Tropical Andean Butterfly Diversity Project

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Proyecto Diversidad de las Mariposas Andinas Tropicales

Darwin Initiative Annual Report 3

2007-2008

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Darwin Initiative Annual Report

Darwin Project Information

Project Ref Number	475 or 14-047
Project Title	Tropical Andean Butterfly Diversity Project
Country(ies)	Venezuela, Colombia, Ecuador, Perú, Bolivia, USA, UK.
UK Contract Holder Institution	University College London (UCL)
UK Partner Institution(s)	Natural History Museum (NHM).
Host country Partner Institution(s)	**Venezuela**: Museo del Instituto de Zoología Agrícola, Universidad Central de Venezuela, Maracay (MIZA); Instituto de Investigaciones Científicas de Venezuela IVIC. **Colombia**: Instituto de Ciencias Naturales, Universidad Nacional de Colombia (ICN); Universidad de los Andes, Bogotá. **Ecuador**: Museo Ecuatoriano de Ciencias Naturales, Quito (MECN). **Perú**: Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima (MUSM). **Bolivia**: Museo de Historia Natural Noel Kempff Mercado, Santa Cruz (MHNNKM); Museo Alcides D'Orbigny Cochabamba (MAO) y Colección Boliviana de Fauna de La Paz (CBF). **USA**: Florida Museum of Natural History, University of Florida, Gainesville (FLMNH). **Andes Region**: Conservation International (CI).
Darwin Grant Value	**£** 149,187
Start/End dates of Project	August 2005 - March 2008
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)	1 Apr 2007 to 31 Mar 2008 Annual report number 3
Project Leader Name	Professor Jim Mallet
Project website	www.mariposasandinas.org (Spanish) www.andeanbutterflies.org (English)
Author(s), date	J. Mallet (JM), K. Willmott (KW), B. Huertas (BH), G. Lamas (GL), April 2008.

1. Project Background

The Convention on Biological Diversity (CBD) requires signatory countries to identify and conserve globally important components of their biodiversity. Meeting this obligation requires knowledge of the diversity, distribution and ecology of species. While such knowledge might be available for some vertebrate groups, data are almost non-existent for insects, which make up 70% of terrestrial species, are often highly endemic and are vital to ecosystem health. Among insect groups, butterflies are regarded as one of the best potential indicator groups for biodiversity conservation because of the extent of existing knowledge, relative ease of survey

and value in communicating ideas about conservation to the public. However, despite a recent renaissance in research on Andean butterflies, the world's richest and most poorly known fauna, Andean countries still lack an adequate knowledge of their national butterfly faunas.

Institutions and governments throughout the Andean region have highlighted the urgent need for basic systematic and biological data, and a number of small-scale efforts to compile such information exist (e.g. by C); project at MIZA, Venezuela). However, such efforts are hindered because taxonomic expertise and the world's richest sources of collections information still reside mainly in UK (the NHM has c. 20% of world specimens) and the USA.

The Tropical Andean Butterfly Diversity Project aims to address the biodiversity challenge posed by tropical Andean butterflies. This challenge consists of increasing the number of trained workers on the region's butterflies, making distribution data and photographs of specimens widely available, assessing the true diversity of species and subspecies, resolving the systematics and classification at many levels, obtaining baseline data on biology and distribution, and applying such data to begin to conserve threatened elements of the fauna.

The project is a collaborative initiative involving the UK, USA and the five tropical Andean countries: Peru, Colombia, Bolivia, Venezuela and Ecuador. The project involves work at museums and institutions in the UK, USA and South America, and at field stations in Andean countries (described further below).

2. Project Partnerships

The UK lead institution is responsible for the coordination of principal project activities, for housing the project's online butterfly diversity database, and for assisting in capacity building of host country institutions and students. Project leader JM attended the student courses in Peru and Bolivia in 2007, strengthening links between the lead institution and host institutions. A partnership between the lead institution, other UK and USA institutions, notably the Natural History Museum, London, and the Florida Museum of Natural History, Gainesville (FLMNH), and the Museo de Historia Natural, Lima (MUSM), has been instrumental in building capacity for butterfly research in tropical Andean countries. Researchers from these four institutions have led development of the butterfly specimen databases and digital image archives that will be one of the most important legacies of the project (see elsewhere in report), and in providing the majority of training material for the student courses in Andean countries

In turn, host country institutions have supported the project through databasing of specimen information in Andean collections and assisting in the logistics of the student courses. The project also benefited from the assistance of several former course students from 2006, who played a key role in running courses in Colombia, Ecuador, Peru and Bolivia. Such assistance included identification of the course location, reservations of field stations, hotels and transport, loan of equipment, recruitment of volunteers to assist with running the courses, provision of facilities and assistance with daily logistics during the courses. A number of local companies, people and institutions and foundations contributed through generous discounts in accommodation, food and transport.

The project also received important contributions from Dr Mathieu Joron (University of Edinburgh) and Dr Jorge Bizarro (Mariposario "Reserva Ambiental Serelepe", Brazil), Fernando Guerra (Colección Boliviana de la Paz) who assisted with lectures, practicals and even logistics during the week-long courses in Peru and Bolivia, respectively. Perhaps most importantly, numerous institutions have contributed researchers, curators and lecturers who have spent significant periods managing the project and attending student courses, without reimbursement from the grant. The FLMNH (USA) and MUSM (Peru) allowed Dr Keith Willmott and Dr Gerardo Lamas, respectively, substantial time to prepare lectures and practicals, assist with the organisation of courses and other project activities, attend the courses to help with training, and spend time in partner institutions to assist with curation. Other significant contributions of time of staff and curators towards organisation of courses and databasing were received from the MHNNKM and the CBF (Bolivia) (3 researchers), the Museo Ecuatoriano de Ciencias

Naturales (1 researcher), the ICN, CENICAFE and Universidad de los Andes, Bogotá (ULA; Colombia) (3 researchers). Universidad de los Andes provided a substantial contribution towards the transport for the Colombia course. Two owners of major private collections, Jean François LeCrom (Colombia) and Padre Francisco Piñas (Ecuador) have contributed by allowing us to database their personal collections, while the former also gave lectures at the course in Colombia at his own time and expense.

The project has continued to build new collaborations with individual researchers who are providing specimen locality data and digital images from collections. These researchers include Fabio Vitale (Lecce, Italy) (provision of distribution data for certain Ithomiinae), Maurizio Bollino (Lecce, Italy) (provision of photographs of type specimens of *Catasticta*) and Stéphan Attal (Paris, France) (provision of type specimens of Biblidinae). A number of students from the training courses in 2006 and 2007 have requested copies of our Andean butterfly database to record the data in their own private collections, and have begun to return these data to the project to be disseminated via the online database. Finally, the project is a key collaborator in the IUCN Red List Sampled Approach, the first attempt to assess the global IUCN conservation status of ten invertebrate groups, of which butterflies are one such group. This project is described further elsewhere in the report.

We have recently joined the project "The geography of speciation in *Heliconius* butterflies" led by Dr Albert Phillimore at Imperial College, London. The project will start this month and has been funded by CEE with £2750 to capture distribution data on this butterfly genus. A South American student has been involved in the project to database the *Heliconius* specimens at the BMNH. BH has trained the student to use the TABDP database to speed the data capture process and will supervise the data capture process at NHM. Data collected during this project will be also available in the TABD Project online database. We hope that a similar project will also be undertaken at FLMNH under KW's supervision

3. Project progress

3.1 Progress in carrying out project activities

Enhanced institution staff capacity for butterfly research

In 2007, UK and USA project members have spent time with South American project members during field courses and visits to institutions to curate collections in Colombia, Ecuador, Peru and Bolivia. No visits have been made to Venezuela in 2007 since the Venezuela student training course was cancelled (as explained elsewhere), and visits are instead planned in 2008-09. Wherever possible and appropriate, curation has been conducted alongside curators and volunteers to teach identification skills. As explained in the previous annual report and further below, emphasis has shifted from staff training to student training for a number of reasons.

Student training

Four student courses were conducted between September and December 2006 in Colombia, Ecuador, Peru and Bolivia, lasting 5-6 days each (see Annex 3 attached for course programmes). The courses took place later than anticipated due to constraints imposed by availability of key project members and seasons and field sites. The Venezuela course was cancelled due to a lack of applicants (5), and all applicants were offered the opportunity to attend the course in Colombia instead. Following discussion with country coordinators and a desire to offer courses that would not only be attractive to new students, but also to former students of the 2006 courses, two different types of training courses were offered, based on the perceived need in each country. An Intermediate course (Colombia, Peru, Bolivia) included an introductory day for new students, containing much of the background material from the Basic course, with additional more specialised lectures and practicals for returning students from 2006. In addition, there was a greater emphasis on field techniques, as requested by returning students. The Advanced course (Ecuador) was only available for those with prior

experience of butterfly research and was designed mainly to support and encourage students from the previous year. It included lectures by instructors on their own areas of expertise, discussing in more depth research project design, and had an even stronger field component, with demonstration of advanced techniques such as tree-climbing, introduction to host plant identification and collection, and teaching of identification of certain important Andean groups. Each course was attended and taught by one to three of the four main project members (KW, JM, BH and GL), as well as country coordinators and invited national and international experts.

The courses remained popular (c.100 applications in total), with 30 students attending in Colombia, 11 in Ecuador, 16 in Peru and 19 in Bolivia (original target 30 students per country). The relatively low numbers on the Ecuador course primarily reflect the paucity of institutions with lepidopterist expertise in that country, as well as the advanced nature of the course (several practicals required specialised equipment and constant supervision). Unfortunately, the number of students attending the Bolivian course was affected by a national strike. The courses were developed and aimed for the Andean region, but, because of project publicity, we received and considered applications from students and assistance from students and lecturers of 11 different nationalities (Peru, Colombia, Ecuador, Bolivia, Brazil, UK, USA, Argentina, Korea, New Zealand, France), Participants on the courses included: 3 international students (Argentina, New Zealand and USA) 7 MSc students, 54 undergraduate students and 15 graduates including owners of important private collections and workers in National Parks, educational butterfly exhibits, NGOs, universities, schools and butterfly farms.

