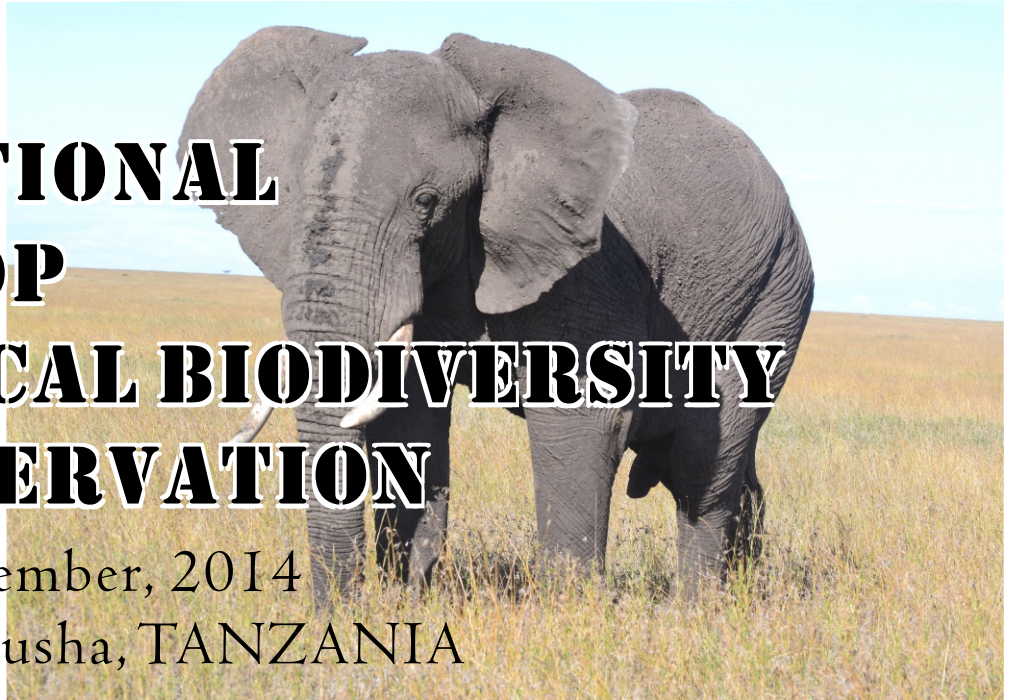




THE 3RD INTERNATIONAL WORKSHOP ON TROPICAL BIODIVERSITY AND CONSERVATION

22nd-23rd, September, 2014
Impala Hotel, Arusha, TANZANIA



Cosponsored by:



JSPS Core-to-Core Program, A. Advanced Research Networks, “International Network for Tropical Biodiversity Conservation Focusing on the Studies on Large Animals”



JSPS Core-to-Core Program, B. Asia-Africa Science Platforms, “Study for Wildlife Conservation in the Western Tanzania”



MEXT Leading Graduate School Doctoral Program, “Leading Graduate Program in Primatology and Wildlife Science”

Cooperative International Workshop 2014

- JSPS Core-to-Core Program: Advanced Research Networks
“Conservation Research of Tropical Biodiversity Centering on Large Animal Studies” (CCTBio)
- JSPS Core-to-Core Program: Asia-Africa Science Platforms
“Study for Wildlife Conservation in the Western Tanzania” (CCWT)
- JSPS Program for Leading Graduate Schools
“Leading Graduate Program for Primatology and Wildlife Science” (PWS)
- Tanzania Wildlife Research Institute (TAWIRI)

*JSPS: Japan Society for the Promotion of Science

22nd & 23rd September, 2014 at Impala Hotel, Arusha, Tanzania

We are very happy to hold this International Workshop in Tanzania. This workshop was made possible through the cooperation of Tanzania Wildlife Research Institute (TAWIRI) and Wildlife Research Center (WRC) of Kyoto University. It sets the grounds for an international network for wildlife science and conservation joined by Brazilian National Institute for Research of the Amazon (IMPA), Center for Ecological Science (Indian Institute of Science), Institute of Tropical Biology and Conservation (University Sabah Malaysia), Primate Research Institute (PRI, Kyoto University) and Graduate School of Science (Kyoto University). With today's environmental and economic conditions of the world, we are faced with serious challenges in developing our studies - we must explore unique and novel ideas for the future. The major focuses of this international cooperation are research, education and conservation of the great animals. We hope this workshop provides an opportunity for many fruitful discussions as well as making strong relationships of mutual trust. We are grateful to Dr. Simon Mduma, Director General of TAWIRI and all the staff of TAWIRI for their kind hospitality. We also appreciate all the participants of this workshop.

Coordinator, CCWT

Vice-Coordinator, PWS

Professor, WRC

Gen'ichi Idani

We are very happy to have this workshop in Tanzania by the cooperation with Tanzania Wildlife Research Institute (TAWIRI). This workshop is co-organized by JSPS Programs “International Network for Tropical Biodiversity Conservation Focusing on Studies on Large animals” (CCTBio), “Study for Wildlife Conservation in the Western Tanzania” (CCWT) and “Leading Graduate Program for Primatology and Wildlife Science” (PWS).

I would like to introduce our program (CCTBio) briefly.

This program aims to establish international network for Tropical Biodiversity Conservation by promoting academic exchange among Japan, Brazil, Malaysia and India. We focused on Large animals because many of them are umbrella species and flagship species important for Biodiversity conservation. In this program we promote academic collaboration as equal partners for the study of biodiversity and evolution. We will also hold international seminar and workshop every year to foster young researchers.

At the same time we plan to develop field museum that can contribute to the study, conservation and education of biodiversity.

