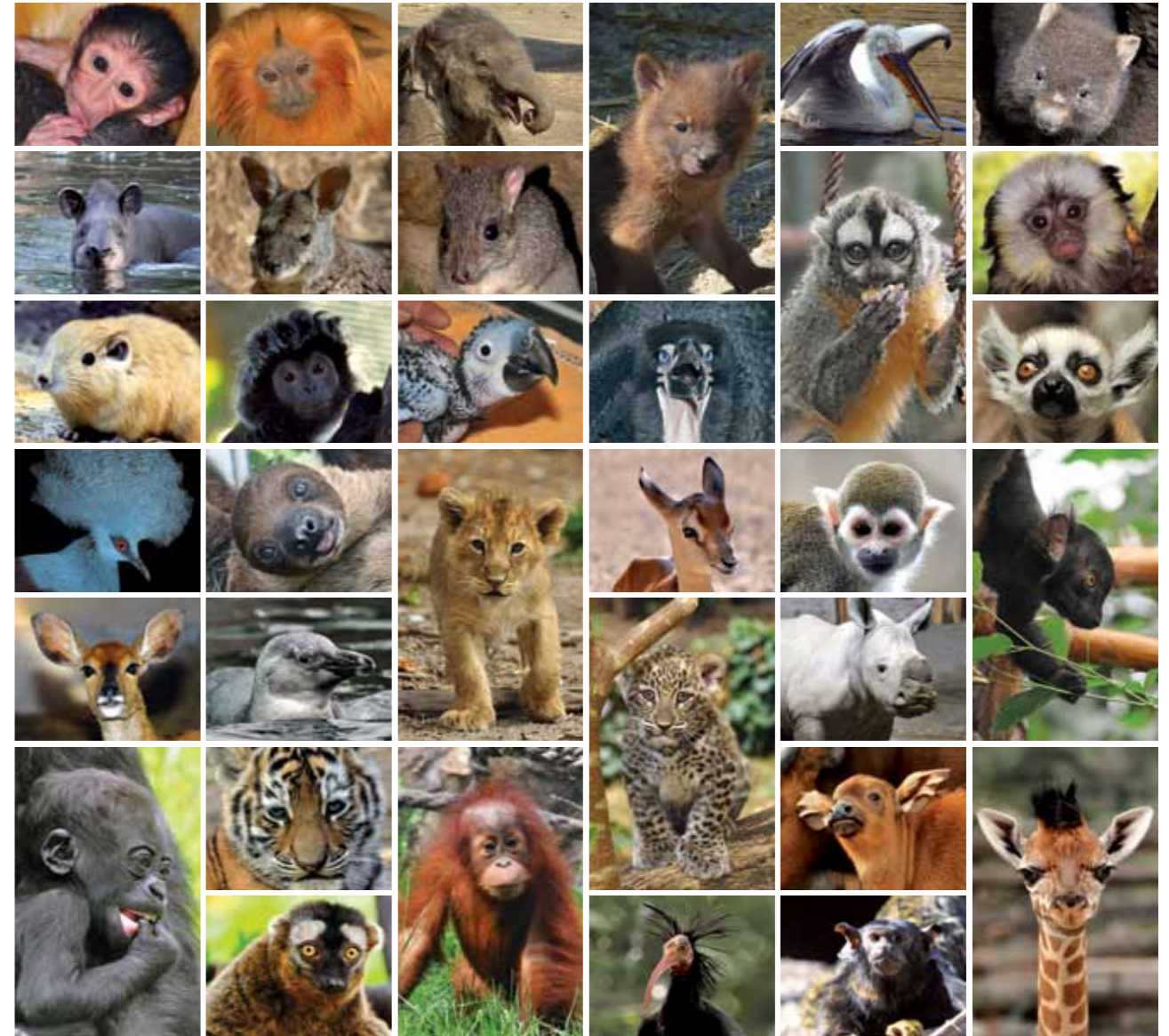


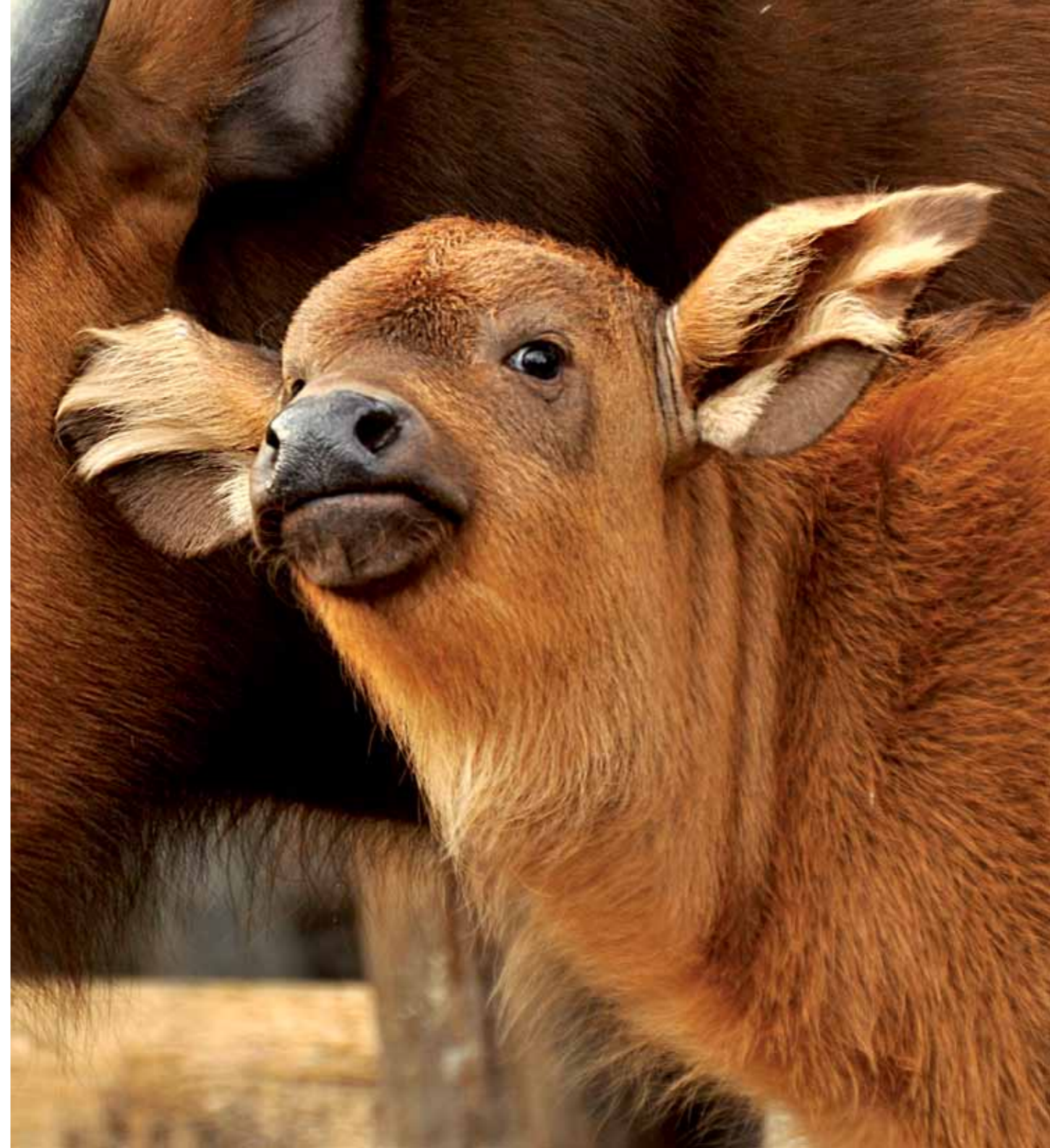
The IUCN classifies the conservation status of species according to their extinction risk.

The following terms are used in this book:



Red Data Book of Budapest Zoo Animals





African Forest Buffalo (*Syncerus caffer nanus*)

ESB

The smallest subspecies of the African buffalo lives not on the savannah but in forested areas of Central Africa up to an altitude of 4000m (13,000ft). Few population estimates are available for this form but it is generally confined to (nominally) protected areas. Experts estimate that their population stands at about 60,000, which is a very low number compared to that of the three savannah subspecies (approximately 830,000). They face the very same threats as other big game animals in Africa: habitat loss, agricultural development and poaching—unfortunately, even within national parks. In addition, prolonged drought, combined with anthrax and rinderpest epidemics, heavily reduces populations. Forest buffalos have regularly bred in Budapest since 2011, though this is not the case in most of the two dozen zoos that keep them. Unlike their forest counterparts, the savannah buffalo are considered highly dangerous to humans.

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12 African Penguin (*Spheniscus demersus*) EEP

African penguins, as their name suggests live and breed along the western coast of Africa rather than at the South Pole. Their population is decreasing mainly due to pollution, so their survival must be aided by captive breeding. Compared to the early 20th century, numbers have dropped to just ten percent, another cause for this decline being egg collection. Current threats come from oil spillages in coastal waters and commercial fishing.

Similarly to its cold-loving relatives the sole species of penguin in Africa feeds exclusively on fish. It breeds in colonies on the continental coast and offshore islands, laying its eggs into burrows. Parent birds sit on the eggs alternately.

The two chicks of our experienced breeding pair hatched four days apart in December 2013. Both young turned out to be males. As the sexes are monomorphic, they can only be identified by biochemical technology.





14 **Amur Tiger** (*Panthera tigris altaica*) **EEP, ISB**

This is the largest living (sub)species of felid on Earth. Although tigers are all striped, no two specimens are perfectly alike. However, they recognise each other by the shape of a white patch on the back of their auricles rather than their stripes. They are also unique among cats for their liking of water. They swim well and even hunt in water. Their only enemy is man: poaching and habitat fragmentation threatens their survival. As members of widely separated subpopulations tend to mate with close relatives, genetic defects are increasingly common. Traditional Chinese medicine greatly values tiger parts (bones, hairs, internal organs), hence poaching continues. Shrinking habitats force tigers to move closer to settlements where they are often killed to “protect” humans and livestock. Today as few as 400 Siberian tigers remain in the wild so captive breeding is of huge importance for the continued survival of this form. At present 497 individuals are maintained in 172 zoos worldwide. Of the 49 cubs produced in 2013, two little females were born in Budapest.

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16 **Asian Elephant** (*Elephas maximus*) **EEP**

The Asian elephant (the Indian form being one of the subspecies) is threatened by habitat loss due to deforestation and poaching. Its total population of 40,000–50,000 individuals inhabits a disjointed range scattered over 13 countries. Just a century ago these numbers were ten times higher.

In our zoo the first calf to reach two and a half years of age came into the world on 16 September 1941. Calves born subsequently—Jubile (1956) and Quinba (1961)—were reared without any serious complications. Today, a calf named Asha (b. 14 February 2013) can be seen in Budapest. Asha had to overcome a difficult start in life: she was starving because she could not find her mother's teats and needed hand-feeding for a couple of days. The zoo stock of Asian elephants is rapidly increasing: between 2008 and 2012 75 calves were born in Europe alone.

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Asiatic Lion (*Panthera leo persica*)

EEP

Of extant lion subspecies this is the closest to becoming extinct. Scarcely more than 350 adults remain in the wild—all descendants of about a dozen animals. The sole protected area where they may still freely roam is Gir Forest in western India. 2000 years ago lions were common in the Middle East, southern Europe and Asia but due to hunting pressure they only survived in India and Africa. Concerted captive breeding is essential for the survival of this subspecies. Of the 26 cubs born in zoos in 2013, eight came into the world in Budapest.

The lion is the only species of felid living and hunting in packs. The benefits of this method are clearly reflected by the number of successful hunts: when hunting cooperatively, lions make one kill in three attempts whereas only every sixth endeavour results in prey capture if they have a go alone. Furthermore, unique among cats, the males also take part in raising the young. While the species as a whole is classified as endangered, the subspecies discussed here is considered critically endangered by the IUCN.

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20 **Black Lemur** (*Eulemur macaco*) **EEP, ISB**

Only the males of this species are actually black—the females have a coffee brown fur. This species inhabits forests in northwestern Madagascar. It moves along almost invisibly in the treetops of closed-canopy forests, with only its far-reaching, sometimes frightening voice giving it away. Although mostly diurnal, black lemurs may also be active at night, but perhaps only if disturbed by humans. They live in troops consisting of five to ten individuals and led by an experienced female. These highly social creatures groom each other like monkeys but use their long canines rather than their hands for this purpose.

There is not enough information for a proper assessment of the conservation status of black lemurs. However, their numbers are decreasing, their habitats are often burnt and they are trapped and hunted, so captive breeding efforts are of great importance. The pair in Budapest have produced four offspring so far.

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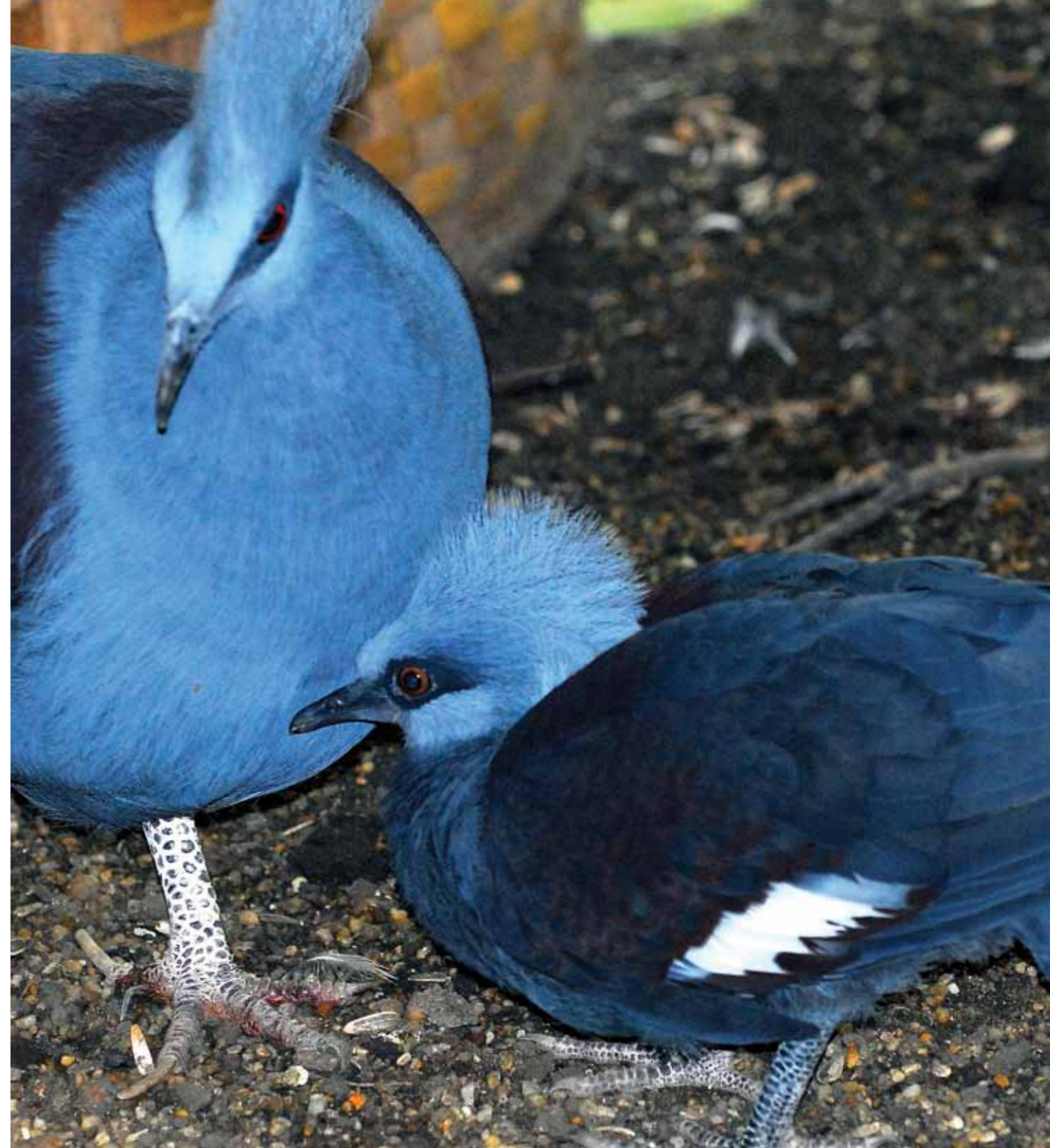
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22 **Blue Crowned Pigeon** (*Goura cristata*) **ECP, ISB**

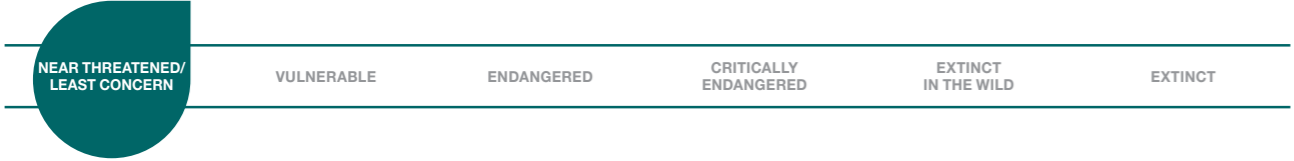
The largest living species of pigeon reaches a weight of 2.2kg (4.9lb) and a length of 75cm (29.5in). Both sexes look alike. This species inhabits rainforests in northeastern New Guinea and some smaller offshore islands. Its population size is decreasing because of habitat loss and collection for the pet trade; crowned pigeons are also hunted for their tasty meat and nice plumes. Their wild population numbers about 15,000. They are extremely loud at dawn and emit a voice reminiscent of the blowing of a ship horn. Their nests measure 40 cm (15.7 in) in diameter and are constructed in trees a couple of meters off the ground. Females usually lay a single egg at a time, which takes about 30 days to crack. The young bird leaves the nest at 28–30 days old but is fed by both parents for another two months. This is a long-lived species with a potential lifespan of 50 years or more. It feeds on seeds, fruits and buds, as well as arthropods and snails. During the past decade 12 young have hatched in our zoo.

