Figure 1. Ban En National Park, Vietnam, with loris survey sites indicated.
A PRELIMINARY SURVEY OF LORISES (*NYCTICEBUS SPP.*) IN NORTHERN VIETNAM

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Introduction

A loris field survey was conducted in Ben En National Park from 19 February to 2 March 2001. Team members from the Zoological Society of San Diego; Vietnam National University (VNU), Hanoi; and the Institute of Ecology and Biological Resources (IEBR), Hanoi, jointly carried out the survey.

Ben En Park was selected as an appropriate site for this survey because Vu Ngoc Thanh (VNU) and Trinh Viet Cuong (IEBR) previously had found and photographed lorises (*Nycticebus spp.*) there during a survey in June 1997. The results of that survey are published in a case study of Ben En National Park (Ha, 2000).

Ben En was established as a national park in 1992 (Figure 1). It consists of 38,153 ha and is located about 200 km south of Hanoi in Nhu Xuan and Nhu Thanh districts in Thanh Hoa province. The park lies between 60°-66°N latitude and 43°-52°E longitude, and the altitude ranges from 50-300 m above sea level. It includes an artificial lake with 23 islands. A complete description of Ben En Park and its wildlife is published in *Wildlife of the Ben En National Park* (Vietnam National University and Ecosystem Conservation Society, 1997). The study area consisted of a bamboo forest mixed with hardwood trees. The survey was done during the dry season, although there was still a light drizzle at least 30% of the time. The first part of the survey was conducted in the Binh Luong portion of the park from 19 to 26 February. The second part was in the Hoa Quy area from 27 February through 2 March. The area of these survey sites totaled approximately 9,000 ha of the park.

Methods

We obtained information about the lorises of the region by interviewing the local people, hunters, wood collectors and traders. They were shown photographs of slow lorises (*Nycticebus coucang*) and pygmy lorises (*N. pygmaeus*) for identification purposes.

Night surveys were done by two to four teams, each surveying established trails that had been walked during the preceding day. Each team consisted of at least one trained biologist, park ranger, and local guide. Night surveys began at 20:00 each night and lasted until as late as 1:00 the following morning. Each team covered approximately four km of trails each night. Lorises were identified in the trees by their distinctive orange colored eyeshine reflected from the investigator's headlamps and flashlights (Vu and Le, n.d.). Trail distance and locations of loris sightings were determined by using Garmin GPS equipment.

Results

We observed a total of eight pygmy lorises during this study. All of them were found in and around endemic hardwood trees and were from five to 20 m above the ground. One pygmy loris was captured by VNT in the forest at night for closer examination and later released on a fenced island in the park.
The captured loris was a sub-adult male who was approximately one year old (Table 1). Several samples were obtained from this animal, including hair for genetic analysis and feces for diet and parasite analysis.

Additionally, we examined a male and two female pygmy lorises and a male slow loris that were confiscated by park officials during this study (Table 1). These lorises had been caught in the park and kept for barter by local traders.

<table>
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<td>840</td>
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</table>

A wide variety of mammals, birds, reptiles, and amphibians were encountered during our survey at Ben En Park. Other mammals included the tree shrew (*Tupaia belangeri*), Malayan porcupine (*Hystrix brachyura*), belly-banded squirrel (*Callosciurus flavimanus*) bamboo rat (*Rhizomys sp.*), palm civet (*Chrotogal owstoni*), Javan mongoose (*Herpestes javanicus*), leopard cat (*Felis bengalensis*), wild pig (*Sus scrofa*), sambar deer (*Cervus unicolor*), and serow (*Capricornis sumatraensis*).

Currently, the IB appendix includes pygmy lorises on its list of endangered mammals. The Vietnam Red Data Book (Ministry of Science, Technology and Environment, 1992) lists both loris species as vulnerable. While both species are in serious need of protection, it appears that the slow loris may be at more of a risk in this location (VNT, personal observation). Since pygmy lorises are only about 400 grams in size, the local hunters do not make a major effort to hunt them. They are much more interested in slow lorises because they are 3-4 times the size of pygmy lorises and provide much more profit for illegal trade with China for medicinal uses. Besides being one of the largest slow loris subspecies, the slow lorises that are endemic to Vietnam have very long, fluffy pale-colored fur. Pygmy lorises appear to be more common in Ben En National Park than are slow lorises, possibly due to the greater demand of the larger species. The 1997 survey of this park by Vietnam National University, Hanoi and Ecosystem Conservation Society of Japan identified six other primate species living in this park: Phayre’s langur (*Trachypithecus phayrei*), black gibbon (*Nomascus concolor*), stump-tailed macaques (*Macaca arctoides*), pigtail macaques, (*M. nemestrina*), and rhesus macaques, (*M. mulatta*). Except for one confiscated slow loris (Table 1), we did not see any other primates during our survey. The only indication of the existence of other primates was a report from a local hunter who claimed that a pair of gibbons lived in the mountain cliff area in a remote part of the reserve.

Acknowledgments

We are very grateful to Mr. Le Duc Giang Director, Mr. Luong Xuan Ha, vice-Director and the other officials at Ben En Park for the opportunity for us to conduct this research. We also thank Dr. Pham Trong Anh, Hoang van Quan, Le Dinh Phuong, Vi Van Binh, Tu Ngoc Sang, Pham Van Nam and the many other individuals who helped us conduct
this survey. This project was funded by a Conservation and Research Grant through the Zoological Society of San Diego.

References


THE GRAY-SHANKED DOUC: SURVEY RESULTS FROM TIEN PHUOC, QUANG NAM, VIET NAM

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Introduction

The general distribution of the gray-shanked douc (Pygathrix nemaeus cinerea) has been described in recent publications (Lippold and Vu, 1995, 1999; Nadler, 1997). This langur is endemic to central Viet Nam and our research has demonstrated that its distribution is confined to Quang Nam, Quang Ngai, Binh Dinh, and includes parts of Kon Tum and Gai Lai provinces (approximately 16° 30' 13°30' N and 107°30' 109°E) [Lippold and Vu, 1999].

Recently, the conservation status of the gray-shanked douc langur was listed as endangered (EN) at the Workshop on a Conservation Action Plan for The Primates of Vietnam held in Hanoi in 1998 (Anon, 1999) and in the 2000 IUCN Red List of Threatened Animals (Hilton-Taylor, 2000). The gray-shanked douc, which is found in the IndoBurma Biodiversity Hotspot, also has been placed in the top 25 most endangered primates by Conservation International (Mittermeier et al., 2000).

Because gray-shanked doucs have been the object of hunting and trade, a few animals have been discovered either during transport or at pick-up sites and confiscated by the Forest Protection Departments of Quang Nam, Quang Ngai and Binh Dinh provinces. However, the exact location where confiscated doucs were captured was unknown. This situation changed in December 1997 and January 1998 when two doucs were confiscated from the forests surrounding Tien Phuoc district in Quang Nam province. One douc was recovered from Tien Canh commune and the other from Tien Ngoc commune. Our team went to the exact locations where the animals had been captured to conduct the first survey of these forests and collect data related to forest type and group size composition, sex ratio and feeding behavior of the gray-shanked douc.

Methods

Surveys were carried out between March and April 1999 in forested areas in Quang Nam province. Precise locations were selected based on information collected from Forest Protection Department staff and interviews with individuals such as hunters and forest products collectors, who have intimate knowledge of the local forest.
In each location, systematic walks were carried out on trails exclusively in forest habitat looking and listening for specific indications of doucs such as leaf drop, scat and species specific vocalizations. Field observations were made from 0600 to 1800.

The number of encounters with douc groups or individuals was recorded. Following this, the distance to the center of the group was measured. This was then calibrated with line transects to give a semi-quantitative method of sampling abundance (Brockleman and Ali, 1987). Whenever a primate was encountered, the time of observation and location were noted on a forest map. The number of individuals, their sex, and an estimate of each individual's age was recorded. This was followed by a detailed description of the face and coat coloration of adults of both sexes and of infants (Lippold, 1977). Photos and recordings were made whenever possible.

Results

Our team observed one group of ten gray-shanked douces for 5 minutes at Son Ve in Tien Hiep commune on 28 March 1999 at 14:30. On the following day (29 March 1999) we observed a group of 20 individuals for 30 minutes at 10:30 at approximately the same location as the day before (Lippold and Vu, in press). This may have been the same group as they were eating Ficus sp. fruits and leaves, as the douces had been doing the day before. We collected samples of food items eaten by the douces (Lippold and Vu, in press). The habitat in the area is composed of secondary evergreen forest with highest trees measuring approximately 25-30 m. The altitude of this area is 500 m above sea level.

Our team observed another group of 20 gray-shanked douces at Hon Nua-Chop Lung Pass in Tien Lanh commune. During 30 minutes of observation, we were able to identify three females with dark faced infants of about two months old (Lippold, 1977). The habitat in this area is also secondary evergreen broadleaf forest at an elevation of 450 m above sea level.

Each of the groups of gray-shanked douces was multi-male and multi-female with females outnumbering males by more than 2:1. We were able to observe infants in one of the groups. However, the females protected their infants so well that we were unable to identify the infant's sex, but their face and body coloration is the same as that of the red and black shanked douc infants of the same age (Lippold, 1977).

Besides the observations of the gray-shanked douces, we observed groups of stump-tailed macaques (Macaca arctoides) in Na Kao-Tien Ngoc area in Tra My district. We also surveyed at night for nocturnal primates and observed pygmy lorises (Nycticebus pygmaeus). In addition, the local people identified pictures of the slow lorises (Nycticebus coucang) and pigtail macaque (Macaca leonina) as animals they collected from these forests.

We also observed that the habitat area that includes the food supply for the gray-shanked douces and other primates is being reduced by the destruction of the forest. We discovered that one of the major causes of this reduction is the cutting of the forest and its immediate replacement by fruit tree plantations. Illegal logging and the collection of forest products such as rattan and firewood also are producing an impoverished forest.

In addition, douces are hunted for food and their meat and bones are used in the preparation of medicinal products. The local people admitted that they used the gray-shanked douc in the preparation of monkey balm, a product commonly available in the area. In the Tien Phuoc area, douces are not only hunted with guns but also trapped in ground traps baited with fruit and corn.
Discussion

Previous research (Lippold, 1977, 1995a, 1995b, 1998; Lippold and Vu, 1995, 1999) has demonstrated that doucs are found in Viet Nam in an almost unbroken distribution from 11° to 19°N. They are differentiated into subspecies (Groves, 1970; Lippold, 1977; Jablonski, 1995) or species (Brandon-Jones, 1984; Nadler, 1997).

Our research has demonstrated that the distribution of the gray-shanked douc is confined to the mountainous regions of the provinces of Quang Nam, Quang Ngai, Binh Dinh and parts of Kontum and Gai Lai (16°30'N, 107°30'E-108°30'E to 13°30'N, 107°30'E-109°E) [Lippold and Vu, 1999]. The present contribution, which reports our observations of the gray doucs in Tien Phouc (15°25-15°32'N, 108°10'-108°17'E), documents the first observations of gray-shanked doucs groups in this restricted area. The gray-shanked doucs continue to be located in areas that fit into Fooden's (1996) latitudinal faunal transition zone in Viet Nam. They may a product of what Brandon Jones (1996) has described as past Quaternary climatic changes of forest type.