Field museum is a kind of new generation zoo, aquarium, botanical garden and nature reserves in natural habitat. It is essential for the study and conservation of large animals and could be a center for the study and conservation of local ecosystems and biodiversity. At the same time, it can be resources for education and ecotourism and contribute to the local economy by providing jobs for the specialists and local people.

We hope many people share this dream with us by this program.

Coordinator, CCTBio

Vice-Coordinator, PWS

Director/Professor, WRC

Shiro Kohshima

Day 1 (22/9/2014)				
Time			Speaker	Timekeeper
0930-1000		Registration		
1000-1015		Opening remarks	Dr. Idani, Gen'ichi Dr. Mduma, Simon	
SESSION 1: Conservation and wildlife monitoring				
1015-1035	1	Concept of "field museum" for tropical biodiversity conservation	Dr. Koshima, Shiro	Matsukawa
1035-1055	2	The use of camera traps to monitor a multispecies carnivore assemblage: An example from Tarangire National Park, Tanzania	Dr. Msuha, Maurusi	Matsukawa
1055-1110		Coffee break		
1110-1130	3	Monitoring of botos and tucuxis (Mammalia, Cetacea) over the last twenty years in Brazilian Amazon shows drastic populational decrease	Dr. da Silva, Vera M. F.	Sawaguri
1130-1150	4	Capture, Boma management and movement pattern of the first released wild dogs pack in the Serengeti Ecosystem, Tanzania.	Mr. Ernest Eblate	Sawaguri
1150-1210	5	Landscape changes: Implications to chimpanzees (<i>Pan troglodytes</i>) conservation in Tanzania	Mr. Ndimuligo, Sood	Sawaguri
1210-1340		Lunch break		
SESSION 2: Genome sciences				
1340-1400	6	The puzzling relationships amongst the Southeast Asian Bovini	Dr. Ahmad, Abdul H.	Tawa
1400-1420	7	Conservation of Bornean banteng (<i>Bos javanicus lowi</i>) in Sabah, Malaysian Borneo	Dr. Matsubayashi, Hisasi	Tawa
1420-1435		Coffee break		
1435-1455	8	Toothed whale olfaction	Dr. Kishida, Takushi	Takeshita
1455-1515	9	Recent advances of DNA technology to investigate genomes and ecology of wildlife	Dr. Agata, Kiyokazu	Takeshita
1515-1530		Coffee break & poster preparation		
1530-1630		POSTER SESSION		

Day 2 (23/9/2014)				
SESSION 3: Ecology and animal behavior				
1000-1020	10	Timing of browsing reduces forage scarcity period in the dry season	Dr. Kohi, Edward	Sakuragi
1020-1040	11	Rapors of rice-fields in the Northern region of Peninsular Malaysia	Dr. Sah, Shahrul A. M.	Sakuragi
1040-1100	12	Applications of acoustic lures for surveying and studying microchiroptera	Dr. Hill, David	Sakuragi
1100-1115		Coffee break		
1115-1135	13	Recent findings from long-term studies of Mahale chimpanzees	Dr. Nakamura, Michio	Nakazawa
1135-1155	14	Long-term study of wild Japanese macaques	Dr. Sugiura, Hideki	Nakazawa
1155-1345		Lunch break		
SESSION 2: Humans & animals				
1345-1405	15	The influence of social structure on the success of microcredit-funded businesses aiming to curb illegal bushmeat hunting in Serengeti, Tanzania	Ms. Lowasa, Asanterabi	Wakamori
1405-1425	16	The behavioural ecology of elephant-human conflicts and their management	Dr. Sukumar, Raman	Wakamori
1425-1440		Coffee break		
SESSION 3: Wildlife health				
1440-1500	17	Disease status at the human-livestock-wildlife interface in the Serengeti ecosystem, Tanzania	Dr. Fyumagwa, Robert	Sakakibara
1500-1520	18	Internal parasites of wildlife in the Serengeti ecosystem, Tanzania	Dr. Keyyu, Julius	Sakakibara
1520-1540		Closing remarks	Dr. Koshima, Shiro Dr. Keyyu, Julius	

POSTER SESSION

No.	Title	Presentator
1	Estimation of the lag time in echolocation of captive commerson' s dolphins	Ms. Yoshida, Yayoi
2	How do wild dolphins approach toward underwater swimmers?	Ms. Sakakibara, Kasumi
3	Affiliative behaviors by third party toward victim of conflict in bottlenose dolphins	Ms. Sakuragi, Hiroko
4	Ecology of long-tailed porcupines in tropical rainforests of Borneo, Malaysia: burrow use and behavior in the nighttime	Ms. Matsukawa, Aoi
5	Non-invasive analysis of adrenal hormones in female Japanese macaques (<i>Macaca Fuscata</i>)	Ms. Takeshita, Rafaela Sayuri C.
6	Utilization of salt licks by wild Malayan tapirs	Ms. Tawa, Yuko
7	Relations between wild mammals and human activities in the Ugalla area, Western Tanzania	Ms. Iida, G. E.
8	Pup rearing by dholes (<i>Cuon alpinus</i>) in and around a den near Mudumalai Tiger Reserve, Southern India	Mr. Sawaguri, Shuta
9	Gut microbiota associated with dietary changes in wild Japanese macaques	Dr. Sawada, Akiko
10	Prey species of leopards (<i>Panthera pardus</i>) in Mahale Mountains National Park and Ugalla	Ms. Nakazawa, Nobuko

O-01

Concept of “Field Museum” for tropical biodiversity conservation

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For conservation of endangered large animals with long lifespan and large home range, we need to foster specialists of large animal studies in their natural habitats. At the same time, we also need to develop observation facilities for captive, semi-captive and wild animals in natural habitats for their study and conservation. We call such facilities “field museum”.

