

BREEDING CONSERVATION OF ENDANGERED BIG CATS – THE EXAMPLE OF BARBARY LIONS

Zoological gardens allow the preservation of many endangered animal species. Modern zoos form arks for the conservation of these species, which are facing extinction due to environmental degradation.

WHAT IS A MODERN ZOO?

The world's oldest established zoo is Tiergarten Schönbrunn in Vienna, founded by the Austrian empress Maria Theresia. The golden age of zoo foundations was the 19th century, initiated by the middle classes. The animals were kept in cages. The most recent development in zoo concepts is as an animal theme park such as Erlebnis-Zoo Hannover, in which the visitor undertakes a journey on which he/she sees the animals in representations of their natural habitats.

A pioneer for modern zoos was the Swiss biologist and ethologist Heini Hediger (1908-1992). In 1942 he defined a new specialised branch of biology, zoo biology, in which he postulated that animals in zoos are not to be considered as »captives« but as »owners of property«, namely the territory of their enclosures. In modern zoos the quality of the enclosures (their furnishings and structure) is equally important for the captive animals. H. Hediger defined four main tasks for a modern zoo: recreation, education, research, and conservation. Today, modern zoos function as a present-day Noah's Ark. They have the experience, space and information (studbook) to save an endangered species. The IUCN (International Union for Conservation of Nature) states: »[...] more than 31 000 species are threatened with extinction. That is 27 % of all assessed species« (IUCN 2020). Thus modern zoos will be the last refuges of the endangered natural world.

HISTORY OF THE BARBARY LION IN NORTH AFRICA

Various authors (Yamaguchi/Haddane 2002; Hemmer/Burger 2005) have described in detail the history of the extinct Barbary lion (*Panthera leo leo*) and the status of the captive Moroccan »Royal Lion« collection as putative representatives of the subspecies. In 1826 the Austrian zoologist Johann Nepomuk Meyer was the first to describe Barbary lions as a subspecies *Felis leo barbaricus* (fig. 1) under the specific name *Felis leo* as used by Carl von Linné in 1758.

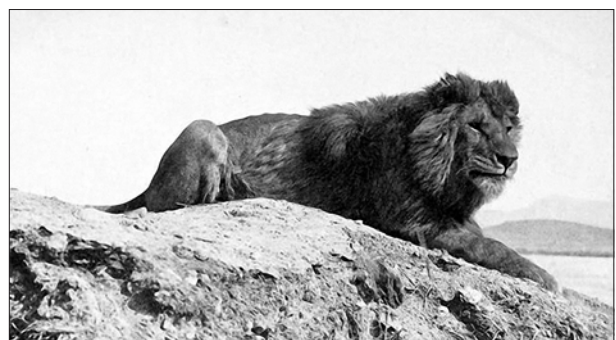


Fig. 1 Barbary lion in Algeria. – (Photo A. E. Pease, 1893).

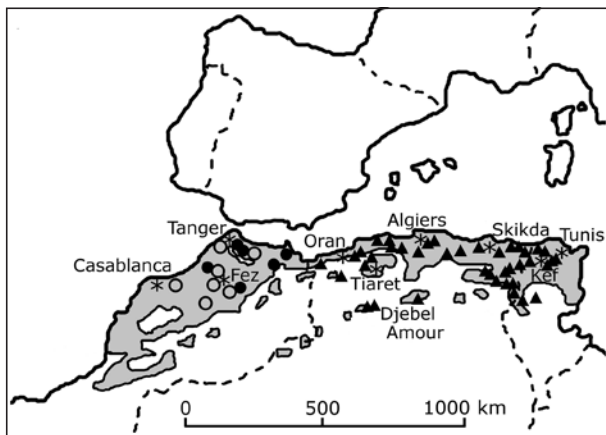


Fig. 2 Distribution of historical reports of lions in North Africa (1500-1900). – (After Black et al. 2013, 8 fig. 1).

The original habitat of the Barbary lion was North Africa, including mountainous regions from Morocco to Egypt (fig. 2). In the 18th century Barbary lions disappeared from Northeast Africa. In the mid-19th century the number of lions in Northwest Africa decreased (fig. 3-4). In 1942 the last recorded shooting of a Barbary lion, by a French colonial hunter, occurred in Morocco (Western Maghreb) (Yamaguchi/Haddane 2002; Black et al. 2013). Barbary lions were common in European menageries during the Middle Ages and more recently in public zoological parks (figs 5-6) and circuses up to their final extermination from the wild in the Atlas Mountains during the 1940s (IUCN 2020).

Since this time, some lion groups in captivity have been proposed as descendants of the North African Barbary lion. Especially the direct descendants from the King of Morocco's original collection, and their direct descendants in European zoos, have the strongest circumstantial claim (Yamaguchi/Haddane 2002). Studies by Paul Leyhausen (1975) and Helmut Hemmer (1978) in the early 1970s identified the gene potential of lions in the Moroccan Royal collection, which they defined as »Royal Lions« at Rabat Zoo. These lions are presumably representatives of the current Barbary lion stock. A selective breeding programme involving all international zoos was proposed (Leyhausen 1975; Hemmer 1979; Frankham et al. 1986; Yamaguchi/Haddane 2002; Hemmer/Burger 2005).

