Darwin Initiative for the Survival of Species

Annual Report

1. Darwin Project Information

Project title	*Conservation of the orang-utan in Kinabatangan Wildlife Sanctuary, Sabah, Malaysia*
Country(ies)	*Sabah, Malaysia*
Contractor	*Cardiff University*
Project Reference No.	*08/044*
Grant Value	*£147,264*
Start/Finishing dates	*01/12/2000-30/11/2003*
Reporting period	*1.4.2002 to 31.3.2003*

2. Project Background

- Briefly describe the location and circumstances of the project and the problem that the project aims to tackle.

The recent technical developments in genetics and the use of non-invasive methods give conservation professionals powerful tools for the long-term management of wildlife populations. The orangutan is a flagship species for wildlife conservation in Malaysia. One of the main orangutan populations in Malaysia is found in the forests of the Lower Kinabatangan region, Sabah. These forests are in the process of being gazetted as a Wildlife Sanctuary because of their unique wildlife diversity and abundance. However, although the aim of the Sanctuary is to create a corridor for wildlife along the Kinabatangan floodplain, these forests are currently fragmented. It is not known whether the impact of habitat fragmentation on isolated orangutan subpopulations could jeopardise their long-term survival. The current ecological and behavioural observations and the surveys undertaken by the Kinabatangan Orangutan Conservation Project (KOCP, Drs Isabelle Lackman-Ancrenaz and Marc Ancrenaz, Directors) through different areas in the Lower Kinabatangan have shown an unusually high density of orangutans in small fragmented areas. The high density is possibly due to recent habitat loss and consecutive concentration in the remaining forests. In these degraded forests, distribution in space and in time of orangutan food sources greatly differs from primary forests and is often much more abundant: these forests are thus able to sustain greater densities of apes. These factors will likely affect orangutan seasonal movements, territory ranges and therefore will impact the social and structure organisations.

The present project aims at providing a range of essential information on the genetic structure of the Kinabatangan orangutan population (e.g. genetic variability, gene flow between subpopulations, effective population size, and patterns of dispersal). The results will greatly contribute towards a realistic assessment of the current conservation status of the Kinabatangan orangutan population. This will therefore provide crucial tools for the development of adapted practical management measures to ensure the maintenance of a healthy genetic diversity within this population over a long period of time.

3. Project Objectives

- State the purpose and objectives (or purpose and outputs) of the project. Please include the Logical Framework for this project (as an appendix) if this formed part of the original proposal or has been developed since, and report against this.

a) to establish a high quality long-term research programme at the University of Malaysia-Sabah in tropical biology and biodiversity conservation using non-invasive population genetic techniques;

b) *to establish a university teaching programme in conservation science through which candidates for further training can be identified, and through which increased national awareness of conservation issues can be raised;*

c) *to establish population genetic methodology that will be applicable to endangered rainforest species;*

d) *to investigate the genetic consequences of recent demographic changes brought about due to human pressure, habitat disturbance, population fragmentation and high density.*

- Have the objectives or proposed operational plan been modified over the last year and have these changes been approved by the Darwin Secretariat?

The objectives or proposed operational plan have not been modified over the last year.

4. Progress

- Please provide a brief history of the project to the beginning of this reporting period. (1 para.)