Field museum is a network of nature reserves and observation facilities in natural habitats of wildlife, where we can observe various organisms in captive, semi-captive and wild condition as well as research and conservation activities. It can contribute not only to the study, conservation and environmental education, but also to the local community through ecotourism and as a center for conservation of local ecosystems. It will not consist of large buildings or facilities gathering in one place as traditional zoos and aquariums. It will be a network of relatively small facilities located in proper places for each organism. A new SATREPS project entitled “Biodiversity conservation in Amazon based on a new concept of “Field Museum” ” have started from 2014 by Japan-Brazil collaboration. SATREPS (Science and Technology Research Partnership for Sustainable Development) is a Japanese government program that promotes international joint research targeting global issues. Purpose of this project is to conserve Amazonian ecosystems around Manaus by developing a field museum that can contribute to the study, education and conservation of local ecosystems and also to the local economy through eco-tourism. The field museum in Amazon will include facilities for aquatic mammals, fish and various organisms in Amazon River, and organisms of tropical rain forests, especially those in forest canopies. This project also aims to develop human resource and organization for effective use and management of the field museum as a center for the environmental study, conservation, education and eco-tourism in this area. In this talk, I will introduce this project and the concept of the “field museum”.

O-02

The use of camera traps to monitor a multispecies carnivore assemblage: An example from Tarangire National Park, Tanzania

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The ecology of many carnivores is poorly known, yet our understanding of their distribution and abundance is critical for conservation planning. Camera trap survey techniques has led to a rapidly accumulating database on rarely seen nocturnal carnivores, however most surveys are focused on a single species. This is a pity as (1) there is a clear need to understand relationships between different species within the guild and; (2) surveys designed to assess density of multiple species provide substantial additional value. We provide the first estimates of density of leopard, serval and aardwolf from a single camera trap study in Tanzania; we assess effect of camera trap spacing, number of cameras and habitat on species capture success and explore the potential of using camera traps to monitor multiple species. Density varied with camera spacing, number and habitat. Density of leopard was 7.9 ± 2.1 animals/ 100 km² during the wet season and no estimate was determined during the dry season due to low captures. Density of serval and aardwolf were 10.9 ± 3.2 animals/ 100 km² and 9 ± 2.5 animals/ 100 km² respectively during the dry season and no estimates were determined during the wet season due to lack of recaptures. Despite being territorial, capture success was relatively higher during the wet season when 2 km spacing was used than during the dry season when 1km spacing was used. Using our results, we develop guidelines for monitoring and demonstrate the cost of surveys able to deliver density estimates of multiple species.

O-03

**MONITORING OF BOTOS AND TUCUXIS (MAMMALIA, CETACEA)
OVER THE LAST TWENTY YEARS IN BRAZILIAN AMAZON SHOWS
DRASTIC POPULATIONAL DECREASE**

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Populations of boto (*Inia geoffrensis*) and tucuxi (*Sotalia fluviatilis*) have been studied in the Mamirauá Sustainable Development Reserve, Brazilian state of Amazonas, since 1994. One of the study's techniques consists of monthly or more frequent monitoring, where the same 30km of canals and lake in flooded forest (várzea) is sampled in a standardized way on a small motorized boat with 3 or 4 people, when all sighted animals are counted (minimum count). Up to August 2013, 322 surveys were made, with mean duration of over 3 hours each, and mean sightings of 40 botos (SD = 24.9) and 8 tucuxis (SD = 9.0) per survey. For the analysis of population trend over those two decades, and to eliminate the seasonal effect of water level, we first analyzed the relation between water level and the animals' abundance in each survey. When the water level was very low or very high, abundance was low. In the first case, botos are forced to the main river, and in the second case they enter the flooded forest, making their sightings difficult. When not in such extremes, with botos visible in high numbers, we called it "best water level". So, we've used only those surveys in which the water level was the best for each species (n = 235, mean sightings = 45.1, SD = 25.6 for botos; and n = 232, mean = 9.9, SD = 9.6 for tucuxis). From these data, we measured the maximum, mean and minimum numbers of sighted animals per survey in each year, and exponential models were adjusted to the data. For botos, a significant reduction was observed in the maximum (annual reduction of 7.4%; p < 0.001) and mean (annual reduction of 5.8%; p < 0.001). For tucuxis, a significant reduction was also observed in the maximum (annual reduction of 7.2%; p = 0.001) and mean (annual reduction of 8.3%; p < 0.001). The number of sighted animals per hour of monitoring shows a similar decrease. Strong evidence suggests that the observed decrease in boto numbers is due to the use of these animals as a bait in piracatinga (*Calophysus macropterus*) fishing and bycatch in gillnets; while decrease in tucuxi numbers is probably due mainly to bycatch in gillnets.

O-04

Wild dog capture, management in boma and movement pattern of the first released pack in the Serengeti National Park, Tanzania

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African wild dog metapopulation management is the possible solution for conservation of endangered species in the Serengeti ecosystem. We present the capture, management in boma and movement pattern after release of the first wild dog pack in the Serengeti National Park (SNP). A total of 11 wild dogs (nine pups and two adults) were captured in the Loliondo Game Controlled Area (LGCA) in July 2011. Both physical (use of foot plastic coated trappers) and chemical immobilization were used in the process. The dogs were kept in bomas (enclosure) and fed fresh goat meat for duration of 13 months before released into SNP. Alpha pairs were fitted with GPS satellite collars for easy monitoring after release into the wild. Our result showed no mortality associated with capture and management of the dogs while in bomas. Nine months movement pattern showed that the dogs utilized SNP area for five months, while using other areas outside SNP, including Maswa Game Reserve, Ngorongoro Conservation Area, LGCA, Maasai Mara National Reserve and Mara ranches for the rest four months. Two members were lost and pack separation occurred with alpha female residing in Mara ranches while eight adult members are currently in north east border of the SNP. Therefore, wild dog relocation has shown potential areas utilized by wild dogs which will improve future safeguarding of the species by responsible conservation authorities.