The current Moroccan collection is descended from the individuals recorded in a census by Leyhausen (1975) and Hemmer (1978). Fortunately, all European individuals can be accurately traced to the 1974 set of Moroccan founders. In the European population a number of animals could be recorded as being descended from two individuals at Madrid Zoo, acquired from a circus in 1977 (ISIS 2008). Both were originally obtained from the royal palace collection prior to 1974. The Madrid lioness gave birth to cubs in July 1979, suggesting an age on arrival at Madrid of two years or more (Black et al. 2009).



Fig. 3 Lions at the Tower of London. – (Select views of London: with historical and descriptive sketches of some of the most interesting of the public buildings. Compiled and arranged by J. B. Papworth [London 1816]).

Fig. 4 Hunting of Barbary lions in the 19th century. – (agk-images, AKG4165093).

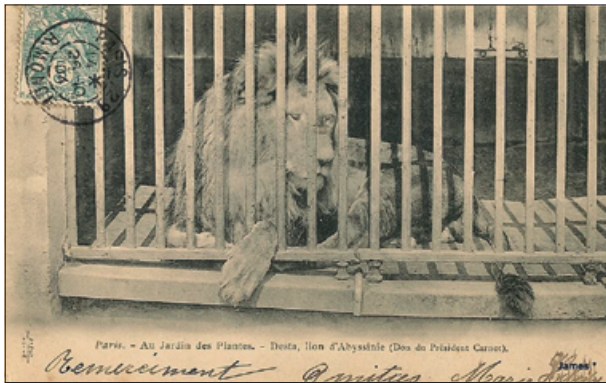


Fig. 5 Carte postale, Jardin des Plantes, Paris 1904.

REASONS FOR EXTINCTION

During the period of the Roman Empire Barbary lions fought for example against gladiators at the Roman Colosseum and other arenas; the Romans killed thousands of lions in their games (Pease 1899; Sparreboom 2016). In historical time, from the 16th century, the royal families of Morocco kept Bar-

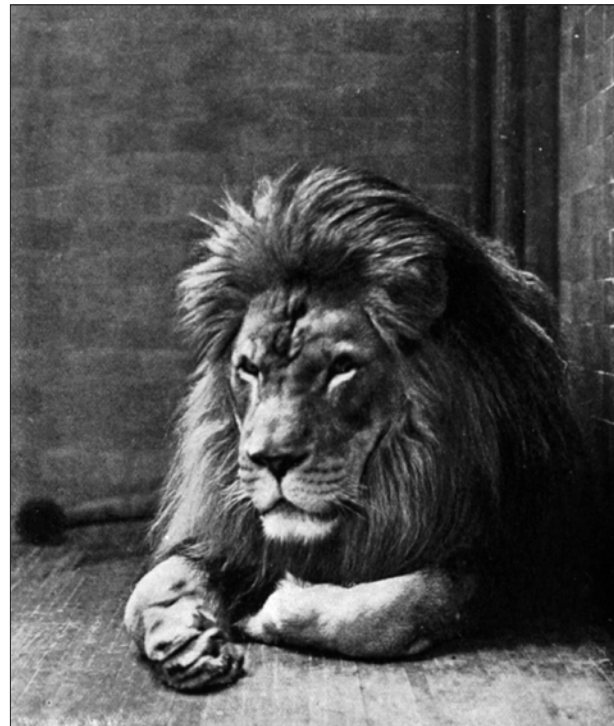


Fig. 6 Another Barbary lion called Sultan, New York (Bronx) Zoo, 1897. – (After Nelson Robinson, Seventh Annual Report of the New York Zoological Society 1902 [1903], 121).



Fig. 7 Morphology of Barbary lions and Moroccan »Royal Lions« characteristics. – (Photo Erlebnis-Zoo Hannover, 2015).

bary lions. The Berbers offered lions in lieu of taxes and as gifts to the Sultan of Morocco and the Emperor of Ethiopia, exacerbating their decline in the wild. During the colonial era lions were shot as coveted trophies, and the last Barbary lion was killed in Tunisia in 1891, in Algeria in 1893, and in 1942 the last in Morocco (Yamaguchi/Haddane 2002; Black et al. 2013).

Barbary lions were one of the biggest carnivores in Africa, hunting game such as Barbary sheep, Barbary stags and North African Hartebeest. These herbivores were also shot for trophies, depriving the lion of their prey in their habitat. Another problem was the strong interest of European and North American circuses and zoos in Barbary lions during the 19th and 20th centuries. Circuses and zoos were keen to present these powerful lions to their clientele and so many lions were captured and the wild population decreased even more. In the 1970s it was more common to give »Royal Lions« descendants directly to private collections. For example, between 1970 and 1973 Rabat Zoo sold 28 cubs to circuses and private buyers in Spain, Portugal and France (Yamaguchi/Haddane 2002). Thus, in these decades many of the »Royal Lions« offspring were transferred between various private institutions, specifically in North America and Europe (Hemmer 1979; Yamaguchi/Haddane 2002; Hemmer/Burger 2005).

LIVING IN CAPTIVITY

One of the places where lions were kept in captivity outside North Africa in the Middle Ages was the Tower of London Menagerie (fig. 3). This was stopped by an order of the Duke of Wellington in 1835 and the animals were transferred to London Zoo. One of the most popular London Zoo lions was called »Sultan« (1896). The Moroccan Sultans kept Barbary lions in historical times until 1912, when they were moved to the royal palace in Rabat. In the 1950s a few lions were transferred to Rabat Zoo, and by 1955 only 17 Barbary lions were kept at the royal palace. In 1973 the descendants of King Hassan II transferred all the lions to the Moroccan National Zoo in Rabat.

