NOTE FROM THE EDITOR

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Dear Friends, Colleagues and Otter Enthusiasts!

YES – it is with great pleasure that I can announce that we in 2010 we will definitely have 3 issues as I have received enough manuscripts already now to fill issue 2. The manuscripts are in different stages from being with the reviewers, or with the authors for revision or with the persons translating the abstracts into Spanish and French. You will notice that in some cases we have an additional abstract in a local language. Please feel free to submit one in case you think it will help otter conservation and awareness in your country. As you will have realized we have an increasing number of manuscripts from South America and Asia. This reflects the good work done by the senior scientists on the two continents that inspires many young students to elaborate their own research projects.

It is with excitement that Lesley and I are awaiting the decision of Thompson ISI on whether the IUCN OSG Bull. will be assigned an impact factor. The pending decision is due to be announced sometime in June to us. It would be a great step ahead. However, if this is not happening yet we will keep up the work and apply in three years again.

Lesley is putting an incredible amount of work into the Bulletin and the homepage of OSG. Lesley is not only updating regularly the website, is uploading articles on short term once the final versions become available, but finds in addition the time take care on the websites for Furget-Me-Not, Giant Otter Research and Otter Joy. Thanks a lot Lesley! For all your time and your efforts!

We all regret not to be able to have the XIth Otter Colloquium later this year in Italy, to discuss all aspects of otter related science and conservation and to meet old friends again. However I am also sure that we all understand the reasons for the organizers to postpone the meeting and I hope to see you all in Italy in 2011. Good luck to the team in Italy as there is a lot of work ahead.

OSG GROUP MEMBERS NEWS

New **Members of OSG**

Since the last issue, we have welcomed 9 new members to the OSG: you can read more about them on the Members-Only pages.

Hugues Akpona, Benin: I work on the ecology and ethnozoology of tree pangolin (*Manis tricuspis*), mongoose species (*Crossarchus obscures*; *Herpestes ichneumon* and *Atilax paludinosus*) and spotted necked otters (*Lutra maculicollis*) in Benin. My primary research was on fisherman-otter conflicts and implications for conservation. One of my goals is to link science with policy making since main research results are not integrated and capitalized on by conservationists in Benin. Considering that, I had organised many awareness and workshops to share research results and get stakeholders to be aware of biodiversity loss. I am the national Manager of the Clearing House Mechanism (CHM) of the Convention on biological Diversity (CDB) in Benin (bj.chm-cbd.net), have worked on the Benin Red List, and was an associate consultant for the elaboration of the 4th National Report on the Implementation of the Convention on Biological Diversity

Margherita Bandini, Italy: After a year of research with Lorenzo Quaglietta in southern Portugal, I am now writing my thesis to obtain my master's degree in Animal Behaviour ("Evoluzione del Comportamento Animale e dell'Uomo") at the University of Torino. My study area concerns the marking behaviour of the Eurasian Otter *Lutra lutra* in a typical Mediterranean habitat.

Hanne Christensen, Luxemburg: My PhD thesis was on "Determinants of Otter *(Lutra lutra*) Distribution in Norway. Effects of Harvest, Polychlorinated Biphenyls (PCBs), Human Population Density and Competition with Mink". The last year I have been working as a teacher at the European school here in Luxembourg (Integrated Science) and teaching ecotoxicology at the University of Trier, Germany.

Pablo García Díaz, Spain: My research work with otters in Spain deals with their behavioural ecology, as a way to obtain the most comprehensive possible picture of their population ecology. For accomplishing such a work, I'm doing an intensive fieldwork, since 2005, in a variety of habitats from Central Spain (from floodplains rivers to mountain reservoirs). Particularly, I'm interested in how food resources affect the general ecology of the species, in the broadest sense –from diet preferences to breeding performance, and on the reliability of methods to estimate population abundance, as this is a crucial parameter.

Vania Fonseca, Brazil: I've been interested in otters for many years and started studying them in 2006, when I've been involved with dietary studies of the neotropical otter during my degree thesis in Biology. In 2008, I began working on a project with eurasian otters in southern Portugal, where I'm currently finishing my Msc thesis in Conservation Biology. Now I've just been selected for a research grant to study giant otters in the Amazon, where I'm going to assess the potential conflicts of the species with local populations. My main interests are dispersal, social behavior, diet and conservation.

Simon King: United Kingdom: I have been a cameraman/presenter in natural history programming for 30 years, working on many projects including Life of Mammals and Blue Planet. I have worked on the BBC's Springwatch and Autumnwatch series, often on otters, and had my own series: "Simon King's Shetland Diaries", which also featured otters, orcas and puffins. I have a website about my work: http://www.simonkingwildlife.com

Maribel Recharte, Peru: I have been working on Giant river otters in the North-eastern of Peruvian Amazon since 2004, carrying out censuses on the Samiria River in the Pacaya-Samiria National Reserve and on the Yavarí River, the border between Peru and Brazil. I also work on the ecology and behaviour of giant river otter, identifying individuals and have conducted surveys for evidence for the presence of giant river otters in Lorteto, Peru for the Wildlife Conservation Society-Peru. Currently, I am working on fishermen–otter conflict and environmental education in site in Loreto, focusing in school children in the research area.

Suzann Speckman, USA: I am a biologist with the northern sea otter program, Marine Mammals Management, United States Fish and Wildlife Service (USFWS). We are located in Anchorage, Alaska. Our role within this federal agency is management of northern sea otter populations and regulation of activities that may impact them.

Juliana Vianna, Chile: My interest is conservation genetics and in my PhD thesis I studied the phylogeny and phylogeography of the four otter species found in South America.

R E P O R T

DISTRIBUTION OF OTTERS IN THE TROPEANG ROUNG, KOH KONG PROVINCE, CAMBODIA

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ABSTRACT: Two species of otters are found along Tropeang Roung River, the smooth-coated otter (*Lutrogale perspecillata*) and the hairy-nosed otter (*Lutra sumatrana*). The distribution of these species was studied along a stretch of the Tropeang Roung River in Koh Kong province, Cambodia, between May and June 2009. Their main habitat appears to be both small and big estuary surrounded by Melaleuca, Mangrove and evergreen forest with shoreline vegetation followed by sand (24%), clay (13%), rocky (10%) and bank with vegetation (53%), where is rich of food sources, particularly fish. The sprainting sites were found more under open sky then canopy cover, and situated their spraint in average of 4.33 m from water edge and 2.73 m of water depth. Diet compositions in spraint consisted of fish 64%, frog 5%, crab 2%, shrimp 1% and unidentified debris 28%. The study revealed that the distribution of otters along the river has diminished. Hunting for skin to trade, traditional medicine, meat and habitat disturbance such as sand mining and fishing activities might be putting pressure on the population. Conservation measures such as monitoring of the otter population and interviewing locals should be done regularly and restrictions on sand mining, oil spills from shipping and snaring should be imposed along Tropeang Roung River.

Key-words: *lutrogale perspecillata, lutra sumatrana,* habitats, threats, ecology

INTRODUCTION

The occurrences of four species of otter have been mapped by both Lekagul and McNeely (1977) and Corbet and Hill (1992) in Cambodia (Poole, 2003): Hairy-nosed otter *(Lutra sumatrana),* Eurasian otter *(Lutra lutra),* Smooth-coated otter *(Lutrogale perspicillata)* and Asian small-clawed otter *(Aonyx cinerea)*. The smooth-coated otter

is considered to be Vulnerable due to an inferred future population decline caused by habitat loss and exploitation (Hussain et al., 2008a), the hairy-nosed otter is considered to be Endangered due to past population declines. Based on estimated rates of decline, this species is suspected to have declined by up to 50% in the past 3 generations (30 years) due to illegal poaching and hunting, pollution, by catches and prey depletion due to over-fishing. The current rates of decline are expected to continue and further threaten this species. In its entire range, the hairy nosed otter is under increasing pressure due to high levels of poaching (Hussain et al., 2008b), the Asian small-clawed otter is considered vulnerable due to a projected future population decline due to habitat loss and exploitation. In the last few decades, the range of Asian small-clawed otter has shrunk particularly in its western portion, as evident from the published literature, (Hussain and de Silva, 2008) and the Eurasian otter is considered to be near threatened due to an ongoing population decline but at a rate no longer exceeding 30% over the past 3 generations. There is concern about what is happening in parts of its range in Asia due to increasing habitat loss and poaching (Ruiz-Olmo et al., 2008).

Based on Poole's (2003) records, there were two species of otters with definite location records from Cambodia, the smooth-coated otter and the hairy-nosed otter. However, recent information show that three species of otters are now confirmed to exist in Cambodia: the smooth-coated otters found in most parts of Cambodia (Hon, 2008), the hairy-nosed otters found at Tonle Sap Great Lake (Olsson et al., 2007) and the small-clawed otters recently found in northeastern Cambodia (Hon et al., 2009).

The hairy-nosed otter is a medium-sized otter, around 1.3m in length and weighing around 7-8kg. The paws are fully webbed with well-developed claws. The fur is dark brown above, slightly paler underneath with a contrasting pale chin and upper lip. The whole nasal area (rhinarium) is covered in short, dark fur (Wright et al 2008). The hairy-nosed otter has limited distribution range. In Thailand, they are found in the Toa Daeng peat swamp forests, and also near the mouth of the Bang Nara River, which is low lying and tidal. In Viet Nam, the species have been reported from low lying peat swamp forests dominated by Melaleuca cajuputi in lower Mekong. In Cambodia, the species mainly live around the Tonle Sap Lake where the otters live mainly in the flooded forest and scrub surrounding the lake. Like many predators the hairy-nosed otter occurs in low density and the number and frequency of sightings are very few. In recent years, the tropical peat swamp forests have been under severe threat due to fire and other anthropogenic activities such as plantations for oil palm, production of food crops such as rice, corn and soyabean, and fish farming. In Viet Nam, the entire Mekong Delta has been converted into rice fields, reducing the habitat of otters and other wildlife species to a few parks. In Malaysia, fire reduced 70% of the Binsulok Forest Reserve and 10% of the Klias Forest Reserve. This has affected the surrounding environment and its biodiversity. In Indonesia, over the last 20 years, the ecosystem has been reduced from almost 30 million hectares to only about 15 million hectares, and most of what remains has already been logged selectively. Such levels of habitat modification have profound effects on the native biodiversity. All over its range, the hairy-nosed otter is under increasing pressure due to intensive poaching. In Cambodia, around the Tonle Sap Lake, poaching of otters and other wildlife is common practice. In Viet Nam otters are hunted for illegal wildlife trade, as well as for meat and medical use. These problems also occur in other countries of its range (Hussain et al., 2008b).

The smooth-coated otter is a large (7–11 kg) otter characterized by a very smooth, sleek pelage. Color varies from dark to reddish brown, with the undersides

slightly lighter. The subspecies *L. p. maxwelli* is the darkest, with a dark brown to almost black coat. The belly is noticeably paler (Kanchansaka, 1988). The upper lip, cheeks, sides of neck, and throat are whitish or gray. The tail is flattened dorsoventrally, with a distinct lateral keel distally. The eyes and ears are small. The limbs are short, strong, with broad feet. All feet are fully webbed (Yeen and Serge 2005). This species is considered to be vulnerable due to a projected future population decline as a response to habitat loss and exploitation. The smooth-coated otter is essentially an otter of lowlands and floodplains. Major threats to the population are loss of wetland habitats due to construction of large-scale hydroelectric projects, reclamation of wetlands for settlements and agriculture, reductions in prey biomass as well as, poaching and contamination of waterways by pesticides (Hussain *et al.*, 2008a).

The small-clawed otter is the smallest otter in the world (1-3 kg). The male is bigger than the female. The coat color is grayish brown. The color on the belly is lighter than on the sides of the body and on the back. However, the coat color changes from season to season. There is a periosteum between part of the toes, as such, their toes are free for movement, which is different from the other three species of the region. The nails are very short in adults. The juvenile small-clawed otters have long and curved nails, but they fall off when they become 5 weeks old. The small-clawed otters have tactile sensitivity on the front legs, this helps them to hunt efficiently, even in murky water, which is different from the big otters who use eyesight in hunting (Kanchansaka et al., 1998)

The Tropeang Roung River is situated in Peam Krasoap Wildlife Santuary, Koh Kong province. The presence of otters has been confirmed there (Hon and Dong, 2008), which makes it a significant area for research and conservation. There is very little data about the otter species along the Tropeang Roung, and the actual otter species present has not yet been clearly established. Because of this, we conducted this study in the area around Roung, focusing on otter distribution, otter species identification, habitat selection by otters and human impact on otters.

Survey Area

The study was carried out between May and June, 2009 on part of the coastal area in Koh Kong province. Six villages were chosen for conducting interview: Koh Sralau, Koh Andeth (Prek Popel and Koh Smach), Koh Kong Khnong, Prek Angkugn, Dei Tomneab and Tropeang Roung (Veal Tapou). Transect surveys were conducted along canals, streams and swamps along Tropeang Roung river (Figure 1), situated in Peam Krasaob Wildlife Sanctuary between latitudes $11^{o}20'$ and $11^{o}30'$N and longitudes $103^{o}03'$ and $103^{o}20'$E. The vegetation at the survey sites are mangrove forests, melaleuca forests and evergreen disturbed forests. The beauty of the natural landscapes and wildlife at Peam Krasaob Wildlife Sanctuary is very important for eco-tourism and conservation. Many estuaries and vegetation along the watercourses are in an optimal state in terms of biodiversity. The vertebrate fauna is rich in fish, reptiles such as turtle species, snake species, and water monitor (*Varanus niloticus*), birds and mammals as Long-tailed Macaque (*Macaca fascicularis*), civet species, Hog badger (*Arctonyx collaris*), Rat species, Northern Slow Loris (*Nycticebus bengalensis*), Wild pig (*Sus scrofa*) etc).

METHOD

Interviews

Interviews were conducted with 50 local people who live around the survey sites. As the first step, local authorities were selected for interviewing in order to identify target groups, especially the chiefs of the villages. The interviewees were selected based on their experience; they might be fishermen, hunters, wildlife middlemen, or people who spend much time in the forest or in fishing activities. Those people were interviewed by using pre-designed semi-structured questionnaires in order to get information related to the distribution and abundance of otters, their presence both in the present and in the past, their biological characteristics, threats to otters caused by human activities and other factors, wildlife trade in otters or their parts, and general awareness of the value and importance of otters.

Transect Lines

Transect surveys were done for direct observation of otters and their signs. Transects were designed to cover all habitat types and followed waterways such as canals, streams and swamps (Nguyen *et al*, 2001). Sixteen transect lines were done along the waterways. The length of transect surveys was not fixed; it was based on the situation of canals, streams and swamps. Most transect surveys were carried out by boat because of dense forest along waterways. Where travelling by boat was impossible, transect survey had to be conducted on foot. Where otter signs were found, habitat assessments were also done. Signs could be spraint sites, grooming sites and dens (Anoop and Hussain, 2004). Only smooth areas were measured as rolling site and dens were measured up to down and around hole.

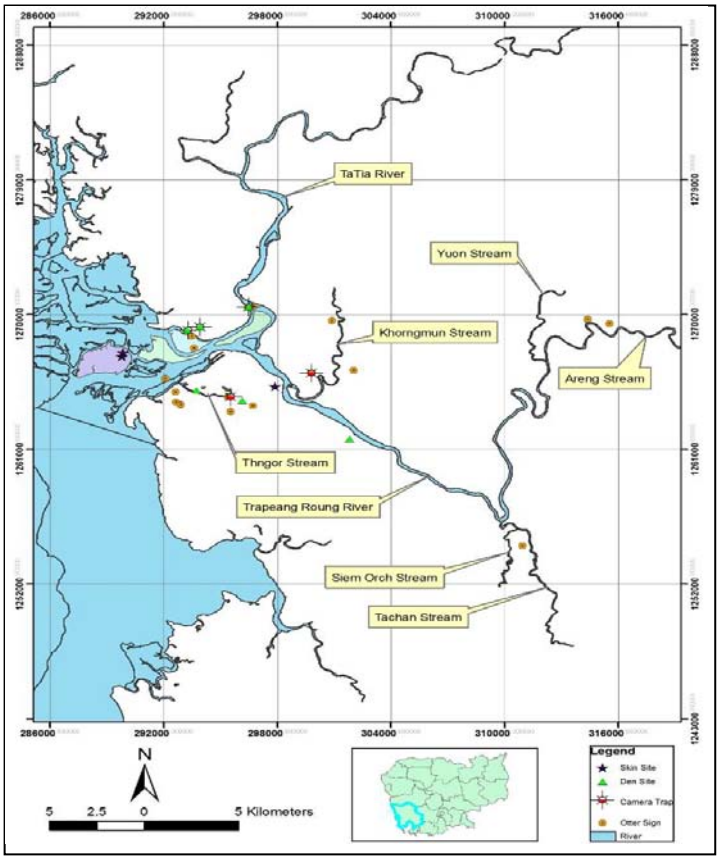

Figure 1. Study sites along Tropeang Roung area

Spraint Collection
Spraints were collected for analysis of otter prey categories. One to four samples of spraint were collected at each spraint site (depending on the number of different spraints at that site). All spraints which were collected were washed under tap water in a steel sieve of mesh size 1 mm (Anoop and Hussain, 2004) and then dried.

