

Project Borneo 2004



University of Edinburgh

Project Borneo Final Report

Expedition to South Kalimantan, Borneo, Indonesia

18th July – 8th September 2004

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Abstract

Agile gibbons (*Hylobates agilis*) are small arboreal lesser apes found in the rainforests of South East Asia. This area of the world is under immense logging pressure, and habitat is shrinking daily. Our research investigated the presence of geographic variation in the territorial 'Great Call' of female agile gibbons. Recordings were taken from three geographically isolated populations in south Kalimantan, Borneo, between the months of July and September 2004. Analysis revealed that there was both variation in the introduction length and differences in the length of the climax note. This information could potentially be used as a conservationary tool, to identify the origin of confiscated gibbons.

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We are also very grateful to Dr. John Deag, Dr. Liz Rogers, Dr. Susan Cheyne and Becci Coe, and to the members of Edinburgh University Expeditions Committee, particularly Margaret Jackson, for their expert advice and support.

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Camp Leakey, Tanjung Puting National Park: *Upat, Litus, Pesin, Herman, Dadi, Desy, Ani & Depi, Sabre, Mr. Baim, Pac Umar, Ayan, Engkot, Hobri, Kalim, Roso, Dedy, Rulan, Syawani, Nuri, Slas, Anang Nanda, Tumbane, Ingkris and Dudin.*

Cabang Panti, Gunung Palung National Park: *Pac Tadin, Pac Uthay and Pac Agung.*

We would lastly like to thank the Edinburgh University Chaplaincy Centre, particularly Liz Forrester, for providing us with a venue to exhibit educational text and photographs taken in Kalimantan.

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Section 1

Introduction

Aims and Objectives

Our aim was to investigate the presence of geographic variation in the Great Call of Bornean agile gibbons.

- We collected recordings of agile gibbon Great Calls from 3 geographically isolated populations. Analysis of these calls using the computer programme 'Wavesurfer', revealed whether or not geographic variation exists between isolated populations.
- We talked to pupils at Palangkaraya High School. The school has an environmental module as part of their English course and we talked to the students about our work.

Geographic Location

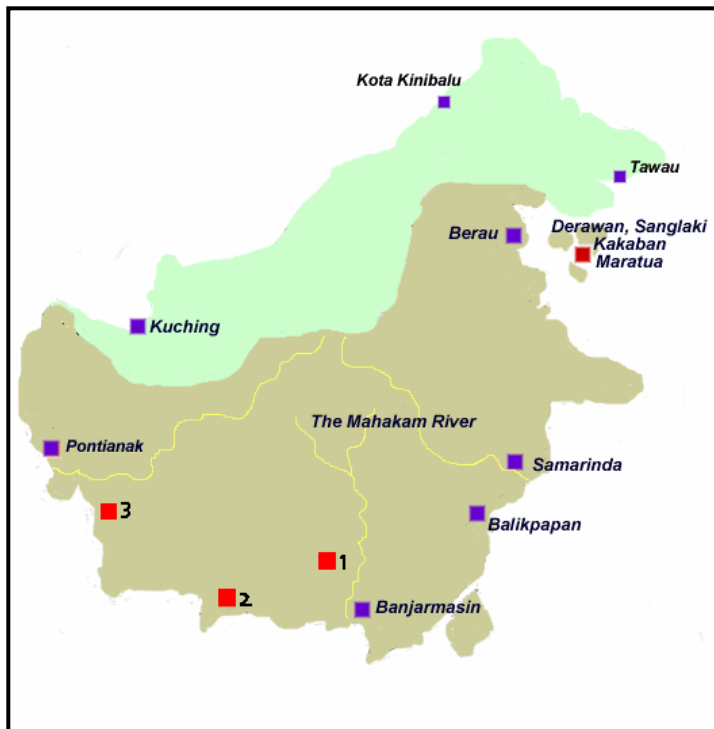
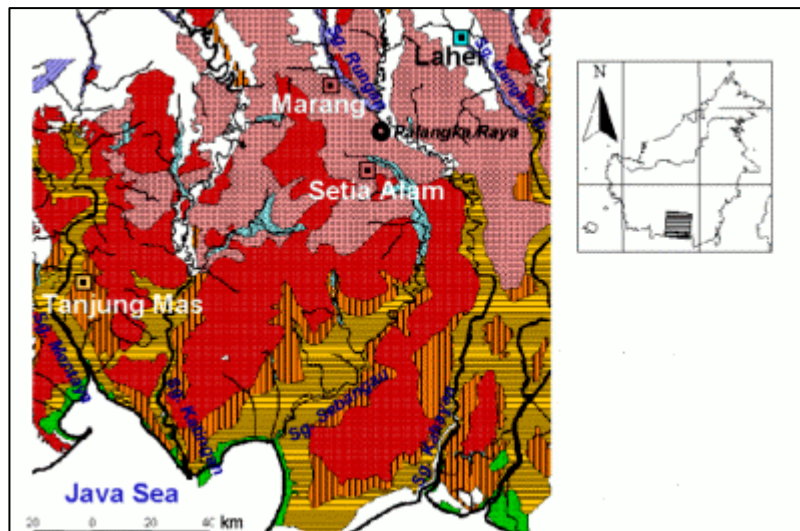


Fig. 1 – Map to show location of the three research sites in Kalimantan, Borneo

- 1 - Setia Alam Research Station, Sebangau National Park
- 2 - Camp Leakey, Tanjung Puting National Park
- 3 - Cabang Panti Research Station, Gunung Palung National Park

1. We based ourselves at **Setia Alam Research Camp**. It is located in the north-east of the 9000km² Sungai River, Sebangau National Park, Central Kalimantan, approximately 20km SW of the provincial capital of Palangkaraya. The Sebangau catchment, bounded by the Sungai Katingan to the west and Sungai Kahayan to the east, remains largely forested (>7000km²) and forms one of the largest areas of tropical peat swamp forest

remaining in SE Asia. Since completion of the project, the Sebangau has been granted National Park status (December 2004).



2. From there we travelled to **Camp Leakey** in Tanjung Puting National Park. This 741,100 acre Park started as a game reserve for the protection of orangutans in 1936 and 1937, and was upgraded to a National Park in 1982. In 1971 Camp Leakey was established as a research site from which Dr. Birute Galdikas began her pioneering studies of orangutans.



3. Cabang Panti Research Station is situated in Gunung Palung National Park. Gunung Palung National Park is located on and around the Gunung Palung and Gunung Panti mountains in West Kalimantan, Borneo, Indonesia. This 90,000 hectare park represents nearly every type of vegetation in Borneo, including beach and mangrove forests, peat and freshwater swamp forests, and endangered lowland dipterocarp forests. In addition it is home to a range of rare and endangered species of fauna, including orangutans.