Since our last report (1999), two new reserve areas have been proposed for Quang Nam province and these may protect the gray-shanked douc, if they are established. The first is Ngoc Linh (Quang Nam) Proposed Nature Reserve (15°00'15°15'N-107°56'-108°07'E). This nature reserve encompasses a total area of 18,430 ha and was approved by Quang Nam Provincial People's Committee in April 2000. The proposed nature reserve is situated on the Kon Tum plateau, a mountainous area separated from other high altitude plateaus by relatively long distance. Ngoc Linh (Quang Nam) Proposed Nature Reserve has a large number of natural habitats ranging in elevation from 150 m to 2,598 m (Tordoff et al. 2000), in addition to a high degree of endemism in both plants and animals.

The second new reserve proposed for Quang Nam is Song Thanh Proposed Nature Reserve (15°13'-15°41'N, 107°21'-107°50'E), with a total area of 93,249 ha of which 75,737 ha would be strictly protected. Song Thanh is a mountainous area with evergreen forests covering several peaks over 1,000 m.

These two new reserves, along with the contiguous Ngoc Linh Nature Reserve in Kon Tum province (15°00'-15°18'N-107°41'-108°01'E) with 41,424 ha, could contribute to the preservation of a number of endemic species including the gray-shanked douc.

Conservation Status

At the present time, the gray-shanked douc has been observed in groups ranging from ten individuals to 20 individuals. All of the groups were multi-male and multi-female with females outnumbering males. However, the outlook for the conservation of these groups looks bleak unless an increased level of protection takes place immediately. While the groups are difficult to locate once discovered, they do not always run away like the red or black shanked doucs (Lippold and Vu, field notes). On two occasions, we were able to observe groups for over 30 minutes. While they did try to hide their faces, we were amazed that they did not run away. Because of this behavior, it is not difficult to imagine that, given the chance, several hunters with guns could kill an entire group.

Acknowledgements

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References


ASSESSMENT OF THE SALE OF PRIMATES AT INDONESIAN BIRD MARKETS

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Introduction

Asian nonhuman primate populations may be especially sensitive to human based environmental pressures, including the capture of certain species for illegal trade (Eudey, 1999). One aspect of this trade involves the sale of primates at public animal markets, in response to a domestic demand for the keeping of wild animals as pets. Previous monitoring has indicated a substantial volume of trade in species protected by Indonesian conservation law, namely members of the genera Nycticebus, Hylobates, and Pongo (KSBK, 1998). The continuous, systematic monitoring of these markets is critical to the assessment of this trade's potential impact on wild populations, as well as an indicator of the effectiveness of current conservation strategies.

Methods

During the months of June and July 2000, an effort to monitor the sale of primates at various pasar burung ('bird markets') was undertaken in both Java and Bali, Indonesia. Collaboration with KONUS (The Indonesian Nature Conservation Society) and KSBK (Animal Conservation for Life), Indonesian NGOs, facilitated the collection of these data. The present report serves as a preliminary description of the market locations, species representation, volume, costs, and the network of trade encountered during this study.

Observational monitoring of bird markets consisted of recording species identification and number of individuals present by two independent observers. Whenever possible, animals being traded and general market conditions also were photographed. Interviews with sellers were aimed at revealing prices, age, origin, and path of travel to the market for traded primates. During these interviews, the researchers would demonstrate an interest in protected species, specifically gibbons and siamangs (family Hylobatidae). This technique was used to more thoroughly document the sale of primates during this brief survey, in that it led to the further observation of animals for sale in nearby homes, at which the owners appeared to be in cooperation with the market sellers. These animals are recorded under the market at which the connection was established. Upon completion of an interview or survey effort, all of the repeated offers of actual sale of the primates were politely refused.

Results

Market Locations: Twenty-one animal markets were located in ten cities across Java and Bali. The following markets were sampled during our visits to these cities:

Java

Jakarta
Pramuka and Jalan Barito Bird Markets

Bogor
Taman Topi Bird Market, Pasar Bogor, and Jalan Ciawi

Bandung
Bandung Indah Plaza, Jalan Dr. Rajiman, Kebon Kalapa and Sukahaji
Purwokerto
Yogyakarta
Semarang
Malang
Surabaya
Jember
Bali
Denpasar

Wage Bird Market
Ngasem Bird Market
Karamata and Johar Bird Markets
Malang Bird Market
Pasar Turi, Pasar Kupang, and Bratang Bird Markets
Gebang and Jaya Bird Markets
Satria and Sanglah Bird Markets

Information from market vendors and local conservationists sometimes revealed primates for sale at private homes. Collaboration with local NGOs is essential for the completion of a thorough survey, as the heaviest volume of primate trade within a city may rotate between markets, and market sellers often keep protected species at private residences. In addition to these markets and nearby homes, we also discovered primates on display at the Marinara Restoran at the Sarinah department store in Jakarta and at the Splendid Inn Hotel in Malang.

Species Representation, Volume and Costs A total of 181 primates were observed for sale in and around the markets surveyed. The species represented were: *Macaca fascicularis* (49%), *Nycticebus coucang* (22%), *Macaca nemestrina* (15%), *Trachypithecus auratus* (7%), *Symphalangus syndactylus* (3%), *Hylabates agilis* (2%)\(^1\), *Hylabates muelleri* (1%)\(^1\), and *Pongo sp.* (1%). Table 1 records the distribution of traded primates at the various locations.

The sale price of individual primates is mainly dependent upon their species. The average price of a long-tailed macaque, a species considered to be at lower risk, for example, was around 100,000 rupiah (approximately $12 US dollars). Purchasing a protected animal such as a siamang, however, would cost between one and two million rupiah (between US$120 and $240).

The requested purchase price also was consistently dependent upon an animal's age, with infants and juveniles drawing a higher price than older individuals. These reported prices represent the seller's original request. It is unlikely that this is given as a fixed price, however; a negotiated purchase price possibly could be as little as half of the initial amount.

The concealment of certain species demonstrates an awareness of conservation law and a general caution in regard to the occasional enforcement action by either governmental officers or NGOs. Despite this caution, viewing protected species either just off the market or at a private residence was surprisingly easy. It seemed that the potential sale of a protected animal outweighed any suspicion about our inquiries.

Discussion of Trade Networks

**From Source to Java and Bali** It was hypothesized at the onset of this study that we would find primate species not native to the island of Java for sale because of the importance of Java as the economic center of Indonesia. This hypothesis was supported by the presence of primates from Sumatra and Borneo, including orang-utans (*Pongo sp.*), siamangs (*Symphalangus syndactylus*), agile gibbons (*Hylabates agilis*), Mueller's gibbons (*H. muelleri*), and pigtail macaques (*Macaca leonina*). The representation of observed species and interview data reveal southern Sumatra and Kalimantan as especially vulnerable primate source areas. Twice we were informed that the siamangs for sale had come from Kalimantan. As siamangs are not indigenous to Kalimantan, this may reflect either the lack of market seller participation in the extraction and transportation of primates or the possibility of a trade route from Sumatra, through Kalimantan, to Java. We were told that three likely points of entry into Java are the capital city of Jakarta in West Java or ports in Surabaya or Banyuwangi.
<table>
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<th>Lidah Buaya</th>
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* An independent researcher reported the presence of a second orang-utan and a second shanang shortly after our survey of Pramuka (L. Engels, personal communication).
in East Java. The use of Banyuwangi, with subsequent travel to Jember, Malang, and Surabaya is thought to be in response to the stricter enforcement of shipping regulations encountered in Surabaya.

**Within Java** Transport of animals from the above mentioned entry points to markets throughout Java is done by car. It is thought that animals entering through Jakarta will end up in markets throughout West Java while those entering through Surabaya and Banyuwangi will either remain in East Java or possibly travel to Central Java. Interviews with all primate traders that at the time were not offering gibbons and siamangs revealed their ability to obtain these animals within a period of one week. This finding suggests that the connections readily exist to transport animals both to and within Java. For example, a seller from Jalan Dr. Rajiman in Bandung called to a nearby residence where an available siamang was known to be held; however, that particular animal had very recently been transported to Jakarta at the request of a buyer.

**Within cities** Most cities have more than one animal market, and differences may exist in the amount of buyer traffic, size, prices for traded animals, and degree of monitoring by conservation officials. The best example of this can be seen between Pasar Bratang and Pasar Kupang in Surabaya. The former market is centrally located and receives a high degree of both buyer and monitoring activity, while the latter is quite small, less active, and the living conditions of the animals were the worst encountered during this survey. The prices for primates at these two markets reflected these differences. At Kupang, we were told of a particular siamang that had recently been involved in a seller to seller transaction between a vendor from Bratang and one from Kupang. We were informed that it was common for sellers from Bratang to purchase animals from Kupang for subsequent sale at the larger market at an increased price. The large number of primates (17) for sale at Kupang, despite its small size, may indicate the significance of this market as a safe supplier for the greater trade throughout Surabaya and East Java.

**Within markets** At the Pramuka Bird Market in Jakarta, an initial vendor showed us two infant gibbons for sale. These animals were brought to the market on a motorbike from a nearby residence. After our inspection of the animals they were transported back to the residence. Later that same morning, in a different section of the market, the same two gibbons were offered to us again by different vendors. Interview information revealed that the vendors did not own these animals but would only receive a commission through their sale from the actual primate trader.

**Implications for Wild Populations** The high volume of trade encountered during our relatively brief survey suggests that over the course of a year the impact on wild populations could be very substantial. Further, repeat visits to the same market usually revealed daily fluctuations in the number of primates present. This finding most likely means that different sellers frequent the markets and our observation of the primate trade is probably limited. Also, sellers who did not have protected animals available stated their ability to obtain them with not much more than a few phone calls in about one week’s time. This finding suggests that the market trade is continuous and directly connected to original primate sources.

**Conclusions**

- Continued monitoring of trade and collaboration with Indonesian NGOs is needed to best provide scientific evidence for support of governmental reports and conservation policies.
• Education is needed to discourage the purchase of primates for pets by domestic tourists within Indonesia.

• Further investigations into the sellers network and ultimate connections to original primate sources are needed to understand the economic and social implications of this trade for those involved at all levels of its practice.

Acknowledgments

Special thanks to the Universitas Udayana (UNUD) Primate Research Center, Dr. Juan Carlos Morales and Dr. Don Melnick at Columbia University and the Center for Environmental Research and Conservation (CERC), Yayasan Gibbon Indonesia, and Meredith Fischer for photographic and personal support. This research was supported by a Grant-in-Aid of Research from Sigma Xi, the Central Washington University Office of Graduate Studies and Research, The Balinese Macaque Project, and the Primate Conservation and Welfare Society.

Note

1. Noninvasive collection of hair samples was completed in collaboration with this research. The analysis of these samples has yet to be completed. Species identification within the genus Hylobates is therefore preliminary due to the potential for both developmental pelage changes and naturally occurring hybrids. Genetic analysis may confirm the apparent presence of both agile gibbons (H. agilis) and Mueller’s gibbons (H. muelleri).

References

Diet and Feeding Behavior of Assamese Macaque (Macaca assamensis)

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Introduction

This paper deals with the diet and dietary habits of the Indian Assamese macaque (Macaca assamensis). The species is restricted mainly to the northeastern part of the Indian landmass although its range extends from Uttarakhand to Arunachal Pradesh along the Himalayan belt. Its habitat also is described briefly. Feeding is one of the primary activities in the daily budget and always has been a field of interest to investigators. Most of the information given here was collected from 1996 to 1999 by direct observation in the field (Mitra, 2000). Intensive study was carried out on two free ranging groups (A and B) selected from among the 27 sighted groups of Darjeeling district, West Bengal distributed altitudinally between 200 and 2550 m. Assamese macaque groups are sparsely distributed in some selected patches of the district, but concentration is higher along the riverbanks and streams. Some groups are wild, living in total isolation from human settlements, while others are semi-wild or provisioned, inhabiting areas adjacent to human habitation.