MORPHOLOGY AND BIOLOGY OF BARBARY LIONS

Adult males weigh between 150 and 200 kg, adult females weigh between 120 and 180 kg. Lions range from 2.6 to 3.3 m in length (including the tail); shoulder height is 1.2 m. Barbary lions have a greyish pelage which, with their long fur, gives them a shaggy appearance. The females and young males have long hairs around the neck and throat, the back of the front legs and on the belly.

Adult males have a huge mane covering the head, neck, shoulders and belly (fig. 7). The colour of the mane varies, becoming darker toward the posterior parts. They have a well-developed tail tuft. They have a higher back of the head and a pointed crown, forming a straight line from the nose to back of the head, rounded cheeks and a narrow muzzle. These lions have a prominent anterior edge of the pelvis with dished rostral profile. The colour of the iris is egg-yolk yellow, not dark yellow or olive. Their food is a wide range of herbivorous prey including cattle, antelope and small game; like all lions they hunt in groups of lionesses in open and barren territory. Lions are a highly social species, an unusual characteristic amongst big

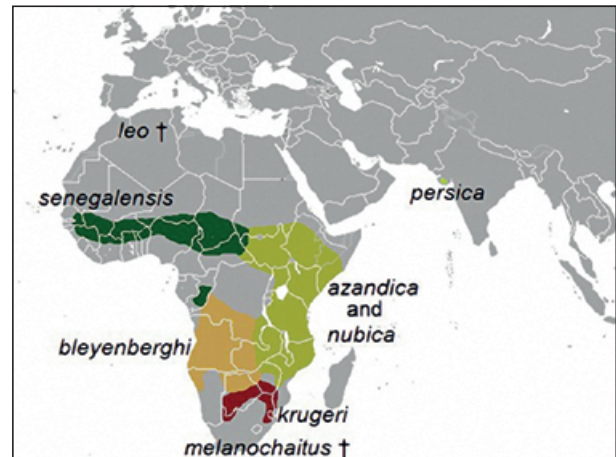


Fig. 8 Range map of the commonly accepted subspecies of the lion in the late 20th century. – (After Haas/Hayssen/Krausman 2005, 3).

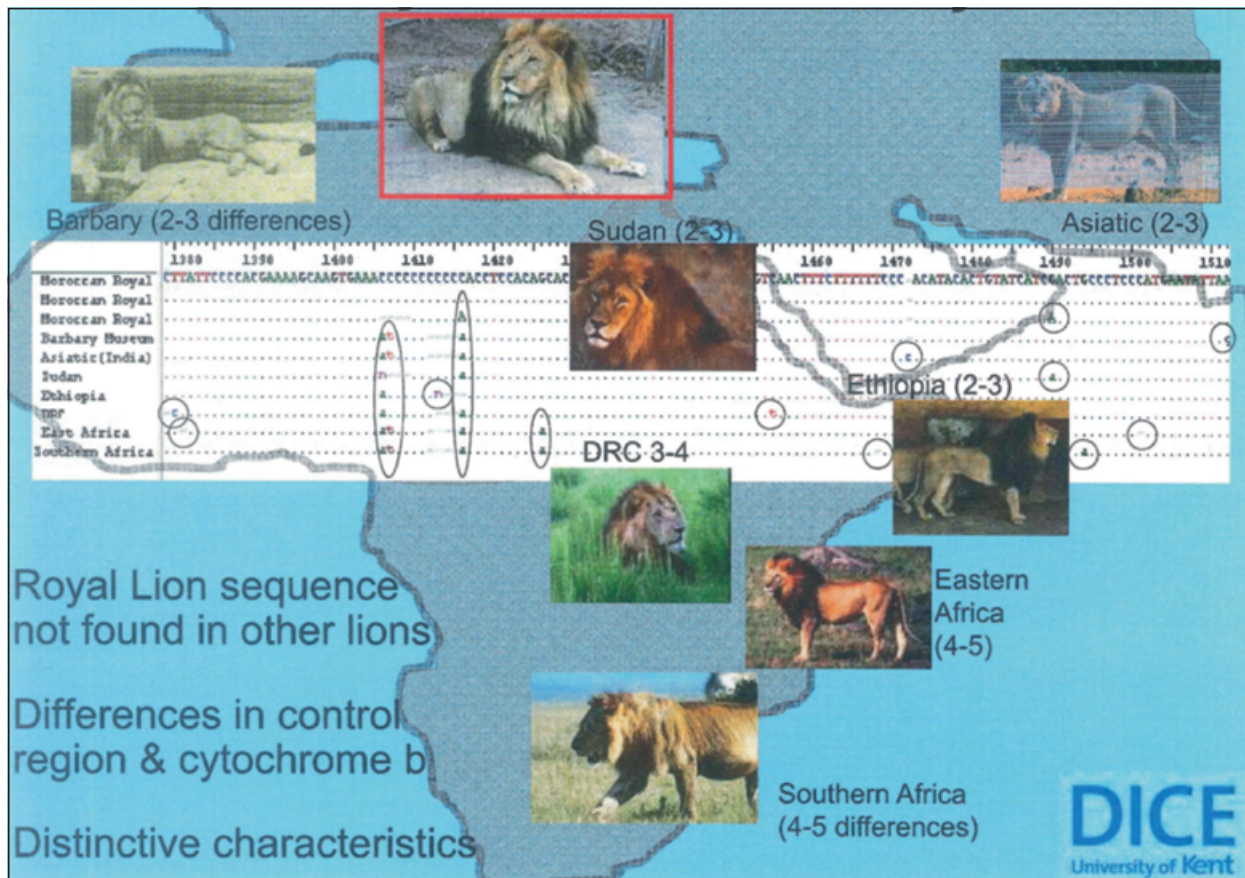


Fig. 9 Genetic analysis of Moroccan »Royal Lions«. – (After Harland/Black 2010).

