

Conservation of Primates in Indochina



INTERNATIONAL SYMPOSIUM

Cuc Phuong National Park, 27th-30th November 2008



FRANKFURT
ZOOLOGICAL
SOCIETY



CONSERVATION
INTERNATIONAL

Symposium “Conservation of Primates in Indochina”

Five years ago Vietnamese and foreign scientists gathered in Cuc Phuong National Park to discuss current research, knowledge and conservation issues facing the primates of Vietnam. Conservation of Primates in Vietnam, an edited volume of the symposium's lecturers, was published in 2004.

Subsequent years have witnessed a flourishing of expansion of studies on the genetics, behavior, ecology, taxonomy, and conservation of primates in Vietnam. In addition, primatological studies from neighboring countries of Indochina have deepened our knowledge about closely related and situated Asian primates. Vietnam has five endemic primate taxa yet several of the primates have distributions that, while restricted in range, extend cross political boundaries. Vietnamese primates share habitat types and conservation threats with primates of Laos, Cambodia, and southern China. Consequently, it is most fitting that this year's symposium prominently features the broader region of Indochina.

This is a serendipitous year in which to meet, as 2008 marks the 15th year anniversary of the Endangered Primate Rescue Center in Cuc Phuong National Park and the 150th anniversary of Frankfurt Zoological Society.

This symposium also includes a visit to Van Long Nature Reserve, which is home to the largest wild population of Delacour's langur. Van Long NR has had protection status since 2001, and is the largest freshwater wetland in northern Vietnam with steep limestone outcrops, creating breathtaking scenery. Van Long NR is developing as an important locality for primate conservation and tourism.

The symposium ‘Conservation of Primates in Indochina’ is sponsored by Frankfurt Zoological Society, Conservation International, CI’s Primate Action Fund, Primate Conservation Incorporated and Cuc Phuong National Park. During the symposium, there is an optional workshop and group discussion held on the 30th November entitled “Necessity, problems and risks for translocation of ‘Critically Endangered’ primates in Vietnam”. This discussion is sponsored by Münster Zoo.



Photos on the cover page are accredited to Tilo Nadler and Alex M (Lao langur).

Hội thảo

“Chuyên đề Bảo tồn Linh trưởng Đông Dương”

Năm năm trước tại Cúc Phương, các nhà nghiên cứu linh trưởng Việt Nam và quốc tế đã họp mặt, trao đổi và cùng chia sẻ những nghiên cứu, kiến thức, kinh nghiệm và các vấn đề bảo tồn có liên quan đến thú linh trưởng của Việt Nam. Ấn phẩm “Bảo tồn Linh trưởng ở Việt Nam” bao gồm những tham luận được trình bày trong Hội thảo đã được xuất bản đầu năm 2004.

Trong những năm qua đã có rất nhiều nghiên cứu được tiếp tục thực hiện với các chủ đề như gien di truyền, tập tính, sinh thái, phân loại và bảo tồn về thú linh trưởng ở Việt Nam. Ngoài ra các nhà nghiên cứu linh trưởng còn thực hiện một số nghiên cứu ở các nước láng giềng trong khu vực Đông Dương bởi sự gần gũi giữa các loài thú linh trưởng và tình trạng bị đe doạ chung đối với chúng ở Châu Á. Việt Nam có năm loài và phân loài thú linh trưởng đặc hữu và một số loài khác là đặc hữu trong khu vực, chúng thường phân bố trong những khu rừng cẩm và nầm dọc đường biên giữa các quốc gia. Thú linh trưởng Việt Nam cùng chung môi trường, sinh cảnh sống và cũng chịu nhiều áp lực và mối đe doạ như các loài thú linh trưởng của các nước bạn Campuchia, Lào và Nam Trung Quốc. Với những lý do trên, Hội thảo năm nay sẽ là một bước khởi đầu cho những vấn đề nghiên cứu và bảo tồn thú linh trưởng giáp đường biên trong khu vực Đông Dương.

Năm 2008 này cũng là một năm sự kiện cho Trạm Cứu hộ Linh trưởng Nguy cấp tại Vườn Quốc gia Cúc Phương đã hoạt động được 15 năm và kỷ niệm 150 năm thành lập Hội Động vật học Frankfurt, Cộng hoà liên bang Đức.

Chương trình Hội thảo lần này bao gồm cả chuyến thăm Khu bảo tồn đất ngập nước Vân Long, nơi có số lượng phân bố lớn nhất cho loài voọc mông trắng ngoài tự nhiên. KBTĐNN Vân Long được thành lập năm 2001, đây một vùng đất ngập nước lớn nhất ở miền Bắc Việt Nam với những dãy núi dã vôi trùng điệp, cảnh quan đặc sắc. KBTĐNN Vân Long là một điểm quan trọng đang trên đà phát triển về cả tồn linh trưởng và du lịch bền vững.

Hội thảo “Chuyên đề Bảo tồn Linh trưởng Đông Dương” được tài trợ kinh phí từ các tổ chức là Vườn Quốc gia Cúc Phương, Hội Động vật học Frankfurt (Frankfurt Zoological Society/FZS — Cộng hoà liên bang Đức), Tổ chức Bảo tồn Quốc tế (Conservation International/CI — Hoa Kỳ), Quỹ Hành động vì Linh trưởng Quốc tế (CI’s Primate Action Fund — Hoa Kỳ) và Tổ chức Hợp tác Bảo tồn Linh trưởng (Primate Conservation Incorporated - Hoa Kỳ). Hội thảo mở rộng chuyên đề đặc biệt được tổ chức vào ngày 30/11 về

“Những cấp thiết, những vấn đề và những rủi ro trong các hoạt động di dời các loài thú linh trưởng “Rất nguy cấp” ở Việt Nam. Phần Chuyên đề mở rộng này được Vườn thú Munster Zoo tài trợ kinh phí.



Ảnh bìa Tilo Nadler và Alex McWilliam, WCS (voọc Lào).

Symposium
“Conservation of Primates in Indochina”
November 27th – 30th, Cuc Phuong National Park

Program & Presentations

Wednesday, November 26th, 2008	
12:00	Departure from Hanoi to Cuc Phuong National Park, Bus leaves from Opera House
15:00	Estimated arrival in Cuc Phuong National Park
15:00-18:00	Registration for Symposium Check-in rooms at Guest House
19:00	Welcome Dinner

Thursday, November 27th, 2008	
8:15 – 8:50	Welcome Speeches by: Director of Cuc Phuong National Park Central Forest Protection Department Chairman of Zoological Society Vietnam Chairman of Vietnam National Park and Nature Reserve Association Country Representative of Frankfurt Zoological Society Representative of Conservation International
8:50 – 9:00	Coffee/Tea Break
9:00 – 12:00	Scientific Presentations
9:00 – 9:20	Hamada, Y., Kurita, H., Kingsada, P., Pathoumthone, S., Goto, S. & Malaivijitnond, S.: Distribution and present status of primates in Laos
9:20 – 9:40	Rawson, B.: Distribution and status of primates in Cambodia
9:40 – 10:00	Nadler, T.: Distribution and status of lorises, langurs and gibbons in Vietnam
10:00 – 10:20	Vo Dinh Son, Malaivijitnond, S., Goto, S., Cao Quoc Tri, Nguyen Van Hung, Le Van Hoang, Tran Cong Trang & Hamada, Y.: Present distribution and status of macaques, <i>Macaca</i> in Vietnam
10:20 – 10:40	Van Ngoc Thinh & Roos, C.: Phylogeny, taxonomy and distribution of crested gibbons, genus <i>Nomascus</i>
10:40 – 11:00	Haus, T., Vogt, M., Forster, B. & Ziegler, T.: Primate censuses in difficult to access karst forests in the Phong Nha-Ke Bang National Park, central Vietnam
11:00 – 11:20	Clements, T., Rawson, B., Pollard, E., O'Kelly, H. & Nut Meng Hor: Conservation status and monitoring of black-shanked douc, <i>Pygathrix nigripes</i> and yellow-cheeked crested gibbon, <i>Nomascus gabriellae</i> in the Seima Biodiversity Conservation Area, Cambodia
11:20 – 11:40	Workman, C.: Seasonal effects on feeding selection by Delacour's langurs, <i>Trachypithecus delacouri</i> in Van Long Nature Reserve, Vietnam
11:40 – 12:00	Le Khac Quyet, Nguyen Anh Duc, Vu Anh Tai, Wright, K.A., Wright, B.W. & Covert, H.H.: Habitat structure and habitat use of the Tonkin snub-nosed monkey, <i>Rhinopithecus avunculus</i> in the Khau Ca forest of Ha Giang Province, Vietnam
12:00 – 14:00	Lunch Break
14:00 – 17:00	Visiting Tours and Open Time: Visitors Center Endangered Primate Rescue Center Turtle Center Civet & Pangolin Project Botanical Gardens Cuc Phuong National Park

Friday, November 28th, 2008	
8:30 – 10:30	Scientific Presentations
8:30 – 8:50	Channa, P. & Gray, T.: Distribution and population of yellow-cheeked crested gibbon, <i>Nomascus gabriellae</i> in Phnom Prich Wildlife Sanctuary in Mondulkiri Province, Cambodia
8:50 – 9:10	Hoang Minh Duc & Baxter, G.S.: Using Bayesian Belief Networks to predict possible distribution of black-shanked doucs, <i>Pygathrix nigripes</i> in Ninh Thuan Province, Vietnam
9:10 – 9:30	Starr, C., Streicher, U., Nekaris, K.A.I. & Leung, L.: The use of lorises, <i>Nycticebus bengalensis</i> and <i>N. pygmaeus</i> in traditional Cambodian medicines: Implications for conservation
9:30 – 9:50	Pliosungnoen, M., Savini, T. & Gale, G.A.: Density estimates and micro-habitat use of Bengal slow loris, <i>Nycticebus bengalensis</i> in disturbed mosaic low-land habitat, Khao Ang Rue Nai Wildlife Sanctuary, Thailand: Preliminary results
9:50 – 10:10	Nguyen Thanh Tuan & Le Vu Khoi: New information on grey-shanked douc langurs, <i>Pygathrix cinerea</i> in Quang Ngai Province, Vietnam
10:10 – 10:30	Nguyen Xuan Dang, Nguyen Xuan Vinh & Pham Huu Khanh: Status of yellow-cheeked gibbon, <i>Nomascus gabriellae</i> in Cat Tien Biosphere Reserve
10:30 – 10:45	Coffee / Tea Break
10:45 – 12:05	Scientific Presentations
10:45 – 11:05	Rawson, B.: Use and abuse of gibbon survey techniques: shortcomings of the auditory survey methods and future directions
11:05 – 11:25	Covert, H.H., Insua-Cao, P., Le Khac Quyet, Wright, B.W. & Hoang Van Tue: Looking toward the future: Conservation of the Tonkin snub-nosed monkey, <i>Rhinopithecus avunculus</i> in Ha Giang Province, Vietnam
11:25 – 11:45	Hallam, C. & Johnson, A.: Gibbons as landscape species: Strategic planning for primate conservation in Lao PDR
11:45 – 12:05	Hoang Van Lam & Nguyen Thi Thanh Nga: Conservation of the western black crested gibbon, <i>Nomascus concolor</i> in Mu Cang Chai Species and Habitat Conservation Area, Vietnam
12:05 – 14:00	Lunch Break