Materials and Methods

Their preference for rocky terrain and hill slopes makes Assamese macaques difficult to approach and study. The present study area is not only a suitable habitat for M. assamensis but also offers several accessible sites for investigation. This land is an assemblage of lofty mountain ridges, steep slopes and difficult terrain intersected by numerous streams and rivers. There are deep river gorges as well as valley plains. All the rivers, streams and their tributaries are shallow but become turbulent during the monsoon season. Soil erosion and landslides are common in some places.

Group A was located near the riverbank of Teesta, away from any township at an elevation of 231 m in an area of gentle slopes covered with thick vegetation. Group B inhabited open valley land interspersed with human settlement and tea plantations. This zone has steep slopes where a considerable portion of the natural vegetation had been replaced by commercial varieties. Table 1 summarizes general features of the study area.

<table>
<thead>
<tr>
<th>Table 1. General features of the study area.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altitudinal variation</td>
</tr>
<tr>
<td>Longitude</td>
</tr>
<tr>
<td>Latitude</td>
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<tr>
<td>Rainfall</td>
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<tr>
<td>Temperature</td>
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<tr>
<td>Summer</td>
</tr>
<tr>
<td>Monsoon</td>
</tr>
<tr>
<td>Winter</td>
</tr>
<tr>
<td>Forest type</td>
</tr>
<tr>
<td>Human population</td>
</tr>
<tr>
<td>Other primates</td>
</tr>
<tr>
<td>Possible predators</td>
</tr>
</tbody>
</table>
Detailed study on daily activities was carried out on a seasonal and temporal basis following the scan sampling and ad libitum techniques described by Altmann (1974). Data were recorded on the basis of the relative number of monkeys engaged in various activities under different ecological conditions such as seasons (summer, monsoon and winter), habitats and period of the day (morning, noon and afternoon). Feeding is one of the ten selected behavioral categories (e.g. resting, grooming, play, locomotion) that were analyzed quantitatively and verified statistically by ANOVA and Chi-square (X²) methods. All analyses and interpretations were based on diurnal observations. As the selected study groups were not very large, at any given time of observation 15-20 group members were under surveillance. Monthly variation in the percentage of plant species carrying flowers and fruits was determined from a sample of 143 species available in the home range of focal groups. Vegetation samples from the food plants were collected and identified.

Results

Dietary requirements in this species may vary due to metabolic, geographic and altitudinal effects. Assamese macaques are predominantly vegetarian and utilize a wide range of trees, herbs, shrubs, grasses and climber species. An instance of taking boiled egg (yolk portion) is the only exception.

Food items can either be natural or artificial (provided by humans). Natural food consists of all the plant materials collected directly from forests, plantation areas and domestic orchards. Fodder consumed by Assamese macaque includes plant parts like fruit, leaf, seed, petiole, leaf base, bud, flower, rhizome, epiphytic root and cotyledon from 63 different plant species of 34 families. Varieties of fruits such as banana, orange, apple, mango, guava, papaya, litchi, cucumber, tomato and items such as bread, biscuit, snacks, rice grain, grams, groundnut and molasses are often offered to them by the local inhabitants and travelers. All of these items collected directly or indirectly from human sources are considered as artificial food.

Maximum feeding recorded in both groups was seen between the heights of 5 and 13 m. In group A, 79.16% of the total feeding recorded was arboreal, while maximum ground level feeding (58.5%) was noticed in group B due to insufficient fodder plants and proximity to human habitation.

Feeding behavior showed very significant differences in different hours or time periods of the day (F=101.03, P<0.05). Feeding has certain distinct phases or peaks when the majority of group members concentrate in taking food. In general, there were two such peaks, but especially in group B another low peak was noticed depending on the availability of artificial food. Total time spent in daily feeding was nearly 1.5 hours in both the groups and 51% of this time occurred during the morning session of feeding. Average percentage of feeding behavior varied considerably in three different seasons. It was proportionately higher in winter (14.4%) than summer (12.74%) and monsoon (12.65%). However, overall feeding involved 13.26%±0.8% of time in the daily routine of *M. assamensis*.

It is interesting to note that group A consume 90.12% natural food daily, while group B, having greater chances of provisioning, utilized 74.35%. Artificial foodstuff made up the remainder in both the groups.

These monkeys have the habit of licking rainwater from leaves and the seepage water through the rock cliff. They also take water from ditches and potholes when filled up after a spell of rain. Average daily activity of feeding and drinking together constituted 15.62% of total time spent.
Discussion

Diet is an important limiting factor in the distribution and activity patterns of any wild animal. The present study revealed that Assamese macaques spend relatively less amount of time in feeding compared to other daily activities. Growing anthropogenic pressures on the land over the last two decades have influenced the habitat and behavior of Assamese macaques to a large extent. The common impacts originated through the following sequence of events: (1) habitat modification, (2) decreasing resource availability, (3) growing dependence on artificial food, (4) greater chances of human and monkey conflict.

Acknowledgements

I am grateful to the Ministry of Environment and Forests, Government of India for the financial support for this research, and Directorate of Forests, Government of West Bengal for permission to carry out the field work.

References


SLEEPING TREES AND SURVIVAL OF LANGURS IN KUMBHALGARH WILDLIFE SANCTUARY IN ARAVALLI HILLS, INDIA.

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Introduction

Groups of Hanuman langur (*Semnopithecus entellus*) dwell in a well marked area or home range that includes sleeping sites. In Kumbhalgarh Wildlife Sanctuary (KWS) of the Aravalli Hills, Rajasthan, India, langurs use large trees as their sleeping sites. These sites constitute only a limited part of the total home range at about 100 to 150 meters in area. A site is comprised of one large tree, or two to six small trees, or both. The sleeping area is important as most of a group’s activities start and terminate here; this is the place where langurs spend their maximum time (Chhangani, 2000).

Very little quantitative information on sleeping sites and factors responsible for shifts in sleeping sites are available for forest Hanuman langurs. This study reports important aspects of sleeping sites that help langurs survive in the KWS forest ecosystem.

Data presented in this paper are part of a long-term study of the eco-behavioral diversity of Hanuman langurs carried out in and around KWS. This study was initiated in December 1995 and continued until December 2000 and data was collected *ad libitum* as well as by scan and focal sampling methods as described by Altman (1974). Initially, 15 and later 16 groups of Hanuman langur were studied, with 540 animals studied overall.
Material and Methods

The Study Site

The Kumbhalgarh Wildlife Sanctuary (KWS) lies between 20°5’ and 23°3’N and 73°15’ and 73°45’E, 200 km south of Jodhpur in the west Aravalli hills of Rajasthan. The total area of KWS is 585 km². The altitude varies from 270 to 1135.5 meters above sea level. KWS is characterized by distinct winter, summer and monsoon seasons. During summer temperature fluctuates between 30 and 35°C and may rise up to 46°C during May and June. The mean temperature in winter is 5°C and may go down to 2°C from December to January. The average rainfall is 725mm, with a maximum of 950mm and a minimum of 403mm. The forest is broadly dry or deciduous or woodland type dominated by ‘gorya dhawa’ (Anogeissus latifolia), salar (Boswellia serrata), gol (Lannea coromandelica), kherni (Wrightia tinctoria), dhawa (Anogeissus pendula), kumbat (Acacia Senegal), khair (Acacia catechu), ber (Zizyphus mauritiana), and dhang (Butes monosperma). The undergrowth mainly consists of jharber (Zizyphus nummerlaria), aridna (Adhatada vasica) gangan (Grewia tenex) franger (Grewia flavescens), kanter (Capparis separaia), and lantana (Lantana indicus). Some climbers and grasses also are found.

The main fauna of KWS includes leopard (Panthera pardus), hyena (Hyaena hyaena), Indian wolf (Canis lupus), jackal (Canis aureas), sloth bear (Melwashus ursinus), four-horn antelope (Tetracerus quadricornis), chinkara (Gazella g. benetti), Porcupine (Hystrix indica indica), sambar (Cervus unicolor), blue bull (Boselaphus tragocamelus), toddy cat (Paradoxurus hermapodius), jungle cat (Felis chaus), fox (Vulpis bengalensis), crocodile (Crocodilius palustris) and rock python (Python molurus).

Study Groups

Out of 16 study groups (11 bisexual and five all-male bands), three troops living in about 48km² of different habitats within the Aravalli Mountains were studied intensively. The three habitats basically are uniform in respect to climate, rainfall, topography, altitude, and vegetation; but there were variations in predator pressure and human impact caused by such factors as artificial feeding, cattle grazing, wood cutting, agricultural activity and settlement (Table 1). The focal bisexual groups originally were numbered B-2, B-5 and B-10.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Ecosystem-I</th>
<th>Ecosystem-II</th>
<th>Ecosystem-III</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Troop (B-2)</td>
<td>Troop (B-5)</td>
<td>Troop (B-10)</td>
</tr>
<tr>
<td>Human interference</td>
<td>Present</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Human settlements</td>
<td>Present</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Grazing</td>
<td>Allowed</td>
<td>Allowed</td>
<td>Not Allowed</td>
</tr>
<tr>
<td>Tree cutting</td>
<td>Present</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Artificial feeding</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Agricultural activity</td>
<td>Present</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Highway traffic</td>
<td>Present</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Predators</td>
<td>Panther, jackals, wolf, dog</td>
<td>Dogs only</td>
<td>Panther, hyena, wolf, jackals</td>
</tr>
</tbody>
</table>
Results and discussion

Selection of sleeping sites

The selection of sleeping trees and sleeping sites by KWS langurs was mainly influenced by predator presence in their home ranges. All of the 16 groups had their sleeping sites distributed throughout the home range except in the case of temple troop B-5, which always roosted inside the 4.5m temple boundary wall. Troop B-2, B-5 and B-10 had 4, 3, and 5 sleeping sites respectively. The details of sleeping sites and sleeping trees are summarized in Table 2.

Selection of sleeping sites is important as langurs spend 8-13 hours there during the night. Usually old females and females with infants went first to sleeping trees, followed by juveniles, white coats, sub-adults, young females and the male leader. Average time between the first and last group member entering a sleeping site was 15-25 minutes.

Each sleeping site had more than two tall, straight trees. In the case of predator attacks during the night, langurs might shift from one tree to another or move to other trees close by. The number of sleeping trees in a sleeping site was greater in a higher predation risk area than in a lower predation risk area. For example, sleeping sites averaged 4.2 trees for B-10, 2.75 trees for B-2 and only 1.6 trees for B-5 (see Table 2). Average height of sleeping trees was 12.1m (range 6-20m) with 4-6m of straight trunk. Trees with long and straight trunks surrounded by six to ten contiguous trees were selected for roosting purposes.

Sometimes troop B-2 was observed sleeping on E. camaldulensis trees that were straight with the main trunk branching at a height of 10-15m. Similar observations were made on langurs by Jagtawat (1999) in the same kind of habitat in the Aravalli Range at Mount Abu. He found that in the evening before sunset langurs climbed to the top of trees and perched on the delicate branches where predators could not reach them.

Shifting of sleeping trees

Shifts in sleeping sites were observed on 15 occasions in bisexual troops and all-male bands including the focal troops. As crops matured, troop B-2 started roosting in F. racemosa and E. camaldulensis adjacent to a farm in order to invade the fields. When chased by the farm owners and pet dogs, the langurs withdrew to two more distant sleeping sites. In Ranakpur temple complex, troop B-5 attempted to roost on a F. benghalensis tree that was located in front of the temple office. The langurs repeatedly soiled the office area by urinating and defecating at night and were chased out by temple guards throwing stones and making loud noises using tin boxes.