All students, lecturers and country coordinators received a CD-ROM with 15-30 lectures (including copies of previous years'), up to 675 PDF articles, 2 free statistical analysis programs, identification keys and colour plates of certain groups where provided by some lecturers, and the project MS Access database. The latter contained tables of locality data for the relevant country and the comprehensive neotropical butterfly systematic checklist, with some 26,000 records. Lead institutions, keen students and other butterfly researchers in each country received a total of 50 butterfly collecting nets and net-poles, 15,000 pins for butterfly specimens, 8000 butterfly storage envelopes, forceps and other small items of equipment required for butterfly collection and research projects.

We are currently providing financial and logistical support to 19 research projects on Andean butterflies, selected following a competition in the five Andean countries in March 2007. Approximately USD $12,000 was distributed in 2007, mainly to support fieldwork in these projects. Projects were selected based on their relevance to understanding diversity in tropical Andean butterflies and their conservation, on their overall scientific merit, on their feasibility, and on the importance of the research to the project members' own studies of butterflies. So far two projects have been completed and their results will be soon published on the project website.

In addition, TABDP members and other experts contacted through our network constantly assist and advise South American students in their research. One Venezuelan student worked for 6 months at the FLMNH with KW learning techniques for butterfly curation, while two Ecuadorian students from the 2006 course will be starting Masters degree programs at University of Florida in August 2008 with KW as their thesis supervisor. Two South American students (Peru and Brazil) have been volunteering with BH at the BMNH since late 2007 and receiving training in butterfly curation. Also, two former Colombian students from the 2006 and 2007 courses are working with BH as their undergraduate supervisor.

Curated collections

Curation continued in the BMNH, UK (Melitaeini, Satyrinae and c. 600 selected species from the IUCN project), FLMNH, USA (Ithomiinae, Satyrinae, Papilionidae, Pieridae) and Andean country collections. Gerardo Lamas and/or Keith Willmott, and other TABDP project members including lecturers visited the following Andean country collections to assist with curation: ICN Colombia, JFL Colombia, MECN Ecuador, MHNNKM Bolivia, Colección Boliviana de Fauna, La Paz.

Database and digital images

Copies of the project MS Access database, with collection locality gazetteers and a complete systematic checklist, have been distributed to a number of Andean students and other researchers on request. Databasing has been or is being conducted at 10 Andean collections since April 2007 assisted with CI funds.

Databasing continued in the NHM, London, with 9352 records added (multiple groups targeted to complete the IUCN list - at present, 370 species have been databased from the 600 spp targeted); the FLMNH, Florida, with 21,168 records added (multiple groups, but especially Pieridae, Ithomiinae, Heliconiinae, Biblidinae); the ICN (Pieridae) and Jean François LeCrom Collection (JFL) (Papilionidae and Pieridae), Colombia, with 4,388 records added. Yuvinka Gareca (Bolivia) provided 5,187 records from specimens collected during her research and during visits to museums in Germany and the USA funded by a TABDP scholarship in 2007. In Venezuela 4,591 records have been captured, and over 10,000 in Bolivia, but no data have yet been received from the lead institutions there, or from that in Peru. More than 72,000 additional records for Ithomiinae and *Adelpha* (Nymphalidae) are also available for data analysis by the project from KW and GL's research databases.

Maurizio Bollino (Lecce, Italy) and Stéphane Attal (Paris, France) provided digital images of type specimens of *Catasticta* and certain Biblidinae, respectively. However, with the exception of these images, work on completing the originally planned digital image archive essentially halted when Blanca Huertas took up her position at the Natural History Museum, for two reasons. Firstly, Ms Huertas had less time available to devote to the project, but secondly, and more importantly, Gerardo Lamas, our Andean region coordinator, offered to make his collection of print photographs of neotropical butterfly type specimens in Lima available to be digitised by the project. Scanning this collection of photographs will generate an archive of digital images of type specimens at a minute fraction of the cost and time that would be required to take digital photographs, and at the same time eliminate any risk of damaging these fragile, historically irreplaceable specimens. After approval of DEFRA to undertake this project, we purchased a high-speed Canon scanner in USA, which was recently taken to Lima by Dr Lamas.

The project database is now freely available online at www.mariposasandinas.org/database.html. We request the country of origin and student status of each potential user to monitor use of the website, after which users are instantly sent a password to access the site. The database can be searched via 4 different search pages that permit users to search for specimens in the database, to search for taxonomic information about a particular species-level taxon name, to generate a summary of information for any species, including geographic and elevational range, and images of each subspecies, and to generate any part (or all) of the current neotropical butterfly checklist.

The online distribution database includes 80,476 specimens and 56,403 records, from numerous collections. The majority of the specimens are in the BMNH (London) (37,647 specimens) and FLMNH (Gainesville, Florida) (7,996 specimens). Other databases received from country coordinators and from other sources are being checked for consistency and will be made available online as soon as possible.

The Andes region coordinator, Gerardo Lamas, has made a major contribution by making available a free digital copy of the neotropical butterfly bibliography via our website: Lamas, G. 2008. *Bibliography of Butterflies. An Annotated Bibliography of the Neotropical Butterflies and Skippers (Lepidoptera: Papilionoidea and Hesperioidea). Revised Electronic Edition.* [complete to end December 2007].

Regional research and conservation strategy

Dates and location of the final project workshop have been finalised: the workshop will be held from September 1-3 in Urubamba, Peru. This date is later than originally anticipated (May), mainly due to availability of key project members, a desire not to coincide with other major Lepidoptera meetings and to reduce the costs of airline travel. We expect approximately 30

people to attend the workshop, including Andean country coordinators and other Andes country butterfly experts, UK and USA lead project members, international researchers on major groups of Andean butterflies, and a representative from Conservation International.

Our principal project publication will identify key regions in the tropical Andes for future research and conservation. Analyses will be based in part on 629 species selected randomly from the neotropical checklist by the IUCN for assessment of conservation status. This assessment is part of the IUCN Red List – Sampled Approach project, which has chosen Lepidoptera as one of ten invertebrate groups to be studied, in which TABDP is undertaking assessment of neotropical species. Keith Willmott and Blanca Huertas attended a 1-day workshop with IUCN members on assessment of species in July 2007. Since most species assessments will be based on range size, we are currently developing a standardised set of procedures for estimating range size based on a combination of ecological modelling, using the freely available programme DIVA-GIS, and expert opinion. Methods for analysis will be finalised before September, and then taught to all participants at the workshop in Urubamba.

3.2 Progress towards Project Outputs

Enhanced institution staff capacity for butterfly research

As explained in our previous annual report, specific training activities have proven to be inappropriate since no partner institution staff has a junior position dedicated solely to Lepidoptera. Our output-level assumption that Andean institutions would employ such staff has therefore proven to be untrue, with project members instead either already being experienced butterfly researchers (e.g. MUSM, ICN), or having a broad range of taxonomic and biological knowledge and experience. We have thus shifted our emphasis from "training" of national coordinators to training of a new generation of Andean butterfly researchers, concentrating on the most promising students from the training courses (see below). Nevertheless, our goal has also been for all partners to understand basic aspects of butterfly systematics, biology and conservation, and practical aspects such as curation, databasing protocols and photography techniques, such that they might support this project and the activities of future researchers working with them. Project activities such as training courses and visits to museums have continued to contribute to this goal. A number of independent researchers and professionals working with butterflies and conservation (e.g. butterfly houses, universities and schools) have also been trained through attendance at the student courses. Evidence of an increased capacity and desire to support future butterfly research is the enthusiasm for a follow-up project expressed by many partner institutions already, which will be a major topic of discussion at the final workshop in Peru later this year.

Student training

Progress towards training students has been significant. A total of 180 students attended TABDP courses in 2006 and 2007. While we originally projected a total of 300 students, our project has shifted emphasis from training large numbers of students at a basic level to training fewer students at a more advanced level, as explained in the previous annual report. In the last year, the project has also funded some 20 small research projects by student groups on Andean butterflies. These projects have provided practical training in grant proposal writing, design of field research projects, field experience, butterfly identification and curatorial methods, data analysis, contacts with other researchers, and are valuable contributions to each student's academic profile. Finally, a number of students have worked with national coordinators to database collections, and thus gained experience in using databases, in identifying butterflies, and in curatorial methods. For example, 5 students were involved in databasing and curating the three Colombian collections that have contributed data to the project. Former students from the 2006 courses participated as lecturers and tutors during the 2007 courses in Peru and Colombia. Ultimately, we hope such experiences will stimulate these young researchers to continue studying butterflies and make a real long-term impact on regional Lepidoptera research.

As evidence for this, two students from the Ecuador course in 2006, both of whom also received project grants, will be starting Masters degree programs at University of Florida in August 2008 with KW as their thesis supervisor. Both intend eventually to return to Ecuador and seek academic positions. Given that such positions are essential for fostering interest in young students, and that Ecuador currently has no University professors whose work focuses on butterflies, these two students alone could make a significant difference to the future of butterfly research in Ecuador. We also expect one Masters student from the 2007 Colombia course to spend 6 months with KW at University of Florida in 2008-09 as part of his degree course, with a view to developing a PhD proposal. One Venezuelan student and one other Colombian student are also in now contact with KW with a view to pursuing graduate degrees, and we will be seeking to further the careers of all promising students with whom we are now in contact. In addition, BH continues to recruit and train South American students to capture data at the BMNH as part of their career development.

