Giraffa

Newsletter

Volume 6(1), July 2012

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Note from the Editor

Another interesting and jam packed edition of Giraffa – and can you believe, we are now in its sixth year! I am a little surprised (but quietly proud) that we have managed to put this newsletter together for so long as it seemed like only last year the concept was first mooted.

In this Issue we bring you stories from the wild and captive giraffe world, with stories ranging from DNA to DRC, capture to conference, and sadly killings to Kenya. An interesting piece on current giraffe taxonomy is presented which is accompanied by a recent statement by IGWG on the extant giraffe taxonomy. Exciting and engaging discussions have been had by many around this issue and I hope we can all contribute to unravelling the mysteries of their status over the coming years.

Our field experts have been out and about collaring, capturing and photographing giraffe across the continent – all in the name of research and management! We are also fortunate to bring you snippets from the most recent IAGCP conference in the USA – so for those of you (like me) who could not attend, we can now feel like we did not totally miss out. All of this and more... including the first notice for Giraffe Indaba II. Whilst still a year away we want to allow people enough time to plan and build up the enthusiasm. Stay tuned as all the pieces will fall together and we all migrate together to Kenya in August 2013!

For the last year we at the IGWG have been working towards the possibility of increasing giraffe awareness and profile – especially in the highest stage, IUCN. Whilst we are not quite there, discussions have taken the concept to the next level and together with our okapi colleagues we are moving closer to establishing a distinct Giraffe and Okapi Specialist Group. To honour this new, emerging partnership, there are some okapi storries in this issue – including a report on the recent killings in DRC.

I would like to wish you a positive second half of 2012, and one which brings opportunities for all giraffe around the globe and those people that risk their lives, impart their knowledge and sweat and toil for the long-term conservation and management of this unique and amazing critter!

Julian Fennessy
Chair IGWG & GCF Trustee

Newsletter of the IUCN SSC ASG International Giraffe Working Group (IGWG) & the Giraffe Conservation Foundation (GCF)

Objectives

IGWG: to define the taxonomy of giraffe with respect to the historic classifications as seen today across the African continent blending traditional taxonomic morphometrics with molecular genetic techniques and to establish the effect of habitat fragmentation and reduction on conservation management decisions for the future success of the species.

GCF is dedicated to securing a future for all giraffe populations and (sub)species in the wild.

This newsletter was compiled and designed by Steph Fennessy. Please send any questions, comments or articles for the next issue of *Giraffa* to steph@giraffeconservation.org.

Extant giraffe taxonomy: statement from the IUCN SSC ASG International Giraffe Working Group

IGWG

Currently the giraffe is recognised as one species *Giraffa camelopardalis* with nine extant subspecies: *G. c. camelopardalis* (Nubian), *G. c. angolensis* (Angolan), *G. c. antiquorum* (Kordofan), *G. c. giraffa* (Cape), *G. c. peralta* (West African), *G. c. reticulata* (reticulated), *G. c. rothschildi* (Rothschild's), *G. c. thornicrofti* (Thornicroft's) *and G. c. tippelskirchi* (Masai).

The giraffe is a widespread and phenotypically diverse species. As a result, giraffe taxonomy has been revised a number of times since the late 19th century. Lydekker (1904) described two giraffe species: the monospecific reticulated giraffe (*G. reticulata*) and the netted giraffe (*G. camelopardalis*) containing ten subspecies. Dagg (1971) proposed the generally accepted taxonomy of one species consisting of nine subspecies. East (1998) proposed six population groups, though he did not describe these as taxonomic subspecies. Seymour (2001) supported at least six valid subspecies using phenotypic and genetic analyses. In 2007, genetics research on six (Brown *et al.* 2007) and eight (Hassanin *et al*. 2007) of the subspecies indicated that they are not interbreeding in the wild and are potentially reproductively isolated. In 2011, Groves and Grubb (2011) proposed eight full species of giraffe (subsuming the Rothschild's giraffe into the Nubian giraffe).

The IUCN SSC ASG International Giraffe Working Group (IGWG) recommends the following genetic samples should be collected and analysed as a priority:

1. Cameroon: northern areas including Waza, Bouba Ndjida , Faro and Bénoué National Parks and surrounding hunting zones
2. Central African Republic: Manovo-Gounda-St. Floris National Park
3. Chad: Zakouma National Park
4. Democratic Republic of Congo: Garamba National Park
5. Ethiopia: Gambella National Park
6. South Sudan: Boma National Park
7. Southern Tanzania: southern areas including Katavi, Ruaha and Selous National Parks and surrounding areas
8. Zimbabwe: Hwange National Park and surrounding areas
9. Zambia: Sioma-Ngwezi National Park and surrounding areas

Morphological analyses of additional museum specimens must also be prioritised.

Conservation of each currently recognised giraffe subspecies is important, as each of these groups represents unique evolutionary diversity within the genus *Giraffa* and in the remaining terrestrial large mammal fauna. The Rothschild's and West African giraffe are recognised as endangered on the IUCN Red List. Ongoing conservation evaluations of other giraffe subspecies (e.g. Thornicroft's, reticulated, Masai and Kordofan) will likely result in elevated conservation rankings for these groups as well.

Genetic sampling and analysis of the remaining populations is currently being undertaken in collaboration with the Giraffe Conservation Foundation and the Biodiversity and Climate Research Center, Senckenberg Museum, Germany.

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Rebels kill people and okapi at Okapi Wildlife Reserve headquarters, DRC

Noëlle Kümpel, Zoological Society of London

A shocking rebel attack took place on Sunday 24 June at the reserve headquarters and nearby town of Epulu in the Okapi Wildlife Reserve in north-eastern Democratic Republic of Congo (DRC), slaughtering the captive okapi kept there.

Among other atrocities, a total of 7 people, including two ICCN rangers and a ranger's wife, and all 14 captive okapi held at the reserve headquarters, were killed. Buildings were destroyed and food, medical supplies and equipment looted at both the reserve headquarters and the town of Epulu. Other reserve staff and villagers fled on foot into the forest following the attack or were taken hostage by the rebels. A single okapi had been left alive but wounded and subsequently succumbed to her injuries.

Carried out by an infamous Mai Mai rebel leader, the attack was not politically motivated but specifically targeted at conservationists. From a nearby village, the rebel leader Morgan was a gold-miner-turned-elephant-poacher who had been arrested three times by the park authorities, ICCN (the Congolese Institute for Nature Conservation), and had threatened retaliation against ICCN and the conservation groups that support its wildlife protection operations and personnel in the reserve, such as White Oak Conservation Center and its Okapi Conservation Project, the Wildlife Conservation Society and the German Development Bank KfW.

John Lukas of White Oak Conservation Center said, "There are no words to describe the loss of the okapi at the station, some of which have been in residence for over 23 years and all made it through seven years of civil war unscathed. They were ambassadors for all wildlife in the forest and had been helping educate visitors to the station of the marvels of the diversity of life in the rainforest for over 25 years."

During its recent annual meeting in Geneva, the UNESCO World Heritage Committee observed a minute of silence in memory of those killed by the rebels on 24 June. The reserve was inscribed on UNESCO's World Heritage List in 1996 and has been on the World Heritage List in Danger since 1997. Recently, illegal mining and poaching for the ivory trade has increased in the reserve.

The Okapi Wildlife Reserve occupies about one-fifth of the vast Ituri Forest in the northeast of DRC, and is known as a stronghold for the okapi, which is threatened by hunting and habitat loss. In addition to the traumatic losses at the reserve headquarters, the resulting insecurity in the reserve has forced a halt to a 12-month study into okapi survey methods that had just been started there by the Zoological Society of London (ZSL) as part of the collaborative range-wide okapi conservation project it is leading on behalf of ICCN. Ironically, ZSL had chosen to carry out this research there as the reserve had been felt to be relatively secure compared to other protected areas in central/north-eastern DRC where okapi are found.

At both an individual and species-wide level, these are challenging and concerning times for the okapi. Our thoughts are with the families of those who lost loved ones, and to those in DRC who risk their lives daily in the pursuit of conservation.

Watch this BBC online report on the attack here, including footage of Epulu's captive okapi: http://www.bbc.co.uk/news/world-18679625.

If you would like to support the families of the rangers who were killed and the rehabilitation of the reserve headquarters, you can find out more and donate online through the Wildlife Conservation Network (http://wildlifeconservationnetwork.org/about/news_okapi.html) or contact ICCN Okapi Wildlife Reserve Director Mapilanga directly.

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Five giraffe successfully collared in Garamba National Park, DRC

Marina Mònico & Nuria Ortega (photos), African Parks

The Congo giraffe is one of the symbols of Garamba National Park, in part because it is an endemic subspecies but also because it represents the only giraffe population in the Democratic Republic of the Congo.

Although population numbers have always been low, they have plummeted to only a few individuals over the past couple of decades. A count of 354 giraffe in 1993 dropped to a mere 86 in 2007. Although historically poaching and political instability have been major contributors to the decline in the giraffe population, currently giraffe poaching is considered taboo for cultural reasons. Locally it is believed that consuming giraffe meat causes leprosy and poaching incidents have declined considerably as a result. As such, the causes for the population crash or subsequent lack of recovery are unknown and speculation has ranged from high levels of predation to forage limitation.

In an attempt to gather more information on the Garamba giraffe population, it was decided to fit some giraffe with GPS collars, financed by the Fundación Biodiversidad from Spain. The first attempt in February ended in failure as the giraffe were too skittish to approach on foot. Although giraffe are mostly collared by darting them from a helicopter, we were unable to obtain one. Consequently, we changed our approach and darted them using an ultra-light aircraft.

We completed some practice runs using a wooden target mounted on the back of a moving vehicle. The ground team also received some training to cut off the animal's escape route and to help her fall gently to avoid any injuries.

Early morning on 21 May a nervous team set off to find the giraffe. Once we located the animals, it was the aerial team's task to steer the animals into an area where the giraffe is unlikely to hurt itself falling, where visibility favours an accurate shot and an area easily accessible by the ground team. The immobilisation of free ranging giraffe is a delicate process. Once the drug is administered, the ground team has three minutes to reach the giraffe to assist the fall. The veterinarian administers an antidote after which the animal is awake, but held down and kept calm by covering its eyes and ears.

Following these critical moments the team silently continued their work, each with their own task - placing the collar, taking blood, skin and hair samples and checking the giraffe's vital signs. When all is done the team moves away allowing the animal to get up and run away safely.

Everything went smoothly and we managed to fit collars to five giraffe over a period of three days. These collars will now allow us to follow their movements and map their distribution, providing a basis for studies on their behaviour, population numbers and habitat and feeding preferences. This information may ultimately help us understand the reasons for the population declines. The initial monitoring of the giraffe will be done by Marina Mònico, a volunteer from Spain. Marina is a biologist with a Master's degree in Management and Conservation of Biodiversity.

In addition to the giraffe, the team also used the opportunity to collar another lioness and a female elephant. Currently the Garamba monitoring team is following the movements of five giraffe, five lion and five elephant.

This story has been reprinted with permission from African Parks: http://www.african-parks.org/News_30_Five+giraffe+successfully+collared+in+Garamba.html

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The taxonomic history of giraffe – a brief review

Russell Seymour, IGWG

The giraffe has long been considered a single species, albeit highly polymorphic. Its high degree of geographically structured phenotypic variation has lead to 27 recorded specific or subspecific taxon names (Grubb, 2005). This article briefly reviews the significant episodes in the complex taxonomic history of the giraffe.

Linnaeus (1758) described the giraffe based on the work of Belon who had seen a captive giraffe in Cairo some two hundred years earlier. With no specimens to work with, Linnaeus classified the giraffe with the American elk and the red deer as *Cervus camelopardalis*. The giraffe was reclassified in 1762 by Brisson as *Giraffa giraffa* and amended in 1848 to the currently used *Giraffa camelopardalis*. Although now considered a monospecific genus, the giraffe was long classified as two species.

In 1761 Dutch explorers sent a skin from the Orange River region of South Africa to Leyden University (Dagg and Foster, 1982). This southern giraffe was formally described by Levaillant in his account of his travels in Southern Africa, published in 1790 (Dagg and Foster, 1982). The French anatomist, St. Hilaire, following his study of Levaillant's specimens at a Paris museum and the living northern giraffe in the collection of King Charles X of France (Allin, 1998), decided that the two represented different species. Richard Owen, the British anatomist and zoologist, maintained two species (Owen, 1841) in discussing the features of the Cape and Nubian giraffes separately. Lesson (1842) also classified the northern and southern forms as different species. However, other contemporary authors, including Ogilby (1836), Sundevall (1842) and Swainson (1835), considered the two types of giraffes to indicate variation in the same species.

De Winton (1897) reviewed the taxonomic status of the giraffe, considering the paucity of available specimens to be "the reason for the nomenclature of the *two species* being left in a very unsettled state" (p. 274, with my italics added), and maintained the separation between northern and southern species. However, the distinction was confused by de Winton's use of a specimen from Somalia, rather than material from the northern type locality. In this specimen the pelage spots were "large, sharply defined, and only separated from each other by narrow pale lines" (Thomas, 1894, p. 135); the pattern now recognised as *G. c. reticulata;* the reticulated giraffe. De Winton (1899) later recognised his error and sought to

"correct a statement ... which may cause confusion if not rectified" (p. 211). He realised that the Somali specimen was, in fact, "very distinct from the true *Giraffa camelopardalis* from Senaar (the type locality) and the adjacent countries" and was "a strikingly different animal" that was "well worthy of a separate name" (all quotes de Winton, 1899. p. 212). To this end he redefined this taxon as a subspecies of the northern species; *Giraffa camelopardalis reticulata*.