Background & Justification

Agile gibbons (*Hylobates agilis*) are small arboreal apes found in the rainforests of South East Asia. Like most gibbons, they are monogamous and territorial. Territory is defended by chasing intruders, displaying at boundaries and singing. Adult agile gibbon pairs produce loud and complex duets, which are dominated by the female [Haimoff and Gittins 1985]. This song (or great-call) lasts around 15 seconds and can be heard at intervals, over a 10-15 minute period during the hours of dawn. Several playback experiments have supported the hypothesis that singing functions as a spacing mechanism [Mitani 1987, Cowlishaw 1992]. It has also been shown that there is a degree of call individuality between females [Haimoff and Gittins 1985], which again

supports the argument that singing is a form of intergroup communication. It was important therefore for us to bear this in mind when analysing our data statistically.

It is estimated by WWF that less than 40% of Borneo's primary forest remains [WWF website]. Borneo comprises East Malaysia (which is composed of Sarawak and Sabah), the nation of Brunei, and Kalimantan (part of Indonesia). The Indonesian government has a comprehensive conservation strategy, but much of the wildlife and habitat is still threatened by mining, oil exploration and deforestation by both legal and illegal logging. The deforested land is used for agriculture, such as oil palm plantations that produce vegetable oil for export. This logging, added to the shrinkage of habitat following the 1997-98 fires on the islands of Borneo and Sumatra (wrecking 50 million acres of forest), is putting the future of agile gibbons and other endemic animals at risk. Gibbons are also frequently captured for illegal sale as pets.

We proposed to look for individuality, by geographic variation, between isolated populations of Bornean agile gibbons. Our research served three purposes;

- The recordings were added to a bank of call recordings built up by Susan Cheyne, which, assuming geographic variation is present, can be used to identify the initial origin of confiscated, captured gibbons. Gibbon rehabilitation centres, such as the Kalaweit gibbon protection programme, can identify those areas from which the majority of confiscated gibbons have originated. These areas can then be targeted as priority conservation sites.
- OUTROP (Orangutan Tropical Peatland Project), partnered with CIMTROP (Centre for International Cooperation in Management of Tropical Peatlands, University of Palangkaraya) and linked to WWF, are investigating Orangutan density and distribution from Setia Alam Research Station in the Sebangau forest. Our data from Setia Alam provided evidence of an existing population of agile gibbons in the Sebangau forest, which when added to the orangutan population estimates, helped OUTROP's efforts to gain the recent protection of the Sebangau catchment.
- The recordings have been donated to the British Library of Sounds and Cornell University's Macaulay Library of Natural Sounds, both of whom previously held no recordings of Bornean agile gibbon calls.

Expedition Members

Hugh Sturrock (24): Project Leader

Hugh has recently gained a first class degree in Zoology. He has travelled to Australia, Africa, North America and extensively throughout Europe. In 1999 Hugh trekked in the Highlands of Papua New Guinea before working in a camp, as a guide, for 5 months in Kanha National Park, a protected tiger reserve in Madhya Pradesh, India. From August – October 2003, Hugh took part in an orang-utan research project in the Sebangau forest in Borneo, monitoring orangutan distribution and density. This prior knowledge of the local area proved invaluable in the planning stages of the proposed expedition.

In Edinburgh, Hugh was President of the University Music Society, playing the French horn and piano, and is a wildlife photographer for the Scottish Wildlife Trust. He is also a keen diver, plays basketball and squash and enjoys painting. He wishes to continue with biological research, photography and film, and has recently had photos published in The Times, The New York Times and BBC Wildlife magazine.

Languages: French, German, basic Hindi, Arabic and Indonesian.

Anna Lewis (23): Science Officer / Medical Officer

Anna achieved a First Class degree in Biological Sciences with Honours in Zoology and is going on to do a Leverhulme-funded MSc in Marine Science at Otago University, New Zealand. She has a particularly keen interest in the practical aspects of biology. In 2003, she led a EUCARE (Edinburgh University Coral Awareness and Research Expeditions) project based in Andavadoaka, S.W.Madagascar, researching coral reef biodiversity and health, and assessing the potential threats these previously unstudied ecosystems may be under. Anna also took part in the 2002 EUCARE expedition to Zanzibar, Nungwi, where she undertook the role of Survey Coordinator, and followed up the project to work for two months as a PADI Divemaster for 'Sensation Divers'. She has travelled parts of Africa, Australia, Thailand, Indonesia, North America, Argentina and Europe.

Anna holds a Level 2 Powerboat-handling Certificate and is a keen musician of the French horn, alto saxophone and piano, having played in the Edinburgh University Symphony Orchestra. She is also a keen photographer.

Languages: French, German and Indonesian.

Collaboration

We principally collaborated with CIMTROP (Centre for International Cooperation in Management of Tropical Peatlands, University of Palangkaraya). In Tanjung Puting we employed assistants from OFI (Orangutan Foundation International). In Gunung Palung, we employed 2 guides, both of whom have worked with various researchers in the park for 19 years.

We have also collaborated data with Dr. Susan Cheyne (Wildlife Research Group, University of Cambridge). She has given us invaluable help and advice throughout.

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Section 2

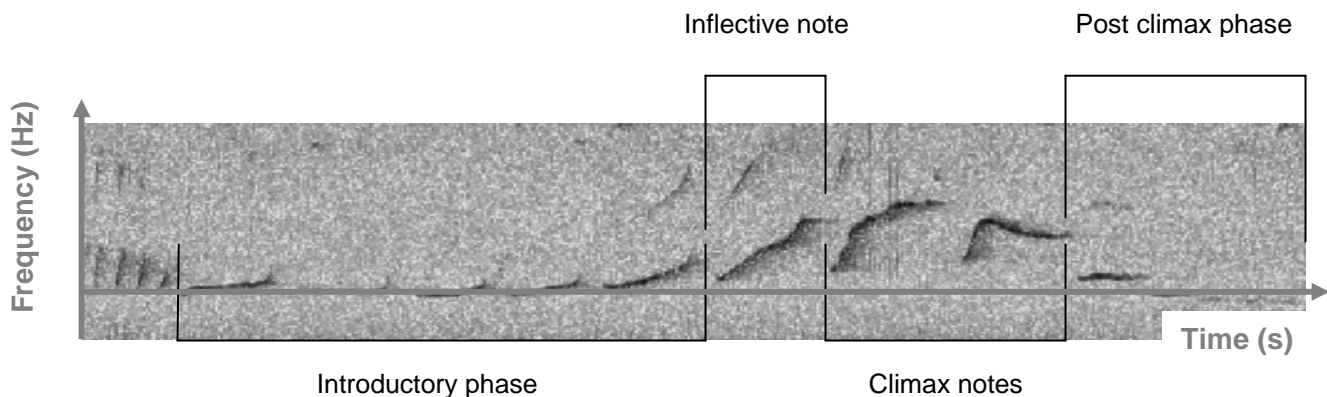
Fieldwork & Research

Materials and Methods

Recordings were collected from 3 geographically isolated populations of agile gibbons from southern Kalimantan, Borneo. Only the female Great Call was analysed, as this is the most conserved of all the songs i.e. it is possible to distinguish the species by listening to the female Great Call which is not always possible with the male (Dr. Susan Cheyne, pers comm). In order to assess the variation in calls between individuals, the Great Calls of at least 5 adult females from each population were recorded. To assess whether any other variables had an effect on the song, recordings were made on different days where possible. Provided maps of the research area were used to mark the position of the recording point as well as the direction of the call (see Fig. 3-5). Date, weather conditions and any other unusual observations were also noted.