Curated collections

In addition to collection visits, we continued to assist with curation remotely via photographs of type specimens and assistance via e-mail, not only to the 5 partner institution collections, but also to many smaller research collections. The MUSM (Lima) is fully curated and the MECN (Ecuador) is fully databased, while a visit to the ICN concentrated on identification of Ithomiinae, one of the most taxonomically difficult groups. Given the lack of staff dedicated full-time to curating butterfly collections in the host countries, we expect that it will take longer than the time-span of this project for such collections to be fully curated. Nevertheless, our commitment to improving national collections will also continue beyond the conclusion of the project. We also believe that the online archive of images of butterfly type specimens (see below) will represent a "virtual museum" that will prove to be a significant resource for researchers throughout the Andes region.

Database and digital images

The project currently has c. 160,000 specimens, representing more than 1200 species, available for analysis in various databases, surpassing our initial goal of 150,000 specimens. No precise totals or data have been received from Bolivia (c. 10,000 records) or Peru (c. 2,000 records) to assess progress there. Databasing has concentrated on Papilionidae, Pieridae, three subfamilies of Nymphalidae (Nymphalinae: Melitaeini, Ithomiinae and Limenitidinae) and the 629 species (all families) selected for Red List assessment, but also represents species from all groups for Ecuador (KW's personal research database).

While our photographic database currently does not cover all species, we expect the archive of images of butterfly type specimens to be a much more significant project output. Lamas' photograph archive in Lima is the result of 30 years of work and visits to virtually all world museums with neotropical butterfly types. The task of identifying type specimens is painstaking, since such specimens typically lack any indication that they represent types. Ultimately, the identity of a name rests solely on its type specimen, so photographs of these are essential for all taxonomic research. However, because most types are in European collections they are almost inaccessible to most South American researchers. This project will thus not only assist researchers in identification, but also contribute significantly to one of our major goals, the repatriation of historically unique specimen information.

3.3 Standard Measures

3.4 Table 1. Project Standard Output Measures

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	TOTAL
2A	Number of host country students whose enrollment in a Masters degree programme benefited			2	2

	significantly from project activities				
4A	Undergraduate students trained (Colombia, Ecuador, Peru, Bolivia, UK, Chile, New Zealand)		49	54	103
4B	Training weeks provided (each course involved 6 days x 12 hrs per day, total 72 hrs per course, equivalent to 2 training weeks)		8	8	16
4C	Postgraduate students trained (Ecuador, Colombia, Bolivia, Venezuela, Mexico, USA)		16	7	23
6A	Non-student professional and amateur lepidopterists; includes course attendants (39) and country coordinators and owners of private collections (11) (Venezuela, Colombia, Ecuador, Peru, Bolivia)		49	15	64
6B	Time spent in curating collections (c. half week per country for 4 countries)		6	2	8
7	Number of different kinds of training materials produced for use by host country	1 (10 Powerpoint lectures)	4 (2 manuals, 1 poster, 1 CD containing scientific articles and computer software, more than 20 Powerpoint lectures, more or less 5 different per country)	2 (CD containing scientific articles and computer software, c. 35 Powerpoint lectures per country; 2 colour plates for identification of S. Ecuadorian Ithomiinae, Satyrinae)	7
8	Number of weeks spent by UK project staff on project work in host country		6	4	10
10	Field manuals		1 (Field techniques for surveying neotropical butterflies)		1
11A	Number of papers published in peer reviewed journals (acknowledging DI or increasing knowledge of Andean butterfly diversity)		5 (listed in Table 2), 7 (listed in Annex 3)	2 (listed in Table 2), 16 (listed in Annex 3)	7
11B	Number of papers submitted to peer reviewed journals (acknowledging DI or increasing knowledge of Andean butterfly diversity)		1	2	3
12A	Computer databases established and handed over to host country	3 (Taxonomic database, locality database,			3

		specimen database)			
12B	Computer databases enhanced and handed over to host country		3 (Taxonomic database, locality database, specimen database, all updated from previous year)	3 (Taxonomic database, locality database, specimen database, all updated from previous year)	6
14B	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.			2 (International Conference on Neotropical Butterflies, International Conference on Biology of Butterflies)	2
15A	Number of national press releases in host country(ies)		3		3
15D	Number of local press releases in UK	2	1		3
16A	Number of newsletters to be produced		1 (news page on project website)	1 (news page on project website)	2
16B	Estimated circulation of newsletter in host countries		150 (readership of website)	150 (readership of website)	300
16C	Estimated circulation of newsletter in UK		30 (readership of website)	30 (readership of website)	60
17A	Number of dissemination networks established		6 (1 website mailing list; 5 contact lists of students and researchers attending courses in each of 5 Andean countries)		6
17B	Number of dissemination networks to be enhanced/ extended			5 (1 website mailing list; contact lists of students and researchers attending courses in each of 4 Andean countries)	5
20	Estimated value of physical assets handed over to host countries		£4,655 (laptop computers and printers [£2163]; digital cameras [£1605]; field equipment [£887])	c. £800 (field equipment, books)	£5455

23	Value of resources raised from other sources for project work	£18,231 (FLMNH contribution for workshop [£5882]; contributed travel expenses [£2500]; overheads [£3666]; salary time project members [£6183])	£55,424 AndinoNET [£1110], WWF Bolivia [£890], Conservation International [£13,890]; overheads [£14,663]; salary time [£24,731]; BioQuip discount [£140]; + numerous unquantified contributions [see Project Partnerships])	£40,194 Overheads [£14,963]; salary time [£24,731]; course transport (Universidad de los Andes) [£500] + numerous unquantified contributions [see Project Partnerships])	£113,849

Table 2. Publications. Additional publications are listed in Annex 3. Publications listed here are only those that were produced over the last year either specifically as a result of this project, or that acknowledge Darwin support. Additional publications are listed in Annex 3.

Type * (eg journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
Book (field guide)	Santa María – Mariposas Alas y Color – Guía de Campo. Andrade, M. G., Campos-Salazar, L. R., González-Montaña, L. A., Pulido, H. W. 2007.	Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá		unknown
Journal article	Dasmahapatra, K. K., Silva, A., Chung, J.-W., & Mallet, J. (2007). Genetic analysis of a wild-caught hybrid between non-sister *Heliconius* butterfly species.	Biology Letters 3: 660-663.	http://www.ucl.ac.uk/taxome/jim/jimpubs.html	

3.5 Progress towards the project purpose and outcomes

The project has continued to make excellent progress in training of students and researchers, and evidence of the success of such training is now being seen as students advance to graduate degrees. Our indicator of enhanced Andean country capacity for butterfly research, namely that institutions and individuals secure their own funding for research and publish the results, is likely to be applicable only over the next couple of years. The ICN published a field guide to Colombian butterflies during the last year assisted in part by this project, and similar activities are in progress in Bolivia which will undoubtedly benefit from the project's activities.

The project website is now the most extensive information resource for tropical Andean butterflies, or indeed butterflies of any large tropical region, with its databases, images and bibliographic information. Compilation of information on butterfly diversity, distribution and abundance is progressing well in UK and USA, and variably in Andean countries. Although we will exceed our estimated total of 150,000 specimens databased, significant contributions from Andean country institutions have so far been received only from Ecuador, with individuals from Bolivia and Colombia, and KW also making significant contributions. Nevertheless, we will have sufficient data to achieve the third main project outcome, namely the identification of current and future priorities for research and conservation. We have made significant progress towards

this last goal during 07-08, with development of methods for modelling species ranges, work towards assessing IUCN Red List conservation status for select Andean species, and organisation of the final project workshop in September 2008.

3.6 Progress towards impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

As explained elsewhere, we are contributing to the IUCN's assessments of conservation status of 629 neotropical butterflies, using distribution data from our database. These assessments will not only result in threatened species being targeted for research and conservation action, but also, we hope, in identifying general priorities and regions for biodiversity conservation.

4. Monitoring, evaluation and lessons

Our project has three main aspects: training, data gathering and data analysis. It is mainly the first two that have been applicable over the last year.

Tangible outputs

Progress on compiling information on distribution of tropical Andean butterflies has been evaluated via the number of records in the project database, the number of species represented and number of distinct localities represented. The number of butterfly images and species with images permits assessment of progress towards a complete taxonomic digital archive for the region, discriminating between type and non type specimens. Ultimately, whether the database contributes towards an increased knowledge of Andean butterflies may only be judged in the long-term from the number of publications that use its information.

Written reports

All national coordinators have been requested to provide an annual written report to us on their activities and progress in the project. In addition, Conservation International requires a 6-monthly report to assess progress in databasing. To date, we have only received reports from Colombia, Ecuador and Venezuela, addressing only to some extent the questions posed in the guidelines that we sent out. Although we received a report for Bolivia doe 2006-2007, we have not yet received that for 2007-2008. This issue was discussed in the previous annual report. Coordinators have suggested the inclusion of additional collections in future data gathering activities, inclusion of additional groups (the majority of Nymphalidae have so far not been databased in Colombia), and the creation of distribution maps for species (an ultimate goal of the project).

Evidence that outputs contribute to project purpose

Evidence that outputs are contributing to the project purpose is discussed under 3.4.

5. Actions taken in response to previous reviews (if applicable)

The review requested we report on the small project grants funded by the project during 2007, and a list is provided in Annex 3. These grants were funded from our Darwin Initiative grant, as originally outlined in the project's full proposal.

The review also requested information about the students employed for databasing activities in Andean countries. These students are using the project database to capture specimen locality information in partner institutions and other key collections in the five Andean countries. The work has been supported by a contribution of $25,000 from Conservation International ($5,000 per country).

The review suggested some slight modification of the logical framework in recognition that some project outputs are unlikely to be achieved within the timeframe of the project, but will be realized only after the project's conclusions. We will be discussing these proposed changes shortly with DEFRA.

The review found that the project's most important challenge will be to ensure all partners remain fully committed to the project. The principal project members alternated the countries in which they organised courses this year, so that by the end of the project each main project member (Mallet, Willmott, Huertas and Lamas) will have visited 4-5 of the Andean countries. Such personal visits are extremely important in maintaining partnerships. For example, KW visited the ICN during organisation of the Colombia course and assisted in curation of the collection there, which strengthened considerably the relationship between the project and this institution.