O-05

**Landscape changes: Implications to chimpanzees (*Pan troglodytes*)
conservation in Tanzania**

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Long-term monitoring of chimpanzee populations is essential for assessing efficacy of regionally implemented conservation strategies. We aimed to assess change in chimpanzee density within the Masito-Ugalla Ecosystem (MUE) by comparing results of the line transects in 2007 and 2014. We further used remote sensing vegetation cover analysis to assess landscape change within a 5km buffer of these transects in that same period. Our results indicate that there has not been a significant decline in chimpanzees across the surveyed areas of MUE. Comparisons between 2007 and 2014 results suggest that the MUE chimpanzee population has been stable over this period, and represents approximately 576 individuals. Although the overall mean density of chimpanzees may have declined from 0.09 individuals/km² in 2007 to 0.05 individuals/km² in 2014. Several reasons can account for the changes in ape density: seasonality of chimpanzee habitat preference for ranging or nesting may explain variation in density at some of the survey sites between 2007 and 2014; habitat loss may have influenced changes in some sites and small sample size of nests encountered. We measured the total amount of forest and woodland lost in each survey area in 2000 and again in 2011 using Landsat satellite imagery. We found that areas within five kilometers of the MUE line transects lost a combined 1,134Ha between 2008 and 2013. There was a relationship between increasing habitat loss and decreasing chimpanzee density in some survey sites. A correlation between habitat loss against changes in densities implies a trend for increased negative change in chimpanzee density with increasing forest loss (Spearman's rank correlation, $r_s = -0.80$, $n=5$, $p < 0.10$). Future surveys need to ensure a larger sample size, broader geographic effort, random survey design, harmonization of methods and integrating other approaches to precisely determine trends in MUE chimpanzee density and population size over time.

O-06

The Puzzling Relationships Amongst the Southeast Asian Bovini

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The phylogenetic relationships of SE Asian bovini has been a subject of study for several groups of scientists and hitherto produced partial relationships amongst the SE Asian species, all of which are listed as Endangered in the IUCN's Red Data book, including the only member of the tribe in Borneo. Between its all three known free-ranging subspecies, the Bornean type was excluded in all previous attempts. The relationships at subspecific level were examined using partial sequences of cytochrome *b* and D-loop of mitochondrial DNA. The radiation into Borneo, however, might not be through Java connection. The results show that the Bornean banteng carries the mtDNA of the gaur (*Bos gaurus*), opening the possible explanation for an important event in the past between *Bos gaurus* and *Bos javanicus* before the banteng's arrival to Borneo.

O-07

Conservation of Bornean banteng (*Bos javanicus lowi*) in Sabah, Malaysian Borneo

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The banteng (*Bos javanicus* d'Alton 1923) is a wild cattle and an endangered species that is found in open forests of Southeast Asia. Phylogenetic relationships among three subspecies of Banteng: Javan banteng *B. j. javanicus* in Java, Burma banteng *B. j. birmanicus* in mainland SE Asia and Bornean banteng *B. j. lowi* in Borneo and presence/absence of interbreeding between wild Bornean banteng and domestic cattle in Sabah, Malaysia were investigated by partial sequences of cytochrome *b* and D-loop of mitochondrial DNA derived from the fecal samples. The results of DNA analysis show that genetic distance of the Bornean banteng are relatively close to the gaur *Bos gaurus* / gayal *Bos frontalis* followed by Burma banteng and the kouprey *Bos sauveli*. There are much greater distances between Bornean banteng and domestic cattle, *Bos taurus* and *Bos indicus*. These results suggest that the Bornean banteng diverged genetically from other banteng subspecies and that the wild Bornean banteng from this study are pure-strain and have high conservation value. In addition, new distribution sites were identified by field survey. Two of them were expected as captive breeding sites because of good access from Kota Kinabalu and no distribution of Asian elephants.

O-08

Toothed whale olfaction

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Olfaction, the sense of smell is one of the most important senses for vertebrate species. Whales are an order of mammals that derived from artiodactyls, and all modern whales can be classified into two suborders; mysticetes (baleen whales) and odontocetes (toothed whales). It has widely been considered that toothed whales do not possess the sense of smell. Indeed, no olfactory nerves and no olfactory bulbs are reported in any toothed whale species. However, in my research, it was found that toothed whales still possess most of the olfactory-related genes in their genomes although they are anosmic. Some of these genes had been evolved under strong purifying selection even in the toothed whale lineages. These findings led me to hypothesize that toothed whales have the sense of smell. These findings will be discussed.

O-09

**Recent advances of DNA technology to investigate genomes and ecology
of wildlife**

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We'll introduce our recent trials using NGS (next generation sequencing) to investigate the genomic background of biodiversity. Especially, I would like to introduce recent advances of genome science. Now, we can obtain whole genome sequences of wild animals from their feces (called "capture method") and could estimate the population size of wild animals by analyzing the heterogeneity of the genome sequences of a single individual and speculate the scenario of their evolutionary processes. Metagenomic analysis is also a very powerful method to investigate not only the host animal genomes but also the diet and body conditions of wild animals. Interestingly, these data can be obtained from feces-derived DNA. We do not need to catch animals in the wild. We could obtain a lot of information from feces!! We are planning to teach these methodologies to young researchers around the world by organizing a genome training course at Kyoto University. Here we'll report the performance of the training course which was held from the end of May to the middle of July 2014 in Kyoto University.