cats, living in families and groups of 2-15 individuals. Females often give birth at the same time so the cubs can be reared together, suckling from any one of the group's mothers. Male cubs leave when they are sexually mature and roam together in bachelor groups. Lions have been divided into seven subspecies (fig. 9):

Genus: *Panthera* (Large cats)

Species: *Panthera atrox* † (American lion)

Species: *Panthera leo* (lion)

Subspecies: *Panthera leo bleyenberghi* (Southwest African or Katanga lion)

Subspecies: *Panthera leo goojratensis* (Asiatic lion)

Subspecies: *Panthera leo krugeri* (Southeast African or Transvaal lion)

Subspecies: *Panthera leo leo* (Barbary lion) †

Subspecies: *Panthera leo massaicus/nubia* (East African or Masai lion)

Subspecies: *Panthera leo melanochaita* (Cape lion) †

Subspecies: *Panthera leo persica* (Persian or Indian lion)

Subspecies: *Panthera leo senegalensis* (West African lion)

Subspecies: *Panthera leo azandica* (Congo lion)

Subspecies: *Panthera leo spelaea* (European cave lion) †

CONSERVATION IN CAPTIVITY

In 1970 there were only 35 purebred Barbary lions living at the Moroccan National Zoo in Rabat. In 1974 the National Zoo of Rabat asked German biologists Paul Leyhausen and Helmut Hemmer to study these lions to establish an international studbook. P. Leyhausen and H. Hemmer considered the »Royal Lions« only for their morphological and ethological traits and based on this studbook they established a Barbary lion survival project (Hemmer 1974; Burger/Hemmer 2006; Leyhausen 1975). The 1990s saw a revival of interest in »Royal Lions« at zoos of the European Association of Zoos and Aquaria (EAZA) and the Association of Zoos & Aquariums (AZA). At this time electronic records were collated from the handwritten breeding logbooks at the Rabat Zoo and other European and North American zoos that were keeping Barbary lions. Besides that, zoos were starting to use their data to inform other institutions for breeding decisions in conserving animals (Hill/Haynes 1999). By 1998 the maintenance of this data collecting programme had lapsed, and with it all clear inter-institutional commitment to preserving »Royal Lions« (Black et al. 2009).

Following studies from K. Hill and D. Haynes (1999) several European and American zoos launched the »Atlas Lion Project« and a selective breeding programme was proposed based on these results. However, there was no definite genetic relationship for the origin of the lions, and in 2005 Oxford University and Wildlinks International launched their »Atlas Lion Project«. For this project, sequences of mitochondrial DNA from 140-year-old museum samples were matched with the genetic material of living Barbary lions (fig. 10). Several zoos, which kept »Royal Lions«, abandoned their breeding programmes due to difficulties in obtaining new breeding stock, also being discouraged by the publication of genetic research which appeared to suggest that all lions shared a common ancestor (Yamaguchi 2000; Hemmer/Burger 2005). Consequently, there is a risk that the purity and genetic health of the bloodline may be compromised (compared to the original Moroccan royal collection fig. 11) in terms of inbreeding effects and a loss of genetic diversity. These problems would be exacerbated if future limited transfer of animals between institutions led to the isolation of breeding groups. However, several institutions remain committed to maintaining their »Royal Lion« collections, providing opportunities to manage the population appropriately (Black et al. 2009).

Fig. 10 Family tree for »Royal Lions« held in captive collections in Europe (1973-2009). – (After Harland/Black 2010).