The review suggested the need to communicate results beyond the immediate research community. We will therefore be seeking suggestions from our principal NGO partner, Conservation International, in relevant stakeholders to be invited to the final project workshop in September 2008, to more broadly promote the findings of the project.

6. Other comments on progress not covered elsewhere

We have slightly refined the project's methods over the last year in relation to data analysis. Because of the project's involvement with the IUCN Red List assessments, we will be using these species are "indicators" for the identification of priority areas for research and conservation. It makes sense to include species that will have an official IUCN conservation status, since recognition of priority areas can be supported by the threatened species that they are known to contain, while the additional work required in assessing these species precludes inclusion of all species in the final analysis. Nevertheless, we also intend to include at least some other groups where the taxonomy is sufficiently resolved and data are suitable (e.g. Ithomiinae, *Adelpha*, Papilionidae).

We feel the project is currently on track to achieve its training and data-gathering objectives. The greatest risk we believe is that the principal project output, namely the publication identifying future research and conservation priorities in the Andean region, is ignored by many researchers. If this occurs then our goal of unifying research efforts on tropical Andean butterflies will not have been reached. To attempt to reduce this risk we aim to invite all principal researchers on Andean butterflies to the workshop, in addition to CI and other conservation organizations, so that the final publication represents the views of the majority of stakeholders.

7. Sustainability

The project continues to have a high profile within host countries, as evidenced by the encouraging number of applications that we received for the second set of student courses. The project is likely to be self-sustaining only if at least some of the trained students go on to become researchers in their own countries, and thus train others. Although it is too early to be certain that this will be the case, results so far are encouraging, with the enrollment of two Ecuadorian students for graduate degrees at University of Florida. All of our partner institutions and several additional public and private collections in each country are now involved in databasing specimens and/or mentoring students, and the project's mailing list is in frequent use, evidence of increased interest in butterfly research. A number of Andean country coordinators and students have expressed interest in additional courses in the future. The fact that the project's four leaders are all professional butterfly researchers means that project activities will certainly continue beyond the conclusion of the project itself. Our exit strategy remains the same as detailed in the previous annual report, and our principal concern about the long-term sustainability of the project's impacts is discussed in 5.

8. Dissemination

A poster detailing progress and achievements of the project to date was presented at the second International Conference on Neotropical Butterflies ELEN in the city of Panama in May, 2007, and at the 5th International Conference on the Biology of Butterflies in Rome, Italy, in July 2007. The poster generated considerable interest and a number of new student links and other collaborations were established. The poster is now permanently displayed in the Natural History Museum, Department of Entomology, to provide visitors to the world's largest butterfly collection with information on the project.

The project website remains our primary means of disseminating information and resources resulting from the project to the worldwide audience. The website contains links to publications by project members, country profile pages that provide information about current projects in each Andean country, and links to download manuals and other project publications.

The online database is of course the main point of access to the specimen locality data being digitised by the project, as well as digital images of type and other specimens. During its first ten months online, a total of 136 people have registered to use the project database, representing 24 countries (8 South American countries [75 users, of which 67 are from the five host countries], 12 European countries [36 users], USA [19 users], Russia [2 users], Canada [2 users]). These users consist of 77 university students, 62 non-students, and 2 school students.

The TABDP network in our website has been a key space to exchange ideas and questions between Andean butterfly enthusiast and experts, ad nd new members have continued to join throughout the year. We have advertised job opportunities, scholarships, butterfly related events and project activities.

A substantial amount of information on tropical Andean butterfly research and the results of the project to date were disseminated during the 2007 student courses and on CD-ROM to participating students, as described elsewhere in this report.

All of the UK and USA project members, and most of the South American coordinators, have been committed to research on tropical Andean butterflies for their entire professional careers. There is thus no doubt that we will continue to gather and disseminate information on tropical Andean butterfly diversity beyond the lifespan of the project. Indeed, our main hope is that this project will provide a foundation for project members and students to apply for funding to greatly expand future research on Andean butterflies. The FLMNH has agreed to host the project's website and provide server space for data and images for the forseeable future, thus providing us with a permanent platform for dissemination of information.

9. Project Expenditure

Table 3. Project expenditure <u>during the reporting period</u> (Defra Financial Year 01 April to 31 March)

Item	Budget (please indicate which document you refer to if other than your project application)	Expenditure	Balance
Rent, rates, heating, overheads etc			
Office costs (eg postage, telephone, stationery)			
Travel and subsistence			
Printing			
Conferences, seminars, etc			

Capital items/equipment				
Others				
Salaries (specify)				
TOTAL				

Project underspend and the carryover of remaining funds to the following year has already been discussed and approved with DEFRA.

10. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum). This section may be used for publicity purposes

I agree for ECTF and the Darwin Secretariat to publish the content of this section

In 2007-2008 the Tropical Andean Butterfly Diversity Project has made excellent progress to achieving its goals of expanding the Andean butterfly research community, providing resources for butterfly research, and analysing data to identify research and conservation priorities. Four training courses were conducted, in Colombia, Ecuador, Peru and Bolivia, with both new and returning students. The project supported19 student research projects on Andean butterflies with small grants, following a competition that attracted nearly 40 applications. Two students from the project's training courses in 2006-2007 have since been admitted to study for a Masters degree on Andean butterflies at the University of Florida with one of the project leaders. The project's database is now available online, accessed via four innovative search pages, and has been accessed to date by students and researchers from 24 South American, North American and European countries. More than 150,000 specimen records are now available to the project for analysis. Finally, the project is a major collaborator in developing the first IUCN Red List for world butterflies, based on a sample of 1,500 species. Data on species conservation status and threats will be incorporated into developing a publication identifying butterfly research and conservation priorities in the tropical Andes.

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2007/08

Project summary	Measurable Indicators	Progress and Achievements April 2007 - March 2008	Actions required/planned for next period
Goal: *To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve* *The conservation of biological diversity,* *The sustainable use of its components, and* *The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources*		*(report on any contribution towards positive impact on biodiversity or positive changes in the conditions of human communities associated with biodiversity eg steps towards sustainable use or equitable sharing of costs or benefits)*	*(do not fill not applicable)*
Purpose **To establish a regional research programme and conservation priorities for tropical Andean butterflies, through improved knowledge of their diversity, distribution and abundance**.	Enhanced institutional capacity for butterfly research and conservation Synthesised knowledge of butterfly diversity, distribution and abundance Current and future priorities for research and conservation identified.	Four training courses were successfully completed. Databasing has continued in UK, USA and Andean countries, and the project now has more than 150,000 specimen records for analysis. Organisation of the final project workshop for September 2008 is underway. Methods for modelling species ranges and assessments of IUCN conservation status for a sampled list of more than 600 neotropical species are in development.	Completion of databasing for key groups in all collections. Red List assessments for tropical Andean species. Organisation and running of final project workshop, Cuzco, September 2008. Discussion and/or development of follow-up project. Data analysis with project partners to identify priorities for research and conservation. Preparation and publication of "Regional Strategy for Butterfly Research and Conservation in the Tropical Andes". Preparation of 1-2 papers on Andean butterfly diversity and conservation.
Outputs			
Output 1. Enhanced institution staff capacity for butterfly research.	10 staff from 5 partner institutions trained in identification, curation, databasing and grant proposal writing.	In 2007, UK and USA project members spent time with South American project members during field courses and visits to institutions to curate collections in Colombia, Ecuador, Peru and Bolivia. No visits have been made to Venezuela in 2007 since the Venezuela student training course was cancelled (as explained	

		elsewhere), and visits are instead planned in 2008-09. Wherever possible and appropriate, curation has been conducted alongside curators and volunteers to teach identification skills.
Activity 1.1 Work with Andean country project members in Andean countries		Keith Willmott and Gerardo Lamas spent c. 5 days in 4 countries working at major collections to identify and curate collections, during the process helping project partners to learn new techniques for identification of difficult groups. A visit to Venezuela is planned for 2008-2009.
Activity 1.2 Student courses		One-week student courses were conducted in 4 Andean countries, at which project coordinators were present. In addition to learning skills for running such courses, participants also benefited from assisting with practicals, field work and networking with researchers and other butterfly students from their own country.
Activity 1.3 Data analysis workshop		Planned for mid-2008, the workshop will involve project coordinators and other taxonomic experts to analyse data gathered in the project towards producing the regional strategy. All attendants will be taught methods for assessing species conservation status using IUCN criteria, methods analysing and modelling species ranges using bioclimatic data and methods for identifying priority areas based on species complementarity. We hope that these skills will be invaluable to our project partners in conducting similar, more focused studies in each Andean country.
Output 2. Students trained in butterfly systematics, field survey methods and data analysis.	Field survey manual; 1 student-training workshop of 1 week per country per year (25 students per course, total 250 students). 40 students receive further training and support for dissertation research.	Significant progress has been made with completion of another four 1-week training courses, attended by both new and returning students from 2006. 19 student research projects have been supported by the project, and although we have training fewer students than initially envisaged, the level of training has been much higher. Two Ecuadorian students have subsequently been admitted to Masters degree programme at the University of Florida with one of the project leaders.
Activity 2.1. Training courses		Four 1-week training courses were conducted, in Peru, Colombia, Ecuador and Bolivia, with a total of 76 participants attending. These included 54 undergraduate students, 7 MSc students, and 15 other professional and amateur lepidopterists.
Activity 2.2. Production of training materials		New Powerpoint presentations were produced for the student courses and distributed to students on CDs at the end of the courses together with the previous