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24 **Bolivian Night Monkey** (*Aotus azarai boliviensis*) **ESB**

Night or owl monkeys, as they are also called, are the only truly nocturnal monkeys. Formerly considered a single taxon, they are now classified as eleven separate, albeit rather similar-looking, species. Due to these recent changes in taxonomy the population status of the individual forms is unknown but habitat loss is likely to be a serious threat to all. Night monkeys see very well in the dark, even though their ancestors were diurnal animals forced to adopt unusual lifestyles by predators and competitors. They are socially monogamous, and each family group consists of a mating pair and up to four immature offspring. Females give birth to one or occasionally two infants after a gestation of 126–133 days. Night monkeys may live as long as 25 years in captivity. In the past decade six young were born in Budapest, despite the fact that identifying species and finding matching pairs is quite problematic.





26 **Brush-tailed Bettong** (*Bettongia penicillata*) **EEP**

This rabbit-sized marsupial is one of the rarest species of wallabies today, inhabiting small patches of land in the southwest of Western Australia and the northeast of Queensland. Its wild population is believed to consist of about five thousand specimens. For conservation purposes a few bettongs were released on undisturbed offshore islands. The species is threatened by a loss of habitat and predators such as invasive foxes and feral cats. Its main food is mushrooms, but it also consumes resin and insects. It stores fat in its tail covered with brush-like hair, so this “fifth limb” serves as a food reserve. Woylies have regularly reproduced in Budapest for several decades. Currently three individuals are on display and in the past ten years five young have emerged from their mothers’ pouch. Being a night-active species, we have lodged our bettongs in the nocturnal section of the Australia House.





Dalmatian Pelican (*Pelecanus crispus*)

EEP

Dalmatian pelicans were nesting in Hungary in the 19th century but are rarely seen nowadays due to the large-scale draining of wetlands. In addition to Europe, this species is found in northern Africa and southern and southeastern Asia. On our continent the largest breeding population inhabits the Danube Delta. Pelicans feed on fish and usually hunt in groups: several birds paddle in a row close to the shore and corral fish into shallow waters by flapping their wings. Pelicans can fit numerous fish into their expandable gular pouch and feed their chicks with regurgitated, half-digested fish directly from this skin flap. With a weight of 9–15kg (20–33lb), this is one of the heaviest of flying birds. The species' existence is threatened by aridification, water pollution, human disturbance and illegal hunting. In Budapest, these birds are kept together with great white pelicans, and because they successfully reproduce year by year ours is one of the largest colonies of pelicans in any European zoo.

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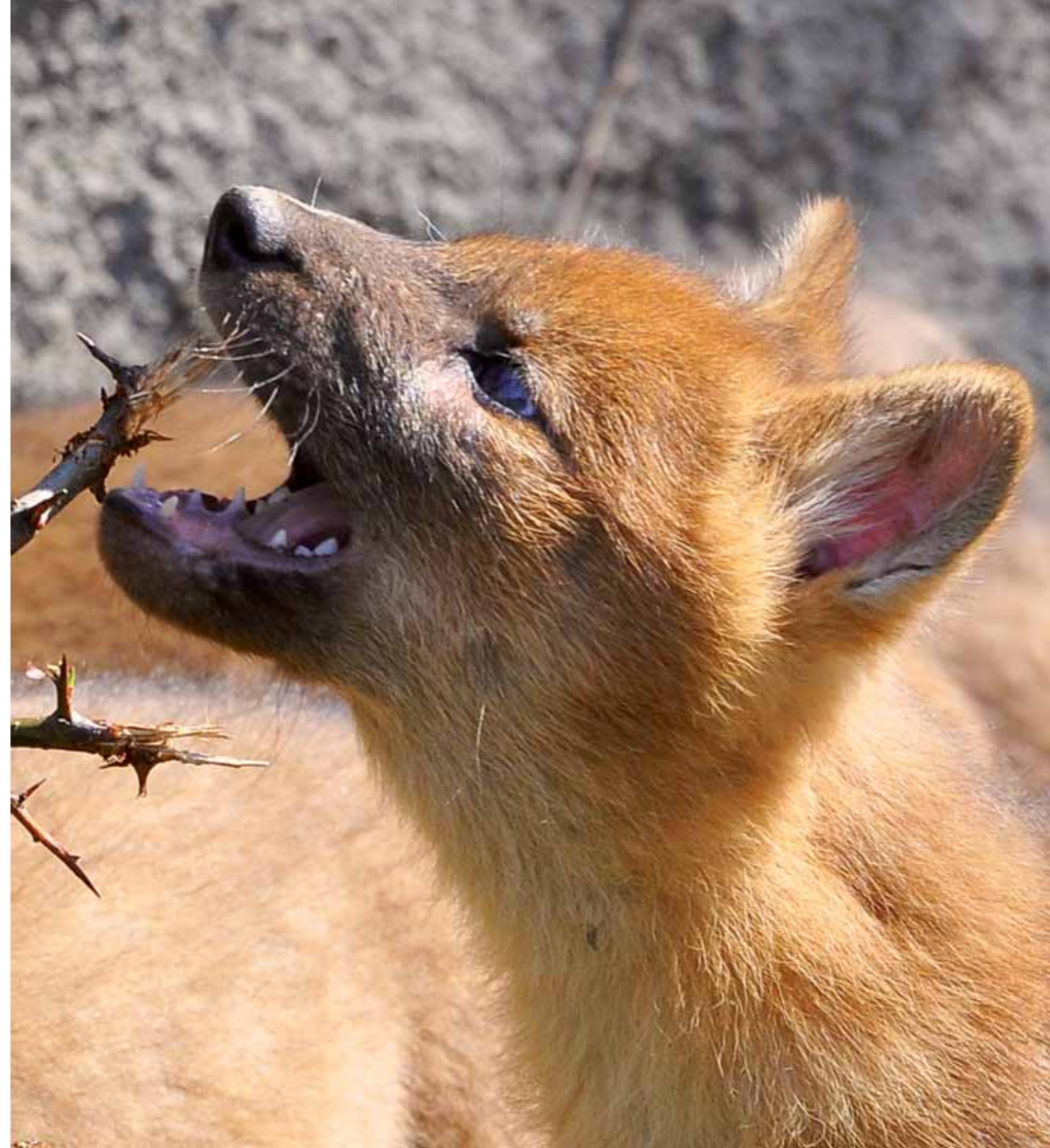
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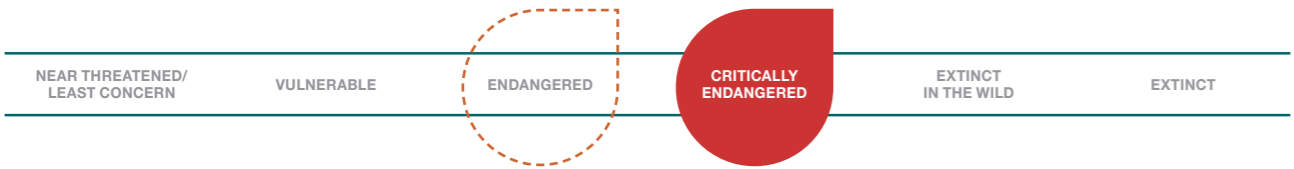
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30 **Dhole or Asiatic Wild Dog (*Cuon alpinus lepturus*)** **EEP**

The dhole subspecies on display in our zoo is the rarest one native to southern China. Dholes are highly social and cooperative animals but their survival can only be guaranteed if their habitats are no longer transformed and fragmented. They are extremely susceptible to canine diseases (rabies, parvovirus and parasites) and infections take a heavy toll among them. The wild population consists of less than 2000 individuals and is decreasing. There are 131 specimens maintained in 23 zoos registered in the conservation breeding programme, of which 12 are in Budapest. Asiatic wild dogs hunt in packs and are able to kill large deer and water buffalo or even to steal food from a tiger. Clan members join forces to raise the pups. Their help is most welcome as the dominant female can give birth to 12 young in a single litter. Dholes were successfully bred in Budapest in 2009 and 2014, producing 18 pups, respectively. While the species as a whole is classified as endangered, the subspecies discussed here is considered critically endangered by the IUCN.





32 **Golden-bellied Mangabey** (*Cercocebus chrysogaster*) **ESB, ISB**

This exceptionally beautiful species native to the central Congo Basin is one of the rarest monkeys. Very few zoos keep it: of the several thousand institutions worldwide only eight maintain a total of 42 individuals, i.e., even fewer than giant pandas. The best breeding colony in any zoo is the one in Budapest (presently consisting of eight females and one male): in the last decade 12 young were successfully raised here. However, very little information is available about numbers in the wild, and even the species' habits are known only from observations in captivity. Thus, every single specimen is of extremely high genetic and conservation value. Since the zoo population consists of too few individuals to base a breeding programme on, our present task is to collect and manage studbook data. Once the stock reaches higher numbers, purposeful breeding can start and specimens can be released into the wild to boost natural populations.

DUE TO ITS EXTREME RARITY, THERE IS NO DETAILED INFORMATION ABOUT THIS SPECIES' ABUNDANCE.



Golden Lion Tamarin (*Leontopithecus rosalia*)

EEP, ISB

Golden lion tamarins favour dense primary forests, especially patches where bromeliads grow in large numbers 5–10m (16–32ft) above the ground. The most serious threat comes from deforestation: 98 percent of the species' habitat has already been destroyed. In the 1970s only about a hundred individuals were left on the eastern coast of Brazil, and as many were maintained in zoological gardens. However, zoos came to the monkeys' rescue and today at least a thousand specimens are found in the wild. Thanks to captive breeding and reintroduction programmes their numbers continue to grow, and the zoo population now consists of 471 individuals.

The first callitrichids received by Budapest Zoo in 1912 were representatives of this species. The presently maintained pair has produced two young so far.

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Gundi (*Ctenodactylus gundi*)

ESB

The gundi is an inhabitant of stony semi-deserts in northern Africa. Unlike many nocturnal desert dwellers, gundis are active during the day and even enjoy basking in the sun. They have adapted so well to the harsh conditions that they do not need to drink because they are able to metabolize water from their food. These little mammals run with great speed and agility on steep cliffs. They keep their insulating fur in condition with bristles on their back toes. The unicellular parasite *Toxoplasma gondii*, which is now known to cause toxoplasmosis in humans, was discovered over a century ago as a parasite in gundis. There is no detailed information on its abundance but the species is thought to occur in substantial numbers in its native habitats and requires no conservation action. Today 15 zoos keep gundis. Of the total of 84 specimens 14 live in Budapest Zoo. Two gundis were born in December 2013 and three in February 2014.

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38 **Hyacinth Macaw** (*Anodorhynchus hyacinthinus*) **EEP**

The hyacinth macaw is one of the largest species of parrot, reaching a length (from the top of its head to the tip of its long pointed tail) of 90–100cm (35–39in) and a weight of 1.5kg (3.3lb). It inhabits rainforests in central and eastern South America. Macaws were always heavily hunted by indigenous peoples, especially for their feathers. However, in addition to habitat loss, their numbers were reduced to the greatest extent by collecting for the pet trade: these intelligent birds were caught and exported by the thousand to Europe, North America and Asia. Less than ten percent of macaws taken from their natural environment survived. Fortunately, international trade is completely banned now.

Males and females are indistinguishable in this species. Hyacinth macaws are not easy to breed in captivity. In the last decade three chicks were raised in our zoo. The wild population is believed to number approximately 6500 specimens, while another 390 are maintained in zoological gardens.

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Javan Langur (*Trachypithecus auratus*)

EEP

Ebony lutungs, as they are also called, occur only on two Indonesian islands (Djawa and Lombok). As their volcanic habitat is not easily accessible, few researchers have ever studied them in the wild. The abundance of the species is unknown and one can only hope that changes in its environment do not affect it irreversibly. Javan langurs are threatened by habitat loss and hunting. Tropical rainforests are disappearing at an alarming rate due to wood extraction and agricultural expansion, so langur habitats are essentially reduced to national parks today. Of a total zoo population of 132 individuals, eight lutungs are kept in Budapest.

Lutungs are highly arboreal and rarely move around in the undergrowth. They live in small family troops formed mainly by female relatives. Their two colour morphs—copper red and black—are about as equally common in nature as in captivity.

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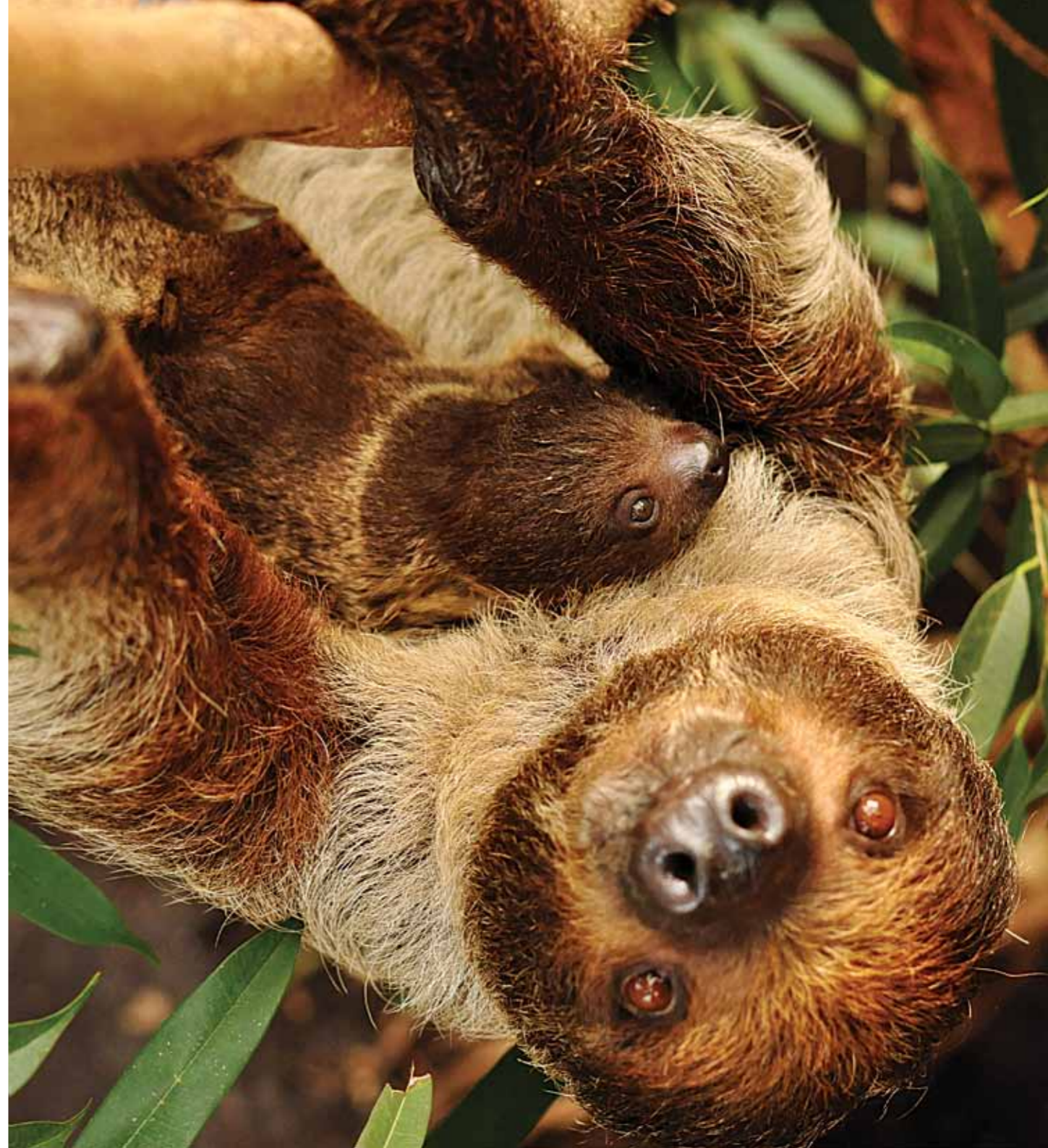
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Linnaeus' Two-toed Sloth (*Choloepus didactylus*)

ESB

Known by the local name unau, this species is found in the tropical rainforests of Central and South America. Its food consists mainly of leaves, fruits and—occasionally—small animals. It is famous for being sluggish but this is the result of its slow metabolism rather than its laziness. Symbiotic algae growing in its fur provide excellent camouflage as the sloth appears green rather than greyish brown, the actual colour of its hairs. Sloth reproduction is not a hasty matter either. A singleton is born at a time, which reaches sexual maturity at four to five years of age, while gestation takes nearly a whole year, and females give birth infrequently. In order to produce enough offspring for their species to survive, sloths are comparatively long-lived, with a potential lifespan of 30–40 years. The latest baby in our zoo was born in February 2014 from the oldest female, Banya (Witch). This is her fourth young. In all, seven unaus live in Budapest now.