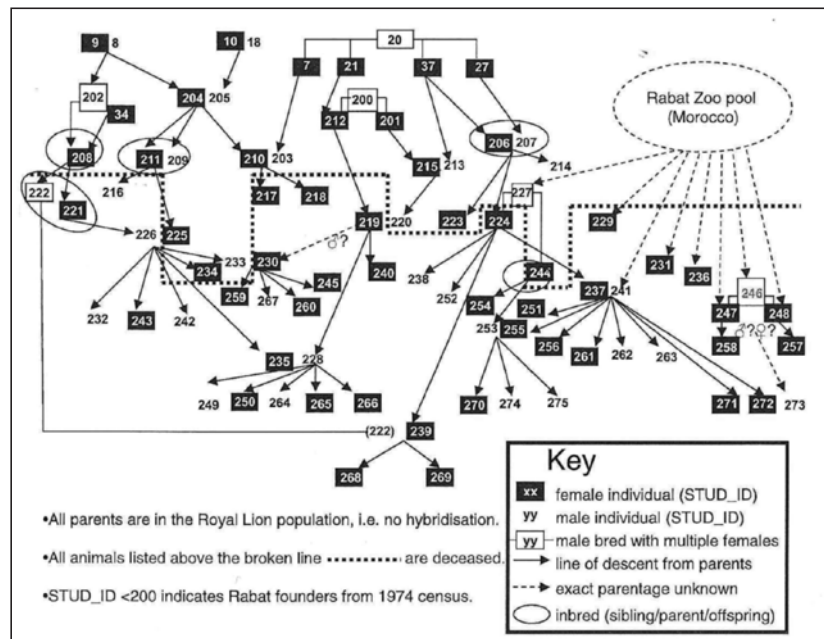
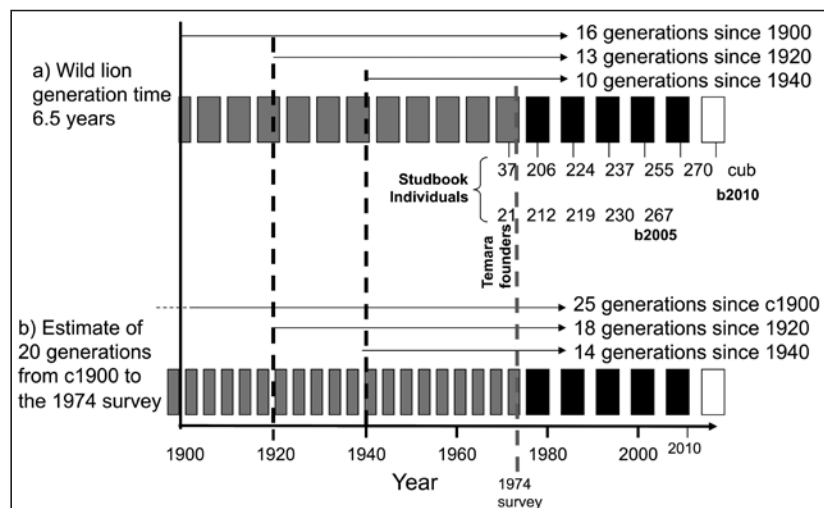


Fig. 11 Estimates of captive generations since wild collection in North Africa for current Moroccan Royal lions. – (S. A. Black / A. Fellous / N. Yamaguchi / D. L. Roberts, Examining the Extinction of the Barbary Lion and Its Implications for Felid Conservation. PLoS ONE 8(4): e60174 2013, fig. 4; <https://doi.org/10.1371/journal.pone.0060174>).



GENETIC RESULTS AND STUDBOOK

The genetic distinctiveness of the historical Barbary lion has not yet been fully established and the question of whether the »Royal Lions« are true Barbary lions also remains unanswered (Dubach et al. 2005; Yamaguchi 2005; Barnett et al. 2006b; Burger/Hemmer 2006; Antunes et al. 2008; Black et al. 2009). The historical Barbary lion is morphologically more distinct than any of the African lion populations (Hemmer 1979). As a consequence, guidelines were drawn up on the precautionary principle (Foster/Vecchia/Repacholi 2000). These guidelines would suggest that reasonable action to conserve diversity is preferable, with a separate management unit distinct from the other »zoo lions« in the maintenance of the »Moroccan Lions«. This study focuses on those European zoo collections (including Hai Kef Zoo in Israel), which hold reliable zoo records. In addition, Rabat Zoo holds approximately 25 individuals but breeding records are incomplete and do not appear on the International Species Information System (ISIS 2008). However, reasonable inferences about these animals can be made from historical records of selective breeding concerning the existing Rabat

collection. The research team from Simon Black are reviewing the genetic ancestry of living animals and compiling a European studbook in order to identify (Black et al. 2009):

1. age and gender demographics;
2. reproductive success;
3. founder representation in European collections versus the Rabat group;
4. implications for a future breeding programme to maintain and improve the genetic health of this captive meta-population.

Information for supporting demographic assessment of the existing captive population was found in a number of primary and secondary sources, including the breeding records for »Royal Lions« since 1998. This data included information from both handwritten breeding records at the Rabat Zoo and the records in Western zoos (ISIS 2008). Recent records from zoos that include paternity and maternity data were published in official zoo publications and journal articles by L. Teichmann (2004) and L. Veselá et al. (2005). Informal sources included zoo websites, newsletters and personal communications between the authors and zoo staff (Black 2009). A printed version of the 1998 studbook for »Royal Lions« was validated against the ISIS species database (ISIS 2008). This information was analysed to identify founder animals (born before 1969) recorded in the H. Hemmer and P. Leyhausen census of the former royal palace collection (Leyhausen 1975), the breeding individuals from that population, and subsequent offspring and parentage for all other animals between 1970 and 1998 (Black et al. 2009).

In the studbook from 1998 S. Black and his team (2009) presented the current holdings with their parental relationships.

Current holdings comprised parental histories and individual animal entries for parents, using online ISIS queries, for comparison with the 1998 studbook (Black et al. 2009). Zoo websites and web-based zoo reports were scrutinized for supporting data on names, dates of birth, gender and parental identifiers. Several zoos claiming to hold Barbary lions were contacted directly by an email questionnaire. This process revealed that some institutions have either not submitted records to ISIS or have since withdrawn their claims to hold *Panthera leo leo* from the ISIS records (Black et al. 2009).