		year's lectures. In addition, these CDs contained a table of grant opportunities, a list of contacts of other course participants, protocols for field work, two computer programmes for data analysis (available free from the Internet), and c. 600 scientific articles (PDF) on butterfly systematics and biology, and related topics.
Activity 2.3 Website and Lepidoptera specialist network		Our website (since May 2006) is available in English and Spanish, with background information on the project, research projects underway in each country, student courses and links to publications. It offers a mailing list with many messages exchanged concerning requests for information, help with identification, job and grant opportunities, and the website's periodic photo identification competition.
Activity 2.5 Student research projects		A total of 19 student research projects were supported with small grants from the project in 2007-2008.Students received feedback on their project proposals, development of survey methods, data analysis and identification of specimens, both via e-mail and during the training courses. A number of students gave presentations on their findings at the courses. Three students have already completed their projects. We will be announcing a similar grant competition shortly.
Activity 2.4 Butterfly data supplied to students		A total of 77 university students registered to access data at the project's online butterfly taxonomy and distribution database.
Output 3. Curated national collections..	National collections (minimum of 5, 1 per country) curated and identified.	We expect to surpass our initial goal of 5 major, well-curated national collections, though only after the completion of the project, given that none of the project coordinators is a dedicated butterfly curator and thus all have time constraints. While visits to such collections have been important for demonstrating identification methods, we have assisted numerous requests for identifications by email, and our project to scan and make available online images of neotropical type specimens in the next year should provide a very significant resource for collections curation.
Activity 3.1. Curation of lead institution collections		Curation was conducted by project members at the ICN (Colombia) and MECN (Ecuador). Gerardo Lamas continues to maintain the MUSM (Peru) as the best curated collections of Andean butterflies.
Activity 3.2. Curation of other important collections		KW visited Jean Le Crom in Colombia to help with identification of Ithomiinae.
Output 4. Darwin Andean Butterfly Database.	Taxonomic and photographic database established; NHM, MCLB and partner	The project currently has >150,000 specimen records available for analysis in various databases; no reports or information have been received to date from two

	collections databased (3500 species, 150,000 specimens).	Andean countries to assess progress there. Databasing has concentrated on Papilionidae, Pieridae, and four subfamilies of Nymphalidae (Nymphalinae: Melitaeini, Ithomiinae, Limenitidinae, Biblidinae). In addition, databasing was completed at the FLMNH of specimens of species to be assessed for conservation status using IUCN criteria. Our major project for 2008-2009 will be to conclude databasing the IUCN assessment list species in other major collections and to begin to digitise Lamas' collection of neotropical butterfly type photographs.
Activity 4.1. Locality database		The locality database now contains c. 9160 records, with c. 4500 georeferenced to date. Georeferencing the remainder will be an important task in 2008-2009.
Activity 4.2. Databasing of specimens at NHM (London)		Papilionidae, Pieridae, Nymphalidae (Melitaeini) and priority IUCN list species have so far been databased (c. 27,352 specimens).
Activity 4.3. Databasing of specimens at FLMNH (Gainesville)		21,168 records were added (multiple groups, but especially Pieridae, Ithomiinae, Heliconiinae, Biblidinae)
Activity 4.4. Databasing of Andean country collections		The following numbers of specimens have so far been databased in 2007-2008: Venezuela: 4591; Colombia: 2576; Ecuador: no additional specimens; Peru: MUSM: no report received to date; Bolivia: MHNNKM: no report received to date
Activity 4.5.Other records		C. 28,000 additional records from personal research databases of KW; 5187 records from Yuvinka Gareca (Bolivia)
Activity 4.6. Online database		The online database (www.mariposasandinas.org/database.html) is now active, featuring: “species summary search”, a summary of distribution data and type photographs of all subspecies for any given species; “taxonomic list search”, capable of reproducing any part of the entire neotropical butterfly checklist complete with higher taxa, synonyms, authors, original genus of description and type locality; “specimen and image search”, which will return data or images from the database according to geographic and taxonomic criteria; and a “species name search”, allowing searches for any species or subspecies name and providing taxonomic and type specimen information and images. During its first ten months online, a total of 136 people have registered to use the project database, representing 24 countries (8 South American countries [75 users, of which 67 are from the five host countries], 12 European countries [36 users], USA [19 users], Russia [2 users], Canada [2 users]). These users consist of 77 university students, 62 non-students, and 2 school students. We will continue to update the database with specimen records and type images over the next year.

5. Taxonomic revisions.	10 taxonomic papers submitted to peer-reviewed journals.	Project members have produced a variety of taxonomic publications this year, though none that have relied heavily on data from this project, largely because significant amounts of data are not yet available from the majority of host country collections. However, we believe that this situation will change over the next year as host countries contribute their databases to the project website.
Activity 5.1. Work on taxonomic revisions and other scientific articles promoting research on tropical Andean butterflies		Project members continued working on a variety of taxonomic revisions, especially in the Ithomiinae and Satyrinae, the most poorly studied of our focal groups (see Annex 3).
6. Regional research and conservation strategy, with 50 Key Butterfly Areas identified.	Workshop (Yr 3) in Gainesville; data analysis complete; publication detailing regional research and conservation strategies.	We have further defined the butterfly groups that will form the focus of the project's data analysis. BH and KW completed a 1-day training course in assessing IUCN threat status for Andean butterflies, and the project is a collaborator in the first global IUCN assessment of butterfly species threat status. We are in the process of developing protocols for modelling species distributions, based on museum distribution and bioclimatic data, using the programme BIOCLIM. Part of the reason for using this programme is that it is freely available online. All project members will receive training in these methods during the workshop in September 2008.
Activity 6.1. Training in assessing IUCN threat categories		BH and KW took a 1-day course in assessing IUCN categories in July 2007. Skills will be passed on to country coordinators during the workshop in 2008.
Activity 6.2. Workshop in yr 3		Organization of the workshop is underway, with the venue and dates already established. It will involve all project members in data analysis and finalisation of the scope of the research and conservation strategy.
Activity 6.3. Data analysis		Work has begun in assessing species conservation status using IUCN threat criteria. Species distributions are being modelled using BIOCLIM software and specimen records from the project database. These distributions will be used in identifying 50 Key Butterfly Areas - those containing high numbers of endemic or threatened species, those in need of further research, and those which represent the maximum amount of tropical Andean butterfly diversity within the smallest number of sites (high complementarity). We expect to receive substantial input from Conservation International and other conservation groups during the project workshop to ensure that are results are useful and that our recommendations are supported and applied by such bodies.

Annex 2 Project's full current logframe

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Goal: *To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve* *the conservation of biological diversity,* *the sustainable use of its components, and* *the fair and equitable sharing of benefits arising out of the utilisation of genetic resources*			
Purpose.			
To establish a regional research programme and conservation priorities for tropical Andean butterflies, through improved knowledge of their diversity, distribution and abundance.	Enhanced institutional capacity for butterfly research and conservation. Synthesised knowledge of butterfly diversity, distribution and abundance. Current and future priorities for research and conservation identified.	Institutions capable of securing funding and conducting research into butterfly diversity and conservation. Distribution and taxonomic data from collections and literature compiled into a single database. Published "Regional Strategy for Butterfly Research and Conservation in the Tropical Andes".	Partner institutions and taxonomists remain committed to research and conservation work on tropical Andean butterflies.
Outputs.			
Enhanced institution staff capacity for butterfly research. Students trained in butterfly systematics, field survey methods and data analysis.	10 staff from 5 partner institutions trained in identification, curation, databasing and grant proposal writing. Field survey manual; 2 student training workshops of 1 week per country (30 students per course, total 300 students). 40 students receive further training and support for dissertation research.	Annual report by national co-ordinators. Annual student supervisor reports and national co-ordinator reports.	Andean institutions continue to employ staff who pass on knowledge. At least some students use knowledge gained to take higher degrees and become next generation of butterfly researchers.

Curated national collections.	National collections (minimum of 5, 1 per country) curated and identified.	Six-monthly reports by national coordinators; data in database.	Institutions maintain collections.
Darwin Andean Butterfly Database.	Taxonomic and photographic database established; NHM, MCLB and partner collections databased (3500 species, 150,000 specimens).	Six-monthly reports by national coordinators; database online and CD, also sent to DI.	Data quality sufficient for achieving conservation and research goals; database maintained in future.
Taxonomic revisions.	10 taxonomic papers submitted to peer-reviewed journals.	Pre-prints/reprints at project website.	-
Regional research and conservation strategy, with 50 Key Butterfly Areas identified.	Workshop (Yr 3) in Gainesville; data analysis complete; publication detailing regional research and conservation strategies.	Published strategy in hard copy and CD, sent to DI, and available on project website.	Strategy is followed by major research institutions and conservation organisations within the region.

Activities.	**Activity Milestones (Summary of Project Implementation Timetable)**
Institution staff training and student workshops.	Project planning workshop to establish methods, goals and develop training programme (Yr 1, Apr 06). 1st student training courses completed (Yr 1, Aug 06). 2nd student training courses completed (Yr 2, Aug 07). Staff training in identification, curation and databasing complete (Yr 2, Aug 07).
Databasing, development of digital products.	Database structure complete. WORLDMAP software developed. Website established. Digital photograph collection established (30% complete) (Yr 1, Mar 06). Online database with Ithomiinae, Limenitidinae (Yr 1, Dec 2006). Photography complete (Yr 2, Jul 07). Database complete (Yr 3, Feb 08) and online (Dec 08).
Curation of collections.	MCLB complete (Yr 1, Jun 06). Preliminary curation of Andes collections complete (Yr 1, Jul 06). NHM complete for focal groups (Yr 2, Jul 07). Andes countries curation complete (Yr 2, Jul 07).
Taxonomic revisions.	5 papers submitted to peer-reviewed journals (Yr 2, Jul 07). 5 papers submitted (Yr 3, Nov 08).
Data analysis and development of long-term research and conservation strategy.	Analysis of results (Yr 3, Apr 08). Strategy planning workshop with project members, taxonomists and conservation organisations (Yr 3, May 08). 50 Key Butterfly Areas identified (Yr 3, May 08). 2 papers submitted on Andean butterfly diversity and conservation. "Regional Strategy for Butterfly Research and Conservation in the Tropical Andes" published (Yr 3, Dec 08).