Recordings were made using a Sennheiser MKH416 P48U-3 directional shotgun microphone and a Sony digital audio tape (DAT) recorder (a recordable minidisc player was taken as backup due to DAT sensitivity to humidity). Recordings were transferred from DAT to a Benq Joybook 5000U laptop computer and converted to audiospectrograms using Wavesurfer[®] software.

Fig. 2 shows a typical audiospectrogram of a female agile gibbon Great Call indicating the phases used in analysis.



Box 1. Variables used in analysis

Variable	Definition
Duration of introductory phase (s)	Beginning of the first note of the Introductory Phase until the beginning of the Inflective Note.
Duration of the whole song (s)	Beginning of the first note of the Introductory Phase until the end of the first note of the Post-Climax Phase (this is to avoid ambiguous post-climax notes on the more distant recordings)
Duration of the climax note (s)	Beginning to the end of the 1 st Climax Note.
No. of notes in Introductory Phase	Number of introductory whoops (not including the inflective note or organising notes).
No. of notes in Climax Phase	
Total number of notes	Based on Introductory Phase, Inflective Note, Climax Phase and first note of Post-Climax Phase.
Frequency exploitation (Hz)	Maximum minus minimum frequency in Great Call. Minimum frequency taken from Introductory Phase

Statistical analysis

Only Great Calls that had at least three complete recordings were used. The values for each variable (see Box 1) were averaged for each gibbon, e.g. mean introductory length for each gibbon.

A MANOVA was used to distinguish whether any of these variables were affected by population. GLMs were then used to distinguish which variables were significant. Post hoc Tukey pair-wise comparisons were carried out to distinguish which populations differed.

All analyses were carried out using Minitab 14 software.

Where recordings were taken on separate days, or on the same day but from slightly different locations, gibbons were identified by call characteristics and by the position and bearing of the call. Maps with recording locations and bearings are shown by Fig. 3-5.

Fig. 3 Map of recordings from the Sebangau

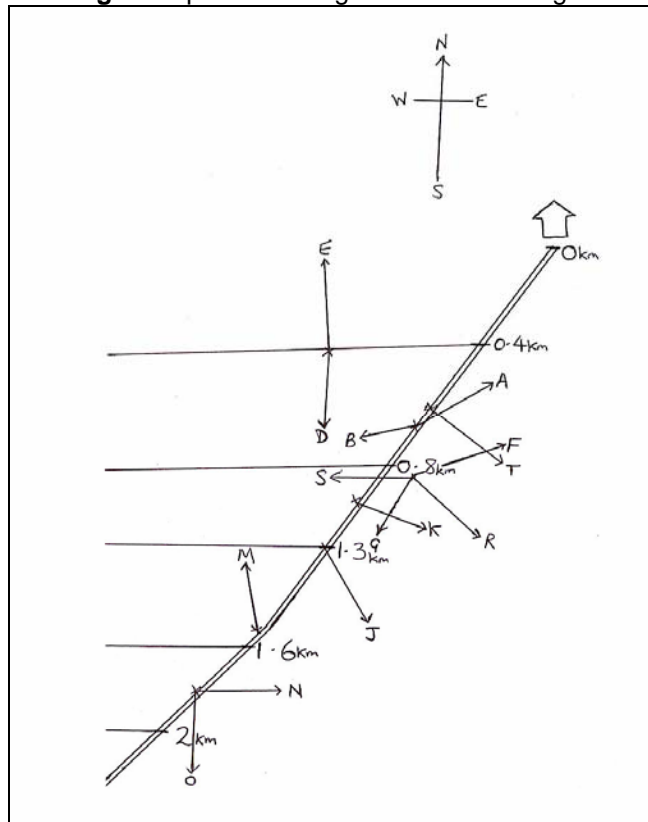


Fig. 4 Map of recordings from Tanjung Puting

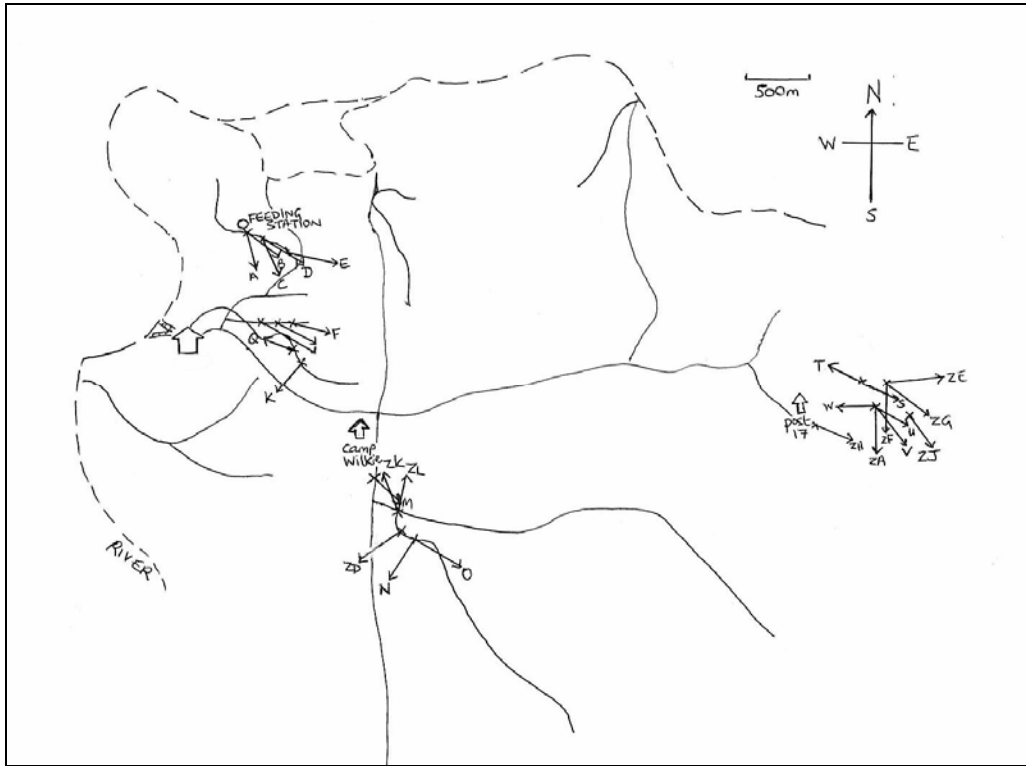
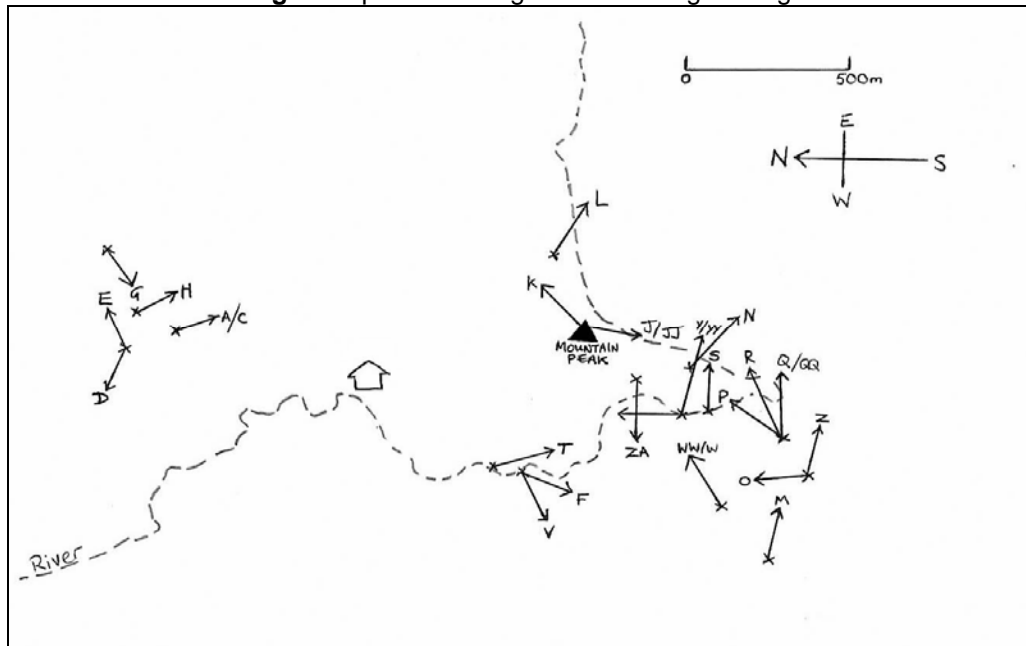