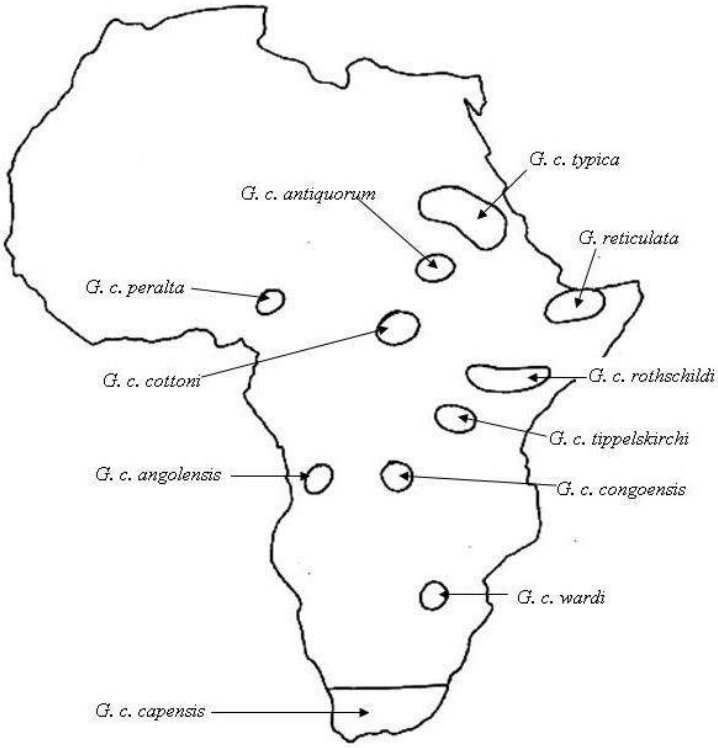

Figure 1: Giraffe subspecies ranges according to Lydekker (1904) (Redrawn from Lydekker 1904, text figure 23).

Thomas (1901) argued that the reticulated giraffe deserved specific recognition due to the lack of intermediate forms between it and any neighbouring forms. He further suggested that the northern form grades, through intermediate populations, into the southern form at best making the southern form a subspecies. Hence, while Thomas (1901) also recognised two species these were different from those previously proposed.

Lydekker (1904) carried out the first major review of giraffe subspecific variation that included a reasonable geographic representation of specimens, although his sample sizes were small for many taxa. He followed Thomas' (1901) arrangement and considered the reticulated (*G. reticulata*) and blotched (*G. camelopardalis*) giraffe to be separate species because of pelage patterns with the former monotypic and the latter containing ten subspecies. Although Lydekker's geographic ranges (Figure 1) were inadequate by today's standards, and even incorrect in some cases, his classification provides the basis of the contemporary classification. His subspecies descriptions were largely based upon the variation of the pelage patterns, although he stated that "most, if not indeed all, of the subspecies of Giraffe are distinguishable by cranial differences." (p. 202). Lydekker (1911) subsequently named a further blotched giraffe subspecies (*G. c. thornicrofti*) and a subspecies of the reticulated giraffe (effectively creating two subspecies within this species, the nominate subspecies and the newly recognised *G. r. nigrescens*).

Krumbeigel's (1939) work followed Lydekker's (1904 and 1911) classification. Rather than reviewing the validity of Lydekker's subspecies Krumbeigel sought to describe them more adequately using larger sample sizes. His classification recognises a single species with two subspecies. Infrasubspecific groups, previously recognised as subspecies, were recognised by a fourth latinised name. As such Krumbeigel's work is not consistent with the requirements of the ICZN (1999). Krumbeigel's work is noteworthy as he extends Lydekker's subspecies ranges and presents a more realistic range map (figure 2) that has, apparently, remained the basis for contemporary range maps.

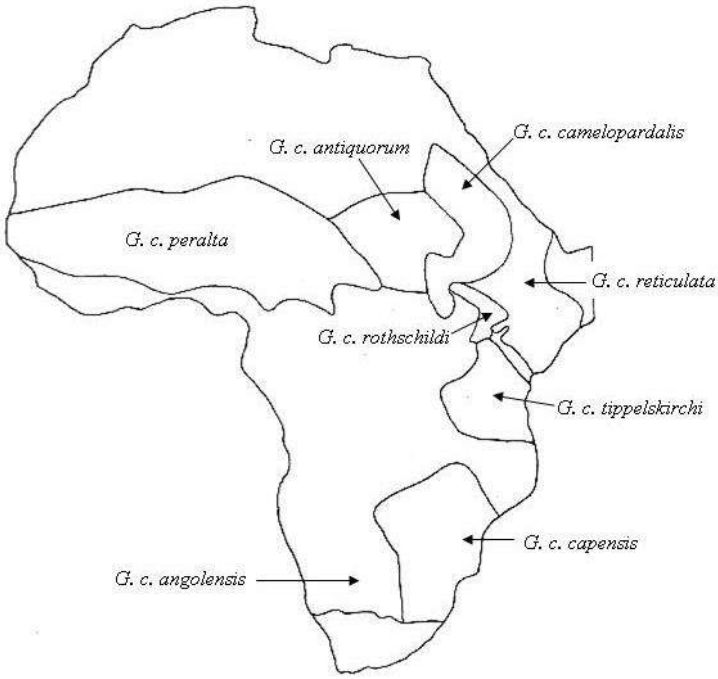

Figure 2: Giraffe subspecies ranges according to Krumbeigel (1939) (Redrawn from Krumbeigel 1939, figure 49. Note that the 'open' ranges of *G. c angolensis* and *G. c. reticulata* are as drawn by Krumbeigel).

Until recently Dagg (1971) was the authority most frequently consulted for the status of giraffe taxonomy. She based her classification on that of Ansell (1968) who provided detailed descriptions of the ranges of each subspecies. Ansell's (1968) classification, in turn, was largely based on Dagg's previous work (Dagg, 1962; 1968)

and that of Haltenorth (1962). Ansell (1971. p. 13, in an updated version of his 1968 paper) stated that his list of subspecies "should be regarded as provisional".

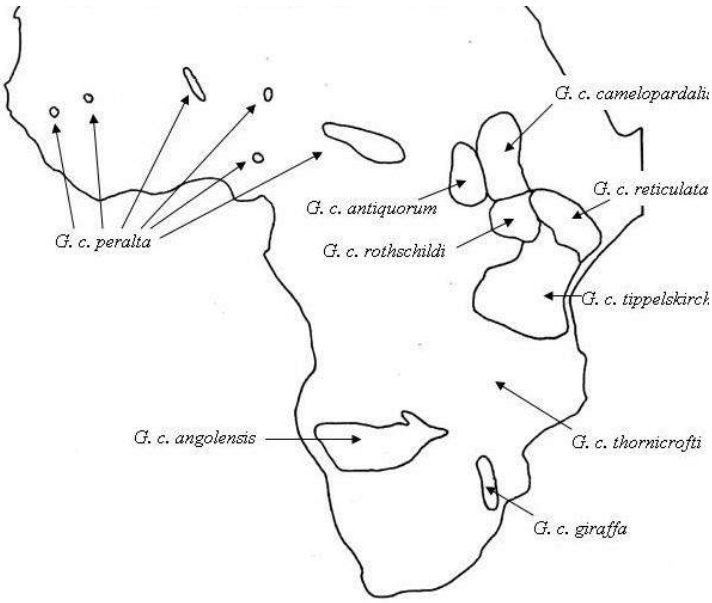

Figure 3: Giraffe subspecies ranges according to Dagg (1971) (Redrawn from Dagg 1971, figure 3).

East (1999, p. 94) has suggested that "considerable uncertainty surrounds the validity and geographical limits of most of the described subspecies of the giraffe" due to the lack of geographical barriers between supposed subspecies. He suggests instead six "subspecies/ subspecies groups" (not given taxonomic trinomials), but states that these groupings are "arbitrary, like other treatments of giraffe subspecies". Grubb (2005) also recognises six subspecies. However, these two authors differ in the demarcation of the ranges of the nominate subspecies; while Grubb (2005) groups the western giraffe (*G. c. peralta*) in *G. c. camelopardalis*, East includes the Rothschild's giraffe with the nominate subspecies.

Recently Brown *et al* (2007) have suggested the existence of six full species of giraffe in Africa. Their mitochondrial DNA sequence analyses demonstrate between five and seven geographically defined clades. Reticulated giraffe haplotypes are paraphyletic with respect to a monophyletic sister group pairing of Rothschild's and Western giraffe haplotypes. Reticulated giraffe also demonstrate some female mediated introgression with a Masai haplotype occurring within the clade. The South African giraffe haplotypes are embedded within the Masai clade. Analyses of nuclear data (microsatellite allele frequencies) demonstrate six population groups, with the South African giraffe discrete from the Masai. While this study demonstrates that there is strong genetic structure among giraffe populations, indicating reproductive separation over evolutionary time, and Brown *et al* assert that these population level subdivisions represent species level differentiation, such distinction depends wholly on the species concept used. Interestingly, although also invoking six taxa Brown *et al*'s (2007) conclusions differ from those of both East (1999) and Grubb (2005). At about the same time Hassanin *et al* (2007) published a study of mitochondrial DNA variability in West and Central African giraffe. They suggest, based on sequence data, that the geographic distributions of the West African giraffe should be adjusted, but they maintain the trinomial nomenclature of the subspecies.

From a taxonomic perspective none of these recent studies do anything to further the classification of giraffe populations as they contain no diagnoses or descriptions of the purported taxa nor any of the required taxonomic discussion. The recent review of ungulate taxonomy by Groves and Grubb (2011) includes eight full species of giraffe, grouped into northern and southern groups (Northern: *G. camelopardalis*, *G. reticulata*, *G. antiquorum* and *G. peralta*. Southern: *G. tippelskirchi*, *G. thornicrofti*, *G. giraffa* and *G. angolensis*) though not all of the taxa have full diagnoses and descriptions. Their review does include examination of specimens, though their sample sizes are small for certain taxa, and they find significant overlap in their analyses. Their recognition of eight taxa is somewhat based on novel analyses of morphology and pelage characters, but is largely based on the genetic results of Brown *et al* (2007) and Hassanin *et al* (2007). Their decision to elevate all taxa to species level reflects a philosophical switch, not accepted by all taxonomists, or biologists, to adopt a phylogenetic species concept. Even this treatment, while a welcome addition to the discussion, does not adequately review giraffe taxonomy.

For a century the most complete assessment of giraffe taxonomy remained that of Lydekker (1904), although common use as lead to the general acceptance of a single giraffe species containing nine subspecies, following Dagg (1971). However, as this review shows, the giraffe has had a complex taxonomic history. Hence, a re-evaluation of subspecific variation in the giraffe was clearly warranted. My own research (Seymour 2001 and reported in *Giraffa*, Seymour 2007) presented the results of analyses of geographic structure in three complementary data-sets from pelage patterns, morphological data and genetic sequence data from museum specimens gathered all across sub-Saharan Africa, including many areas no longer populated by giraffe. It concluded the probable existence of two species containing six definitive subspecies between them.

Authority	Species	Subspecies
Lydekker, 1904 and Lydekker 1911	*G. reticulata* *G. camelopardalis*	*G. r. reticulate* *G. r. nigrescens* *G. c. camelopardalis** *G. c. angolensis* *G. c. antiquorum* *G. c. capensis* *G. c. congoensis* *G. c. cottoni* *G. c. peralta* *G. c. rothschildi* *G. c. thornicrofti* *G. c. tippelskirchi* *G. c. wardi*
Dagg, 1971	*G. camelopardalis*	*G. c. camelopardalis* *G. c. angolensis* *G. c. antiquorum* *G. c. cottoni* *G. c. peralta* *G. c. reticulata* *G. c. rothschildi* *G. c. thornicrofti* *G. c. tippelskirchi*
Seymour, 2001	*G. camelopardalis* *G. giraffa*	*G. c. camelopardalis* *G. c. reticulata* *G. c. rothschildi* *G. g. giraffa* *G. c. thornicrofti* *G. c. tippelskirchi*
Brown *et al*, 2007	*G. angolensis* *G. peralta* *G. reticulata* *G. rothschildi* *G. tippelskirchi*	
Groves and Grubb 2011	*G. camelopardalis* *G. angolensis* *G. antiquorum* *G. giraffa* *G. peralta* *G. reticulata* *G. thornicrofti* *G. tippelskirchi*	

Table: Summary of the classifications by five authors. Note that Seymour (2001) did not explicitly name these taxa and maintained *G. c. angolensis*, *G. c. peralta* and *G. c. antiquorum* as provisional subspecies pending examination of further material. Brown *et al*'s (2007) classification was based on genetic evidence. They sampled the six taxa shown; other populations were not sampled. * Lydekker's actually used the subspecific name *G. c. typica*. However, current convention repeats the species name for the nominate subspecies.

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Giraffe translocation from Aberdare Country Club to Sera Wildlife Conservancy

Stephen M. Chege, Kenya Wildife Service

Summary

The giraffe population among other species in Aberdare Country Club (ACC) sanctuary has been viewed by the management to exert unhealthy pressure to the habitat. Kenya Wildlife Service was informed of this situation and sent a team of scientists to carry out a rapid assessment and come up with recommendations. The team concluded that since 1988 when the giraffes were introduced into the sanctuary there has been a steady increase in their population and subsequently this impacted negatively on the habitat. This was manifested by defoliation of the highly palatable browse of the giraffe diet. It was also noted that even the lowly palatable, *Euclea divinorum*, was also defoliated. A total of 43 giraffes were counted as of January 2008, and one of the recommendations was to destock the giraffe population and leave a recommended number of between 15 -20 individuals.