On the other hand the authors of the study wished to emphasise the Barbary lion label in marketing communications to the visitors. Data checking ensured the claim validity and the consistency of information cited in a number of different sources. Information on individual lions within the newly compiled studbook consists of zoo records going back to European collections included the known remaining animals from Hemmer and Leyhausen's 1974 census of pre-1969 founders (Black et al. 2009). The European collections included the known remaining animals from American zoos (Yamaguchi 2005) that participated in the original Hemmer and Leyhausen project (Leyhausen 1975; Hemmer 1979; Yamaguchi/Haddane 2002). Rabat Zoo does not have complete zoo records of maternity, paternity, birth date or other demographic information on their Barbary lion collection, so an equivalent studbook was not feasible. Each animal was allocated a unique reference number (STUD_ID) within the draft 2008 European studbook, because many individual animals have multiple zoo ID numbers and, in some instances, multiple names. Only living animals and their parental lines reaching back to the 1969 founder group were included in the studbook. Dead non-breeders or failed breeders (i. e. those with no surviving descendants) were excluded, although all living non-breeding animals have been included since genetic and morphological data for these animals may become important for future analyses. Analysis of parental lineage and founder gene representation involved identification of founder representation across the major zoo collections and then for the total known population of »Royal Lions« (i. e. zoos in Morocco, Europe and North America; **fig. 12**). The calculation involved mathematical proportioning of founder genes assuming an equal contribution from both sire and dam (Black et al. 2009).

Fig. 12 Location of existing Moroccan »Royal Lions«. – (After Harland/Black 2010).



The spread of founder gene representation was calculated forwards from the royal palace founders with STUD_IDs 7-10, 18, 20-21, 27, 34, 37 and the two probable founders from Madrid Zoo. STUD_IDs 200, 201 (Yamaguchi/Haddane 2002; ISIS 2008) were the lions from Madrid with the ideal founder maximum of 8.33 %.

Based on these calculations, the proportion of founder genes represented in any one individual was estimated, together with the total proportion across the population. For Rabat Zoo lions, an estimate of founder representation was calculated as an average of the last known proportions of founder representation in 1978 (Black et al. 2009). This was adequate to generate calculations of founder gene representation in each subsequent set of offspring. The Microsoft Excel statistical functions enabled the analysis of means across sub-populations, based on the calculated founder representations for individual animals in each sub-population (Black et al. 2009). Demographic analysis of the »Royal Lion« population data from the draft 2008 European studbook was used to identify distributions of population age, gender, and opportunities for breeding pairs, cub mortality and fecundity and to reveal trends in these variables since the 1974 royal palace census (Black et al. 2009). At first samples of young females descended from the breeding group at Rabat Zoo and various other lion females were analysed for Cytochrome b sequences. The result of this first screening shows that the radiation within *Panthera leo* separating the extinct European cave lions from recent lions happened no more than 60 000 years ago (Antunes et al. 2008). Sub-Saharan and Asian lion sub-groups separated between 7400 and 20 000 years ago.

The genetic studies used mitochondrial DNA sequencing data to clarify the phylogenetic relationship between Barbary, Sub-Saharan and Asian lions. The phylogenetic tree (based on mtDNA) for the North African Barbary lion joins the Asian lion clade. It shows a slight difference but clear distinction from Sub-Saharan lions. It can be considered as a genetically defined phylogeographic group of its own. The date of splitting between Barbary lion and Asian lion happened later than the splitting of the other lions (Barnett et al. 2006a; 2006b; 2014). The results of the examination by Burger and Hemmer (2005) should be the basis of an urgent call for new strains for breeding of the stock of Barbary lions. Initial research into a possible future reintroduction into the Moroccan wilderness has recently been positively received by the Moroccan government.

The captive population of »Royal Lions« is currently held in relatively isolated zoo collections and is vulnerable to the effects of inbreeding depression (Balmford/Mace/Leader-Williams 1996). Pairing animals from UK zoos with those from Central Europe is a priority to increase diversity and retain a more even spread of founder genes. The draft 2008 studbook and the founder analysis in this study have identified a number of suitable breeding exchanges. A formal studbook-led breeding programme would enable constructive par-

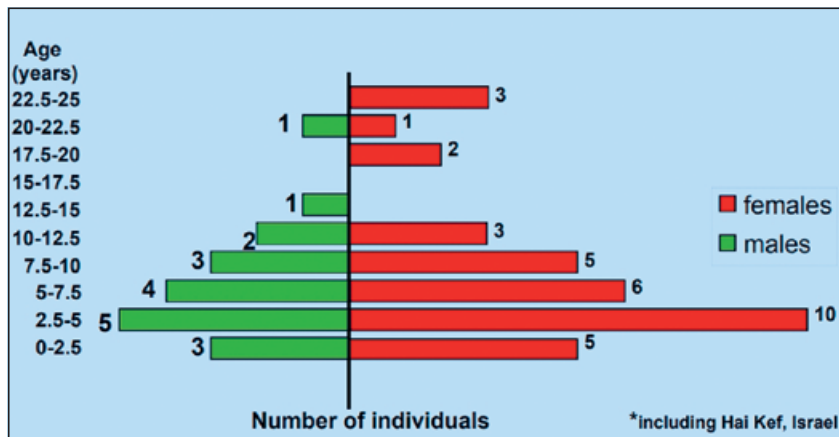


Fig. 13 Age profile for »Royal Lions«, differentiated by gender in European Zoos (including 1,1 lions at Hai Kef Zoo, Israel), Black, Yamaguchi, Harland, Groombridge 2009.