Habitat Assessment
Plots were laid around wherever otter signs were found (Anoop and Hussain, 2004). We intended to use plot sizes of 5×10m for habitat assessment; but due to weather conditions (flooding), the situation of the survey sites and the abundant tree species in these study area, the actual plot sizes used were $25m^2$ (5×5m). The habitat variables measured were: distance from water edge to sign, water depth, river width, number of spraint sites, and number of basking and grooming sites (Anoop and Hussain, 2004). Habitat was also classified according to the percentage of canopy cover, ground cover and vegetation. Canopy cover was assessed using a simple method that uses a hole in a piece of paper or large leaf to judge proportions of canopy and open sky. For ground cover, we assessed the proportions of leaf litter, grass cover, soil, rock and sand in the plot area. The vegetation types were measured focusing on vegetation diameter and height. Observed disturbance and threats to otters were also recorded during the survey period.

Camera Trapping
Camera traps were set during the survey in order to identify otter species and threats from humans. Two types of camera traps were used (Cam Trakker, Reconyx 1.3 mpx Mono R). The camera-traps were set at 24 hour activity. The Reconyx 1.3 mpx Mono R powered by six alkaline batteries [batteries (CC)], was set to automatically take batches of three successive pictures when triggered, and the Cam Trakker, powered by eight alkaline batteries [4 batteries (CC) and 4 batteries (AA)], was set to take one picture at a time, with a 10 second delay after triggering. The traps were set for periods of one month at 5 locations in the study area. They were set up in front of otter spraint sites, grooming sites and otter dens. The camera trap setting was flexible base on the location of the signs; they were set in the distance about 1.5 to 2 meters away from otter sign.

RESULTS

Interviews
The 50 interviewees were interviewed in villages along the survey sites. Most of them work closely with natural resources because their livelihoods still depend on them. Three main occupations of interviewees were detected (Figure 2): fishermen, farmers and middlemen. For local people who are fishermen and farmers, they always have a second job to support their family such as going into forests to collect non-timber forest products or to fish etc.

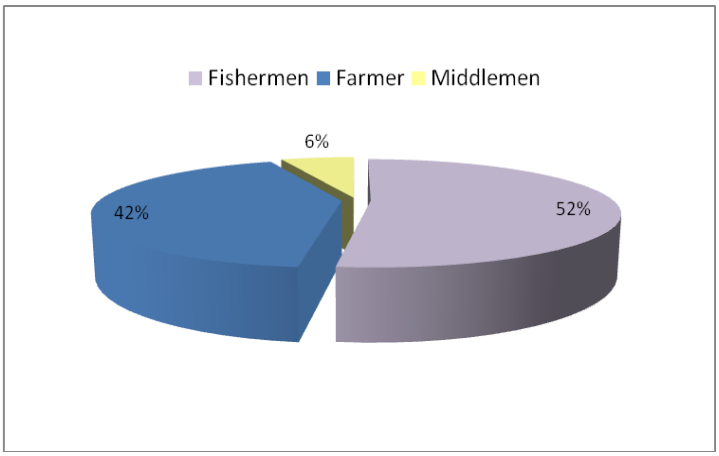

Figure 2: The main occupations of interviewees in the study area

Distribution and species of otter

The interviewees' responses showed that all of them (100 %) used to see otters (Table 1). Nevertheless, the local people could not identify otter species, they just identified them by color as "black" (dark brown) and "grey" (paler brown). The black otters are actually *L. sumatrana* and the grey otters are *L. perspicillata*.

Table 1. Percentage of interviewees who sighted otters in different time periods at the survey sites

Date Period	Percentage of Interviewees reporting Otter Sightings
1980 - 1990	52%
1991 - 2001	27%
2001 - 2009	21%

The local people considered that recently, the otter population has declined rapidly because the present of otters have been less than in the past since sand mining were invested in their areas.

The local people also noticed that otters have always been present along watercourses such as Koh Smach, Koh Krey, Prek Popel, Prek Thngor, Prek Tachan, Prek Khorngmun etc (Koh means Island, Prek: means stream or river). They often saw otters swimming, and walking near the water's edge at low tide. 87.5 % of interviewees saw otters rolling on sand and 12.5 % on grass. Sometimes, they saw otters were catching food along streams. Local people confirmed that otters were present both during day time and at night, and that they caught fish, crabs and shrimp at low tide when they are easy to catch.

Threats

Habitat loss and disturbance: By observation and through the interviews we found that the river banks where otters used to be seen have been destroyed by commercial sand mining. 80 % of local people stated that sand mining only impacted otter habitats, but their own settlements are also facing this issue as well. Food and other economic resources for local livelihoods are being affected because fish, crabs and shrimp yields are now in decline. Sand mining operates both day and night, and has transformed the ecosystem of aquatic animals. In addition, water pollution is caused by fuel leaks from their ships, which has had a great effect on the degree of biodiversity in the area. The sound from the machines also disturbs wildlife, including otters. In addition, forests around the streams are cut down for trade (Melaleuca trees) and making energy (charcoal production).

Hunting and otter trade: Otters are not the main hunting targets for local people, but hunting per say still pose a serious threat to otters. The most common situation when otters are killed is when they come close to settlements and raid fishing equipment. Sometimes, local people go out to hunt other wildlife, but when they meet otters, they will kill them for food, traditional medicine and skins for trade. During interviews, only 32 % of respondents said they had caught otters. Methods include using fishing equipment, guns, dogs, and directly by hand (Figure 3). Local people also said that sometimes otters were killed by accident, especially when raiding fishing gear.

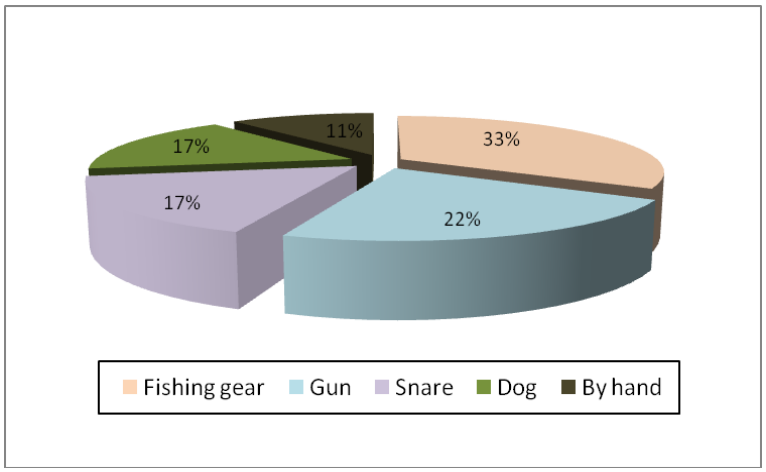

Figure 3. Methods used by local people for catching otters in the study area

Otters and other parts are currently being illegally traded in the survey areas. The middlemen in the local areas buy wildlife and wildlife products from local people and sell them outside the area, such as in Koh Kong town. The prices reflect the type of body part and its quality (Table 2).

Table 2. Price of otters and their parts were destined for trade at the survey sites

N°	Period	Otters and their's Parts	Range Price
1	1990-2000	Skin	10-30 $
2	2001-2007	Whole body	10-15 $
		Skin	50-80 $
		Penis	10-20 $
3	2008-Present	Whole body	25-40 $
		Skin	90-110 $
		Penis	15-30 $

Note: Whole body of otter means otter has not skinned (fresh). It has cheaper price if compare to the dry skin because in order to convert from fresh skin to dry skin, it have to spend long time and need person who have skill for skinning.

The high prices and traditional beliefs of local people have contributed to the decline of the population of otters. Five otter skins were found in Koh Sralau village, Koh Kapi commune and parts of otters were found at a wildlife middleman's house in Koh Kong Khnong village, Tropeang Roung commune during the interviewing and observations. Three of the otter skins are blackish in color, being those of the hairy-nosed otter (Figure 4) and two skins and other body parts (otter feet and penises) are grey in color, from smooth-coated otters (Figure 5).

Figure 4. Skins of hairy-nosed otter (*Lutra sumatrana*) found at Koh Sralau. The local middleman bought them from local people (fishermen) in late 2008. So they were not resold because of their poor quality (hair would detach from the skin).

Figure 5. Body parts and skins of smooth-coated otters (Lutrogale perspicillata) found at Koh Kong Khnong and Koh Sralau. From left to right, skins are from animals killed in late 2008, on 23th March 2009, and on 8th May, 2009.

Transect Survey

Fifty signs total of otters were found during the transect survey: 19 spraint sites, 25 grooming sites and six dens.

Sprainting sites

Spraint color depends on how long they have been deposited and in what habitat. Otters defecated on leaf litter, soil, rock and sand. The survey was done in the rainy season, and rain affected the size and the shape of spraints, so we could not measure and identify whether they were fresh or old (Figure 6).

Figure 6. Otter spraint found at a survey site during a transect survey

From spraint analyses, the most abundant prey remains were fish bones and scales, followed by crabs, shrimps and unidentifiable remains (Figure 7)

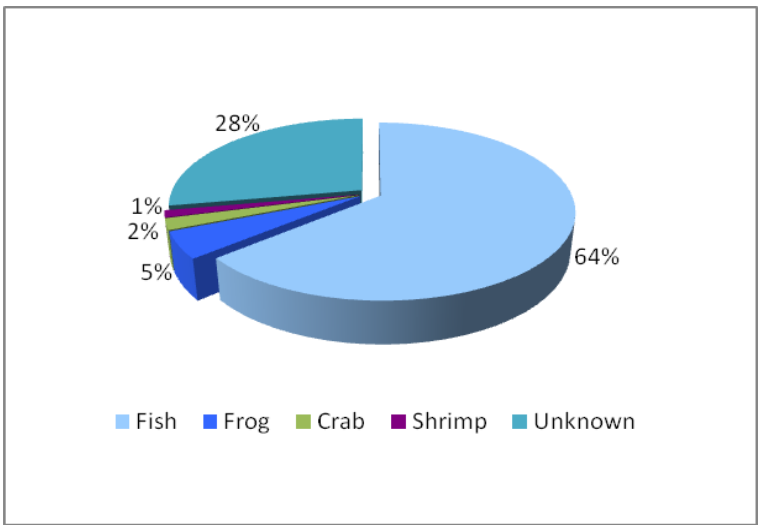

Figure 7. Percentage of otters' prey found in 19 scats in the Tropeang Roung Areas

Rolling sites

Rolling sites were used by otters for rolling and basking. All rolling sites were found associated with spraint sites within an average distance of 2m. 56% of rolling sites were on soil, 40% on sand and 4% on rock. On average, each spraint site was associated with 2 rolling sites.

Dens

Of the six dens found along streams, two where in natural rock crevices, three were dug into the substrate close to the shoreline and one was dug under the roots of a tree. The average distance of dens from the water's edge was 2.83 m (standard error = 0.74, range distance: 1-6 m) and the average distance from spraint and rolling sites was 20.5 m (standard error = 7.17, range distance: 2-50 m). According to the local guides, those dens have been used by otters when they got pregnant and looked after young cubs because the guides used to see otters with their small cubs. Some of the local guides used to catch otter cubs from those dens.

Habitat type

The typical (average) habitats selected by otters had slow water currents, an average water depth of 2.73 m (standard error = 0.32), and a river width of approximately 75 m (standard error = 35.01). Otter signs were found an average of 4.33 m (standard error = 1.36) from the water's edge. Vegetation tended to be around 4 m in height, with an average trunk diameter of 0.096 m (standard error = 0.34). The watercourse banks were of various compositions (Table 3).

Table 3. Bank characteristic of streams at 50 sites used by otters in the survey area

Habitat type	Bank Characteristic (%)
Sand bank	24
Rocky bank	10
Clay bank	13
Bank with vegetation	53

Thirty-four tree species were recorded at otter sign sites. The dominant vegetation in habitats which were selected was shown in Table 4.

Table 4. Dominance of tree species of otter habitat in the survey sites

Tree species	Percentage of vegetation at otter sign sites
Heritiera littoralis	14.02
Rhizophora mucronata	12.20
Thespesia populnea	8.54
Holarrheno pubescens	6.10
Other 30 species	59.15

Areas chosen by otters (sites found with signs during survey) were characterized by canopy cover and open sky. According to analysis showed that 61% of otter sign sites were under open skies, and 39% under canopy cover. The ground cover was mainly leaf litter and soil (Figure 8).

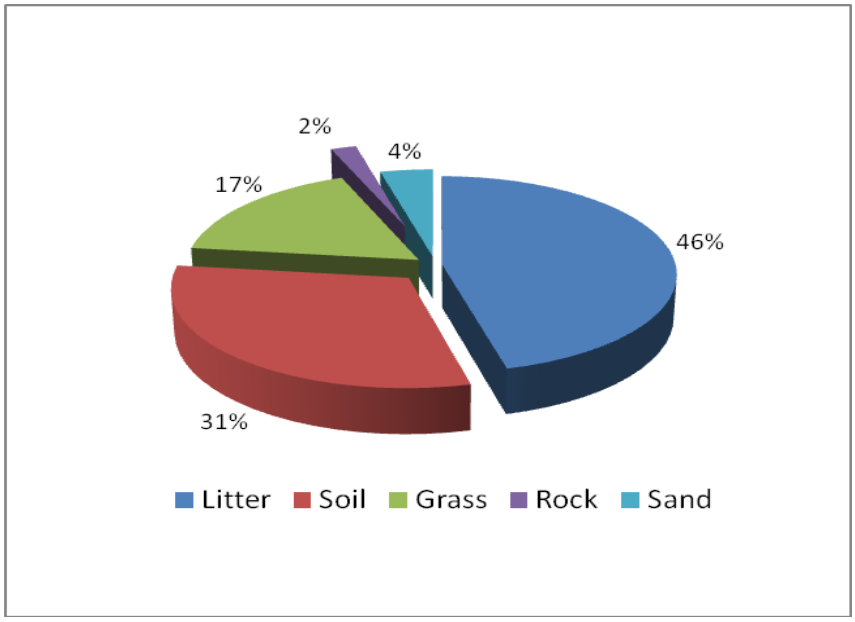

Figure 8. Ground cover components in spraint and rolling sites

Camera Trapping

Eight wildlife species were recorded during camera trapping. Those species were:

- Mammal: Common Palm Civet (*Paradoxurus hermaphroditus*) , fishing cat (*Prionailurus viverrinus*), long-tailed macaque (*Macaca fascicularis)*, rat species, Berdmore's squirrel (*Menetes berdmorei*), squirrel species, hog badger (*Arctonyx collaris*), East Asian porcupines (*Hystrix brachura*)
- Bird: bird species

There were 6 pictures of civet species, 3 pictures of fishing cat, 36 pictures of long-tailed macaque, 31 pictures of rat species, 39 pictures of quarrel species, 55 pictures of hog badger, 8 pictures of East Asian porcupines, 3 pictures of bird species and 1 picture of an unknown species were recorded by cameras. No otters were recorded during camera trapping.

DISCUSSION

The present of two species of otters were confirmed in the study areas, the smooth-coated and hairy-nosed otters. The presence of smooth-coated otters was confirmed at Tatai Krom (Heng and Hon, 2007) and the hairy-nosed otter was confirmed to be present at Koh Kong Khnong in 2008 (Hon and Dong, 2008). During our study, it was the wet season and waterways were flooded during the survey period, so it was impossible to walk transects along all the waterway's banks. On the other hand, much evidence indicated that the two species of otter are present in our survey area. Three skins of hairy-nosed otters were present in a wildlife middleman's possession, dark in colour, and with the rhinarium covered in hair (Kanchanasaka, 1998 and Wright et al., 2008).Two smooth-coated otter skins were also found in the local people's houses (identified by its paler coat, especially on the belly). There is very little data available from the literature to compare past and present populations of smooth-coated and hairy-nosed otters in the study area, but after interviews with local people in six villages in the study area where the existence of otter was confirmed during the survey, the overall opinion expressed was that the otter population is facing a decline.

The main contributing factors to this pressure on the otter population is the economic poverty of local people, unemployment and lack of awareness about otters and the activities which generally degrade the environment for both humans and wildlife, sand mining, fuel leakage, deforestation and charcoal production. High demand for otter skins in China and Tibet (IOSF, 2008) and its high price (Khan et al, 2008) in the study area, coupled with the low risks for the hunters because of the weakness of wildlife law enforcement, creates a strong encouragement for local people to hunt otters. Along Tropeang Roung River, there is a lot of sand mining, which has eroded some areas close to the river, adversely affecting the ecosystem and hence reducing the abundance of otter prey such as fish, shrimps and crabs, and also staple foods of local people (Sebastian and Vong, 2009). According to the interviewees, the fish and crab yields have decreased rapidly. The combination of competition for food, and the high price of skins have caused a small group of fishermen to make snares and traps to catch otters and sell them to traders. Local people also believe that the skin and penis of an otter are important in traditional Cambodian medicine, which apparently uses the skin in wine to assist women during pregnancy and/or childbirth (Poole, 2003). According the people along Tropeang Roung River, the otter were used for Cambodian traditional medicine too. The dried

penis are rubbed with the rock and mixed with coconut milk as the sexual medicine. It helps the people to increase the sexuality.