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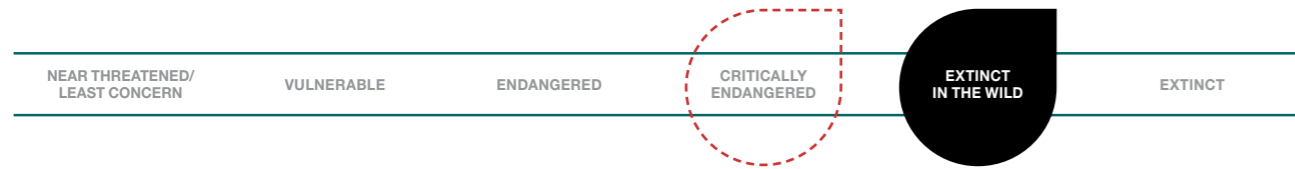
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44 **Mhorr Gazelle** (*Nanger dama mhorr*) **EEP, ISB**

The mhorr gazelle is a subspecies of the dama gazelle native to northwestern Africa. Today, this is one of the most critically endangered hoofed animals with not a single individual left in the wild. At present 18 zoos are breeding mhorr gazelles, but the number of captives is little more than 150, so the birth of every new fawn is an important step towards saving this subspecies. Budapest Zoo has taken part in the breeding programme since 2008 and our animals have reproduced since 2009. In late 2013 two young were born here.

The mhorr gazelle is threatened with extinction for the same reason as almost all the African wild ungulates. Overhunting, military conflicts, grazing by domestic animals and conversion of habitats all contributed to its disappearance. While the species as a whole is classified as critically endangered, the subspecies discussed here is considered extinct in the wild by the IUCN.

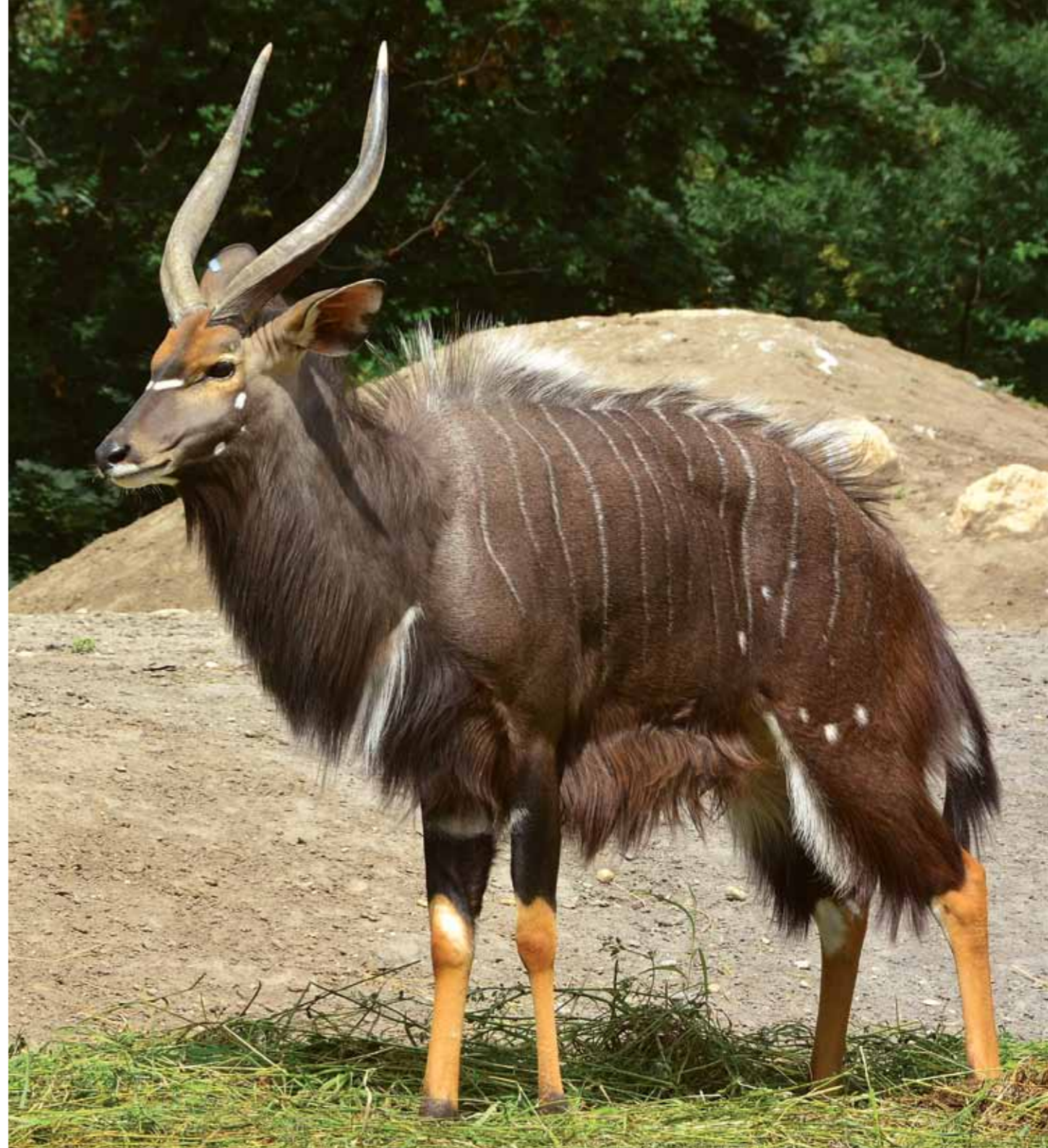




46 Northern Bald or Waldrapp Ibis (*Geronticus eremita*) EEP

Budapest Zoo has taken part in the conservation-oriented breeding programme since 1998. Our ibises breed every year, and of the 38 individuals maintained in 2013, seven are juveniles. Some of the young hatched here are transferred to a protected area in Jerez, Spain, where they can live naturally. The northern bald ibis was once common in the southern and central parts of our continent but was exterminated from Central Europe in the 16th century by hunting and collecting chicks for food. There are several reintroduction programmes that aim to establish breeding subpopulations within the former range of the species. Currently more specimens live in zoos than in nature: approximately 1400 individuals are maintained in captivity, whereas remaining habitats in Morocco and Turkey harbour just 440 and 100 bald ibises, respectively.

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Nyala (*Tragelaphus angasii*)

ESB

This species of antelope native to southern Africa is sexually dimorphic, i.e., the females and males look completely different. The former grow to 55–70 kg (121–154 lb), and have dark stripes on a light brown background, whereas the latter may reach 125 kg (276 lb), are dark chestnut brown in colour, and their backs and bellies are covered with longer, mane-like hair. The horns of males can be 80 cm (31.5 in) long. Our three adults (one bull and two cows) arrived in 2012, and both females (Nina and Amira) gave birth to one calf in December 2013.

Although this species is not endangered in the wild, European zoos have set up a studbook for the reason that all savanna-dwelling ungulates are increasingly at risk due to rapid agricultural encroachment, overgrazing of remaining grasslands and overhunting in Africa.

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Persian Leopard (*Panthera pardus saxicolor*)

EEP

The leopard is one of the most adaptable of large cats. Once it was the most widespread felid on Earth, too, after the domestic cat. It is found in virtually all climatic regions, ranging from deserts through rainforests and grasslands to alpine coniferous forests. It is not a picky feeder either, taking anything and everything from antelopes to insects and fish. In spite of its success as a species, populations are dwindling, with less than 1200 Persian leopards remaining in the wild. Tolerance is of little use if habitat patches get widely separated from each other and sexually mature animals cannot meet or only encounter close relatives. In addition to habitat loss, the scarcity of natural prey is also a serious problem, as is the fact that areas inhabited by leopards (e.g., in Armenia, Azerbaijan, Iran, Afghanistan, Georgia, Turkmenistan) are in military conflict zones. Furthermore, these beautiful cats are still being killed for their fur. As part of the international captive breeding programme eight cubs were born in 2013, one of them—a little male—in Budapest.

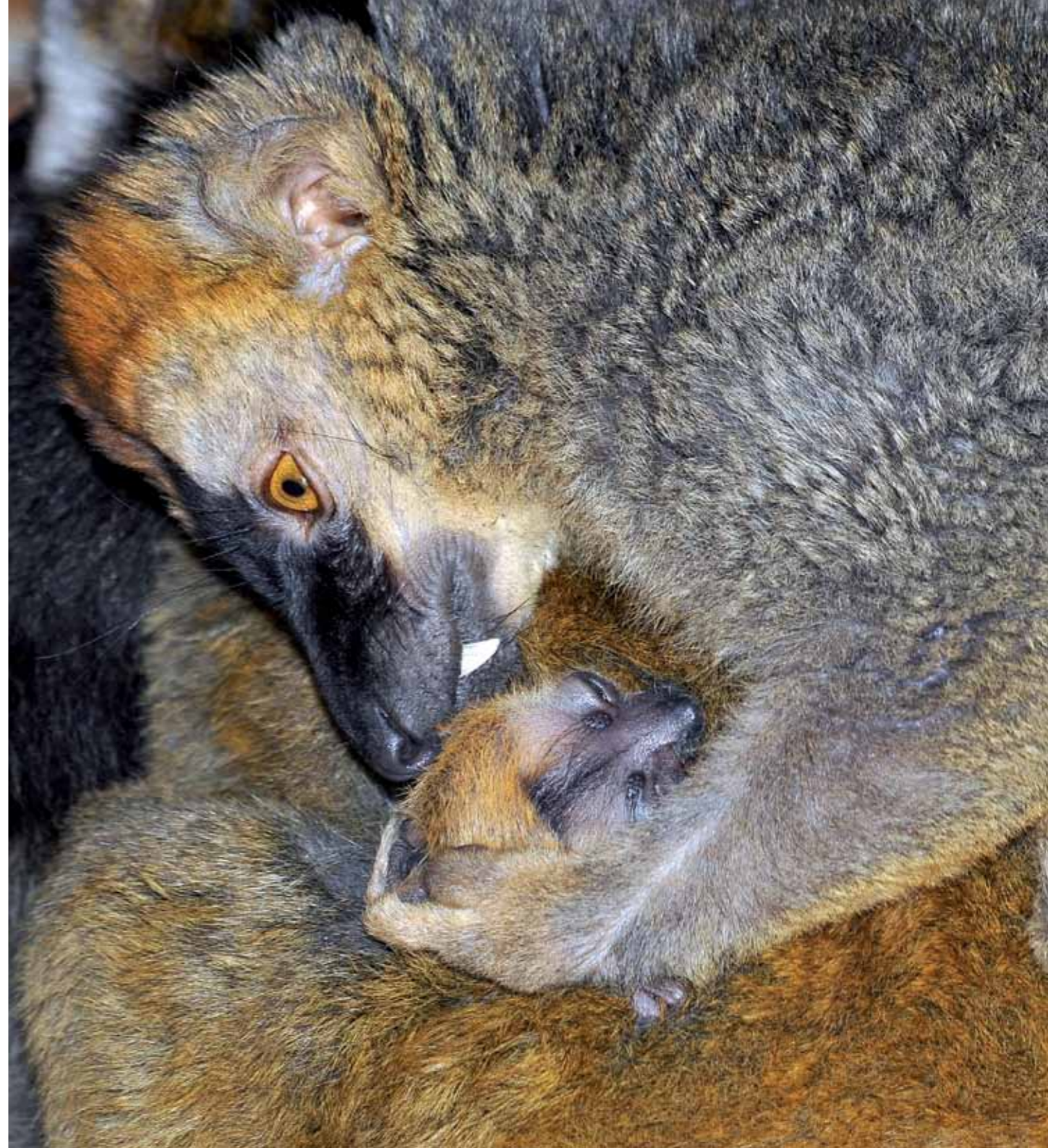
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Red-fronted Brown Lemur (*Eulemur rufus*)

ESB

For a while considered a variety of another species, the “former” red-fronted brown lemur itself is now believed to constitute a separate taxon. Consequently, little is known about its biology. It inhabits western Madagascar, where it occurs in dry lowland forests. It is both diurnal and nocturnal, and feeds on a great variety of items, such as fruits, shoots, leaves, tree sap and small animals. It lives in troops consisting of 3–12 individuals and communicates by scent. Its continued existence is threatened by human activity: as revealed by a 2012 study, there is a suspected population reduction of more than 30 percent in this species over a three-generation period. A real rarity in zoos, a total of 78 individuals are maintained worldwide. We keep two specimens in Budapest and had a single birth in the past decade.

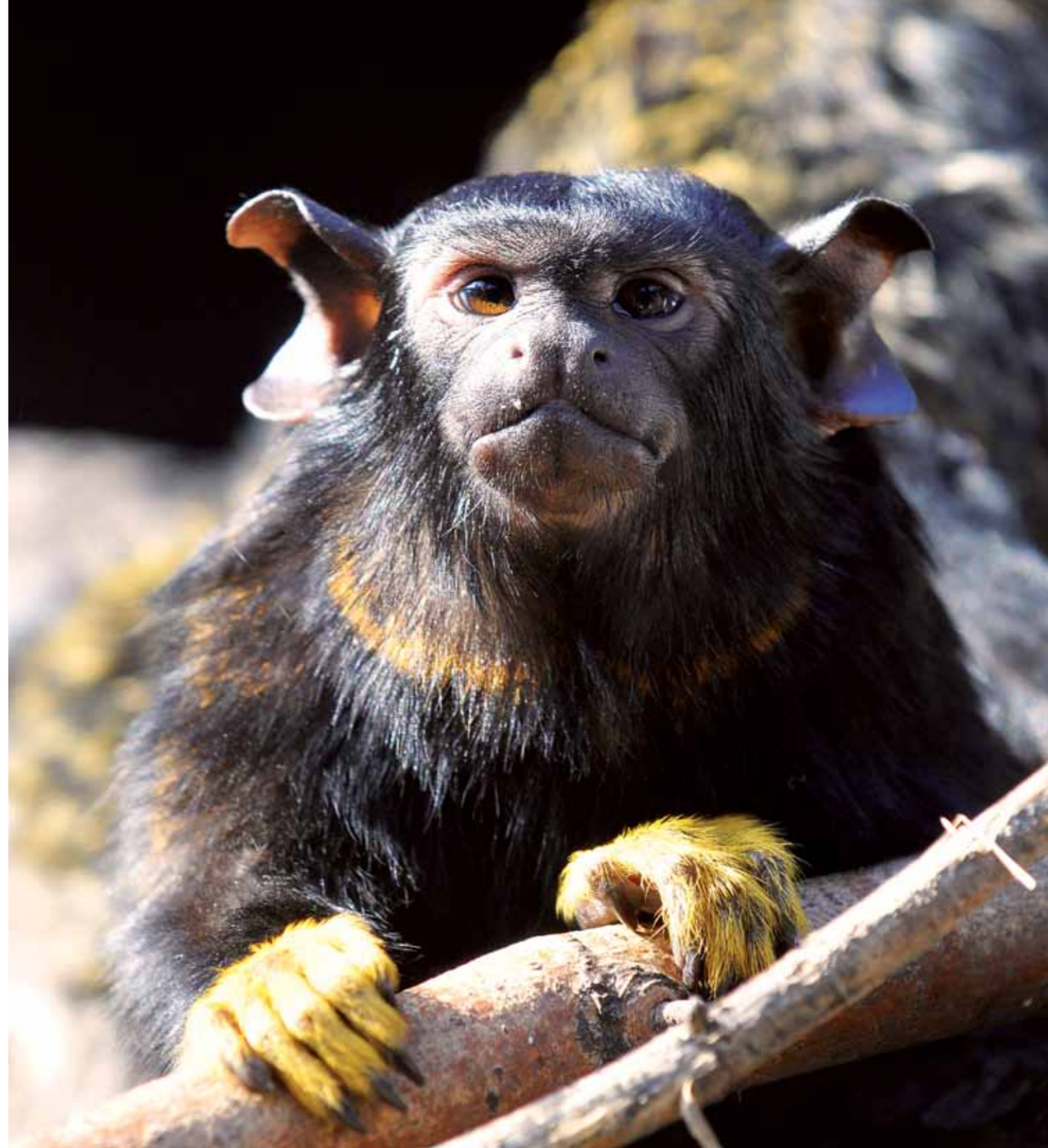
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54 **Red-handed Tamarin** (*Saguinus midas*) **ESB**

Native to South America, this species occurs in both primary and secondary forests, as well as in edge habitats. Its diet is made up of 50 percent animals and 50 percent plants—of insects and other invertebrates, soft fruits and nectar. Family troops consist of 3–12 individuals. Within a group only one female has the right to reproduce and she gives birth to twins once a year. The ovulation cycle of other females is blocked by pheromones released by the dominant matriarch. A possible reason for this is that raising the young requires help from all other group members. Red-handed tamarins have numerous predators: they are hunted by mammals, birds and snakes. However, it is human activity, especially habitat alteration, that threatens their survival. In the past decade 12 young were born in Budapest.