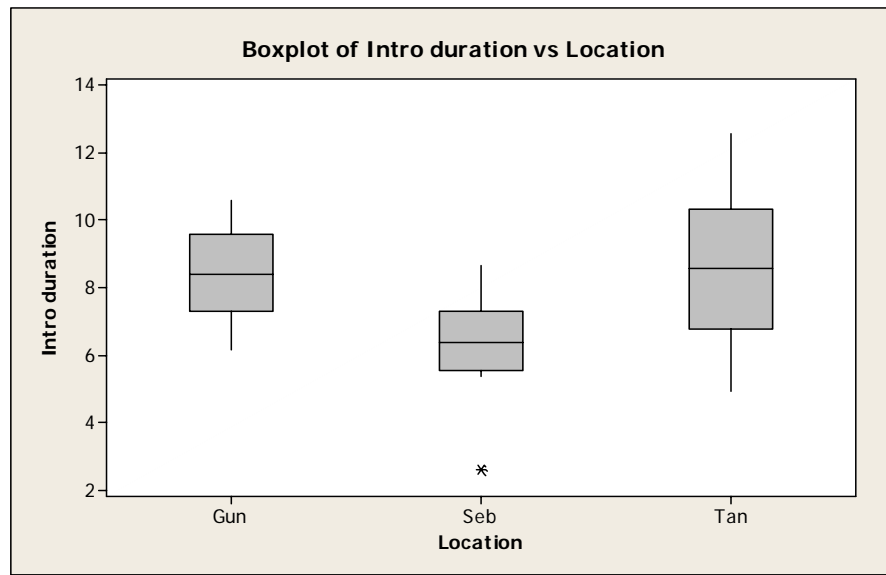
Fig. 5 Map of recordings from Gunung Palung



Results

Using Pillai's criterion, a MANOVA revealed that there was a significant difference in Great Call between the three populations of gibbons studied ($F_{2, 36} = 2.916$, $p = 0.001$). A GLM was used to distinguish which variables were responsible for this significance. This revealed that the length of the introduction was significantly different ($F_{2, 36} = 5.23$, $p = 0.01$). A post hoc pair-wise comparison showed that this difference was due to the fact that gibbons from the Sebangau have shorter introductions than those from Tanjung Puting ($p = 0.0116$) and Gunung Palung ($p = 0.025$) (Fig. 6). Introduction duration was not significantly different between Tanjung Puting and Gunung Palung ($p = 0.9605$).

Fig. 6 Differences in introduction length between populations



This difference in introductory length was due to the fact that gibbons from the Sebangau have fewer introductory notes than those from Tanjung Puting ($p = 0.0083$), and may have fewer introductory notes than those from Gunung Palung, as this result was almost significant ($p = 0.0625$). This non-significance may be due to slight variations in the length of introductory notes or the length of gaps between them.

Table 1. Variations in introduction length.

Location	Number of gibbons	Mean Intro length \pm S.E.	Mean no. intro notes
Gunung Palung	14	8.34 \pm 0.41	4.74 \pm 0.26
Sebangau	9	6.21 \pm 0.56	3.03 \pm 0.36
Tanjung Puting	16	8.52 \pm 0.53	4.26 \pm 0.39

The other major difference was found between Tanjung Puting gibbons and those from Gunung Palung. Using the 'total' song length (beginning of the first note of the Introductory Phase until the end of the first note of the Post-Climax Phase, see Box 1) minus the introduction duration, it was found that the length of time between the beginning of the inflective note to the end of the first post climax note was longer in Tanjung Puting ($p = 0.002$). This was not due to a difference in the number of climax notes ($p = 0.126$), but may have been due to differences in the length of climax notes, as it was found that the first climax note was significantly longer in Tanjung Puting than Gunung Palung ($p = 0.0256$).

The maximum and minimum frequencies of the calls did not differ significantly between populations ($F_{2, 36} = 0.429$ and $F_{2, 36} = 0.137$ respectively).

Discussion

According to the analysis, there is geographic variation between the three populations of gibbons studied. This difference seems to be due to differences in the length of the introduction, which is in turn due to the fact that gibbons from the Sebangau have fewer introductory notes. There was also a difference observed in number of climax notes, whereby gibbons from Tanjung Puting had significantly more climax notes than those from Gunung Palung.