Apart from this, evidence of deforestation and charcoal were recorded, resulting in destruction of vegetation in areas used by otters, as well as disturbance by noise, dogs, etc. Otters may be most vulnerable to disturbance when they are raising cubs (Hussain and Choudhury, 1997)

The most likely reason that the camera traps did not capture any otter pictures. Probably, because of disturbance from human activities, otters were not back to their sites. Lopping of trees, setting of fishing nets and settlements occurred near trap sites. Additionally, sand companies were active night and day, and were traveling along the streams. This probably affected the chance of otter going to trap sites. These causes were obstacles for camera trapping. Human occupancy of natural wetlands has created a difficult situation for otters that rely on this habitat for food (Khan et al, 2009). Furthermore, the study period was in the rainy season, which affected trap locations. Two camera traps (Cam Trakkers) were destroyed by rain during the survey, and only three camera traps recorded any wildlife.

CONCLUSIONS

From the considerable decrease in the number of positive sites and sightings of otters and the small number of spraint sites found, we conclude that the population of otters along the Tropeang Roung River is in decline. The Tropeang Roung area is currently controlled by the Wildlife Alliance cooperating with Forestry Administration to try to ensure that most of the wild animals are well protected. Otters have been thus receiving protection along with other aquatic fauna. However, there is no distinct management policy for otter conservation and it is suggested that conservation programs and monitoring activities be extended by the management staff of the authority and other partner organizations to determine future trends in the otter population along the Tropeang Roung River, and determine and implement mitigation measures in order to especially protect the globally rare hairy-nosed otter. Sand mining needs to be controlled, and snaring, charcoal production, cutting and lopping of trees along the banks should be strictly prohibited.

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RÉSUMÉ

LA DISTRIBUTION DES LOUTRES SUR LA REGION DE TROPEANG ROUNG DAND LA PROVINCE DE KOH KONG AU CAMBODGE.

Deux espèces de loutre, la loutre d'Asie (*Lutrogale perspicillata*) et la loutre de Sumatra (*Lutra sumatrana*), ont été trouvées sur les rives de la Tropeang Roung. La distribution de ces deux espèces a été étudiée entre mai et juin 2009 sur une section de rives de la Tropeang Roung dans la province de Koh Kong au Cambodge. Leur habitat principal se situe dans le petit et le grand estuaires entouré par la Malaleuca, Mangrove et la forêt sempervirente avec shore line végétation suivez par les bancs de sable (24%); la terre argileuse (13%); la terre roches (10%) et les rives avec végétation (53%), où sont riches de sources alimentaires, particulaire les poissons. Les lieux des laissées sont principalement situés dans des espaces ouverts que sous le couvert de la canopée. Les laissées se trouvent en moyenne à 4.33 m du bord de l'eau et à 2.73 m de profondeur. Leur composition est à 64% de poisson, 5% de grenouille, 2% de crabe, 1% de crevette et 28% de débris non identifiée. L'étude a révélé que la distribution des loutres sur la rivière a diminué. La chasse pour le commerce de la fourrure, de la médecine traditionnelle, de la viande de brousse, ainsi que la perturbation de l'habitat comme la collecte de sable, la pêche mettent une pression sur la population de loutre. Des mesures de conservation devraient être menées le long de la rivière Tropeang Roung comme le suivi régulier des populations de loutres et des entretiens avec les populations locales. De même, devraient être imposées des restrictions comme la collecte des sables, le rejet de pétrole par les bateaux et la pose de pièges.

RESUMEN

DISTRIBUCIÓN DE NUTRIAS IN LA REGION DE TROPEANG ROUNG, PROVINCIA DE KOH KONG EN CAMBODIA

Dos especies de nutrias fueron identificadas a lo largo del rio Tropeang Roung: la nutria de pelaje fino (*Lutrogale perpecillata*) y la nutria de sumatra o lutra de nariz peluda (*Lutra sumatrana*). La distribución de estas especies fue estudiada a lo largo de un segmento del rio Tropeang round en la privincia de Koh Kong en Cambodia, entre los meses de mayo y junio de 2009. El hábitat principal parece ser pequeños y grandes estuarios rodeados de Malaleuca, Manglar y bosque perennifolio con vegetación rivereña, seguido por arena (24%), arcilla (13%) y piedra (10%) y bancos con vegetación (53%) ricos en fuentes de alimento, especialmente peces. Sitios de defecación fueron hallados principalmente a cielo abierto que bajo el dosel del bosque a 4.33 m del borde del agua en promedio y a 2.73 m de profundidad. La composición de las heces consistió em promedio de 64% peces, 5% ranas, 2% cangrejo, 1% camarón y 28% de residuos no identificados. El estudio reveló que la distribución de nutrias a lo largo del río ha disminuido. Caza para comercializar la piel, medicina tradicional, alimento y alteración de hábitat como minería de arena y pesca podrían ser causantes de presión sobre la población. Se requieren medidas de conservación tales como monitoreo poblacional y entrevistas con la población local. Restricciones a la minería de arena, derrames de aceite y caza con trampas deberán ser impuestas a lo largo del rio Tropeang Roung.

សង្ខេប

របាយរបស់សត្វភេនៅតាមបណ្តោយស្ទឹងត្រពាំងរូងខេត្តកោះកុងនៃប្រទេសកម្ពុជា

ភេពីរប្រភេទត្រូវបានរកឃើញនៅតាមបណ្តោយស្ទឹងត្រពាំងរូង ដូចជាភេខ្លួនរលោង (*Lutrogale perspecillata*) និងភេរោមច្រមុះ (*Lutra sumatrana*)។ របាយរបស់សត្វភេទាំងពីរនេះត្រូវបានសិក្សានៅតាមបណ្តោយដងស្ទឹងត្រពាំងរូង ក្នុងខេត្តកោះកុងនៃប្រទេសកម្ពុជា នៅកំឡុងខែឧសភា និងខែមិថុនា ឆ្នាំ២០០៩។ សត្វភេទាំង នេះមានទីជំរកនៅតាមពាមដែលព័ទ្ធជុំវិញដោយព្រៃស្មាច់ កោងកាង និងព្រៃស្រោងដែលនៅតាមមាត់ច្រាំងទាំងនោះមាន ខ្សាច់ ២៤% ដីឥដ្ឋ ១៣% ថ្ម ១0% និងច្រាំដែលមានរុក្ខជាតិ ៥៣%។ ទីជំរករបស់ភេខ្លួនរលោង និងរោម ច្រមុះជាកន្លែងដែលសំបូរចំណីជាពិសេសត្រី។ ទីតាំងលាមករបស់វាភាគច្រើននៅកន្លែងដែលមានពន្លឺថ្ងៃច្រើនជាកន្លែងដែលមានគំរបព្រៃ ហើយស្ថិតនៅចំងាយជាមធ្យម ៤.៣៣ ម៉ែត្រពីមាត់ទឹក និងជំរៅទឹកជាមធ្យម ២.៧៣ ម៉ែត្រ។ កាកសំណល់ដែលមាននៅក្នុងលាមករបស់ភេ គឺមានឆ្អឹងត្រី និងស្រកាត្រី ៦៤% ឆ្អឹងកង្កែប ៥% សំបកក្តាម ២% សំបក បង្គា ១% និង ២៨% ទៀតជាកំទិចកំទីដែលមិនអាចកំណត់បាន។ តាមការសិក្សាបង្ហាញថា ចំនួនរបស់សត្វភេទាំងពីរប្រភេទនៅតំបន់នោះមានការធ្លាក់ចុះយ៉ាងខ្លាំង។ ការបរបាញ់យកស្បែក លក់ ធ្វើឱសថបូរាណ យកសាច់បរិភោគ និងការរំខានដល់ទីជំរករបស់វា ដូចជាការបូមខ្សាច់ និងសកម្មភាពនេសាទកំពង់តែជាក់សំពាធទៅលើចំនួនរបស់ភេ។ ការអភិរក្សតាមរយៈការតាមដាន និងការសំភាសន៍ជាមួយប្រជាជនមូលដ្ឋានគួរតែធ្វើឱ្យបានឡើងទាត់ ហើយគួរតែរឹតបន្តឹងទៅលើសកម្មភាពបូមខ្សាច់ និងការចាក់ប្រេងម៉ាស៊ីនចូលទៅក្នុងទឹកនៅតាមបណ្តោយស្ទឹងត្រពាំងរូង។

S H O R T N O T E

PREDATION OF WATER MONITOR LIZARD (*Varanus salvator*) BY SMOOTH-COATED OTTER (*Lutrogale perspicillata)* IN PENINSULAR MALAYSIA

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Abstract: A smooth-coated otter (*Lutrogale perspicillata*) was observed and photographed attacking and killing a water monitor lizard (*Varanus salvator*) in a small pond at the Forestry Research Institute, Malaysia, Kuala Lumpur. This is the first time such an interaction has been recorded between these species and possible explanations for the behaviour are discussed.

Otters, as a group, are fairly generalist in their diet taking almost anything that is either plentiful or easy to catch; a behaviour that is largely governed by their fast metabolism and subsequent need to consume large quantities of food each day (MacDonald, 2001). As such they have been observed taking young birds, frogs, crabs and even small snakes. However, little is known about the specific feeding preferences of the large smooth-coated otter (*Lutrogale perspicillata)* though it is considered to be, predominantly, a piscivore (Yeen Ten Hwang and Lariviere, 2005). Weighing in the region of 7-11 kg with a total length of around 100-120 cm (Francis, 2008) it is the largest of the four species found in this region.

Work in India by Hussain and Choudhury (1998) suggests that the smooth-coated otter shows a distinct preference for just two species of fish whilst, in Java, research found a distinct preference for fish supplemented with freshwater prawns (Melisch et al., 1996). Accounts of smooth-coated otters predating on species other than fish are rare though they are known to feed on rats, snakes and insects (Yeen Ten Hwang and Lariviere, 2005). This paper gives an account of a smooth-coated otter attacking and apparently killing a water monitor (*Varanus salvator*) in Peninsular Malaysia.

On 29th March 2009, at around 08.00, an adult smooth-coated otter, of unknown sex, was observed in a pond at the Forestry Research Institute, Malaysia (FRIM) (3°13'49"N - 101°38'00"E) (Figure 1). The pond is approximately 200 m in diameter and surrounded by a mixture of by trees and lawns, the latter leading to a road around 50 m from the pond. Although otters have been observed there by the authors before, sightings are considered to be a rare event.

Figure 1. Location of the observation

The otter was initially observed catching and eating small fish at several locations within the pond over a half-hour period. At approximately 08:30 a large water monitor lizard, approximately 110-120 cm in length, swam across the pond and climbed onto a small tree protruding from the water (Figure 2). Within seconds the otter appeared at the base of the tree and grabbed the monitors' tail in its mouth (Figure 3). Although the monitor resisted the efforts of the otter, turning it's head repeatedly as if trying to bite it (Figure 4), it was eventually pulled into the water where the otter immediately climbed onto its' back (Figure 5).

The ensuing struggle lasted several minutes during which the monitor seemed to put most of its effort into escape. The otter, however, seemed intent on overpowering it and dragged it underwater several times (Figure 6). At one point the otter was seen biting the back of the monitors' neck and, though it was not clear if this was a fatal bite, the monitor did cease to struggle and soon after was seen floating on its back. At this point it was assumed to be dead, though this was never actually verified. The otter then gripped the “carcass” in its jaws and swam with it back to the area where the encounter had begun. Here it appeared to push the body under a partly submerged tree-limb, as if caching it; a behaviour that is not, to this authors knowledge, recorded elsewhere.

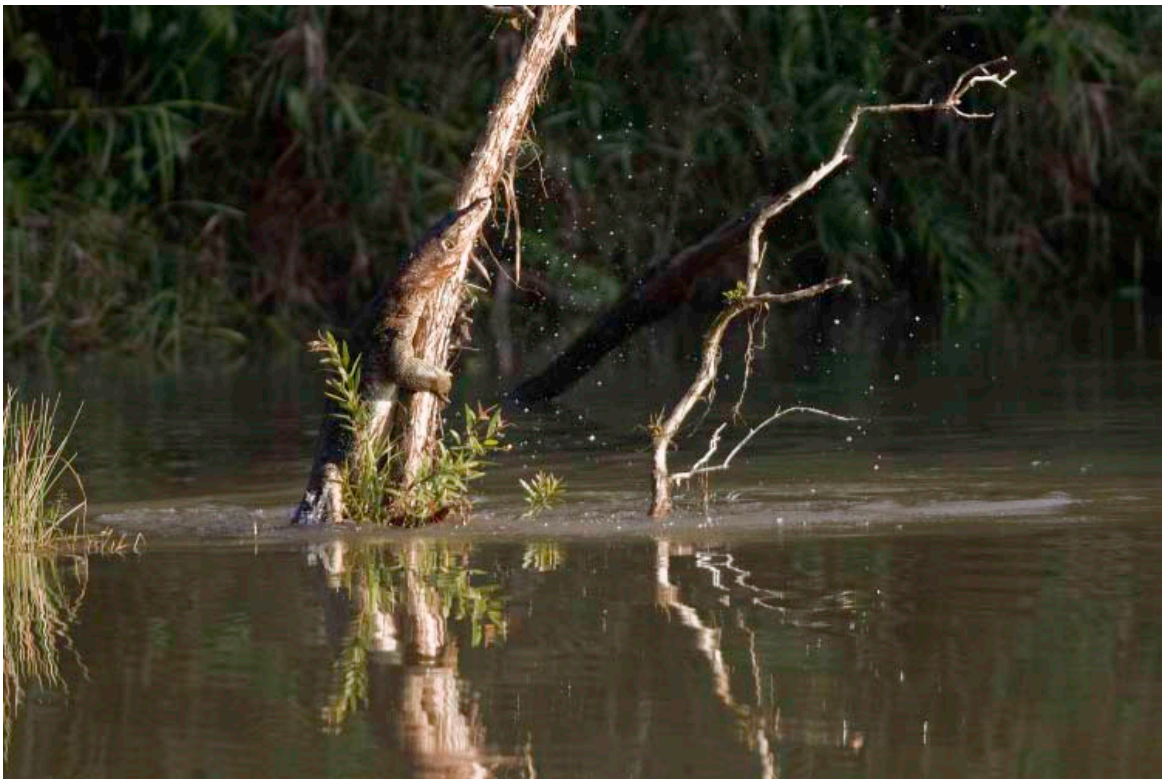

Figure 2. Monitor climbing into a small tree, protruding from the water.

This appears, then, to be the first record of a smooth-coated otter attacking and killing such a large animal. The motivation for the attack is unclear as, whilst simple predation would be the most obvious explanation, none of the authors actually observed the otter consuming any part of the monitor lizard during or after the attack. Predation by otters on novel and high-risk species is not unheard of: Ruiz-Olmo and Marsol (2002) cite three separate accounts of Eurasian otters (*Lutra lutra*) killing and eating large birds, including a red kite (*Milvus milvus*). However, such examples of novel prey-taking tend to be the result of reductions in natural prey species (e.g. Gallant and Sheldon, 2008) and, as detailed above, all authors had seen this otter take and consume fish from the pond with apparent ease. Other explanations should, then, be considered.

Competitive exclusion is readily observed between a wide variety of species in both the animal and plant kingdoms. However, the monitor is such a generalist in nature (Gaulke, 1991; Auliya, 2006) and the otter so predominantly piscivorous that it seems unlikely that the former would present a big enough threat to the resources of the latter as to provoke such a high-risk attack (Dr. Mark Aulia, pers. Comm.. to G. Goldthorpe).

A second alternative explanation would be the protection of pups from the monitor, which would represent a very real threat to defenseless young. Again, the records of such events are extremely rare in the literature but some observations of reptiles taking otter pups have been made. For example, Weber Rosas et al. (2008) witnessed the predation of giant otter (*Pteronura brasiliensis*) pups being apparently predated by a tegu (*Tupinambis teguixin*) in the Central Brazilian Amazon. However, it should be noted that no young have been observed at this site subsequent to the observation detailed herein.