Friday, November 28th, 2008 Continued	
14:00 – 16:00	Scientific Presentations
14:00 – 14:20	Grueter, C.C., Dayong Li, Baoping Ren & Fuwen Wei: Feeding ecology of Yunnan snub-nosed monkeys, <i>Rhinopithecus bieti</i> in the Samage Forest, Baimaxueshan Nature Reserve, China
14:20 – 14:40	Kenyon, M., Vo Thanh Binh, Tran Van Mui & Tran Van Thanh: Home range size and habitat quality of golden- cheeked crested gibbons, <i>Nomascus gabriellae</i> in Cat Tien National Park, Vietnam
14:40 – 15:00	Phiapalath, P. & Suwanwaree, P.: Time budget and activity of red-shanked douc langurs, <i>Pygathrix nemaeus</i> in Hin Namno National Protected Area, Lao PDR
15:00 – 15:20	Dinh Thi Phuong Anh, Bui Van Tuan, Nguyen Hong Chung, Nguyen Thi Hien, Huynh Nguyet Hang: Research results on the distribution, population dynamics, and feeding ecology of red-shanked douc langurs, <i>Pygathrix nemaeus</i> in Son Tra Nature Reserve, Da Nang City, Vietnam
15:20 – 15:40	Lippold, L.K., Vu Ngoc Thanh, Tran Dinh Nghia, Nguyen Xuan Thuan, Nguyen Manh Tien, Phan Van Mui & Huynh Ngoc Dai: Feeding ecology and conservation actions of red- shanked douc, <i>Pygathrix nemaeus</i> at Son Tra Nature Reserve, Da Nang City, Vietnam
15:40 – 16:00	Ha Thang Long, Tran Huu Vy, Thi Nguyen Tinh, Tran Ngoc Toan, Nguyen Ai Tam, Ho Tien Minh, Li Tho & Nadler, T.: Current research and conservation status of the grey-shanked douc, <i>Pygathrix cinerea</i> in Vietnam
16:00 – 16:20	Coffee / Tea Break
16:20 – 18:00	Scientific Presentations
16:20 – 16:40	Vogt, M. & Forster, B.: The primate reintroduction program in Phong Nha-Ke Bang National Park, central Vietnam
16:40 – 17:00	Jadejaroen, J., Yhamdee, A. & Sirilak, S.: Long-tailed macaques, <i>Macaca fascicularis</i> living in a fragmented forest, southeastern Thailand and their plant diets
17:00 – 17:20	Bhumpakphan, N.: Seasonal foraging of the Phayre's langur, <i>Trachypithecus phayrei</i> in Huai Kha Khaeng Wildlife Sanctuary, western Thailand
17:20 – 17:40	O'Brien, J.A., Tran Van Thanh, Pham Huu Khanh & Covert, H.H.: The ecology and conservation of black-shanked douc, <i>Pygathrix nigripes</i> in Cat Tien National Park, Vietnam
17:40 – 18:00	Hoang Minh Duc, Tran Van Bang, Covert, H.H. & Luu Hong Truong: Conservation status of primates in Ta Kou Nature Reserve, Vietnam

Saturday, November 29th, 2008	
8:30 – 10:30	Scientific Presentations
8:30 – 8:50	Nguyen The Cuong, Yan Lu, Nong Van Tao & Insua-Cao, P.: How transboundary cooperation and field-based conservation have led to improved hope for survival of the cao vit gibbon, <i>Nomascus nasutus</i> on the Vietnam – China border
8:50 – 9:10	Tran Thu Hang: Stopping the trade of Vietnam's primates: Experiences and cases from ENV's Wildlife Crime Unit
9:10 – 9:30	Kenyon, M., Luong Van Hien, Cronin, A., Kurtis Pei, Tran Van Mui & Tran Van Thanh: Dao Tien Endangered Primate Species Centre, Cat Tien National Park, Vietnam
9:30 – 9:50	Kulcharoen, N. & Utara, Y.: Population of red-shanked douc langur, <i>Pygathrix nemaeus</i> at Dusit Zoo, Thailand
9:50 – 10:10	Yeong, C., Chia Tan & Meijer, L.: Behavioural development and infant care in red-shanked douc langurs, <i>Pygathrix nemaeus</i>
10:10 – 10:30	Benirschke, K. & Nadler, T.: Placentation and related issues in leaf monkeys
10:30 – 10:45	Coffee / Tea Break
10:45 – 12:05	Scientific Presentations
10:45 – 11:05	Le Khac Quyet, Wright, K.A. & Covert, H.H.: Locomotor and postural behavior of the Tonkin snub-nosed monkey, <i>Rhinopithecus avunculus</i> at Khau Ca, Ha Giang Province, Vietnam
11:05 – 11:25	Phoonjampa, R., Savini, T. & Gale, G.A.: Sleeping trees and sleep-related activities of pileated gibbons, <i>Hylobates pileatus</i> in southeast Thailand
11:25 – 11:45	Houck, M.L., Benirschke, K., Nadler, T., Streicher, U. & Ryder, O.: Chromosomal studies of leaf-eating primates
11:45 – 12:05	Malaivijitnond, S., Gumert, M.D. & Hamada, Y.: Relationship between humans and long-tailed macaques, <i>Macaca fascicularis</i> in Thailand
12:05 – 12:25	Plesker, R. & Mayer, V.: Non-human primates mask signs of pain
12:25 – 14:30	Lunch Break
14:30	Departure to Van Long Nature Reserve, bus leaves from reception
15:15	Estimated arrival in Van Long Nature Reserve
18:00	Dinner at Van Long Nature Reserve
20:00	Departure to Hanoi or return to Cuc Phuong National Park
20:45	Estimated arrival time if return to Cuc Phuong National Park
22:00	Estimated arrival time if depart to Hanoi

Saturday, November 30th, 2008	
9:00 – 12:00	Optional Workshop / Group Discussion: Necessity, problems and risks for translocation of ‘Critically Endangered’ primates in Vietnam
12:00 – 14:00	Lunch Break
14:00	Departure to Hanoi from reception
17:00	Estimated arrival in Hanoi

PRESENTATIONS

BENIRSCHKE, K & NADLER, T.: Placentation and related issues in leaf monkeys.

BHUMPAKPHAN, N.: Seasonal foraging of the Phayre's langur, *Tachypithecus phayrei* in Huai Kha Khaeng Wildlife Sanctuary, western Thailand.

CHANNA, P. & GRAY, T.: Distribution and population of yellow-cheeked crested gibbon, *Nomascus gabriellae* in Phnom Prich Wildlife Sanctuary in Mondulkiri Province, Cambodia.

CLEMENTS, T., RAWSON, B., POLLARD, E., O'KELLY, H. & NUT MENG HOR: Conservation status and monitoring of black-shanked douc, *Pygathrix nigripes* and yellow-cheeked crested gibbon, *Nomascus gabriellae* in the Seima Biodiversity Conservation Area, Cambodia.

COVERT, H.H., INSUA-CAO, P., LE KHAC QUYET, WRIGHT, B.W., HOANG VAN TUE: Looking toward the future: Conservation of the Tonkin snub-nosed monkey, *Rhinopithecus avunculus* in Ha Giang Province, Vietnam.

DINH THI PHUONG ANH, BUI VAN TUAN, NGUYEN HONG CHUNG, NGUYEN THI HIEN, HUYNH NGUYET HANG: Research results on the distribution, population dynamics, and feeding ecology of red-shanked douc langurs, *Pygathrix nemaeus* in Son Tra Nature Reserve, Da Nang City, Vietnam.

GRUETER, C.C., DAYONG LI, BAOPING REN & FUWEN WEI: Feeding ecology of Yunnan snub-nosed monkeys, *Rhinopithecus bieti* in the Samage Forest, Baimaxueshan Nature Reserve, China.

HALLAM, C. & JOHNSON, A.: Gibbons as landscape species: Strategic planning for primate conservation in Lao PDR.

HAMADA, Y., KURITA, H., KINGSDA, P., PATHOUMTHONE, S., GOTO, S. & MALAIIVIJITNOND, S. : Distribution and present status of primates in Laos.

HA THANG LONG, TRAN HUU VY, THI NGUYEN TINH, TRAN NGOC TOAN, NGUYEN AI TAM, HO TIEN MINH, LY THO & NADLER, T.: Current research and conservation status of the grey-shanked douc, *Pygathrix cinerea* in Vietnam.

HAUS, T., VOGT, M., FORSTER, B. & ZIEGLER, T.: Primate censuses in difficult to access karst forests in the Phong Nha–Ke Bang National Park, central Vietnam.

HOANG MINH DUC & BAXTER, G.S.: Using Bayesian Belief Networks to predict possible distribution of black-shanked doucs, *Pygathrix nigripes* in Ninh Thuan Province, Vietnam.

HOANG MINH DUC, TRAN VAN BANG, COVERT H.H. & LUU HONG TRUONG: Conservation status of primates in Ta Kou Nature Reserve, Vietnam.

HOANG VAN LAM & NGUYEN THI THANH NGA: Conservation of the western black crested gibbon, *Nomascus concolor* in Mu Cang Chai Species and Habitat Conservation Area, Vietnam.

HOUCK, M.L., BENIRSCHKE, K., NADLER, T., STREICHER, U., STANYON R. & RYDER, O.: Chromosomal studies of leaf-eating primates.

JADEJAROEN, J., YHAMDEE, A. & SIRILAK, S.: Long-tailed macaques, *Macaca fascicularis* living in a fragmented forest, southeastern Thailand and their plant diets.

KENYON, M., LUONG VAN HIEN, CRONIN, A., CRONIN, J., KURTIS PEI, TRAN VAN MUI & TRAN VAN THANH: Dao Tien Endangered Primate Species Centre, Cat Tien National Park, Vietnam.

KENYON, M., VO THANH BINH, TRAN VAN MUI & TRAN VAN THANH: Home range size and habitat quality of golden-cheeked crested gibbons, *Nomascus gabriellae* in Cat Tien National Park, Vietnam.

KULCHAROEN, N. & UTARA, Y.: Population of red-shanked douc langur, *Pygathrix nemaeus* at Dusit Zoo, Thailand.

LE KHAC QUYET, WRIGHT, K.A. & COVERT, H.H.: Locomotor and postural behavior of the Tonkin snub-nosed monkey, *Rhinopithecus avunculus* at Khau Ca, Ha Giang Province, Vietnam.

LE KHAC QUYET, NGUYEN ANH DUC, VU ANH TAI, WRIGHT, K.A., WRIGHT, B.W. & COVERT, H.H.: Habitat structure and habitat use of the Tonkin snub-nosed monkey, *Rhinopithecus avunculus* in the Khau Ca forest of Ha Giang Province, Vietnam.