Timing of browsing reduces forage scarcity period in the dry season

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Understanding the responses of trees after they have been browsed is an important aspect of herbivore ecology. Browsed trees by elephants have been reported to have leaf availability in the dry season when food resources are limited. While browsing intensity and frequency influence plant response, it is not clear yet how the extent and timing of browsing during the wet and the dry season improve the availability of forage to browsers particularly in the dry season. A defoliation experiment was conducted in Kruger National Park, South Africa. In a defoliation experiment we varied the timing of simulated browsing (February, May and July) at different browsing intensities (%) i.e., 25, 50, 75, and 100 to understand the responses of the trees in terms of leaf production over time. A total of 384 trees were defoliated. The leaves were collected during the wet and dry season. The results indicate that the timing of the initial browsing affected the food scarcity period by prolonging leaf availability in the dry season and initiating early leaf flush at the end of dry season. Trees that were defoliated in the dry season had high leaf biomass in the subsequent growing season and also extended their leaf availability in the subsequent dry season. The defoliated trees compensated for the leaf biomass in the same way regardless of the defoliation intensity and season.

In conclusion, frequently browsed areas in the wet season will have high proportional of re-sprouting leaves (compensatory growth) in the dry season as such attract further browsing creating a positive feedback loop. Hence, heavy browsing in the wet season can reduce the time of forage.

Raptors of Rice-Fields in the Northern Region of Peninsular Malaysia

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Rice fields, the landscape of the Malaysian staple crop, provide important habitat for raptors. Field data was obtained from field observation, road surveys and Bird-I-Witness database maintained by Malaysian Nature Society. Peninsular Malaysia's location on the East-Asian Australasian flyway makes it a host to more than 120 migratory birds with about 45 species of diurnal raptors were recorded. In this study, a total of 20 species of raptors were sighted utilizing a diversity of habitats in the area. This study recorded from the families of Pandionidae and Accipitridae, 10 were migratory raptors, seven residents, one resident and migrant, and two vagrants. Species identified included *Aquila clanga* and *Aquila heliaca*, two wintering species ranked as IUCN Vulnerable. Others were *Pandion haliaeetus*, *Alviceda leuphotes*, *Pernis ptilorhynchus*, *Milvus migrans*, *Haliastur indus*, *Haliaeetus leucogaster*, *Elanus caeruleus*, *Circaetus gallicus*, *Spilornis cheela*, *Circus spilonotus*, *Circus melanoleucos*, *Accipiter trivirgatus*, *Accipiter gularis*, *Aquila pennatus*, *Spizaetus cirrhatus*, *Microhierax caerulescens*, *Falco tinnunculus* and *Falco peregrinus*. The high diversity of raptor occurrence was largely restricted to the cultivation season with maximum abundance during harvesting and migratory season (September-March). This coincides with their foods availability that consists of small mammals feeding on different ripening stages of rice. Large predators such as *Haliastur indus* (Brahminy Kite), *Elanus caeruleus* (Black-shouldered Kite) and *Spilornis cheela* (Crested Serpent-eagle) were observed to occur in the harvested areas and responded quickly to the intentional burning of fields. Rice fields undoubtedly serve as important feeding grounds, roosting and wintering habitats for resident and migratory raptors.

O-12

Chatting to bats: Applications of acoustic lures for surveying and studying microchiroptera.

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Microchiropteran bats are a highly diverse group in terms of their ecology and social systems, but they are difficult animals to survey or study. Direct observation of behaviour is usually impossible because microbats are small, fast-moving, nocturnally active and most species remain hidden during the daytime. They can also be difficult to catch. All microbats use ultrasonic echolocation to navigate and catch their prey and a different set of ultrasonic “social calls” for communication. By using an acoustic lure (the Autobat) that plays simulations of social calls we can attract bats for capture and to study their vocal communication. We have shown experimentally that the Autobat can increase capture rates of bats by as much as 15 times. It has been used successfully in temperate habitats in Europe, Japan, Korea and Taiwan, as well as tropical rainforests in Malaysia, Thailand and Australia. We have also used it to study the function and temporal patterns of social calls in forest bats. In this paper I will give an overview of the results of these experiments and studies.

O-13

Recent findings from long-term studies of Mahale chimpanzees

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A research project on wild chimpanzees (*Pan troglodytes*) in the Mahale Mountains National Park at the eastern shore of the Lake Tanganyika has been continued since 1965. Because the chimpanzee has a long lifespan, and grows very slowly, several aspects of their society have become clear only recently after accumulating decades of observational data. In this talk, I will present some of the recent outcomes from the long-term research at Mahale. For example, colleagues and I recently showed the first empirical evidence that orphaned chimpanzee sons die younger than expected even they lose their mothers after weaning, using a long-term demography data of the chimpanzee population at Mahale. This suggests that long-lasting but indirect maternal investments to sons continue several years after weaning and are vital to the survival of the sons. Finally, I emphasize the need of continuous basic researches in order to have better understandings of large mammalian species in general, which is also essential for conservation of such animals.

Long-term study of wild Japanese macaques

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Wild Japanese macaques have been studied without provisioning since 1974 in Yakushima Island, southern part of Japan. The study area have been well protected as World Heritage of IUCN and human disturbance is thought to be minimum at present. Long-term study on wild monkeys have brought some important findings, such as inter-group competition, group fission and group extinction. The density of monkeys in the study area is quite high and inter-group competition seems very severe. While some groups increased in size and fissioned into two groups, some groups decreased and became extinct. Home ranges have also changed. Some groups expand their home range but some group reduce or shift their ranges. In general, the groups of monkeys are unstable in their size and home ranges, in the study area. A possible reason for the unstableness is human disturbance in the past. Some part of the study area have been logged almost completely about 70 years ago and it becomes a secondary forest now, where monkeys seems increase well. Increased monkeys in this area flow out this area and may cause home range shift and severe inter-group competition. In other words, logging may have influenced the distribution of wild animals for more than 70 years.