Sometimes langur groups were observed to shift their sleeping site because of harassment by other animals living in their home range. For example, honey bees (Apis orseta) and the golden black wood packer (Microplemaus brachyurus) were observed attacking, chasing, and harassing langurs. Sometimes intraspecific interactions also forced langurs to shift their sleeping sites. The most common attacks were from the all-male bands, AMB3 and AMB4. These bands used to roam and encroach on the home ranges of study troops. Nevertheless, at times these intruders shared the same roosting trees. Three groups, consisting of two all-male bands and one bisexual troop, were observed using the same F. benghalensis tree to roost.

Acknowledgements

This study is part of the Indo-US Primate Project, a collaborative project of the Ministry of Environment and Forests, Government of India, and United States
Fish and Wildlife Service (Grant Agreement No. INT/FWS-22). I would like to thank Professor S.M. Mohnot, Director, Indo-US Primate project, staff and officials of State Forest Department, especially Mr. Lalit Singh Ranawat, A.C.F. of Khumbhalargh Wildlife Sanctuary and Manager Ranakpur Temple Board for their support during this field study.

Table 2: Number of sleeping sites, sleeping trees and their heights used by three Hanuman langur troops in KWS study area

<table>
<thead>
<tr>
<th>Study troops (No of sleeping sites)</th>
<th>Sleeping sites</th>
<th>No. of trees in sleeping sites</th>
<th>Plant species as sleeping trees</th>
<th>Height of sleeping trees (in meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Savika troop B-2 (4)</td>
<td></td>
<td></td>
<td>Ficus benghalensis</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>a</td>
<td>1</td>
<td>Ficus racemosa</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b</td>
<td>1</td>
<td>Eucalyptus camaldulensis</td>
<td>12, 18</td>
</tr>
<tr>
<td></td>
<td>c</td>
<td>2</td>
<td>Azadirachta indica</td>
<td>8.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Eucalyptus camaldulensis</td>
<td>20.18</td>
</tr>
<tr>
<td></td>
<td>d</td>
<td>1</td>
<td>Ficus benghalensis</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Azadirachta indica</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Eucalyptus camaldulensis</td>
<td>18+</td>
</tr>
<tr>
<td>Temple troop B-5 (3)</td>
<td></td>
<td>1</td>
<td>Ficus benghalensis</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>a</td>
<td>2</td>
<td>Tamarindus indica</td>
<td>16+</td>
</tr>
<tr>
<td></td>
<td>b</td>
<td>1</td>
<td>Azadirachta indica</td>
<td>12.10</td>
</tr>
<tr>
<td></td>
<td>c</td>
<td>1</td>
<td>Tamarindus indica</td>
<td>14+</td>
</tr>
<tr>
<td>Forest troop B-10 (5)</td>
<td></td>
<td>4</td>
<td>Lannea coromandelica</td>
<td>10-14</td>
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<tr>
<td></td>
<td>a</td>
<td>2</td>
<td>Boswellia serrata</td>
<td>14, 16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Anogeissus latifolia</td>
<td>12, 15</td>
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<td></td>
<td>b</td>
<td>1</td>
<td>Lannea coromandelica</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Azadirachta indica</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Albizia procera</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>d</td>
<td>2</td>
<td>Lannea coromandelica</td>
<td>10.14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Boswellia serrata</td>
<td>12.15</td>
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<tr>
<td></td>
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<td>1</td>
<td>Albizia procera</td>
<td>10</td>
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<td>10, 12</td>
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<td></td>
<td></td>
<td>2</td>
<td>Lannea coromandelica</td>
<td>12.15</td>
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<td></td>
<td></td>
<td>1</td>
<td>Boswellia serrata</td>
<td>13</td>
</tr>
</tbody>
</table>

References


MASSIVE HABITAT LOSS FOR PRIMATES IN ASSAM'S SONITPUR DISTRICT

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Introduction

Sonitpur district is located in central Assam bordering Arunachal Pradesh (26°20'–27°03'N, 92°18'–93°48'E). Sandwiched between the Himalaya and the Brahmaputra rivers, it covers 5324 km². The terrain is mostly flat plain with small areas of foothills in the north, especially in Nameri National Park. Four species of primates have been recorded: slow loris (Nycticebus coucang), Assamese macaque (Macaca assamensis), rhesus macaque (M. mulatta) and capped langur (Trachypithecus pileatus) [Choudhury 1989, 1997]. The situation is alarming in that large-scale encroachment has resulted in loss of almost half of the habitat of the forest-dwelling primates, mostly during the last five years.

Primate Habitat and Status

Tropical wet evergreen and semi-evergreen (rainforest) dominates the vegetation type of the district with patches of deciduous plantations, mostly sal (Shorea robusta) and teak (Tectona grandis). Artocarpus chaplasha, Amoora wallichii, Duabanga sonneratiioides, Bombax ceiba, Terminalia myriocarpa, and Tetrameles nudiflora are the main tree species in natural forests. There are patches of grassland along the rivers and in Sonai-Rupai Sanctuary. Elsewhere, village environments, urban centers and tea plantations are the main habitat.

The slow loris was always very rare on the north bank of the Brahmaputra river (Choudhury 1992) and in Sonitpur; it is confined to the good-quality forests of the north bordering Arunachal Pradesh. It has been recorded from Charduar RF, Sonai-Rupai Sanctuary, Balipara RF, Naduar RF, Nameri National Park, Behali RF, and Biswanath RF. It has vanished from Gohpur RF due to large-scale space encroachment in the late 1980s and early 1990s. There are also a number of records of capture from tea plantations adjacent to forest, notably in the Bor-Dikorai tea garden in the 1980s and 1990s.

The Assamese macaque is also very rare and occupies a more northerly range restricted to denser forest. It has been recorded in all the areas mentioned for the slow loris. The rhesus macaque is very common and is the most abundant primate of the district. It occurs all over: in the forest, tea gardens, village woodlands, and even in the temples in the district headquarters at Tezpur. The capped langur is also common but confined to the forests. There was a population in a small patch of woodland in a tea garden at Mijikajan. Unlike the Assamese macaque, the langurs occupied a larger area in the forest as they extended well up to the fringe towards the southern boundary of the reserved forests.

Massive Habitat Loss in the 1990s

Poaching of primates was never a major threat in Sonitpur area (Choudhury, 1996). Occasionally some Bangni (a clan of Nishi or Dafila tribe) and Nishi hunters killed a few animals near Assam-Arunachal Pradesh border for food. Habitat loss was a problem all over northeastern India, including the Sonitpur. However, since the mid-1990s, an unprecedented flow of encroachers belonging to the Bodo tribe started cutting down trees and constructing temporary hutsments. By the end of 2000, they had completely devastated Charduar RF, three-fourth of Balipara RF, almost the
entire Naduar RF, and parts of Behali, and Biswanath RFs (Figure 1).

Table 1. shows the notified areas of these reserved forests and sanctuaries and the encroached area as of approximately April 2001. No slow loris or capped langur is likely to survive in the destroyed area of about 600 km². They would either be killed by predators, domestic dogs, or village youths. During a visit to Naduar RF in March 2001, I could see a group of capped langurs in a patch of about 10 ha of trees surrounded by devastation with little chance of survival. Although normally Bodos do not take primate meat; some youths have developed this habit, especially when it is easily available. The rhesus macaques could manage to survive in the adjacent tea gardens, village woodlands and degraded forest. The Assamese macaques did not suffer much as they were confined to border areas having contiguous habitat in Arunachal Pradesh.

<table>
<thead>
<tr>
<th>Name of the area</th>
<th>Area in kms</th>
<th>Forest encroached in 1990-2000, in kms (Approx.)</th>
<th>Primate Species found</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balipara RF</td>
<td>190</td>
<td>120</td>
<td>S,A,R,C</td>
<td>Mostly after 1995; still continuing</td>
</tr>
<tr>
<td>Behali RF</td>
<td>140</td>
<td>70</td>
<td>S,A,R,C</td>
<td>Continuing</td>
</tr>
<tr>
<td>Biswanath RF</td>
<td>110</td>
<td>60</td>
<td>S,A,R,C</td>
<td>Continuing</td>
</tr>
<tr>
<td>Charduar RF</td>
<td>241</td>
<td>200</td>
<td>S,A,R,C</td>
<td>Started in early 1990s; still continuing</td>
</tr>
<tr>
<td>Gohpur RF</td>
<td>133</td>
<td>133 (See remarks)</td>
<td>R</td>
<td>Entire RF encroached in 1980-1995; S,A and C are locally extinct.</td>
</tr>
<tr>
<td>Naduar RF</td>
<td>81</td>
<td>60</td>
<td>S,A,R,C</td>
<td>Mostly after 1997; still continuing</td>
</tr>
<tr>
<td>Nameri NP</td>
<td>200</td>
<td>Negligible</td>
<td>S,A,R,C</td>
<td></td>
</tr>
<tr>
<td>Singlijan PRF</td>
<td>14</td>
<td>&lt;6</td>
<td>S?, A?, R,C</td>
<td>S and A not seen but possible.</td>
</tr>
<tr>
<td>Sonai-Rupai WS</td>
<td>220</td>
<td>&gt;20</td>
<td>S,A,R,C</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>1329</td>
<td>670 (50%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Calculated from the maps of State of Forest Report (Government of India) 1999, Forest Department maps, and field visit
NP= National Park, WS= Wildlife Sanctuary, PRF= Proposed RF, S= slow loris, A= Assamese macaque, R= rhesus macaque, C= capped langur.

Discussion

Although habitat destruction is a common phenomenon, especially in the less developed tropics, this case is rather unusual; about 50% was completely devastated within a span of about only 5 years. Among the primates, the capped langur and slow loris have suffered the most and both species have already vanished from many areas. The loss of langur and loris population was apparently about half of the actual population that survived in the early 1990s as the loss of habitat indicated. The areas where I sighted langurs as recently as 1996-99 have no trees left.
There was also little chance for these primates to escape to the contiguous forests of Arunachal Pradesh as destruction was haphazard and the langurs (and perhaps the lorises) were confined to 'islands' of trees here and there. Subsequently such 'islands' were also cleared. The local forest authorities had evicted the encroachers on a few occasions but due to lack of follow-up and security measures, they came back again. Even with eviction, the langurs and lorises have no chance to recover due to lack of tree-cover and it will take many years to regenerate. Nameri National Park and Sonai-Rupai Sanctuary, as of now, remain as two pockets where the habitat is largely intact. Both these areas are contiguous with the forests in Arunachal Pradesh. Besides primates, other species severely affected were the hornbills and wild elephants (Elephas maximus). The pachyderms have moved to Tezpur town and man-elephant conflict is at its worst.

**Recommended Actions**

Eviction of encroachers should be carried out in the reserved forests and fringe of Sonai-Rupai Sanctuary with proper follow up by setting up armed Guard Camps to prevent re-encroachment. This area is part of bhabar tract, where without good forest cover, the water table will go down rapidly making it unsuitable for cultivation as well as habitation, as experienced in parts of Kokrajhar district.

Since this devastation has affected a large population of wild elephants besides primates and other wildlife, the entire belt needs to be brought under wildlife management. Nameri already was declared a Project Tiger Reserve with parts of Naduar and Balipara RFs as buffer zones in 2000. A proposal to include Sonai-Rupai Sanctuary and adjacent reserved forests within its fold is ready but the authorities are now not keen to do so. This should be done immediately to prevent further damage to the habitat. Protection measures in the entire belt should be strengthened.