June 8-19, 2002	*Benoît Goossens (BG) writing 2nd year report contribution and 1st paper on the genetic results.*
June 20-27, 2002	*BG and KOCP research assistants: expedition in Balad Dami (Kinabatangan floodplain) to collect orangutan samples in nipas and mangroves.*
June 29, 2002	*BG and Marc Ancrenaz in Kota Kinabalu to attend the 2nd Sumatran Rhino Conservation Seminar. Contacts taken by BG with the NGO SOS Rhino.*
July 4, 2002	*Meeting BG, Marc Ancrenaz(KOCP), Menno Schilthuizen (UMS), Soren Jensen (DANIDA), Patrick Andau (Director SWD), Lanrentius Ambu (Vice-Director SWD), Agustine Tuuga and Peter Malim (Senior Wildlife Officers), Raymond Alfred and Junaidi Payne (WWF-AREAS) for the preparation of the orangutan workshop and the setting up of a long-term collaborative project on genetic studies on endangered species.*
July 4, 2002	*Meeting BG, Marc Ancrenaz, Menno Schilthuizen, Fairus Jalil and Maryati Mohamed (several issues such as the workshop, Fairus Jalil's thesis, Sheena James' master, the DNA lab, the course 2003, future research at UMS).*
July 6-10, 2002	*BG and Rosdy Sakong (KOCP research assistant): Sumatran rhino survey in Balad Dami (Kinabatangan floodplain), collection of faecal samples.*
July 11-14, 2002	*BG and Jamil Sinyor (KOCP research assistant) prepare talks for the International Primatological Society Conference 2002.*
July 16-August 1, 2002	*BG in Kota Kinabalu, writing papers and proposals and preparing talks for IPS 2002.*
July 17, 2002	*Submission to SOS Rhino of a proposal: "Sex ratio and individual identification of Sumatran rhinos in Tabin Wildlife Reserve" for funding (10,000 RM).*
July 25, 2002	*Meeting at UMS with Maryati Mohamed, Fairus Jalil, Marc Ancrenaz and Lori Sheeran from California State University-Fullerton to discuss about her proposal to study the Bornean gibbon at the Kinabatangan Wildlife Sanctuary.*
July 29, 2002	*Submission to UMS of a proposal: "Population genetic structure and conservation of endangered primate species in the Lower Kinabatangan" for funding (50,000 RM) (Fairus Jalil's PhD thesis).*
July 31, 2002	*Submission to the Sabah Wildlife Department of a proposal: "Genetic management of endangered mammal species in Sabah" for approval.*
July 31, 2002	*Submission to UMS of a proposal: "Patterns of relatedness in a fragmented orangutan population in the Lower Kinabatangan" (Sheena James' MSc, funded by Darwin Initiative).*
August 2, 2002	*BG and Datu Mohd. Ahbam Bin Abulani (KOCP research assistant) fly to Beijing.*
August 3, 2002	*Jamil Sinyor and Fairus Jalil fly to Beijing.*
August 4-9, 2002	*XIXth International Primatological Society Conference in Beijing, China*