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56 **Ring-tailed Lemur** (*Lemur catta*) **ESB**

This day-active, semi-terrestrial animal is found in dry areas in southern and southwestern Madagascar. It feeds on fruits, leaves and flowers high up in trees and lives in troops consisting of about 20 individuals led by a dominant female. Ring-tailed lemurs mark the boundaries of their territory with scent glands located in the anal region and on the forelegs. Their tails are used for signalling and telling conspecifics about the whereabouts, the mood and the rank of group members. Interestingly, ring-tailed lemurs are born with blue eyes but the eye colour turns to a vivid yellow with maturation.

This species is the most common captive primate: the 3275 registered individuals are maintained by 376 zoos. There are several groups in Budapest, consisting of a total of 10 specimens, three of which are infants. Overall, 19 young have been born in the past ten years.

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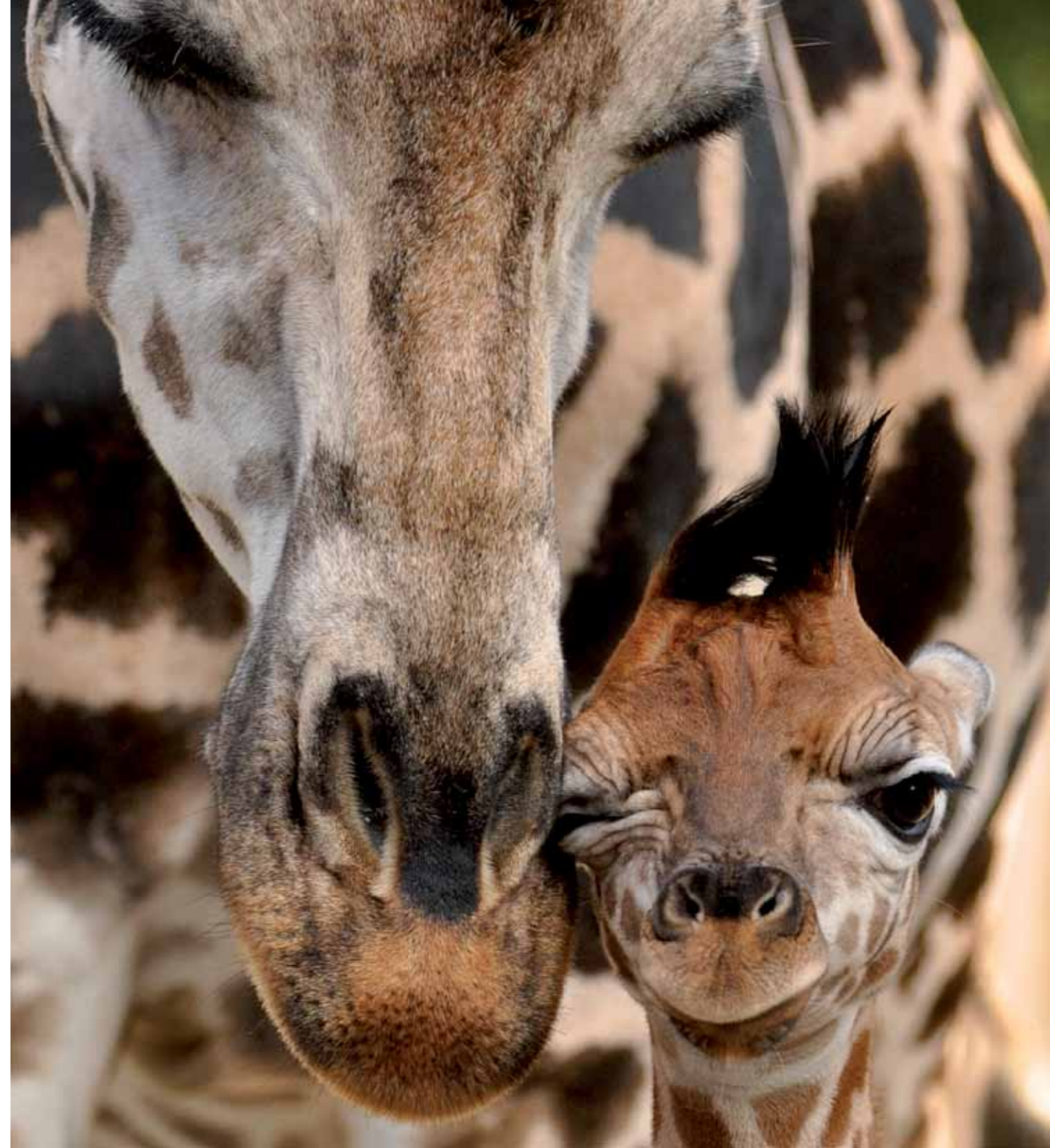
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58 **Rothschild's Giraffe** (*Giraffa camelopardalis rothschildi*) **EEP**

As a species, the giraffe is not yet endangered and at least a hundred thousand individuals live in Africa. However, some of its subspecies are nearing extinction. Of Rothschild's giraffe just 2500 remain in the wild. Human activity, such as deforestation and climate change, contribute to its decline: the Sahara is increasingly taking over the savannah and the explosively growing human population needs cropland and pasture, while poaching is also a problem. Giraffes frequent savannahs, grasslands, flood plains and gallery forests, in particular acacia woodlands. Females give birth to a 150–180cm (59–71in) high calf after a gestation of approximately 450 days. Within a few hours of birth the newborn is able to run around. 75 percent of calves fall victim to predators before reaching their first year of age. The first calf in our zoo, the mother of which was presented by Queen Elisabeth of Hungary, came into the world in 1868. Since then 26 calves representing various subspecies have been born in Budapest. The present group of Rothschild's giraffes have produced five young so far. In total 549 specimens of this subspecies are maintained in zoos worldwide, seven of which are in Budapest.

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8

South American Tapir (*Tapirus terrestris*)

EEP

The South American or lowland tapir occurs east of the Andes, from northern Colombia to northern Argentina. With a weight of up to 150kg (331lb) this is the largest terrestrial mammal in the region. Adults have few enemies, except for jaguars. Most of the population inhabits the Amazon rainforest, while the rest of the range is heavily fragmented. This species frequents jungles, marshes, floodplains and, more rarely, open areas. In the mountains it is found up to an altitude of 1700m (5,577ft). A solitary creature, it feeds on grasses, leaves, fruits and various crops. It swims well and readily enters water to escape from predators. It has poor eyesight but its hearing and sense of smell are excellent, while its thick hide offers protection against thorns. The maximum longevity is approximately 30 years. Overall, 414 South American tapirs are maintained in captivity worldwide. Several decades ago this species successfully reproduced in our zoo and we have strong hopes that our breeding pair will soon delight us with a calf.

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Southern Ground-hornbill (*Bucorvus leadbeateri*)

ESB

A characteristic, large bird of African savannas, it is typically seen on the ground while searching for food. This skillful and cautious hunter stalks arthropods and small-bodied rodents and reptiles moving around in the grass. Its red throat pouch acts as a resonator. It emits a strange, deep, drumming-like voice to announce its presence to other groups or pairs. The abundance of this species is unknown but populations are probably in decline due to a general loss of habitats in the region. Agricultural expansion, devastating bush fires, hunting and commercial collecting all threaten its survival. As females may lay three eggs at a time but raise only the first nestling, researchers often collect the other eggs for incubation and release the young once they are able to fend for themselves. This appears to be an effective method for stabilising populations of this “unproductive” species. A breeding pair is presently maintained in Budapest with offspring that hatched in 2012.

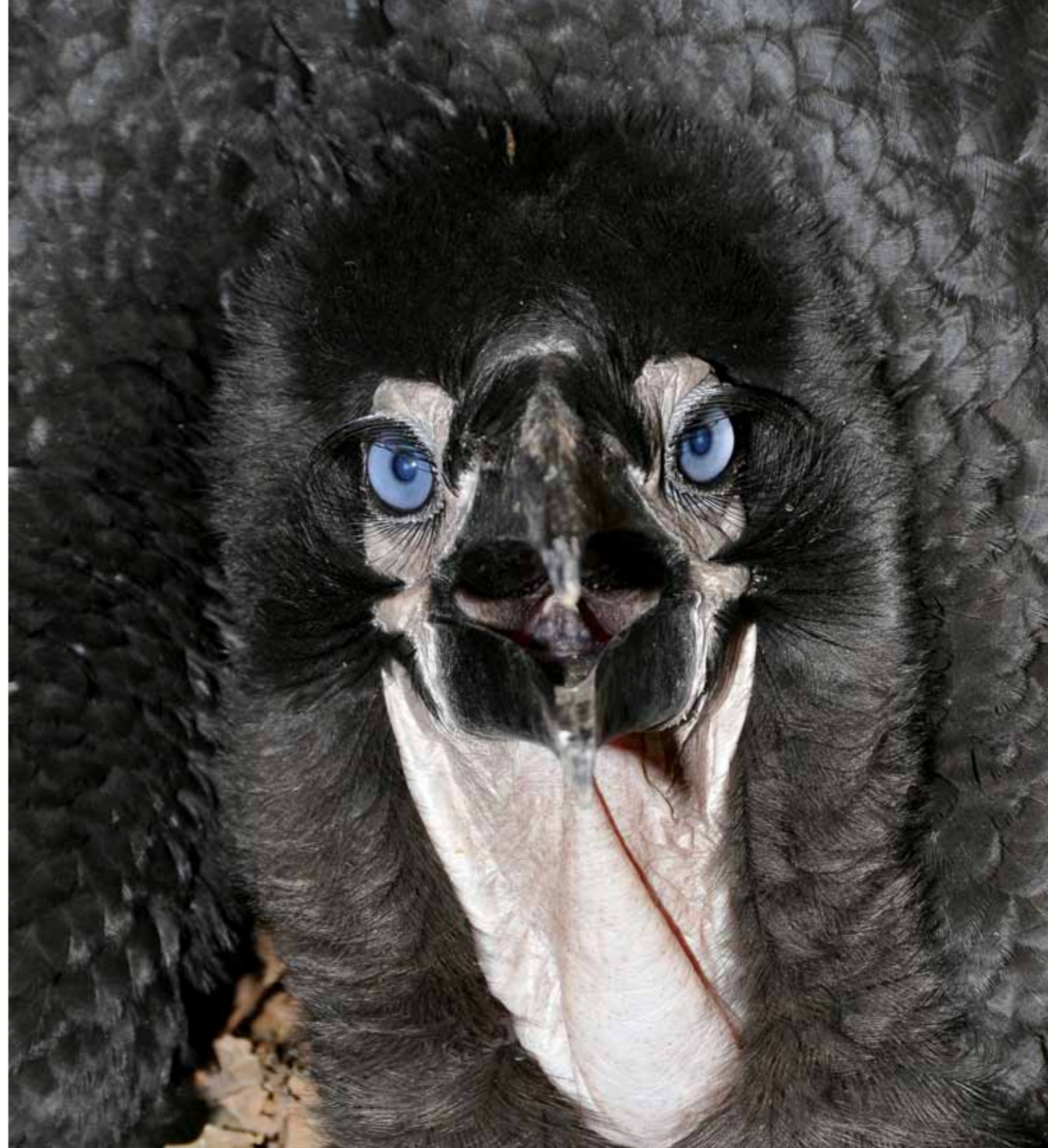
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64 **Squirrel Monkey** (*Saimiri sciureus*) **EEP**

Fortunately, this monkey is still abundant in nature, although populations are decreasing. The most serious threat comes from deforestation, but not long ago the species was also collected by the thousands to be used as laboratory animals for the medical and cosmetic industry or as pets. This small bodied animal inhabits South America, from Colombia to eastern Bolivia and Amazonia. It prefers rainforests and is found up to 1500m (about 4900ft) above sea level on the eastern slopes of the Andes. It feeds on fruits, shoots, flowers, invertebrates, bird eggs and small vertebrates. Troops are almost constantly on the run and move on for 2.5–4.2km (1.6–2.6 miles) a day. The common squirrel monkey could very well be considered the emblem of our zoo. At present 21 specimens are maintained here, and 38 young have been born in the past ten years.

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Sumatran Orangutan (*Pongo abelii*)

EEP, ISB

Orangutans are the heaviest arboreal animals. In contrast to chimpanzees and gorillas they live solitarily and spend almost the whole day in the canopy of trees. Their “fetishism” reveals itself clearly in captivity, but they also use tools (e.g., sticks, branches) in the wild. The survival of the wild population is threatened by deforestation, persecution and the illegal pet trade. Even today, poachers catch babies to order, after killing the mothers. Their shrinking habitats get fragmented, the parts being disjointed by plantations (of oil palms, for example) and roads. As a result, the once contiguous Sumatran population decreased by 80 percent in just three generations and the remaining stock is confined to nine widely separated groups on the island. Reintroduction programmes have as yet been unable to reverse this process, although 70 orangutans have been added to the wild population. Worldwide, 245 Sumatran orangutans live in zoos, among them four-year old Moira and four other individuals maintained in Budapest. Besides Moira, four other young have been born in the past 20 years in Budapest.

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Tammar Wallaby (*Macropus eugenii*)

ESB

Even though the tammar wallaby is still relatively common in the wild, it is seldom seen in European zoos. However, it has regularly bred in Budapest Zoo for decades. A native to South and Western Australia and a couple of offshore islands, this species was introduced to New Zealand in the 1860s where it soon became established. It is now considered a serious pest and is intensively culled—in vain. It prefers heavily vegetated areas and forest edges, and only ventures out into the open to graze. A secretive animal, it feeds mostly at night or dawn, primarily on grasses. On some islands, where there are no sources of freshwater, wallabies are forced to drink from the sea. While they lead solitary lives throughout most of their range, there are subpopulations in which animals form bonds and males establish a hierarchy. Females give birth to a single naked joey after a pregnancy of 25–38 days. The embryo-like young is carried around in the pouch for 8–9 months. In the past ten years 45 joeys were born in Budapest.

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2 Western Lowland Gorilla (*Gorilla gorilla gorilla*) **EEP**

In theory, gorillas could live undisturbed in the tropical rainforests of Africa. They have no natural enemies and their preferred habitats are widely separated from human settlements. However, their numbers have decreased with frightening speed in the past two decades. A major threat comes from bushmeat trade. Even though 60–80 percent of forests inhabited by gorillas are still pristine, removal of trees and mining on their periphery make them more accessible to poachers. Besides persecution, ebola is the greatest killer of large apes. It is believed that since 1995 one-third of the gorilla population was wiped out by infection. According to some estimates the remaining western lowland gorillas number 125,000. As females give birth to a singleton every four or five years and have a maximum of 5–6 offspring in their lifetime, recruitment is slow and cumbersome. So the zoo population of 772 specimens (of which six live in Budapest) is of enormous value in saving the species from extinction. Our silverback male named Golo has three young from his earlier mate, and another infant, four-year old Bongo, from his present one, N'Yaounda.

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White-fronted Marmoset (*Callithrix geoffroy*)

EEP

One of the smallest species of monkeys, the white-fronted marmoset inhabits forest remnants in southeastern Brazil. As a result of its small population and physical size little is known about its habits in the wild. This species lives in family groups, each consisting of up to 20 individuals. Being diurnal, they take refuge in tree hollows at night. Scent glands play an important role in their communication with each other. The menu of marmosets is extremely varied: in addition to fruits, flowers and small animals they also feed on large amounts of gum. Females usually produce twins, and mature offspring help their parents to raise their younger siblings. Not so long ago, marmosets were notoriously difficult to keep. However, it is now easier to provide them with a specialised diet and keeping conditions have improved so they readily breed in captivity. So far, three young have been born in Budapest.