The capture and translocation preparations began in July 2008, with a reconnaissance survey to establish the capture sites and routes to be used for transportation of animals. The actual capture, a collaborative effort between Kenya Wildlife Service and Lewa Wildlife Conservancy began in mid August and came to a close at the end of August 2008. A total of 26 giraffes were captured and taken to Sera Wildlife Conservancy. Three giraffes died during transit and this accounted for 11.5% mortality which is considered within acceptable limits for giraffe capture.

All the captured animals were transported directly to Sera Wildlife Conservancy where they were held in a boma for six weeks before finally releasing them to the wild. Two more animals died during the acclimatisation phase in the boma.

One of the main objectives of the exercise was to reduce the giraffe population within the sanctuary to manageable levels. We managed to remove a total of 26 giraffes, and if the actual figures of giraffe population within the sanctuary then were 43, then only 17 giraffes were left and hence we attained the objective. More adult males were left within the sanctuary and we recommend that another translocation exercise be organised to remove these adult males and swap with others from another area.

Introduction

Sera Wildlife Conservancy is a community conservancy in Samburu East but gets guidance on wildlife management from the Northern Rangelands Trust (NRT). Over the recent past, Sera has expressed interest in getting more wildlife, through translocation from other areas. With the idea of wildlife conservation, there has been improvement in general security in this area, which is a big boost to wildlife conservation. It is on this background that Sera wrote to Kenya Wildlife Service (KWS) seeking approval for translocation of animals into Sera. The animals requested for translocation included; 150 elands, 100 beisa oryx, 80 reticulated giraffes, 50 Somali ostriches and 400 impala. If all this is achieved, it will lead to conflict resolution and a boost in tourism in the area. Consequently, the value of wildlife conservation will be appreciated by the surrounding communities.

The reintroduction committee based at KWS approved the request but recommended that the translocation should be done in phases. In the first phase 30 impalas, 50 elands, 50 beisa oryx and 30 reticulated giraffe would be introduced. The rest of the requested animals would be translocated based on the outcome of the first phase.

The Aberdare Country Club (ACC) on the other hand, had raised a concern on the impact of increasing numbers of giraffes in their sanctuary. A KWS led team visited the area and did a rapid assessment and concluded that most of the animals including giraffes at ACC had gone beyond the ecological carrying capacity of the sanctuary and recommended destocking of between 30-35 giraffes and leave a manageable population of between 15 -20 individuals.

It was on this basis that the capture team began the necessary arrangements in readiness for capture and translocation of giraffes from ACC to Sera. Giraffe capture is one of the most challenging captures, and mortalities of up to 100% have been reported. Accordingly, the capture team held consultations with local and international experts to minimise and avoid the risks involved. During the reconnaissance survey, several alternative routes for transport of the animals were established. Different capture methods were discussed and the best was agreed upon by the team members.

Actual capture began on 14th August 2008 and came to an end on 26th August 2008. In general, the giraffe capture operation was challenging, but the objective was achieved.

Materials and Method

Capture site

The study area covers 1500 acres. Four open grass land areas exist: a glade to the North, a former golf course, a centrally situated football pitch and the top of Kamatongu Hill. Some sections including the slopes of Kamatongu Hill have very steep gradients while most of the land is gentle to undulating. The slopes are forested or bushed with some herb-layer undergrowth. Kamatongu Hill at altitude of 2063 m above sea level is the highest point on the sanctuary. The slopes of the hill are covered with some forest and bush on either side. On the property, stand the exclusive ACC, staff housing, vehicle garages and administration offices. Honi River borders the sanctuary to the northeast and northwest. The sanctuary borders with Sangare Ranch to the west. To the south and east the land borders private farms. The entire property is bound by an even strand electric fence. The capture trap was set on the main glade leading from the ACC to the water source north of the club.

Capture equipment and personnel

The capture team comprised staff from Lewa Wildlife Conservancy (LWC) and KWS. The two teams had worked together in the past. A total of 24 people were involved in the operation.

We had one 7-ton lorry fitted with a giraffe transport container. We also had a standard giraffe trailer on standby just in case it was required. There were three Land Cruisers dedicated for the exercise. A complete mass capture system was also available.

Capture Method

A funnel-shaped plastic boma was erected on the main glade leading from the ACC to the water source on the north of the club. Curtains were placed 20 m inside the bush with an entry point on the southern side and a gate on the northern end. On the northwestern corner we placed the loading ramp which was initially hidden behind the main curtain and was only opened when the animals were inside. The dividing curtains were only put up once the animals were inside.

The animals were used to drinking water and licking salt which was placed on the northern end of the glade. We

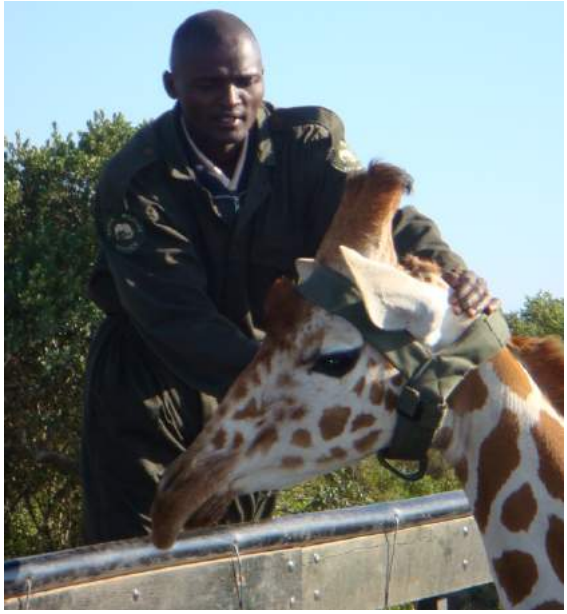
deliberately left this end open so that the animals could continue taking water and mineral salts for a minimum of seven days, without any disturbance. The capture team left the site for the seven days and only 2 people were allowed to visit the capture site as they observed and fed the animals.

During capture, animals were initially pushed by people until they got near the entrance of the capture trap, where vehicles applied pressure. Once inside the main curtain was put. The animals would then be pushed towards the loading ramp and dividing curtains would be put once animals crossed the already ear-marked areas. On approaching the loading ramp, vehicles were used to push the animals with people lifting the curtain behind the vehicles. Once inside the crush, a curtain at the entrance of the crush was raised. In the crush, a piece of hessian cloth was used to pursue the animals until they entered the container.

Use of vehicles and people to push the animals at one point failed to work and we reverted to using a helicopter. With only two drives, the helicopter was able to push 14 giraffes into the trap. The animals were held inside the plastic boma until they were all transported to Sera.

Loading and Transport

The distance between ACC and Sera Wildlife Conservancy is 240 km. Driving at an average speed of 30km/h, we spent eight hours in transit. Once the animals were loaded into the container, the truck left immediately. Live electric wires were a challenge during transit.



Upon arrival, animals were released into an already erected holding pen. The holding pens were constructed at Kauro headquarters in Sera. Plastic capture material was used to construct the boma, which was later gradually extended using electric live wires.

A bridle type collar fitted with a radio transmitter was fitted onto some of the animals while in the truck. There was no need of immobilising the animals. Some animals were cooperative while others were not. We did not pursue them so much.

Boma care and management

Animals within the holding pens were provided with clean drinking water put on troughs (half drums were used). There was one central place for water. Within the boma there was natural browse, but the animals were also supplemented with lucerne and dairy cubes. On average dairy cubes were estimated at 3kg/animal per day, while lucerne was estimated at 4.5kg/animal per day. This was increased gradually as the animals got used to it. There were two dedicated people to look after the giraffes while they were in the boma.

Results

Captured animals

A total of 26 giraffes were successfully captured within five capture days, with a rest day after each capture day. It took three days to construct the capture trap. Three animals died during transport. The table below shows the summary.

Among the 26 captured, there were 17 adults (13 females and 4 males), 4 sub adults (2 females and 2 males) and 5 juveniles (3 females and 2 males).

DATE	BREAKDOWN	TOTAL	COMMENTS
14/08/2008	3 adults (2F+1M), 2 juvenile females and 1 sub adult male	6	1 adult female was pregnant. The sub adult male fell in the truck during transit, dislocated his neck and died.
16/08/2008	1 adult male, 1 pregnant female, 1 sub adult male & 1 juvenile male	4	1 adult male was electrocuted and died instantly. The remaining 3 animals were taken to OPC for temporary holding in the boma, for later transfer to Sera. The sub adult was collared 170.090
22/08/2008	3 adult females & 1 juvenile male	4	The mother of the juvenile was collared 170.110
24/08/2008	6 adults (2M+4F) & 2 sub adult females	8	1 adult female fell in the truck during transit, was trampled on, developed bloat and later died.
26/08/2008	3 adult females & 1 juvenile female	4	All arrived safely at Sera
28/08/2008	The 3 that were held at OPC were loaded and taken to Sera		
Totals=> captured = 26, mortality = 3(11.5%)			
17 adults (4M+13F), 4 Sub adults 2F+2M), 5 juveniles (3F+2M)			

Transport

The transit distance was long (240km) and we faced challenges due to live electric wires. One adult male measuring 5.9 m in height was electrocuted while crossing the Honi River and died instantly. One female in contact with the electrocuted male became unconscious and fell in the truck. The distance to the release site was still quite far and the available options were to look for an alternative place and hold the animals in a holding pen temporary awaiting later transfer to Sera or to go back to ACC and release them to the wild. The former was preferred and Ol Pejeta came to our rescue and agreed to hold the animals temporarily in their holding pens.

Discussion

Giraffes have either been singly captured, using chemical immobilisation, or mass captured using funnel shaped plastic boma system. The historical high morbidity and mortality (>10%) encountered with previous field anesthetic procedures utilising opioids has resulted in a hesitancy to anesthetise this species [Bush *et al*. 1976]. The major problems encountered when using opioids (etorphine and carfentanil) in giraffes are [Langman *et al.* 1973], vomiting or passive regurgitation leading to fatal aspiration pneumonia, marked respiratory and cardiac depression, self-induced trauma during the onset of recumbence with the animal falling without control and prolonged induction and/or stormy recovery resulting in secondary self-induced trauma, marked hyperthermia and/or capture myopathy [Citino *et al.* 1984]. All these challenges associated with chemical immobilisation of giraffes and the terrain with steep gradient at ACC resulted into use of mass capture system as the method of choice.

Mass capture system is better compared to chemical immobilisation since animals are captured in mass and less time is spent in capturing many animals. In this operation, we used a funnel shaped mass capture system where animals were pushed by vehicles and people and also one last drive where a helicopter was used. Herding giraffes using people is not a common practice and this could be the first ever documented case. In this scenario it was possible to use people to herd the animals since they were used to them, but after a few attempts the animals declined to move and we reverted to using a helicopter.

The terrain at ACC was not ideal for chemical immobilisation of giraffes. Two giraffes were known to have died in the past at ACC after chemical immobilisation (Chege personal communication). The animals fell in a ditch after darting, which compromised their respiration and consequently resulted in their death.

Ideally, when giraffes are chemically immobilised they are held in a holding pen for a minimum of 10 days before transport, to avoid mortalities. In our operation, we transported animals straight to the recipient site without first holding them in a boma. There were no mortalities associated with capture myopathy as in the case of chemical method where animals run after darting. We can report here that we can recommend moving giraffes straight to recipient site after capture if they have not been chased for long.

Recommendations

In future, when many giraffes are to be captured, it is advisable to employ mass capture system method where animals are herded by a helicopter. This saves time, though it may be limited by the high cost of hiring a helicopter.

Holding giraffes in holding pens before releasing them into the wild is necessary, but animals should be supplemented with lucerne and dairy/horse cubes.

Acknowledgements

To KWS, LWC and other donors for initiating and funding this translocation. To Sera Wildlife Conservancy for providing a home for the translocated animals. To the staff of KWS and LWC for working tirelessly despite the challenges faced during the exercise.

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Giraffe Conservation Status Report

GCF has commenced an exciting project in order to establish the current status of all giraffe populations and (sub)species throughout the African continent to support and appropriately inform their conservation and management.

The project intends to gather data on giraffe numbers and range from across their distribution and to furthermore develop an integrated giraffe database working collaboratively with African governments, NGOs, Universities and researchers. The subsequent analysis of data, findings and production of GIS range maps will facilitate the publishing of the first ever detailed reports on the giraffe conservation status in Africa. This project will provide an invaluable framework and the necessary base for possible future giraffe research and conservation management to be conducted across the continent.

As a first step GCF is developing country profiles based on desktop research for each African giraffe range State. For these profiles we aim to collate all historical and currently available census and anecdotal data on numbers and distribution of as well as threats to giraffe (sub)species in order to gain a greater understanding of giraffe numbers and their conservation status. These profiles will gradually be published on the GCF website (http://www.giraffeconservation.org/prj_info.php?cid=247&prjid=25&pgid=82).

This is were your input is required – please visit the GCF website and comment on the profiles, send additional information, submit census data, or tell us if we have missed any available information. These profiles are a work in progress and we appreciate your comments! Please contact Andri Marais at andri@giraffeconservation.org or Steph Fennessy at steph@giraffeconservation.org with your feedback.