August 5, 2002	*Talk: "Behavioural observations of wild orangutans in the Kinabatangan Wildlife Sanctuary, Sabah, Malaysia" by Datu Mohd Ahbam Bin Abulani, Isabelle Lackman-Ancrenaz, Marc Ancrenaz and Sheena James*
August 6, 2002	*Talk: "Which nests to choose: collecting shed hairs from wild orangutans" by Jamil B. Sinyor, Zulkiflie B. Abdullah, Marc Ancrenaz and Benoît Goossens*
August 9, 2002	*Talk: "Genetic diversity patterns in the Kinabatangan orangutan population, Sabah, Malaysia" by Benoît Goossens, Fairus Jalil, Maryati Mohamed, Marc Ancrenaz, Isabelle Lackman-Ancrenaz, Patrick Andau and Michael W. Bruford*
August 9, 2002	*Talk: "Orangutan conservation genetics in the Kinabatangan Wildlife Sanctuary, Sabah, Malaysia: a Darwin Initiative for the Survival of Species project" by Fairus Jalil, Maryati Mohamed, Patrick Andau, Isabelle Lackman-Ancrenaz, Marc Ancrenaz, Michael W. Bruford and Benoît Goossens*
August 21, 2002	*BG back in Sabah.*
August 23, 2002	*Meeting BG and Soren Jensen (genetic management project).*
August 25, 2002	*BG back in Cardiff University.*
Sept-Dec, 2002	*BG in Cardiff: writing and submitting Folia Primatologica paper and one chapter for the Kinabatangan Scientific Expedition book.*
	BG extracting DNA from study site samples.
Jan 13, 2003	*Sheena James (UMS master student) in Cardiff for training in genetic methods with BG.*
Jan-March, 2003	*BG train Sheena James in non-invasive genetics, analysis of Sukau study site samples for paternity and relatedness.*
April 2, 2003	*BG: departure to Malaysia (London-Singapore-Brunei-Kota Kinabalu).*
April 3-20, 2003	*BG prepares the 2nd International Conservation Biology Course.*
April 20, 2003	*Prof Mike Bruford's arrival in Kota Kinabalu.*
April 21-May 16, 2003	*2nd International Conservation Biology course, lectures and assessment (see attached outline).*
April 26, 2003	*Dr Lounès Chikhi's arrival in Kota Kinabalu.*
May 3, 2003	*Prof Mike Bruford's departure to UK.*
May 8, 2003	*Meeting BG, Marc Ancrenaz, Isabelle Lackman-Ancrenaz, Soren Jensen and Roger Cox for the preparation of the Orangutan Conservation Workshop.*
May 9, 2003	*Field training in Manukan Island with Dr Annadel Cabanban (coral reef conservation).*
May 12-16, 2003	*Course assessment.*
May 12, 2003	*Workshop on "Eco-tourism and conservation" with the students (supervised by Isabelle Lackman-Ancrenaz).*
May 15, 2003	*Workshop on "Protected areas conservation in Sabah" with students (supervised by BG).*
May 16, 2003	*Closing ceremony and certificate distribution.*
May 19, 2003	*BG at immigration for research visa.*
	Meeting BG, Isabelle Lackman-Ancrenaz and Sabah Tourist Guide Association (STGA) for course organisation in the future.
May 20-31, 2003	*BG writing 3rd year report and articles.*

- Summarise progress over the last year against the agreed baseline timetable for the period. Explain differences including any slippage or additional outputs and activities.

The 12 last months of the project (June 2001-May 2002) have been extremely successful.

The main objective for this period was to obtain genetic information from the 52 different samples (faeces) collected between April 2000 and August 2002 in the Lot 2 of the Kinabatangan Wildlife Sanctuary, in a 4-km^2 study site in which KOCP research assistants conduct behavioural observations. DNA has been successfully amplified for 13 microsatellite loci, for 44 (85%) of the samples. The genotyping identified 35 different individuals.

The second objective was to train a UMS staff member, Sheena James (SJ), in molecular techniques applied to conservation of the orangutan. SJ spent three months (January-March 2003) in Cardiff University, together with BG and received training on faecal and shed hair DNA extraction techniques, PCR amplification techniques, microsatellite genotyping, and data analysis. SJ has increased her knowledge in conservation genetics and she will continue her work at University Malaysia Sabah during her master's thesis, ensuring the future viability of laboratory techniques in the ITBC genetics lab at UMS.

The third objective was to continue the establishment of a university teaching programme in conservation science at UMS, in order to raise awareness of conservation issues. This course provided a useful opportunity for all involved or interested in biodiversity conservation to gain up-to-date knowledge and foster strategic contacts. The International Conservation Biology Course took place between the 21st of April and the 16th of May 2003, at the Institute for Tropical Biology and Conservation (ITBC), UMS. Twenty-five participants from different agencies (UMS, WWF Malaysia, Sabah Forestry Department, Sabah NGOs (KOCP), Borneo Tourism Institute, SI Tours and Wildlife Expeditions, and one Indonesian participant) attended the 4-week course. The four weeks were broken down into three weeks of lectures, one day of field training on coral reef conservation and one week of assessment (workshops and presentations). At the end of the course a certificate was given to those participants who attended the course and passed the assessment procedure. All participants successfully obtained their certificate.

- Provide an account of the project's research, training, and/or technical work during the last year. This should include discussion on selection criteria for participants, research and training methodologies as well as results. Please **summarise** techniques and results and, if necessary, provide more detailed information in appendices (this may include cross-references to attached publications)

<u>Research</u>

The main research objective of the project was successfully achieved between September 2002 and March 2003. The set of samples collected and brought back in UK by BG and SJ was analysed in the laboratory. Thirty-five orangutans have been identified genetically in the KOCP study site.