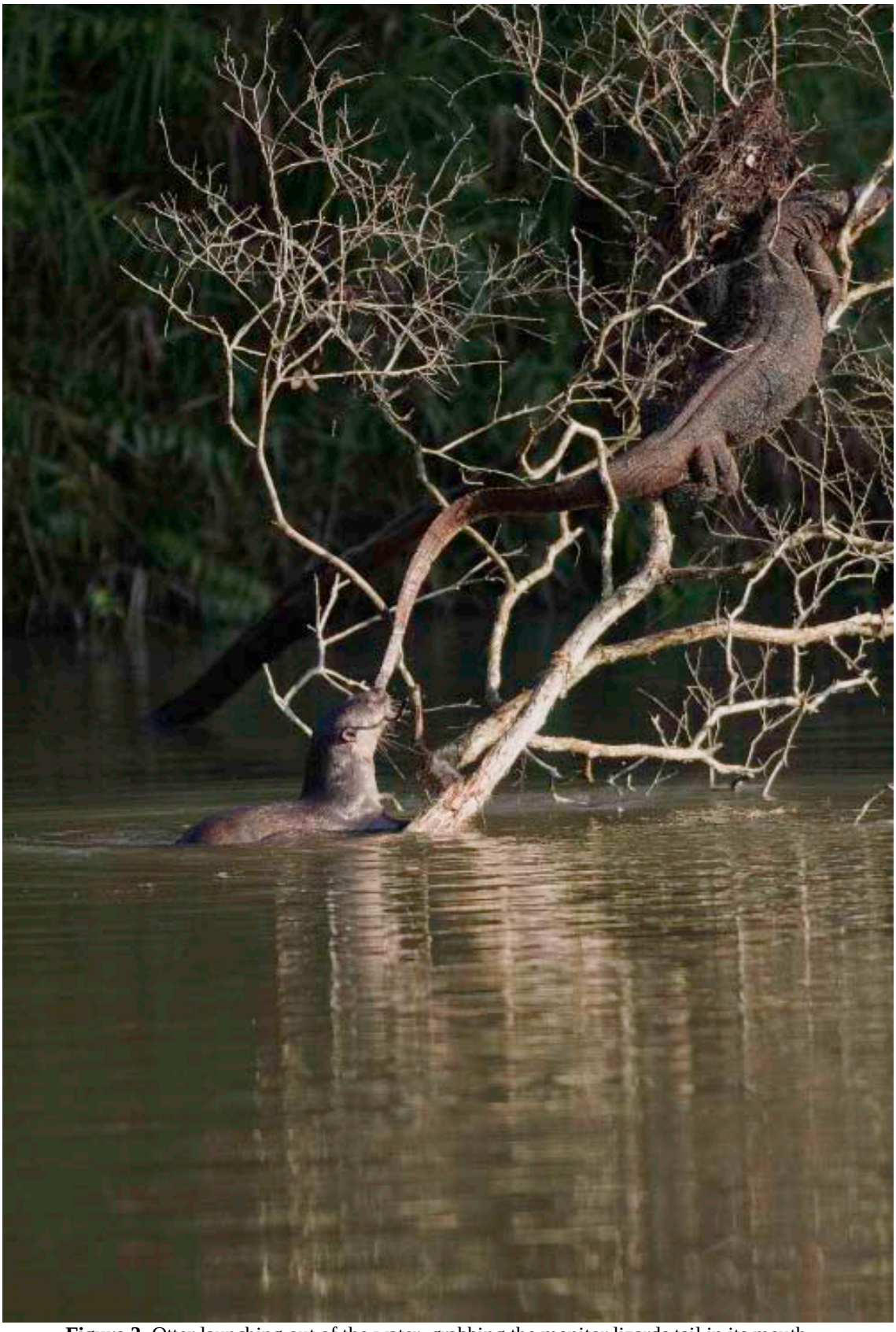

Figure 3. Otter launching out of the water, grabbing the monitor lizards tail in its mouth.

Figure 4. Monitor lizard attempting to defend itself.

Figure 5. Otter managing to dislodge the monitor lizard from the tree, immediately jumping on its back as it hits the water.

Figure 6. The monitor lizard being dragged under water during the struggle.

There have been multiple observations, made over a number of years, of captive Asian small-clawed otters (*Aonyx cinerea*) attacking and killing monitor lizards in both Singapore Zoo (Frances Lim, n.d., in litt.) and the Singapore Night Safari (Charlene Yeong, Madhavan Vijayan, Kumar Pillai, Razak Alwi, n.d., in litt.). In at least one of these observations it was noted that the presence of monitors was tolerated until the otters started to breed, at which point they became the targets of repeated "tail-nipping" by the otters.

Although not common, inter-specific killing for reasons other than predation is a natural phenomenon with examples observed in a variety of species (e.g. steamer ducks (*Tachyeres sp.*, Batt, 1992; hippopotamus (*Hippopotamus amphibius*), Kingdon, 1989; California ground squirrels (*Spermophilus beecheyi*), Feldhamer et al, 2003) and it may now be possible to extend this behaviour to smooth-coated otter. Whatever the motivation behind this dramatic and fatal attack it is certainly the first of its kind recorded by reliable witnesses and captured on film. Further investigation of such inter-specific interactions maybe warranted.

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RÉSUMÉ

PREDATION DU VARAN MALAIS (*Varanus salvator*) PAR LA LOUTRE À PELAGE LISSE (*Lutrogale perspicillata*) SUR LA PENINSULE MALAISE

Une Loutre à pelage lisse (*Lutrogale perspicillata*) a été observée et prise en photo lors de l'attaque d'un Varan malais (*Varanus salvator*) sur un petit étang de l'Institut de Recherche Forestière à Kuala Lumpur (Malaisie). C'est la première fois qu'une telle observation est enregistrée entre ces deux espèces c'est pourquoi les hypothèses d'un tel comportement sont discutées ici.

RESUMEN

PREDACIÓN DEL VARANO ACUATICO (*Varanus salvator*) POR LA NUTRIA DE PELAJE LISO (*Lutrogale perspicillata*) EN MALAYSIA PENINSULAR

Una nutria de pelaje liso (*Lutrogale perpicillata*) fue observada y fotografiada atacando y matando un varano acuático (*Varanus salvator*) en un pequeño estanque del Instituto de Investigaciones Forestales, Malaysia, Kuala Lumpur. Esta es la primera vez que una interacción de este tipo entre las dos especies ha sido registrada y las posibles exploicaciones sobre este comportamiento son discutidas.

S H O R T N O T E

CONSUMPTIVE USES OF AND LORE PERTAINING TO SPOTTED-NECKED OTTERS IN EAST AFRICA – A PRELIMINARY REPORT FROM THE LAKE VICTORIA AREA OF KENYA, TANZANIA, AND UGANDA

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Abstract: We compiled information about uses and lore pertaining to spotted-necked otters (*Lutra maculicollis*) inhabiting portions of Lake Victoria. The information was derived from discussions conducted during 2005-2009 with 100 residents living in communities adjacent to Lake Victoria in Kenya, Uganda, and Tanzania. Our information is entirely anecdotal, but residents indicated that parts of otters are eaten or worn to enhance virility, and also killed for food. We do not know the extent that otters are being killed for these purposes and further investigation is needed on the potential impact on populations.

Over five years (2005-2009), we accumulated anecdotal information about traditional medicinal and consumptive uses of the spotted-necked otters (*Lutra maculicollis*) and mythology involving the species based on conversations with 100 residents (95 were males) living near Lake Victoria in portions of Kenya (60 residents; Kisumu area), Tanzania (30 residents; Rubondo Island National Park area, surrounding islands, and Mwanza area), and Uganda (10 residents; Entebbe area) (Figure 1). The intent of our report is to provide insight about the role of otters in some East African cultures and review potential impacts that anthropogenic use and attitudes may have on their populations. This preliminary information is presented as background for future more formal studies focused on otter-human interactions.

Figure 1. Google Earth Map® satellite photo showing the location of interviews conducted between 2005 and 2009. Kenyan interviews incorporated the Dunga Beach area of Kisumu. Tanzanian interviews incorporated the Mwanza shoreline, Rubondo Island National Park and surrounding communities including nearby islands, and the shoreline communities of Nkome and Mganza to the south and east of Rubondo. Ugandan interviews refer to beliefs held by some people in the shoreline areas of Entebbe, Ngamba Island and Sesse Islands located off the Entebbe area, and other islands scattered along the northern shore of Lake Victoria.

Traditional Medicinal Value of Otter

Otters were reported to be consumed, or portions of their skin worn, predominantly by men, to enhance virility. Knowledge of using the otter to enhance male-sexual prowess was mentioned by at least some of the residents from each of the communities where discussions took place. Overall, about 40 people reported being familiar with medicinal use of the otter to enhance virility; most of these were fishermen or otherwise those with jobs closely associated with Lake Victoria.

The presumed "sexual powers" of otters are thought to manifest themselves in various ways, ranging from general enhancement of a male's sexual performance to making men become extremely attractive to women. The male is thought to be endowed with these benefits by eating the flesh (dried or cooked), drinking boiled blood, or wearing the skin of an otter.

A medicine man from Kisumu, Kenya told us otters are used in two ways. One of the methods consisted of consuming a "small" amount (he emphasized only a few bites) of otter flesh, and the other entailed wearing a small piece of pelt (described as a section about 2.5 x 2 cm) as a talisman. The talisman is attached to a string and then worn around the waist, next to the skin, as a belt. Both of these methods are described as endowing men with "super-human" sexual ability, making them highly attractive to women. The talisman is attributed with long-lasting "power". The medicine man also indicated that eating too much of an otter will cause a man to develop chronic erectile problems that can become a health issue. This practitioner indicated that an otter carcass used to enhance virility will last him a long time (typically 1-2 years when used appropriately) because only a small amount is necessary to derive the supposed sexual benefits. However, we also heard stories of another medicine man (Muganza, Tanzania) obtaining one otter for each client. In this case, he would first have the client drink a soup made from the otter's boiled blood. The meat is eaten 3 days later and the man is then provided with female companionship. We did not discern estimates of the specific duration for which a client derived enhanced sexual prowess following consumption of an otter. However, the sexual "power" derived from a talisman is considered to be permanent, can be transferred among users, and is therefore considered highly valuable and is closely guarded by the owner.

Consumption of otters as food

Historically, customs of some tribes living along Lake Victoria were reported to include a taboo against consuming otters in all assessed areas. We were unable to discern the basis of these taboos, but were told that in some cases there has been a lessening of this prohibition, leading to intentional hunting of otters for food and a willingness to consume otters accidentally drowned in fishing nets (i.e., gill nets). Also, other tribes living along Lake Victoria apparently have traditionally killed and eaten otters. Methods mentioned for hunting otters include the use of dogs, clubbing, catching in bags, and drugging with an alcoholic banana-based mash. The following summarizes descriptions provided by some residents about the processes involved for catching otters in bags and drugging them.

- **Bag catching** – This method of catching otters was reported to be performed by fishermen from the Aluru tribe (the correct spelling of the tribal name was unknown) that inhabit small islands in the northern portion of Lake Victoria (Uganda) and portions of Kenyan lake waters. These fishermen tell tales of being able to sneak up on sleeping otters and trap them in bags. Members of the tribe were said to eat the otter meat, which they consider to have a sweet taste, and use the skins to make bracelets, belts, and many other items of personal use. Fishermen from this tribe spend the majority of their time on the lake and are considered wildlife experts by residents of other tribes in nearby communities.
- **Alcoholic banana-based mash** – We heard of this practice from several Tanzanian residents living in the Rubondo Island National Park area. Fishermen are reported to spread the banana-based mash (the residual of locally brewed alcoholic beverages) on rocks along Lake Victoria for consumption by otters. The mash, referred to by some as *machicha ya pombe* in Kiswahili, is supposedly readily eaten by otters and, because it contains alcohol, causes them to become intoxicated. After becoming intoxicated otters were reported to be easily clubbed or caught in a net while in the water.

East African Otter Lore

During our conversations with residents we learned of various interesting beliefs regarding otters. For example, otters are perceived as being very sexual and three widespread beliefs are that they will: 1) rape both men and women, 2) "make love" to rocks, and 3) they will "make love" to almost anything. We suspect some of the sexual prowess attributed to otters relates to their tendency to rub the ventral surface of their body against the substrate while grooming (most visible when the rubbing takes place on rocks in or near the water), a motion that could be perceived as an attempt to copulate. Some fishermen from Uganda are reported to believe that otters eat the eyes from fish caught in their nets.

Human Uses of Otters - Potential Impact on Lake Victoria Populations

The anecdotal information we present provides little insight on the impact human consumption has on otters inhabiting Lake Victoria. The discriminate use of otters, such as that indicated by the medicine man in Kisumu would not seem to negatively impact on their populations. In fact, he emphasized the importance of using otters in a sustainable way. However, the use reported by Muganza's medicine man, which requires one otter per person treated could be more problematic. We do not know the extent of this more intensive use of otters but, if widespread, this practice could potentially have an adverse impact on their populations. Similarly, we don't know the frequency at which otters are inadvertently caught in fishing nets or killed intentionally for food. Nonetheless, otters in Lake Victoria clearly are being killed by humans for various reasons and research is needed to better delineate the type and extent of human-induced mortality.

RÉSUMÉ

UTILISATIONS ET TRADITIONS DE CONSOMMATION DE LA LOUTRE À COU TÂCHETÉ EN AFRIQUE DE L'EST – RAPPORT PRELIMINAIRE SUR LE LAC VICTORIA AU KENYA, TANZANIE ET OUGANDA

Nous avons compilé les informations relatives aux utilisations et aux traditions autour de la Loutre à cou tâcheté (*Lutra maculicollis*) fréquentant des zones du Lac Victoria. Les données proviennent de discussions menées entre 2005 et 2009 avec 100 résidents vivant dans les communautés adjacentes au Lac à la fois au Kenya, en Ouganda et en Tanzanie. Nos résultats sont totalement anecdotiques néanmoins, nos informateurs nous ont indiqué que des parties de loutres sont consommées ou portées pour améliorer la virilité mais elles sont aussi tuées pour l'alimentation. Nous ne savons pas dans quelles mesures les loutres sont tuées à ces fins c'est pourquoi une enquête plus approfondie serait nécessaire pour établir son impact potentiel sur les populations.

RESUMEN

USOS Y CONOCIMIENTO TRADICIONAL DERIVADO DE LA NUTRIA DE CUELLO MANCHADO EN AFRICA DEL ESTE – REPORTE PRELIMINAR DEL AREA DEL LAGO VICTORIA EN KENYA, TANZANIA Y UGANDA.

Hemos compilado información hacerca de los usos y el conocimiento tradicional derivado de la nutria de cuello manchado (*Lutra maculicollis*) que habita en algunas porciones del Lago Victoria. La información fue basada en discusiones conducidas durante el período comprendido entre 2005 y 2009 con aproximadamente 100 residentes que habitan las comunidades adyacentes al Lago Victoria en Kenya, Uganda y Tanzania. Nuestra información es completamente anecdótica, pero los residentes indicaron el uso de alguans porciones de la nutria como afrodisíaco así como alimento. No conocemos la extensión en que las nutrias están siendo sacrificadas para tales fines e investigación adicional es necesaria para elucidar el impacto de estas actividades sobre las poblaciones de nutrias en el área.

S H O R T N O T E

OTTER CONSERVATION IN PAKISTAN

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Abstract: This note describes the conservation status and threats of the two otter species described in Pakistan; Smooth coated otter (*Lutrogale perspicillata sindica*) and the Eurasian or common otter (*Lutra lutra*). It also briefly describes the actors involved as well as the efforts made for its conservation.

Pakistan being located at western ends of Indian subcontinent and having various habitat types, hosts a mixture of Palaearctic, Oriental and Ethiopian fauna. Its vertebrate fauna is comprised of more than 1200 species with 120 (10%) endemic species. It is a unique feature that shows the zoogeographical importance of the country. Mammalian fauna of the country includes 188 species and sub-species representing 10 orders (Insectivora, Chiroptera, Primates, Pholidota, Carnivora, Perrisodactyla, Artiodactyla, Lagomorpha, Rodentia and Cetacea).

Otter Species in Pakistan

Two otter species exist in Pakistan: the Smooth coated otter (*Lutrogale perspicillata sindica*) (Figure 1) and the Eurasian or common otter (*Lutra lutra*). The Eurasian otter occurs in the northern mountainous region while the Smooth coated otter occurs in the Sindh, Punjab and North West Frontier Province (NWFP) of Pakistan (Roberts, 1997; Khan et al., 2009). A few reports of hunters also show the existence of the Smooth coated otter in Balochistan (pers. comm.; Mr. Faiz Mohammad, a local conservationist). The sub-species found along the Indus River has been referred as the "Sindh otter" (*Lutrogale perspicillata sindica*) by Pocock (1940).

Conservation Status of Otters in Pakistan

Wildlife conservation movement started in Pakistan during the early 1970's following the release of a report on the World Wildlife Fund (WWF) expedition to Pakistan (1967) and a report from the Wildlife Enquiry Committee (1971) under the Ministry of Agriculture and Works, Government of Pakistan. But since then only a few practical efforts have been made by wildlife biologists and ecologists to study or update the existing knowledge about mammals in the country. In 1997, Roberts described 188 mammalian species and provided their conservation status in Pakistan,

which listed both otter species as being Rare. However, according to a more recent assessment (Sheikh and Molur, 2005) both of the species have been assessed as Near Threatened in Pakistan. Both of the species are protected under Provincial Wildlife Acts being included in 3rd Schedule meaning that cannot be hunted under any circumstance.

Figure 1. Male Smooth coated otter (*Lutrogale perspicillata sindica*) at Haleji Lake in the Thatta district, Sindh, Pakistan @ WWF Pakistan

Threats to Otters in Pakistan

A major damage caused to otter populations worldwide is from illegal trade of their skins and body parts (IOSF, 2008). Similar is the case with Pakistan where both the species are hunted ruthlessly due to the demand for their fur that has decreased otter populations considerably. Other potential threats to otters in Pakistan include; habitat degradation, water pollution, weak enforcement of wildlife laws, increased tourists' activities in otter habitats, human-otter conflict upon common fish resources (i.e. food competition among human and otters) and the misconception of its use in medicinal recipes (Khan et al., 2009). Above all is the lack of awareness about importance and ecological role of the species even among the educated people.