**References**


**THE PRIMATES OF CHINA: BIOGEOGRAPHY AND CONSERVATION STATUS**

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On the basis of field surveys in three representative regions of China, we developed questionnaires with certain items tailored for conditions particular to specific areas. The questionnaires were completed by experts in 18 provinces, permitting us to collect the most
comprehensive information on primate species distributions, population numbers, and conservation status in China to date. The task was started in spring 2000 and completed recently. Using a biogeographic framework for basic statistical comparisons between species and regions, we generated a series of maps that reveals the biogeographic features and conservation status of each of the 21 species of primates in China today. The maps also include substantial regions where information on particular species is insufficient for mapping. Taken as a whole, these maps provide a broad base of information for developing a primate conservation action plan. The maps have been compiled by GIS (ARC/INFO), and will be published in electronic format within a book entitled The Primates of China: Biogeography and Conservation—Map Supplement.

The distribution of primates in China reflects the influence of long-term changes in the Asian continents’ monsoonal climate and vegetation zones. The most important dividing line between the climates of northern and southern China lies along the east-west-running Qinling Mountain Range and the Huai River. This line also marks the northern boundary of the central subtropical climate zone and the zoogeographic dividing line between the Palearctic region and the Oriental region. The vast majority of the primates in China are distributed across the regions south of this line. Over half of the species of primates in China are concentrated in the southern subtropical region. The northern border of the monsoonal warm zone is the northern limit of primate distribution in China. In climatic terms, it corresponds to the 500mm isohyet (line of equal rainfall), a line that also corresponds in topographic terms with the boundary between the eastern hills and lowlands (“first step”, as indicated on the maps) and the higher mountains and plateaus in the north and northeast (“second step”), and with the boundary between the “second step” and the Qinghai-Tibetan Plateau to the west (“third step”).

According to historical records, the regional nature of primate distribution patterns was similar to what now exists today, but the actual distributions of particular species were much greater in area. Fossil records indicate that since the Pleistocene, primates in China have followed north-south shifts in the climate zones. Due to different climatic constraints on each species, however, the degree of north-south distributional fluctuation has varied considerably between species. The wet monsoonal and semi-humid monsoonal regions were the most important ecoregions for the ancestors of the primates presently found in China.

To estimate primate population numbers in China, we adopted the method of using a known number of primates in particular areas and extrapolating based on the total number of such areas where a particular species is actually known to occur. This method results in population estimates that are lower than those derived by other methods in which extrapolations are based on what would appear to be suitable habitat for a given species without field verification. With the exception of the rhesus macaque (Macaca mulatta), which is especially abundant with an estimated 80,000 individuals in the wild, species are divided into groups by population size as follows:

**Most Common (Roughly 20,000)**
- Golden snub-nosed monkey
  
  (Rhinopithecus roxellana)
- Tibetan stump-tailed macaque
  
  (Macaca thibetana)

**Common (5,000-7,000 or more)**
- Phayre’s langur
  
  (Trachypithecus phayrei)
- Assamese macaque
  
  (Macaca assamensis)
Less Common (roughly 3,500)
Francois's langur
(Trachypithecus francoisi)
Stumptail macaque
(Macaca arctoides)

Uncommon (roughly 1,500)
White-headed langur
(Trachypithecus leucocephalus)
Slow loris
(Nycticebus coucang)
Black snub-nosed monkey
(Rhinopithecus bieti)
Common langur
(Semnopithecus entellus)

Rare (roughly 1,000)
Gray snub-nosed monkey
(Rhinopithecus brelichi)
Crested gibbon
(Hylobates concolor)
Pigtail macaque
(Macaca leonina)

Very Rare (300-600)
Intermediate loris
(Nycticebus intermedius)
Capped langur
(Trachypithecus pileatus)
Hoolock gibbon
(Hylobates hoolock)

Extremely Rare (roughly 100 or less)
Pygmy loris
(Nycticebus pygmaeus)
White-cheeked gibbon
(Hylobates leucogenys)
Lar gibbon
(Hylobates lar)

Each species can be ranked by degree of endangerment according to the following criteria: 1) number of individuals; 2) number of remaining populations; 3) number of populations in nature reserves; 4) number of large populations (with 500 or more individuals); 5) number of small populations (with roughly 15 individuals or fewer); and 6) recently lost populations. After each of these factors has been accounted for and their cumulative significance assessed, we can place each species within one of the following categories according to its degree of endangerment:

1) Extremely Endangered: Lar gibbon, white-cheeked gibbon, hoolock gibbon, capped langur, and intermediate loris
2) Highly Endangered: pygmy loris, gray snub-nosed monkey, and white-headed langur
3) Endangered: crested gibbon, pigtail macaque, Black snub-nosed monkey, common langur
4) Extremely Threatened: Phayre's langur, slow loris, Francois's langur, stumptail macaque, Assamese macaque
5) Highly Threatened: Rhesus macaque, Black snub-nosed monkey, Tibetan macaque

The authors recommend that this new classification system, which is based on actual field evidence, be implemented in place of the older, more generalized tripartite system that differentiated three categories of protection – endangered, vulnerable, and hunting controlled. Furthermore, the new system should provide the foundation for an action plan for Chinese primate conservation in the 21st century.

This research has been made possible by a grant from the National Geographic Society, organizational support from the Chinese Forestry Administration Conservation Section, and field support from numerous zoologists and nature conservation officials all over China.

(Editor's Note: In recognition of a multi-genera model of Presbytis, in which both Semnopithecus and Trachypithecus are resurrected as distinct genera (see Colin Groves Primate Taxonomy, 2001), appropriate changes have been made in the original manuscript in which langur species were referred to Presbytis. The genus Presbytis Eschscholtz 1821 is used sensu stricto and is usually confined to Sundaland taxa. No changes have been made on the specific level. A Taxonomy of Asian Primates: A Working Document from the Workshop “Primate Taxonomy for the New Millennium”, 2000, recognizes the four subgenera of Hylobatidae as genera: Bunopithecus, Hylobates, Nomascus and Symphalangus.)
ORANGUTAN
REINTRODUCTION AND
PROTECTION WORKSHOP

Originally the Wanariset Orangutan Reintroduction Project (ORP) had
planned a workshop on Orangutan Reintroduction and Protection
Perspectives after 10 years of operation (see Asian Primates, vol. 7, nos.
3&4). Subsequently Dr. Willie Smits of the Wanariset Orangutan Reintroduction
Project invited the IUCN Conservation Breeding Specialist Group (CBSG) to
conduct an orang-utan conservation workshop. The aim of this workshop,
sponsored by the Wanariset Orangutan Reintroduction Project, the Balikpapan
Orangutan Survival Foundation, the Gibbon Foundation, and the Balikpapan
Orangutan Society-USA, was to bring together world experts to address the
threats facing the critically endangered orang-utan and to identify potential
solutions. The workshop was held 15-18 June, 2001 in Balikpapan, East
Kalimantan, Indonesia. Attendees representing 12 countries numbered 104
and included scientists, field researchers, veterinarians, captive managers, funding
organizations, NGOs, and government and wildlife agency representatives. The
workshop was broken down into the following working groups: Reintroduction and
Rehabilitation, Veterinary Issues, Habitat and Species Protection, Identification of New Field
Research and Release Sites, Socio-economic and Governance Issues, and
Public Awareness and Education. All
groups were asked to consider the over-
arching issues of: research, funding and
implementation.

At the beginning of the workshop, there
was agreement among the participants
that the general desired outcome was to
avoid extinction of the species. A total
of 19 key strategies were developed and
unanimously accepted by workshop
participants, based on the 3-4 most
critical strategies identified by each
working group. The major issues which
emerged as top priorities are:

- Stop illegal logging
- Increase sustainable economic
  alternatives for communities
  surrounding critical orang-utan
  habitat
- Assure sustained funding for the
  long-term in-situ orang-utan research
  vital for effective orang-utan
  conservation
- Create a national campaign to instill
  national pride in the orang-utan and
  its environment
- Recommend that ex-captive orang-
  utans are only released into suitable
  habitat that does not contain and is
  geographically isolated from wild
  orang-utan populations

The consensus of this workshop was
that habitat loss through illegal logging
and land conversion is the greatest threat
to the orang-utan. There is no time left.
Ultimately, the survival of the wild
orang-utan is the responsibility of the
Indonesian and Malaysian governments.
Unless there is the political will to commit
to saving the orang-utan, this primate will
not survive. The international community
shares responsibility and its support is
critical in ensuring the survival of the
species. Details of the workshop can be
found in the final report which is
available from the CBSG Office.

Conservation Breeding Specialist Group
c/o Minnesota Zoo
12101 Johnny Cake Ridge Road
Apple Valley, MN 55124 USA

JAVAN GIBBON RESCUE AND
REHABILITATION CENTER

Following a dedicated workshop held at
the XVIIIth Congress of the International
Primatological Society in Adelaide,
Australia in January 2001, planning is
well advanced to build a gibbon
rehabilitation center in Java, Indonesia.
Conservation International applied to the Margot Marsh Biodiversity Fund for monies to match the amount that the Silvery Gibbon Project of Perth already had established with just such a center in mind. This amount is US$60,000, which will cover the initial construction of facilities and administrative costs for the first phase of this project. Funding to cover on-going running costs will need to be found and the Javan Gibbon Conservation Consortium, established to administer the center, will welcome inquiries from prospective partners.

The Javan or Silvery Gibbon (Hylobates moloch) is endemic to the island of Java and one of the most endangered gibbon species. The species was assessed as Critically Endangered (CR) on the 2000 IUCN Red list of threatened species (Hilton-Taylor, 2000). The remaining animals in the wild have been estimated at between 400 and 3,000, occurring in about 20 forested areas mainly scattered over West Java. Many of these smaller populations are considered non-viable in the long term. Although recent discoveries show that the Central Javan population may be larger than previously assumed (Nijman and van Balen 1998), population estimates still suggest that intervention will be necessary in order to conserve the species.

In addition to gibbons remaining in the wild, approximately 80 gibbons are kept illegally as pets throughout Java, and it is these animals that will be the focus of the Javan Gibbon Rescue and Rehabilitation Center.

The objective of the center is to receive these donated or confiscated Javan gibbons and to place them into a rescue, rehabilitation, breeding and re-introduction program. The immediate aim is to assess their medical and psychological health, in order to restore them to full health. The ultimate aim is re-introduction into the wild. This objective, however, is not short term, as behavioral rehabilitation also involves the gibbons’ abilities to form family groups. Any re-introductions would be based on specific guidelines for gibbon re-introduction derived from IUCN/SSC recommendations. These would be drawn up by the International Recovery and Management Committee for the Javan Gibbon. As re-introduction of rehabilitated gibbons is one of the final conservation strategies to be used for the conservation of doomed populations, these gibbons should be managed at species level regardless of sub-species.

As mentioned above, the Javan Gibbon Rescue and Rehabilitation Center will be stocked with animals already held in captivity illegally. Essentially, the genetic material that these animals represent is considered too important to be lost to efforts aimed at saving this species from extinction. The Center will seek to achieve the goals agreed upon at the 1997 workshop for the rehabilitation and welfare of captive gibbons, and to utilize these animals for captive breeding, non-invasive research and education. Pair formation and breeding of rehabilitated gibbons will be encouraged, as will living in natural family groups following the anticipated breeding success.