LIPPOLD L.K., VU NGOC THANH, TRAN DINH NGHIA, NGUYEN XUAN THUAN, NGUYEN MANH TIEN, PHAN VAN MUI & HUYNH NGOC DAI: Feeding ecology and conservation actions of red-shanked douc, *Pygathrix nemaeus* at Son Tra Nature Reserve, Da Nang City, Vietnam.

MALAIVIJITNOND, S., GUMERT, M.D. & HAMADA, Y.: Relationship between humans and long-tailed macaques, *Macaca fascicularis* in Thailand.

NADLER, T.: Captive breeding – reintroduction – translocation: Manipulated nature – a way for conservation?

NADLER, T.: Distribution and status of lorises, langurs and gibbons in Vietnam.

NGUYEN THANH TUAN & LE VU KHOI : New Information on grey-shanked douc langurs, *Pygathrix cinerea* in Quang Ngai Province, Vietnam.

NGUYEN THE CUONG, YAN LU, NONG VAN TAO & INSUA-CAO, P.: How transboundary cooperation and field-based conservation have led to improved hope for survival of the cao vit gibbon, *Nomascus nasutus* on the Vietnam – China border.

NGUYEN XUAN DANG, NGUYEN XUAN VINH & PHAM HUU KHANH: Status of yellow-checked gibbon, *Nomascus gabriellae* in Cat Tien Biosphere Reserve.

O'BRIEN, J.A., TRAN VAN THANH, PHAM HUU KHANH & COVERT, H.H.: The ecology and conservation of black-shanked douc, *Pygathrix nigripes* in Cat Tien National Park, Vietnam.

PHIAPALATH, P. & SUWANWAREE, P.: Time budget and activity of red-shanked douc langurs, *Pygathrix nemaeus* in Hin Namno National Protected Area, Lao PDR.

PHOONJAMPA, R., SAVINI, T. & GALE, G.A.: Sleeping trees and sleep-related activities of pileated gibbons, *Hylobates pileatus* in southeast Thailand.

PLESKER, R. & MAYER, V.: Non-human primates mask signs of pain.

PLIOSUNGNOEN, M., SAVINI, T. & GALE, G.A.: Density estimates and micro-habitat use of Bengal slow loris, *Nycticebus bengalensis* in disturbed mosaic low-land habitat, Khao Ang Rue Nai Wildlife Sanctuary, Thailand: Preliminary results.

RAWSON, B.: Distribution and status of primates in Cambodia.

RAWSON, B.: Use and abuse of gibbon survey techniques: shortcomings of the auditory survey methods and future directions.

STARR, C., STREICHER, U., NEKARIS, K.A.I. & LEUNG, L.: The use of lorises, *Nycticebus bengalensis* and *N. pygmaeus* in traditional Cambodian medicines: Implications for conservation.

TRAN THU HANG: Stopping the trade of Vietnam's primates: Experiences and cases from ENV's Wildlife Crime Unit.

VAN NGOC THINH & ROOS, C.: Phylogeny, taxonomy and distribution of crested gibbons, genus *Nomascus*.

VO DINH SON, MALAIVIJITNOND, S., GOTO, S., CAO QUOC TRI, NGUYEN VAN HUNG, LE VAN HOANG, TRAN CONG TRANG & HAMADA, Y.: Present distribution and status of macaques, *Macaca* in Vietnam.

VOGTT, M. & FORSTER, B.: The primate reintroduction program in Phong Nha – Ke Bang National Park, central Vietnam.

WORKMAN, C.: Seasonal effects on feeding selection by Delacour's langurs, *Trachypithecus delacouri* in Van Long Nature Reserve, Vietnam.

YEONG, C., CHIA TAN & MEIJER, L.: Behavioural development and infant care in red-shanked douc langurs, *Pygathrix nemaeus*.

Abstracts
“Conservation of Primates in Indochina”

We kindly request authors of abstracts presented here to submit a paper by the end of February 2009, based on the contents of their presentations. As a result of the previous symposium in 2004, an edited volume of the lecturer's papers was published, called 'Conservation of Primates in Vietnam'. This volume was well received, and we would like to continue with an edited volume of
'Conservation of Primates in Indochina'
based on this year's presentations. Please submit a paper with a maximum of 10 pages, including abstract, contents, figures, tables, and references. Detailed instructions will be sent at a later date. Thank you.

Paper drafts and questions can be sent to:

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Use and abuse of gibbon survey techniques: shortcomings of auditory survey methods and future directions

Ben Rawson

Conservation International, Indo-Burma Program, Vietnam

Keywords: gibbons; survey techniques; density; population estimates

Gibbons (family Hylobatidae) represent one of the most threatened families of primates, with all 16 species listed as threatened under the IUCN Red List of Threatened Species. With such high conservation concern comes a demand on the part of many managers to determine and monitor population status. This has generally been approached using auditory survey techniques developed for gibbons in the 1980s and 1990s, which take advantage of the fact that most species make loud, sex specific vocalisations that can be heard up to several kilometers away. There are, however, several inherent problems with these techniques, including most seriously (1) an inability to accurately calculate the area surveyed from any listening post, and by extension the density of animals in this area, and (2) no measure of the percentage of calling groups within this area that are actually detected, assuming detection probability < 1 . A further problem is that these methods are often applied incorrectly or only partially, and/or violate other assumptions associated with calculating density and abundance of wildlife populations using standard sampling protocols. This can lead to incorrect results which can confound comparisons between sites, populations and species. This presentation details these issues and possible future directions, including the potential for using a hybrid between distance sampling and auditory survey methods.

Seasonal foraging of the Phayre's langur, *Tachypithecus phayrei* in Huai Kha Khaeng Wildlife Sanctuary, western Thailand

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Keywords: *Tachypithecus phayrei*, seasonal forage, phenology, Huai Kha Khaeng Wildlife Sanctuary, Thailand

Phayre's langur (*Trachypithecus phayrei*) inhabited Tropical Dry and Evergreen forest mosaic habitats in Huai Kha Khaeng Wildlife Sanctuary, Uthai Thani and Tak Provinces, Western Thailand. The langurs shared canopy habitat overlapping with five species of macaques (*Macaca* spp.), the silvered langur (*Trachypithecus cristatus**), and the white-handed gibbon (*Hylobates lar*).

Due to characteristics of mosaic patterns in their habitat used, floral phenology and seasonal change, the movement and foraging of the Phayre's langur troops were dependent on available of some seasonal forage species. We found that the Phayre's langur utilized various kinds of young leaves, flowers, fruits, and seeds of at least 77 floral species of which there were 18 species utilized in the dry season and 50 species in the wet season. Only nine species were used throughout the year. Those key resource species were composed of *Ficus* spp., *Polyalthia* spp., *Artocarpus lakoocha*, *Irvingia malayana*, *Spondias pinnata*, *Schleichera oleosa*, and *Afzelia xylocarpa*. During the wet season the langur troops tended to move further into Dry Forest habitats for foraging and doing their activities, e.g. sun bathing, resting, grooming, and visiting saltlicks. Ecological competition for foods between the langur and other sympatric primates, mostly white-handed gibbon and pig-tailed macaque (*Macaca nemestrina*) were commonly found in the study area.

In addition, the Phayre's langurs are threatened with extinction from poaching pressures due to the high market demands of local villagers living near the sanctuary. In order for wildlife species and especially the Phayre's langur to successfully recover their population, there needs to be an education program which informs local peoples, and increased protection through a well informed and capable patrolling system. Together, this will allow for the successful conservation and recovery of wildlife in general and primates in particular in the sanctuary. This sanctuary is listed as the first natural UNESCO World Heritage Site in Thailand.

The sanctuary staff did very good monitoring and patrolling during recent years.

*Note from reviewers: *Trachypithecus cristatus* in this area is now recognized as *T. germaini*.

Seasonal effects on feeding selection by Delacour's langurs, *Trachypithecus delacouri* in Van Long Nature Reserve, Vietnam

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Keywords: *Trachypithecus delacouri*, diet, seasonality, Vietnam

Primates make food choices based on seasonal changes in food availability and food chemistry. Van Long Nature Reserve in northern Vietnam is a highly seasonal habitat with hot, wet summers from May-October and cold, dry winters from November-April and a mix of deciduous and evergreen vegetation.

The objective of this study was to examine how a largely folivorous monkey responds to seasonal fluctuations in resource abundance. Behavioral data were collected on *Trachypithecus delacouri* at Van Long from June 2007-July 2008. Phenology transects were monitored twice a month to determine seasonal food availability. Foods eaten by focal animals were collected, dried, and analyzed for crude protein, neutral detergent fiber, condensed tannins, polyphenolics, water, and ash content. Langurs fed on 42 of 145 available species within the habitat, but just ten species accounted for 52.6% of the diet. Leaves were available throughout the year and dominated the diet in both winter and summer. During winter months, langurs responded to decreased availability of their most important foods- which were plant parts from deciduous trees- by shifting to the young leaves of other (evergreen) species as well as eating more unripe fruit and flowers. Summer leaves were higher in fiber than leaves eaten in winter, and young leaves eaten in summer had higher protein and higher fiber levels than young leaves eaten in winter.

Knowledge of seasonal feeding variation by *Trachypithecus delacouri* at Van Long increases our understanding of how limestone langurs are adapted to and flexible within this highly fragmented habitat.

Gibbons as landscape species: Strategic planning for primate conservation in Lao PDR

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Keywords: *Nomascus*, strategic planning, habitat modeling, Lao PDR

Bolikhamxay Province in Lao PDR contains the highest quality dry evergreen forest left in Indochina, with the largest block centered on the 1570 km² Nam Kading National Protected Area (NPA). The Integrated Ecosystem and Wildlife Management Project (IEWMP) used the Landscape Species approach to bring together government, community and NGO stakeholders to select seven landscape species for the province including the white-cheeked crested gibbon (*Nomascus leucogenys* spp.).

Government staff worked with the IEWMP to create maps identifying areas of management priority for the white-cheeked crested gibbon considering the best habitat and the location and relative importance of human-caused threats. The maps were used to build a conceptual model and define a population target and goal for the species. The team identified the management interventions needed to reach the targets and designed a monitoring program to measure gibbon population change. A monitoring program using line transects is now allowing IEWMP to measure the effectiveness of management interventions in the Nam Kading National Protected Area and to adapt actions accordingly.

This presentation outlines the process of planning from modeling to developing conservation interventions specifically focused on increasing white-cheeked crested gibbon populations in the NPA and comments on the status of Gibbons within the NPA.

Feeding ecology of Yunnan snub-nosed monkeys, *Rhinopithecus bieti* in the Samage Forest, Baimaxueshan Nature Reserve, China

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Keywords: *Rhinopithecus bieti*, diet, seasonality, China

We present data of a 20 month study of dietary strategies in Yunnan snub-nosed monkeys (*Rhinopithecus bieti*) at South Baimaxueshan Nature Reserve, PRC. The study area consists of a patchwork of evergreen broadleaved, evergreen coniferous and mixed deciduous broadleaved/coniferous forest assemblages.