Annex 3 onwards – supplementary material (optional)

Other publications by project members that contribute significantly to knowledge of Andean butterfly diversity and classification, the main goal of this project, but that have not resulted from data collected by the project and/or been produced solely in the last reporting year.

Type * (eg journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £ (if applicable)
Journal article	Elias, M., Hill, R., **Willmott, K. R.,** Dasmahapatra, K., Brower, A., **Mallet, J.**, Jiggins, C. Limited performance of DNA barcoding in a diverse community of tropical butterflies. (2007).	Proceedings of the Royal Society of London B, 274: 2881-2889	http://www.ucl.ac.uk/taxome/jim/jimpubs.html	
Journal article	Brehm, G., Hartmann, T., and **K. R. Willmott**. Pyrrolizidine alkaloids and pharmacophagous Lepidoptera visitors of *Prestonia amabilis* (Apocynaceae) in a montane rain forest in Ecuador. (2007).	Annals of the Missouri Botanical Garden, 94(2): 463-473		
Journal article	**Willmott, K. R.**, and **G. Lamas**. A revision of *Pachacutia*, a new genus of rare Andean ithomiine butterflies (Nymphalidae: Ithomiinae), with the description of two new species. (2007).	Annals of the Entomological Society of America, 100: 449-469		
Book	Amat-García, G., **Andrade, M. G.,** Amat-García, G. (eds.). *Libro Rojo de los Invertebrados Terrestres de Colombia.* (2007)	Conservación Internacional Colombia, Instituto de Ciencias Naturales, Bogotá		unknown
Journal article	Hall, J. P. W., and **K. R. Willmott**. Four new species of Symmachiini from Ecuador (Lepidoptera: Riodinidae). (2007)	Tropical Lepidoptera, 16(1-2): 1-5		
Journal article	**Huertas, B** & Arias, J.J. A new butterfly species from the Colombian Andes and a review of the taxonomy of the genera *Idioneurula* Strand, 1932 and Tamania Pyrcz, 1995 (Lepidoptera: Nymphalidae: Satyrinae). (2007)	Zootaxa. 1652: 27-40	Free online access: http://www.mapress.com/zootaxa/2007f/z01652p040f.pdf	
Journal article	**Lamas, G.** Five new Peruvian subspecies of *Morpho* (Lepidoptera: Nymphalidae, Morphinae). [with P. Blandin] (2007)	Revista peruana de Entomología 45: 65-70.		
Journal article	**Lamas, G.** Invalidation of six neotypes among Neotropical butterflies (Lepidoptera: Hesperiidae, Pieridae, Lycaenidae and Nymphalidae). (2007)	Revista peruana de Entomología 45: 115-119.		
Journal article	**Lamas, G.** The identities of *Neonympha nerita* Capronnier, 1881 and *Neonympha thobiei* Capronnier, 1881 (Lepidoptera: Nymphalidae,	Revista peruana de		

	Satyrinae). (2007)	Entomología 45: 121-123.		
Journal article	**Lamas, G.** Pre- and postzygotic isolation and Haldane rule effects in reciprocal crosses of *Danaus erippus* and *Danaus plexippus* (Lepidoptera: Danainae), supported by differentiation of cuticular hydrocarbons, establish their status as separate species. [with M. M. Hay-Roe & J. L. Nation] (2007)	Biological Journal of the Linnean Society 91(3): 445-453.		
Journal article	**Lamas, G.** Four new symmachiine taxa from the eastern Andes of Peru and Ecuador (Lepidoptera: Riodinidae). [with J. P. W. Hall] (2007)	Zootaxa 1533: 41-52.		
Journal article	**Lamas, G.** Inventario biológico rápido de mariposas diurnas (Lepidoptera: Rhopalocera) en Huamanpata, Amazonas, Perú. [with L. Campos] (2007)	Folia amazónica (Iquitos) 15(1/2): 101-115.		
Journal article	**Lamas, G.** A synonymic list of the genus *Colias* Fabricius, 1807 (Lepidoptera: Pieridae). [with J. Grieshuber] (2007)	Mitteilungen der münchner entomologischen Gesellschaft 97: 131-171.		
Journal article	**Lamas, G.** Adiciones, rectificaciones y actualizaciones a "Mariposas de Venezuela" por Théophile Raymond. IV. Pieridae y Hesperiidae (Lepidoptera). [with J. M. González & A. M. Orellana] (2008)	Entomotropica 20(3): 265-269.		
Journal article	**Lamas, G.** Nomenclature, variation, and the biological species concept in *Lamasina* (Lycaenidae: Theclinae: Eumaeini). [with R. K. Robbins] (2008)	Revista brasileira de Zoologia 25(1): 116-127.		
Journal article	Beltrán, M., Jiggins, C.D., Brower, A.V.Z., Bermingham, E., **Mallet, J.** (2007). Do pollen feeding and pupal-mating have a single origin in *Heliconius*? Inferences from multilocus sequence data. (2007)	Biological Journal of the Linnean Society 92: 221-239.	http://www.ucl.ac.uk/taxome/jim/jimpubs.html	

Small project grants awarded by the project during 2007

Country	Project title	Project leader	Other TABDP students involved?	Progress
Peru	Mariposas Asociadas Al Bosque De Podocarpus Glomeratus, En El Santuario Nacional Del Ampay	Jorge Luis Curo Miranda	No	Ongoing. 30 species recorded. Delays in field work due to rainy season.
Peru	Comparación de la Biodiversidad de Mariposas Diurnas de dos bosques de Neblina de Ayabaca.	Walter Humberto Zelada Feria	Yes	Not reports received yet
Peru	Análisis Preliminar del Estado de Conservación de las especies de mariposas diurnas (Lepidoptera: Papilionoidea) en el Río Urubamba, Cusco 2007	José Alfredo Cerdeña Gutiérrez	Yes	Ongoing. 2000 individulas registered and databased, Community work conducted.
Peru	Estudio Comparativo de la diversidad de especies de Heliconius spp. y determinación del ciclo de desarrollo bajo condiciones de confinamientos en la cuenca del Río Shilcayo – Tarapoto.	Raúl Gonzáles Alegría	Yes	Not reports received yet
Ecuador	Análisis conjunto de variables bióticas y abióticas y comunidades de mariposas carroñeras (Lepidotpera: Nymphalidae) del Chocó ecuatoriano	María Fernanda Checa Villafuerte	No	Not reports received yet.
Ecuador	Diversidad de mariposas (Papilionoidae) en un gradiente altitudinal en el sur del Ecuador	Pablo Sebastián Padrón Martínez	No	Finished. 273 individuals collected and 108 species recorded. New data for the regon, species data to be included in TABDP database.
Colombia	Estudio sobre la diversidad de licénidos Andinos en las cordilleras occidental y central de Colombia.	Carlos Humberto Prieto Martinez,	No	Not reports received yet.
Colombia	Diversidad de mariposas diurnas en selvas subandinas de la Serranía de los Yariguíes (Lepidoptera: Hesperioidea & Papilionoidea)	Jeisson Cristóbal Ríos Málaver	Yes	Ongoing. 118 species recorded, several endemic species recorded.
Colombia	Diversidad De Mariposas (Lepidoptera: Papilionoidea) De Algunas Localidades Del Departamento Del Caquetá	Claudia Patricia Sañudo Restrepo	Yes	Ongoing. 1359 individuals registered. Community work conducted. 716 species recorded. 3 students train in fieldwork methods.
Colombia	Reconocimiento e identificación de Ithomiinae en el suroeste de Antioquia	Juan David Suaza Vasco	Yes	Ongoing. Not updated. Last report due in October reported 40 species registered in 7 study localities. .

Colombia	Evaluación de los Papilionoidea de Aguazul (Limite sur del piedemonte andino de la Orinoquia)	Guillermo Ramírez Angulo	Yes	Ongoing. Not updated. Last report due in October reported 522 individuals collected, representing 174 species.
Colombia	Diversidad, Composición y Estructura de las comunidades de Mariposas (Lepidoptera: Papilionoidea) en cafetales con y sin certificaciones ambientales	Elena Ortiz Acevedo	Yes	Ongoing. First study comparing these kinds of habitats. 107 species recorded and 676 individuals databased.
Colombia	Variación altitudinal en una comunidad de mariposas (Lepidoptera: papilionoidea) en sucesión vegetal aledaña a la quebrada la tigra, norte de santander	Diego Armando Carrero Sarmiento	No	Ongoing. Not updated. Last report, due in October, reported 768 individuals collected, representing 106 species.
Colombia	Mariposas diurnas (Lepidoptera: Papilionoidea-Hesperoidea) del Cañón del río Chicamocha Santander. Distribución altitudinal y Diversidad de especies.	Zulma Yajaira Cacua Perez	No	Ongoing. No second report received.
Colombia	Diversidad de Mariposas (Lepidoptera: Rhopalocera) en los valles secos del cañón del Chicamocha, Santander, Colombia.	Marcela Beltrán	No	Finished. 2900 records captured on Andean species of Nymphalidae. Data added to the TABDP database,
Colombia	Toma de datos de especimenes andinos, presentes en BMNH para el Proyecto TABD	Rosemary Diaz	No	Finished. 3052 records provided for the TABDP database in Pieridae and Nymphalidae.
Bolivia	Biogeografía de la Tribu Pronophilini (Satyrinae) en los Yungas, del Parque Nacional Carrasco (Cochabamba- Bolivia)	Marcelo Martín Aliaga Arrieta	Yes	Ongoing. No second report received.
Bolivia	Toma de datos de especimenes bolivianos, presentes en museos internacionales para el Proyecto TABD	Yuvinka Gareca Valdez	No	Finished. 5,187 records provided for the TABDP database.
Bolivia	Diversidad de mariposas en una transecta altitudinal en tres tipos hábitat del suroeste del PN ANMI Madidi	Martín Antonio Apaza Ticona	Yes	Ongoing. No second report received.