Faecal extractions were carried out in a Class I microbiological safety hood, using a QIAamp® DNA Stool Mini Kit and following a specific protocol for orangutans detailed in Goossens et al. 2000 and Utami et al. 2002. Thirteen human-derived microsatellite loci were amplified. A multiple-tube procedure was conducted for each faecal extract for which three amplifications were performed using the locus D5S1457 according to Goossens et al. 2000. After, the most successful extract (3 positive PCRs) for each sample was amplified seven times for each locus to avoid typing errors. Three software packages were used (POPASSIGN 4.1, CERVUS 2.0 and KINSHIP 1.2) to analyse parentage and patterns of relatedness. A paper Is currently in preparation from these data.

During the large faunal survey carried out by the Sabah Wildlife Department and KOCP in the whole state of Sabah, we planned to collect orangutan samples (faeces and shed hairs) from the different areas surveyed. Unfortunately, this sampling was largely unsuccessful, due to the difficulty of finding fresh samples (mainly in primary forests). The success of the 2001 sampling in the Kinabatangan (see 2nd year report) was mainly due to the fact that wild orangutans and fresh nests were sighted from the river, and that staff (BG and two KOCP research assistants) carrying out the sampling were dedicated 100% to it during six months. Sample acquisition Sabah-wide is still ongoing.

<u>Training</u>

BG's second Malaysian counterpart, Sheena James from ITBC, UMS was trained in molecular ecology techniques in Cardiff University for three months. She worked with BG in the laboratory, extracting DNA from faecal samples and from shed hair samples previously collected in the field;

amplifying nuclear markers and genotyping orangutan individuals. She also spent time studying the literature, increasing her knowledge of both population genetics and conservation biology. This work is part of her Master thesis (Title: "Patterns of relatedness in a fragmented orangutan population in the Lower Kinabatangan").

Back in Malaysia, SJ followed the 2nd International Conservation Biology Course and successfully obtained her certificate. She is now back in the field to collect more behavioural data on KOCP study site's orang-utans for her Master's thesis.

During a one-day field training on Manukan Island (Tunku Abdul Rahman Park), 25 course participants were trained in coral reef and fish identification and conservation by Dr Annadel Cabanban from the Borneo Marine Institute (UMS).

Rosdy Sakong, KOCP research assistant, has been trained by BG in DNA sampling collection of endangered species such as Asian elephant and Sumatran rhinoceros during a field expedition in June 2002.

Jamil Sinyor, KOCP research assistant, presented an oral communication at the XIXth International Primatological Society Conference, held in Beijing, 4-9 August, 2002.