Conservation Measures for Otters in Pakistan

WWF Pakistan took the leading role in otter conservation in Pakistan and launched an informal otter awareness and conservation campaign in 2008. Subsequently, several conservationists from different governmental and non-governmental organizations have come forward to become practically involved in otter conservation.

Role of WWF Pakistan

Indus for All Program and *Pakistan Wetlands Program* (PWP) are two major programs of WWF Pakistan with the former concerned with the conservation of the Indus Eco-region while the later concerns itself with the conservation of more than 200 wetlands throughout the country.

Indus for All Program, as a component of its conservation activities, has been focusing on three threatened wildlife species; the Marsh crocodile (*Crocodilus palurus*), the Hog deer (*Axis porcinus*) and the Smooth coated otter (*Lutrogale perspicillata*) as the species of special concern from the Indus eco-region. It intends to conserve these species through habitat restoration, relocation, and management with the help of local communities. In this context, *Indus for All Program* has also funded a 2-year project for the conservation and management of Smooth coated otters in Indus Eco-region to the Sindh Wildlife Department (SWD). Under one of the project activities, the population of Smooth coated otter has been estimated to 161 individual recently (Khan and Qasim, 2010) in Indus Eco-region.

PWP has launched distributional studies in NWFP for the Eurasian otter and in the Punjab province for the Smooth coated otter with the intention to expand these studies up to Gilgit-Baltistan in northern Pakistan. PWP has also designed a poster showing paintings and brief write ups about the otter species found in Pakistan. Facilitating three conservationists from Pakistan to attend the Otter Training Workshop in Cambodia during February 2009 is another valuable contribution of the PWP towards otter conservation.

Role of Sindh Wildlife Department

SWD is playing a leading role in otter conservation in Sindh Province with its most important initiative towards otter conservation being the establishment of a Conservation Breeding Center at Haleji Lake in the Thatta district which is not yet fully functional but currently serves as an Information Center for students, researchers and general public. SWD is also planning the establishment of Wildlife Sanctuary for otters in the Sanghar district this year, which will be the first ever otter sanctuary in Pakistan.

Conclusion

As a result of the otter conservation campaign in recent years, three students in three different universities in the country are now doing their PhD and Ms. phil. research on otters. More than five research and popular articles about otters have been published recently in Pakistan and a similar number of articles are presently being prepared. It is hoped that these initiatives about otters will lead other conservationists towards other threatened wildlife species in the country as well.

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RÉSUMÉ

CONSERVATION DE LA LOUTRE AU PAKISTAN

Deux espèces de loutres subsistent au Pakistan, la Loutre à pelage lisse (*Lutrogale perspicillata sindica*) et la Loutre d'Europe (*Lutra lutra*). Rares et protégées, les menaces pesant sur elles sont celles communément répandues à travers le monde: chasse illégale pour la fourrure et la pharmacopée, destruction des habitats, compétition avec l'Homme sur la pêche et un manque d'éducation sur leur rôle et leur importance écologique fait défaut. Le WWF a lancé une campagne d'information en 2008 suivi d'un programme de conservation de Loutre à pelage lisse dans la région de l'Indus où 161 individus semblent subsister. Aujourd'hui, divers organismes régionaux s'investissent progressivement dans la conservation *ex situ* et *in situ* de ces espèces et des étudiants en font leurs sujets d'études.

RESUMEN

CONSERVACION DE LA NUTRIA EN PAKISTAN

Esta nota describe el estatus de conservación y las amenazas que se posan sobre las dos especies de nutria en Pakistan: la nutira lisa (*Lutrogale perspicillata sindica*) y la nutria común o Euroasiática (*Lutra lutra*). Adicionalmente describe las entidades relacionadas y los efuerzos realizados para su conservación en el país.

اردو (Urdu)

پاکستان میں پائی جانے والی فقاریہ جانوروں کی بارہ سوانواع میں سے ایک سو اٹھاسی انواع دودھ دینے والے جانوروں کی ہیں۔دوانواع کے لدھڑ؛ہموار چمڑی لدھڑ اور یوریشیائی لدھڑ بھی پائے جاتے ہیں۔ہموار چمڑی لدھڑ صوبہ سندھ، پنجاب اور سرحد کے میدانی اور دریائی علاقوں میں جبکہ یوریشیائی لدھڑ شمال کے اونچے پہاڑی سلسلوں میں پائے جاتے ہیں۔ماہرینِ حیوانیات دونوں انواع کو کمیاب اور خطرے سے دوچار قرار دے چکے ہیں۔پاکستان میں صوبائی محکمہ جات برائے تحفظِ جنگلی حیات کے تحت دونوں انواع کو قانونی تحفظ حاصل ہے اور ان کا شکار کسی بھی حالت میں ممنوع ہے۔پاکستان میں لدھڑ کی دونوں انواع کو لاحق خطرات میں کھال کے حصول کیلئے شکار، آبی ذخائر کی آلودگی، لدھڑ کے مساکن کی تباہی، قانون کی بالادستی نہ ہونا اور لوگوں میں شعور اور آگہی کا فقدان شامل ہیں۔پاکستان میں ڈبلیوڈبلیوایف نے دو جامع منصوبے شروع کر رکھے ہیں ان میں ایک انڈس فار آل پروگرام اور دوسرا آبگاہوں کے تحفظ کا منصوبہ پی ڈبلیو پی ہے۔انڈس فار آل منصوبہ کے تحت ایک سروے کے مطابق ۲۰۰۹ء میں صوبہ سندھ میں لدھڑ کی آبادی ایک سو اکسٹھ شمار کی گئی۔ڈبلیوڈبلیوایف پاکستان کے ان منصوبوں کے تحت لدھڑ پر تحقیقی کام کو سارے ملک میں پھیلایا جارہا ہے۔صوبہ سندھ کے محکمہ تحفظ جنگلی حیات نے ٹھٹہ ضلع کی مشہور ہالیجی جھیل کے ساتھ لدھڑ کی افزائشِ نسل کے منصوبے کا آغاز کیا ہے جبکہ ضلع سانگھڑ میں لدھڑ سینکچری کے قیام کا ارادہ رکھتا ہے۔لدھڑ کے تحفظ کی ان کوششوں کے پیشِ نظر مختلف تعلیمی اداروں میں لدھڑ پر تحقیق کا رجحان بڑھ رہا ہے اور یہ امید کی جاتی ہے کے لوگوں میں خطرات سے دوچار دوسری انواع پر بھی کام کرنے کا شوق اور جذبہ بڑھے گا۔

S H O R T N O T E

OBSERVATIONS ON THE CLIMBING HABITS OF NEOTROPICAL OTTER *LONTRA LONGICAUDIS*

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Abstract: An individual of *Lontra longicaudis* was observed climbing a tree trunk till the height of ca. eight meters (trunk inclination=84.29º) about 50m away from the water in a southeastern Brazilian Atlantic Forest fragment. This behavior occurred after an interaction with the observer and may be related to defensive tactics in areas more distant from water bodies.

Keywords: arboreal stratum, Atlantic Forest, defensive behavior, neotropical otter.

The neotropical river otter *Lontra longicaudis* is a carnivore species adapted to semi-aquatic habits, which can be evidenced by its morphological characters such as dorsal-ventrally flattened tail and the presence of interdigital membranes (Emmons and Feer, 1997; Cheida et al., 2007; Carvalho-Júnior, 2007). However, other authors have described the utilization of arboreal structures in activities related to scent marking with feces and anal secretions (Spinola and Vaughan, 1995; Quadros and Monteiro-Filho, 2002; Kasper et al., 2004; 2008), besides the record of utilization of a hollowed treetop to shelter young in a flooded Amazonian forest (Santos et al., 2007). The present work reports the climbing behavior of *Lontra longicaudis* observed in an Atlantic Forest fragment in southeastern Brazil.

The Private Reserve of Nature Heritage (RPPN) Usina Maurício is located at the boundary of Leopoldina and Itamarati de Minas municipalities, Paraíba do Sul river basin, Minas Gerais State (Zona da Mata region), between the coordinates 21º27'50"S - 42º50'52"W and 21º29'10"S - 42º49'24"W (Figure 1). The RPPN hosts a system of pools and reservoirs, with rocky banks and riverbeds. The vegetation is composed of the Seasonal Semidecidual Tropical Forest. On 30 June 2009 at 08h15min an

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individual of *L. longicaudis* (indeterminate sex) was observed (FAS) climbing a tree trunk of *Soroceae blonplandii* (Baill.) Burger, Lanjouw & Boer (Moraceae) (total height=14m; diameter at breast height=20cm; altitude=226m; 21°28'15.2"S, 42°49'56.5"W) until the height of approximately eight meters (Figure 2). The trunk presented the inclination of 84.29º and the distance from water (a pool) was approximately 50m. After climbing, the individual stayed about eight minutes moving over the branches, vocalizing and watching the observer. Climbing down was performed head first until a lower segment of the trunk, from where the individual jumped to the ground. Back to the ground, the individual entered further the dense vegetation, moving even more away from the pool system.

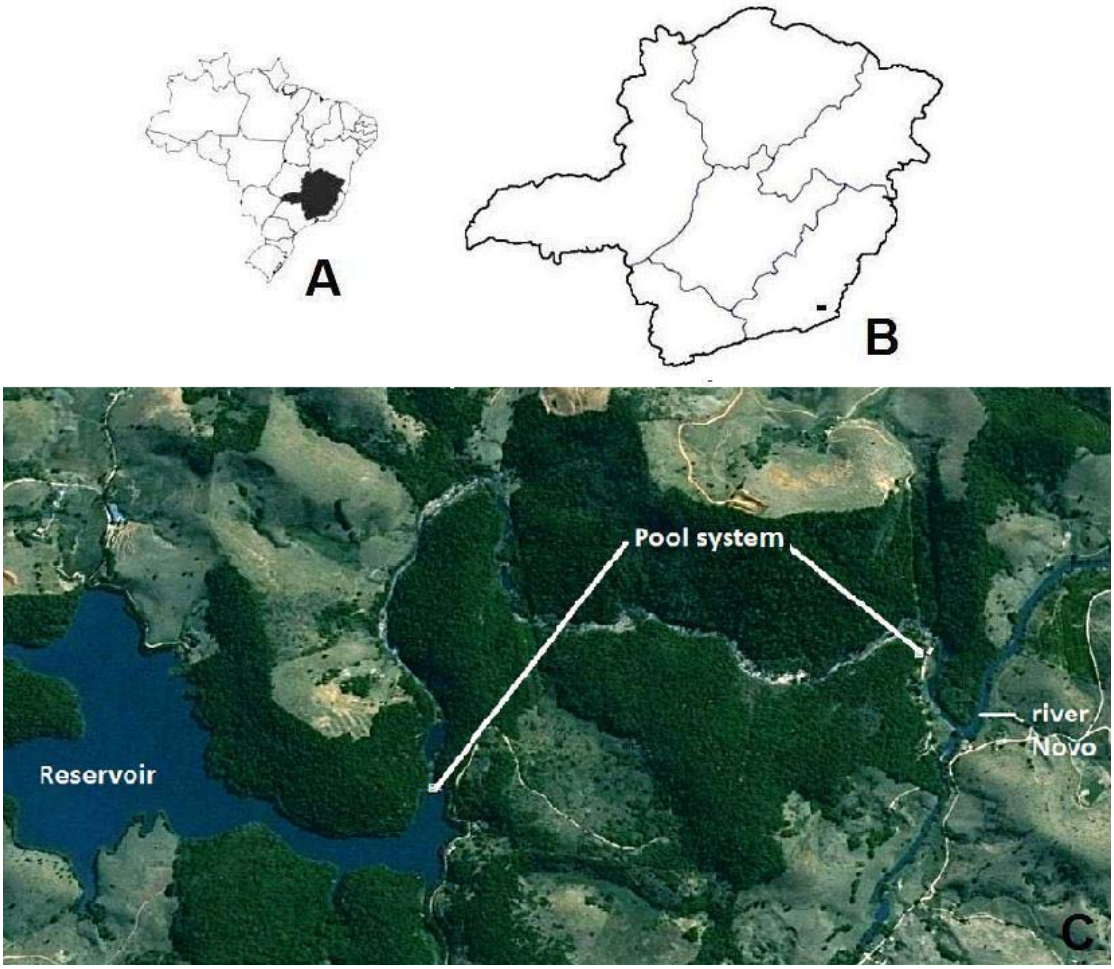

Figure 1. A) Location of Minas Gerais State (A), RPPN Usina Maurício (B) and Atlantic Forest fragment where the climbing behavior of an individual of *Lontra longicaudis* was observed (C).

It is important to note that the individual climbed the trunk soon after the approach of the observer. Therefore, this action could be related to an escape behavior after threat identification, being possible that *L. longicaudis* utilizes the arboreal stratum for refugee during dangerous situations in areas more distant from the water bodies. In these cases, climbing trees could represent a more efficient method of escape if compared to ground displacement through the dense submontane vegetation. The neotropical river otter have few natural predators, including anacondas (*Eunectes*), caimans (*Caiman*) and jaguars (*Panthera onca*) (Larivière, 1999). Therefore, utilization of higher arboreal stratum could also be related to observation and perception of environment around. On the other hand, arboreal stratum provides

food resources (e.g. reptiles, nesting birds) which could be exploited by *L. longicaudis.*

Figure 2. A) Site where the climbing behavior of an individual of *Lontra longicaudis* was observed in an Atlantic Forest fragment in Private Reserve of Nature Patrimony (RPPN) Usina Maurício, Minas Gerais State, and southeastern Brazil. The circle points to the segment of the trunk corresponding to the maximum height reached by the individual. **B)** Detail of trunk segment pointed in (A). Photo: Fabiano Aguiar da Silva.

Considering factors such as the height achieved by the individual, the high inclination degree of the tree trunk and its small diameter, it is reasonable to assume

that *L. longicaudis* possesses natural climbing abilities, and the behavior reported here may occur frequently in nature. However, since the Neotropical river otter is rarely observed in its natural environments (Carvalho-Júnior, 2007), this behavioral aspect remained unknown till the present record. It is worth noting that encounters with *L. longicaudis* at greater distances from water bodies are even rarer and the behavior reported in the present study probably was triggered by an interaction with the observer.

Information on use of arboreal structures by *L. longicaudis* is scarce. Santos et al. (2007) reported the encounter of a cub at a natural tree cavity located in a height of 1.20m from the water surface in a seasonally flooded Amazonian forest. Kasper et al. (2004) found scent marks in fallen trunks close to the edge or projected to the river bed in southern Brazil. Fallen trunks also represented 49.2% of the sprainting sites found by Spinola and Vaughan (1995) in Costa Rica. Moreover, there are no available data concerning climbing habits of the neotropical river otter based on field observations. Thus, the present record contributes to the knowledge on behavior and climbing ability of *L. longicaudis*.

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RÉSUMÉ

DES OBSERVATIONS SUR LES HABITUDES GRIMPEUSES DE LA LOUTRE NEOTROPICAL *Lontra longicaudis*

Un individu de *Lontra longicaudis* a été remarqué grimpand le tronc d'une arbre jusqu'à la hauteur d'environ huit mètres (inclination du tronc = 84.29º), vers 50m de l'eau dans une partie de la Mata Atlântica au sud-est du Brésil. Ce comportement, s'est-il passé, après l'interaction avec l'observateur et peut être en relation à des tactiques défensives dans les aires les plus éloignées des corps d'eau.

RESUMEN

OBSERVACIONES SOBRE EL COMPORTAMIENTO ESCANSORIAL DE LA NUTRIA NEOTROPICAL *Lontra longicaudis*

Un indivíduo de nutria neotropical *Lontra longicaudis* fue visto ascender un tronco de árbol hasta una altura de cerca de ocho metros (inclinación del tronco = 84.29°), a una distancia de aproximadamente 50m del agua en un fragmento de Mata Atlántica en sudeste de Brasil. Este comportamiento se produjo tras una interacción con el observador y puede estar relacionado a tácticas defensivas em áreas más lejanas a los cuerpos de água.

RESUMO

OBSERVAÇÕES SOBRE O COMPORTAMENTO ESCANSORIAL DA LONTRA NEOTROPICAL *Lontra longicaudis*

Um indivíduo de *Lontra longicaudis* foi observado escalando um tronco de arvore até a altura aproximada de oito metros (inclinação do tronco=84.29º), a uma distância de cerca de 50m da água em um fragmento de Mata Atlântica no sudeste do Brasil. Este comportamento ocorreu após uma interação com o observador e pode estar relacionado a táticas defensivas em áreas mais distantes dos corpos d'água.