Resource abundance was estimated by establishing vegetation plots within which a total of 80 tree species in 23 families were recorded. As measured by basal area, the most common plant families are predominantly evergreen Pinaceae and Fagaceae, making up 69% of the total tree biomass at the site. The monkeys have a relatively diversified diet composed of 94 plant species, but the majority of diet was provided by 6 plant genera (*Acanthopanax*, *Sorbus*, *Acer*, *Fargesia*, *Pterocarya*, and *Cornus*).

The animals expressed high selectivity for uncommon angiosperm tree species. Winter feeding was characterized by a severe reduction in dietary diversity, while spring brought a considerable increase in the number of foods exploited. The monkeys adjusted intake of plant food items corresponding with changes in the phenology of deciduous trees in the forest: young leaves in spring, bamboo shoots in summer, mature leaves of deciduous plants and fruits in summer/fall and some frost-resistant fruits also in winter.

A non-plant food, lichens, featured prominently in the diet throughout the year (annual representation in the diet was about 67%) and became the dominant food item in winter when palatable plant resources were scarce. The monkeys' choice of lichens as a staple fallback food is likely due to their spatiotemporal consistency in occurrence, nutritional and energetic properties and the ease with which they can be harvested. Using lichens is a way to mediate effects of seasonal dearth in palatable plant foods and ultimately a key survival strategy in a temperate habitat.

**Conservation status and monitoring of black-shanked douc,
Pygathrix nigripes and yellow-cheeked crested gibbon,
Nomascus gabriellae in the Seima Biodiversity Conservation Area,
Cambodia**

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Keywords: *Pygathrix nigripes*, *Nomascus gabriellae*, monitoring, conservation, Cambodia

According to IUCN approximately 90 percent of primate species in Cambodia are considered at risk of extinction. Since 2003, a long-term site-based monitoring program has aimed to estimate annual population sizes and trends for two such species, black-shanked douc (*Pygathrix nigripes*) and yellow-cheeked crested gibbon (*Nomascus gabriellae*), both “Endangered”, in the Seima Biodiversity Conservation Area (SBCA), eastern Cambodia.

Monitoring programs are important to measure the success of conservation projects and must be sufficiently well designed to provide statistically robust results that address the questions being tested. The program in the SBCA is one of the first such long-term initiatives in the region and has facilitated an evaluation of the effectiveness of conservation interventions at the site. Despite exponentially increasing human pressures on protected areas throughout the country, conservation management activities within SBCA have achieved considerable success and key populations are increasing or stable. This is primarily due to a reduction in hunting effected through gun confiscation schemes in the 1990’s and improved law enforcement at the site.

Line-transect distance-sampling generated population estimates in 2008 of 41,755 (95% CI: 31,388-55,538) doucs and 2,400 gibbons (1,728-3,328) indicate that these are the largest remaining global populations for both species, making the SBCA of critical importance for their conservation.

The SBCA project constitutes a valuable model for conservation in South East Asia in that despite severe resource and capacity constraints, conservation objectives have been realized and can be reliably substantiated by the outputs of a scientifically rigorous monitoring regime.

**Looking toward the future:
Conservation of the Tonkin snub-nosed monkey, *Rhinopithecus avunculus*
in Ha Giang Province, Vietnam**

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Keywords: *Rhinopithecus avunculus*, Ha Giang Province, Khau Ca, Vietnam

This presentation describes plans to establish a protected area for the Tonkin snub-nosed monkey (TSNM) (*Rhinopithecus avunculus*) at Khau Ca in Ha Giang Province and goals for future conservation efforts of this species in this region. This population was first confirmed in early 2002 and survey, census and behavioral data reveal that the population is presently stable and increasing in size. Ha Giang Province has confirmed its intention to establish a protected area for the Khau Ca forest and with support from FFI it is expected that the protected area will be gazetted in early 2009. This support will allow us, working with the Forest Protection Department, and local stakeholders to strengthen protection of the TSNM for the long-term and continue detailed behavioral ecology research. The protected area is proposed to include the entire Khau Ca forest (about 1,000 hectares) plus an adjacent 1,000ha of degraded forest lands. Collaborating with local villages to manage these degraded areas is a key strategy for forest regeneration.

Working with these stakeholders and botanists from Hanoi University of Science we are planning a forest rehabilitation programme. Plants chosen for reforestation will include a representative sample of native food and non-food species ensuring that the rehabilitated forest will provide the required habitat for survival of the TSNMs and sympatric fauna.

We end noting that a second Ha Giang population of TSNMs has recently been confirmed north of this area in Quan Ba District, giving further hope for the survival of the species.

Using Bayesian Belief Networks to predict possible distribution of black-shanked doucs, *Pygathrix nigripes* in Ninh Thuan Province, Vietnam

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Keywords: *Pygathrix nigripes*, distribution, Bayesian Belief Networks, Ninh Thuan Province, Vietnam

The black-shanked douc is an endangered colobine monkey found only in southern Vietnam and eastern Cambodia. Current distribution records are scattered and mostly confined to protected areas. Lack of knowledge on habitat preferences has hindered management of the species in the fragmented forest areas of Vietnam.

This paper reports on a 3-year study of the conservation and management of the black-shanked doucs. In this study, we first listed keys environmental correlates for the doucs from the species-environment relations (SER) database created during our study in Ninh Thuan Province and published data of associations of species with suitable habitats. The SER database lists the presence or absence of the species dealing in association with qualitative ecological factors that most influence the distribution and abundance of the douc.

We then applied Bayesian Belief Networks (BBN) modeling process to compile a conceptual model then converted it into functional BBN, a predictive model, by specifying appropriate states and probabilities for each node in the diagram using NeticaTM software. The functional BBN was linked to geographic data to map occurrence of the doucs. The result showed that the black-shanked douc may occur widely in Ninh Thuan but their potential habitat is very fragmented and areas where the probability of occurrence is over 50% occupy less than 10% of total province area. The size of the potential habitat suggests that the province could support approximately 4,000 individuals, but many more could survive if a relatively small area of extra forest was set aside as new reserves.

Conservation status of primates in Ta Kou Nature Reserve, Vietnam

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Keywords: primates, conservation, threats, Ta Kou Nature Reserve, Vietnam

Ta Kou Nature Reserve is situated in the southern central coastal region of Vietnam and is characterized by a dry coastal monsoon climate. The strictly protected 11,866 ha core-zone includes 1,104 ha on the 697 m high Ta Kou Mountain and a 10,762 ha coastal sandy flat area. The 5,957 ha buffer-zone includes anthropogenic ecosystems and desertified coastal sandy land.

Using intensive survey our ongoing project has confirmed the occurrence of six primate species including two species of leaf monkeys, three species of macaques and one species of loris.

While the Annamese silvered langur and the black-shank douc are restricted to the mountain, the three macaques are found in most areas of the reserve and are often seen close to agricultural areas. Until now, the pygmy loris is only found in the dry dipterocarp-dominated forests.

The project also addressed three main threats on the primates in the reserve: trapping, disturbance of tourist and potential disease transmitting from uncontrolled release of animals, especially primates by Buddhists. Our preliminary results suggests that Ta Kou Nature Reserve will play an important role in conservation of biodiversity in the coastal areas of Vietnam and may be considered as a sink for recolonisation of small forest patches. In addition, it is an ideal place to study niche-partitioning by sympatric colobine species and we plan to test a number of hypotheses about ecological differences between members of *Pygathrix* and *Trachypithecus*.

Conservation of the western black crested gibbon, *Nomascus concolor* in Mu Cang Chai Species and Habitat Conservation Area, Vietnam

Hoang Van Lam and Nguyen Thi Thanh Nga

Fauna and Flora International - Vietnam Conservation Support Programme

Keywords: *Nomascus concolor*, community-based conservation, Mu Cang Chai, Vietnam

In 1999, the western black crested gibbon *Nomascus concolor* was rediscovered in the forests of Mu Cang Chai District, Yen Bai Province, and adjacent areas in Son La Province by Fauna & Flora International (FFI). This is considered to be the largest and only viable population of this species in Vietnam.

Since then, FFI has been working with local authorities to protect this population by developing a model for community-based conservation. The goal is to develop a win-win scenario by which benefits to conservation also improve local livelihoods. In order to achieve this goal, village level forest regulations have been established and a new model for Vietnam of collaborative management has been developed for the newly-established Mu Cang Chai Species and Habitat Conservation Area. A community-based patrol group has been established to patrol the forest, monitor wildlife, conduct awareness raising and support law enforcement. The patrol group is supervised directly by the protected area. Also a Forest Protection Council has been established as an advisory body of community representatives to the protected area.

These efforts, along with a landscape level ICDP, appeared to have helped stabilise the gibbon population based upon gibbon censuses carried out in 2006 and 2007 which both recorded 25 groups. However, a census in 2008 recorded only 17 groups. This appears to be due to increased pressure on the unprotected forest in Son La Province related to dam construction, while the number of groups in Mu Cang Chai remains constant.

Long-tailed macaques, *Macaca fascicularis* in a fragmented forest, southeastern Thailand and their plant diets

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Keywords: *Macaca fascicularis*, fragmented forest, diet, Thailand

Long-tailed macaques (*Macaca fascicularis*) living in 54.4 ha fragment of mixed deciduous forest located on the Si Racha Campus of Kasetsart University in Southeast Thailand (13°7' N and 100°55' E) were studied from January to October 2008.

The forest is surrounded by local communities, private business areas, and roads. The Royal Forest Department of Thailand gave permission to Kasetsart University for use of the forest in educational and conservation purposes in 2005. The major threat to macaques here is fires set from the edge of the forest during the dry season (January–March). This makes the forest floor more open and promotes the growth of grasses. In this study, we assessed the diet plants in the home range of the monkeys. Two troops of monkeys with >100 and 17 members, respectively, occupied the forest area. Fifty-two species of plants eaten by macaques were identified. During January–May, they fed on leaves of 14 species, fruits of 4 species, flowers and young fruits of 2 species, seeds of 1 species, the phloem of a vine species and a species of grass. During June–October (wet season), leaves of 11 species, fruits of 10 species, seeds of 1 species and 7 species of grass were eaten.

In March, August and October, the plant *Christia vespertilionis* (Leguminosae: Papilionoideae) was found to be chewed but not swallowed by adult monkeys which left wads of chewed fibers on the forest floor. It is interesting that this plant species has been studied in Vietnam for its antimarial activities.

The ecology and conservation of the black-shanked douc, *Pygathrix nigripes* in Cat Tien National Park, Vietnam

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Keywords: *Pygathrix nigripes*, feeding ecology, conservation, plant chemistry,
Vietnam

Ongoing research in Cat Tien National Park on the ecology and conservation of the black-shanked douc (*Pygathrix nigripes*) is the focus of this presentation. An understanding of the douc's feeding ecology is an essential step towards developing detailed conservation plans for both this species and the national park.

The black-shanked douc is an endangered animal (IUCN, 2007) and is also likely an important indicator species for the health and status of Cat Tien's forests. Cat Tien National Park is one of the largest and best-protected areas in Vietnam with an active research staff engaged in the protection of biodiversity.