It is difficult to put forward a hypothesis as to why these variations exist. A possible explanation for the difference in the number of climax notes is the effect of vegetation density on sound attenuation. Higher frequencies are affected more by dense vegetation [Marten and Marler 1977, Kime, Turner and Ryan 2000]. Although we did not make any measurements of forest density, it was noted that vegetation was most denser in the Sebangau, followed by Gunung Palung then Tanjung Puting. Both Gunung Palung and the Sebangau forest have been subjected to illegal logging, and concession logging in the Sebangau, which has produced a dense mosaic of secondary and primary forest. The fact that these forests are denser than Tanjung Puting, could explain the loss in number of climax notes found in both the Sebangau and Gunung Palung.

The relationship between forest density and sound attenuation however, cannot explain the difference in introduction length, as gibbons from the densest forest (Sebangau) had

the shortest introduction. If lower frequencies degrade less in denser forest [Marten and Marler 1977, Kime, Turner and Ryan 2000], one would expect Sebangau gibbons to display the longest introductions, which was not the case.

It is also surprising that there was no difference seen in frequency exploitation. Vegetation density has been shown to affect the frequencies of the American Tanager (Thraupinae: *Piranga*) song [Shy, 1983]. Birds from areas of dense vegetation had lower maximum and minimum frequencies. This relates back to the affect of vegetation density on higher frequencies. The concession selective logging from 1984-1996 and illegal logging 1997-2003 in the Sebangau has produced dense secondary forest growth within the mixed peat swamp forest. One might therefore expect Sebangau gibbons to have lower maximum and minimum frequencies, but this was not observed.

However, as gibbons call from high vantage points of the canopy, the density of vegetation observed at ground level may be an irrelevant factor. The differences seen could simply be a result of natural drift, whereby chance differences in calls arise in populations. As the populations studied are reproductively isolated, it is perfectly feasible that this could happen. In order to rule this out, it would be necessary to take recordings of more populations, measuring other influential factors such as forest density and sound propagation at different levels of the canopy height, and predator and gibbon density. Measuring how many times each gibbon repeats the Great Call could also be valuable, but may be problematic due to the fact that often, not all the calls are heard.

Another explanation for the results found could be due to sampling method. In order for the study to hold more weight, it would have been better to choose random points within each population from which to take recordings. The recording locations were restricted by logistics, producing 'clumped' sample sites representing only a fraction of each National Park (see Fig. 3-5). Because of our sampling method, the three populations are not fully represented, which may have led to false conclusions, especially as it is possible that different dialects exist within each population. Equally, the differences found could be due to genetic similarities of gibbons within the sampled areas, which may affect their song structure.

It would, however, have been impossible to carry out this type of study any other way given the time restrictions. The Sebangau forest is very dense, and only cut (and vigorously maintained) paths could be used to travel around. This obviously limited how far we could travel. In Gunung Palung, we had to carry all our food and supplies with 2 guides and a Park ranger, walking up a river for a full day. Taking the necessary extra gear to enable random sampling would have been impossible at that time of year. For the short period of the year where the river is high enough and it is not torrential raining, a boat can be used to ferry supplies up and down. Only during this time (around December time) could that kind of study be carried out. Tanjung Puting was slightly better equipped for research, having small camps or 'pondoks' throughout a large area of the Park. We made use of one of these (Post 17) to try and widen our sample area, however, time restrictions limited its usage.

Other limitations

Due to the fact that gibbons move around within their territory, it was not possible to collect recordings for every gibbon on different days. We cannot therefore rule out the possibility of inter-day variation causing the observed differences.

The VHF radios were rendered useless under the canopy. Despite having an advertised range of 5 miles, contact was lost after around 100m. It is possible to get powerful radios that work under canopy, with a large aerial mast at base camp (as set up in Setia Alam and Camp Leakey). These would be a worthwhile investment for future projects, allowing one to keep contact with base camp and any other researchers in the forest. This would have advantages for gathering recordings, as well as increasing safety.

Further research

Hopefully our results can be used by centres such as the Kalaweit Programme as a conservation tool. Much of our data was not usable due to the fact that the introductions were not caught in time, or there were simply not enough replicates for carrying out statistics. However, the recordings may still be of use to researchers such as Dr. Susan Cheyne, when added to other recordings of gibbons from the same area for example.

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Section 3

Administration & Logistics

Medical Officer's Report

There were no medical emergencies throughout the duration of the project. We brought an extensive medical kit, which allowed for the difficult conditions and remoteness of research sites.

By following basic sanitary guidelines, maintaining personal levels of hygiene and drinking purified water, the risk of illness was kept to a minimum. Both team members had completed basic Royal Geographical Society Wilderness medical training, and one member completed the advanced course.

Prior to departure, we were inoculated against the following diseases

Typhoid, Polio, Hepatitis A and B, Tetanus, Diphtheria, Rabies and Japanese encephalitis.

Malaria

Malaria is present in Borneo and both team members took suitable prophylaxis - *Doxycycline* - for one week before, during, and 4 weeks after the expedition.

Diarrhoea

Avoiding food or drink with a high risk of contamination and ensuring hands and cutlery were clean before eating, reduced risk. Suitable rehydration solutions were taken along with the Antidiarrhoeal agent, loperamide hydrochloride (Immodium).

Dehydration

Due to the humidity and nature of the work, dehydration was a serious risk. It was avoided by drinking plenty of clean fluids (at least 3 litres a day).

Avoiding mosquito and other insect bites

Repellents such as *deet* were used, along with wearing long-sleeved shirts and trousers, and sleeping under permethrin impregnated mosquito nets.

Terrain

Many of the sites are frequently flooded, and because of this, trees have adapted by developing breathing roots, which allow the base of the tree to be submerged. These were a significant tripping hazard, so care was taken when walking in the forest. Pandan and rattan plants were abundant, both of which have very sharp cutting thorns. Long-sleeved shirts, long trousers and gloves were therefore worn at all times in the forest. There are species of poisonous snakes, scorpions and spiders found in the forest, so care was taken when putting hands on tree trunks.

Our extensive medical kit was adapted from the Royal Geographical Society's 'Recommended Medical Kit'. It comprised of the following:

Antimicrobials:

Amoxicillin (Amoxil)	500mg caps	Flucloxacillin	500mg
Chloramphenicol ointment		Metronidazole	200mg
Ciprofloxacin	250mg	Quinine sulphate	300mg
Erythromycin	500mg	Tetracycline	250mg
Fansidar			

Painkillers, Local Anaesthetics and Sedatives:

Aspirin	300mg	Paracetamol	500mg
Co-proxamol		Tetracaine (amethocaine) eye drops	
Ibuprofen	400mg		

Other Medication:

BiSoDol		Lactulose (Duphalac)	
Bradosol		Loperamide (Immodium, Arret)	
Chlorphenamine (Piriton)	4mg	Piriton for injection	10mg
Dioralyte sachets		Prochlorperazine (Stemetil)	5mg

Creams and Ointments:

Anusol cream		E45 cream	
Bactroban cream		Flamazine cream	
Betadine paint		Hydrocortisone cream 1%	
Benadryl cream		Malathion (Derbac-M)	
Betnesol-N ear drops		Tisept sachet	
Canesten cream			