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74 **White or Square-lipped Rhinoceros** (*Ceratotherium simum*) **EEP, ISB**

White rhinoceros is the second largest land mammal on Earth. All five species of rhinos are at great risk, but this one is especially attractive to poachers because of its two horns. Over a century ago it was almost hunted to extinction for its horns and meat: by the end of the 1890s only a handful remained. However, a breeding project initiated in the last minute helped it to regain strength slowly. Of the 30–40 individuals a 20,000-strong population was built up again. Today 524 specimens live in zoos, making this is the most populous species of rhino in the world. The first successful artificial insemination of this species was performed in Budapest. Born in 2007 and named Layla (Nati), the calf inhabits the “savannah” in our zoo. She grown into a 2–2.5 ton female and we hope that in a couple of years she will have her own offspring without any special intervention. Lisimba, the second calf produced by the same method, was born in 2009. The little bull was reared by his own mother but was sent to the Athens Zoo as part of the breeding programme.

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76 **Wombat** (*Vombatus ursinus*) **EEP**

In Australia and Tasmania farmers do not like wombats because their extensive tunnel systems often collapse under grazing cattle and cause injuries. However, in spite of heavy persecution the wombat is still abundant throughout its range. Its wild population is estimated at approximately 40,000 individuals. This nocturnal creature favours forests and clearings in pristine hilly country but also gladly uses pastures created by the removal of trees and shrubs. In contrast to most other marsupials its pouch opens backwards so that it does not get filled with earth when the wombat is excavating. Another rather special characteristic of this species is its permanently growing teeth.

The common wombat has always been scarce in captivity. In Budapest it was first kept about 100 years ago, and a related species again in the 1960s and 1970s. Also known as the coarse-haired or bare-nosed wombat, this is the greatest rarity on display in our institution, since this bear-like marsupial is kept by only three zoos in Europe, and the total captive population does not surpass 51 specimens. An even greater sensation was the birth of a joey in 2012, the first in 20 years in Europe.

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The species discussed on the following pages have not yet reproduced (or only a very long time ago) in our zoo but we hope to welcome their babies in the near future.

Hopes for the future





8 Eastern Quoll (*Dasyurus viverrinus*)

ISB

Referred to as “native cat” in Tasmania, the eastern quoll was once found in the southern part of Australia as well. However, the last specimen on the mainland was seen in the outskirts of Sydney in 1960. Possibly superseded there by feral cats, it remains widespread and locally common in “Tassie”. It favours dry grassland and forest mosaics, bounded by agricultural areas. Two colour morphs are known—about 25 percent of the population belongs to the black phase, while the rest belong the lighter fawn phase. Both can be seen in our zoo. Females first reproduce at one year of age. They mate in May or early June and give birth to up to 30 young after a gestation period of 30 days. However, a maximum of six young can attach themselves to the teats. They stay in the pouch for 8–9 weeks and are weaned after 5½ months. Essentially carnivorous, eating invertebrates and small vertebrates, they also consume plants. The first eastern quoll arrived in Budapest in 1991. The present group has been on display since 2013.

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Emerald or Green Tree Monitor (*Varanus prasinus*)

ESB

A relatively small monitor lizard reaching 65–85 cm (25.6–33.5 in) total length. This species is found over much of New Guinea, both in rainforest as well as plantations. It has adapted extremely well to an arboreal lifestyle: it has a slender body with a prehensile tail and long claws to grip branches. With its green colour it is perfectly camouflaged in its habitat and spends most of its time high up in the trees. The long tongue is used to pick up chemical stimuli from the environment and recognising prey as well as conspecifics. Sexes are difficult to tell apart. Males are very protective of their territory and attack any intruder fiercely. This species feeds on invertebrates, eggs, nestling birds and small mammals. Females produce clutches of 2–5 eggs, which hatch in 165–190 days.

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Fennec Fox (*Vulpes zerda*)

ESB

This small carnivore, weighing barely 1.5kg (3.3lb), is native to North Africa and a small part of the Arabian Peninsula. As a species it is currently not at risk but has become rare locally due to trapping for commercial use, canid diseases and the increase of vehicular traffic. The fennec is special for two reasons: it is the smallest of foxes and has the largest ears relative to body size. The ears serve to dissipate heat and also act as sonars. Unlike most of its relatives it lives in packs consisting of up to ten individuals. A desert dweller, it prefers stable sand dunes in which it can construct burrows. It is also known to absorb water through food consumption. The dense coat deflects heat during the day and keeps the fox warm at night. The soles of the feet are protected from the hot desert sand by thick fur.

Fennecs did not reproduce in captivity for a very long time. They first bred in Budapest Zoo in 1977.

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Giant Otter (*Pteronura brasiliensis*)

EEP, ISB

From Fall 2014, visitors will be able to see three giant otters in Budapest Zoo. Previously only the much smaller Oriental small-clawed and European otters were maintained here, so these females will be the very first ambassadors of their species in Hungary. Tropical lowland rainforests and wetlands bordering large rivers are the native habitats of the largest of all otters, which grows to 1.8 m (5.9 ft) in length and 30 kg (66 lb) in weight. Until a few decades ago this semi-aquatic carnivorous mammal was intensely hunted for its pelt and much of the population became decimated. Today, poaching, mining, logging, habitat degradation and water pollution are the most serious threats. Apart from man, this species has few enemies. Only anacondas, caimans and jaguars prey on giant otters.

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Griffon Vulture (*Gyps fulvus*)

ESB

One of the largest species of vultures, the wingspan of its fully extended wings may reach 2.6m (102in). Hungary was once the northernmost limit of the species' distribution, and griffon vultures were nesting here in the wild until the 1940s. At that time the lowlands were teeming with grazing livestock and these birds happily cleaned up their remains. However, due to the decline of extensive livestock production and changing habits (e.g., burying carrion), as well as systematic persecution, vultures disappeared from the country by the end of the 1940s.

In the meantime, populations of griffon vultures were reaching the point of collapse in Asia and other parts of Europe, too. The southern European—in particular the Croatian—subpopulations were almost exterminated by poisons meant to protect sheep from the attack of wolves, while Indian and Pakistani vultures died in large numbers from renal shutdown caused by a drug administered to domestic ungulates. After these threats were recognised, methods changed and breeding programmes have successfully boosted wild stocks. Our zoo is involved in the consolidation of the Croatian subpopulation in collaboration with the Birds of Prey Conservation Centre in Senj.

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Kea (*Nestor notabilis*)

EES, ISB

These large parrots inhabit 600–2,000m (approximately 2,000–6,500ft) high alpine regions on South Island, New Zealand. Outside the breeding season they live in small flocks. Older males are polygynous, i.e., may be attached to up to four females. Nest sites—often reached by long tunnels—are positioned on the ground beneath large trees, in rock crevices, or in burrows dug between roots. These playful birds may cause considerable damage, picking at the rubber seals of cars, breaking off windscreen wipers or carrying away unguarded items. They are omnivorous creatures, feeding on both plants and animals. Keas were accused of attacking sheep and because of this 150,000 of them were killed between 1860 and 1970. They are now protected by law and protected areas were established to aid their survival.

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Kinkajou (*Potos flavus*)

ESB

The kinkajou is an inhabitant of tropical forests in Central and South America. Although classified as a carnivore it does not eat meat: over large parts of its range it consumes fruit for 90 percent of its diet, and nectar and leaves for the other 10 percent, even though members of some populations occasionally do feed on insects. This species uses its tail much in the same way as New World monkeys: holding on to branches with its “fifth limb” the kinkajou can hang upside down. Another characteristic is its widely extendable tongue that helps it to extract nectar and honey. The kinkajou is a “lucky” animal, for when it is active, raptors are already asleep. With a weight of 2–3kg (4.4–6.6lb) it is normally too large a prey for an owl, and because it leads an arboreal life, it rarely encounters mammalian predators. Probably this is the reason for its low reproductive output: females give birth to one or very rarely two young following a gestation of 118 days. In captivity this species may live for 32 years.

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Komodo Dragon (*Varanus komodoensis*)

EEP, ISB

The Komodo dragon is a gigantic species of monitor lizard found on Komodo and some offshore islets in Indonesia. It reaches 3m (9.8ft) in length and 100kg (220lb) in weight. First documented in 1912 by a Dutch herpetologist, the largest terrestrial reptile to roam the Earth today has a couple of surprises to offer even to contemporary scientists. As discovered in the Chester Zoo in 2006, this species is able to breed asexually, i.e. without the need to mate (by a method known as parthenogenesis). This phenomenon is extremely rare among tetrapods and may come in handy for Komodo dragons, which occur in highly isolated habitats and hence rarely encounter conspecifics. However, parthenogenesis produces exclusively male offspring. Our lizard, which came to Budapest Zoo in 2008, had been conceived without outside fertilisation in Chester, i.e., it is a male, too.

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Kowari (*Dasyuroides byrnei*)

ESB

Known also as the brush-tailed marsupial rat, the kowari is native to northern South Australia and southwestern Queensland . Its home range encompasses just a couple of square kilometres. It lives in underground burrows singly or in small groups and emerges to hunt among grass tussocks or to bask in the morning hours. It marks its territory with its urine, faeces and the secretion of its scent glands. Contrary to other carnivorous marsupials, the kowari is a highly social and playful creature. The 32-day long gestation of females as well as the 126-day weaning of the young is very long compared to similar-sized relatives. The breeding period lasts from April to December. Usually six, approximately 4mm (0.16in) long young are born in a litter. They attach themselves to the teats of their mother for about 56 days and first venture into the outside world at about 100 days old. Kowaris may live for up to 6–7 years in captivity. They are not very picky and eat invertebrates, lizards, small mammals and occasionally small birds. Feral cats constantly reduce their numbers.

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Radiated Tortoise (*Astrochelys radiata*)

ESB

This medium-sized tortoise is native to southern and southwestern Madagascar but was also introduced elsewhere on the island, as well as to Réunion and Mauritius. It reaches 40cm (15.7in) in carapace length and 13kg (28.7lb) in weight. However, little is known about the species' biology. About 80–90 percent of their food is grasses but radiated tortoises also eat succulents and fruits and have been seen eating the dried faeces of bushpigs, too. Females lay 3–12 eggs in September. The Malagasy people often keep the tortoises in pens with chickens and ducks as a means of warding off poultry diseases. The Mahafaly and the Antandroy have a taboo against eating or touching them, but other peoples harvest them. Habitat loss and illegal collecting for the international pet trade are the greatest concerns. There are six individuals in our zoo.

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Red Panda (*Ailurus fulgens*)

EEP, ISB

Also called the lesser panda or red cat-bear, the range of this species stretches from the Himalayas to southern China. Its population size is estimated at 16,000–20,000 individuals. The total area of potential habitat is decreasing, and there remain few forests of bamboo thickets where red pandas may take refuge. They occur up to an altitude of 4,300m (about 14,000ft). Active from dusk to dawn in the wild, in captivity they can be seen moving around also by day. When asleep they cover themselves with their bushy tail. Excellent climbers, their claws are retracted when not in use. Cat-bears feed on a great variety of items: leaves, grasses, berries, fruits, shoots, roots and lots of bamboo leaves and shoots, as well as invertebrates and eggs. The first pair in Budapest came from Shanghai Zoo in 1990, and also reproduced. They belonged to the subspecies *A. f. styani* native to China. However, European zoos, Budapest included, now maintain the lighter coloured subspecies

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Red River Hog (*Potamochoerus porcus*)

EEP

With its striking reddish-brown fur and contrasting pattern this species is unique among wild pigs, which are normally greyish in colour. Sexes are easily distinguished because only boars have lumps on both sides of their snout. The red river hog is found in West Africa and the Congo Basin, where it inhabits rainforests, wet dense savannahs, forested valleys, flood plains and marshes. It generally lives in troops comprising a maximum of 15 individuals but can form huge groups of up to 60 animals. The red river hog is one of the few large mammals that are actually on the rise in Africa: agricultural development and the decline of predators positively affect its population numbers. Although abundant in the wild, it is seldom seen and—because matching pairs are difficult to come by—rarely bred in zoos. This species can survive for up to 20 years in captivity.

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92 **Red Ruffed Lemur** (*Varecia rubra*)

EEP, ISB

This lemur calls northeastern Madagascar home. Reaching a weight of up to 5kg (11lb) it is one of the largest prosimian on the island. It has a loud and eerie call. Active after dusk, the nocturnal creature feeds mainly on fruits. Matriarchal groups are lead by a dominant female. Females give birth to twins or occasionally triplets in a simple nest built of twigs, leaves, vines, and fur. Initially, the babies are not able to hold on to their mother, so she picks them up one by one when she moves. This critically endangered species is declining mainly due to habitat loss and hunting. At present, one male and two females live in Budapest. In addition, two black-and-white ruffed lemurs (*Varecia variegata*), the species' closest relative, are maintained in the zoo.

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93 **Short-beaked Echidna** (*Tachyglossus aculeatus*)

ISB

The short-beaked echidna is an inhabitant of New Guinea, Australia and Tasmania, and is one of the greatest rarities in zoos. It is found, sometimes in great abundance, in nearly all types of habitats except for tropical and montane rainforests. In addition to using their spines males can actively defend themselves with small poisonous spurs located on the rear legs. A monotreme mammal, females of this species lay rubbery-skinned eggs, one at a time, directly into a small, backward-facing pouch. The semitranslucent, blind and naked embryo—known as a puggle—hatches after about ten days and is just 1.5cm (0.59in) long. Approximately 50 days later the baby is ejected from the pouch and becomes completely independent at 6–8 months of age. Echidnas mainly consume ants and termites. They have no teeth but use their sticky tongue—up to 17cm (6.7in) long—to collect food. During the winter they go into a deep torpor and their body temperatures sink to 4C (39.2F). Increasing the zoo population of echidnas is one of the foremost goals of EAZA (European Association of Zoos and Aquaria) members.

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Southern Cassowary (*Casuarus casuarius*)

ESB

The second largest species of bird on earth, the Southern Cassowary grows to 170cm (5.6ft) in height and 60–80kg (132–176lb) in weight. It inhabits New Guinea and northeastern Australia, and the wild population is estimated at 20,000 individuals. This flightless bird inhabits dense forests and uses its casque to force its way through the undergrowth. It feeds on fruits, seeds, berries and sometimes on fish and insects. The bright skin of a cassowary's head and neck reflects its mood. A very fast runner, it can reach speeds of up to 60km/h (37.2mph). Although it normally avoids people, some individual birds can be extremely aggressive, especially in the breeding season, and seek to stab their opponents with their 10cm (3.9in) long dagger-like claws. Females may even kill unattractive males by this means.

Females lay their 3–5 eggs into a mattress of plants gathered together by the male. The hen also incubates the eggs and raises the chicks alone. A female may produce 4–5 clutches in a single season, fathered by different males. The chicks hatch in 50–56 days. Their lifespan in the wild is 10–15 years but in captivity they may live for 18, or sometimes even up to 40 years.

NEAR THREATENED/
LEAST CONCERN

VULNERABLE

ENDANGERED

CRITICALLY
ENDANGERED

EXTINCT
IN THE WILD

EXTINCT



Striped Hyena (*Hyaena hyaena*)

ESB

A nocturnal predator occurring in both Africa and Asia, the striped hyena hunts less than its spotted cousin and feeds mostly on carrion. Sometimes it even digs up buried corpses. With its powerful jaws it can crack the hardest bones. It is usually seen alone, although it lives in small family groups. Older cubs help their parents raise their younger siblings. This species has few enemies because, some researchers suggest, it is extremely smelly. Another interesting fact is that because both sexes look almost perfectly alike the striped hyena was long believed to be a hermaphrodite. Even though hyenas are distinctly dog-like, they are not canids but belong to a separate family of carnivores. This species is generally declining throughout its range and occurs at low population densities. It is seldom maintained in zoos but may live for up to 24 years in captivity.

NEAR THREATENED/
LEAST CONCERN

VULNERABLE

ENDANGERED

CRITICALLY
ENDANGERED

EXTINCT
IN THE WILD

EXTINCT



Rare species in a unique historic environment

From its opening in 1866, Budapest Zoo was the only zoological garden in Hungary for almost a century. Today, it is one of the most popular cultural attractions in the country, visited by one million people annually. Luckily, it has shed its “menagerie” character over time. As a contemporary zoo, its scope of activities includes the organisation of value- and nature-oriented recreational programmes, education, conservation programmes directed at saving endangered species and scientific research. During the past decades it has refashioned its collection of animals to meet legal requirements, conservation priorities and the expectations regarding modern animal husbandry. The focus has shifted towards illustrating environmental issues and exhibiting endangered species and subspecies. In addition to boosting a rich collection of living creatures, Budapest Zoo turned into a complex cultural institution: it now organises various events, festivals, art shows, as well as classical music and jazz concerts.



Contemporary Noah's arks

Budapest Zoo is a gem in the heart of the Hungarian capital. Its botanical garden is a nationally protected area, while its unique architectural treasures provide an unparalleled historic environment. With the recent reconstruction works not only have we managed to preserve the original beauty of the century-old buildings and even to restore some of the long-destroyed houses, but the resulting new facility also meets both the requirements imposed on modern animal and plant husbandry, and educational needs.