This study will test hypotheses regarding how the feeding ecology of the black-shanked douc varies across ecologically diverse habitats and should yield a much better understanding of the habitat requirements for this species. Methods include behavioral observation, phenological transects, plant and soil chemical testing, and the use of remotely sensed images to better understand habitat requirements and usage of this species.

This research is currently ongoing and will be completed by December 2009. Funding for this research provided by Fulbright, National Geographic, Conservation International's Margot Marsh Biodiversity Fund, Primate Conservation Inc., and the San Diego Zoological Society Conservation and Research for Endangered Species.

Locomotor and postural behavior of the Tonkin snub-nosed monkey, *Rhinopithecus avunculus* at Khau Ca, Ha Giang Province, Vietnam

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Keywords: *Rhinopithecus avunculus*, positional behavior, locomotion, Vietnam

To date, there have been relatively few field studies of the Tonkin snub-nosed monkey (*Rhinopithecus avunculus*). The literature on this species consists primarily of information on social organization and behavior, feeding ecology, home range and ranging behavior, and conservation needs. Although these studies have provided preliminary data documenting general aspects of the behavior, ecology and conservation of *R. avunculus*, detailed research on its positional behavior has yet to be undertaken.

This report provides an initial description of the locomotor and postural modes used by *Rhinopithecus avunculus* in the Khau Ca forest of Ha Giang Province, northeastern Vietnam.

Bout sampling methods were used to collect behavioral data in the wild, including detailed data on the locomotion, posture, and substrate use by this species. Additionally, locomotor and postural data were extracted from video footage of *R. avunculus* at Khau Ca. We follow the terminology of Hunt *et al.* (1996), to describe the locomotor and postural modes of *R. avunculus*.

The locomotor repertoire of *R. avunculus* is dominated by quadrupedal walking, followed by quadrupedal running, leaping, and forelimb suspension. The majority of its postural behavior is comprised of sitting postures (including sit-in, sit in/out, and sit/forelimb suspend). During locomotion, *R. avunculus* appears to prefer large horizontal and subhorizontal substrates (> 10cm), but also uses smaller and subvertical substrates. Large horizontal and subhorizontal substrates are preferred for postural behaviors.

We use our findings to identify important aspects of the environment that appear critical for the survival of this highly endangered primate species.

Habitat structure and habitat use of the Tonkin snub-nosed monkey, *Rhinopithecus avunculus* in the Khau Ca forest of Ha Giang Province, Vietnam

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Keywords: *Rhinopithecus avunculus*, habitat, conservation, Ha Giang Province, Vietnam

Among the four species of *Rhinopithecus*, the Tonkin snub-nosed monkey (*R. avunculus*) of Vietnam is the only species that inhabits tropical evergreen lower montane forests. The remaining three snub-nosed species inhabit temperate forests at ever increasing altitudes in China.

Our ultimate goal is to compare and contrast the habitats of all four species to identify similarities and differences that could be of evolutionary and conservation significance to this primate genus. Here we describe the habitat and habitat use of *R. avunculus* at Khau Ca. All of our habitat descriptors include forest structure, plant species richness, tree biomass, phenology, arboreal substrate size, and substrate orientation. We focus on forest structure as defined by DBH, bole height, and crown height for this study. Data were collected from four one-kilometer randomly stratified transects identified as A-D. Of the four transects, A and D are similar with relatively tall trees and high to intermediate tree density. B is distinct in having the shortest trees and greatest tree density, and C is distinct in having the tallest trees and very low tree densities.

R. avunculus was most frequently observed on the A (33%) and D (30%) transects suggesting a preference for tall trees with small to intermediately sized gaps. We close by discussing the importance of maintaining species specific natural environmental features for conservation and regeneration of the Tonkin snub-nosed monkey's habitat.

Feeding ecology and conservation actions of red-shanked douc, *Pygathrix nemaeus* at Son Tra Nature Reserve, Da Nang City, Vietnam

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Keywords: *Pygathrix nemaeus*, feeding ecology, Son Tra Nature Reserve, conservation, Vietnam

The first study of red-shanked doucs at Son Tra in 1974 laid the foundation for the continuous study of the red-shanked douc after Lippold returned to Vietnam in 1993.

Recently three surveys (2006-8) of Son Tra sponsored by the Douc Langur Foundation (DLF) reported a significant population of red-shanked doucs. These findings provided the basis for a multiple year Memorandum of Understanding between the Douc Langur Foundation, Hanoi University of Science (HUS) and the Forest Protection Department (FPD) Da Nang to support research and conservation of the red-shanked douc population at Son Tra Nature Reserve. Presently our team is studying red-shanked douc feeding ecology in association with social organization, population structure and ranging patterns. Also in progress is a detailed characterization of the ecological habitat of Son Tra including vegetation, phenology, climate, altitude and physical features. In addition, standard laboratory analyses of food items are in progress at HUS. We are also undertaking capacity building and wildlife conservation projects. Certificates of completion in biodiversity training were presented to all members of the FPD rangers and associate staff in March 2008. Monthly snare and trap patrols and the monitoring of local restaurants, hotels and spas are actively protecting the wildlife at Son Tra and other local nature reserves. An ecotourism project is also underway. All of these actions sponsored by the DLF, HUS and FPD are increasing the knowledge, protection and conservation of the red-shanked douc at Son Tra Nature Reserve.

Behavioural development and infant care in red-shanked douc langurs, *Pygathrix nemaeus*

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Keywords: *Pygathrix nemaeus*, behaviour, infant development,

We studied the behavioural development of five infant *Pygathrix nemaeus* from birth up to 18 months at the Singapore Zoological Gardens. In addition to developmental milestones, we focused on infant's interactions with their mother and other group members using focal animal sampling. Each infant was sampled up to 4 days a week and daily observations consisted of 1 to 3 one-hour sessions. We collected instantaneous data on infant's activity, physical location with respect to the mother or caretaker, and distance from the mother at 2-minute intervals.

We also employed *ad libitum* sampling and recorded behavioural landmarks as they emerged. Infants exhibited little activity after birth but began showing interest in their environs and started to make brief exploratory excursions away from their mothers, and tasted solids within the first month. Social play and consumption of solids began in the second month, followed by independent travel in the third month. Infants, however, did not reach complete locomotor independence until 8-9 months old.

Mothers provided the majority of care and restricted their infants from venturing out of contact only during the first few months. As early as 4 months, mothers started rejecting infants from suckling, which became increasingly more intense after 12 months. Infants were weaned subsequently. The development of the infants appeared to be affected by parental care style, group composition and physical environment.

This study was funded by Amerman Foundation, Offield Family Foundation, Singapore Zoological Gardens, and the Zoological Society of San Diego.

Density estimates and micro-habitat use of Bengal slow loris, *Nycticebus bengalensis* in disturbed mosaic low-land habitat, Khao Ang Rue Nai Wildlife Sanctuary, Thailand: Preliminary results

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Keywords: *Nycticebus bengalensis*, density, micro-habitat use, Khao Ang Rue Nai Wildlife Sanctuary, Thailand

The ecological role of nocturnal primates in the tropics is significant, but poorly understood particularly due to the perceived difficulty of their study. The Bengal slow loris (*Nycticebus bengalensis*), is listed as CITES Appendix I and “Data Deficient”* (IUCN 2000), underlining the crucial need for more data in order to effectively manage the species.

Our ongoing study initiated in November 2007 in Khao Ang Rue Nai Wildlife Sanctuary aimed to study the effect of habitat degradation on loris abundance, examine habitat variables that may explain variations in abundance, and describe the feeding behavior of this loris. A 3.6 km-dirt road which cuts through exotic plantations, plantations undergoing succession, and relatively pristine dry-evergreen forest patches, was surveyed monthly using line transect distance sampling. We also noted micro-habitats used and behavior on first detection. During 64 night-walks, we detected 103 lorises at 75 locations. They had the highest density in successional habitat and the lowest in plantations.

Trees used by lorises in the different habitats differed significantly in terms of diameter, height, crown structure and trunk cover. There appeared to be no difference in micro-habitat use between seasons. Plant exudates (*Terminalia catappa* and *Bauhinia* sp.) were the most commonly consumed item. Other food types included floral parts (*Parkia* sp.), fruits (*Lepisanthes rubiginosa*), and insects.

Ongoing work focuses on micro-habitat selection, and testing associations between used and available resources.

*Note from reviewers: *Nycticebus bengalensis* is now listed as “Vulnerable” in the IUCN Red List of Threatened Species.

Dao Tien Endangered Primate Species Centre, Cat Tien National Park, Vietnam

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Keywords: primates, rehabilitation, reintroduction, Vietnam

Dao Tien Endangered Primate Species Centre is located on a 56-hectare island at the entrance of Cat Tien National Park, officially opened on the 12th July 2008. As a collaboration between Monkey World Ape Rescue UK, Pingtung Rescue Centre Taiwan, Cat Tien National Park and the Forestry Protection Department of Vietnam, the centre will specialise in the rehabilitation, reintroduction and research of endangered primates of southern Vietnam.

Species will include the golden-cheeked gibbon (*Nomascus gabriellae*), black-shanked douc (*Pygathrix nigripes*), silvered langur (*Trachypithecus cristatus**), and the pygmy loris (*Nycticebus pygmaeus*). At the moment it is early days as the new centre develops, with plans for the first semi-free gibbon area, the start of the education/awareness programme, a primate monitoring team and the continuation of research within Cat Tien National Park.

*Note from reviewers: *Trachypithecus cristatus* is now recognized as *T. margarita* in central Vietnam , and as *T. germaini* in southernmost Vietnam.

Home range size and habitat quality of golden-cheeked crested gibbons, *Nomascus gabriellae* in Cat Tien National Park, Vietnam

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Cat Tien National Park, Vietnam

Keywords: *Nomascus gabriellae*, home range, habitat, Cat Tien National Park, Vietnam

The ecology of golden-cheeked crested gibbon* was investigated in the semi-evergreen lowland forests of Cat Tien National Park. As one of the last remaining populations of *N. gabriellae* in Vietnam, the study of their ecology is vital to develop baseline knowledge. Four study areas were selected based on forest type (varying structurally and compositionally), from January 2004 to December 2005.

In each intensive study area, the average home range size was consistent, but between forest types there was a wide variation, ranging from 16.72 ha in the “evergreen forest, 51.86 ha in “semi-evergreen” forest and 60.50 ha in the “bamboo”. The very small home ranges are surprising. It was initially thought that they are part of an energy conservation strategy of the gibbons, but this does not fit with the poorer-quality “bamboo” forest, with larger home range similar to the “semi-evergreen” forest. The structural qualities of the “evergreen” and “bamboo” forest are poor, with low tree density, and broken canopy, but species richness and fruit-tree density are similar to the “semi-evergreen” forest. As high levels of conflict behaviour between neighbouring groups was found in the “evergreen” forest, a compression scenario is more likely. The calling pattern, with a high number of female initiated calls may also agree with the high “compression” and need for female defence of resources.