The project is currently financially supported by GCF, the Mohamed bin Zayed Species Conservation Fund and Blank Park Zoo, however, in order to complete this onerous task, additional funding is needed. Please contact Steph Fennessy at steph@giraffeconservation.org if you can provide additional financial support.

Mercy killing for snared giraffe

The Times of Swaziland, 9 January 2012

As if to ensure that 2011 ended on a sombre note, Mbuluzi Game Reserve lost a young female giraffe to snaring on 30 December 2011.

Mbuluzi staff noticed a badly limping giraffe and upon closer inspection, found that it appeared to have a snare wound on its left front leg. With the help of rangers from Big Game Parks (BGP), a rescue plan was formulated, and the giraffe was captured and treated. The personnel involved first went through a crash course on how to trip a giraffe with a long rope in thick and thorny bush. Once this technique had been mastered by the team, the newly found skills were put to the test. All went well with the team pulling down the badly limping giraffe within six minutes.

A very tight cable snare was found having already embedded itself deep into the flesh of the giraffe's fetlock joint. The lower leg was severely swollen and infected, although the body was trying to regenerate by growing back over the poacher's snare wound. The cable had already cut into the fetlock joint and, on one side, was lodged between the two bones of the joint having damaged some of the tendons.

The poachers' snare was removed using a pair of side cutters and the wound was disinfected, cleaned out and antibiotics given. There was great joy among the team as the giraffe got shakily back onto her feet. The team's sense of accomplishment was unfortunately short lived as the giraffe moved off 10 meters trying to get a steady footing before she collapsed into the long grass and stared fearfully at her rescuers. She soon got back onto her feet again – only this time there was an exaggerated high step in her gait.

It soon became apparent that the leg had torn apart at the injured joint when the lower portion of her leg began to swing wildly around occasionally appearing above the long grass as she hobbled off. She was no longer able to take her weight on her foot and she moved onto a nearby road. To the team's horror, as she hobbled down the road, the foot made one last wild flap before flying off the leg and landing lifelessly on the road.

Having covered a distance of approximately 100 metres, the giraffe was now tiring and was forced to take her weight on the stump of her leg. As the giraffe was obviously in indescribable pain, and there was no chance of her surviving, the decision was taken to conduct a swift mercy killing to put her out of her misery.

"This incident clearly demonstrates the wastefulness of poaching – especially when it comes to snare poaching," said Matt Mcginn, the Manager at Mbuluzi Game Reserve. "This was a young giraffe cow on the point of entering her reproductive life – all of which now is just wasted. Not even the poacher who set the snare benefited from the risk he took in sneaking into the Reserve to set his snares.

The rescue team was obviously devastated, having taken some measured risks in order to restrain the giraffe, experienced the temporary satisfaction of removing the snare and seeing the giraffe getting to her feet again and then seeing their hard work come to zero with the giraffe losing her foot and having to be killed."

Mbuluzi went to considerable expense and trouble to purchase and transport a breeding group of giraffe from South Africa and has been nurturing their establishment in the Reserve over almost 20 years, which makes this loss even more serious. "The loss of this female will undoubtedly affect the viability of this Reserve and impact badly on our tourism product. In addition to this, we now have to comb the bush to find the poachers' snare site before any remaining snares do more damage," Mcginn added.

Snares remain capable of killing game and livestock many years after they have been abandoned by those who set them.

George Mbatha, Chief Warden of Hlane Royal National Park said "This giraffe is a prime example. Poachers normally set snares to catch animals around the neck. The snare that caught this giraffe was likely to have been set for warthogs or impalas, but it has now killed a giraffe many miles from where the poacher set it. The snare could just as easily have caught an elephant by the trunk with the same end result."

Jubela Reilly said, "To get a measure of the pain that the giraffe suffered, simply take an elastic band, wrap it tightly around your finger and see how long you can go before removing it. In the giraffe's case, multiply this by the three or four weeks that this animal had to walk on its leg with a cable lodged between the moving bones of its joint, with added infestation of maggots and infection without the aid of painkillers and antibiotics, and one will only just begin to appreciate the pain endured by this giraffe. No human could possibly endure that. It is time that we all treat poaching with the seriousness that the situation deserves. If we don't, Swazi culture and Swaziland's tourism will be the first casualties."

This article was reprinted from The Times of Swaziland, http://www.times.co.sz/News/36396.html

Caught on tape: camera trapping giraffe in Etosha National Park, Namibia

Katharine Dean, GCF & Namibia Nature Foundation

The camera traps don't look like much from the tourist roads around Okaukeujo Rest Camp, one of the main tourist camps in Namibia's famous Etosha National Park. But these small boxes should not be underestimated; they are continuously recording a host of information about all kinds of species in their natural habitat.

The cameras were originally set up in 2010 by Dr. Wendy Turner (University of California, Berkeley) to study anthrax transmission at carcass sites. Four camera sites quickly grew to eight and hundreds of thousands of pictures poured in.

These included over seven thousand pictures of giraffe (*Giraffe camelopardalis angolensis)* spanning two years that provide a unique prospective on giraffe in the park. Through my work with the Namibia Nature Foundation and Giraffe Conservation Foundation I was lucky enough to be able to analyse these pictures over the last few months.

It is just after sunrise and a giraffe is walking across a grassy plane towards the camera. The picture fills with a nose, then part of a leg and goes completely brown. I continue to flip through the images, watching as the giraffe saunters away leaving the camera angle slighting askew. I exhale in relief; it would not have been the first time a giraffe mercilessly knocked over a camera for a good scratch.

As tedious as sitting in the office and sorting through pictures could be, I was always amazed by the curiosity of these tall creatures.

Fortunately there were not just pictures of noses and legs, but also pictures of giraffe doing exactly what giraffe do: eating, walking, mating, suckling, chewing bones (osteophagia), etc.

The camera traps recorded these behaviours 24/7 in different locations, an impossible feat for a researcher in a car. As a result, the most interesting data has been of daily and seasonal movement patterns. During a 24-hour day, giraffe travelled the most around sunrise and sunset.

Giraffe were active throughout the night too, especially in the hours following sunset. Using the number of photos at specific sites we could see which areas they preferred during the wet and dry seasons. This information is being used to better understand giraffe behaviour in Etosha National Park.

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Can an eland and a giraffe be friends? – Interesting behavioural observations at the Oakland Zoo

Amy Phelps & Sara Mellard, Oakland Zoo

The Oakland Zoo has a unique mixed-species African Savannah exhibit that is home to Egyptian geese, common eland, and reticulated giraffe. The collection includes five female and four male giraffe: three castrated males and one intact bull, as well as three female and one castrated male common eland.

Around a year ago, when the bull giraffe, Mabusu, was approximately five years old and the castrated male eland, Kairu, was two, keepers began to observe some interesting interactions between the two animals. They started to engage in what appeared to be short sparring sessions, where Mabusu would spread his front feet and lean down, gently swinging his head at the eland while Kairu would tilt his head and bump the giraffe's face with his horns.

Over the next year, the amount of time these two were observed together greatly increased. They were seen not only sparring, but also eating side by side, following each other from one section of the exhibit to another, and even licking and smelling each other's faces and necks. As long as no female giraffe were in oestrus, the two males were observed spending most of the day together.

While our observations are certainly not scientific in nature, it does seem to appear that Mabusu and Kairu choose to spend a significant amount of time in close proximity to and interacting with each other. Can we call this friendship? Based on current observations we cannot say for sure, but we can say that these two individuals spend around 85 percent of their exhibit time together; up to and including resting together in the same straw bed!

While they each have ample opportunities to spend time with their conspecifics, this giraffe and eland seem to prefer the company of each other. Whether friendship or not, it definitely appears to be a positive and socially enriching experience for both. Perhaps there can be a future Oakland Zoo intern project to work on a behavioural study that examines this relationship more thoroughly.

Acknowledgements
Special thanks to professional photographer Jason Vaughan for sharing these exquisite photographs. Jason's work can be observed at http://jasonvaughan.com

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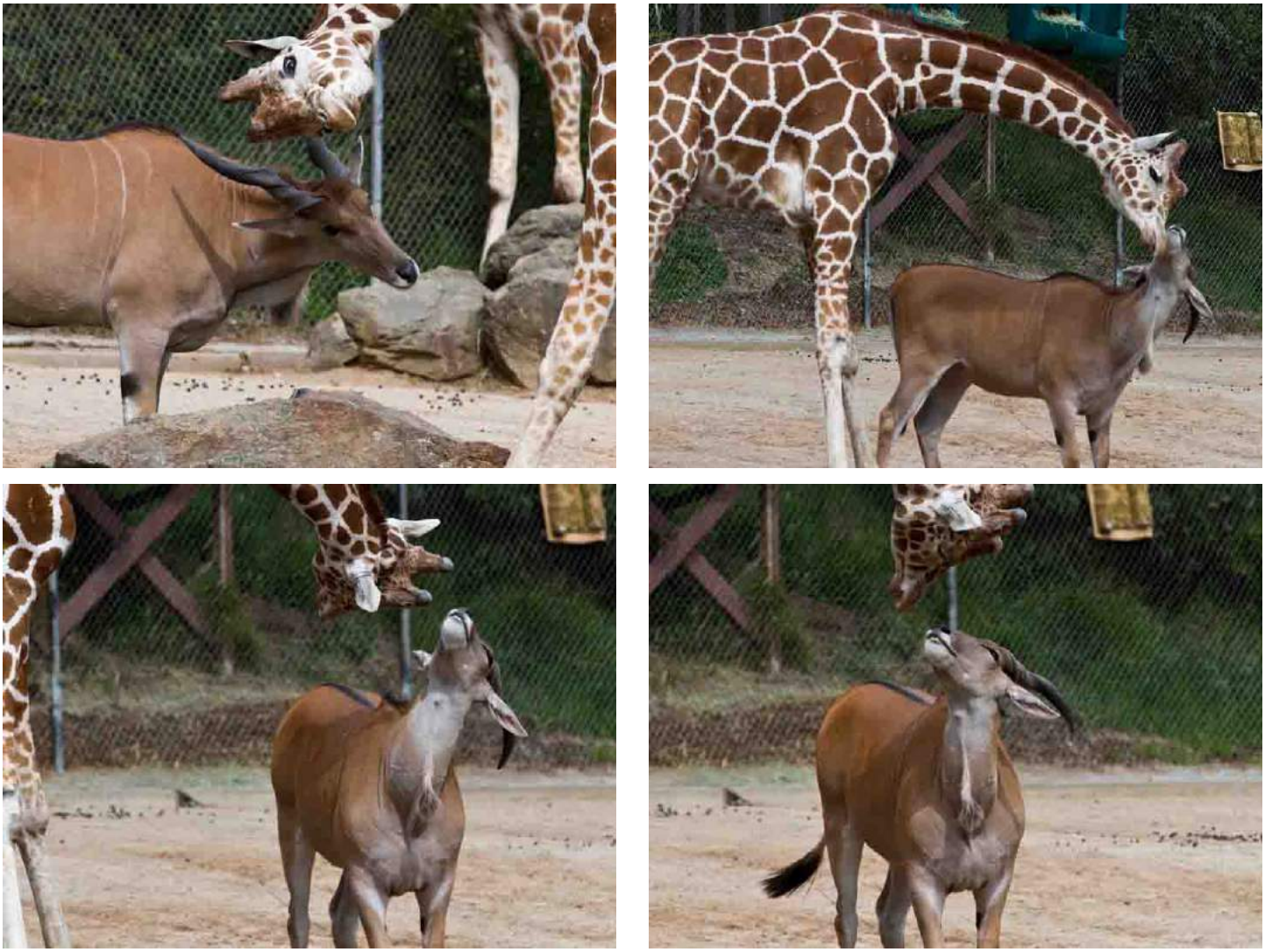


Okapi status update – Okapi (*Okapia johnstoni*) International Studbook 2011

Kristin Leus, Royal Zoological Society of Antwerp

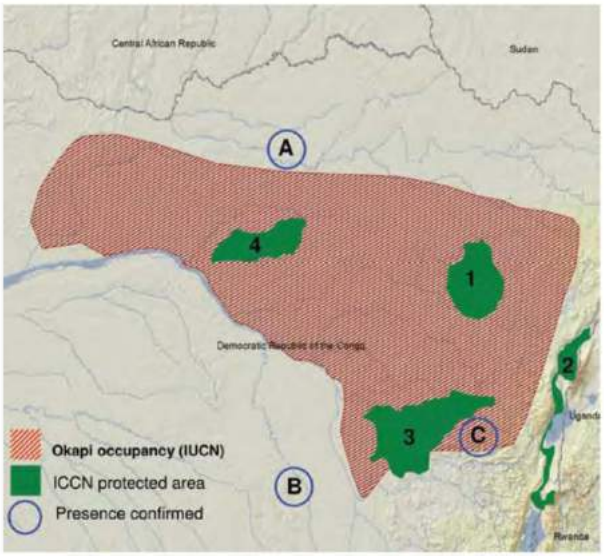
Taxonomy, distribution and natural history

The okapi (*Okapia johnstoni* (P.L. Sclater, 1901)) is the single member of the genus Okapia within the Family of Giraffidae (Order Cetartiodactyla, Class Mammalia). It has a dark brown velvety coat with irregular horizontal white stripes on the buttocks and upper forelegs. The stripe pattern is unique for each individual and provides camouflage in the sun-dappled rainforest. Females tend to be somewhat heavier than males. Males have short skin covered horns. The okapi is endemic to the north-eastern rainforest of the Democratic Republic of Congo and occurs between about 500 m and 1,500 m elevation over a fairly large range, on both sides of the Congo River (Figure 1). The primary strongholds of okapi include the Ituri / Aruwimi and adjacent Semliki and Nepoko Forest, the forests of the middle Lindi, Maiko and Tshopo Basins and the Rubi-Tele region in Bas Uele. In 2006 the presence of okapi in Virunga National Park (NP) was reconfirmed after not having been recorded there since 1959. Okapi are found in four protected areas, the Okapi Wildlife Reserve, the Rubi-Tele Reserve, Maiko NP and Virunga NP. Recently okapi presence was also confirmed in the Usala Forest north of Walikale, in the Bili-Akiti Forest and in an area between the Tshuapa, Lomami and Lualaba rivers (named TL2) (Figure 1).