ticipation by zoos holding »Royal Lions« and allow future planning and negotiations (fig. 13). The Hemmer and Leyhausen morphological categorization has been largely ignored since the 1974 census (Leyhausen 1975; Hill/Haynes 1999; Yamaguchi/Haddane 2002; Tefera 2003) but should be incorporated into the studbook alongside genetic and parental data to enable easier assessment of pedigrees as new genetic knowledge of lions emerges (Dubach et al. 2005; Patterson 2007). Other zoo animals, if proven genetically similar to »Royal Lions«, could be included in future breeding efforts, whilst radical approaches such as in-vitro procedures might be considered to retain the genes of ageing »Royal Lions«. The holding capacity of participating zoos will be a constraint on population growth and institutions will need to be willing to transfer selected animals. However, opportunities exist for mutually beneficial exchanges of animals between zoo institutions that should enable effective maintenance of captive prides in the near future. The »Royal Lion« population may yet hold a unique genetic heritage for the global lion population (Patterson et al. 2005; Yamaguchi 2006) and the precautionary principle would suggest that reasonable steps should be taken to preserve »Royal Lions« until their conservation value has been properly assessed. The intention of the »Atlas Lion project group« comprising Simon Black, Nobuyuki Yamaguchi, Adrian Harland and Jim Groombridge (2009) was to create a studbook for the Barbary lion population in captivity.

All studbook data based on a review of zoo records in Rabat (1969-1998) plus a detailed review of breeding records from zoos worldwide (from 1974 onwards). The studbook could help return the majestic Barbary lion to the wild, and will help establish a breeding programme for the Barbary lion. Black's team managed and coordinated breeding to optimize the overall captive population of Moroccan »Royal Lions«. At the moment Barbary lions are managed by EAZA monitoring. Currently we have 54 living individuals in the European zoo population (fig. 13), with 15 males, 31 females, 8 juveniles (3 ♂ and 5 ♀).

HANOVER ZOO BARBARY LIONS

Hanover Zoo opened in 1865, founded on the initiative of the Hanoverian middle class. From 1931 till 1971 the animal dealer Herman Ruhe was the owner of Hanover Zoo, and from 1972 till 1993 the zoo was owned and managed by Hanover city council. Since 1993 the zoo has been a limited liability company under the supervision of the Kommunalverband Großraum Hannover.

As an EXPO 2000 World Exposition project, Hanover Zoo began to transform and modernise its grounds, replacing cages with spacious enclosures comprising theme worlds. One of their main focuses is the nature

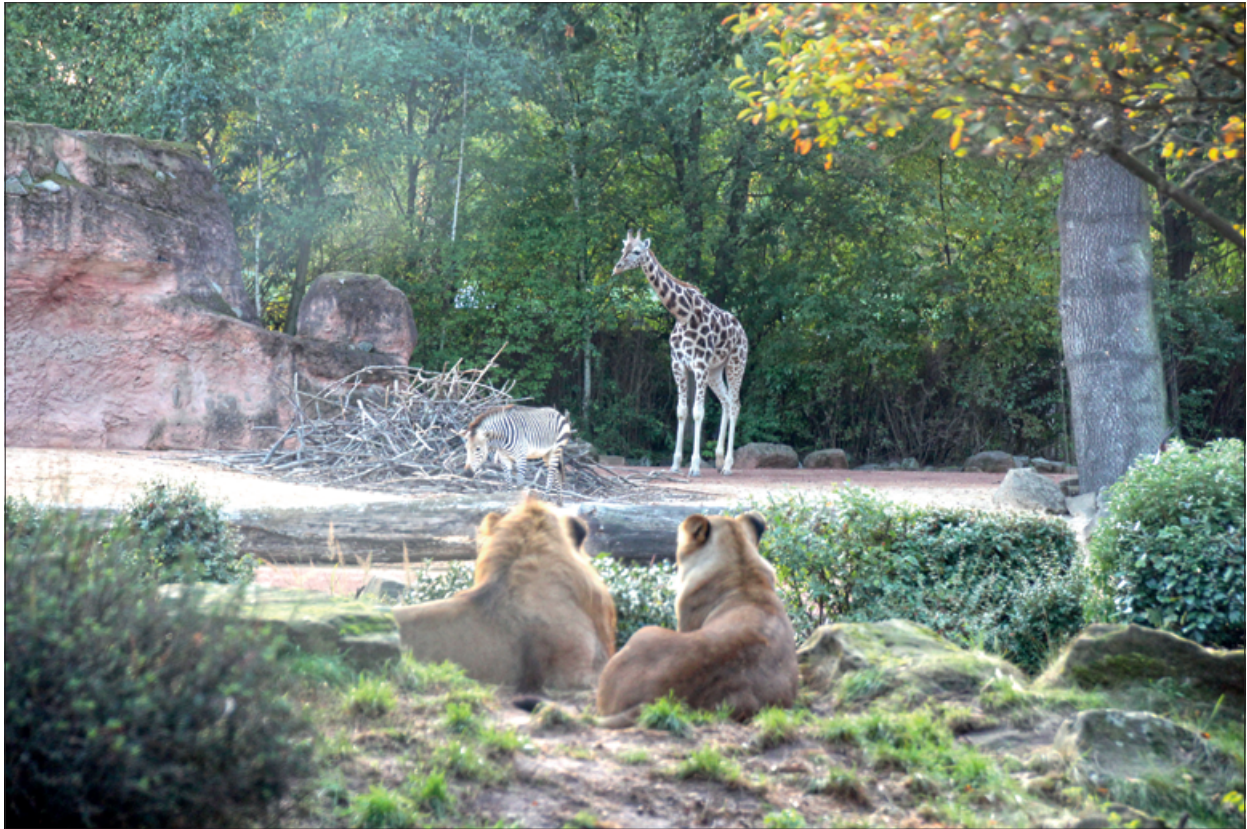


Fig. 14 View from the visitors' platform at Hanover Zoo. – (Photo Erlebnis-Zoo Hannover, 2015).