*Note from reviewers: The currently used common name is “yellow-cheeked crested gibbon”.

The primate reintroduction program in Phong Nha – Ke Bang National Park, central Vietnam

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Keywords: *Trachypithecus laotum hatinhensis*, *Pygathrix nemaeus*, reintroduction,
Phong Nha-Ke Bang National Park, Vietnam

In 2005, as part of the Vietnam Primate Conservation Programme of the Frankfurt Zoological Society (FZS), FZS in cooperation with Cologne Zoo initiated a primate reintroduction program in the Phong Nha – Ke Bang National Park (PNKB-NP) in Central Vietnam.

In the long run, the project strives to enforce and link currently isolated populations of two endangered primate species, the Hatinh langur (*Trachypithecus laotum hatinhensis*) and red-shanked douc langur (*Pygathrix nemaeus*), respectively. PNKB-NP comprises about 90.000 ha and is one of the last remaining areas of retreat for both species. The animals for reintroduction come from the “Endangered Primate Rescue Center” in Cuc Phuong National Park. As a first step, a semi-wild enclosure was built and in September 2007 two groups of Hatinh langurs, comprising four individuals each, all equipped with radio transmitters, were brought to the site.

A continuous long-term monitoring program was started for general supervision and protection of the langurs, as well as to collect data on their behavioural ecology. As the long-term aim of the program is the final release of the primates into their natural habitat, forest protection is another essential component of our work. In cooperation with the Forest Protection Department, we initiated a ranger program to set up special protected areas in PNKB-NP. To define these areas as well as to obtain actual data on the population size and distribution of the wild populations, primate surveys are carried out. Moreover, awareness campaigns for locals and tourists are arranged.

New Information on grey-shanked douc langurs, *Pygathrix cinerea* in Quang Ngai Province, Vietnam

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Keywords: *Pygathrix cinerea*, distribution, Vietnam

In a recent report, Ha Thang Long (2004) stated that in Quang Ngai Province, the grey-shanked douc langur was only distributed in Ba To District. However, our field research from 4/2007 to 10/2008 observed 25 groups of about 200 individuals of 43,186.9 ha. Most of them are only distributed from about 250 to 720m where there is a lot of primary and secondary forests in three districts: Son Ha, Tra Bong and Ba To. The average group size is approximately 6-7 individuals. Most importantly, the population of grey-shanked douc langurs in Quang Ngai Province is decreasing seriously. The reason for this status is hunting and forest destruction by local people. Therefore, it is the time for local people, local authorities and forest management units to cooperate in protection programs. In addition, research on grey-shanked douc langur should be continued and provide appropriate solutions for long term conservation of this species in Quang Ngai Province.

How transboundary cooperation and field-based conservation have led to improved hope for survival of the cao vit gibbon, *Nomascus nasutus* on the Vietnam – China border

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Keywords: *Nomascus nasutus*, distribution, status, conservation, China, Vietnam

In 2002, the “Critically Endangered” cao vit gibbon *Nomascus nasutus* (also known as eastern black crested gibbon) was rediscovered by a team from FFI, in a 1600ha block of limestone mountains in Trung Khanh District, Cao Bang Province on the border with China. At that time, 26–28 individuals were recorded in five groups and FFI initiated a project to protect this population, focusing mainly on community forest patrols, interventions to reduce firewood extraction and establishing a protected area in 2007. In 2006 the FFI China Programme also began conservation measures in the adjacent border area, having seen there was viable habitat for the gibbons. Towards the end of 2006 a survey there recorded three more gibbon groups and led to the announcement that the species has been rediscovered in China.

In September 2007, a transboundary census of the gibbon population was conducted over the entire area of viable habitat; the most comprehensive survey effort to date. Survey teams were assigned to listening posts on the summits of the mountain tops before dawn to record gibbon vocalisations. Visual observations were used to determine the numbers and structure of gibbon family groups where possible. The same approach was followed by both the Vietnam and China survey teams, with both sides beginning close to the border on 8 September.

By comparing data from both surveys, the team concluded that 18 different groups were recorded, totalling ca. 110 individuals. Three groups appear to move across the border, and this has been confirmed by field research conducted since the beginning of 2008 in China. The revised population estimate was much higher than expected, and the results of the census are a milestone indicator of the success of conservation efforts so far.

Status of yellow-cheeked gibbon, *Nomascus gabriellae* in Cat Tien Biosphere Reserve

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Keywords: *Nomascus gabriellae*, status, conservation, Cat Tien Biosphere Reserve, Vietnam

Yellow-cheeked gibbon* (*Nomascus gabriellae*) has a restricted distribution confined to southern Vietnam, northeast Cambodia and possibly in southernmost Lao. Cat Tien Biosphere Reserve (CBSR) plays an important role for the survival of the species due to its location in the centre of their range and harboring possibly one of biggest populations of the species.

Sightings the gibbons and hearing their calls have been reported by various scientists who conducted wildlife surveys in the CBSR, confirming existence of the species not only inside Cat Tien National Park, but also in 6 surrounding State Forest Enterprises (SFE). However, very few census surveys have been conducted to assess the species population size. There was also no monitoring programme conducted to monitor trends of population change in CBSR.

In 2005, under the technical support of one of these authors (NXD) and financial support from US Fish and Wildlife Service, the first census survey of yellow-cheeked gibbons using call listening post technique was carried out in Cat Tien NR. This census has found that population of yellow-cheeked gibbons in Cat Tien NP consists of about 150 groups, 480 individuals. In 2007, under technical support of 2 authors (NXD, NXV) and financial support from Winrock International, the first community-based monitoring programme for yellow-cheeked gibbons (and five other endangered wildlife species) has been developed and applied in Da Te SFE (buffer zone of CBSR).

The first survey of yellow-cheeked gibbons using call listening post technique was conducted in December 2007, in Quoc Oai and An Nhon Communes of Da Te SFE. Totally, 18 groups of gibbons were recorded from 7 listening posts and for 5 consecutive listening days, resulting at about 55 individuals. Habitat of the yellow-cheeked gibbon in CBSR has been degraded and much disturbed by various activities (hunting, timber logging, NTFP harvesting, etc.) that threaten the survival of the gibbon population. Landscape-wide conservation approaches must be applied to conserve this important yellow-cheeked gibbon population.

*Note from reviewers: The currently used common name is “yellow-cheeked crested gibbon”.

**Time budget and activity of red-shanked douc langurs,
Pygathrix nemaeus
in Hin Namno National Protected Area, Lao PDR**

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Keywords: *Pygathrix nemaeus*, activity budget, behaviour, Hin Namno National Protected Area, Lao PDR

Changes in time budget can be the influence of threat and habitat quality. We studied two nonhabituated groups of red-shanked douc langurs *Pygathrix nemaeus* through scan sampling in Hin Namno National Protected Area, Khammouane Province in Lao PDR. The first group G1 (17 individuals) is located at Camp 5 Nam Pasai and has more human pressure whereas the second group G2 (39 individuals) is located at Camp 4 Nam Khoum with low human pressure. The distance between these two groups is about 5 km. In each group we identified six target animals including an adult female, adult male, sub-adult, juvenile, infant 2 and infant 1, from which data was recorded at 30-minute intervals.

We examined the species time budget to find out if these groups were influenced by seasonality and human pressure. Group observations were conducted from March 2007 to June 2008 ($N=8,837$). Results from the two groups show that feeding (29.46%) was the highest proportion of the time budget; then social activity (14.89%) including grooming and playing; inactive mode (14.16%) is the 3rd largest time budget but probably includes monitoring inconsistency; foraging (13.36%); sleeping (11.90%); traveling (9.81%); and others (6.42%). Red-shanked douc langurs behaved slightly different between dry season and wet season, but not significantly different. On another hand, more human pressure and especially hunting was an important factor leading to changes in their activities. Group 1 with more human pressure spent more time in travel and inactivity especially in monitoring for threats, but less time sleeping and feeding.

In addition, social activity was mainly for auto-grooming (43.26%); solitary play (21.04%); and chase play (15.8%), while surprisingly grooming covers only (11.02%) of the species social activity budget which is considered low. In conclusion, feeding covers the highest percentage of the species time budget, and higher in auto-grooming but low in grooming for their social activity. Their time budget and activity is not influenced much by season but is influenced by degree of human pressure.

Distribution and population of yellow-cheeked crested gibbon, *Nomascus gabriellae* in Phnom Prich Wildlife Sanctuary in Mondulkiri Province, Cambodia

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Keywords: *Nomascus gabriellae*, distribution, density, Phnom Prich Wildlife Sanctuary, Cambodia

Yellow-cheeked crested gibbon *Nomascus gabriellae* is a globally threatened species restricted to the east of the Mekong River in Cambodia, Vietnam and Lao PDR. Surveys were conducted in Phnom Prich Wildlife Sanctuary, Mondulkiri Province, Cambodia to assess the distribution and status of the gibbon population. The distribution and population size was obtained from auditory sampling undertaken between January and April 2008.

The census used single listening posts, visited on three consecutive mornings, to estimate the density of gibbon groups. Fifty-three listening posts were established across 866 km² of suitable habitat and these were used to obtain a gibbon population estimate. The estimated total population size within Phnom Prich was 278 (95% CI range: 39-526) gibbon groups; 185 groups in semi-evergreen forest; 18 groups in riparian semi-evergreen forest; 64 groups in evergreen forest and 11 groups in riparian evergreen forests. Suitable habitat in the north-west of the site, and within Lumphat Wildlife Sanctuary, Ratanakiri, were unoccupied by gibbons.

Our population estimate compares to >800 groups within Siema Biodiversity Conservation Area, the only other site within the species' range with similarly robust population estimates. Phnom Prich Wildlife Sanctuary may therefore support the 2nd largest global population of taxonomically unambiguous *Nomascus gabriellae*.

Threats to gibbon within Phnom Prich largely derive from habitat loss and degradation driven by extractive activities (mining and logging) and associated infrastructure developments. However given strong future management the site has good potential conservation value for yellow-cheeked crested gibbon due to the current relatively manageable threat levels and a habitat mosaic that includes several large patches of suitable semi-evergreen forest.

Non-human primates mask signs of pain

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Keywords: primates, pain, wounds, behaviour

In this report we tried to answer the question whether monkeys routinely mask signs of pain in case of wounds/illness. In a laboratory primate colony containing group-housed African green monkeys (*Chlorocebus aethiops*), rhesus macaques (*Macaca mulatta*), pig-tailed macaques (*Macaca nemestrina*) and long-tailed macaques (*Macaca fascicularis*), cases of spontaneously occurring illnesses or wounds were recorded.

In a total of 54 cases, three sets of data were collected: (1) individual data of the affected monkey (species, sex, age, social status within the group), (2) wound/illness-related behaviour (at least 5 minutes of behavioural observation after the detection of illnesses/wounds), (3) wound/illness description and corresponding photos (done/taken by primate veterinarians). After the data within sets (1) and (3) had been translated into human dimensions, an experienced medical doctor was consulted in order to determine the fictive human behaviour with comparable wounds/illnesses (resulting in data set (4)). The data for sets (2) to (4) were independently transferred into scores and the scores were compared for each individual case of illness/wounds. As a result, the monkey behaviour score (2) was significantly lower than both the fictive human behaviour score (4) and the wound/illness score (3). This clearly demonstrates that monkeys mask signs of pain.