The okapi prefers undisturbed, high canopy, primary or secondary forests. Its diet in the wild is predominantly composed of leaves and its long tongue comes in handy to reach leaves higher up and to strip leaves off branches. The okapi diet is highly species diverse, but they nevertheless feed very selectively on high quality foliage tips of plants and trees they often find in tree fall gaps or along in small forest clearings. Their large, rotatable ears

help them to spot danger and predators (mainly leopards) from a distance away.

Okapis are diurnal and solitary. Both sexes have well defined home ranges. Adult breeding females have permanent exclusive home ranges of about 3 to 6km² with high quality food sources. Males have larger home ranges that overlap with those of other males and those of several females. Captive females cycle year round and have an oestrus cycle of about 14-16 days. Gestation lasts about 440 days after which a single calf is born. In captivity weaning takes place at around 6 or 7 months.



1) Okapi Faunal Reserve 2) Virunga NP 3) Maiko NP 4) Rubi-Tele Reserve
A) Bili-Akiti B) Lomami C) Usala

Figure 1: Global okapi distribution, with numbers demarking protected areas and letters non-protected areas where okapi presence has been confirmed. **From Nixon, S. and T. Lusenge (2008), itself modified from IUCN 2011.**

Current status and conservation and research activities

The okapi is currently listed as Near Threatened on the IUCN Red List of Threatened species. It is fully protected under the law of the Democratic Republic of Congo.

Estimates for population numbers range from 10,000 to 35,000 individuals, the large range of which is partly explained by the fact that their dense forest habitat and secretive nature makes them difficult to survey, so that reliable data is lacking from large areas of their range. Recent surveys in the Okapi Wildlife Reserve have reported a decline of its the okapi population of 40% between 1996 and 2006. In the Maiko NP and the Usala region they are likely widespread but rare and the population in the Virunga NP is probably small and fragmented.

Threats include hunting for subsistence, skin trade and bushmeat trade (often as a by-product of elephant ivory poaching, gold mining and timber extraction); habitat degradation from mining and logging activities and slash and burn agriculture; fuel wood extraction, charcoal production and charcoal trade and general increased pressure on the already limited forest resources due to a rapidly growing regional population.

The Okapi Conservation Project (OCP) in the Ituri Forest was started in 1987 (http://www.okapiconservation.org/). The mission of the OCP is to conserve the okapi in the wild, while preserving the biological and cultural dynamics of the Ituri Forest. The okapi serves as an ambassador representing the incredible diversity of species found in the region. The objective of the OCP is to protect the natural forest systems of the Okapi Wildlife Reserve (~13,700 km² – the OCP contributed significantly to the establishment of the OWR) by supporting and equipping government wildlife rangers; providing training and infrastructure development to improve protection of wildlife and habitats; assisting and educating communities to create an understanding of sustainable resource conservation; and by promoting alternative agricultural practices and food production in support of community livelihoods. Zoos holding okapis contribute a significant proportion of the OCP's budget.

In addition, the Zoological Society of London is involved in the conservation of, and research on, the okapi through a project that focusses on building capacity for wildlife monitoring and management and that supports the Institut Congolais pour la Conservation de la Nature (ICCN) in the management of the Virunga National Park.

A PhD student of Cardiff University (UK) is carrying out molecular genetic analysis of faecal samples from wild okapis in the OWR and other parts of the okapi's range, as well as museum samples from wild okapis and samples from current and historical captive specimen (for the latter cooperating with the Centre for Research and Conservation of the RZSA). The aim is to evaluate the genetic diversity and structure of the wild and captive populations, as well as to evaluate the population dynamics and densities of the okapi, and as such provide a basis for monitoring and management of okapi populations in the DRC.

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Tall Tales

New additions at Giraffe Manor/Center in Nairobi

Management and staff of the Giraffe Manor and Center in Nairobi, Kenya, were delighted to welcome four new Rothschild's giraffe in their sanctuary earlier this month.

Giles Pattison, General Manager of the Giraffe Manor reports: "The giraffe had a long trip from Kigio Wildlife Conservancy last Sunday and arrived at the Manor just in time for lunch. Other than the giraffe breeding in our 140 acre sanctuary, the only other way to increase our giraffe population is through the relocation of these animals from different parts of Kenya.

Each guest that stays at Giraffe Manor contributes to the African Fund for Endangered Wildlife, which is dedicated to increasing the population and protecting this extremely endangered species. With our four new additions we now have a total of eleven giraffe roaming the grounds of the Manor vying for your attention in the breakfast room, sitting room and even your bedroom window!

The last relocation happened in April 2010, which was a truly memorable day for all those that saw it. Check out this fun at http://vimeo.com/44305011 to view the moment captured on film."

For more information contact Jessica and Giles Pattison at the Giraffe Manor at giraffe@giraffemanor.com

The other side of the story: Lions invade wealthy Nairobi suburb

At the entrance of Mukoma housing estate, a leafy suburb 15 kilometres from the bustling city centre of Nairobi, a prominent neighbourhood watch sign has been warding off potential intruders. For the past six months, not one robbery has been reported in this wealthy community. A chalkboard sign subtly hints at why. "To All Our Dear Residents: LION SEEN — Ndorobo Road."

The neighbourhood watch, it seems, has had some extra help. Since last year, several full-grown adult lions have taken up residence in this pleasant neighbourhood, terrorizing residents and causing a peculiarly Kenyan case of suburban woes.

Mukoma residents say that two lionesses — one with newborn cubs — and a male lion are living in the thick bushy areas of the estate, helping themselves to residents' dogs and cats and any wild warthogs that happen by. The lions also recently killed two endangered baby Rothschild's giraffe from Giraffe Manor, a famous Nairobi attraction where tourists come to see, and even "kiss" giraffes.

Although many of Mukoma's residents are wildlife experts — from safari guides to carnivore biologists — they are split on whether to keep or kill their ferocious feline neighbours. "When we moved here 30 years ago," says resident Mike Norton-Griffiths, "there were lions, zebra, leopard and cheetah roaming freely. It was all bush." Yet

as Nairobi has crawled outwards, Mukoma has become a populated housing estate. It borders the western edge of Nairobi National Park, a large natural park less than 7 kilometres from the city centre and the only natural safari park in the world surrounded on three sides by urban sprawl. (It has electrified fences on those sides.)

The first lion sighting occurred last April, yet it wasn't until early September that the 160 families of Mukoma realised they might have a problem on their hands. A lioness with two five-month old cubs wandered onto one woman's property and was immediately confronted by a perhaps slightly too daring family Rottweiler. The ensuing brawl left the Rottweiler traumatized and one lion cub stuck 12 metres up a tree.

Since then, residents have set up camera traps and the sightings have become more frequent, from gardens to golf courses. In February, Ohmar Fernandez saw a lioness wandering outside the famous Karen Blixen Museum early one evening, and Ole, a guard for Hog Ranch property, recalls running for his life when he accidentally shined his flashlight on a lion "just metres away."

Lion expert and Mukoma resident David Mascall says these lions live in proximity to people all the time, and "there is not one reported killing or attack from a lion here in 30 years." Resident Stephanie Dloniak, a carnivore biologist, agrees, but argues this is an "unprecedented situation" that poses an immediate danger. "No one has ever studied urban carnivores," she says, and though they haven't attacked a human, in this environment they are "unpredictable." "As a carnivore biologist, it's cool." Dloniak says. "But as a homeowner with two kids, lions in my flower bed are a problem." With more than 80 children under 7 years old in the neighbourhood, many agree.

Resident Christine Riley, who works with the Nairobi Animal Orphanage, feels the lions should be allowed to stay. "We love wildlife, that's why we live here."

Aside from the extra security they provide, it's an animal lover's dream to have lions in your backyard.

The Kenya Wildlife Service (KWS) legally owns all wildlife in Kenya, but its assistance has been limited. Its resources are stretched and it is under pressured from both sides of the community, residents say. James Kiparos, a community warden for KWS, says several traps have been set but the lions "seem to know the tricks." If they're caught, he says, the KWS will put the lions back into the park with tracking collars.

"A zebra in your garden is one thing, quite the cachet," says Norton-Griffiths. "But a lion?"

This article was reprinted from http://www.thestar.com/news/world/article/1168554--lions-invade-wealthy-nairobi-suburb

Wardens hold 5 over suspicion of poaching

Five suspected poachers have been arrested in Simanjiro District, Manyara Region, Tanzania, after being found with government trophies and firearms. Game wardens alleged that they found them with three guns, giraffe meat and six elephant tusks, according to the acting district council executive director, Mr Patrick Saduka. They were also found with two vehicles and motorcycles, which the authorities believed were being used in illegal hunting. Mr Saduka told the council meeting recently that the suspects would be arraigned after the law enforcers completed investigations. "They were arrested at Orkugit and Kabojo villages with two vehicles, one of which was loaded with elephant tusks and another with game meat," he said.

Poaching has been on the rise in the vast Simanjiro District, which borders the Tarangire National Park, and other wildlife protected areas in recent years. Cases of illegal hunting dominated the council meeting, with councillors pointing an accusing finger at game wardens for their laxity. The civic leaders wanted a deliberate action to be taken to reverse the trend. However, staff from the natural resources department have complained that they were ill equipped to fight against the poachers.

This article was reprinted from http://thecitizen.co.tz/business/-/21912-wardens-hold-5-over-suspicion-of-poarching

Giraffe electrocuted by power cables at South African game reserve

A giraffe was electrocuted after walking into power cables on a private game reserve bordering South Africa's famed Kruger National Park. Beeld newspaper said this was the fourth giraffe to be shocked to death at Marloth Park reserve in the past year. The latest giraffe death happened earlier this month, with honorary rangers at the reserve blaming "unprotected transformers and the unprofessional electrical distribution systems hanging on these poles," according to a website for the group.

Rangers have piled stones around electricity poles with transformers on top of them, to form a barrier, and state power company Eskom has been asked to help find a solution to the problem. “As it is very densely wooded, giraffe look for open spaces to graze. The roads where Eskom’s power cables are situated create such spaces,” Pat Wilmans, chairperson of the Marloth Park landowner’s association, told Beeld.

Following the latest giraffe tragedy, Eskom CEO Brian Dames has "personally intervened" on the issue, Beeld said. At a meeting in Marloth Park last week, workers for the power utility discussed ways to giraffe-proof the transformers. Giraffes aren't the only creatures falling victim to power cables. A highly endangered martial eagle died last month after flying into a power transformer while carrying its prey, a monitor lizard. Civets and a warthog are among the other animals that have died from being electrocuted at the power transformers, according to Marloth Park rangers.

This article was reprinted from http://www.globalpost.com/dispatches/globalpost-blogs/weird-wide-web/giraffe-electrocuted-power-cables-south-africa-marloth-park

So, where is the deep end then?

When this unlikely guest took a dip in a clubhouse swimming pool, he had no trouble keeping his head above the water – which is not surprising since he is a giraffe.

In fact, three-and-a-half-year-old Monduli is a regular sight at the Kilimanjaro Golf and Wildlife Estate in Tanzania. The leggy swimmer is the only giraffe at the estate after being rescued as a baby by the anti-poaching unit of the Wildlife Department of the Tanzanian Government.

Workers at the estate said Monduli thinks he is a cross between a guest and a horse and is often up to mischief trying to play football, polo and taking a dip in the pool.

Read more: http://www.dailymail.co.uk/news/article-2165404/Monduli-giraffe-takes-dip-swimming-pool.html#ixzz20nFVlc00

IAGCP Awards 2012

Giraffe care professionals from around the world gathered in the San Francisco Bay Area for the second bi-annual conference of the International Association of Giraffe Care Professionals (IAGCP) from 6th to 9th February 2012. See presentation and poster abstracts from page 25 of this issue of *Giraffa*.

The IAGCP is a relatively young one-of-a-kind organisation that was formed with the intention to further the professional care of giraffe worldwide, IAGCP's goal is to bring together and combine the knowledge of zoo keepers, veterinarians, field biologists, conservationists, educators and anyone else interested in and passionate about giraffe.

In line with this year's conference title 'Reaching new Heights', outstanding achievements in giraffe care and conservation were honoured in four award categories.

The *IAGCP Enrichment Award* was awarded to Eric Flossic and the Tulsa Zoo. Eric designed and implemented life size, paper-mache giraffe as unique enrichment for the Tulsa giraffe. He took something traditionally used with smaller species and modified his design for giraffe, showing great enrichment design and creativity. IAGCP applauds Eric and the Tulsa Zoo for thinking outside the box, raising the bar for all captive giraffe managers, and most importantly greatly enriching the lives of the Tulsa Zoo herd!