Dressings:

Adhesive plasters		Melolin dressings 5 and 10cm.sq	
Cotton wool		Micropore tape 2.5cms	
Crepe bandages 7.5cm		Steri-strips, assorted	
Dressing No. 15		Triangular bandages	
Eye dressing No. 16		Vaseline gauze 10cm.sq	
Fluorescin eye test strips		Zinc oxide roll plaster	
Gauze swabs 5 x 5cm.sq			
Medi-swabs			

Hardware:

Flexi-splint/Sam splint		Pen torch	
Safety pins		Economy stethoscope	
Sterile supplies kit		Anaeroid sphygmomanometer	
Dental First Aid kit		Otoscope	
Disposable Scalpel		Sterile supplies kit	
Thermometer (digital)		Stifnek select neck immobiliser	
Isolaide resuscitation aid		Sterile gloves	
Sutures 3/0, 4/0, 5/0 (Nivofil)		Non-sterile latex gloves	
Foil blanket		Tuff Cut scissors	

Treasurer's Report

Funds were sufficient to cover all expenses. The accounts below include all expenses in pounds sterling at an exchange rate of 15'000 rupiah to the pound.

Incoming

Davis Fund	5000
Weir Fund	1500
Gordon Foundation	1500
British Association	500
Dr. Neil Mackay	100
James Rennie Bequest	350
Student Travel Fund	96
Swann Travel Fund	200
Total	9246

Outgoing

Category	Details	Amount (GBP)	Amount (Rupiah)
Equipment	Lap-top (BenQ Joybook 5000U)	1080.00	
	2 sets of head phones + 'splitter'	27.49	
	Sennheiser MKH416 P48U-3 Shotgun Microphone (inc VAT)	893.21	
	Leads, microphone holder (inc VAT)	172.73	
	Phantom power supply (inc VAT)	66.98	
	Minidisc Recorder (Sony)	129.99	
	VHFs	85.00	
	Field clothes (inc. walking boots, gloves, field clothes)	268.60	
	Blank CDs	9.99	
	Pelicase	400.00	
	Silca Gel	14.97	
	Resealable freezer bags	1.49	
	Batteries	13.97	
	Pyrethrin impregnated mosquito nets	39.98	
	Lonely Planet Guide to Indonesia	16.99	
	Padded rucksack for camera and recording equipment	89.99	
Administration	Ink & paper	27.24	
	Postage	11.97	
	Phone calls	12.15	
	Insurance (AON Ltd)	630.00	
	Visa (Indonesian Embassy, London)	70.00	
Medical	Vaccinations (LSHTM travel clinic)	196.00	
	Medical supplies (inc. Doxycycline - malaria prophylaxis)	342.00	

	RGS Wilderness Medical Training	504.00	
	Health certificates for LIPI Permit	30.00	
	Sunscreen	26.97	
	Insect Repellant	21.00	
Transport	Return fares (train) to Wilderness Medical Training courses	76.00	
	Return fares (train) to Cambridge to see Dr. Susan Cheyne	110.00	
	Return flights (Gulf Air: London Heathrow to Jakarta), inc. tax	1896.00	
Accommodation	Hotel Kresna (Jakarta)	44.36	665400
	Hotel Mina (Palangkaraya)	38.00	570000
	Setia Alam (OUTROP - Sebangau)	350.00	5250000
	Hotel Tiara (Pangkalanbun)	46.22	693300
	Camp Leakey (Tanjung Puting) including donation	100.00	1500000
	Hotel Perdana (Ketapang)	50.40	756000
Transport (Flights)	Jakarta to Palangkaraya	52.57	788600
	Palangkaraya to Pangkalanbun	39.92	598800
	Pangkalanbun to Ketapang	39.29	589400
	Ketapang to Palangkaraya	67.22	1008240
	Palangkaraya to Jakarta	49.20	738000
Transport (Other)	Speed boats to Tanjung Puting	16.67	250000
	Return from Tanjung Puting (boat + taxi)	33.33	500000
	Bus from Ketapang to Sukadana (3 persons)	4.00	60000
	Taxis	72.62	1089300
	Ojeks (Motorbikes)	18.23	273450
	Truck from Sukadana to Ketapang	16.67	250000
	Petrol for boat to Cabang Panti	10.00	150000
Wages	Guides in Camp Leakey (included in accomdation fee)	-	-
	Guides plus Park ranger in Gunung Palung	108.67	1630000
Subsistence	Jakarta	68.70	1030500
	Palangkaraya	38.56	578450
	Setia Alam, Sebangau (included in accomodation)		-
	Pangkalanbun	38.00	570000
	Camp Leaky (Tanjung Puting)	50.00	750000
	Ketapang	16.00	240000
	Cabang Panti (Gunung Palung)	25.27	379000
Administration	Phone calls and internet	48.25	723750
	Printing/photocopying	3.12	46800
	Taxes & baggage allowances (flights)	9.17	137584
	Permits (National Parks)	4.67	70000
	Charges for changing money	39.00	585000
	LIPI Research Permits (\$100 per person)	120.00	1800000

Miscellaneous	Sweet rewards for school children	3.66	54900
	Laundry	2.44	36600
	Batteries	9.40	141000
Exhibition	Art supplies for mounting pictures	94.90	
	Ink & A3 paper for printing photographs	168.00	
Administration	Ink & paper for reports (estimate)	65.00	
	Postage of reports (estimate)	70.00	
	Phone calls	6.20	
	GRAND TOTAL	9302.41	

Overall expenditure (incoming-outgoing)

9246 - 9302.41 = - **56.41 GBP**

We went over our budget by approximately £56, which is very little when compared with the amount achieved during the project. This expedition's success was indebted to the generosity of its sponsors.

Project Borneo 2004



Section 4

Fieldwork Diary

Itinerary of Fieldwork (18th July – 8th September)

18th July: Depart Heathrow.

19th July: Arrive in Jakarta. Stay on Jalan Jaksa.

20th – 23rd July: Time spent securing LIPI permits.

24th July: Fly to Palangkaraya. Taxi straight to CIMTROP – meet Dr. Suwido Limin. Arrive in Setia Alam (camp) by the afternoon.

25th July – 1st August: Heavy rain means very wet and muddy conditions. Record gibbons 4am-9am, walking the treacherous plank walk in the dark. See two wild orangutans – a large cheek-padder and a young male – but no gibbon sightings!

2nd – 3rd August: Arranging next leg of journey in Palangkaraya.

4th August: Fly to Pangkalan Bun where Steven Brent (Orangutan Foundation International – OFI) meets us.

5th August: Meet Ibu Waliyati (Professor Biruté Galdikas' secretary) to talk about project. Go to Kumai and get a speedboat up the Sekonyer River. Catch up with the OUTROP klotok and go with them to Camp Leakey, Tanjung Puting. Attend the orangutan's daily feeding.