Programmes for student courses conducted in 2007 are included as part of PDF file.

Checklist for submission

	Check
Is the report less than 5MB? If so, please email to Darwin-Projects@ectf-ed.org.uk putting the project number in the Subject line.	
Is your report more than 5MB? If so, please advise Darwin-Projects@ectf-ed.org.uk that the report will be send by post on CD, putting the project number in the Subject line.	
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	
Have you completed the Project Expenditure table?	
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Tropical Andean Butterfly Diversity Project
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Proyecto Diversidad de las Mariposas Andinas Tropicales

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SEGUNDO CURSO INTERNACIONAL TEÓRICO-PRACTICO
Métodos Avanzados en el Estudio en de la diversidad de las Mariposas Tropicales (Lepidoptera: Papilionoidea).
Hotel La Jungla, Banda de Shilcayo, Tarapoto, Perú.
Noviembre 20 al 25 de 2007

CURSO INTERMEDIO

Conferencistas (en orden alfabético)

- JAE-WOO CHUNG (JC), PhD student, University College London, Inglaterra.
- DRA STEPHANIE GALLUSSER (SG), Investigadora, Instituto de Investigación Biológica de las Cordilleras Orientales- INIBICO.
- RAUL GONZALES ALEGRIA (RG), Coordinador Curso TABDP-PERU 2007. Director URKU Estudios Amazónicos, Perú.
- ZACHARY GOMPERT (ZG), Investigador, Fundación Nacional de la Ciencia – EEUU, University of Cambridge, Inglaterra.
- DR MATHIEU JORON. (MJ), Royal Society University Research Fellow, Institute of Evolutionary Biology, University of Edinburgh. School of Biological Sciences, Escocia. http://xyala.cap.ed.ac.uk/joron/ .
- Dr GERARDO LAMAS (GL), Director e Investigador Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Perú.
- Dr JIM MALLET (JM), Director Proyecto TABD. Profesor de Diversidad Biológica, University College London, Inglaterra. http://abacus.gene.ucl.ac.uk/jim/

Programación

DÍA 1: *Charlas introductorias al estudio de las mariposas y su biología*

0830-0900: Café, Inscripciones y entrega de materiales. (RG/JM)
0900-0930: *Presentación del Proyecto diversidad de las Mariposas Andinas Tropicales*: resumen y avances. Información Gral del Curso.(JM)
0930-1000: *Introducción a la diversidad de las mariposas tropicales*: Por que estudiar insectos, porque estudiar mariposas? Porque estudiar mariposas neotropicales? (JM)
1000-1030: Receso
1030-1100: *Estado de las colecciones* y la investigación de mariposas en Perú 1. Estado de la taxonomía actual de los Lepidoptera, perspectivas, descripción de nuevos taxa. (GL)
1100-1130: *Estado de* la investigación de mariposas en Perú 2. Actuales proyectos e investigaciones, Biogeografía y hábitats para el estudio de las mariposas, posibilidades (JM/ JC)
1130-1230: *Vistazo a la biología y diversidad de las mariposas.* Resumen. (GL)

1230-1330: Almuerzo
1330-1400: *Ecología de las mariposas, a*dultos. Evolución del mimetismo en mariposas, biogeografía. (MJ).
1400-1430: *Ecología de las mariposas,* Comportamiento y particularidades de los diferentes grupos de Lepidoptera diurnos de la región San Martín. (SG)
1430-1500: *Experiencia de un investigador local*: Preferencia de *Archaeoprepona demophon muson* (Fruhstorfer, 1905), (Nymphalidae: Charaxinae), por diferentes sustratos de alimentación en condiciones de cautiverio en la Microcuenca del Río Shilcayo - Tarapoto (RG).
1500-1530: Receso
1530-1600: *Principios de sistemática 1.* Propósito de la taxonomía y la clasificación. Dos áreas de la sistemática: nivel de especies y categorías superiores (GL).
1600-1630: *Principios de sistemática 2.* Concepto especie y origen de las especies. (JM)
1630-1730: Organización de grupos y entrega de materiales para las prácticas de campo.
1730-1800: Sesión de preguntas.

DÍA 2 Técnicas en campo y estados inmaduros

0830-1200: *Práctica de campo 1. Técnicas en inventarios cualitativos de mariposas.* Ecología de diferentes especies, patrones de actividad diurna, microhábitats, *Ubicación del sitio de colecta y métodos de colección*: acceso y transectos. Colecta con redes, trampas, manejo de especimenes, almacenamiento, observaciones de historia natural. Instalación de trampas a diferentes alturas, caminatas en transectos, conteo en puntos específicos, conteo y patrulleo, otros métodos para estimar el esfuerzo (registro de especies, tiempo etc.) (GL, RG, MJ)
1200-1300: Almuerzo
1300-1600: *Práctica de campo 2. Estados inmaduros*. Buscando plantas particulares, colecta de plantas, descripción *y* almacenamiento, colección de estados inmaduros. Estandarización de Metodologías. Muestreos en diferentes hábitats, marcas y re-capturas, liberación de especimenes (JM, SG, JC)
1600-1700: Receso y regreso a la estación.
1700-1730: *Especiación en mariposas* (JM)
1730-1800: Sesión de preguntas.

DIA 3: Evolución y especiación en Mariposas

0830-1200: *Biología y evolución de Heliconiinae*. Estados inmaduros, plantas hospederas, mimetismo, ecología química, evolución, practica de campo (MJ).
1200-1300: Almuerzo
1300-1600: *Biología y evolución de Ithomiinae*. Estados inmaduros, plantas hospederas, mimetismo, ecología química, evolución, practica de campo (GL).
1600-1700: Receso y regreso a la estación.
1700-1730: Zonas de hibridación. (JM/JC).
1730-1800: Sesión de preguntas.

DÍA 4 Proyectos de investigación

0800-1000: *Presentaciones de los participantes de los cursos 2006*. Estado actual de las investigaciones en curso, lecciones y progresos. Estudiantes antiguos. Presentaciones de 15 minutos cada una incluyendo preguntas.
1000-1030: Receso
1030-1230: *Presentaciones de los participantes de los cursos 2006*. Propuestas para financiación o proyectos de grado. Estudiantes nuevos. Presentaciones de 15 minutos cada una incluyendo preguntas.
1230-1330: Almuerzo
1330-1500: *Práctica*: Variac*ión y caracteres morfológicos*. Tipos de variación entre especies (sexos, continuos, polimorfismo, estacional, geográfico). Selección de Caracteres para la identificación de especies de Ithomiinae y Heliconiinae. (GL/JM/MJ/JC)
1500-1530: Receso

1530-1730: Continuación de la práctica.
1730-1800: Sesión de preguntas.

DÍA 5 Práctica de campo

0800-1700: *Práctica final de campo.* El grupo se dividirá en cuatro subgrupos para realizar un miniproyecto liderado por dos tutores.
1200-1300: Almuerzo en el campo.
1700-1730: Receso y regreso a la estación.
1730-1800: Sesión de preguntas.

DÍA 6 Análisis de datos y conclusiones

0800-1200: Análisis de datos y procesamiento de la información.
1200-1300: Almuerzo
1300-1400: Presentaciones de cada grupo de trabajo (15 min cada una).
1400-1500: Entrega de certificados, toma de fotos, brindis de despedida y...

FIN DEL CURSO, Gracias por asistir!

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SEGUNDO CURSO INTERNACIONAL TEÓRICO-PRACTICO
Métodos en el Análisis y el Estudio de la Diversidad de las Mariposas Tropicales (Lepidoptera: Papilionoidea).

Parque Natural Regional El Vínculo, Corregimiento El Vínculo – Municipio de Guadalajara de Buga, Carretera Panamericana, Valle del Cauca, Colombia.
Diciembre 14-19 de 2007.

CONFERENCISTAS (en orden alfabético)

- GONZALO ANDRADE MSc (GA), Profesor Asociado Universidad Nacional de Colombia, Instituto de Ciencias Naturales.
- LUIS MIGUEL CONSTANTINO MSc (LMC), Investigador CENICAFE, Chinchiná, Caldas.
- EFRAIN HENAO BAÑOL MSc. Docente en Ciencias Biológicas. Universidad de Caldas.
- Ing. JEAN FRANCOIS LECROM (JFL), Investigador y editor Serie Mariposas de Colombia. Bogotá.
- Dr MAURICIO LINARES (ML), Jefe del departamento de Biología e Instituto de Genética, Universidad de los Andes, Bogotá.
- Dr CAMILO SALAZAR (CS) Docente en Ciencias, Universidad de los Andes, Bogotá.
- Dr KEITH WILLMOTT (KW), Curador de Lepidoptera, McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Gainesville, FL, USA.

* Mayor Información sobre el Parque: http://www.valledelcauca.gov.co/inciva/publicaciones.php?id=969

PROGRAMACIÓN
(Nota: Todas las prácticas contarán con la tutoría de los conferencistas del día)

DÍA 1 Viernes Diciembre 14

Introducción al estudio de las mariposas y su biología
0800-0830: Café, Inscripciones y entrega de materiales (GA, KW).
0830-0845: *Presentación del Proyecto Mariposas Tropicales Andinas*: objetivos, misión, equipo, avances, oportunidades (KW).
0845-0930: *Investigación de Lepidópteros en Colombia*. Biogeografía y hábitats de Colombia, estado del conocimiento de las mariposas en Colombia, investigaciones, posibilidades, recursos, colecciones (JL, GA).
0930-1000: *Biología y diversidad de las mariposas (adultos)* Características biológicas y morfológicas de las mariposas diurnas y sus relaciones con otros Lepidoptera. Superfamilias, familias y subfamilias de mariposas diurnas verdaderas (KW).
1000-1400: *Práctica de campo*: *Técnicas en inventarios de mariposas 1.* Colecta con redes, manejo de especimenes, marcando especímenes. Instalación de trampas a diferentes altura.