Sleeping trees and sleep-related activities of pileated gibbons, *Hylobates pileatus* in southeast Thailand

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Keywords: *Hylobates pileatus*, sleeping trees, sleep-related activities, Thailand

Patterns of sleeping sites use by forest-dwelling primates have received relatively little attention, while the functional significance of these sites also remains unclear. The aim of this study was to characterize the sleeping trees of pileated gibbon (*Hylobates pileatus*) and their use at the Khao Ang Ru Nai Wildlife Sanctuary in southeastern Thailand, a previously logged forest.

One habituated group (one adult male, one adult female and one infant) was followed from night tree to night tree for five consecutive days each month from September 2006 to September 2008. We measured diameter at breast height, total height, and canopy structure of each sleeping tree. We also recorded the time when the group entered and left these trees. All sleeping trees were mapped using a GPS and entered into a GIS.

Group members usually slept on separate trees; the adult male slept alone while the infant slept with the mother. Most of the trees were in the upper storey and tended to be large (92 cm DBH on average). *Lagerstroemia calyculata* Kurz was the most used and was found throughout the area, with an average height of 37 m. They repeatedly used their night trees, whereby 52% of the trees were re-used at least once per year. They entered their sleeping trees in mid-afternoon (average 15:10) and left at sunrise (average 6:06). Based on preliminary comparisons with other forests, the relatively high rate of re-use of trees may suggest that logging has created a shortage of sleeping sites in the sanctuary.

Relationship between humans and long-tailed macaques, *Macaca fascicularis* in Thailand

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Keywords: *Macaca fascicularis*, human-macaque conflict, wildlife management, Thailand

Long-tailed macaques (*Macaca fascicularis*) are the most frequently encountered primate in Thailand. They distribute from the lower northern and northeastern (ca. 16° 30' N) to the southernmost part (ca. 6° 30' N) of Thailand. From our survey from December 2002 to August 2008, long-tailed macaques were found in 91 locations. Fifty-one of these were temples. Roughly 90% of Thai people are Buddhists, who pay respect to well-being of all living things. Being provisioned by monks and pilgrims, monkeys are safe from hunting or predation. For these reasons, the population of long-tailed macaques has increased by 5-10 times from that of 15 years ago. On average 200 monkeys per location were counted and some populations had more than 1,000 individuals, which causes human-monkey conflicts.

There are pros and cons of having long-tailed macaques in the areas. In some locations, macaques damaged crops and houses when the natural foods are scarce and thus they are regarded as pests. Residents living around these populations protected their houses with metal fencing and television antennae with steel guards.

Zoonotic transmissions between macaques and humans such as fecal parasites, chigger mite and malaria were also reported. To control the population of macaques, inexperienced contraception and translocation were conducted in some locations. However, some local organizations earned benefits from macaques by holding monkey parties as found in Lopburi City. More or less, some populations of long-tailed macaques exhibited morphological, genetic and behavioral uniqueness which is worthwhile to conserve. Therefore, management conservation measures should be taken.

Primate censuses in difficult to access karst forests in the Phong Nha–Ke Bang National Park, central Vietnam

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Keywords: primate survey, distance sampling methods, karst forest, Phong Nha-Ke Bang National Park, Vietnam

In 2007 we conducted systematic surveys to determine the distribution and population densities of the primates in the Phong Nha-Ke Bang National Park (PNKB-NP). A comparative study of point and line transect sampling should give information on the efficiency of both methods in difficult accessible karst forest areas.

From April to August we carried out a total of 117 transect inspections and 55 point surveys. In the past, nine primate taxa were documented for PNKB-NP. Within the framework of our surveys we could confirm five of these taxa, including the Hatinh langur (*Trachypithecus laotum hatinhensis*), red-shanked douc langur (*Pygathrix nemaeus*), stump-tailed macaque (*Macaca arctoides*), eastern Assamese macaque (*M. assamensis assamensis*) and southern white-cheeked crested gibbon (*Nomascus leucogenys siki*). During our surveys in 2007 we could not detect the two nocturnal lorises, Bengal slow loris (*Nycticebus bengalensis*) and pygmy loris (*N. pygmaeus*), as well as the rhesus macaque (*Macaca mulatta*) and northern pig-tail macaque (*M. leonina*). Further research on these primates, especially on the lorises in PNKB-NP are highly recommended.

Point transect sampling seems to be more efficient for recording Hatinh langurs. However, to investigate all primate taxa in PNKB-NP, line transect sampling should be preferred, because more taxa are detectable with higher probability. Even though primary forests remained almost unaffected within PNKB-NP, logging and hunting are still present, affecting the distribution and population densities of the primates.

Phylogeny, taxonomy and distribution of crested gibbons, genus *Nomascus*

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Keywords: *Nomascus*, phylogeny, taxonomy, distribution, molecular genetic

Currently, several classification schemes based on morphology, fur colouration and genetics are available, but no consensus of crested gibbon taxonomy exists and the distribution areas of different taxa are not well defined. All gibbon taxa are endangered at different levels, knowledge about their taxonomic classification and their exact distribution zones is a major issue for crested gibbon conservation.

The present study is set up to clarify the taxonomy of crested gibbons and to elucidate their exact distribution zones. Therefore, an approach will be used in which acoustic, morphological and genetic data will be combined.

Call parameters from acoustic signals will be extracted and analysed in combination with already published data. Genetic material will be collected during field surveys and expanded with further material from museums and zoos. In order to detect hybridization or introgression, genetic studies will include maternal, paternal and biparental marker systems. As maternal inherited marker, the complete mitochondrial cytochrome b gene and the hypervariable region I of the mitochondrial D-loop will be sequenced. To obtain paternal and biparental data, partial sequences from the genes coding for the testis-specific protein on the Y-chromosome (TSPY) and von Willebrand factor (vWF) will be generated, respectively.

Based on the expected results, it will be possible to 1) clarify the taxonomy of crested gibbon taxa, 2) depict their exact distribution zones, 3) reconstruct phylogenetic relationships among them, 4) reconstruct biogeographic patterns leading to their current distribution, and 5) detect possible hybridization zones. As a major result, the data should provide a solid platform for the establishment of conservation action plans.

The use of lorises, *Nycticebus bengalensis* and *N. pygmaeus* in traditional Cambodian medicines: Implications for conservation

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Keywords: *Nycticebus bengalensis*, *N. pygmaeus*, wildlife trade, traditional medicine,

Two species of lorises occur in Cambodia, the Bengal slow loris *Nycticebus bengalensis* and the pygmy loris *Nycticebus pygmaeus*.

Little is known about the ecology of these nocturnal primates and most of the information on species distribution is still based on animals in the trade. Both species however appear to be very heavily exploited and traded all over their distribution range despite protection under national laws and international treaties. Lorises are traded for pets, food and as traditional medicines. Within Indochina Cambodia appears to be the country where lorises have the highest value in traditional medicine. A detailed interview study found that pygmy lorises are more readily available than Bengal slow lorises, a fact that also reflects the status in the wild and spotlighting surveys were unable to detect the latter species in the wild. Lorises are traditionally used to treat problems of childbirth, stomach problems and as a wound treatment. The demand for lorises medicines was reported to be increasing in Phnom Penh and lorises were found to be the preferred treatment for certain illnesses when compared to plant based traditional remedies and western medicines. Comparable surveys in Vietnam and Laos are required to gain a comprehensive overview about the trade situation and to effectively and nationally appropriately address the problem.

Present distribution and status of macaques, *Macaca* in Vietnam

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Keyword: *Macaca*, distribution, status, hybrids, Central Highlands, Vietnam

In a cooperative macaque research project (2004-2008), the members from Saigon Zoo and Primate Research Institute, Kyoto University have conducted a survey on distribution and status of Vietnam's macaques in the Central Highlands and its vicinity (ca. 16°16' N. to ca. 8°41'N.). The study was implemented by field survey and questionnaire survey for the provincial level. A part of the study was carried out by five students from Kyoto University as their graduate research. As for pet monkeys, samples for DNA, morphological measurements and photos were obtained. Additional GPS information was used for macaque distribution. Capture and release survey was carried out in Ca Mau.

The study covered 150 sites. Among five macaque species occurring in Vietnam, *Macaca fascicularis* is the most successful species having a wide range, from Son Tra (16° 6' N) to Ca Mau and Con Son Islands southwards. In the Central Highlands, located around 12°N. -15°N., we found this species at 40 localities, while *Macaca arctoides* and *Macaca nemestrina** at 67 localities and at 65 localities, respectively.

Only four localities for *Macaca mulatta* were found concentrating in the area ca.15°N to ca.16°N. Rhesus macaques having intermediate tail-length between rhesus and long tailed macaques were found. These "hybrid" macaques occurred in Son Tra, A Luoi and Central Highland areas. The populations in the Cu Lao Cham Island, which is situated 30 km east from Hoi An, also showed intermediate morphology between the two species, indicating hybridization. Based on our analysis, we can conclude that the "yellow" monkey reported by village people is probably rhesus macaque and the contacting or co-occurrence zone of these two species is estimated at the area ca.12° N to ca.15° N, located east of the Truong Son Mountain Chain. No *Macaca assamensis* was found during the survey.

Non-indigenous macaques (confiscated or pets) have been released into the wild troops. At recreation areas or pagodas (e.g., Nui Ba Den where hybrids with *M. nemestrina**, *M. mulatta*, and *M. fascicularis* were found) two to three macaque species coexist in the same group that consequently leads to hybridization. Field study revealed that forest habitat fragmentation led the macaque populations to become isolated from each other, meanwhile persistent hunting has made them very timid. Deforestation for resettlement, illegal hunting and trading of primates has reduced wild macaque populations.

*Note from reviewers: *Macaca nemestrina* in Vietnam is now recognized as *M. leonina*.

Distribution and present status of primates in Laos

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Keywords: primates, distribution, status, Lao PDR

The Lao People's Democratic Republic (or Laos) is rich in primate fauna, prosimians, cercopithecids, and lesser apes were reported. Human population and economical activity have rapidly increased and become threats to local primate populations; however, their distribution and present status have not been thoroughly studied.

Fooden (1982) hypothesized ecological segregation for macaques by tropical *vs.* subtropical, evergreen *vs.* non-evergreen forests, arboreal *vs.* terrestrial, and east *vs.* west of the Gulf of Bengal, which should be proved by the study on distribution pattern of five species of macaques inhabiting Laos.