The Influence of Social Structures on the Success of Microcredit-funded Businesses aiming to Curb Illegal Bushmeat Hunting in Serengeti, Tanzania

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Bushmeat is harvested illegally in western Serengeti, Tanzania, to provide cash and protein. This is seen to compromise conservation aims. Recently, microcredit-funded businesses have been initiated in Serengeti as an intervention to curb illegal bushmeat hunting. The credit scheme facilitated development of income generation to make local residents less dependent on bushmeat hunting. This study investigated on the influence of microcredit schemes on the establishment of small businesses and the social structures that help or hinder the success of such businesses. Data was collected using both qualitative and quantitative techniques involving key informant interviews and focus group discussions with members of microcredit schemes in four villages. Structured questionnaire were administered to a random sample of 200 credit beneficiaries in four villages. Results suggested that microcredits supported the establishment of business alternatives to hunting and selling of bushmeat, but most of these businesses were not able to sustain themselves on the long run. Also, a substantial proportion of credits were used for activities not related to the creation of businesses. Gender roles appeared to severely constrain business activities, as businesses run by women were mostly small and confined to their home village. These constraints weakened the potential of microcredits to reduce dependencies on bushmeat. It was recommend that longer runtimes for credits, clearer conditions and supervision might support the creation of more sustainable businesses. Improvements of market channels and the products and services produced by those businesses would further improve the impact of the scheme. Finally, awareness and education campaigns on gender constrains could help to support businesses which are constrained by gender roles.

O-16

The behavioural ecology of elephant-human conflicts and their management

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Elephant-human conflicts are widespread across Asia and most regions of Africa. The basis of such conflicts can be traced to a complex interplay of factors related to the behavioural ecology of elephants, environmental variability especially with respect to climate, historical patterns of land-use by people, and the diverse nature of elephant-human interactions or relationships. The successful management of conflict is thus constrained by inadequate understanding of the ecological basis of conflict, inadequate financial resources and trained manpower, and widely divergent views among the conservation community on addressing the issue. Conflicts thus continue to perpetuate and even escalate in many regions to the detriment of elephant conservation. In this talk, I shall brief review these issues and provide a framework on elephant-human conflict resolution based on a case study from Karnataka.

O-17

Disease status at the human-livestock-wildlife interface in the Serengeti ecosystem, Tanzania

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The Serengeti ecosystem (SE) is renowned for wildlife migration; however, the migration is a risk factor for disease transmission between livestock and wildlife. Tick-borne haemoparasites and tick infestation had a serious health impact in livestock and wildlife in the Ngorongoro Crater in early 2000's. A new bacterium *Streptococcus equi subsp. ruminatorum* similar to what caused mastitis in sheep and goats in Spain affected 4% of spotted hyenas in the crater between 2002-2004. Cytotoxins (anatoxin-a & mycrocystins) with secondary bacterial infection caused mass mortality of lesser flamingos in soda lakes along the Rift valley from 2000-2004. Three rabies strains have been described in the SE (domestic dog, hyena and bat strain). Prevalence of brucellosis is high in cattle (11%), buffalo (24%) and wildebeest (17%), and many febrile cases in humans in pastoral areas are misdiagnosed for malaria. The resurgence of sleeping sickness was observed from 2001 following the El Nino of 1997/98. Anthrax in the SE is associated with drought and zebra is the most susceptible wild herbivore species, and quite often it affects the maasai pastoralists who consume infected meat. Foot and Mouth Disease (FMD) is among important diseases which hinder most African countries to participate in international trade on livestock and animal products. Buffaloes in the SE are the reservoir of SAT1,2&3, and SAT1,2,A & O circulate in livestock. Rift valley fever (RVF) is associated with high precipitation and primarily affects livestock and wildlife. Humans are affected from contamination or consumption of affected animal fluids and products, and is a professional hazard to medical and animal workers. In Serengeti, 2.3% wildebeest, 6.5% topi, 14.5% thomson gazelle, 19% impala, 20% hartebeest, 23% grant gazelle and 31.4% buffaloes are exposed to the RVF virus. In livestock 5.2% goats, 9.1% sheep and 12% cattle are exposed to the virus, and 2.7% of mosquitoes have been detected with RVFV nucleic acids. Encroachment in wildlife areas exacerbated by adverse weather conditions favour disease outbreaks and vector distribution. Therefore, targeted interventions are important to restore the pathogen-vector-host equilibrium in the ecosystem.

Internal parasites of wildlife in the Serengeti ecosystem, Tanzania

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This study was conducted to determine the prevalence and species composition of internal parasites (helminths) of wildlife in the Serengeti ecosystem in Tanzania. Samples collected were whole gastrointestinal tracts and livers of wildlife killed during the hunting season, road kills and natural deaths. The gastrointestinal tracts were double-ligated to separate the stomach, small intestine and large intestine. This was followed by washing and sieving of intestinal contents to trap helminths before examination and picking of helminths in trays. A total of 28 animals were examined for helminth parasites in a period of six months. All animals examined (100%) were found to harbour at least one Helminth parasite and that most animals were infected by multiple helminth species. A total of 28 helminth species were recovered from examined animals. The parasites recovered were nematodes (19 species), cestodes (7 species) and trematodes (2 species), six of the parasite species recovered were zoonotic. This study reports 6 new species of helminths for the first time in wildlife in Tanzania.

P-01

Estimation of the lag time in echolocation of captive commerson's dolphins.

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Lag time is the time probably required for the mental or neuronal process in the echolocation task (Au et al, 1993). The lag time of commerson's dolphin (*Chephalorhynchus commersonii*), however, is still not known. In this study, to estimate the lag time of echolocation in commerson's dolphins, the relationship between the Inter click intervals (ICI) during the echolocation and the distance to the target from the dolphin was analyzed for 4 captive dolphins in Toba Aquarium, Japan.