R E P O R T

NOTE ON HAIR-SAMPLING DEVICES FOR EURASIAN OTTERS

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ABSTRACT: Devices to collect hairs from Eurasian otters were tested in captivity. Two designs of hair traps (a wooden box and a set of 7 sticks stuck into the ground) were set in an enclosure and each was tested with two different materials to capture hairs: double-sided adhesive tape and the hook side of velcro brand fastener. Three types of lures were used to entice the otters into the box: food, foreign spraints and cod liver oil. All the hair trap configurations tested were successful in capturing hairs, and up to 52 hairs/24 hours were found glued on the adhesive tape that was fastened to the lid of the box. The set of sticks with velcro strips was the less effective device with only 5 hairs captured in 4 days.

KEY WORDS: hair trap, hair catcher, hair snagging

INTRODUCTION

Hair traps are used to collect hairs from wild animals for species identification using hair structure, DNA-based analysis or toxicology studies (e.g. Baker et al., 2003; Foran et al., 1997; Woods et al., 1999). Hair sampling devices have the advantages of being non-invasive and do not need to be visited routinely as necessary for traps. Various designs using different materials to snag hairs (glue, tape, wire, brushes etc.) have been presented and used in previous studies (e.g. Suckling, 1978; Baker, 1980; Major, 1991; Pasitschniak-Arts and Messier, 1995; Mowat and Strobeck, 2000; Mills et al., 2002; Mowat and Paetkau, 2002). The animals are generally attracted to the trap using lures, for example food or odorous substances like faeces, urine or beaver castoreum (e.g. Nelson, 1979; Mc Daniel et al., 2000).

Only few researchers have tried to capture hairs from otters using hair traps (Busserolles and Mercier, 2004; Depue and Ben-David, 2007). The semi-aquatic way of life of these species makes such experiments particularly difficult. In this study, the efficiency of four hair trap configurations (two designs, each with two different

materials to capture hairs) was tested on Eurasian otters, *Lutra lutra* (Linnaeus, 1758) in captivity.

MATERIALS AND METHODS

The hair traps were tested during summer in an exhibit enclosure with 3 adult males at the Otter-Centre (OTTER-ZENTRUM) in Hankensbüttel (Germany).

The first hair-sampling device tested was a wooden box (20x20x100 cm; Figure 1). The box had one entrance (20x20 cm) on the side (in previous trials with a box opened at both ends, forming a sort of tube, the otters used to put their head into the box but did not go through it). The material to capture hairs was attached to a removable board (60x15 cm) that was fastened to the lid of the box (74 cm). In one configuration double-sided adhesive tape was used and in the other one the material to capture hairs was the hook side of velcro brand fastener. A wooden block (6x8 cm) was screwed on the bottom of the box, in order to make the otters arch their back and brush against the adhesive tape/velcro when reaching the back of the box (previous trials without the wooden block had shown that the otters went into the box but did not touch the sticky surface with their back).

Figure 1. Wooden box with double sided adhesive tape on a removable board

Testing of the box with adhesive tape was conducted during 6 days. The otters were attracted to the trap using three different lures, each during 48 hours: 1. food (chicks), 2. spraints from two males living in other enclosures, 3. cod liver oil. The box was checked and the board replaced by a new one daily (food was renewed in trial 1). The box with velcro strips fastened on the removable board was tested during 24 hours, baited with chicks.

In another trial, 7 wooden sticks were set along the trail between one of the sleeping boxes and the water (Figure 2). The sticks were from 15 to 25 cm high

(distance above the ground). The distance between the sticks was from 20 to 40 cm, and the distance between the first and the last stick was 110 cm. In one configuration double-sided adhesive tape was wrapped around the stick. A modification of the trap was to fasten velcro strips to the sticks (Figure 3). These hair catchers were controlled after 4 days and then again a week later.

Figure 2. Sticks with adhesive tape

Figure 3. Stick with a velcro strip

RESULTS

All the hair trap configurations were successful in collecting hairs, mainly guard (primary) hairs. Up to 52 guard hairs/24 h could be collected using the wooden box with adhesive tape (Figure 4). Table 1 shows the number of guard hairs collected with the different lures. The hairs could be removed easily with forceps. The box with velcro strips enabled us to catch 22 guard hairs per 24 hours.

Table 1. Number of guard hairs collected with adhesive tape fastened to the lid of the wooden box for each lure

	Food	**Spraints**	**Cod liver oil**
Day 1	52	24	8
Day 2	44	0	0

The sticky sticks enabled us to collect 50 guard hairs (on 3 sticks) in 4 days (Figure 5). One week later, only two more guard hairs were glued on one of the sticks. The tape had lost almost all its adhesion. Only 5 guard hairs (all on one stick) could be collected by the velcro strips (all during the first 4 days). The sticks were quite dirty and marked with spraints at the end of the trial, showing that the otters visited the trap but had not left many hairs.

Figure 4. Otter approaching the box

Figure 5. Sticky stick with captured hairs

DISCUSSION AND CONCLUSION

In previous studies, Busserolles and Mercier (2004) could collect hairs from *Lutra lutra* in captivity using pieces of coco doormats set along trails or rolling places. Depue and Ben-David (2007) captured hairs from *Lontra canadensis* in the wild with 2 traps, a modified body-snare and a modified foot-hold trap, set on river banks, along the coast of otter latrine sites, crossover points and trails.

The hair sampling devices tested in this study appeared to be effective in captivity. The hair-collecting box seems to be the easiest way to capture hairs because otters brush against the material to capture hairs (adhesive tape/velcro) each time they enter the box and again when they step back to leave the box. However, it is difficult to predict the efficacy of this device in the wild because it may be much more complicated to entice wild otters into the box. Food may not be an effective lure for otters in the wild and anyway the food would have to be enclosed within a wire mesh chamber or similar device, in order not to be eaten by the first "visitor" that would probably not be an otter. Only few hairs could be collected with cod liver oil, which means that this bait induced few visits by the otters living in the enclosure (maybe only one visit). Better results were obtained with spraints. Spraints are particularly interesting lures because they appear to be effective in attracting foreign otters (Rosoux pers. comm. in Libois et al. 1990; Kellermann 1998, this study), they decompose slowly and are normally not eaten or stolen. Traditional lures used by hunters like valerian and camphor are ineffective in attracting otters (Kellermann, 1998). Depue and Ben-David (2007) did use a commercial otter lure at latrine sites but did not specify if this increased the efficacy of their traps.

The sticks with double-sided adhesive tape also showed good capture efficiency and may be less repellent than the box for a wild otter. They could be set along trails or at sprainting sites. Further trials in captivity and in the wild may be useful to find out the optimum number and disposition of the sticks. The system could be improved by the use of lures (for example foreign spraints). The sticks with velcro strips did not show satisfactory results with only 5 guard hairs captured in 4 days. It would be worth to do further trials with some modifications (for example the velcro strips could be wrapped around the sticks).

Generally, the double-sided adhesive tape appeared to be a better material to capture hairs than the velcro strips, especially if it is necessary to obtain the root. It is recommended to choose a tape with a strong adhesion, which stays sticky at least several days despite of humidity. Pocock and Jennings (2006) used the sticky substance Faunagoo, which lasts a lot longer than sticky tape. However, the velcro strips at the lid of the wooden box enabled us to collect 22 guard hairs within a day, which is a quite satisfying result. Velcro strips may be particularly interesting if the hairs have to be used for toxicology analyses, since in this case an interaction with chemical glue may bias the results. In regard of the fact that Eurasian otters moult gradually throughout the year (Kuhn, 2009; Kuhn et al., 2010), there is no season that is particularly advantageous for hair collection.

In conclusion, the results of the tests in captivity were satisfying, but the hair-sampling devices now have to be tested in the wild.

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RÉSUMÉ

NOTE SUR LES METHODES DE CAPTURE DE POILS DE LOUTRE D'EUROPE

Des systèmes pour prélever des poils de loutres d'Europe furent testés en captivité. Deux modèles (une caisse en bois et une série de 7 bâtons plantés dans le sol) furent placés dans un enclos et chacun fut testé avec deux types de matériaux pour collecter les poils: du ruban adhésif double face et la couche crochet d'une bande auto-agrippante velcro. Trois types d'appâts furent utilisés pour inciter les loutres à entrer dans la caisse : de la nourriture, des épreintes étrangères et de l'huile de foie de morue. Tous les pièges à poils testés furent efficaces et jusqu'à 52 poils/24 heures furent retrouvés collés sur le ruban adhésif fixé au couvercle de la caisse. La série de bâtons avec des bandes velcro fut le système le moins efficace, avec seulement 5 poils collectés en 4 jours.

RESUMEN

NOTA SOBRE LOS EQUIPOS PARA MUESTREO DE PELOS DE NUTRIA EURASIATICA

Equipos para el muestreo de pelos de nutria euroasiatica fueron provados en captividad. Dos diseños de tranpas de pelos (una caja de madera y siete estacas plantadas en el suelo) fueron dispuestos entre un cerco; cada uno fue probado con dos materiales diferentes para capturar los pelos: cinta adhesiva de doble cara y la superficie engancharte de una cinta de velcro. Se utilizaron tres tipos de señuelos para atraer las nutrias: alimento, excrementos y aceite de hígado de bacalado. Todas las trampas fueron exitosas en muestrear pelos, hasta 52 pelos / 24 horas fueron hallados en la cinta adhesiva adherida a la tapa de la caja de madera. Las estacas con velcro fueron menos efectivas con solamente 5 pelos en 4 días.

R E P O R T

ECOLOGICAL ASPECTS OF NEOTROPICAL OTTER (*LONTRA LONGICAUDIS*) IN PERI LAGOON, SOUTH BRAZIL

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Abstract: This study presents the monthly and annual diet composition and variability of an otter population living at Peri Lagoon, Santa Catarina Island, South Brazil. Food item proportion through the years and months reveals that fish and crustacean are the main food items, followed by birds and mammals. The results reveal no significant difference in the item fish and crustacean in the diet composition among years. However a difference is found through months for fish abundance in the diet and number of feces, with lowest averages for the month of April. Fish in the family Cichlidae is the main prey in the otter's diet.

Keywords: *Lontra longicaudis*, diet, distribution, population, shelters, behavior

INTRODUCTION

This study analyzes the role of Neotropical Otter *Lontra longicaudis* (Olfers, 1818) in the ecosystem of Peri Lagoon, Santa Catarina Island, South Brazil (Figure 1). The main goal is to discuss monthly and annual diet composition and variability of an otter population living in the study area. The research is based on a long-term data set organized for the years 2003-2009, although the species has been studied in the area since 1986 (Carvalho-Junior, 1990).

Lontra longicaudis is a semi-aquatic carnivorous mammal that belongs to the Mustelidae Family and Lutrinae Subfamily (Wilson and Reeder, 2005). The specie is considered critically endangered by the Convention on International Trade in Endangered Species of Wild Fauna e Flora (CITES) and U.S. Endangered Species Act

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(U.S.E.S.A). In Brazil, the Fauna Protection Law that prohibits the commerce of products made from animals protects the otter.

Although the species is poorly known, perhaps the most studied subject is diet based on spraint analysis. Feces are conspicuous and can be found on the top of rocks, along the water body, including inside shelters, as single mark deposits.

Neotropical Otter can slightly modify some of the preys in the diet, but the final composition does not change, feeding mainly on fishes and crustaceans (Quadros and Monteiro-Filho, 2001; Kasper et al., 2004; Carvalho-Junior, 2007; Carvalho-Junior et al., 2010). Mollusks, small mammals, birds and reptiles complete the diet of the species, but in smaller proportion (Alarcon and Simões-Lopes, 2004; Carvalho-Junior, 2007; Quintela et al., 2008).

Figure 1. Location of Peri Lagoon, South Brazil.

The study area is located at 27°42'S and 48°30'W, in the southeast of Santa Catarina Island, South Brazil (Figure 2). The Peri Lagoon has approximately 5 km^2 of water surface, which is maintained mainly by precipitation. Depth average is 6 meters with a maximum of 11 meters. It has a contact with the Atlantic Ocean through a narrow channel with around 4 km long but it is not affected by tides. This channel represents a vital ecological corridor for the local population as the individual use it to reach the ocean and, at least, two other important areas, Lagoinha do Leste Beach and Naufragados Beach (Carvalho-Junior, 2007).

Mountains covered by Atlantic Forest surround the west part of the lake. The east part is a dune field, responsible for isolating the fresh water lake from the ocean. Small streamlets and waterfall flows from the mountains to the lake, creating an ideal environment to the otters.

The otter shelters are formed by Guabiruba intrusive granite, a common rocky formation along the Brazilian south coast, the substrate for the Atlantic Forest. This formation results in semi closed environments, with the outside covered by typical

Atlantic Forest vegetation. Roots and humus fill the gaps between rocks.

Peri Lagoon shows a high diversity of fish species, such as *Mugil platanus* (Günther, 1880), *Centropomus parallelus* (Poey, 1860), *Eucinostomus melanopterus*, (Bleeker, 1863), *Geophagus brasiliensis* (Quoy and Gaimard, 1824), *Tilapia rendalli* (Boulenger, 1897), *Gymnogeophagus rhabdotus* (Hensel, 1870) and *Hoplias malabaricus* (Bloch, 1794) (Carvalho-Junior, 1990; Ribeiro and Marcon, 1999; Mafra et al., 2003; Zank et al., 2010). *Geophagus brasiliensis*, *Gymnogeophagus rhabdotus* and *Tilapia rendalli* are distributed along the margins of the lake. In these areas, aquatic macrophites as *Typha domingensis* Pers., *Fuirena robusta* Kunth, *Helio ccocharis geniculata* and *Nymphoides indica* (L.) O. Kuntze, are common (Carvalho-Junior, 1990).

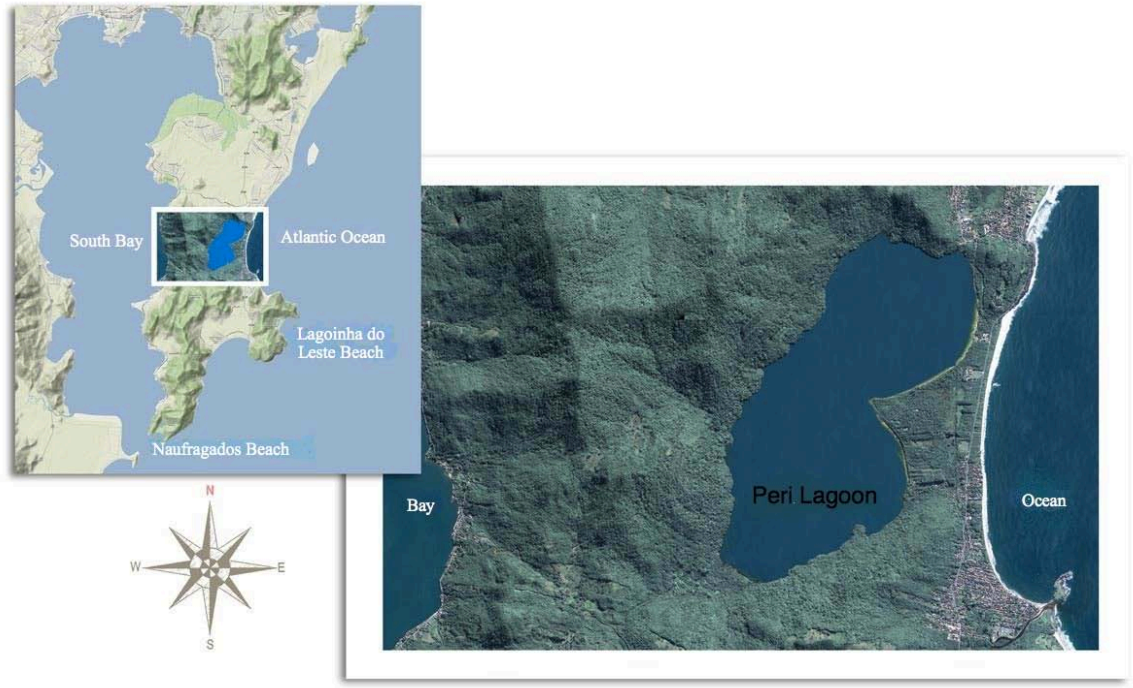

Figure 2. The study area: left - the south part of Santa Catarina Island; right - detail of Peri Lagoon (A small fishermen village can be seen on the bottom of the image).

Cichlids like *Geophagus brasiliensis*, *Gymnogeophagus rhabdotus* and *Tilapia rendalli* are easily found among this vegetation, close to the margin. Moreover, *Mugil platanus* and *Centropomus parallelus* are more often in open waters of the lake, in constant movement, forming small schools or swimming alone. *Hoplias malabaricus* is found in small numbers near the shore or in the lower part of the streamlets. A common crustacean in the Peri Lagoon is the freshwater lobsters *Macrobrachium carcinus* (Linnaeus, 1758) and *M. olfersii* (Wiegmann, 1836) (Ribeiro and Marcon, 1999). As cichlids, freshwater lobsters are also commonly seen close to the shore.