Teaching

The Second International Conservation Biology Course was organised by BG at ITBC, UMS. Subjects covered during the course included: What is conservation biology?; Systematics, taxonomy and phylogeny; Biogeography and island biogeography; The extinction crisis and threats to biological diversity; Behavioural ecology and conservation; Conservation genetics; Population demography and viability, population and habitat viability analysis (PHVA); Conservation management; Eco-tourism and conservation; Marine ecology and conservation; Fieldwork methodology (census) and Wildlife conservation in Sabah. The course was divided into two periods. The three first weeks were devoted to lectures, seminars, practical (PHVA), wildlife films, fieldwork (on Manukan Island) and workshops (see attached program). One day (7 May 2003) was dedicated to student presentations on "Wildlife Conservation in Sabah" (see attached program). Week 4 was spent at ITBC for course assessment. Assessment was based on two equal contributions: 1/2 = powerpoint presentation by each student to the class on one selected Sabah animal or plant species (see attached program); 1/2 = participation in a workshop entitled "How to conserve wildlife biodiversity in protected areas in Sabah?", five protected areas were selected and presented(powerpoint presentations) by 5 groups of 5 students: Kinabatangan Wildlife Sanctuary, Maliau Basin, Crocker Range National Park, Danum Valley, Tabin Wildlife Reserve (see attached program). At the end of the course a certificate of completion was given to those participants who attended the course and passed the assessment procedure. All 25 participants received a certificate of completion. Most of these were tourist guides (13) and staff from governmental and non-governmental agencies (10), showing their great motivation and the wish to increase their knowledge in conservation biology. The course was taught by researchers involved in the Darwin project (Dr Benoît Goossens, organiser, CU and UMS; Prof Michael W. Bruford, Project Coordinator, CU; Drs Marc Ancrenaz and Isabelle Lackman-Ancrenaz, KOCP); staff at the ITBC (Dr Menno Schilthuizen), guest lecturers (Dr Joanna M. Setchell, University Surrey-Roehampton; Dr Lounès Chikhi, University of Toulouse; Dr Annadel Cabanban, Borneo Marine Institute). Seminars were presented by Dr Annadel Cabanban, Dr Menno Schilthuizen, Dr Edwin Bosi (SOS Rhino), and Prof Michael W. Bruford.

Capacity building

Two of the objectives of the project were the setting up of a non-invasive genetic lab at ITBC, UMS, and the establishment of population genetic methodology that will be applicable to endangered rainforest species. Both objectives are now in sight: the genetic lab is established and is used by MFBJ and SJ (trained by BG during Darwin project). An ABI 3100 sequencer has been installed in the lab during the summer 2002 and is extensively used by MFBJ and SJ. BG and MFBJ have set up at ITBC a specific room dedicated for the extraction of non-invasive samples such as hair and faeces. BG is in the process of setting up a genetic project on the Sumatran rhinoceros (individual identification, sex-ratio and relatedness patterns in Sabah populations) in collaboration with SOS Rhino, the Sabah Wildlife Department, KOCP and UMS.

- Discuss any significant difficulties encountered during the year.

No major difficulties were encountered during the year, except for the Sabah orangutan population sampling (see above). The extraction and amplification of the samples collected in the KOCP study site was extremely successful. The International Conservation Biology Course 2003 was well received by the participants, particularly by the tourist guides who expressed their desire to include a similar course in their training in the future.

- Has the design of the project been enhanced over the last year, e.g. refining methods, indicators for measuring achievements, exit strategies?

The design of the project has not been enhanced at this stage of the project. Nevertheless, our teaching methods and subjects were adapted this year to the level of the class, mainly following the attendance by 13 tourist guides and 10 NGO staff. Their knowledge in biology was limited but their motivation was incredibly high and after the four weeks of teaching, their level of expertise had increased considerably.

- Present a timetable (workplan) for the next reporting period.

06 and 07/2003	*BG and co-authors writing and submitting a scientific paper on the Kinabatangan orangutan population genetic results.*
	BG and SJ preparing a scientific paper on the parentage and genetic relatedness of orangutans in the KOCP study site.
06 to 08/2003	*BG will take part in the organisation of the Workshop on Orangutan Conservation along with KOCP.*
06 to 10 /2003	*Field expeditions in Kinabatangan Wildlife Sanctuary to collect Proboscis monkey and long-tailed macaque faecal samples, undertaken by BG, MFBJ (UMS and CU) and Jamil Sinyor (KOCP research assistant), in the framework of MFBJ's PhD thesis.*
12-15/08/2003	*BG will take part in the Orangutan PHVA held in Jakarta, Indonesia.*
19-21/08/2003	*Workshop on Orangutan Conservation, held in Kota Kinabalu, Sabah – involving BG, MWB, MA, IA, MM.*
09/2003	*BG will implement the population genetic methodology applicable to endangered rainforest species.*
05/10/2003	*BG back in Cardiff University.*
10 and 11/2003	*Final report and papers to be written.*

5. Partnerships

- Describe collaboration between UK and host country partner(s) over the last year. Are there difficulties or unforeseen problems or advantages of these relationships?