As it has been designed initially, the Center could hold up to 16 adult gibbons at one time, ten in bonding enclosures and six in breeding cages, in addition to any offspring that are produced. Since at least 80 animals are thought to be in private hands on Java, provision will have to be made for the transfer of rehabilitated animals and pairs to other zoological institutions in Indonesia (through the Indonesian Zoo Association, PKBSI), as well as to foreign zoos and breeding programs in Asia, Europe and North America. In addition, it is likely that facilities at the Center will have to be expanded at some later date.

Should reintroduction of captive-bred animals to the wild ever become a possibility, these ex-situ populations could someday provide the stock for such
an experiment. For the foreseeable future, however, successes achieved at this Center in terms of rehabilitation and breeding will be targeted toward expanding the size and distribution of this endangered species' captive population.

The permanent staff for the Javan Gibbon Rescue and Rehabilitation Center will be Indonesian, with the provision for securing the services of expert advisors from abroad, especially during the project's early stages. Training in captive husbandry techniques will be provided not only to permanent staff, but also to representatives of PKBSI whose institutions are likely to receive captive gibbons through their collaboration with the Center. One important output of this project will be the production of a husbandry manual for distribution to institutions interested in housing and breeding Javan gibbons.

References

International Management Committee

Based upon the model that has proven so successful in managing both captive and wild populations of critically endangered lion tamarins in Brazil, this project will establish an International Management Committee for the Javan Gibbon. Indonesian and foreign stakeholders, experts and interested parties will comprise the Committee, and will represent the authority under which the Center for Rescue and Rehabilitation of the Javan Gibbon interacts with local, regional and national authorities, as well as with foreign institutions, for the integrated management of wild and captive Javan gibbon populations.

In the initial stages of the project the Committee will be composed of the following individuals:

Jaina Supriatna
Conservation International, Indonesia
Russell Mittermeier
Conservation International
Wahyudi
Wardoyo/Indonesian Ministry of Forestry
Widodo Ramono
Indonesian Directorate of Forest Protection and Nature Conservation
Dianne Gates
Silvery Gibbon Project/Perth, Australia
Leif Cocks
International Studbook Keeper/Perth Zoo
David Ware
Independent Consultant

On-going funding will be required to maintain the Center over the next decade, at least. For more information on this initiative, please contact:

Dianne Gates
Silvery Gibbon Project
e-mail: SGP@silvery.org.au
Tel 61 8 9293 3052
Silvery Gibbon Project
Website: www.silvery.org.au.

GRANTS

The Lincoln Park Zoo: Support for Field Research

The Lincoln Park Zoo Neotropic and Africa/Asia Funds support field research in conservation biology around the world. The Neotropic fund focuses on projects undertaken in Latin America and the Caribbean. The fund emphasizes the support of graduate students and other young researchers, particularly those from Latin America. Since 1986, the fund has awarded over 146 grants in 19
countries. The Africa/Asia fund, launched in 1997, focuses on projects throughout Africa, Asia, and the Pacific. Each fund typically supports between five and ten projects annually, including project renewals for a second year. Most awards fall into the range of $3,000-$6,000. Initial support is for up to 12 months from the date of award, and the maximum duration of support is two years. The current deadline for receipt of Neotropic and Africa/Asia proposals is 1 October. For additional information and application procedures go to:

http://www.lpzoo.com/conservation
E-mail: conservation@lpzoo.org
or, write to:
Lincoln Park Zoo NP/AA Funds,
Department of Conservation and Science,
Lincoln Park Zoo,
2001 N. Clark St, Chicago, IL 60614 USA

Wildlife Conservation Society -
Research Fellowship Program

The Wildlife Conservation society, New York Zoological Society, Bronx, New York, has established a Research Fellowship Program (RFP). The geographic preferences are: Africa, Asia, Latin America and their regional marine areas. Please note that the RFP does not support research in North America (excluding Mexico), Australia, or Europe and their territories. The RFP will not limit any individual from applying, however, most of the grantees are: professional conservationists from the country of research, and/or post-graduates pursuing a higher degree. There are the following restrictions: Organizations are not eligible for funding; previous research fellows are not eligible for funding for the same project; faculty and/or research advisors should not be listed as principal investigators unless they plan to carry out the majority of the field work; the principal researcher must write the proposal (those written on behalf of another individual will be disallowed). Applications must be post-
marked by 1 January and 1 July of every year.

Interested applicants may download the application from the website or e-mail the Program Coordinator and request an electronic RFP Application. For any queries or further information, please contact: Christina Ojar, Research Fellowship, at the below address.

Program Coordinator
Research Fellowship Program
Wildlife Conservation Society - International
2300 Southern Blvd.
Bronx, NY 10460 USA
Tel: +1 (718) 220-6828,
Fax: +1 (718) 364-4275,
e-mail: fellowship@wcs.org
Web address:
http://wcs.org/home/wild/researchfellowship/459

Sophie Danforth
Conservation Biology Fund

The Sophie Danforth Conservation Biology Fund (SDCBF), established by the Roger Williams Park Zoo and the Rhode Island Zoological Society in 1989, supports conservation programs which protect threatened wildlife and habitats worldwide. Field studies and other projects that demonstrate a multi-disciplinary approach to biodiversity and ecosystem conservation and projects that involve in-country collaborators receive the highest funding priority. Environmental education programs, development of techniques that can be used in a natural environment, and captive propagation programs that stress an integrative approach to conservation are also appropriate. The maximum annual request is US$1,000. The maximum total proposal length is one title page, a three-page proposal narrative (10 point type minimum), two-page CV and two letters of recommendation. Applications and letters of recommendation must be received by 1 June 2001. Grants are awarded 1 September 2001. Further information and
applications by e-mail, postal mail or fax to:
Sophie Danforth Conservation Biology Fund
Roger Williams Park Zoo
1000 Elmwood Avenue
Providence, Rhode Island 02907 USA
Fax: (401) 941-3988
E-mail: Lisa Dabek at l dabek@rwzoo.org

AZA International Conservation Training Award

The International Conservation Training Award may be applied toward any of the American Zoo and Aquarium Association (AZA) Professional Training courses. Its purpose is to promote professional training for our foreign zoological colleagues. Preference will be given to candidates who are currently involved in cooperative efforts with AZA member institutions or participating in TAGs, CAPs or SSPs. Employees of any zoo or aquarium outside the United States and Canada may apply. Applications for any of the courses and professional training awards may be obtained on the AZA website or from the AZA Training Administrator at the below addresses:

American Zoo and Aquarium Association
8403 Colesville Road, Suite 710
Silver Spring, MD 20910-3314 USA
(301) 562-0777 ext. 238
E-mail: ereinhard@aza.org
Web address: http://www.aza.org

AWARDS

Goldman Environmental Prize

On April 23 2001, environmental grassroots heroes from each of six continental regions received the twelfth annual Goldman Environmental Prize at a ceremony in San Francisco, California, USA. Each of the year 2001 winners received a “no strings attached” award of $125,000 from the Goldman Environmental Foundation. The Goldman Prize allows many to continue their work and expand public awareness of what are often life-and-death environmental crises.

The Asian recipient for 2001 is Yosepha Alomang, a community leader and member of the indigenous Amungme of West Papua (Irian Jaya, Indonesia). West Papua is among the most biologically diverse places on the planet, with severely at-risk virgin tropical rainforests. Three decades of mining practices by the world’s largest gold and copper mine, owned by Freeport McMoRan Copper & Gcld, Inc., of Louisiana, USA, and permitted by the Indonesian government, have destroyed rainforests, polluted rivers, and displaced communities. For over 20 years, Mama Yosepha, as she is known, organized her community to resist Freeport’s destruction and the government’s complacency, during which time she was detained, confined and tortured. Her ethnic group has declared independence to gain control over their resources, and their actions have been met with repressive and violent government action. Most recently, she created a women’s group dedicated to human rights, environmentalism, and traditional culture.

Sheik Mubarak Award, UAE

On 23 May 2001, The Sheik Mubarak Award was awarded to Dr. M.A. Reza Khan, of Dubai Zoo, for his scientific contribution to the natural history of the United Arab Emirates (UAE). The UAE Minister of Higher Education, His Excellency Sheikh Nahayan Bin Mubarak Al Nahyan, was the presenter of the award in the form of a check for 5,000 dirhams and a silver dhow. Dr. Reza Khan has authored eight books on the wildlife and environment of Bangladesh, in Bengali and English, as well as two books on the indigenous trees and the wild cats of the UAE respectively. He also has contributed articles for books published in India, UK and USA and more than 10,000 words for the Bangladesh Encyclopedia (Banglapedia),
to be published by the Asiatic Society of Bangladesh in 2002.

US Fish and Wildlife Service Award

On 30 June 2001, Shri Ashok Gehlot, Chief Minister of Rajasthan, India, presented a U.S. Fish and Wildlife Service “Certificate of Award” to Dr. S.M. Mohnot, during his superannuation (retirement) ceremony from J.N.V. University, Jodhpur. The Award Certificate carried the following message: “In special recognition of his lifelong commitment in furthering the science of primatology in India Dr. Surrendra Mal Mohnot is herewith commended for his leadership and major contributions to the Indo-US project on Primates 1994-2001 by the U.S. Fish & Wildlife Service”. The Indo-US Primate Project generated significant data on several endangered primate species found in different parts of India, including the hotspot area of northeast India, where little or no information existed on primate species prior to 1994.

Fred M. Packard International Parks Merit Award

On 28 May 2001, Marco Marsh accepted the Fred M. Packard International Parks Merit Award on behalf of his late father Dr. Clive W. Marsh at a conference in Mulu National Park in Sarawak, Malaysia. The award was presented by the IUCN/SSC World Commission on Protected Areas (WCPA) in recognition of outstanding service in furthering the conservation objectives of protected areas to society. Dr. Marsh was a strong supporter of WCPA and helped to establish and strengthen key conservation areas in Africa and Southeast Asia.

THE CLIVE MARSH CONSERVATION FUND

In order to honor his memory, the Clive Marsh Conservation Fund has been established to support conservation activities in Southeast Asia. The fund will cover small grants for Southeast Asian students to undertake field research that is related to conservation of wildlife and wildlands. It is hoped that sufficient funds additionally will be raised to create a Clive Marsh Fellowship, to be awarded to exceptional students for their field research. Clive, himself, already had encouraged these sorts of activities while he was working with Yayasan Sabah. This appears to be a fitting tribute that will carry on Clive’s work for conservation and help to build a cadre of local conservationists.

The Wildlife Conservation Society (WCS) already has established the Clive Marsh Conservation Fund (CMCF) with some private donations contributed in his memory. The Fund has been established as a small endowment fund, with grants to be funded from interest only. It will be managed under the WCS Asia Program, and WCS will match contributions on a dollar-to-dollar basis. All monies donated to the Fund will go 100% to field projects, none into administrative costs.

All donations should be sent to:

Wildlife Conservation Society
(c/o Linda Krueger, Program Manager, Asia Program)
Wildlife Conservation Society
2300 Southern Boulevard
Bronx, NY 10460-1099 USA
Tel: 718 220 3973
Fax: 718 364 4275
e-mail: lkrueger@wcs.org

Payments also may be made directly to the Wildlife Conservation Society Bank account, with prior notification to Linda Krueger. The bank account details are:
Wildlife Conservation Society (Clive Marsh Conservation Fund) 
A/C #: 133003663. 
Chase Bank ABA # 021000021 
4 New York Plaza 
New York, NY 10004-2413 USA.