In Santa Catarina State, *Lontra longicaudis* can be found from the highlands to the coast, forests, rivers, lakes and costal islands (Quadros and Monteiro-Filho, 2001; Alarcon and Simões-Lopes, 2004; Carvalho-Junior et al., 2010). Otter conservation along the coastal region of Santa Catarina state depends on the conservation of the Atlantic Rain Forest, currently endangered by human activities. Stratification of the forest, along with the high density of epiphytes represents an important contribution to the formation of safe environments for the *Lontra longicaudis* (Carvalho-Junior et al., 2006).

The main threat for the otter is fragmentation of the environment. Fragmentation

results in a mosaic of patches with increasing threat to otter conservation as the distance between patches increases. Neotropical Otters are constantly moving from place to place and they need trustable ecological corridors to complete a safe journey (Carvalho-Junior, 2007).

A second threat is the presence of domestic dogs in the study area. Domestic dogs walk freely along the lake and channels, representing a serious threat as they can transmit diseases as well as chasing and killing wild animals, including otters (Serfass at al., 1995; Boyle, 2006; Park et al., 2007).

MATERIALS AND METHODS

Otter spraints were collected monthly, from 2003 to 2009, along the margin of the Peri Lagoon, including seven shelters (Figure 3). Coordinates for shelters were estimated using a handheld GPS unit (Garmin model GPSmap 60CSx). Margins of the lake were reached by kayaks and canoes.

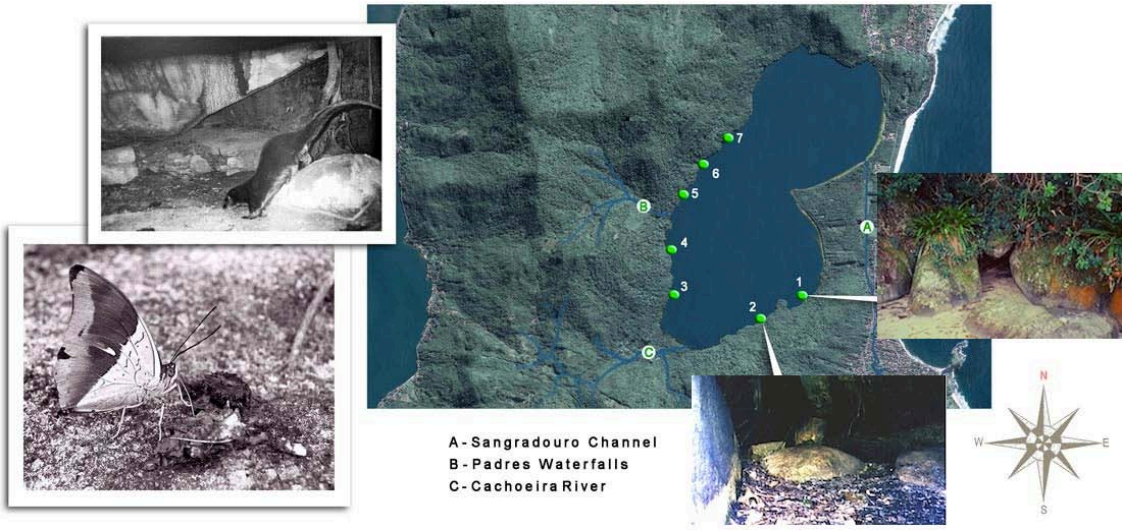

Figure 3. Distribution of the otter's shelters in the study area (green dots). Small pictures, in an anti-clockwise direction, show an otter defecating inside shelter number 2, an otter feces on the rock being tasted by a butterfly, an inside view of shelter number 2 and an outside view of shelter number 1.

Feces were collected individually, separated in plastic bags and taken to the lab. In the lab each sample was washed in a mesh and the contents were analyzed with the help of a stereomicroscope. Food items were classified in five categories: fish, mollusk, crustacean, bird and mammal. A table of scales, specific for the study area, was used to identify the fish species present in the feces.

Food item proportion was used to measure the importance of each item in otter's diet for years and months. It was calculated for each food item using the total number for the food item in relation to the total of all food items. Food item represent each species preyed by Neotropical Otter, identified in the samples. Therefore, food item is a number, for example, a total number of Cichlidae found in the samples during the study time.

Unifactorial ANOVA was applied to test the null hypotheses stating that the main food items consumed by otters and the number of feces do not vary among years and months. Bartlett's test was conducted to verify the heterogeneity of variances before each analysis and Tukey's test were applied in order to detect the source of

variations. When Tukey's test did not detect any variations between the means, Newman-Keuls and Duncan tests were used.

After testing for normality, all quantitative data were [$\log_{10}(x+1)$] transformed in order to stabilize the variances and to fit data to a normal distribution (Zar, 1999). All tests were performed using software Statistica© version 7.0 (Statsoft Inc., 1984-2004).

RESULTS

A total of 2805 food items from 2305 feces were analyzed. Number of feces per year varied from 274 to 388 (2003=274, 2004=388, 2005=372, 2006=333, 2007=325, 2008=317, 2009=296). A higher proportion of fish was found (81%). Second item in abundance was crustacean (16%), followed by bird (2%), mammal (2%) and mollusk (less than 1%) (Figure 4).

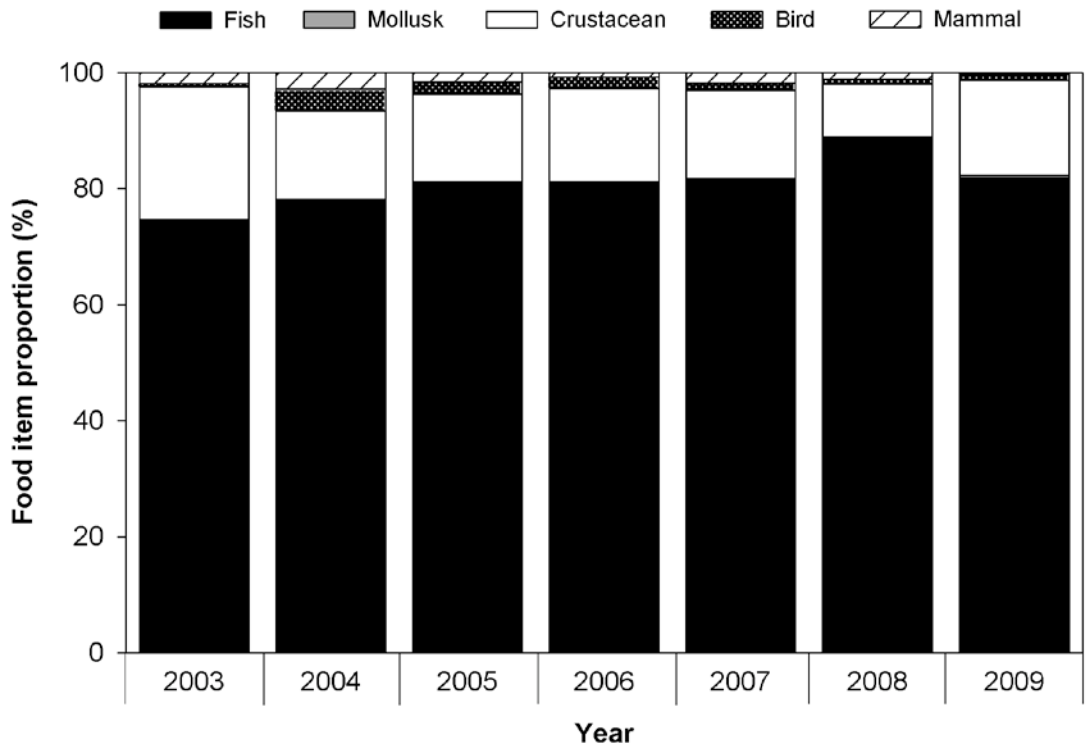

Figure 4. Food item proportion (%) of the otter's diet composition in the Peri Lagoon from 2003 to 2009.

The proportion of each food item (fish, crustacean, mollusk, bird and mammal) was analyzed by months for each year (Figure 5). It is quite clear that during the seven years, the higher proportion of the diet were fish followed by crustacean.

The scale analysis from the otter feces showed a clear preference for fishes from the Cichlidae family with 79.6% in relation to the total fishes found in the analysis (Figure 6). Mugilidae (1.1%) and Erythrinidae (0.5%) were found in smaller proportion in the diet composition.

Unifactorial ANOVA reveals no significant difference in the item fish in the diet composition among years (F=0.619; *P*=0.7141) (Figure 7A). However a difference is found among months (F=2.106; *P* =0.0305) for fish abundance in the

diet (Figure 7B). No significant differences were detected for crustaceans among years (F=1.699; *P* =0.1324) and months (F=1.231; *P* =0.2827).

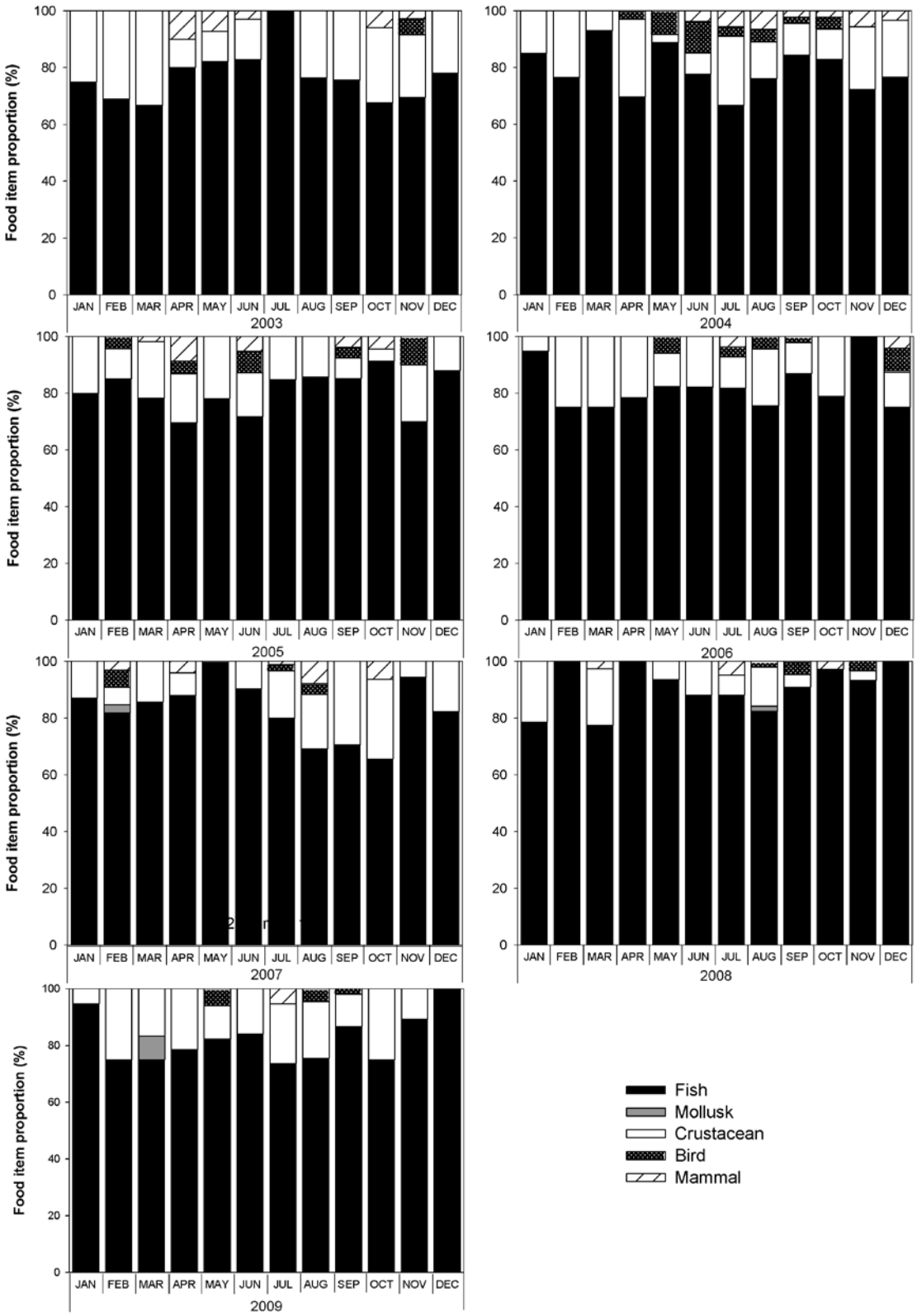

Figure 5. Food item proportion (%) by month and year found in the otter's feces in the Peri Lagoon, from 2003 to 2009.

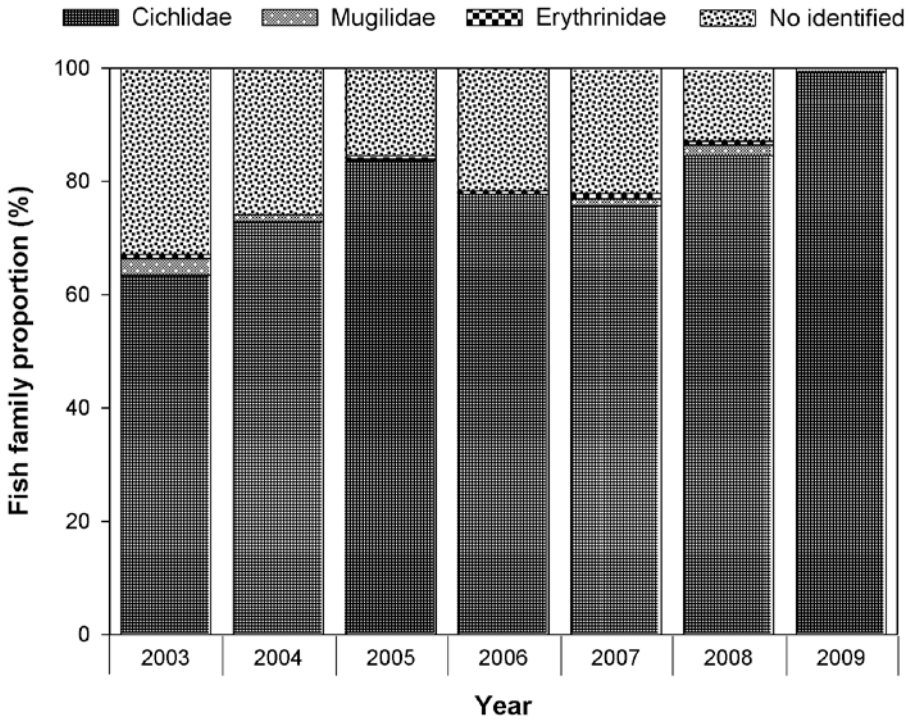

Figure 6. Fish families proportion identified on the otter's diet at Peri Lagoon.

No differences were detected for fish abundance in the diet over the years (ANOVA, Tukey and Newman-Keuls tests). However, when variability is analyzed separately for the months, April is significant different with lower fish abundance (14.9 ± 5.8) from all other months (ANOVA, Duncan's test; $P<0.05$).

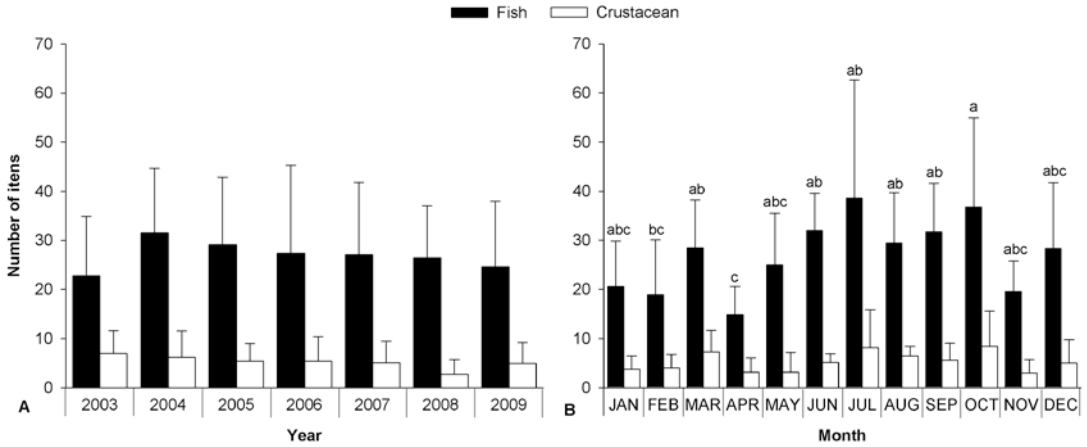

Figure 7. (A) Annual and (B) monthly variability on fish and crustacean items from otter's feces. Letters indicate significantly ($P<0.05$) different averages (ANOVA, Duncan's test)

The distribution of otter feces for years and months in the study area did not show any significant differences for number of feces between years (F=0.664, P=0.6789) (Figure 8A). However, differences in months were found (F=2.018, P=0.0388). October represents the highest average abundance of feces (July presents a large standard deviation) and April the lowest (Figure 8B).