Relationships between BG and the host country partners (University Malaysia Sabah, Sabah Wildlife Department, and Kinabatangan Orangutan Conservation Project) were again extremely good.

The Universiti Malaysia Sabah was extremely supportive and provided BG and MWB with an office at the Institute for Tropical Biology and Conservation, email and internet access and all facilities necessary to organise and execute the International Conservation Biology Course (ICBC) 2003.

The Sabah Wildlife Department was very supportive and gave all the authorisations required to sample in the lot 2 of the Kinabatangan Wildlife Sanctuary. They also provide an export permit for the samples (faeces). The Sabah Wildlife Department is looking forward to the genetic results to incorporate them in their management plan of the Kinabatangan Wildlife Sanctuary. The results will be presented during the Workshop in August 2003.

The Kinabatangan Orangutan Conservation Project provided BG with accommodation at their research station during his stay in Sukau village. KOCP sent four participants (Mr Ramlan Sakong, Mr Rosdi Sakong, Mr Hadrin Lias, and Ms Hamisah Elahan) to the ICBC 2003. KOCP research assistants carried on the orangutan faecal sampling throughout the year in their study site for the mating strategies part of the project (see above). Dr Isabelle Lackman-Ancrenaz (KOCP director) organised a one-day workshop entitled "Eco-tourism and conservation" during the ICBC 2003.

The Sabah Forestry Department sent two participants to the ICBC 2003.

WWF-Malaysia sent three participants to the ICBC 2003 at UMS.

Borneo Tourism Institute, Wildlife Expeditions and SI Tours sent respectively 6, 3 and 4 participants to the ICBC 2003. These 13 tourist guides were extremely motivated throughout the whole course and contacts have been established between BG and the Sabah Tourist Guide Association (STGA) for the setting up of a yearly course training in the future.

- Has the project been able to collaborate with similar projects in the host country or establish new links with / between local or international organisations involved in biodiversity conservation?

Our project strongly collaborates with the Danish Cooperation for Environment and Development (DANIDA) represented by their Chief Technical Adviser, Mr Soren M. Jensen and their Human Resources Development Adviser, Mr Roger Cox. Together with KOCP directors, we are all working on the preparation of the Workshop on the Orangutan Conservation in Sabah, which will be held in Kota Kinabalu during the third week of August 2003.

BG is setting up a collaborative project with SOS Rhino, the Sabah Wildlife Department and KOCP to work on the genetics of the highly endangered Sumatran rhinoceros population in Sabah.

BG is setting up a collaborative project with WWF-AREAS, the Sabah Wildlife Department and KOCP to work on the population genetics and dispersal of the Asian elephant in Sabah.

As last year, we have also been able to establish links with Indonesian projects through the participation of one Indonesian student (Ms Hartati Saat) in the ICBC 2003. Through the course, she has been able to share knowledge with the research assistants of the KOCP on orangutan and biodiversity conservation in their respective countries.

6. Impact and Sustainability

- Discuss the profile of the project within the country and what efforts have been made during the year to promote the work. What evidence is there for increasing interest and capacity for biodiversity resulting from the project? Are satisfactory exit strategies for the project in place?

During the International Conservation Biology Course 2003 MWB ran a Population and Habitat Viability Analysis for the Kinabatangan orangutans in which participants from Sabah governmental and non-governmental agencies and students showed great interest. The results of the PHVA will be presented by MWB during the Workshop in August 2003. We also organised one day during which several students (UMS students, tourist guides, KOCP research assistants, Forestry Department staff, SOS Rhino staff, WWF-AREAS staff) presented their respective work in the NGOs they are working for (see attached program and topics).