RECENT PUBLICATIONS OF INTEREST


Summary: Human and nonhuman primates have intertwined destinies. As our closest evolutionary relatives, nonhuman primates are integral elements in our mythologies, diets and scientific paradigms, yet most species now face an uncertain future through exploitation for the pet and bushmeat trades as well as progressive habitat loss. New information about disease transmission, dietary and economic linkage, and the continuing international focus on conservation and primate research have created a surge of interest in primates. Focus on the diverse interaction of human and nonhuman primates has become an important component in primatological and ethnographic studies, and a field of investigation called ethnoprimate or cultural primatology is developing. By examining the diverse range of relationships between humans and other primates, and how this plays a critical role in conservation practice and programs, Primates Face to Face disseminates the information gained from the anthropological study of nonhuman primates to the wider academic and non-academic world. The book contains 15 chapters arranged into four sections. Part 1. Science and Nonhuman Primates: Anthropology and primatology, P. Dolhinow; Resistance to the cross-species perspective in anthropology, M.M. Pavelka; The ethics and efficacy of biomedical research in chimpanzees with special regard to HIV research, R.S. Fouts, D.H. Fouts and G.S. Waters. Part 2. Cultural Views of Nonhuman Primates: Monkey as food, monkey as child: Guaja symbolic cannibalism, L.A. Cormier; Ethnoecology of monkeys among the Barí of Venezuela: perception, use and conservation, M. Lizarralde; Primates in Matsigenka subsistence and world view, G.H. Shepard; Monkey King in China: basis for a conservation policy?, F.D. Burton; Reflections on the concept of nature and gorillas in Rwanda: implications for conservation, P. Sicotte and P. Uwengeli. Part 3. Conservation of nonhuman primates: Monkeys, humans and politics in the Mentawai islands: no simple solutions in a complex world, A. Fuentes; Conservation must pursue human-nature biosynergy in the era of social chaos and bushmeat commerce, A.L. Rose; A cultural primatological study of Macaca fascicularis on Ngaur Island, Republic of Palau, B. Wheatley, R. Stephenson, H. Kurashina, and K. Marsh-Kautz; Monkeys in the backyard: encroaching wildlife and rural communities in Japan, D.S. Sprague. Part 4. Government actions, local economies and nonhuman primates: The primatologist as minority advocate, A.A. Eudey; Monkey business? The conservation implications of macaque ethnoprimate in southern Thailand, L.E. Sponsel, N. Rutnandakul, and P. Natadecha-Sponsel; Rhesus macaques: a comparative study of two sites, Jaipur, India, and Silver Springs, Florida, L.D. Wolfe.


Summary: Surveys conducted in Indochina over the past decade have shown that Vietnam plays three overlapping roles in the wildlife trade: as a conduit for wildlife sources in surrounding countries, particularly Vietnam, Lao PDR and Cambodia en route to more lucrative markets; as a consumer; and as a source country in its own right. The article makes no specific mention of primates.


Summary: In this book, Colin Groves proposes a complete taxonomy of living primates, reviewing the history and practice of their classification and providing an up-to-date synthesis of recent molecular and phylogenetic research. He contends that the taxonomic designation of individual species is the starting point for conservation, and that the taxonomy of living species is critical to understanding evolutionary relationships. In all, 360 species and 601 taxa are listed. This book is divided into two parts. Part 1 The theory of primate taxonomy. What taxonomy is meant to do and
how it should do it; Taxonomic ranking and nomenclature; A brief history of primate taxonomy; Taxonomy of primates above the family level. Part 2. Putting Primate Taxonomy into Practice, and reviews the taxonomy to subpecies level of Malagasy lemurs, Lorisiformes, Tarsiiformes, Platyrhini, Old World monkeys - Superfamily Cercopithecoidea, and Hominoids - Superfamily Hominoidea. There is an appendix 'A Word about Fossil Primates', and finally a glossary. (there are more primates however - a number were described after his book went to print). For each group of primates, taxonomy is discussed at the family and subfamily level. The genera are divided into species groups where appropriate. Scientific name, author, synonyms, diagnosis, and distribution are given for each species. Similar the treatments are given to subspecies except that common names are not provided.


**Summary:** The phylogeny and systematics of the genus *Pygathrix* is still controversial. This is caused by the fact that douc langurs are rare in the wild and in institutional collections - as living or as museum specimens. We present herein the first molecular study, in which DNA sequences of a 576 basepairs long fragment of the mitochondrial cytochrome b gene from the three extant douc langur taxa are described. Our data show, that *P. nigripes* is the most basal group, whereas *P. cinnereus* and *P. nemaeus* are sister taxa. Based on the molecular distances we propose that all three taxa should be recognized as separate species. Furthermore, within *P. nemaeus* and *P. nigripes* two distinct clades were found, which may reflect geographic variations or even distinct subspecies.


**Abstract:** We describe DNA sequences for the mitochondrial control region and phenylalanine-tRNA from the four extant gibbon subgenera. In contrast to earlier studies on gibbon phylogeny that used other parts of the mtDNA, the control region depicts the crested gibbon (*Nomascus*) as the most basal group of the Hylobatidae, followed by *Symphalangus*, with *Bunopithecus* and *Hyllobates* as the last to diverge. Our data show that the molecular distances among the four gibbon subgenera are in the same range as those between *Homo* and *Pan*, or even higher. As a consequence of these findings, we propose to raise all four gibbon subgenera to genus rank.


**Abstract:** Among the 19 extant species of the genus *Macaca* that are found in southern and eastern Asia as well as northwestern Africa, the Formosan macaque is one of the least known. A long-term field study to investigate the population dynamics and social behavior of 7-16 troops of free-ranging Formosan macaques at Mt. Longevity, Taiwan has been conducted since July 1993. Between Dec. 1994 and Dec 1997, a systematic census was conducted on a biweekly basis to record data on the demography of Formosan macaques. We used focal animal sampling and ad libitum sampling twice per week in respective troops to record data on social behavior including male replacement and fission processes. The maximum density of macaques has been estimated as 26 individuals per km² in Oct. 1997. The average troop size was 26.1 ±9.7 (n=7) in Jan. 1995 and it reached the highest level of 47.0 ±21.2 (n=13) in Aug. 1997. Two cases of fission were observed. The branch troops, 1a and Aa, that were formed as a result of fission had the smallest size with 9 individuals in the beginning, while troop I had the largest size of 86 individuals. Births were recorded mainly between Apr. and June (97%) with a peak in mid-Apr. to mid-May. The annual average overall sex ratio was 1.06 ±0.28, while the adult sex ratio (adult males to adult females) was 0.53 ±0.12. The average tenure length of alpha males was 16.8 ±18.9 months (n=34) and ranged from 1 week to a maximum of 6 years. The average alpha male tenure in newly formed troops was significantly shorter (p< 0.01) than that in the remaining troops. About 88% of alpha male changes occurred between Oct. and Feb., which paralleled the peak and the end of the mating season, respectively.

Abstract: Environmental changes during the Pleistocene in eastern Asia had profound impacts on the distributions of mammalian groups. Critical for many mammals were the southward latitudinal shifts of the tropical and subtropical vegetational zones, and decreases in the areas of these zones. Examination of the responses of members of a single clade, the Catarrhini, indicates that the main catarrhine genera of eastern Asia responded individually to the environmental changes in the Pleistocene. These responses were influenced by the life history parameters and diets of the genera involved. Those animals (macaques, langurs) with shorter gestation times, shorter weaning periods, shorter interbirth intervals, higher intrinsic rates of increase of population, and abilities to survive on a wider variety of vegetation in seasonal habitats were less adversely affected than those (gibbons, orang-utans, and the giant extinct hominoid, *Gigantopithecus*) with more protected reproductive schedules, lower intrinsic rates of population increase and preferences for the higher quality foods (especially ripe fruits) of less seasonal environments. Hominids, while displaying "hyper-ape" life history parameters, increasingly overcame the constraints of these parameters through extra somatic means not available to other catarrhines. This ability made possible their colonization, by the Late Pleistocene, of highly seasonal habitats such as tundra, which were off-limits to non-culture-bearing catarrhines.


Summary: This book is a collection of 13 chapters, seven of which were written by Vincent Nijman while six were co-authored by him, and constitutes his doctoral thesis presented to the University of Amsterdam in 2001. The chapters, including seven published previously, are the result of research on Indonesian primates on Borneo (Kalimantan) and Java conducted in the field and museums during 1994-2001. The chapters include: Density and biomass estimates of gibbons (*Hylobates muelleri*) in Bornean rainforest; a comparison of techniques, with S.B.J. Menken; Effects of behavioral changes due to habitat disturbance on density estimation of rain forest vertebrates, as illustrated by gibbons (Primates: Hylobatidae); Calling behaviour of wild Javan gibbons *Hylobates moloch*, with T. Geissmann; Geographical variation in pelage characteristics in grizzled leaf monkey *Presbytis comata* (Desmarest 1822); Occurrence and distribution of grizzled leaf monkey *Presbytis comata* (Desmarest 1822) in Java Indonesia; Geographical distribution of ebony leaf monkey *Trachypithecus auratus* (Geoffroy Saint Hilaire 1812); A faunal survey of the Dieng Mountains, Central Java, Indonesia: status and distribution of endemic primate taxa, with S. (Bas) Van Balen; Distribution and conservation of the proboscis monkey *Nasalis larvatus* in Kalimantan, Indonesia, with Erik Meijaard; The local extinction of the proboscis monkey *Nasalis larvatus* in Pulau Kaget Nature Reserve, Indonesia, with Erik Meijaard; Patterns of primate diversity on Borneo and selection of priority areas for conservation, with Erik Meijaard. The major synthesis of the work is the re-assessment of the conservation status of endemic primates on Java and Borneo using the categories and criteria applied in the 1996 IUCN Red List of Threatened Animals. Abstracts of each chapter and the concluding summary appear in Bahasa Indonesia as well as English, with the exception of the introduction, acknowledgments and general discussion.


Introduction: The purpose of this manual is to provide basic husbandry guidelines to loris managers, caretakers, and veterinarians. The information in this manual has been compiled from numerous articles, reports, and personal experiences by the authors and editors. As an increasing number of institutions become involved with the management of these specialized prosimians, it has become essential to have this information available in a usable format. The three loris types each have unique
characteristics that are species specific. However, because they share many of the same management methods, housing conditions, and behavioral characteristics, the editors decided that information about all three loris species should be included in this volume. The contents include: Taxonomy and Description; Distribution and Status; History of Lorises in Captivity; Behavior; Reproduction; Infant Care; Diet (composition both in the wild and captivity); Health; Habitat Design; and Map References.

In 1995, The Pygmy Loris Species Survival Plan (SSP) was established through the American Association of Zoos and Aquariums (AZA). One of the goals of this group is to develop a self-sustaining captive population of this species. Along with the Pygmy Loris Masterplan (prepared by H. Fitch-Snyder in 1998), this husbandry manual is intended as a tool to assist toward this goal.

Additional information, particularly for slender loris husbandry, may be obtained directly from:

Helga Schulze
Department of Neuronaomy, Ruhr-University,
MA 6/161 b, D-44780 Bochum, GERMANY
E-mail: helga.schulze@cityweb.de


Summary: The purpose of this volume is to draw attention to the complex nature of the bushmeat crisis in West and Central Africa, and to serve as a starting point for dialogue across sectors about how to best develop and implement solutions. The ideas here are neither a manual of conservation actions, nor a prescription for addressing the bushmeat crisis. Instead, a collection of diverse perspectives is presented to offer a framework for action, one that is based on the social, cultural and ecological context within which the bushmeat problem has arisen. The wildlife and human dimensions are analyzed by experts, all of whom submit their own methods, perspectives, and beliefs to help strengthen conservation initiatives. Each chapter was originally commissioned by Conservation International's Center for Applied Biodiversity Science (CI-CABS) as background for a regional workshop on hunting and bushmeat utilization in West Africa, which was held in December 1999 in Ghana.