IAGCP awarded the *Tiki Animal Impact Award* to animal keepers Rachel Chappell and Krista Seeburger and the giraffe staff of the Cameron Park Zoo. The *Tiki Animal Impact Award* is an honour that recognises those who's work has positively impacted the life and well being of a specific individual or group of giraffe. Recipients of this award have demonstrated an overwhelming amount of compassion, dedication, and innovation, leading to a meaningful impact on and overall enhancement of the quality of life for the animals under their care.

The giraffe team at Cameron Park Zoo adapted their management practices, developed their husbandry, and designed creative and positive training protocols in order to facilitate the care of a very disabled cow named Julie. Rachel and Krista were able to positively impact both the quality of life and overall welfare of Julie the giraffe, while also making her a local community darling and giraffe ambassador. Their management of this individual giraffe set an example for all captive giraffe managers, raising the minimum standard of care, and encouraging all giraffe keepers to go above and beyond for their animals. The keepers exceeded already high standards of care and continuously maintained their dedication to Julie. Furthermore, Rachel and Krista have published articles and given presentations, sharing their experiences with this disabled giraffe with the greater international captive giraffe community.

GCF Research Associate Zoe Muller received the *IAGCP Conservation and Research Award*, which recognises those whose outstanding efforts have made a significant contribution to conservation or research efforts for giraffe. It is presented to recognise exemplary work that has improved the future of captive giraffe management and care, made a significant discovery that enhances our knowledge of the species, or to acknowledge conservation and field research efforts that have positively influenced wild giraffe populations. Zoe was honoured for her work on the endangered Rothschild's giraffe in Kenya's Soysambu Conservancy.

Last but definitely not least, Julian Fennessy and GCF were awarded the *Camelopardalis Innovation Award*. The award was created to honour and recognise those who have made monumental advancements in the knowledge of the giraffe species and (sub)species as a whole. Recipients of this award have demonstrated an exceptionally high degree of skill and innovation that has served to bring forth advancements in understanding and perception of giraffe worldwide. Their efforts have given us new data and added significantly to the global knowledge base for the species. The IAGCP presents this honour with the hope that the legacy and thirst for knowledge of the recipients will both inspire others and further promote the species.

In the motivation statement, IAGCP stressed that Julian Fennessy and the GCF have led the way in giraffe conservation efforts. From organising the world's first conference on wild giraffe in Namibia in 2011, to leading conservation and research projects across Africa, to publishing a joint newsletter with IGWG, and managing a top notch giraffe website, GCF leads the way in progressive and pioneering work for giraffe!

RESEARCH STUDY NEEDED FOR GIRAFFE DISEASE IN RUAHA NATIONAL PARK, TANZANIA

Summary

Ruaha National Park (RNP) is the largest Park in Tanzania, and holds some of the most important giraffe populations in the world. However, over the past 3 years, Park authorities have noticed a marked increase in the number of giraffes suffering from a disease which affects their knees and lower legs. Although the conservation impacts are not fully known, it seems that over time, the disease significantly reduces the function of their leg joints, making them much more susceptible to carnivore attacks. Very little is known about this disease, including its causes, transmission and impacts, and RNP authorities are asking for help from researchers who would be interested in studying this issue in more detail.

Tanzania's Ruaha National Park is important for giraffes, but they are suffering from a lower-limb disease which makes them increasingly vulnerable to lion attacks

Assistance required

Ruaha National Park would like to hear from researchers (ideally in the veterinary/ epidemiology fields) who could find funding and commit to a study on the extent, causes, transmission and impacts of this disease. Ideally, the study should be for 3 years, and could potentially be suitable for a PhD, but if people can only secure funding for 1-2 years, then that would still be considered. The Park can provide assistance with applying for research permits and other necessary logistical issues. If you are interested in learning more, please contact the Chief Park Warden of Ruaha National Park on ruaha@tanzaniaparks.com and Paul Banga, Senior Park Warden and Head of the Ecological Monitoring Department, on bbpaul44@googlemail.com, quoting 'Giraffe Disease Study' in the subject line.

Reaching New Heights: Presentation Abstracts

Conference of the International Association of Giraffe Care Professionals, San Francisco Bay Area, 2012

Development and Application of a Computer-assisted System for Photographic Mark Recapture Analysis of Giraffe Populations

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Photographic mark-recapture is a cost-effective, non-invasive way to study populations. However, to efficiently apply photographic mark-recapture to large populations, computer software is needed for image manipulation and pattern matching. We created an open-source application for the storage, pattern extraction, and pattern-matching of digital images for the purposes of mark-recapture analysis. The resulting software package is a stand-alone, multi-platform application implemented in Java. Our program employs the SIFT operator (Scale In-variant Feature Transform) which extracts distinctive features invariant to image scale and rotation. We applied this system to a population of Masai giraffe (*Giraffa camelopardalis tippelskirchi*) in the Tarangire Ecosystem in northern Tanzania. Over 1200 images were acquired in the field during three primary sampling periods between September 2008 and December 2009. The pattern information in these images was extracted and matched resulting in capture histories for over 600 unique individuals. Estimated error rates of the matching system were low based on a subset of test images that were independently matched by eye. Encounter histories were subsequently analysed with open population models to estimate survival rates and population sizes. This new open-access tool allowed photographic mark-recapture to be applied successfully to this relatively large population.

Tail De-gloving Incident and Subsequent Training for Docking Procedure

Holly Peterson

Utah's Hogle Zoo

In the fall of 2007, the end of a female giraffe's tail was mysteriously de-gloved. The giraffe had about 6 inches of exposed tail vertebra. Through positive reinforcement training, keepers were able to train the giraffe to stand inside the giraffe restraint device, allow touch work, x-rays, injection desensitization and eventually a tail-docking procedure while under chemical restraint. This was an unusual injury and took a lot of teamwork to accomplish the training goals that were set by the vet staff.

Training and Husbandry for a Giraffe with a Long Term Disability Resulting from an Angular Limb Deviation

Rachael Chappell and Krista Seeburger

Cameron Park Zoo

In 1993 Cameron Park Zoo acquired a one year old female giraffe, Julie. Upon her arrival, zoo staff noticed a slight deformity in her right front fetlock. The cause and status of the injury or birth defect was unknown. As Julie grew and her conditioned worsened, zoo staff realised they needed the best long term care and training they could provide, with the resources available for the times. An early solution to her foot support requirements was met through the use of a prosthetic shoe. Upon nearing 20 years of age, Julie's care became much more advanced in order to continue to maintain the condition of the fetlock. This advanced care also allowed us to manage other medical issues that arose in direct response to her deformity. In May of 2009, we began a specific and intense training program outlined for Julie. This paper will outline some of the special accommodations that were made for her as well as the numerous training techniques that benefited her health. The disease which ultimately afflicted her was identified through the dissection of the fetlock joint in July of 2011.

Anything but Normal Giraffe Births at The Toledo Zoo

Maureen Miller

Toledo Zoo

The Toledo Zoo opened a new Africa themed exhibit in 2004. As part of that exhibit, a new giraffe facility was included and the zoo switched from Reticulated to Masaii giraffe. Since then Toledo has had an active breeding herd of 1.2 Masaii giraffe; having produced 5 calves in the past 6 years. Unfortunately 4 of those 5 births were anything but normal. So on July 23, 2011 when our female giraffe, Elvira, gave birth to a healthy baby girl without needing

assistance from the staff, we were elated. Up until that July day, the animal care staff at the zoo had experienced a wide range of giraffe birth scenarios except a "by the book" one in our new giraffe facility. We had experienced everything from hand-rearing, to assisted rearing, to a stillborn. All of which has provided us with invaluable amounts of experience that we would like to share with other institutions preparing for giraffe births.

The Procedure of Male Giraffe Anaesthesia and Neutering at Port Lympne Wild Animal Park, United Kingdom

Gareth Chamberlain
Port Lympne Wild Animal Park

At Port Lympne Wild Animal Park the Giraffe are part of a large mixed exhibit stretching over 150 acres. Within this exhibit they roam freely and coexist with 15 other species including Black rhinoceros *Diceros bicornis*, Roan antelope *Hippotragus equinus*, Eland *Taurotragus oryx* and Wildebeest *Connochaetes taurinus*, creating an African savannah experience for the parks guests and enabling natural behaviours to be observed. The park itself holds a small bachelor group of hybrid giraffe from various other UK collections, all of which are now neutered. These males have formed a close herd and socialise well with each other enabling their management to work well.
In 2010 it was observed that tension had formed between non neutered/entire males in the herd that were sparring for dominance, and this in turn was affecting the herd structure and stress levels. All the park's giraffe at that time had been confirmed as hybrid animals that would not be required for the continuation of the studbook genetics so it was decided that the 2 entire males would be neutered to reduce the tension and stress that had formed. Key planning to increase chances of a successful procedure need to be in place with consideration for:

- Area size- Allowing enough room for an animal to be sedated safely, comfort whilst lying down and also the ability to rise to its feet with ease. The area also needs to allow for the animal, the staff and also the necessary equipment needed to achieve the aim to be in place.
- Injury prevention- Padding to prevent damage to the animal pre and post procedure and the correct substrate to cushion the animal throughout. Removal of obstructing objects such as browse feeders or drinkers.
- Staff safety- Ensuring everyone knows the roles they play in the task and that there are enough people to achieve these roles. To ensure that exits for safety should be available if the need arises.
- Veterinary knowledge- Correct drug choices and how they relate to animal weights. The consideration of a pre procedure sedative being used to reduce stress. Specialist staff in anaesthesia and the correct protocols.
- Animal training- Getting the animals used to the new set up and building their confidence entering the "knock down" area.
- Post care- The requirements of the animals after the procedure and the ability to review and treat post operatively.

There is also a need to consider problems that may occur and have in place suitable equipment and procedures to assist with foreseeable complications. With suitable planning the procedure should hopefully run smoothly and have a higher chance of success rate.

The Why, The How, The What-for of Moving Giraffe

Adam Eyres
Fossil Rim Wildlife Center

In order to maintain a healthy genetically diverse population of giraffe, animals need to migrate to different herds, in captivity that means shipping giraffe. So what does it take to transport giraffe to a new facility? Who makes the decisions and how do they decide what giraffe goes where. Once that decision is made, how do you get the giraffe to its new home? In the late 1700's they walked them, now every consideration is taken to make sure they make it to their new herd safely and quickly to minimize the stress on the "migrating" giraffe. This presentation will hopefully answer the questions of the process of managing giraffe in captivity, moving giraffe, and some of the ways to safely do this.

How to Train Your Giraffe?

Anneleen Bru
Felinova Animal Behaviour Consulting

In March 2011, Felinova worked together with Wild Animal Park Planckendael in Belgium for the start of an amazing project: training their giraffes. This project was unique in many ways: the giraffes were never trained before, the staff had little to no experience in training mammals and it was the first time Felinova was asked to

educate and guide a group of giraffe care professionals to train their animals. The aim of the project was that Felinova started up the project together with the head keeper and staff and guide and educate them in such a way that the staff was completely able to train the animals, observe and support colleagues and write their own reports and training plans. The purpose of training the giraffes is something you can all guess: giraffes have a 50% chance of dying under anaesthesia so being able to avoid this in the future is important. The main reasons for training are: a better bond of trust between the animals and the staff, easier daily routines (following the staff for whatever reason, guiding the giraffes in and out of the barn), less stressful medical examinations and blood taking. In taking off in this project, we wanted the giraffes to follow a target stick and paying attention to the keeper when hearing its name. This paper is about our findings and experience, what we did right and what could have gone better. When I first started preparing the course book for the staff, I thought: "how on earth do you start training a giraffe?". There is no book available with that title. This is the reason we would like to share this basic information with professionals out there who are eager to train their animals but are looking for more information about how to start with the basics. The first step was educating the staff about training animals in general. Felinova wrote a course book for this exact purpose that contained the following subjects: Introduction to behaviour modification, motivations, sorts of emotions, learning processes in animals, clicker training, dealing with frustration, how to get your behaviour: capturing, luring, shaping (+ strengthening and lengthening), basics for training, practicalities, time schedule, safety at all times, target training, a list of definitions and how to fill in reports. The training is based on positive reinforcement through clicker training, followed by basic target training. The clicker is a consistent and reliable predictor of a treat and the training is positive reinforcement because new behaviour in increased by adding something to the situation (treats). Each staff member has its own clicker and we first started with making sure that everyone was using it in the same way, making sure every click sounded the same (speed of clicking, hand use). There were two yellow and two black clickers and we quite soon stopped using the yellow clickers because while holding it, the giraffe where constantly trying to grab it with their tongue. We blame this on the resemblance with the yellow banana pieces. The black clickers caused less to no distraction while training. When training animals, we want to have something to offer that they want, otherwise they will not be motivated to learn anything new. We started with pieces of banana and peanuts in their shell. We soon found out that the giraffe liked the banana a lot more than the peanuts. We first tried to keep varying by first giving the peanuts and then the banana, because the other way around would absolutely not work. After the first two weeks, we decided to drop the peanuts, because they started spitting them out. We took about three to four weeks to associate the clicker with the treats with about three to five training sessions of week of about 15-20 minutes. This was probably to long, we could have already have introduced the target at week 2. We wrote a report of every training per animal and discussed briefly the next items: trainers, presence of people, used motivation, location, medical remarks, what training phase they were at, daily task, general training remarks, success and difficulties of that specific training.