Diversity from various aspects

By the end of 2013, 10,354 individuals and 117 breeding groups belonging to 1072 species were on display in Budapest Zoo. This outstanding collection of live animals constitutes, even by international standards, a diverse assemblage. Our zoo seeks to give a broad cross-section of the diversity of life on Earth. So apart from mammals and birds, visitors can observe a wide variety of amphibians, fish and invertebrates in Budapest.



Cooperating zoos

Today's zoos operate in a world full of increasingly acute environmental problems. Animals and plants are threatened by habitat loss, climate change, water, air and soil pollution, poaching, smuggling, infections, etc. In this depressing situation, the role of zoos and aquaria in nature and species conservation is more important than ever before.

In order to preserve biodiversity, zoos are more purposeful and organised in their actions, and cooperate more intensively with each other to reach their goals. Professional associations serve as a framework facilitating cooperation among the various institutions. There are separate regional organisations for American, Asian, African and Australian zoos. Functioning since 1992, the European Association of Zoos and Aquaria (EAZA) represents and links 345 institutions and organisations in 41 countries, which are visited by 140 million people each year.

Their decades-long experience of keeping and breeding animals makes modern zoos gold mines of information, and thanks to their closely cooperating network they play an increasingly important role in nature conservation programmes. Their work encompasses the whole spectrum of conservation, from the captive breeding of endangered species through research, raising of awareness, education and collection of support to the preservation of species and their habitats. And as attested by successful reintroduction projects, without the work of zoos many species would no longer exist!





Veterinarians at work

Coordinated captive breeding programs are key elements in the zoo-based protection of threatened species that have become rare in the wild. These conservation initiatives are run by regional organisations. Some are managed by the American, others by the Australasian, and still others by the African or the European Association of Zoos and Aquariums. As part of the latter, European zoos breed more than 345 taxa—from Partula snails through horn sharks to great apes. We participate in 34 of these EEP programs (European Endangered Species Programmes) by keeping breeding stock—and in the case of one species—as coordinators. Of the taxa included in the breeding programs, international studbooks (ISB) are kept for 13 species, i.e. their conservation-oriented breeding is of global importance. Of species which do not yet have an organized breeding program but are in the European StudBook (ESB), our zoo maintains 35. We also have some species, such as the golden-bellied mangabey, that are rare even in zoos and their status in the wild is unknown, the coordinated breeding of which is obstructed by the lack of these very data. In all we are involved in the conservation-oriented breeding of 69 unique species.

Another key to success is an up-to-date database that contains as much pertinent information as possible—such as dates of birth, parentage, vaccination, disease history, etc.—for each individual of each species maintained in zoos, on the basis of which animal management professionals can make well-founded decisions. By knowing about their ancestry, these experts can set up breeding pairs that offer the best gene combinations. The name of this global repository is the International Species Information System (ISIS/ ZIMS). After evaluating this information and studbook data the coordinator of a given species determines where each individual registered in the system should go for breeding purposes. For instance, an expert at Budapest Zoo keeps the studbook of mandrills and is at the same time the European coordinator for the species. Data about the sizes of zoo populations mentioned in this book originate from the gigantic ISIS database.



Mandrill

Golden-bellied mangabey

What happens to captive-bred animals?

In itself, captive breeding cannot guarantee the survival of any species in the wild. For this purpose, in situ action oriented at preserving natural habitats is a must. The two programmes should be linked to achieve success. Zoo organisations cooperate both with large international conservation organisations (e.g., the IUCN or WWF) and with national nature protection authorities, ministries, conservationist groups and universities involved in monitoring local fauna and population rescue. For instance, to boost the population of the northern bald ibis, birds hatched in Budapest were released near Jerez, in Spain, as part of an international programme. In the chapter “Back to the wild” we provide a few examples of (critically) endangered or threatened species, the populations of which could be strengthened or a self-sustaining population established by captive-breeding.

Griffon vulture



Northern bald ibis



Outside the fence

Our responsibilities do not end at the zoo's perimeter. For instance, we became involved in a **griffon vulture** conservation programme in 2001 and set out to save the vulture population of the Croatian island of Cres, together with our partner, the Ecological Center “Caput Insulae”. Griffon vultures are in strong decline in the Balkans, and unless something is done to save them they will be extinct sooner or later. The greatest threat comes from the lack of food, the loss of habitats and human disturbance. In the 1980s, as few as 20 pairs nested on Cres, but by rescuing and feeding the birds conservationists managed to boost their numbers to 80 pairs.

The *Hungarian meadow viper* is a small, 50–60 cm (1.6–2.0 ft) long snake protected by law and having a conservation value of one million forints. It has survived in two general areas (Hanság, Kiskunság), but has disappeared everywhere else. The total Hungarian population is



Hutsul horse



Hungarian meadow viper

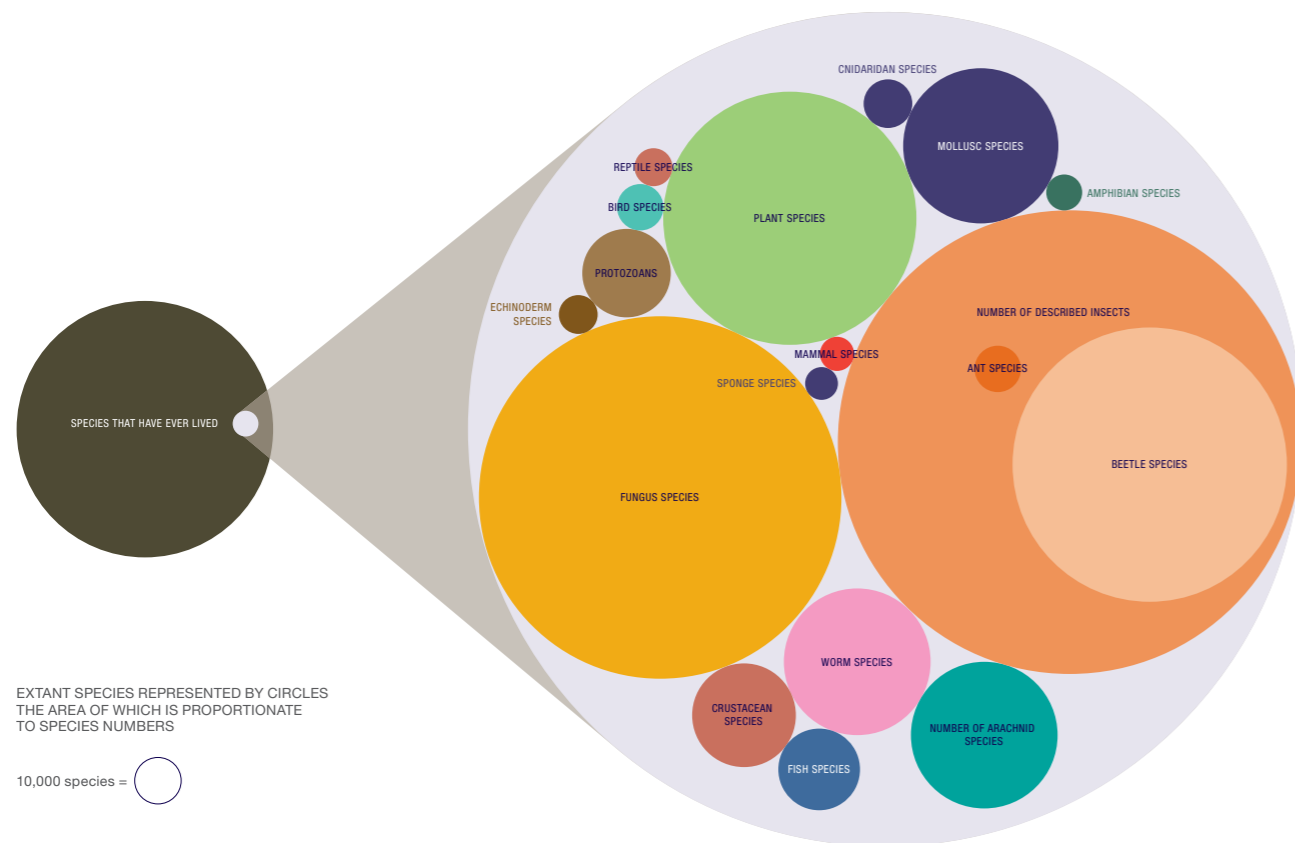
estimated at less than 500 individuals. The reason for their rapid decline was the loss of habitats, but snakes were also collected for pets or deliberately killed, although they normally use their mild venom only to paralyze grasshoppers, locusts, nestlings and baby rodents. As part of a conservation programme, Budapest Zoo offers medical care and temporary accommodation to specimens collected in one of the shrinking habitats. A concerted effort resulted in the birth of more than 600 vipers, i.e., of more than the entire wild stock of the species.

Conservation breeding may extend to the planned reproduction of domestic animals that would otherwise go extinct. One example are **Hutsul horses**, the very last pure-bred specimens of which were gathered by the staff of Budapest Zoo. Ten mares were sent to Aggtelek National Park in 1986 to conserve the genes of this archaic breed.

What fate awaits extant species?

The International Union for the Conservation of Nature (IUCN) annually assesses the population status of each threatened animal and plant species included in its Red List. According to its evaluation, more than one-third of extant species are at risk, mainly because of man's activities. However, detailed information is available about just three percent of the 1.8 million known species, while the majority of taxa inhabiting Earth still await discovery!

As wildlife habitats shrink and the number of captive populations increases, boundaries get blurred: what constitutes a zoo and what is a reserve, and does nature devoid of any human influences exist?



Adapting wildlife – lost and new species

To geologists and palaeontologists, extinction is not necessarily something tragic but the engine of evolution, a natural process by which new species develop. In Earth's history there have been at least five major events which, by their impact, i.e., the percentage of the taxa they affected, can be considered mass extinctions. Some scientists believe that the sixth of such events is currently taking place—and the world is changing faster than ever before. The result, among others, is the strong fragmentation and transformation of habitats. In a new situation, previously advantageous properties might suddenly become disadvantageous.

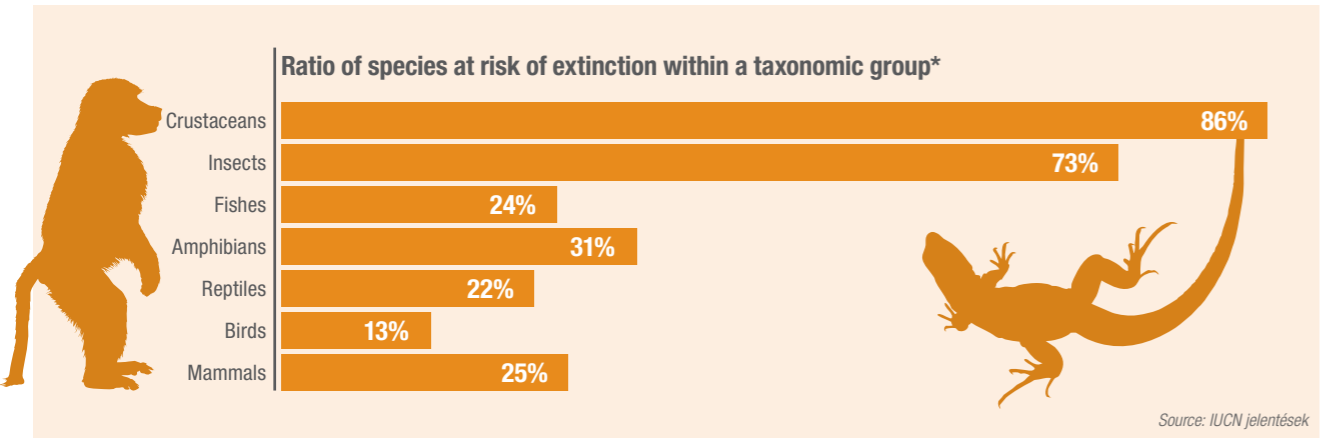
According to the IUCN, 799 species became extinct in the past 50 years, and only 61 of them purely because of “natural” causes. All the others were exterminated in one way or another by people. An additional 58 species survived merely in captivity—in private collections, zoos and wildlife parks. Researchers declare a species extinct when it has not been seen in the wild for at least 50 years. However, “extinct” species are occasionally rediscovered, such as the Parma wallaby or the most famous “resurgent”, the coelecanth. The latter species was believed to have died out 80 million years ago until South American fishermen caught one in their net in 1938. The Lord Howe Island stick insect is another of these “Lazarus taxa”.





The Saint Vincent amazon occurs exclusively on the island after it is named. As only about 500 individuals are left in nature, captive breeding efforts are very important.

According to experts one-third of all known species are on the brink of extinction, and 20 percent of all vertebrates fall in this category. Furthermore, the extinction risk of species is dramatically increasing, especially in the Tropics. The most heavily affected region is Southeast Asia, where agricultural encroachment, deforestation and hunting are the most destructive factors.



Documentation and dissemination of knowledge

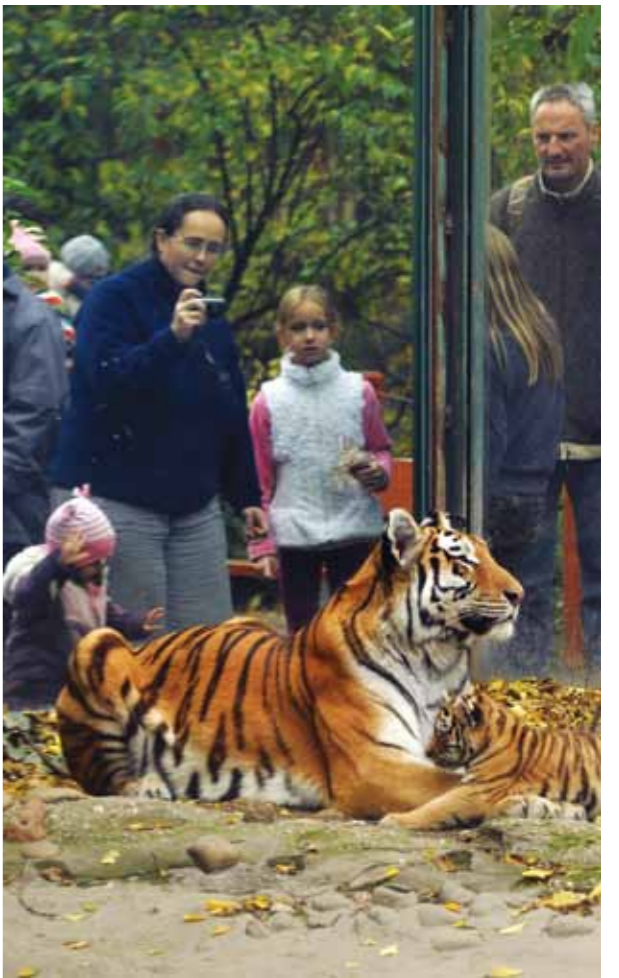
One requirement for the long-term survival of the various animal and plant species—and essential for any real successes—is that zoos should be effective in raising public awareness of the results of their conservation work, the population status of species, the vulnerability of habitats, the risk factors and the importance of action. Zoos are the most obvious arenas for dialogue about animals and for consciousness raising, so education is at least as important to us as hands-on work with animals. It is worth cooperating even in this field so we can draw attention to a particular problem more effectively. European zoos have been running conservation campaigns aimed at familiarising the status of a given taxon or ecological problem for more than a decade. They joined forces to protect tigers, amphibians, gorillas, European carnivores and polar animals, as well as to fight against poaching and the bushmeat trade. The funds thus raised are used for saving critical habitats. So far members have sponsored almost ten thousand habitat conservation initiatives.