IUCN PUBLICATIONS

IUCN Red List Categories and Criteria, Version 3.1, (2001), as approved by the 51st meeting of the IUCN Council in February 2000, is now available after a four-year review called for by IUCN members. The new, improved categories and criteria used for listing plants and animals on the IUCN Red List of Threatened Species will begin to be phased in 2002. The review, coordinated by the IUCN Species Survival Commission (SSC), involved broad consultation with users and organizations from around the world and has produced a clearer, more open, and easy-to-use system for assessing species. With particular attention paid to marine species, harvested species, and population fluctuations, the review has
refined the effectiveness of the Red List categories and criteria as indicators of extinction risk. Please see the following website for more details:


Re-introduction News: Special Primate Issue, Newsletter of the IUCN/SSC Re-introduction Specialist Group, Soorae, P.S. and L.R. Baker, eds. Abu Dhabi, UAE, No. 21, 2002, is devoted to primate re-introduction and translocation efforts. Contributing authors were asked to describe their programs and projects using a similar format, detailing the methods, results, and lessons learned, so that the efforts could be compared. Additionally, it was hoped that the focus on methodology and "learnings" would be useful for others who are thinking about reintroducing primates in the future. Articles specific to Asian primates are: Re-introduction of orang-utans in Indonesia, contributed by K.S. Warren and R. A. Swan; and Release of golden langurs in Tripura, India, contributed by A.K. Gupta. The issue also includes IUCN/SSC Re-introduction Specialist Group: Guidelines for Nonhuman Primate Re-introductions, developed and revised by L.R. Baker after comments by a Core Review Board. This document is the most extensive ever developed for a single taxon and is intended to provide practitioners with a basic framework for developing a re-introduction program for primate species, mainly for conservation purposes.

PSG PUBLICATIONS

Neotropical Primates: A Journal and Newsletter of the Neotropical Section of the IUCN/SSC Primate Specialist Group. With the publication of vol. 8, no. 1 (March 2000), Neotropical Primates has taken on a new role - doubling as a journal while maintaining its main function as a newsletter for the Primate Specialist Group membership as well as for Neotropical primate researchers, zookeepers and conservationists worldwide. The intention is to include up to two or three peer-reviewed articles per issue. These will be limited to aspects directly dealing with or linked to the systematics and taxonomy, biogeography, ecology, and conservation of the platyrhines. A number of renowned Neotropical primatologists with enormous experience in these areas have agreed to act as the new Editorial Board.

The following issue of Neotropical Primates, vol. 8, no. 2 (June 2000) is dedicated to a taxonomic listing of the Platyrhini, results of the workshop "Primate Taxonomy for the New Millennium", organized by the PSG and hosted by the Disney Institute in Orlando, Florida in February 2000. The aims of this Workshop were to provide the fullest assessment of primate diversity with the current state of knowledge, and especially considering the numerous contributions and revelations of genetic studies in the last decade. A full listing of the primates, be they species or subspecies, is a vital first step for the establishment of conservation priorities and the full assessment of the Order for the IUCN/SSC Red List. In no way is a "definitive taxonomy" being imposed and, wherever there is disagreement or doubt, it is hoped that it will stimulate discussion and further research, especially into such poorly understood genera as Alouatta and Cebus.

IUCN DIRECTOR GENERAL

On 1 March 2001, IUCN-The World Conservation Union announced the appointment of its new Director General, Mr. Achim Steiner, who recently held the position of Secretary General of the World Commission on Dams (WCD). Mr. Steiner, at 39, is one of the youngest
ever Directors General of the IUCN. Brazilian born, German by nationality, and educated at Oxford University, he has spent much of his career in Latin America, Africa and Asia. He joins IUCN having led a three-year consultation process, which resulted in the global launch in November 2000 of Dams and Development: the Report of the World Commission on Dams. During his time with IUCN’s Global Policy Unit in Washington, DC in the mid 1990s, he fostered a new level of cooperation and partnership between the organization and international agencies such as the World Bank. Before this, he greatly enhanced the work of IUCN’s Southern Africa Regional Office, developing support programs to government agencies and NGOs in ten countries. Mr. Steiner assumed his position from Dr. Maritta Koch-Weser, who left IUCN at the end of December 2000. Dr. Simon Stuart, formerly of the IUCN Species Survival Commission, was Acting Director General until Mr. Steiner joined IUCN at its headquarters in Gland, Switzerland.

INTERNATIONAL PRIMATOLOGICAL SOCIETY

The XVIIIth Congress of the International Primatological Society was held in Adelaide, South Australia 7-12 January 2001. The Australasian Primate Society was the hosting organization and the national organizing committee consisted of Graeme Crook, Carla Litchfield, Penny Harper and Christine Baker. There were 371 registered participants from 37 countries represented at the Congress. Over the course of the five days there were 35 organized symposia and another 19 sessions, in which a total of 332 papers were presented on almost all every aspect of primatology. There were also 33 posters presented and these were on display in the main venue hall for the duration of the Congress. The papers are currently being gathered for publication on a CD Rom of the Proceedings, which should be available shortly.

The General Meeting of the IPS was held on the Monday evening, and the Wednesday evening featured the launch of Conservation International’s Action Plan for the world’s most endangered primates. Both these events were featured in the national newspapers and on national radio and television news reports. The XXth Congress of IPS will be held in Turin, Italy in 2004. (Source: Graeme Crook, Chair, Organizing Committee.)

The XIXth Congress of the International Primatological Society will take place on 4-9 August 2002 in Beijing, China. The event is being organized by the Mammalogical Society of China and the Institute of Zoology, Chinese Academy of Sciences, and is sponsored by the Chinese Academy of Sciences and the National Natural Science Foundation of China. The main theme of the event will be "Caring for Primates: Progress in, and Prospects for, Primatology and the Conservation of Non-human Primates in the 21st Century." Symposia and workshops of relevance to Asian primates and conservation, of which the abstracts are posted on the Congress website, include the following:

Indonesian Primate Conservation: Status, Distribution, and Likely Future; Models of Speciation in Sulawesi Primates; Priorities for Primate Conservation in the First Decade of the 21st Century; Workshop on World Heritage Status for the Great Apes; Developing Successful Conservation Programs for Primates: Field Initiatives, Education Programs, and Influencing Decision Makers.

A pre-congress workshop entitled "Developing Successful Conservation Initiatives for Primates: From Field Science to Conservation Programs" will be held in Beijing 1-3 August 2002 prior to the Congress. The overall aim of the workshop is to assist participants in achieving the following goals: (1) to develop conservation initiatives into conservation programs, (2) to learn more about what tools are available to assist in developing a program, (3) to understand what makes a field conservation program successful and what it takes to maintain it, and (4) to design a comprehensive, interdisciplinary approach to conservation. Key topics that will be covered in the course include: how to implement scientific studies and identifying the implications of such studies for conservation, the implementation of education and community-based programs, exploring economic alternatives to assist communities in protecting primate species and their habitats, and how to influence decision makers and policy. Anne Savage (Anne.Savage@disney.com) or Colleen McCann (cmccann@wcs.org) may be contacted for further information on the workshop.

**TIMETABLE**

<table>
<thead>
<tr>
<th>Deadline for symposia and workshops</th>
<th>31 December 2001</th>
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<tr>
<td>Deadline for abstracts</td>
<td>31 March 2002</td>
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<tr>
<td>Deadline for registration</td>
<td>31 May 2002</td>
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<td>Deadline for reservation of hotels and tours</td>
<td>1 July 2002</td>
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**REGISTRATION FEES:**

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<tr>
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<td>Regular participant (Non-Member)</td>
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<td>US$380</td>
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<tr>
<td>Student participant</td>
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<tr>
<td>Accompanying person</td>
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All information, including on-line registration, is available from the Congress website at:

http://www.ips.iz.ac.cn

Further inquiries may be made to the following address:

Prof. Fuwen WEI, Secretary General
19th Congress of the International Primatological Society
http://www.ips.iz.ac.cn
c/o Institute of Zoology, Chinese Academy of Sciences,
19 Zhongguancun Lu, Haidian, Beijing 100080, CHINA
Tel: (86-10) 6258 1474
Fax: (86-10) 8262 7398
E-mail: IPS_Beijing@panda.iz.ac.cn
PRIMATE FIELD STUDIES
GLOBAL DATABASE

The Primate Society of Great Britain (PSGB) is compiling the 2002 edition of their guide to primate field projects: Current Primate Field Studies (a supplement to their newsletter Primate Eye). The guide will be compiled in collaboration with the Wisconsin Regional Primate Research Centre (WRPRC), and will also be available electronically on the Field Studies section of the International Directory of Primatology website (http://www.primate.wisc.edu/pin/idp/index.html). This will produce a single comprehensive global database that will maximize accessibility and minimize redundancy for both users and contributors alike.

We invite all those who are currently carrying out primate field studies, or who completed a field study during 2000/2001, to submit their project details to this scheme. Submissions should be made before 1 October 2002, either electronically or by hard copy. In the first instance, submissions can be made on the electronic form found on the International Directory of Primatology website (http://www.primate.wisc.edu/pin/idp/scope.html) [those who already have an electronic entry in the IDP can use the online form for updating]. If submissions are made by hard copy, a form is enclosed on page 37 of this newsletter to help facilitate this option.

Submissions by hard copy should be mailed to:

Eluned Price,
2 La Grange, La Rue de Cambrai,
Trinity, Jersey JE3 5AL,
Channel Islands, Great Britain
(e-mail: eldom@pied.freeserve.co.uk).

MEETINGS

2002


Conservation Assessment and Management Plan (CAMP) for South Asian Primates, 5-9 March 2002, State Forest Service College, Coimbatore, INDIA. Contact: Zoo Outreach Organization (ZOO) / CBSG, South Asia, 29 Bharati Colony, Peelamedu, Coimbatore, 641 004, Tamil Nadu, INDIA. Telephone: 91 422 563 159 Fax: 91 422 563 269 E-mail: zoomach@vsnl.com

The IXTh Congress of the International Primatological Society, 4-9 August 2002, Beijing International Convention Center, Beijing, CHINA. Contact: Prof. Fuwen Wei, Secretary General, c/o Institute of Zoology, Chinese Academy of Sciences, 19 Zhongguancun Lu, Haidan, Beijing 100080, CHINA. Tel: 86-10 6258 1474, Fax: 86-10 8262 7388 E-mail: IPS_Beijing@panda.ioz.ac.cn. Home Page: http://ips.ioz.ac.cn


(This issue of Asian Primates was printed in July 2002. The last issue, vol. 7, nos. 3&4, was published in February 2001.)
Primate Field Studies Global Database Questionnaire
Primate Society of Great Britain, Wisconsin Regional Primate Research Center

1. Title of field project:

2. Country and location:

3. Start and end dates:
   start: ___________________________ end: ___________________________

4. Research objectives:

5. Species studied (list latin names):

6. Other primate species found at site:

7. Positions for field workers/volunteers:

8. Sponsoring institutions:

9. Name and address of project director: (including telephone, fax, e-mail and website details)

10. Names of other research personnel on the project:
    (if contact person for these details is not the director, please list their name here with phone, fax and e-mail)

11. Keywords that best describe the field study:

12. Miscellaneous comments (optional):

Asian Primates is published by the Primate Specialist Group, Species Survival Commission, IUCN - The World Conservation Union and Conservation International, with support from the Margot Marsh Biodiversity Foundation. Please direct all questions, comments and materials for submission to:

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