6th – 7th August: Early morning – young male orangutan breaks into the house and causes a ruckus. No gibbons.

8th – 14th August: Record at areas around 'Feeding' and 'Camp Wilkie'. Catch first glimpse of a wild agile gibbon! Princess breaks into the teamhouse (having worked out the complicated variety of pullies and safety catches!) and steals our tinned food. Young orangutan breaks in through roof and ransacks house (eats nearly whole bottle of malaria prophylaxis, our saline, and various toiletries!).

15th August: Siswi 'eats' our minidisc player. Luckily it was our 'backup' and we never needed it!

16th – 18th August: Go to Post 17. We cook one night only to get besieged by fire ants in the dark. A terrifying and painful experience.

19th – 20th August: Recording around Camp Wilkie and Feeding Station. Make notes from information in the Education Centre for future talks/exhibitions. Professor Biruté Galdikas comes for the day and we share the speedboat back with her.

21st August: Go to the National Park Office, Ibu Waliyati's and the Orangutan Care Center and Quarantine in Pasir Panjang, where we meet Kiki (the mysteriously paralysed orangutan). Three adults are released into the Mandaw.

22nd August: Fly to Ketapang in West Kalimantan. Go to James McCall's place.

23rd August: Go to the National Park Office (Agung is going to accompany us to Cabang Panti) and Police Station. Stock up on food for our week in Gunung Palung National Park.

24th August: Get bus to Sukadana – only to find we're in the wrong village. Get motor bikes to Pac Tadin's house. Meet Pac Uthay (our other guide) and sort out equipment. Sleep on floor at FFI Patrol Office.

25th August (Anna's 22nd Birthday): Get up at 5.15am and begin the boat ride into Gunung Palung National Park in the low river. After a few hours and 9km battling lethally sharp pandan, we are informed that the river is too low for the boat and we shall have to walk. Pushing the boat upriver barefooted we become more and more downhearted. Going against the current, all sharp branch matter is positioned in an ideal foot-stabbing angle. Not that we can see and avoid them, as the clay kicked up by the person in front makes the water clear as mud. Then there is the sand. What seemed at first to be good, wholesome, foot-massaging sand is actually so coarse that every step scrapes a little more from our soft, unprotected, western soles. Anna teeters on the edge of a tantrum. Then, socks are donned and the world seems a little kinder.

Eventually, the river is so dry that we can't even push the boat up to the field site. While besieged by the worst mosquito swarm to-date, we bury the boat and engine at the side of the river and pick up our bags containing all our clothes, toiletries, equipment and food for the week and start staggering up river.

Reach Cabang Panti (camp) around 5.30pm after 11km on foot. Have a coffee, mandi, food on an open fire, and bed in one of the disused huts. Anna is woken in the middle of the night by an intrepid rat crawling over her legs in its search for food. After the initial hysteria, the precious chocolate biscuits are given to Hugh to look after.

26th August: Out with Pac Uthay at 4.50am. Get close to a group, getting some great recordings. See lots of logged sites and red leaf monkeys.

27th August: Get some decent recordings. Walked to derelict camps down river from ours. Go to Air Tergun (waterfall) that afternoon. Get back to find Hugh's third hard tick (not including the dead one in his trousers!). Anna's hasn't had any. Cook dinner for the Indonesians.

28th August: Good recordings. See (and hear) a sun-bear scaling fast down the tree 5m in front of us. Never seen Pac Uthay look so scared or run so fast!

30th August: Go on a night walk – see mainly frogs and toads, a catfish, blenny and spiders.

31st August: Leave Cabang Panti and walk downriver back to Pac Tadin's. Get a lift in a pick-up truck back to Ketapang.

2nd September: Fly from Ketapang to Palangkaraya (via Pangkalan Bun), then onto Setia Alam.

4th September: Gibbons hardly calling, and basically all OUTROP staff and volunteers leaving Setia Alam for Palangkaraya, so decide to leave on 4th with them.

5th - 7th September: Speak to Ibu Risti about taking some lessons in the local high school as part of their 'Environmental Module'. Give talks to various classes, with pupils ranging from 11 to 18 years old. Give quizzes at the end with sweet rewards. A good experience.

8th September: Completion of fieldwork.

Inventory of fauna sighted on expedition:

Agile gibbons

False ghavial – Sekonyer River, Tanjung Puting

Red-leaf monkeys

Monitor lizards

Many species of butterfly (possibly the Atlas)

Malay brown snake and a 2m brown snake (inside room in Gunung Palung!)

Tree shrew

Turtle

Barking deer

Fire ants

Squirrel

Hornbills

Orangutan

Probocsis Monkeys

'Pink fairy' stick insects, lots of spiders, wasps, bees

Sunbear

Lots of frogs and toads on night walk

Millions of fruit bats coming from behind mountain at dusk (Gunung Palung).

Section 5

Additional Activities

School talks

Through a teacher called Ibu Ristemiati, we gave a series of lessons at Palangkaraya High School. The pupils ranged from 12 to 18 years old. We taught in a mixture of English and Indonesian as part of an environmental component of their English course. With aid of an overhead projector, we spoke about gibbons, our project, and about conservation issues faced in Kalimantan today, such as palm oil plantations, forest fires, mining activities and the illegal pet trade.



Anna quizzes students from Palangkaraya High School

The orangutan is a flagship species for conservation in Borneo, and we talked about different aspects of their life history and need for protection. We gave them all a handout with important take-home messages and an accurately scaled diagram of a male orangutan hand to compare their own with. We played them recordings of gibbons and other jungle fauna, such as red-leaf monkeys and cicadas. The lessons were concluded with a quiz for which winning teams and individuals were awarded sweets.

We wrote an article about the project for the Orangutan Foundation's monthly newsletter, which is shown below and can be viewed via the following link:

<http://www.orangutan.org/misc/print.php?id=114>.

Great Call Girl!

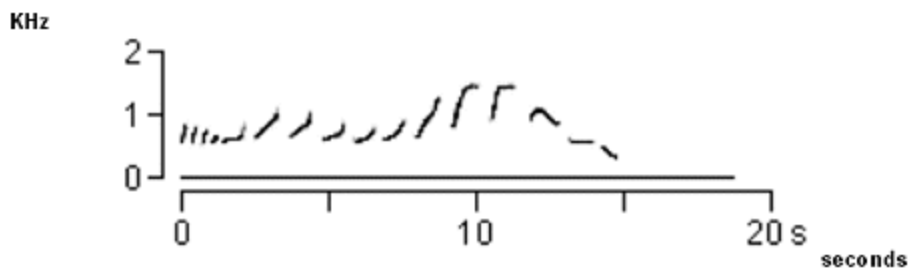
By Hugh Sturrock and Anna Lewis



Our adventure in Indonesia started with a trip to Jakarta. We were greeted by an (un)healthy dose of heat, noise, and smog and endured a week of frustrating, but necessary, red-tape, government officials (more often behind ping-pong tables than desks), and hair-raising taxi drives in order to validate our LIPI research permits. Eventually we received the go ahead to conduct our research and excitedly booked flights to Kalimantan (the Indonesian half of Borneo), enjoying our last night in Jakarta with an impromptu street party known as "Jalan Jaksa Day."