A total of 44,827 pulses were recorded during the observation (70 minutes in total). A total of 4,057 pulses during 67 episodes of their approach to the target were analyzed. The ICI were tended to decrease as the dolphin approached the target. The minimum lag time was estimated to be 2.0-2.2 ms from the relationship between ICI and the target distance. It is close to the minimum lag time estimated in captive bottlenose dolphin (2.5 ms) echolocating the target at the distance of ~0.4 m (Evans et al, 1967). In many case, click trains with very short ICIs (mean±SD, 3.5±1.8 ms) suddenly increased when the dolphin bended its head toward the target suggesting that the clicks were oriented to the target.

P-02

How do wild dolphins approach toward underwater swimmers?

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Dolphins often approach underwater swimmers emitting echolocation clicks, and swim around the swimmers at proximity. In most cases, the swimmers slow down or change their swim directions because of the dolphins' approach. We suppose that such approach behavior has several functions including inquiring, guarding, threatening and playing. We expect to show their social role in their fluid society if these approach behavior have non-affiliative function such as inquiring, guarding, and/or threatening. In this study, we examined the behaviors of wild dolphins during approaching toward an underwater swimmer and compared these behaviors between sexes and age classes.

We investigated the responses of Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) in Mikura islands to an underwater swimmer or an observer from June to July 2014. We recorded continuously dolphin's behaviors by using two cameras in front and back of the observer at the same time. We extracted two behaviors: 1) echolocating toward the observer; 2) dolphins swim across the observer (within 1m) with their eyes open. Of the total 126 recordings of dolphin's approaching possible identified, we estimated 72 episodes of the behaviors: 34 episodes with only echolocation, 11 episode with only swimming across and 27 episodes with the both. Within individuals at the same age with different sex, females showed the inquisitive behaviors more frequently. Moreover, the frequency of these behaviours tend to increase with age regardless of sex.

P-03

Affiliative behaviors by third party toward victim of conflict in bottlenose dolphins

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Studies on post-conflict behaviors in primates have presumed that third party affiliations toward the victim have stress reducing effects, implicating empathy as a motive (de Waal & Aureli 1996; Aureli 1997; Palagi et al. 2004; Fraser et al. 2008). Other conflict-related behaviors by third parties include various types of interventions, including non-aggressive ones (de Waal, 1982; Ren et al, 1991; Petit & Thierry 1994; Sicotte 1995; von Rohr et al. 2012).

There are few reports on cetacean post-conflict behavior, one of them being affiliation between victim and third party (Tamaki et al. 2006). However, no study to date has reported explicit direction in such affiliative interactions. To our knowledge, there is no quantitative study on interventions.

In this study, one bottlenose dolphin showed affiliative behaviors toward the victim during and following conflicts, including approaching, following, and pair swimming with the victim. Intensity of aggression and the victim's behavior affected the occurrence of above behaviors. Pair swimming during conflicts may be regarded as a weak form of intervention, one that supports the victim in a mild way. Stress reducing effects are unclear, but the seeming understanding of the victim's situation and the spontaneity of behaviors could reflect concern for the victim.

P-04

**Ecology of Long-tailed porcupines in tropical rainforests of Borneo, Malaysia:
burrow use and behavior in the nighttime**

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In Borneo, three species of porcupine live in tropical rain forests. However, we have almost no reports on their ecology and behavior. In this study, we studied Long-tailed porcupines (*Trichys fasciculata*) in tropical rain forests of Kabili-sepilok Forest Reserve, Sabah, Malaysia, from July 2012 to May 2014. In the burrow census, 11 burrow sites were found in the study area of about 1 km². We captured 9 individuals. The four of them were estimated to be a family group because they always used a same burrow site. Radio-tracking and direct observation of these animals revealed that they stayed in their burrow together in the daytime and came out of the burrow only in the night time during the hours of darkness. They traveled separately in most cases except a few encounters at resting sites and the burrow entrances. Home ranges of the adult male and the adult female were largely overlapped. All 11 burrow sites found in the study area were included in their home ranges. During the study period, they changed their burrow site frequently. Direct observation at night revealed that they foraged fallen fruits and fungi on the forest floor, and frequently showed scent marking behavior during their night trips.

P-05

**NON-INVASIVE ANALYSIS OF ADRENAL HORMONES IN FEMALE
JAPANESE MACAQUES (*MACACA FUSCATA*)**

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The ability to determine hormonal profiles of primate populations can help to monitor reproductive status, physical fitness and physiological responses to environmental changes. We developed and tested a non-invasive method to evaluate the adrenal activity in Japanese macaques (*Macaca fuscata*) using feces. The subjects were 37 female Japanese monkeys kept in captivity at the Primate Research Institute, Kyoto University (25 monkeys in outdoor social groups and 12 monkeys living in single indoor cages). Fecal samples were collected from all females during the mating season (October to December) and additional samples were collected from mature females living socially outdoors during the following birth season (May to June). These samples were analyzed for glucocorticoids (fGC) and DHEAS by enzyme-immunoassay. We found that age is negatively associated to both fGC and DHEAS levels, with extremely high concentrations in neonates. Both fGC and DHEAS were higher in females housed indoors in single cages in comparison to those living outdoors in social groups. In addition, fGC were higher during the mating (winter) season than the birth (spring) season. This study provides insights about the physiology of these two adrenal hormones in female Japanese macaques and we are currently examining these hormones in a wild population.