Medical Investigation of Unknown Lesions on a Female Masai Giraffe

Wendy Anderson, Michele Green, Kate McMahon
Santa Barbara Zoo

Audrey, a 4 year old Masai giraffe at the Santa Barbara Zoo has developed perineal lesions of an unknown source. The background on this giraffe is that she gave birth approximately 10 months ago but did not nurse her calf. In the days following birth there was some clear discharge seen, believed to be from the contracting uterus. It appeared to resolve itself, but the discharge started up again approximately 2 months postpartum. It was during a vet exam and cleaning of her vulva and rectum that the small sores were found in of 2011. The ulcerations have been treated with multiple topical washes and creams which have on occasion cleared up the outbreak temporarily. The Santa Barbara Zoo team is working to diagnose these lesions and develop a more effective management of this condition. Cultures swabs, biopsies, and other tests have been conducted and results are pending at this time.

How Many Giraffe Species are There? That's a Good Question – The state of Giraffe Taxonomy and Genetic Analysis

David Brown[1], Lanny Brown[2]
[1]International Giraffe Working Group, [2]International Association of Giraffe Care Professionals

These are exciting times in the world of Giraffe. Biological and analytical methods exist today that are aiding researchers in answering many questions that were once given only an "educated guess". One such question that has intrigued many for a long time "how many Giraffe Species and/or subspecies are there?" The International Working Group and the Giraffe Conservation Foundation have incorporated these methods, along with several brilliant researchers and is now closer than ever to answering that question. This discussion will center on the past, present and future answers to that question and the methods used to determine them.

Reticulated Giraffe: the Behavioural and Population Ecology of a Disappearing Megaherbivore

John Doherty, Robert Elwood, Michael Scantlebury
Reticulated Giraffe Project

Reticulated giraffes *Giraffa camelopardalis reticulata* are endemic to the north and east of Kenya, where their occurrence remains relatively natural. Although their distribution is now restricted largely to conservancies, parks and reserves, many of these protected areas remain unenclosed and, to date, there have been few translocations between them. Against a background of falling giraffe numbers across Africa, however, reticulated giraffes are thought to have suffered an especially steep population decline from perhaps 28,000 in 1998 to between 3,000 and 5,000 today. The primary cause is likely to be an increase in rates of mortality, a result especially of poaching and that especially for meat: outwith the protected areas, the remaining range of reticulated giraffes is characterised by growing human populations, by refugees from local and regional conflicts, by environmental degradation and poverty, by overstretched security forces and by a widespread availability of automatic weapons. The Reticulated Giraffe Project is an initiative of Queen's University Belfast. It aims to address the recent population decline through a combination of research into reticulated giraffes' behaviour, ecology and population dynamics with awareness generation, environmental education and the provision to policy makers and stakeholders of reliable information and advice. The first part of this presentation provides an overview of current areas of research: social network theory is to be coupled with analysis of DNA and reproductive hormones to interpret the dispersion patterns of known individuals; bioacoustics are being employed to investigate the possible use of infrasound as a medium of intraspecific communication; movements, behaviour, energy expenditure and environmental parameters will be measured by means of remote-sensing devices; and a combination of telemetry, direct sampling and a collaborative network of observers is being used to examine the demography of the population as a whole. The second part of the presentation offers a wider perspective, combining environmental with prehistorical, historical, cultural, political and economic considerations to explore the context within which this work is taking place. Huge amounts of effort, ingenuity and resources have been spent on nature conservation over the past 60 years, yet the worldwide decline in wild animal and plant populations continues to gather pace. Is it possible that today's demonstrably in-adequate approaches will be augmented or replaced - and in time - by effective alternatives? Or are we witnessing something unstoppable: a process that began long ago on the savannahs of Africa and that will run its course regardless of our insignificant attempts to arrest it?
This presentation includes a poster.

Treatment and Recovery of Traumatic Septic Arthritis of the Fetlock Joint of 1.0 Reticulated Giraffe

Amy Phelps, Karen Emanuelson, Andrea Goodnight, Sara Mellard
Oakland Zoo

Treating serious medical conditions in giraffe can be a difficult task. Giraffe anatomy and physiology makes anaesthesia challenging, sometimes resulting in fatal complications. Since 2001, the Oakland Zoo has managed 1.0 Reticulated giraffe after he presented with trauma-induced septic arthritis of the fetlock joint. The giraffe underwent multiple anaesthesias for radiographs, arthroscopy and, in 2004, surgery for arthrodesis of the fetlock joint. The primary complication following arthrodesis has been deformation of the cannon bone above the fused fetlock, resulting in a length difference between the giraffe's forelimbs. For 8 years, an extensive operant conditioning program has facilitated this giraffe's

care, allowing staff to meet his special husbandry and medical needs. This case has greatly expanded the scope of the training program at the Oakland Zoo, making unique treatments such as intensive hoof care, chiropractic care, massage therapy, IV antibiotic therapy, and transdermal fentanyl patches for pain management available to many of the animals in the Zoo's collection. This paper will illustrate the intensive treatment, inspirational recovery, and long-term care of a giraffe named Kayóde.

Recording Giraffe Behaviour in Zoos

Zoe Muller
Rothschild's Giraffe Project / Giraffe Conservation Foundation

Why record captive giraffe behaviour? Basics of behavioural observation, how to record & interpret behaviour data, discussion of giraffe-specific behaviours. Attendees will create a basic giraffe ethogram with Zoe Muller.

Conservation of the Endangered Rothschild's Giraffe in Kenya

Zoe Muller
Rothschild's Giraffe Project / Giraffe Conservation Foundation

With less than 670 individuals left in the wild the Rothschild's giraffe has been classified as Endangered by the IUCN and is under real threat of extinction in the wild within the next fifty years. Despite declining population figures, little systematic scientific research has ever been conducted on the Rothschild's giraffe and little is known of its behaviour or ecology. Furthermore, recent genetic evidence suggests that it may represent a unique lineage of giraffe and as such, this gives the subspecies a unique evolutionary potential. This presentation will outline the conservation status of the Rothschild's giraffe and present to the audience a full synopsis of the Rothschild's Giraffe Project, the only field study to be conducting research on this giraffe subspecies. The presentation will cover the following:

- Conservation status of the Rothschild's giraffe in the wild
- Historical and current population levels and distribution across East Africa
- Threats facing giraffe in east Africa, with particular reference to the Rothschild's giraffe
- Overview of the Rothschild's Giraffe Project – what is the Project doing and why?
- Overview of the National Giraffe Conservation Strategy for Kenya – background & development
- How can the Rothschild's giraffe be managed for future conservation?
- Giraffe conservation on a wider scale: Kenya and beyond

The presentation will be illustrated with a number of photographs, images and videos and will provide the audience with an opportunity to learn about the Rothschild's giraffe in the wild and the conservation issues it faces. They will also be presented with an overview of giraffe conservation in Kenya and on a larger scale.

Giraffe Welfare in the United States

Laurie J. Gage
USDA APHIS Animal Care, Center for Animal Welfare

There have been an alarming number of giraffe deaths in the United States in the past three years. Husbandry, nutrition, or management decisions accounted for over 75% of these deaths, suggesting many were preventable. Other giraffes have suffered with overgrown hooves, which affected their gait, cold stress from inadequate housing, and serious injuries sustained during transport or from exhibit design-related problems. Giraffes have specialized dietary and housing needs which must be met to ensure the welfare of these animals. Giraffes are intolerant of the cold and lack the means to adapt to cold weather conditions. They must be fed a diet that meets their energy needs and must be provided housing that allows them to maintain their core body temperatures. Because of their unique physiology and body design they tend to have more complications and aesthetic-related deaths than other Artiodactyla. Applying training-based methods to deal with overgrown hooves and other routine husbandry practices, solving thermoregulation-related problems using appropriate housing and inclement weather turn-out protocols, and ensuring the specific nutritional requirements of giraffes are met will help to improve their quality of life and may help to decrease the alarming mortality rate seen in recent years.

The Way Home: Moving 1.6 Reticulated Giraffe into a Contemporary Facility

Aimee Nelson
Fort Wayne Children's Zoo

In October 2010, after much training and hard work, the Fort Wayne Children's Zoo's herd of 1.6 reticulated giraffe entered a new facility of their own free will. This long awaited move for the zoo's seven giraffe required careful planning and execution by the giraffe staff. The old facility had been inadequate for some time; spaces were crowded, shifting was a challenge, and training opportunities were extremely limited. The giraffe keepers wanted the move to be as positive as possible and therefore began planning the steps of the transition months in advance. Staff faced multiple challenges. The location of the new facility was on the opposite end of the four acre giraffe exhibit. Winter was approaching quickly and temperatures were dropping, limiting the time keepers had outside with the giraffe. Two of the giraffe faced more challenges since they had never left the old facility and entered the exhibit. This alone required intensive training and strategic planning to help them shift outside before staff could begin to focus on training the herd as a whole for the final move. Yet perhaps the biggest challenge of all was asking the herd to trust their keepers enough to enter an unfamiliar and equally terrifying foreign space. Patience and planning paid off, and within four days of opening up the new barn for access, all seven giraffe were becoming comfortable in their new building. This new facility has also provided staff with new, amazing opportunities. In the past year, staff has been able to do voluntary blood draws, hoof care, radiograph training, injection training, eye/ ear exams and more all through positive reinforcement. Most of these actions were not possible in the former facility. Through the use of positive reinforcement and the keepers' strong, trusting relationships with the giraffe, the herd was moved successfully in to the new facility. This, in turn, has the allowed the keepers to take the giraffe and themselves to greater heights.

Training for Chiropractic Adjustments, Cold Laser Therapy and Stretching, to Manage a Giraffe with a Cervical Spine Injury

Allison Bernstein
Cheyenne Mountain Zoo

In June of 2010, the Cheyenne Mountain Zoo received Khalid, a 2-year-old male Reticulated Giraffe (*Giraffa camelopardalis reticulata*). Upon arrival he was found to have a pronounced cervical spinal curvature that appeared to be due to an accident during shipment. Initially, the veterinary staff decided to manage the injury with a treatment of muscle relaxants (Methocarbarnol) and anti-inflammatory medications (Phenylbutazone, then Meloxicam). Within the first few weeks the neck straightened considerably, however Khalid continued to guard neck movements and showed sensitivity on the left side of his neck. The vet staff decided to begin using laser therapy and called in a chiropractor to help address his injury. In order for the chiropractic treatments to be successful, we needed Khalid to willingly participate during adjustments. A training plan was created and implemented to begin working towards the goal of establishing several behaviours that would facilitate these adjustments. Over the next few months, through input from the chiropractor, fluid training plans and trial and error, the giraffe, trainer, and vet staff were able to reach their goals and successfully treat his injury. As treatment progressed, new "stretching therapy" behaviours were added and trained to supplement his maintenance adjustments with good results. Today, Khalid exhibits normal movement of his neck and has made a great recovery. Though Khalid's first few months at Cheyenne Mountain Zoo presented many obstacles both giraffe and trainer had to overcome, this training program has resulted in an amazing working relationship with an amazing animal.

Training Progress of Giraffes at UWEC Achieved from Oakland and San Francisco Zoo USA

Henry Opio
Uganda Wildlife Education Centre

Uganda Wildlife Education Centre rescued three Rothschild giraffes from the communities along Murchison falls National Park in Uganda in November 2009. UWEC keepers had no much Idea of the giraffe training in captivity since much was not yet done about captive giraffes at the centre. However, the main purpose

of their rescue was to fulfilled the UWEC's mandate of rescue, rehabilitate, educate and recreational purposes. The first giraffe conference ever in the world which was held in Arizona Phoenix was a gate way to UWEC, where one keeper from UWEC got a full sponsorship to attend the workshop and proceeds with training of captive giraffes in difference Zoos in Arizona and California. Great achievement has been made by giraffe keepers at the wildlife education centre since 2010 conference and training to date. This includes; giraffe captive management, feedings, and training among others.

The Usefulness of Assigning Individual Targets to Your Giraffes and How to Get Started

Kit Perry
Fresno's Chaffee Zoo

In our program we've found that our giraffes respond much better to a "visual name" rather than a verbal one. Part-time keepers and inexperienced trainers have inadvertently desensitized each of our giraffes to its given name. By using the giraffe's strongest sense, vision, we have assigned them a colour and shape name unique only to them. After training them the process through shaping, and discriminating, Uzuri would ignore her name as usual, but when shown her yellow diamond she would react as if it were magnetized, drawing her head in from across the exhibit. Since each giraffe knows their own target we can call individuals over without disturbing the rest of the animals and change shifting routines with ease. This technique is also very useful for large exhibits since the giraffe can see their target from far distances. One of the most useful things about having individual targets has to be the ease of a quick examination. If I get a report of a medical problem on exhibit I can quickly and silently call that individual giraffe over to get a close look at any problems he may have without the rest of the herd disturbing my exam. Other training uses: By having separate targets it is very easy to separate your giraffes exactly how you want to. If you need to keep a bull inside and put a female in oestrus on exhibit it is much easier. We have had to put a mother and calf on exhibit in the early morning, but bring them in when the afternoon heat came. We were able to do this in minutes while still keeping the rest of the herd on exhibit using the individual targets explaining where we wanted each giraffe to go. Traditional individual target training is very useful too of course. We've used their targets to teach our giraffes to follow the trainer, come here, back up, and bend down. Bending down to touch the target on the ground is a great way to demonstrate to the public how giraffes drink water! We've found that targeting sooths our giraffes" minds. It's an easy game or a break when we've asked them to learn something difficult. If we've raised the criteria too high on a new behaviour or see that they are becoming afraid of a new task we can use targeting to refocus their mind and then adjust our training while they relax. Training Process: The training process is very simple, first exposing all giraffes to the targets to make sure there is no fear of their new items. Next, they are all trained on their individual targets by themselves and then taught to discriminate against the ones that are not theirs. We next allow them to be trained on them with their herd. The other giraffes naturally get in the way wanting to be trained. We allow all giraffes to explore the targets that are not their own as much as they want. We ignore the giraffes that don't match the target to ensure they learn that they get nothing for a target that isn't their own. This helps them learn to leave other giraffes alone when it's not their turn.