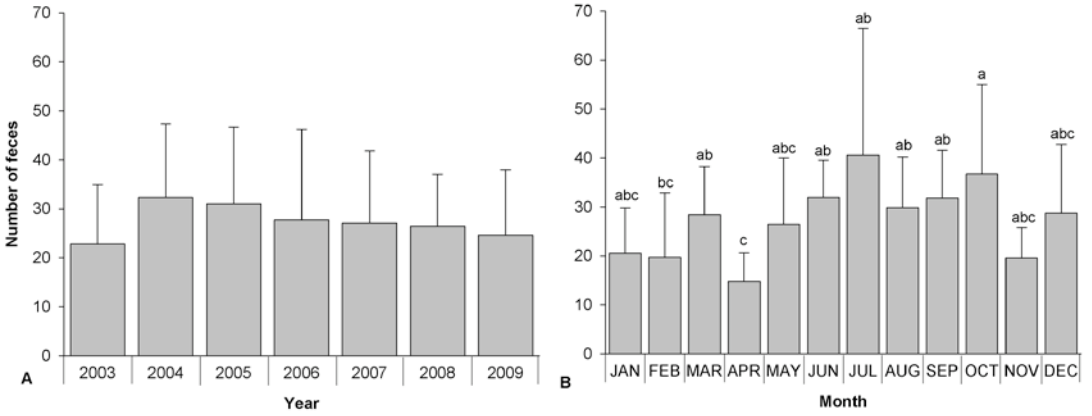

Figure 8. (A) Annual and (B) monthly variability (average ± standard deviation) for number of feces, collected in Peri Lagoon. Letters indicate significantly (ANOVA, Duncan's test, $P<0.05$)

DISCUSSION

In the study area, *Lontra longicaudis* shows a clear preference for fish and crustacean. Similar results were found in other places of South Brazil, such as rivers (Quadros and Monteiro-Filho, 2001; Kasper et al., 2004; Kasper et al., 2008) and coastal areas (Colares and Waldemarin, 2000; Alarcon and Simões-Lopes, 2004; Carvalho-Junior, 2006; Quintela et al., 2008; Carvalho-Junior et al., 2010).

A higher contribution of fish in the diet (81%) is reported for other locations in Southern Brazil, such as in Taquari Valley with 89% (Kasper et al., 2004), in the Environmental Protected Area of Anhatomirin with 87% (Alarcon and Simões-Lopes, 2004) and in a coastal stream in Rio Grande do Sul state with 83% (Quintela et al., 2008). Birds and mammals are also registered in these areas as preys with lowest contribution in the otter's diet. On the other hand mollusks was the third most important item in otter's feces collected in Conceição Lagoon (Carvalho-Junior et al., 2010), but lowest in two other coastal areas in southern Brazil (Alarcon and Simões-Lopes, 2004; Quintela et al., 2008), as in this study.

The monthly variation from 2003 to 2009 presents significant differences for the item fish, as well as number of feces. Both differences occur in April, the lowest average number of fish item and number of feces. As the main prey for otters in the study area is fish, it could be proportional to number of feces.

A similar study as the one conducted here was carried out in Conceição Lagoon (Carvalho-Junior et al., 2010). This study did not show any significant differences in diet composition and feces number, yearly nor monthly. The research in the Conceição Lagoon was from 2004 to 2008. A total of 2516 feces were collected in the Conceição Lagoon for five years while 2305 feces were collected in the Peri Lagoon for seven years.

An average of 1.2 item per feces is found in the study area. This could be related to the size of the prey. Field observations in the study area suggest that the size of Cichlidae predated by the otters normally weights from 300g to 400g. It is also observed in the field, and in captivity, that the specie normally preys one species at the time. It is rare to find two types of items in only one feces.

Among fish populations in Peri Lagoon, *Lontra longicaudis* preys mainly Cichlidae (79.6%). The preference for Cichlidae was also recorded by Quintela et al. (2008) with 72% of the fishes in the otter's diet, and by Quadros and Monteiro-Filho (2001) with 27%. In Taquari Valley, Cichlidae was the second most consumed fish by

otters (Kasper et al., 2004), and in a marine coastal area, Cichlidae was replaced by Sciaenidae as the main item in the otter's diet (Alarcon and Simões-Lopes, 2004).

Despite the low contribution from Erythrinidae in the total fish consumed by otters in Peri Lagoon, this family was an important food resource for the otters in Bolacha Arroio, Rio Grande do Sul State (Quintela et al., 2008), and may be one of the most consumed fish in the diet in Itapoá, Santa Catarina State (Quadros and Monteiro-Filho, 2001). Like in Peri Lagoon, Mugilidae was also registered in otter's diet in coastal streams in Rio Grande do Sul State (Quintela et al., 2008).

The occurrence of Cichlidae in the feces does not indicate any sign of seasonality. In Peri Lagoon, Cichlidae was the most abundant family with 51.7% of the total number of fish caught (Ribeiro and Marcon, 1999). According to the authors, *Geophagus brasiliensis* occur throughout the year and *Tilapia rendalli* was abundant mostly in autumn and winter months. In a recent study conducted in spring, *Gymnogeophagus rhabdotus* was also found in the lake (Zank et al., 2010). Among eurihalines fishes, *Mugil platanus*, *Centropomus parallelus* and *Eucinostomus melanopterus* (Ribeiro and Marcon, 1999), are common in the lake. Erythrinidae is seen regularly in the Cachoeira River, south of the lake, while catfishes such as the genus *Rhamdia* and *Pimelodus* can also be found in the channel.

Crustaceans represent the second most important item in food item proportion. The presence of crustacean such as *Macrobrachium* spp. in the feces is normally mixed with fish, and in some cases might be the most important item in the diet (Kruuk, 2006). In Peri Lagoon, genus *Macrobrachium* are represented by the species *M. olfersii* and *M. carcinus*, and they are often in the margins of the lake, near rocks or macrophytes (Ribeiro and Marcon, 1999). In other freshwater environments, a freshwater crab such as *Trichodactylus fluviatilis* (Latreille, 1828) was also found in otter's feces (Quadros and Monteiro-Filho, 2001), and in marine coastal areas, crustaceans are represented by Grapsidae, Xantidae and Portunidae crabs (Colares and Waldemarin, 2000; Alarcon and Simões-Lopes, 2004; Quintela et al., 2008).

Birds represent a minor item in the otter's diet, with 2% item proportion. The most common feather found is the one from Phalacrocoracidae family, *Phalacrocorax brasilianus* (Gmelin, 1789) (Neotropic Cormorant). *Phalacrocorax*, takes some time when trying to leave the water surface, which might facilitate the otter's job (Figure 9). Another bird found in otter feces is the *Jacana jacana* (Linnaeus, 1766) (Wattled Jacana). Mammal hairs can also been seen in the feces (Figure 9). In some studies, the order Rodentia was the most representative group in the mammals prey by otters (Quadros and Monteiro-Filho, 2001; Alarcon and Simões-Lopes, 2004).

The knowledge of the behavior of the preys might reveal hunting strategies from the predator. Why, in the study area, the Neotropical Otter preys more on Cichlidae fishes, compared to *Mugil* sp. or *Centropomus undecimalis*? A quick analysis of the ecology of these species shows that Cichlidae fishes have a limited capacity of motion, being mainly restricted to the margin of the lake, close to rocks and aquatic macrophytes. On the other hand, *Mugil* sp. and *Centropomus undecimalis*, less important in the otter's diet, are cruiser species, swimming around the entire lake.

The results indicate that Neotropical Otters in the study area are mainly specialist, with a clear preference on fishes, followed by crustaceans. However, more studies on this matter is needed, including different areas, in order to detect possible differences in otter's diet composition.

Figure 9. On the top left corner a typical otter feces on a rock, in front of a shelter's entrance. Following in an anticlockwise direction, an otter swimming close to the margin of Peri Lagoon, fur found in otter feces and a *Phalacrocorax brasilianus*, bird occasionally preyed by otters. All pictures were taken in the study area

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RÉSUMÉ

ECOLOGIE DES *Lontra longicaudis* DANS LAGOA DO PERI, SUD DU BRÉSIL

Ce travail porte sur la composition du régime alimentaire mensuel et annuel, et la variabilité, d'une population de loutres vivant au lac do Peri, sur l'île de Santa Catarina, au Sud du Brésil. La proportion des différents éléments de nourriture à travers les années et les mois révèle que les poissons et les crustacés sont les principaux éléments, suivis par les oiseaux et les mammifères. Les résultats ne révèlent pas de différence significative entre les poissons et les crustacés dans la composition du régime alimentaire entre les années. Cependant, il existe une différence entre les mois pour la proportion des poissons, et aussi le nombre de fèces. Le mois d'Avril est celui qui comporte la plus faible moyenne. Enfin, les Cichlidae sont les principales proies dans le régime alimentaire des loutres.

RESUMEN

ECOLOGÍA DE *Lontra longicaudis* EN LAGOA DO PERI, SUR DE BRASIL

Este trabajo estudia la composición y variabilidad mensual y anual de la dieta de una población de nutria que vive en Lagoa do Peri, Isla de Santa Catarina, al sur de Brasil. Proporción de los ítems alimentos a través de los años y meses revela que los peces y crustáceos son los alimentos principales, seguidos por las aves y los mamíferos. Los resultados non revelan diferencias significativas en los ítems peces y crustáceos en la composición de la dieta entre años. La diferencia se encuentra a través meses para la abundancia de peces en la dieta y la cantidad de heces. Mes de abril es responsable por la diferencia que presenta el promedio más bajo. Cichlidae es la presa principal en la dieta de la nutria.

RESUMO

ASPECTOS ECOLÓGICOS DA LONTRA NEOTROPICAL (*Lontra longicaudis*) NA LAGOA DO PERI, SUL DO BRASIL

Este estudo apresenta a composição, e variação mensal e anual da dieta de uma população de lontras vivendo na Lagoa do Peri, Ilha de Santa Catarina, Sul do Brasil Proporção do item alimentar ao longo dos meses e anos revela que peixes e crustáceos são os principais alimentos, seguidos por aves e mamíferos. Os resultados não demonstram haver diferença significativa no número de peixes e crustáceos na composição da dieta entre os anos. No entanto, é observado diferenças através dos meses para a abundância de peixes na dieta e do número de excrementos, com menores médias para o mês de abril. Os peixes da família Cichlidae são as principais presas na dieta da lontra.

W O R K S H O P R E P O R T

A BLOODY WORKSHOP – ON POST-MORTEM ANALYSES OF OTTER, *Lutra lutra*

Biologists and veterinaries from across Europe gathered in Denmark in February to discuss and practice post mortem analysis on a workshop arranged by the IUCN Otter Specialist Group, Europe. The workshop aimed to produce a standardized post mortem protocol, and to promote wider collaboration between nations.

Across most of the Eurasian otter's range in Europe the populations are subjected to considerable mortality due to road traffic accidents and other anthropogenic causes. In some countries Information on mortality locations and carcasses are collected systematically to guide conservation efforts. However, the standards of information, post mortem analysis and sample collection vary widely between countries.

As the otter is protected in throughout Europe the carcasses from these incidental killings are a valuable resource – if not the only source – of samples that can be used for research, e.g. health, contamination exposure, and to assess conservation status of populations and effects of conservation efforts.

Vic Simpson presented the post morten protocol that he has used in the UK on more than 400 otter carcasses, which has evolved into a standardised method for analysis and sample collection.

Standardized post mortem analysis, sample storage and a database on tissue banks will enable closer cooperation and more detailed pan-European studies, which ultimately may result in more efficient management tools and conservation plans for otters. The post mortem protocol will be presented on the next International Otter Colloquium expected to take place in Pavia, Italy in 2011.

The workshop was arranged by The Swedish Museum of Natural History and National Environmental Research Institute, Aarhus University, Denmark.

For more information please contact: Morten Elmeros: elm@dmu.dk

Figure 1. Vic Simpson demonstrating the first step in the examination of a road killed otter

I N F O R M A T I O N

HUSBANDRY PRACTICES FOR EX-SITU CARE OF *Lutra lutra*

It is with gratitude and pleasure I inform you that the summary of recommended husbandry practices for *ex-situ* care of *Lutra lutra*, written by Carol Heap, Lionel Fontaine, and David Heap using Melissen's husbandry manual as a foundation, has been translated into Italian by Lorenzo Queglietta. It is now available on the OSG website, under library and the Otters in Captivity Task Force.

Many thanks and our deepest appreciation go out to Lorenzo for doing this translation for us and the community working with otters in Italy.

Soon we will have the N.A. river otter and Training OCT documents available in German.

Please if you work with or have contacts with Italian facilities housing this species let them know this document is now available.

Jan Reed-Smith
Chair, Otters in Captivity Task Force
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WORLD'S MOST ENDANGERED OTTER 'REDISCOVERED' IN DERAMAKOT

July 25, 2010

http://www.themalay sianinsider. com/features/ article/worlds- most-endangered-otter-rediscover ed-in-deramakot/

The "rediscovered" hairy-nosed otter (*Lutra sumatrana*) is photographed by an automated camera trap set up by ConCaSa. — Photo courtesy of Mohamed & Wilting, SWD, SFD.

KOTA KINABALU, July 25 - The world's most endangered otter species, known as the hairy-nosed otter (*Lutra sumatrana*), has been "rediscovered" in Deramakot Forest Reserve in Sabah by a team of German and Malaysian researchers.

"This is great news for Sabah and shows once again how unique and fortunate we are in terms of wildlife and nature. In addition, these findings also boost the conservation of this endangered otter internationally as historically this otter was distributed throughout large parts of southeast Asia," said an elated Sabah Wildlife Department Director, Dr Laurentius Ambu. The last confirmed record of the hairy-nosed otter in Sabah is a museum specimen collected over a hundred years ago.

Even over the whole island of Borneo, the last record – a road-kill from Brunei – was 1997, over ten years ago. Therefore it was unknown to scientists if this species can be still found on Borneo," stated Andreas Wilting, the project leader of the Leibniz Institute for Zoo and Wildlife Research (IZW).

In 2008, IZW initiated the Conservation of Carnivores in Sabah (ConCaSa) project with the collaboration of SWD and Sabah Forestry Department (SFD) to study carnivores such as the Sunda clouded leopard, civets and otters in the state.

The ConCaSa project used automated camera traps that were set up in Deramakot and the surrounding forest reserves during the last two years. As the different otter species look very similar the hairy-nosed otter, pictures had to first be verified by a number of experts before they were published recently by the International Union for Conservation of Nature (IUCN) Species Survival Commission journal.

In addition to capturing camera trap pictures of the endangered hairy-nosed otter, the study also confirmed the presence of five Bornean cat species, as well as 13 other small carnivores such as the Banded civet and the sun bear.

"These results mean that out of 25 known carnivore species in Borneo, our project, together with a Japanese researcher Hiromitsu Samejima, confirmed 20 in Deramakot. This makes Deramakot outstanding for being extremely rich in its diversity of carnivores," explained Wilting.

Besides the pictures, ConCaSa also obtained the first video footage ever taken of some species, such as the otter civet (*Cynogale bennettii*).

Since 1997, Deramakot Forest Reserve has been managed by the SFD as a sustainable logged forest with the coveted Forest Stewardship Council certification.

"These findings show that long-term sustainable forest management is of great importance for the protection of some of this country's most threatened species and of the unique biodiversity of the forests of Borneo," shared Datuk Sam Mannan the Director of the SFD.

One of the next steps in the conservation of Bornean carnivores is the First Borneo Carnivore Symposium in Kota Kinabalu, in June 2011.

This symposium organised by the SWD, three IUCN/SSC Specialist Groups and the IZW will be a landmark international meeting, bringing together scientists, government agencies and non-governmental organisations (NGO) working on the protection of the Bornean carnivores.

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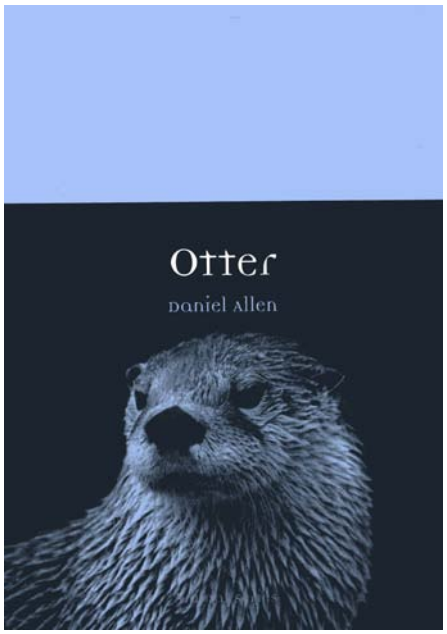
B O O K

Otter

By Daniel Allen



This new book provides in seven chapters an introduction to otters, folklore and fables, commercial otter hunting, otter hunting for sport, otters in literature and otters on screen followed by a chapter on otter protection.

Actually it is definitely not the short introduction with some editorial errors on otter species, or the protection chapter that is also short and could be discussed within the otter community, that make this book absolutely worth for reading even for the experienced scientist. Once I started to read the chapter on folklore with lots of interesting information on the otter in the myths of various areas, or the historical record on otter hunting both for fur trade and for sport as it was done mainly in England, I could not stop. I simply had to go on. The chapters on otters in fiction books and on screen show how good books, stories or films have contributed to a change in attitude towards otters at least in the general population.

For me the approximately 100 pages from chapter 2 “Folklore” to chapter 6 “The otter on screen”, are one of the most interesting information I have read on otters in years.

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