Satisfactory exit strategies are in place: a management plan for the Kinabatangan orangutan population and a management plan for the Sabah orangutan populations which will be presented during the Workshop in August 2003; the conservation biology course will continue after the Darwin completion; the population genetic methodology for other endangered rainforest species is established, and new projects are under development (Asian elephant, tembadau, Proboscis monkey and long-tailed macaques (MFBJ PhD thesis), Sumatran rhino); publications include one article in press in Folia Primatologica, two book chapters in press, and three articles currently in preparation for peer-reviewed journals.

7. Outputs, Outcomes and Dissemination

- Please expand and complete Table 1. **Quantify** project outputs over the last year using the coding and format from the Darwin Initiative Standard Output Measures (see website for details) and give a brief description. Please list and report on appropriate Code Nos. only. The level of detail required is specified in the Guidance notes on Output Definitions which accompanies the List of Standard Output Measures.

Table 1. Project Outputs (According to Standard Output Measures)

Code No.	Quantity	Description
3	1	Ms Sheena James (Malaysian) completed her BSc Degree and presented her research project: "Some social aspects of orangutan (*Pongo pygmaeus*) adaptation in a disturbed forest (study site at Sukau, Kinabatangan)"
4C	2	UMS students (2), WWF-Malaysia staff (3), Sabah Forestry Department staff (2), 1 Indonesian student from Kalimantan, KOCP staff (4), Borneo Tourism Institute (6), Wildlife Expeditions (3) and SI Tours (4) attended the International Conservation Biology Course 2003 and attended the three weeks lectures and one week course assessment at UMS
4D	4	
GO's staff	2	
NGO's staff	8	
Tourist guides	13	
Total	25	
6A	1	UMS master student (Ms Sheena James, Malaysian) has been trained by B. Goossens in the laboratory (DNA extraction, amplification and genotyping) at CU, for 3 months
6B	12	
6A	25	UMS students (2), Sabah Forestry Department staff (2), WWF-Malaysia staff (3), Indonesian student (1), KOCP staff (4) and tourist guides (13) took part in one-day field trip on Manukan Island and were trained in coral reef conservation
6B	1 day	
7	1	International Conservation Biology Course 2003 CD was provided to each student, including all lectures, seminars, presentations and workshops given during the course.
8	1 (6 weeks)	UK Darwin staff (Benoît Goossens, CU) spent 6 weeks (April 2-May 16, 2002) in Sabah for capacity building, training and teaching at the University Malaysia Sabah. He was in charge of the organisation of the International Conservation Biology Course (ICBC) 2003, held at UMS, Sabah
8	1 (2 weeks)	UK scientist (Michael W. Bruford, CU) spent 2 weeks in Kota Kinabalu for teaching during the ICBC 2003
8	1 (4 weeks)	UK scientist (Joanna M. Setchell, Surrey-Roehampton) spent 4 weeks in Kota Kinabalu for teaching during the ICBC 2003
8	2 (1 week)	KOCP Directors (Sabah), Marc Ancrenaz and Isabelle Lackman-Ancrenaz, spent 1 week in Kota Kinabalu for teaching during the ICBC 2003
8	1 (2 weeks)	French scientist (Dr Lounès Chikhi, University of Toulouse) spent 2 weeks in Kota Kinabalu for teaching during the ICBC 2003
11A	1	1 paper in press in *Folia Primatologica*
11B	3	3 papers in preparation to be submitted during the summer 2003 for peer-reviewed journals
13A	9	Establishment of a collection of non-invasive samples from Asian elephant, Bornean orangutan, Proboscis monkey, long-tailed macaque, pig-tailed macaques, maroon langur, Hose's langur, silvered langur, Bornean gibbon at ITBC, UMS
14B	1	XIXth International Primatological Society Conference held in Beijing, China, August 5-9 2002, 3 talks on the Darwin project were presented during that conference :
		August 6, 2002 — *Talk: "Which nests to choose: collecting shed hairs from wild orangutans" by Jamil B. Sinyor, Zulkiflie B. Abdullah, Marc Ancrenaz and Benoît Goossens*
		August 9, 2002 — *Talk: "Genetic diversity patterns in the Kinabatangan orangutan population,*