Case Report of Per Acute Death of Rothschild Giraffe in Belgrade Zoo

Strahinja Medić
Belgrade Zoo Garden

15 years old male giraffe was found dead early in the morning in it's night shelter. No symptoms of illness were noticed during previous days. In the last three years however there were two short periods of time when the animal was refusing the food intake, each lasting approximately one week. The post mortem blood analysis showed extremely high levels of creatin kinase, elevated levels of phosphorus and marked neutropenia. The autopsy was performed approximately 5 hours after the estimated time of death. Noted pathomorphological changes were found in abomasus, jejunum, mesenterial limphnodes and kidneys. Pathohistology revealed numerous changes in all vital organs with hemorrhagic tissue alterations being the dominant histological finding. Microbiology of small intestine and kidneys outcame in isolation of Clostridium perfringens. The peracute death of the animal, the changes in vital organs and performed post mortem analyses all led to the conclusion that the dead occurred as the result of septicemia and endotoxemia caused by clostridial infection.

Yesterday, Today and Tomorrow: The Evolution of a Giraffe Care and Training Program

Chandelle Cotter, Jessica Miller, Teal Burger
Six Flags Discovery Kingdom

The staff at Six Flags Discovery Kingdom had gone through a lot of changes. Departments that were once completely separate had merged. Small mammal trainers were now working with large hoof stock. The different perspective that these trainers had, combined with specific medical needs of individual animals caused the department to come together as a whole and reach out for other training options. Due to their excellent reputation in the giraffe community, we collaborated with Amy Phelps (Oakland Zoo) and Lisa Clifton-Bumpass (A Step Beyond; Training and Teaching Certified Consultant). Through this partnership, a new training program was developed using operant conditioning techniques. The result of this changeover has been phenomenal. Trainers have learned to work together in a team environment, our giraffes have gained confidence and the possibilities for the future are endless.

Let Me Entertain You…..

Allison Six, Reanna Streater-Nunn
Dallas Zoo

In April 2010, the Dallas Zoo was wrapping up construction on the Giants of the Savanna, a state of the art, multi-species exhibit. This expansion included a brand new 9,000 sq ft giraffe barn and four times more giraffe than the zoo previously held. Almost immediately, it became obvious that our current hum-drum enrichment program was not going to cut it. We needed a serious enrichment overhaul… STAT. For five eager giraffe keepers, the challenge was on and the goal was clear. It was time to raise the bar……and we set our sights high, literally. We started “thinking outside the jug-feeder” and tried to address the needs of a large herd whose ages ranged from 1 to 23 years. With the installation of a raised “arm” to hang enrichment items, we are able to accommodate giraffe at various heights and encourage the development of play and tongue work. Heavy focus was placed on developing devices that invited extended periods of interaction and allowed for usage by multiple individuals at a time. We also came up with a new take on some commonly used designs and incorporated unusual materials to keep things interesting. After a lot of teamwork, creativity, patience, and even a little bloodshed, we turned bland into SHIZ-AM!

For more information or contact details of presenters contact Lanny Brown of IAGCP.

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Reaching New Heights: Poster Abstracts

Conference of the International Association of Giraffe Care Professionals, San Francisco Bay Area, 2012

Investigations in the social behaviour of captive giraffe; what do the animals tell us about their life in the zoo?

Paul Rose
Animal Management Department, Sparsholt College Hampshire, UK / Centre for Research in Animal Behaviour, University of Exeter, UK

Since 2007, research carried out on several giraffe herds in the United Kingdom has consistently shown a tendency of giraffe within herds of a mixed demographic to associate non-randomly with individual conspecifics. The implications of such social networks are far-reaching and have important consequences for the individual as well as the population that the individual is part of. Recent published work has shown that non-human animals are similar to human animals in that individuals can gain adaptive benefits from investing in important social bonds, and that the network of social relationships that exists throughout an individual's lifetime is important to reproductive success, quality of life and overall welfare state. The research undertaken has measured social behaviour and degree of interaction in giraffe to provide details on the welfare of individual animals in captivity, as well as if defined social grouping has an effect on reproductive potential. Welfare experienced by an individual zoo animal is always of prime importance, with welfare state changing day-to-day based on prevailing environmental, psychological and physiological conditions. Giraffe display specific behavioural indicators of stress that can be used to measure the effect of a range of variables; husbandry regime, social grouping, physiological state. Results presented in this paper detail social decisions made by giraffe at seven collections across the UK, encompassing a population of approximately 40 animals. Consistently between collections, preferred partners are maintained and established bonds are evident between animals studied. This suggests that regardless of herd structure, management style or enclosure layout, giraffe seek out preferred partners and make choices as to whom they spend time with. All animals were in groups of three or more, thus a choice could be made to interact with one or more individuals at all times. Results show that partner-preference is maintained over time and appears to show very little flexibility, thus providing an insight into the strength of the bonds that can exist within captive populations. Statistical significance has been found for i: non-random association between members of specific demographics (adult, juvenile, young) ii; differences between individuals for time spent alone compared to time spent socialising and iii; consistency of relationships over time. Reproductive success is instrumental to the long-term viability of captive breeding programmes and studbooks are, obviously, managed in a way to promote the genetic quality and future success of populations. Whilst analysis of the effect of decisions for managed breeding is still on-going, results suggest that movement of female giraffe into and out of stable herds can have the potential to affect long-term reproductive output, whereas for male giraffe there appears to be less of an overall negative effect. The assumption being that female giraffe are deriving benefits from the relationships they form and are adversely affected when these are broken; the behavioural ecology of the male giraffe could allow the animal to have the flexibility to cope with more frequent social change. Physiological assessment of stress, and hence evaluation of impacts on welfare, in captive wild animals can be tricky to undertake. The use of faecal sampling to analyse metabolites of glucocorticoids has been used to provide an evaluation of an individual giraffe's ability to cope with changes to social grouping and how they are affected by social disruption. Current findings in the herd that this has been tested in appear are still being analysed, but so far show fluctuations to and from baseline as individuals react differently to changes in the immediate environment. Overall, and in conjunction with ongoing work in the field, this research has provided a strong foundation to the idea that giraffe do associate according to individual preference and that an individual's welfare experience is linked to the relationships it builds and maintains over the course of its lifetime; consequently past quoted remarks on the loose, random and fluid social system of the giraffe would appear defunct. This work highlights the long-term benefits that giraffe obtain from preferential interaction that may well have a role to play in overall welfare state, reproductive output and adaptability in a captive environment.

Tall Order Enrichment

Eric Flossic
Tulsa Zoo

Everybody knows that a Giraffe always stands out in a crowd, so shouldn't their enrichment do the same? For the past few years I have been building Cardboard Giraffes for our zoo's annual enrichment day or special events. By gathering just a few basic supplies, your zoo could also enjoy some great interactions from your giraffe that will be a huge hit for both keepers and guests.

Hand Rearing of a Giraffe Born with Flexor Tendon Laxity

María Nadya Herrán Cárcoba
Zoologico Guadalajara

On august 2010 a female giraffe was born at Guadalajara Zoo presenting bilateral flexor tendon laxity both in the front and rear legs that produced hyperextended carpal joints and dropped fetlocks, making her unable to stand up and walk by herself. She was believed to be daughter of a young male related by blood to a female that already have had an offspring with the same condition and died days after birth. This poster describes the hand rearing of this giraffe and the complete self correction of the anatomic and locomotion problem.

Hoof Trimming and X-rays without Restraints

Lisa Ellison, Holly Peterson
Utah's Hogle Zoo

This poster is about the training we did with our female giraffe to do a hoof trim and x-rays without using any restraints. The female giraffe may have broken one of her toes which caused her right rear lateral claw to grow out to the side and a space between her claws caused her medial claw to grow in towards her lateral claw. Through positive reinforcement training and reaching out another institution for help, we were able to incorporate Team Training to our giraffe program and had a successful hoof trim.

Reducing Boredom in our Giraffe Herd during our Winter Season

Maureen Miller
Toledo Zoo

How do you care for ungulates native to Africa in a climate that receives about 30 inches of snow and temperatures that are below freezing for at least 4 months out of the year? How can we elicit natural behaviours in an artificial environment far from their native land? These are questions we face when December rolls around and we have to house our giraffe herd inside our barn for upwards of 4 months. Using enrichment, training, and varied housing arrangements we are able to keep our giraffe herd active and stimulated throughout the winter months.

For more information or contact details of presenters contact Lanny Brown of IAGCP.

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Recently published research

Berry PSM and Bercovitch FB. 2012. *Darkening coat colour reveals life history and life expectancy of male Thornicroft's giraffe*. Journal of Zoology **287**(3): 157-232.

Much of the information available about the life history of giraffe, *Giraffa camelopardalis*, is derived from captive studies or short term field studies. The coat colour of male giraffe, especially the blotches, darken with age, but no studies have systematically mapped the colour transition with chronological age based on long-term data. We examine the value of using darkening coat colour as a biomarker of male age. We analysed 33 years of data from 36 male Thornicroft's giraffe, *G. c. thornicroftii*, living in Zambia in order to document key milestones in male development. We found that the change in male pelage coloration takes an average of 1.8 years and that males are completely covered with coal black blotches at an average age of 9.4 years. Using lifetime data on male deaths and disappearances, combined with cross-sectional records on coat colour transformation, we conclude that the average age of death among male giraffe is about 16 years old. The maximum lifespan of male giraffe is about 22 years compared with a maximum lifespan of about 28 years for female giraffe. We conclude that the possible proximate mechanisms and adaptive significance of male coat colour changes should be studied in more detail.

Pérez W, Michel V, Jerbi H and Vazquez N. 2012. *Anatomy of the mouth of the giraffe (Giraffa camelopardalis rothschildi)*. Int. J. Morphol. **30**(1): 322-329.

The giraffe (*Giraffa camelopardalis*) is both the largest extant ruminant and a strict browser. We dissect and describe the macroscopic anatomy of the mouth of the giraffe. The heads of two adult giraffes and one foetus were used in this study. The lips were well developed, the upper one was predominant and dorsally flattened near the nostrils. The tongue had a lift or lingual torus and rostrally to it a groove-shaped depression or fossa linguae. There was no adipose body of cheek (*Corpus adiposum buccae*). The hard palate in the giraffe had 18 Rugae palatinae. The final roughness reaches the caudal border of the premolar 3. Caudal ridges had no papillae. The parotid gland was small and consisted of two lobes, one rostral and one caudal to be separated dorsally to accommodate the parotid lymph node. The parotid duct followed the same way as in the cow, ended in front of the upper premolar tooth 2 in the parotid papilla, (not evident at mucosal surface). Mandibular gland was divided into two lobes, the rostral one placed in the intermandibular space and the caudal hidden by the parotid gland. Giraffes have the monostomatic and polistomatic sublingual glands. The monostomatic sublingual gland was located rostrally and joined to the monostomatic of the other side in the very narrow rostral intermandibular space. The polistomatic sublingual gland was caudally located and reached the level of the third molar and at a deeper level than the monostomatic. The studied giraffes had dorsal, ventral and intermediate bucal salivary glands. Leaving aside the differences caused by different dimensions, the mouth of the giraffe had in general a similar anatomical arrangement to the cow.

Carter KD, Seddon JM, Carter JK, Goldizen AW and Hereward JP. 2012. *Develoment of 11 microsatellite markers for Giraffa camelopardalis through 454 pyrosequencing, with primer options for an additional 458 microsatellites.* Conservation Genetics Resources.

Many wild giraffe populations are declining across Africa, with two subspecies listed by the IUCN as Endangered in the past 4 years. We developed 11 microsatellite markers from Giraffa camelopardalis angolensis in Etosha National Park, Namibia using 454 sequencing. In 7 individuals, the loci showed 2–4 alleles per locus and expected heterozygosities of .82–.71There were no significant deviations from Hardy–Weinberg equilibrium for any of the loci. Null allele frequencies were low (<3 %) across all loci. We present primer options for an additional 458 microsatellites. This new set of microsatellite markers and primer options will benefit conservation, population and quantitative genetics studies of giraffe populations.

Page DN. 2007. *The height of a giraffe*. Published online at http://arxiv.org/abs/0708.0573v2.

A minor modification of the arguments of Press and Lightman leads to an estimate of the height of the tallest running, breathing organism on a habitable planet as the Bohr radius multiplied by the three-tenths power of the ratio of the electrical to gravitational forces between two protons (rather than the one-quarter power that Press got for the largest animal that would not break in falling over, after making an assumption of unreasonable brittleness). My new estimate gives a height of about 3.6 meters rather than Press's original estimate of about 2.6 cm. It also implies that the number of atoms in the tallest runner is very roughly of the order of the nine-tenths power of the ratio of the electrical to gravitational forces between two protons, which is about 3 x 10^32.