EAZA MADAGASCAR CAMPAIGN
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Passenger pigeon



New Zealand quail



Prairie hen



Burchell's zebra



Schomburgk's deer



Tasmanian tiger or thylacine



Aurochs

Some bird and mammalian taxa (species and subspecies) that have gone extinct in the past 350 years

Name of species	Presumptive place and year of extinction	Reason for extinction
Aldabra brush warbler (<i>Nesillas albabrana</i>)	Aldabra Atoll, Seychelles, 1994	Introduction of goats, cats and rats
Amsterdam wigeon (<i>Anas marecula</i>)	Mauritius, 1696	Hunting
Arabian gazelle (<i>Gazella arabica</i>)	Arabian Peninsula, 20th century	Hunting
Auckland Islands Merganser (<i>Mergus australis</i>)	Auckland Islands, 1902	Hunting, introduction of domestic animals
Barbados raccoon (<i>Procyon gloveralleni</i>)	Barbados	Hunting
Bar-winged Rail (<i>Nesoclopeus poecilopterus</i>)	Fiji Islands, 1973	Hunting, introduction of rats
Bluebuck (<i>Hippotragus leucophaeus</i>)	Republic of South Africa, 1799	Hunting
Bushwren (<i>Xenicus longipes</i>)	New Zealand, 1950	Introduction of rats
Caribbean monk seal (<i>Monachus tropicalis</i>)	Caribbean Sea, 1952	Habitat loss, hunting
Carolina parakeet (<i>Conuropsis carolinensis</i>)	United States of America, 1914	Hunting
Chatham fernbird (<i>Bowdleria rufescens</i>)	Chatham Islands, 1895	Introduction of rats and cats, as well as brush fires and overgrazing
Cuban macaw (<i>Ara tricolor</i>)	Cuba, 1864	Hunting
Desert rat-kangaroo (<i>Caloprymnus campestris</i>)	Australia, 20th century	Introduction of predators
Dodo (<i>Raphus cucullatus</i>)	Mauritius, 1685	Introduction of domestic animals, agriculture
Elephant bird (<i>Aepyornis maximus</i>)	Madagascar, 17th century	Hunting
Falkland Islands wolf (<i>Duscicyon australis</i>)	Falkland Islands, 20th century	Hunting
Great auk (<i>Pinguinus impennis</i>)	Northern Atlantic Ocean, 1844	Hunting, egg collecting
Hoopoe starling (<i>Fregilupus varius</i>)	Réunion Island, 1705	Hunting, introduction of domestic animals, agriculture
Kangaroo Island emu (<i>Dromaius baudinianus</i>)	Kangaroo Island, 1827	Hunting
Labrador duck (<i>Camptorhynchus labradorius</i>)	Labrador Peninsula, 1875	Hunting
Lesser bilby (<i>Macrotis leucura</i>)	Australia, 1931	Introduction of predators
Mauritius sheldgoose (<i>Alopochen mauritianus</i>)	Mauritius, 1698	Hunting
North Island giant moa (<i>Dinornis novaeseelandiae</i>)	New Zealand, 1850	Hunting
Passenger Pigeon (<i>Ectopistes migratorius</i>)	North America, 1914	Hunting
Quagga (<i>Equus quagga</i>)	Republic of South Africa, 1878	Hunting
Red gazelle (<i>Gazella rufina</i>)	Algeria, 20th century	Hunting
Réunion ibis (<i>Threskiornis solitarius</i>)	Rodrigues Island, 1761	Arrival of humans, disturbance
Réunion sheldgoose (<i>Mascarenachen kervazoi</i>)	Réunion Island, 1710	Hunting
Schomburgk's deer (<i>Cervus schomburgki</i>)	Thailand, 1938	Hunting
Sea mink (<i>Mustela macrondon</i>)	Canada, 20th century	Trapping
Steller's sea cow (<i>Rhytina gigas</i>)	Bering Sea, 1768	Hunting
Thylacine (<i>Thylacinus cynocephalus</i>)	Australia and Tasmania, 1936	Hunting
Yemen gazelle (<i>Gazella bilkis</i>)	Yemen, 20th century	Hunting



Back to freedom

Zoos have been actively participating in conservation projects since the first half of the 20th century, one of the reasons being that from the second half of the 19th century numerous animal species disappeared forever from the face of Earth. The first species directly saved from extinction by zoos was the European bison or wisent. Since then the number of species that would no longer exist if it had not been for zoos has risen to several dozens. In the following pages we discuss some which have been or currently are on display in Budapest Zoo.

A genuine success story

In the 18th century the wisent (*Bison bonasus*) occurred in four isolated regions in Europe: eastern Prussia, Poland, Transylvania and the Caucasus. By the beginning of the 20th century only the Polish and the Caucasian subpopulations were still extant. Their numbers plummeted so much that the Caucasus wisent became extinct in 1927. On 15 October 1922—as a direct result of World War I and the subsequent upheavals—as few as 56 wisents were left in Europe.

In 1927 the International Society for the Protection of the European Bison held its meeting in Budapest mainly because the Visegrád Wisent Reserve, where the European bison of Budapest Zoo were housed, was already functioning at that time. The animals had been moved to Visegrád in 1923, to live in a fenced area of 10 “jugers” (approximately 5.8 ha). The reserve existed until 1930.

The number of bison slowly started to grow in the whole of Europe but the majority were again killed during World War II. The total world population of wisents consisted of 59 bulls and 76 cows in 1951. From that point, however, the number of European bison started to increase steadily: their stock surpassed 1000 individuals (1019) in 1968, while the free-roaming population was 1955 specimens in 2004, kept at 31 different sites, with another 1200 captives maintained in zoos.



European bison of the Budapest Zoo in the Visegrád Wisent Reserve

The first Przewalski's horses (*Equus przewalskii*) collected in Mongolia were transferred to Askania Nova (Ukraine; now a biosphere reserve), and then 28 were dispatched to various European zoos in 1901. However, many went astray, and the two world wars further reduced their numbers.

Prague Zoo established an international studbook for wild horses in 1959, starting with 59 individuals. Today they number more than a thousand.

As a result of international cooperation, a couple found their way to Pentezug (Hortobágy): in 1997 21 specimens arrived to live under optimum conditions in a nearly 3000 ha (about 7400 acres) fenced area. They were so prolific that today more than 200 roam the Great Hungarian Plain. When their species was first made known to Western science in 1866, Père David's deer (*Elaphurus davidianus*), locally called "milu", were already extinct in the wild. The remaining specimens (approximately 120) inhabited an imperial hunting ground near Beijing. A little later some of these were sent to Europe, but only the 11th Duke of Bedford went so far as to set up a herd at Woburn Abbey to breed this species. In the meantime, Père David's deer were completely eradicated in China. However, not many were left on our continent either: they were largely swept away by World War I. Only the Woburn Abbey herd survived: in 1920 about 50 milu were kept there. The Duke later presented quite a few of them to European and American zoos. Currently several thousand Père David's deer are maintained in zoos worldwide, and in 1985 the first reintroduction took place in China.



Przewalski's horse



Père David's deer



Addax



Scimitar-horned oryx

Deserts and semi-deserts can sustain a very few animals only, and species adapted to these habitats are especially vulnerable. Antelopes and gazelles of the Sahelo-Sahara region were hunted for their exceptionally beautiful horns by European and American hunters, as well as for their meat and hide by the increasing local population. No wonder that several species are on the verge of extinction now. The last scimitar-horned oryx (*Oryx dammah*) patrolling the northern and southern borders of the Sahara were seen in the 1980s and their species was officially declared extinct in the wild in 2000. Fortunately, oryxes are most prolific in zoos and breeding centers, so there is hope for their survival and reintroduction. Virtually nothing is known about the natural population of the addax or screwhorn antelope (*Addax nasomaculatus*) but the species is believed to have undergone a very serious decline and is therefore listed as critically endangered. However, it is regularly bred in zoos and today approximately 1700 specimens are maintained in captivity.

Nene geese (*Branta sandvicensis*), also on display in Budapest, are represented by several thousand individuals in zoos worldwide, even though in 1952 just 30 were left in their natural habitat in the Hawaiian Islands. As these birds cannot fly in the nesting season, they were easy prey to introduced animals such as pigs, mongooses, rats, dogs and cats—and, of course, humans. Under the direction of the conservationist Sir Peter Scott, of The Wildfowl & Wetlands Trust, and numerous zoos worldwide, this species was bred back from the brink of extinction. The efforts to save Bali's regional mascot, the Bali myna (*Leucospa rothschildi*) were equally successful. These birds have virtually disappeared from their habitat and the thousand individuals found in zoos are their final hope for survival.



Hawaiian geese



Bali myna



Chinese alligator

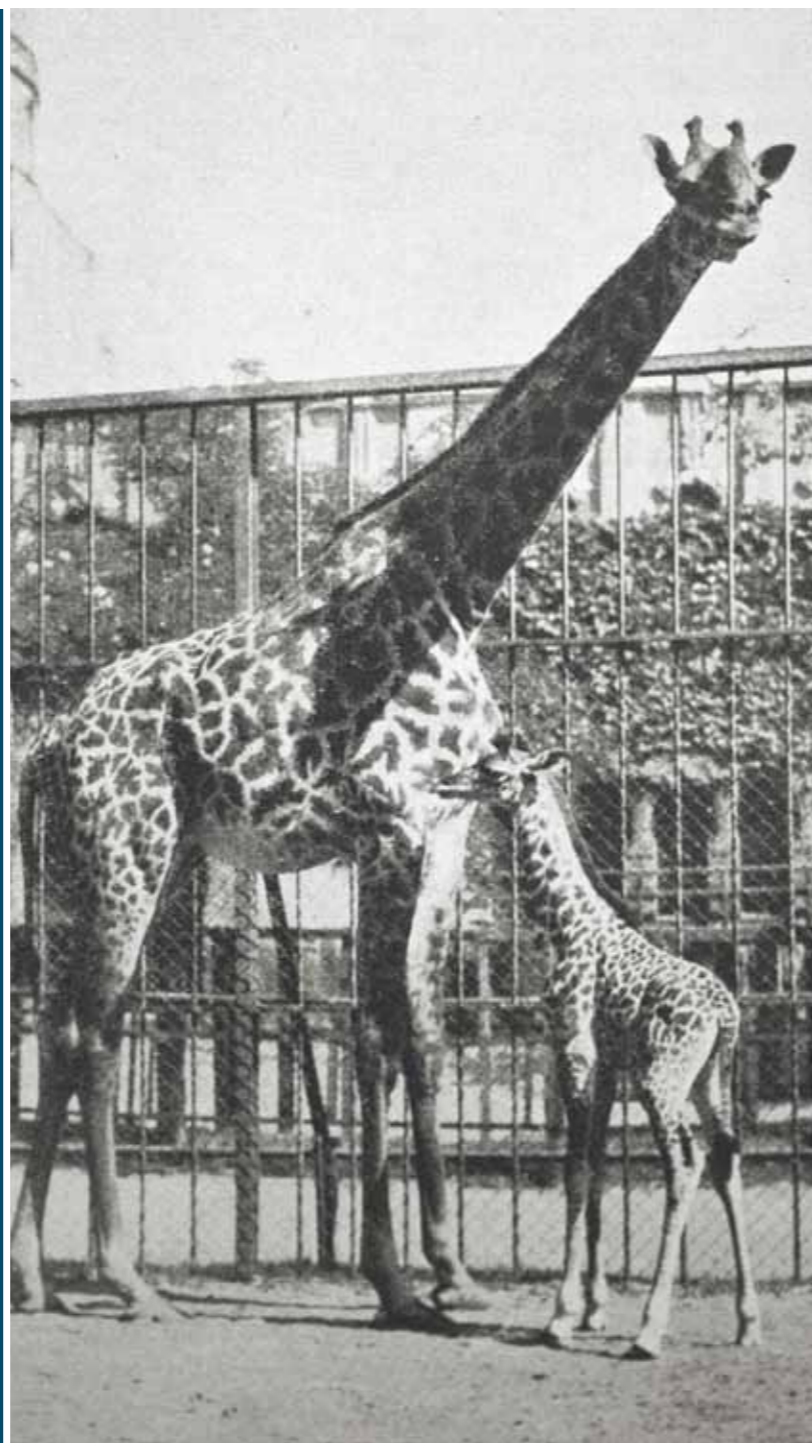
Lord Howe Island stick insect

Originally ranging throughout most of China, the Chinese alligator (*Alligator sinensis*) is at present confined to the lower reaches of the Yangtze (Changjiang) River and adjoining swamps. By the second half of the 20th century, just a couple of hundred were left in the wild. Fortunately, this species is quite prolific in captivity and is now heavily guarded in the wild. Although it is still critically endangered, extinction risk has decreased because offspring hatched in zoos are released into the wild.

The Lord Howe Island stick insect (*Dryococelus australis*), thought to be extinct by 1930, was rediscovered on a volcanic stack 20 km (12 mi) southeast of the island in 2001. Only a few specimens were found, and Melbourne Zoo offered to serve as the center of conservation-oriented breeding. Although rather difficult to keep and breed, several strong captive populations of this rare insect are in existence now.

Earlier successes

In the past 150 years or so we had excellent breeding results with numerous species of animals—among them a few which were first reproduced in Budapest. Between 1918 and 1930 there were no giraffes in the zoo, so the arrival of two Masai giraffes (*G. c. tippelskirchi*) on 4 April 1930 was awaited with great excitement. Before World War II this was the most commonly kept subspecies in European zoos. However, we were the first to breed it in 1934.



Bears and cats

In Europe, the first Asian black bear (*Ursus thibetanus*) cub was successfully raised in Budapest. There was no need to separate the baby born on 10 January 1933 from its mother because she did her job perfectly. The first polar bear cub reared in the Budapest was born on 23 November 1933. This was a real sensation because, as stated by a scientific article from that time, “there are just eight to ten zoological gardens in the world in which a similar event occurred, but only five of them have managed to keep the offspring alive”.

Also leopards, jaguars and tigers produced numerous young over the past century. One of them is certainly worth of mentioning. The first individual of the now extinct Javan tiger (*Panthera tigris sondaica*) lived in the 1920–1930s in Budapest Zoo. The female named Saxa arrived in summer 1925 as an eight months old juvenile. Between 1927 and 1933 she had seven litters consisting of a total of 20 cubs, of which eight were successfully raised to adulthood. However, her mate Emir was not a Javan but a Bengal tiger.

In 1950 a “middle-aged couple” of Javan tigers—Bengal and Fatime—was added to our collection. They had two female offspring in 1952 (both were sent to Soviet zoos later), and in 1959 Nahar was born. It is quite possible that Nahar was the last of her subspecies, because after she died in 1976, no other Javan tiger was seen anywhere in the world. The Javan tiger was declared extinct in the wild in 1950s although in 1976 some tracks were found on the island (the tigers that left them were not sighted, though).



Javan tiger



Asian black bear



Polar bear

The picture would not be complete without mentioning our work related to Hungarian dog breeds. In fact, they would not even exist were it not for Budapest Zoo! The planned breeding of Hungarian herding and livestock guarding dogs started in 1912. The zoo's director, Adolf Lendl, and later the veterinarian Emil Raisits played a major role in the popularisation of these breeds. Following World War II the zoo again played an important role: the breeding of Kuvasz and Puli was initiated in 1956 by Dr. Csaba Anghi, and the head of the Bird Department, Dr. Tamás Fodor, personally saved the Transylvanian hound from total extinction. In 1947 Romania ordered the killing of all hounds because they were declared nuisance animals. Fodor managed to trace down two after a long search and brought them secretly to Hungary. This duo and a few more individuals recovered later formed the nucleus of the current population of this ancient breed.



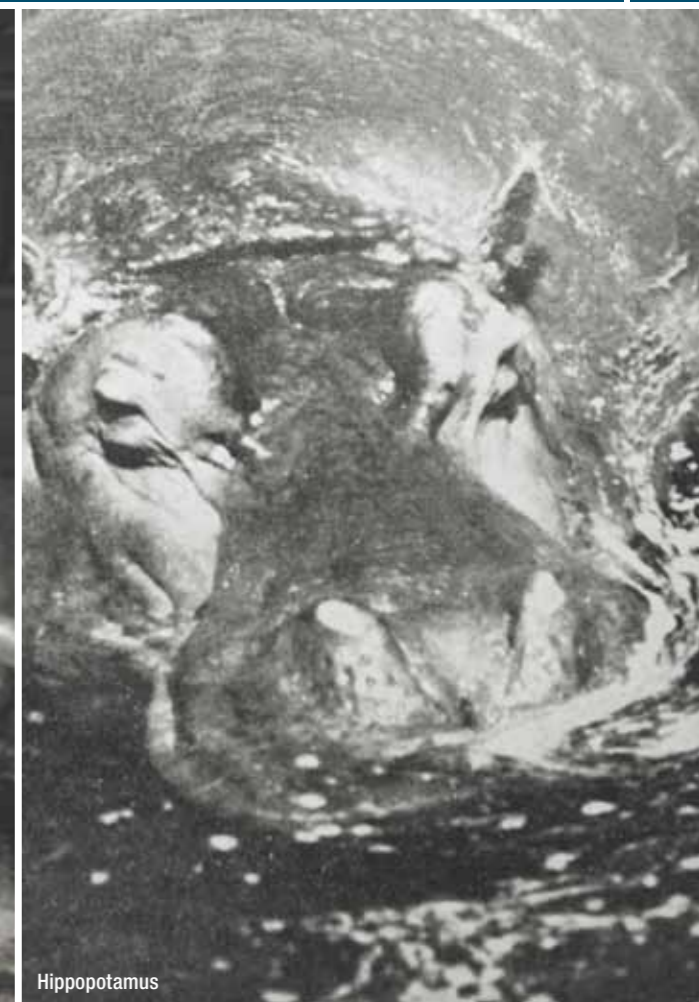
Puli



Transylvanian hound



Hutsul horse



Hippopotamus

The Hutsul horse is a docile, sturdily-built and benign equine breed. It is usually a standard bay colour but sandy bays are also common. Its workload and toughness are legendary, and it is one of the best breeds for children. So the establishing of a highly productive team in Aggtelek National Park was of particular significance.