We have surveyed primates in the north (Xam Neua – Phong Sali – Luang Nam Tha), central (Vientiane – Kasi – Sanakham), and south (Savannakhet – Champasak – Attapu) of Laos since 2004. We recorded locality, geographical coordinates, presence of primates, habitat types, morphology, impact to and conflict with humans by interviews with local people or forest rangers, and also inspected the pet macaques. It was found that the forest type is an important factor of the distribution: stump-tail, pig-tail, and Assamese live mainly in limestone mountainous and mature evergreen forests, rhesus live mainly on patchy forests, and pig-tail tolerates rather dry, isolated forests. Though Assamese and pig-tail tend to occur more frequently in north and south, respectively, and their distribution overlaps widely at the latitude of 15.1 °N to higher. Rhesus and long-tail are parapatrically distributed at 14.0 – 15.2 °N (in the south of Champasak and Attapu).

We also report herewith the habitat loss, hunting, wildlife and bush meat trades, and monkey breeding colonies in Laos.

Research results on the distribution, population dynamics, and feeding ecology of red-shanked douc langurs, *Pygathrix nemaeus* in Son Tra Nature Reserve, Da Nang City, Vietnam

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Keywords: *Pygathrix nemaeus*, distribution, population dynamics, feeding ecology, Son Tra Nature Reserve, Vietnam

To provide a general background, Son Tra is a 4,439 ha peninsula located in central Vietnam, belonging to Da Nang City and surrounded on three sides by the ocean, and the fourth side by the city. The peninsula has a general east to west orientation and is characterized by numerous streams cutting through the landscape. The average height of the peninsula is 350 meters, and the highest point is 696 meters. Concerning the flora, there are 985 species of 483 genera and 143 families, including 22 species which are endangered. The landscape is dominated by *Fagaceae* species and *Parashorea stellata*. Concerning the fauna, there are 289 species of 93 families and 38 orders. Specific to primates, there are a high number of *Macaca mulatta*. Of the fauna, there are 15 endangered species, including the red-shanked douc (*Pygathrix nemaeus*) which are distributed in four sub-populations consisting of between 30-40 individuals (Dinh Thi Phuong Anh, 1997).

Research was conducted continuously between July 2007 and August 2008. Red-shanked doucs are primarily distributed into two main forest types, with groups found mostly in primary forest patches, and those found mostly in secondary forest. The ranging pattern of the groups is seasonally influenced. Population density of the groups differs between primary and secondary forest, with 6-7 individuals/sq km and 3-4 individuals/sq km, respectively. Additionally, there appears to be two different types of locomotor patterns used by the doucs as they moving through the canopy.

Feeding ecology was also studied during this time, and there were 10 species of flora that appear to be highly preferred by the doucs. Of these species, nine have been identified to at least the genus level. This includes species selected for their fruit (*Garcinia oblongifolia* and *Fagaceae* spp.), those selected for both leaf and fruit (*Parashorea* spp., *Baccaurea sylvetris*, *Ficus racemosa* L., and *Syzygium* spp.), and those selected for their leaves (*Ficus* spp. including *Ficus benjamina* L., and *Mischocarpus sundaicus*). Diets are seasonal, including different food and food parts. However, the most selected foods are from *Parashorea* spp. (leaves and fruit) and *Mischocarpus sundaicus* (leaves only). Feeding behaviors were also studied, as well as threats to the food source of the doucs. Threats include parasitizing plant species and illegal forest exploitation. Threats to Son Tra Nature Reserve in general include the construction of roads throughout the habitat, environmentally irresponsible tourism development, typhoon destruction, and illegal forest product and animal extraction.

Chromosomal studies of leaf-eating primates

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Keywords: Colobinae, cytogenetics

Comparative cytogenetics is an important tool for clarifying phylogenetic relationships among species. We compared the karyotypes and G-banding patterns of 10 species of langur including two *Pygathrix*, one *Rhinopithecus*, one *Semnopithecus*, and six *Trachypithecus* species/subspecies. The diploid chromosome number for all species studied was 2n=44 with 82 autosomal arms.

The autosomes are largely conserved among all langurs studied with differences occurring primarily in the small arms. The X chromosome is completely conserved, but the Y chromosome appears in at least three different forms. Two subspecies of *P. nemaeus* are distinguished by inversions in the small arms of two chromosomes. G-banding is described for the first time in several langur taxa including *P. cinerea*, *T. delacouri*, *T. laotum ebenus*, *T. l. hatinhensis*, and *T. obscurus*.

Placentation and related issues in leaf monkeys

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Keywords: cercopithecidae, colobinae, placentation

The placental implantation of cercopithecidae is very superficial and consequently no villi develop in the future membrane region. In many species a secondary lobe develops on the other side of the uterus. Thus, most leaf monkeys have two placental lobes although exceptions exist. All species lack atrophic villi found in the decidua capsularis, in contrast to the situation found in human placentas. Placental infarcts are commonly present in leaf monkeys but they do not relate to the human condition of preeclampsia. Microscopically, the cercopithecid placentas are hemochorial and very similarly constructed one to another.

Microscopically, the syncytiotrophoblast ‘lines’ the intervillous space and this irregular space is being perfused by maternal blood. The nuclei of the syncytium originate from cytotrophoblast, do not subsequently divide, and ultimately they undergo apoptosis. They also regulate placental transfer and are active in hormone production. From the syncytiotrophoblastic surface, small multinucleated ‘buds’ (knots) detach and are carried to the lung during pregnancy. They degenerate there but, while doing so, they release so-called cell-free DNA that circulates in the maternal gestational serum. It disappears promptly after delivery. Fetal diagnosis can be done from this DNA. In human gestation, as many as 150,000 such knots are transported daily and their antigens may be of some importance for the development of tolerance of the ‘foreign’ placenta.

Syncytial knots and pulmonary deportation were found in the lung of the one pregnant douc langur available for study. It is suggested that future studies identify cell-free DNA in leaf monkeys and ascertain the pulmonary cells by staining with antibodies to gonadotropins.

Current research and conservation status of the grey-shanked douc, *Pygathrix cinerea* in Vietnam

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Keywords: *Pygathrix cinerea*, social organisation, distribution, conservation, Vietnam

The grey-shanked douc (*Pygathrix cinerea*) is one of the five Vietnam's primate species listed among "The World's 25 most endangered primates" assessed by the IUCN-Primate Specialist Group (Mittermeier *et al.* 2007). In fact, this endemic leaf-eating monkey is facing the threat of extinction due to the loss of habitat and hunting pressure (Nadler *et al.* 2003). Conservation action is urgently needed. The aim in this presentation is to provide an overview on the current status of research and conservation activity on the grey-shanked douc. Preliminary results of the first long-term research project on the species in Kon Ka Kinh National Park showed that the basic level of social organization is a one-male unit (OMU) with 5 to 11 individuals. The OMU's can gather as a group of up to 99 individuals. Inter-group aggression was rarely observed. Fission and fusion happened often in the study groups.

A new population of about 100 individuals was found in Ngoc Linh Nature Reserve, Kon Tum Province. Review of current conservation status of the species shows that hunting is the most dangerous threat to the remaining populations while the threat of habitat fragmentation is still unclear.

Further conservation action for the grey-shanked douc monkeys in Vietnam in the coming years is needed.

Population of red-shanked douc langur, *Pygathrix nemaeus* at Dusit Zoo, Thailand

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Keywords: *Pygathrix nemaeus*, population, management, feeding, Dusit Zoo, Thailand

Red-shanked douc langurs (*Pygathrix nemaeus*) have long been exhibited at Dusit zoo. There were 12 individuals (7,5) at Dusit zoo in 1997 and then they were translocated to other zoos, leaving only 3 individuals in 2002. But in 2003, 6 individuals were donated to the zoo. They were divided into 3 breeding groups (1,1; 1,2; 1,2).

Their feeding menu was increased to greater than 20 varieties of food consisting of mixed vegetables, fruits, grains, hard-boiled eggs and several kinds of herbs. The schedule consisted of feeding them twice a day and they were fed *ad libitum*, for the purposes of enhancing and increasing the animal's preferences and nutritional balance. The first female gave birth on 28 April 2003. Breeding has become consistently successful after implementing these dietary changes, and recently (October 2008) the population has increased to 10,19,2 of douc langurs within 5 breeding groups. Retrospective analysis of birth data shows that the species is not a seasonal breeder and birth occurs year round, usually at night or early morning. From 22 records of birth, the shortest interbirth interval was 9 months and the longest was 26 months. For successful births the youngest male was 4 years and 6 days old and the youngest female 2 years and 10 months old.

In summary, the successful breeding of red-shanked douc langurs in captivity depends on several factors including those that address breeding and management plans, animal health care, nutritional management and behavioral enrichment.

Stopping the trade of Vietnam's primates: Experiences and cases from ENV's Wildlife Crime Unit

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Vietnam's primates are under serious threat due to heavy hunting pressure and an increasing demand for wildlife and wildlife products. These threats, compounded by the fact that the majority of Vietnamese citizens are unaware of the wildlife protection laws and the legal status of primate species, is pushing Vietnam's primates closer to extinction.

In response to the devastating effects of the wildlife trade, not only on primates but on many endangered species in Vietnam, in 2005, the Vietnamese non-governmental organization (NGO) Education for Nature-Vietnam (ENV) established a Wildlife Crime Unit (WCU) and a toll-free hotline. This hotline facilitates public reporting of wildlife crimes and assists wildlife protection authorities in combating the illegal wildlife trade. The WCU works closely with authorities to respond to these crimes and has developed a national Wildlife Protection Volunteer Network to assist with monitoring of wildlife consumer establishments. The aim of all WCU's activities is to bring an end to the wildlife trade in Vietnam.

After nearly three years in operation, ENV's Wildlife Crime Hotline has recorded more than 1400 cases. Primate crime cases account for about 19 percent (about 271 cases). In total there have been 929 cases involving live animals, which amounts to a total of nearly 16,000 individual live animals. Among these there are 164 macaque cases, making up 17.7% of live animal cases; 26 gibbon cases making up 2.8% of live animal cases; 41 langur cases making up 4.41% of live animal cases; and 36 lorises accounting for 3.9% of live animal cases.

ENV's Wildlife Crime Database also indicates that crimes involving primate species include: possession (57.9%), transportation (12.9%), selling of live animals at markets, restaurants and shops (7.7%), hunting (3.3%), preservation in wine (1.8%), and advertised on menus (0.4%). These figures highlight the demand for primates for pets or in private collections as a significant driver in the illegal trade of these taxa. Species of gibbons (northern white-cheeked, southern white-cheeked and yellow-cheeked), lorises (pygmy loris and slow loris) and langurs (red, black and gray shanked douc langur) are most often found in possession cases, and macaques (long-tailed, pig-tailed, stump-tailed and rhesus macaques) are common in both the possession and transportation cases.

Over the past three years, ENV's Wildlife Crime Hotline has recorded a number of successful cases involving public participation in helping to end the wildlife trade of primates. This presentation will highlight some examples of these cases. In most of these successful cases, the animals were successfully transferred to rescue centers. However, despite many successes, there are still significant obstacles to tackling the trade of primates in Vietnam. Some of the obstacles encountered by ENV's wildlife crime team in dealing with primate crime cases include: a lack of rescue center facilities for macaques species, the costs associated with placement including requests for compensation from residents, weak enforcement and inadequate punishments or penalties that might otherwise deter future crimes.