and endangered species of North Africa. Thus Hanover Zoo hold the studbooks for Addax and North African ostriches. We keep, among others, endangered species such as Somali wild ass and since 2010, the extinct lion subspecies of Barbary lions (**fig. 15**). The lion enclosure was built in 2000.

At first we kept only three »zoo lions« from Givskud Zoo in Denmark. The enclosure is built to resemble an African canyon. The outdoor facility covers 520 m², bounded at the front by an 8 m wide and 5 m deep dry ditch. Visitors can see into the enclosure through four windows.

From the big window one has a fine view across the lion enclosure to our ungulates enclosure with Hartman's mountain zebras, blesboks, springboks and Rothschild's giraffes. The lions have two high lookout points as important features in the enclosure (**fig. 16**). The artificial rock boundary wall is 5 m high. The indoor facility covers 41 m².

THE BARBARY LIONS AT ERLEBNIS-ZOO HANOVER

The adult Hanoverian lion male Chalid was captive born on the 15th of April 2005 at Port Lympne/UK, and is now 10 years old (**fig. 17a**). Chalid has lived at the Hanover Zoo since the 30th of June 2010. He sired five offspring so far. In 2011 couple Barbary lions were born. The young male Joco and his sister Zari were the first Barbary lions to be born in Hanover. Three years later Chalid fathered three more lions. The male, Basu, and his sisters Tamika and Neyla were born on the 1st of July 2015.



Fig. 15 View of the lion enclosure at Hanover Zoo. – (Photo Erlebnis-Zoo Hannover 2015).



Fig. 16 View from the visitor platform across the boundary ditch into the lion enclosure at Hanover Zoo. – (Photo Erlebnis-Zoo Hannover 2015).



Fig. 17 Barbary lions in Erlebnis-Zoo Hannover: **a** Chalid. – **b** Binta with cubs. – **c** Naima. – **d** lion cubs in 2011. – **e** lion cubs in 2014. – (Photos Erlebnis-Zoo Hannover).



Fig. 17 (continued)



Fig. 17 (continued)

The mother of these lion cubs is the Barbary lioness Binta, one of the grandchildren of the »Moroccan Palace Barbary Lions«. Binta is 7 years old and has lived at Hanover Zoo since the 1st of March 2010 (**fig. 17b**). The other lioness, Naima, was also captive-born at Rabat Zoo in Morocco (**fig. 17c**). She is 7 years old and has lived at Hannover Zoo since the 1st of March 2010. Naima is Binta's sister and has no offspring; because of health problems in their uterine tube, we have been treating Naima with hormone contraception since 2010.

The five cubs were born in 2011 and 2014, two males and three females. Both firtborn Barbary lions now live at Thüringer Zoopark Erfurt (Joco) and the female Zari was sent to the Zoo Neuwied (**fig. 19d**).

Of the three litter the females Tamika and Neyla now live at Plzeň Zoo in the Czech Republic. The young male Basu has so far stayed in Hanover (**fig. 17e**). We hope that all Hanover-born animals will do their share for the conservation of the species, extinct in the wild.

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SUMMARY / ZUSAMMENFASSUNG

Breeding Conservation of Endangered Big Cats – The Example of Barbary Lions

Barbary lions have been extinct in the wild since 1942. There is a promising zoo population of 54 animals: 15 males, 31 females and 8 juveniles (3♂, 5♀). Modern zoos are acting as a Noah's Ark – they have experience, space and information (studbook, genetic analysis). There is a chance to reintroduce this species in the wild. However, zoos are closed spaces with all variety of comforts, such as daily feeding, cleaning the facilities and medical care. Thinking about returning to the wild has to be part of the breeding strategy. In the case of the Barbary lion, we are hopeful that it will be possible to eventually return them to the wild.

Zuchterhaltung gefährdeter Großkatzen – das Beispiel der Berberlöwen

Berberlöwen sind in freier Wildbahn seit 1942 ausgerottet. Es gibt eine vielversprechende Zoopopulation von 54 Tieren: 15 Männchen, 31 Weibchen und 8 Jungtiere (3♂, 5♀). Moderne Zoos fungieren als Arche Noah – sie haben Erfahrung, Platz und Informationen (Zuchtbuch, genetische Analysen). Es besteht die Chance, diese Art wieder in der freien Natur anzusiedeln. Allerdings sind Zoos geschlossene Räume mit allen möglichen Annehmlichkeiten wie täglicher Fütterung, Reinigung der Anlagen und medizinischer Versorgung. Der Gedanke an eine Rückkehr in die freie Wildbahn muss Teil der Zuchtstrategie sein. Im Falle des Berberlöwen sind wir zuversichtlich, dass es möglich sein wird, ihn in die freie Wildbahn zu entlassen.