P-06

Utilization of salt licks by wild Malayan tapirs

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Few reports are available on the behavior of wild Malayan tapirs (*Tapirus indicus*) because it is difficult to observe them directly in the rainforest. However, previous studies have reported that they came to salt licks more frequently than other places in their habitat. To collect information on the utilization of salt licks and the behavior in wild Malayan tapirs, infrared sensor cameras were set at five salt licks in Belum-Temengor rainforest complex, Perak, Malaysia.

Malayan tapirs were observed in 75 days out of 185 days at salt licks. An individual stayed at the salt lick for about 4 hours in a day at longest. A male-female pair or a solitary individual occupied the salt lick, and they had never used it at the same time with other individuals or other pairs. Some behaviors characteristic to tapirs, urine spraying and communication between a pair with vocalization or touching each other with the proboscis, were observed around salt licks. The results suggest that utilization of salt licks composes an important part of the life of wild tapirs, and observation at salt licks could provide a foothold for the research on behavior of wild tapirs.

P-07

**Relations between wild mammals and human activities
in the Ugalla area, western Tanzania.**

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The miombo forest in western Tanzania is located in a region in which the main vegetation changes from tropical rainforest to acacia savanna. Various plants and animals in the miombo forest originate from both the tropical rainforest and the savanna. In recent years, however, miombo forests in eastern Africa have been reduced by human activities such as slash-and-burn farming and deforestation. Moreover, at present, large-scale development throughout Western Tanzania, and dam construction and road expansion around Ugalla are in progress. The impacts of such human activity will have an immeasurably negative influence upon the wildlife and natural environment of this area.

The study was conducted at Nguye site and Sisensi site in the Ugalla Forest Reserve, Tanzania. The total study effort was 104 days at Nguye, 7 days at Sisensi. When we walked the study area, we recorded the trace of human activities such as cultivation, hunting, gathering, and deforestation. To collect basic data on mammalian fauna and their densities, we carried out a line transect census of feces once a week, opportunistic direct observations of larger mammals, and set up camera traps.

79 cases (direct observation 64 cases, indirect evidence 15 cases) of human activities was observed at Nguye site ($0.8 \pm \text{cases/day}$). Logging was cover about 63 % of these cases, followed by honey gatherers, poaching, grazing there. Only one case (indirect evidence) of human activities was observed at Sisensi site ($0.1 \pm 0.4 \text{ case/day}$). We found a baboon carcass hunted by humans.

The population density of small and medium-sized mammals of Nguye site was higher than that of Shisenshi area. Large antelope was found only in Shisenshi area.

From this study, it was suggested that the contents of human activities affect the mammal's density distribution density.

P-08

**Pup Rearing by Dholes (*Cuon alpinus*) in and around a Den
near Mudumalai Tiger Reserve, Southern India**

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Rearing offspring, a major factor for a lot of every species to survive, is conducted not only by parents but also by helpers in several species. Dholes (*Cuon alpinus*) form a pack, a social group in which only the alpha pair reproduces and the other members help it to hunt and care for its pups. This research aims to classify behavioural patterns shown by dhole adults during a pup rearing season and to estimate functions of each behaviour. Here we will report pup rearing behaviour by Moyar Pack, a pack of eight male and one female adults roaming in and around Mudumalai Tiger Reserve (MTR), southern India. Their first den was found close to a residential area in Masinagudi Village, located outside MTR on 8th January 2014. Three camera traps were installed in and around the den to monitor their behaviour against their seven pups between 9th and 22nd January, until they shifted their den into the reserve. In this presentation, all the recorded behavioural patterns such as suckling by the mother, allo-grooming by the mother and male individuals and pup carrying with one's mouth by the mother and a male will be described.

P-09

Gut microbiota associated with dietary changes in wild Japanese macaques

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Diet of wild Japanese macaques (*Macaca fuscata yakui*) consists of various food items. While they are frugivorous primates, these macaques consume large amount of leaves or animal matter depending on the season. Here we present data on their gut microbiota, which affects the efficiency of digestion and calorie harvest from the diet. We conducted a study at Yakushima National Park on Yakushima Island from October 2012 to September 2013 and collected fecal samples (n=50) from two adult female macaques. We performed amplicon sequencing of bacterial 16S ribosomal RNA genes using a massive parallel sequencer. Our study indicates that gut microbiota of Japanese macaques was robust at the genus and dominated by *Prevotella*, which is associated with a high-carbohydrate diet, even when macaques became highly insectivorous. Detailed analysis revealed a distinct difference in their gut microbiota when macaques mainly fed on mature leaves. This finding suggests that Japanese macaques have adapted to harbor gut microbial community that is associated with cellulolytic activities when they need to process fibrous leaves. This study was supported by JSPS-MEXT (No. 25840170; 12J04270) and Kyoto University (Excellent Graduate Schools of Biodiversity and Evolution; The Leading Graduate Program in Primatology and Wildlife Science).

**Prey species of leopards (*Panthera pardus*) in
Mahale mountains national park and Ugalla area**

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The leopard has the widest distribution of the wild cats, and shows great variation in appearance and behavior (Nowell and Jackson, 1996). Leopards also have the broadest diet of the larger predators with 92 prey species recorded in sub-Saharan Africa, although it is thought to focus on the 20–80 kg range (Mills & Harvey, 2001; Hayward et al., 2005). Ungulates are the most frequently eaten prey of leopards in acacia woodland (Schaller, 1972; Baily, 2005). In the tropical rain forest, ungulates are not as much eaten as in acacia woodland, and primates are frequently eaten. How about in the miombo woodland and lowland tropical forest? I did scat analysis to see what leopards eat in Ugalla and Mahale mountains national park, Tanzania. I collected 9 scats in Ugalla and 219 scats in Mahale in 8 months. Consequently, it is revealed that leopards consumed ungulates most frequently in Ugalla. On the other hand, leopards in Mahale consumed primates most frequently.