The first hippopotamus of our zoo, named Jónás, was collected in the Upper Nile in the 1880s and arrived in Budapest in 1893 after a short stay in Berlin. He died in 1917. In 1912 there were two other hippos in the zoo, Bandi and Ara. The name of the extremely prolific Ara was changed to Arany (Gold), because young hippos were highly sought-after at that time. Arany gave birth to a total of 14 calves and is thought to be the most fecund hippo ever to live in captivity. One of her daughters, Kincsem, produced 11 babies in the 45 years of her life. In all 39 hippos were born in Budapest Zoo and only seven were obtained from other zoos or dealers.

Hatching and raising nestlings



Right into the incubator.



Great bustard



Bustard chick



Stone curlew chick



Pied avocet

Budapest Zoo was among the very first to incubate eggs of wild birds. When Frigyes Cerva was hired in 1910, his first task was to set up and coordinate a Bird Department. Cerva intended to put on display the most typical representatives of the Hungarian avifauna in the newly restored zoo. He returned from his collecting trips with birds as well as eggs, and incubation on a larger scale was thus started. However, incubating was relatively easy. Raising the chicks was much more difficult. Cerva invented a method for this as well. He successfully reared black-winged stilts, pied avocets, Baillon's and little crakes and several other species. These birds either stayed in the zoo or formed an excellent basis for exchange.

The incubation of wild bird eggs ceased only at the end of World War II but was again in full swing by 1956. The conservation approach started to gain popularity, and countless clutches were collected that would otherwise have been destroyed. Several hundred nestlings were produced each year, and most of these birds were released into the wild after some "preparatory training".

The great bustard (*Otis tarda*) is a protected bird in Hungary. Dr. Tamás Fodor played a major role in elaborating the protocols for its captive breeding. He started his research—together with Dr. István Sterbetz—in 1958 the result of which was the "formula" of incubating bustard eggs and raising the young. His zoo-based, decade-long research made it possible to set up a great bustard rescue station in Dévaványa.

The stone curlew (*Burhinus oedicnemus*) pair maintained in the zoo successfully raised its young in 1973. This was the fourth captive reproduction of the species, followed by another marvel in 1978: Dr. Pál Mödlinger managed to breed pied avocets (*Rucervirostra avosetta*), the sixth person in the world to do so.

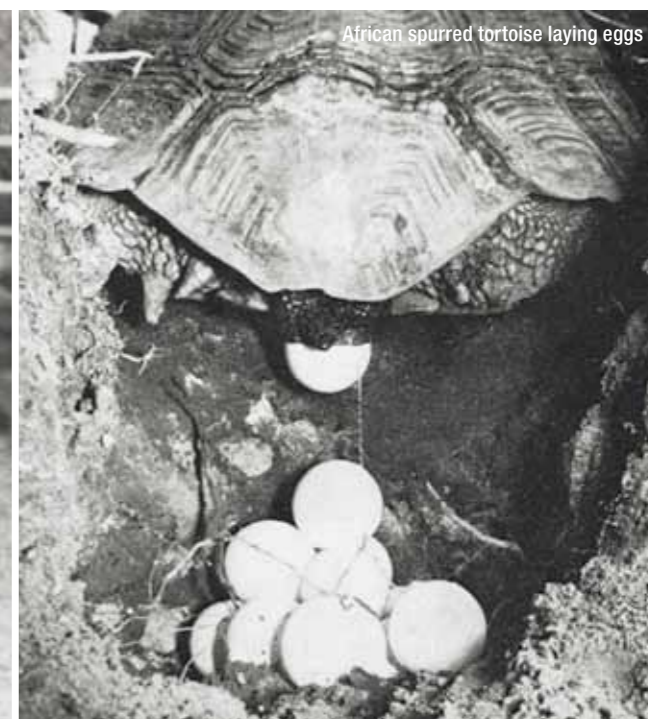
Zebras, guerezas, tortoises

In addition to those mentioned before we have been lucky to experience the births of hundreds of extremely interesting species. For instance, our Grévy's zebras (*Equus grevyi*), reticulated giraffes (*Giraffa camelopardalis reticulata*), onagers (*Equus hemionus onager*), Dorcas gazelles (*Gazella dorcas*), and mantled guerezas (*Colobus guereza*) regularly had young. Of reptiles, our Argentinean boas (*Boa constrictor occidentalis*), now rare in the wild, deserve to be mentioned: they reproduced—probably a first in Europe—in 1961. Then there is the African spurred tortoise (*Centrochelys sulcata*) which bred in 1973. Apparently, we were the first in the world to successfully incubate eggs of this heavy tortoise that grows to almost 100kg (200lb).

In addition, native fishes were very successfully maintained in the Aquarium. For instance, Dr. Bethen Péntzes, the head of the department, and his colleagues managed to breed—probably the first time ever—Eurasian minnows (*Phoxinus phoxinus*) in captivity in the 1960s.



Grévy's zebra



African spurred tortoise laying eggs



Eurasian minnow

Data about the species discussed in this book*

Animal species	Breeding Program or Studbook	Number of specimens in Budapest	Number of births in the last ten years	Wild population (according to the IUCN database)	Population registered in the international zoo information system
African forest buffalo (<i>Syncerus caffer nanus</i>)	ESB	6	6	60,000	136
African penguin (<i>Spheniscus demersus</i>)	EEP	29	12	max. 80,000	2439
Amur tiger (<i>Panthera tigris altaica</i>)	EEP, ISB	4	5	between 431 and 529	497
Asian elephant (<i>Elephas maximus</i>)	EEP	4	1	40,000–50,000	663
Asiatic lion (<i>Panthera leo persica</i>)	EEP	10	8	350	329
Black lemur (<i>Eulemur macaco</i>)	EEP, ISB	2	4	between 10,000 and 100,000	242
Black-and-white ruffed lemur (<i>Varecia variegata</i>)	EEP	3	0	a few thousand, max. 10,000	842
Blue crowned pigeon (<i>Goura cristata</i>)	EEP, ISB	5	13	15,000	177
Bolivian night monkey (<i>Aotus azarae boliviensis</i>)	ESB	5	6	unknown	27
Brush-tailed bettong (<i>Bettongia penicillata</i>)	EEP, ISB	3	5	approx. 5000	274
Dalmatian pelican (<i>Pelecanus crispus</i>)	EEP	13	5	10,000–14,000	620
Dhole or Asiatic wild dog (<i>Cuon alpinus</i>)	EEP	12	18	2000–2500	257
Eastern quoll (<i>Dasyurus viverrinus</i>)	ISB	4	0	unknown, stable	40
Emerald or Green tree monitor (<i>Varanus prasinus</i>)	ESB	2	0	unknown	144
Fennec fox (<i>Vulpes zerda</i>)	ESB	2	0	unknown	371
Giant otter (<i>Pteronura brasiliensis</i>)	EEP, ISB	3	0	1000-5000	95
Golden lion tamarin (<i>Leontopithecus rosalia</i>)	EEP, ISB	2	2	approx. 1000	471
Golden-bellied mangabey (<i>Cercocebus chrysogaster</i>)	ESB/ISB	9	12	unknown due to rarity	37



Golden-bellied mangabey



Wombat



Hyacinth macaw

Animal species	Breeding Program or Studbook	Number of specimens in Budapest	Number of births in the last ten years	Wild population (according to the IUCN database)	Population registered in the international zoo information system
Griffon vulture (<i>Gyps fulvus</i>)	ESB	5	0	European population of approx. 21,000 pairs	445
Gundi (<i>Ctenodactylus gundi</i>)	ESB	14	8	data deficient, population stable	84
Hyacinth macaw (<i>Anodorhynchus hyacinthinus</i>)	EEP	4	3	6500	390
Javan langur (<i>Trachypithecus auratus</i>)	EEP	8	8	unknown	132
Kea (<i>Nestor notabilis</i>)	EEP, ISB	12	0	5000 (3300 nesting birds)	224
Kinkajou (<i>Potos flavus</i>)	ESB	2	0	unknown	243
Komodo dragon (<i>Varanus komodoensis</i>)	EEP, ISB	1	0	5700	223
Kowari (<i>Dasyuroides byrnei</i>)	ESB	6	0	approx. 10,000	66
Linnaeus' two-toed sloth (<i>Choloepus didactylus</i>)	ESB	7	12	unknown	360
Mhorr gazelle (<i>Nanger dama mhorr</i>)	EEP, ISB	8	13	subspecies extinct in the wild	156
Northern bald or Waldrapp ibis (<i>Geronticus eremita</i>)	EEP	28	57	443	1392
Nyala (<i>Tragelaphus angasii</i>)	ESB	5	3	32,000–40,000	550
Persian leopard (<i>Panthera pardus saxicolor</i>)	EEP	3	10	approx. 1200	96
Radiated tortoise (<i>Astrochelys radiata</i>)	ESB	6	0	unknown	1242
Red panda (<i>Ailurus fulgens fulgens</i>)	EEP, ISB	2	0	10,000	501
Red river hog (<i>Potamochoerus porcus</i>)	EEP	3	0	unknown, probably stable	187
Red ruffed lemur (<i>Varecia rubra</i>)	EEP, ISB	3	6	between 10,000 and 100,000	591
Red-fronted brown lemur (<i>Eulemur rufus</i>)	ESB	1	1	unknown, strong population	81



Western Lowland Gorilla



Freshwater stingray



Rhinoceros iguana

Animal species	Breeding Program or Studbook	Number of specimens in Budapest	Number of births in the last ten years	Wild population (according to the IUCN database)	Population registered in the international zoo information system
Red-fronted macaw (<i>Ara rubrogenys</i>)	EEP	5	7	max. 2700	209
Red-handed tamarin (<i>Saguinus midas</i>)	ESB	3	12	unknown, stable	350
Rhinoceros iguana (<i>Cyclura comuta</i>)	ESB	5	0	10,000–17,000	212
Ring-tailed lemur (<i>Lemur catta</i>)	ESB	10	19	10,000–10,0000	3401
Rothschild's giraffe (<i>Giraffa camelopardalis rothschildi</i>)	EEP	7	5	2500	549
Short-beaked echidna (<i>Tachyglossus aculeatus</i>)	ISB	2	0	unknown, probably stable	147
South American tapir (<i>Tapirus terrestris</i>)	EEP	2	1	unknown	413
Southern cassowary (<i>Casuarius casuarius</i>)	ESB	3	0	20,000	195
Southern ground hornbill (<i>Bucorvus leadbeateri</i>)	ESB	3	6	unknown	342
Squirrel monkey (<i>Saimiri sciureus</i>)	EEP	21	38	unknown	1426
Striped hyena (<i>Hyaena hyaena</i>)	ESB	2	0	10,000	158
Sumatran orangutan (<i>Pongo abelii</i>)	EEP, ISB	5	2	7,341	238
Tammar wallaby (<i>Macropus eugenii</i>)	ESB	8	45	unknown	201
Western lowland gorilla (<i>Gorilla gorilla gorilla</i>)	EEP, ISB	6	1	max. 125,000	772
White or Square-lipped rhinoceros (<i>Ceratotherium simum</i>)	EEP, ISB	3	3	20,165	526
White-fronted marmoset (<i>Callithrix geoffroyi</i>)	EEP	1	9	a few thousand	407
Wombat (<i>Vombatus ursinus</i>)	EEP	3	1	approx.40,000	51

*Data were extracted from the IUCN Red List (wild stocks) and the International Species Information System (ISIS; zoo populations).

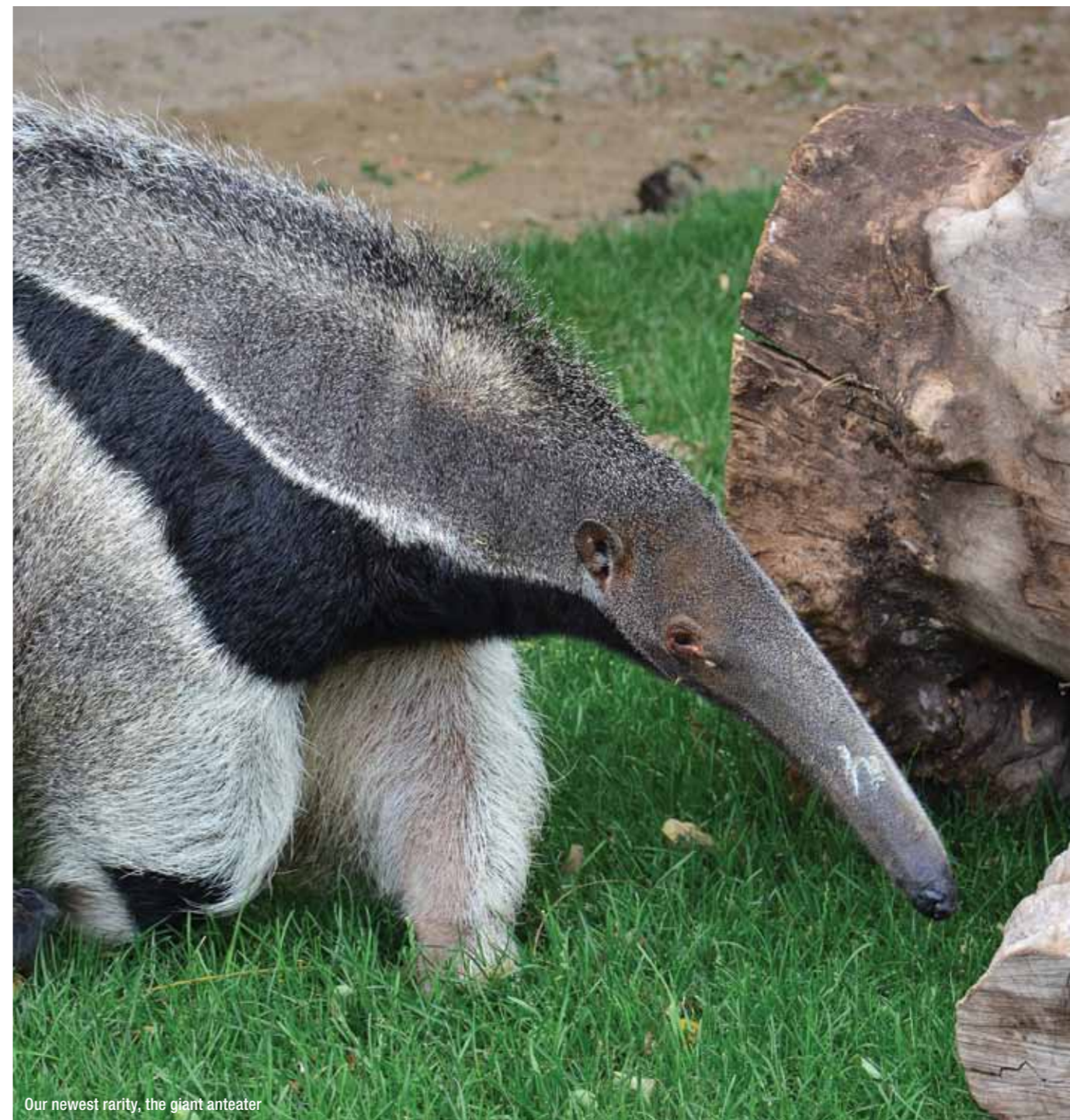
Emerald green monitor



Nyala



Sumatran orangutan



Our newest rarity, the giant anteater

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Front cover:
Giraffe cleaning its calf – photo by Melinda László

Inside front cover:
Sumatran orangutan baby – photo by Zoltán Bagosi

Back cover:
A family of lions – photo by Melinda László

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56, 57, 58, 59, 60, 62, 64, 66, 76, 77, 81, 84, 86, 90, 92, 94, 95, 97, 98, 107, 123, 124.)

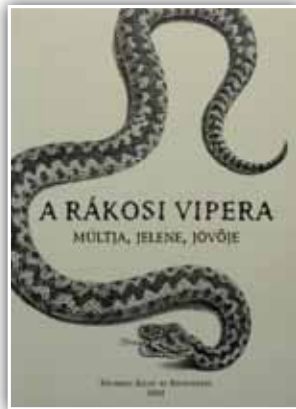
dr. Klára Karai (page 36)

Zsolt Kovács (page 106, 108, 112, 113 right)

Prof. Dr. Miklós Persányi (page 110)

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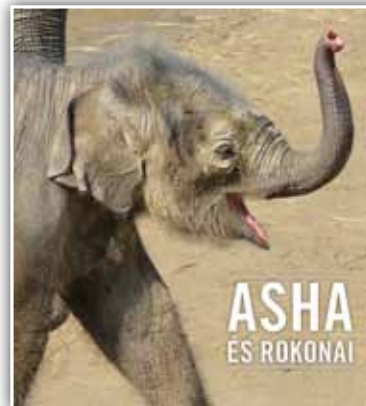
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- 2 Past, present, future of the European otter
- 3 Past, present, future of the European pond turtle
- 4 Past, present, future of the European bison
- 5 Wildlife rehabilitation centers in Hungary.
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- Lynx in the Carpathian Basin
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- The European snake-eyed skink
- The northern bald ibis



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