Before going into too much of a mundane travelogue, we should really introduce ourselves. We are both Zoology students from the University of Edinburgh, UK, and have just completed the fieldwork for a project researching the possibility of geographic variation in the "Great Call" of the female Bornean agile gibbon, *Hylobates agilis*. Agile gibbons are small arboreal apes, endemic to certain areas of Southeast Asia, including Central and West Kalimantan. Our project involved traveling to three geographically isolated areas; the Sebangau (near Palangkaraya), Camp Leaky (Tanjung Puting National Park), and Cabang Panti (Gunung Palung National Park), where we have recorded a number of females, which we will later statistically compare for the presence of any variations.

Gibbons are monogamous and highly territorial. Their early morning (around 4:30 a.m.) vocalizations are believed to act as a spacing mechanism to enforce territorial boundaries. The male starts with a series of loud whoops and is later joined by the female to produce a beautiful duet. The Great Call itself is an evolutionary conserved song, consisting of a series of introductory notes proceeded by one or more "screams" at its climax. The male completes the song with a vocalization pattern known as a "coda." The whole song can be displayed visually with an audio spectrogram (we use wavesurfer software), then different aspects of the call such as duration, pitch of climatic note, and number of introductory whoops, can be compared between individuals and areas.



Click Play to hear the call...

Problems hearing the sound?
[\(download wav file 553K\)](#)
[\(download mp3 file 145K\)](#)

This is a typical audio spectrogram of a Great Call.

The scene is set. It may sound romantic so far, but the reality of 4 a.m. wake up calls, sweaty trekking, and stumbling through dark jungle definitely had its moments! Not to mention the variety of non-gibbon sounds that have cropped up at precisely the moment we start to record our chosen gibbon. Orangutan long-calls, red-leaf monkey alarm calls, screeching cicadas, beating wings, hoarse roars of hornbills, rumbling bellies, and a huge variety of birds and insects all seemed to be actively seeking the microphone for their brief moment of fame.



A young male gibbon grooms himself

Before we analyze the data statistically, we cannot say whether geographic variation does exist or not, but we can reflect on the amazing places we have been privileged enough to visit. All three forests have proved beautiful, diverse, and in massive need of the untiring efforts of NGOs such as OFI to protect them. We were lucky enough to stay in Camp Leaky, to be looked after by all the helpful assistants there, to visit the Orangutan Care Center and Quarantine Facility in Pasir Panjang, and to talk with Professor Galdikas. Whilst in Camp Leaky, we were initially bemused when Princess ambled past with little Percy in tow, but soon got used to the array of orangutans hanging around. Each has their own personality and eccentricities, and despite attempting to eat our minidisc player, Siswi became one of our favorite orangutans.



Hugh and Anna



Princess and Percy

The Care Center was a real eye-opener. The sheer number of confiscated orangutans is shocking, and with illegal logging and clearing forests for palm oil plantations on the rise, the situation looks set to worsen. Monumental efforts are being made, but without continued support and increased pressure on the people who are destroying the forests on such a large scale, the future for orangutans, gibbons, and other wildlife looks grim.

We would like to thank all of our sponsors and individuals who have supported the project both in field and in the UK. We will be exhibiting some of our expedition photographs (many of which are orangutan shots from Tanjung Puting!) in Edinburgh, sometime in the New Year. If any one wishes to contact us about this project or the exhibition, please do not hesitate to get in touch.

Post-expedition

Our best recordings have been donated to the British Library of Sounds and Macaulay Library of Sounds (Cornell Lab of Ornithology). Also, from 17th January to 25th February 2005, we held an exhibition of 35 photographs taken during the expedition, accompanied by 'jungle sounds', in the Chaplaincy Centre, Potterow. Information about current conservation issues was presented alongside the photos to raise public awareness of Borneo's highly endangered flora and fauna. A selection of the images exhibited are shown on the next few pages *[removed from electronic version due to increased file size]*.

Since completion of the project, the Sebangau Catchment has been given official 'National Park Status'. As an area with possibly the highest number of wild orangutans in the world and ongoing illegal logging, this news is an optimistic step forward for the forest and its wildlife.

REFERENCES

- Barnett, A. Expedition Field Techniques – Primates. Published by The Royal Geographical Society Expedition Advisory Centre (1995).
- Brockelman, W. Y., and D. Schilling. (1984). Inheritance of stereotyped gibbon calls. *Nature* 312: 634-636.
- Cowlshaw, G (1992). Song Function in Gibbons. *Behaviour* 121: 131-154
- Dallmann, R., and T. Geissmann. (2001). Individuality in the female songs of wild silvery gibbons (*Hylobates moloch*) on Java, Indonesia. *Folia Primatologica*. 71:220 abstract.
- Haimoff, E. H. (1985). The organisation of song in Müllers gibbon (*Hylobates muelleri*). *International Journal of Primatology* 6:173-192.
- Haimoff, E.H and S.P. Gittins (1985). Individuality in the songs of wild agile gibbons (*Hylobates agilis*) of peninsular Malaysia. *American Journal of Primatology* 8: 239-247
- Kime N.M.; Turner W.R; Ryan M.J. 2000. The transmission of advertisement calls in Central American frogs. *Behavioral Ecology* 11:71-83.
- Marshall & Marshall (1976). Gibbons and their terrestrial songs. *Science* 193:235-237
- Marter, K., Marler, P. 1977. Sound transmission and its significance for animals vocalization I: temperate habitats. *Behavioral Ecology and Sociobiology* 2: 271-290.
- Mitani, J. C. (1985a). Responses of gibbons (*H. muelleri*) to self, neighbour and stranger song duets. *International Journal of Primatology* 6:193-200.
- Mitani, J. C. (1985b). Gibbon song duets and interspacing behaviour. *Behaviour* 92, 59-96.
- Mitani, J. C. (1987). Territoriality and monogamy among agile gibbons (*H. agilis*). *Behav. Ecol. and Sociobiol.* 20:265-269.
- Mitani, J. C. (1988). Male gibbon (*Hylobates agilis*) singing behaviour: natural history, song variations and function. *Ethology* 79, 177-194.
- Shy, E. 1983. The relation of geographical variation in song to habitat characteristics and body size in north American Tanagers (Thraupinae: *Piranga*) *Behavioral Ecology and Sociobiology* Vol 12, No. 1, 71 - 76

Websites

- www.fas.harvard.edu/~gporang/maps.html
www.trans-borneo.com/map.htm
www.wwf.org