			Sabah, Malaysia" by Benoît Goossens, Fairus Jalil, Maryati Mohamed, Marc Ancrenaz, Isabelle Lackman-Ancrenaz, Patrick Andau and Michael W. Bruford
		August 9, 2002	*Talk: "Orangutan conservation genetics in the Kinabatangan Wildlife Sanctuary, Sabah, Malaysia: a Darwin Initiative for the Survival of Species project" by Fairus Jalil, Maryati Mohamed, Patrick Andau, Isabelle Lackman-Ancrenaz, Marc Ancrenaz, Michael W. Bruford and Benoît Goossens*
14B	1	MWB gave a seminar at the Max Planck Institute for Evolutionary Anthropology, Leipzig on "Molecular Ecology of Primates: Sex, Murder and Family Values" 15th May 2003.	
21	1	Setting up of a non-invasive genetic lab at ITBC, UMS	

- Explain differences in actual outputs against those agreed in the initial 'Project Implementation Timetable' and the 'Project Outputs Schedule', i.e. what outputs were not achieved or only partly achieved? Were additional outputs achieved?
- In Table 2, provide full details of all publications and material produced over the last year that can be publicly accessed, e.g. title, name of publisher, contact details, cost. Details will be recorded on the Darwin Monitoring Website Publications database which is currently being compiled. Mark (*) all publications and other material that you have included with this report

Table 2: Publications

Type * (e.g. journals, manual, CDs)	**Detail** (title, author, year)	**Publishers** (name, city)	**Available from** (e.g. contact address, website)	***Cost £***
Scientific Article*	Which nests to choose: collecting shed hairs from wild orang-utans. B Goossens, ZB Abdullah, JB Sinyor, M Ancrenaz 2003	Folia Primatologica	In press	

- Provide details of dissemination activities in the host country during the year. Will these activities be continued by the host country when the project finishes, and how will this be funded and implemented?

There was no dissemination activities carried out during the year reported.

8. Project Expenditure

- Please expand and complete Table 3.

Table 3: Project expenditure during the reporting period

Item	Budget	Expenditure

- Highlight any recently agreed changes to the budget and explain any variation in expenditure where this is +/- 10% of the budget.

All budgetary changes were agreed with the DI secretariat in advance. In respect of the > +/-10% changes, these were simply due to an overlap between the course organisation period (conference and travel budgets) and the DI reporting period.

9. Monitoring, Evaluation and Lessons

- Discuss methods employed to monitor and evaluate the project this year. How can you demonstrate that the outputs and outcomes of the project actually contribute to the project purpose? i.e. what indicators of achievements (both qualitative and quantitative) and how are you measuring these?

Monitoring methods have varied according to the activity being carried out. Laboratory and field work have been monitored through regular (weekly) meetings to discuss progress while in Cardiff and weekly (and more often, except when in the field) email consultation while the PDRA and counterpart were in Malaysia. Progress in the lab has been little short of spectacular and the data are already a major contribution to orangutan conservation as a result. Progress of the students in the course at UMS was continually assessed and end-point assessed through formal work, discussion and presentation. The course was again a success in its second year, and particularly the participation of tourist guides increased the motivation level of the students. Overall, communication and monitoring has been very rigorous in this project to date and progress has been beyond our most optimistic expectations.

- Are there lessons that you learned from this year work and can you build this learning into future plans?

One lesson which has been learned from this year, is to be able to adapt our teaching to the audience and show flexibility throughout the course. We have been able to adapt our training to the students and they have very well received that.

Any population genetic study depends strongly on the sampling. The main objective of the project (Kinabatangan orangutan population genetics) was successfully accomplished because the field parameters were extremely favourable and the staffs carrying out the sampling was dedicated to it at 100% . The lesson we could learn from that is that any sampling of wild animal populations should be undertaken separately from any other activities and by dedicated and well-trained staff.

Author(s) / Date

Prof Michael W. Bruford and Dr Benoît Goossens, 1st June 2003