Observaciones de historia natural, ecología de diferentes especies, patrones de actividad diurna, microhábitats, estacionalidad, importancia de pensar en diferentes dimensiones. Introducción al mimetismo Mülleriano entre *Heliconius cydno cydnides* y *Heliconius eleuchia eleuchia*. Almuerzo en el campo.

1400-1430: *Principios de sistemática 1.* Propósito de la taxonomía y la clasificación. Dos áreas de la sistemática: nivel de especies y categorías superiores (KW).

1430-1500: *Principios de sistemática 2.* Concepto de taxon. Taxonomía de Linnaeus y clasificación jerárquica. Concepto de "tipo", especie y subespecie (LC).

1500-1530: *Técnicas en sistemática 1*: Recursos de identificación, claves taxonómicas, otros medios de identificación (KW).

1530-1600: Receso

1600-1630: *Técnicas en sistemática 2*: Aspectos prácticos del análisis filogenético, selección de caracteres y taxa, codificación de caracteres, análisis en computador (KW).

1630-1700: *Principios de la sistemática 3*. Infiriendo la historia evolutiva o filogenia. Principios del análisis cladístico. Homologías y analogías, homoplasia y criterio de optimización (KW)

1700-1730: *Museos y colecciones.* Importancia de las colecciones de los museos ICN como ejemplo. Curatoría de especimenes, fotografía digital y bases de datos (GA).

1730-1830: Práctica de laboratorio: Preparación e identificación de muestras.

DÍA 2 Sabado Diciembre 15

Evolución y especiación en las mariposas

0800-0830: Café, inscripciones y entrega de materiales para los estudiantes asistentes al curso anterior (GA/KW).

0830-0930: *Biología y morfología de los estados inmaduros: un vistazo*. El ciclo de vida, ejemplares de las larvas de grupos diferentes, ciclos de vida (LC).

0930-1030: *Ecología de las mariposas,* estados inmaduros, aspectos de herbivoría, defensa de plantas, coevolución, radiación adaptativa (LC).

1030-1400: *Práctica de campo*: *Técnicas en inventarios de mariposas 2.* Ubicación del sitio de colecta y métodos de colección: acceso y transectos. Caminatas en transectos, conteo en puntos específicos, conteo y patrulleo, otros métodos para estimar el esfuerzo (registro de especies, tiempo etc.). Estandarización de Metodologías. Estados inmaduros, búsqueda y crianza, colecta de plantas, descripción y almacenamiento. Almuerzo en el campo.

1400-1430: *Ecología de las mariposas,* adultos. Alimentación, escapando de ataques, cripsis, coloraciones aposemáticas, mimetismo, otras estrategias, nutrición, cortejo (KW).

1430-1500: *Biogeografía de mariposas 1.* Patrones en la distribución de mariposas neotropicales. Hipótesis biogeográficas explicando riqueza y endemismos en las tierras bajas: teoría de refugios. Clinas, barreras geográficas (KW).

1500-1530: *Biogeografía de mariposas 2.* Biogeografía de las montañas especiación a o largo de gradientes elevacionales, endemismo en faunas montanas, biogeografías de islas, relaciones especie-área (KW)

1530-1600: Receso.

1600-1630: *Macroecología 1. Diversidad de mariposas.* Biodiversidad y elementos de la biodiversidad. Taxonomía y escala, tipos de diversidad (alfa, beta y gama). Medidas de diversidad. (KW).

1630-1700: *Macroecología 2. Diversidad de la comunidad de mariposas.* Gradientes en la diversidad de la comunidad, factores responsables de patrones, estudios empíricos. (KW)

1700-1800: *Presentaciones de estudiantes*. Cuatro presentaciones de estudiantes del curso anterior y/o que recibieron una beca TABDP.

1800-: Práctica de laboratorio: *Preparación e identificación de muestras*.

DÍA 3 Domingo Diciembre 16

Diversidad de mariposas

0800-1430: Práctica del campo. *Polimorfismo en el mimetismo*. Caso de *Heliconius cydno weymeri* y sus co-miméticos, *Elzunia humboldt* y *Heliconius erato chestertonii* en el sitio de Saladito. Práctica de técnicas de campo de los dias anteriores. Almuerzo en el campo.

1430-1530: *Evolución y especiación en mariposas* (ML).

1530-1600: *Escribiendo propuestas y artículos científicos* (JC)

1600-1630: Receso

1630-1830: *Presentaciones de estudiantes*. Ocho presentaciones de estudiantes del curso anterior y/o que recibieron una beca TABDP.

DÍA 4 Lunes Diciembre 17

Métodos en el análisis de datos

0800-1500: Práctica del campo. *Zona de hibridación* entre *Heliconius cydno weymeri* y *Heliconius cydno cydnides*, Montañitas, E. Cordillera Occidental. Medida de las variables del bosque. Densidad del dosel, tallos, y vegetación. Otros factores topográficos de interés. Almuerzo en el campo.

1500-1700: *Práctica Técnicas básicas en el análisis de diversidad de mariposas*. Usando Excel, Access. Comparando diversidad usando rarefación (PAST) y curvas de acumulación.

1700-1730: *Presentación de los proyectos de campo*. Organización de grupos de trabajo. Máximo 5 estudiantes por grupo. Selección de los proyectos disponibles,

1730-1830*: Tutoría en grupo para el desarrollo del proyecto. Preparación en grupo del trabajo del siguiente día*. Lectura y logística; preguntas y consulta con los tutores; designación de un supervisor por grupo. Selección de artículos científicos y otra bibliografía general, organización de los métodos de campo y análisis de datos.

DÍA 5 Martes Diciembre 18

Mini-proyecto en el campo.

0700-1600: *Práctica de campo todo el día, Atuncela*. Desarrollo de los proyectos. Si hay lluvia, se realizara un proyecto basado en el laboratorio. P. ej., Análisis de datos, estudios cuantitativos, desarrollo de claves, análisis filogenéticos etc. Almuerzo en campo.

1600-*¿?* *Análisis preliminares de los datos de campo obtenidos* y organización de la información. Preparación preliminar de la presentación para el siguiente día (Grupos de trabajo).

DÍA 6 Miercoles Diciembre 19

Análisis de datos y presentaciones

0800-1000 *Análisis final de datos*, detalles finales de la presentación: antecedentes, objetivos, métodos, resultados, discusión. (Ejemplos disponibles).

1000-1200 *Presentaciones* y evaluación (15 minutos por grupo)

1200-1300 Almuerzo

1300-1500 *Presentaciones* y evaluación (15 minutos por grupo)

1500-¿?? *Entrega de certificados, toma de fotos,* brindis de despedida y ...

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SEGUNDO CURSO INTERNACIONAL TEÓRICO-PRACTICO
Métodos Avanzados en el Estudio en de la diversidad de las Mariposas Tropicales (Lepidoptera: Papilionoidea).
Parque Nacional y Área Natural de Cotapata, La Paz, BOLIVIA.
Estación Biológica Asociación comunitaria de Ecoturismo **Urpuma.**
Noviembre 30 al 5 de Diciembre de 2007

Conferencistas (en orden alfabético)

- Ing. JOSE LUIS ARAMAYO BEJARANO (JA), Coordinador Nacional Proyecto TABDP e Investigador Asociado, Museo de Historia Natural Noel Kempff Mercado Universidad Gabriel Rene Moreno, Santa Cruz de la Sierra, Bolivia.

- Dr. JORGE BIZARRO (JB) Responsable Técnico del Mariposario "Reserva Ambiental Serelepe", Quatro Barras, PR – Brasil.

- Lic. FERNANDO GUERRA SERRUDO (FG), Investigador Asociado, Colección Boliviana de Fauna, La Paz, Bolivia.

- BLANCA HUERTAS MSc DIC (BH), Coordinadora Cursos y bases de datos. Curadora Colección de Mariposas, Natural History Museum, Londres, Inglaterra. (b.

- Dr GERARDO LAMAS (GL), Director e Investigador Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Perú.

- Lic MARIA JULIETA LEDEZMA ARIAS (JL), Jefe del Dpto. Entomología del Museo de Historia Natural Noel Kempff Mercado Universidad Gabriel Rene Moreno, Santa Cruz de la Sierra, Bolivia.

- Professor JIM MALLET (JM), Director Proyecto TABD. Profesor e Investigador, University College London, Inglaterra.

Programación

DÍA 1 *Introducción al Estudio de las Mariposas Tropicales*

0830-0900: Café, Inscripciones y entrega de materiales. (JA/BH)
0900-0930: *Presentación del Proyecto diversidad de las Mariposas Andinas Tropicales*: Equipo, Avances, uso de recursos y contenidos del curso. (JM/BH).
0930-1000: Estado de la taxonomía actual de los Lepidoptera, perspectivas, descripción de nuevos taxa. (GL)

1000-1030: Proyecto diversidad de las Mariposas Andinas Tropicales en Bolivia, impacto, avances, oportunidades. Presentación de la Reserva URPUMA. (Instalaciones, proyectos actuales, recomendaciones, etc.) (JA)
1030-1100: Receso
1100-1200: *Principios de la sistemática*. Infiriendo la historia evolutiva o filogenia. Principios del análisis cladístico. Homologías y analogías, Propósito de la clasificación, métodos, clasificación por evolución, fenética, cladística (GL)
1200-1300: Almuerzo
1300-1500: *Práctica de Laboratorio 1. Técnicas de colecciones.* Montaje y extensión de mariposas, preservación, toma de datos, fotografía digital, extracción de genitalias y análisis. (BH, JB)
1500-1530: Receso
1530-1730: *Práctica individual Variación y caracteres morfológicos*. Tipos de variación entre especies (sexos, continuos, polimorfismo, estacional, geográfico). Caracteres para la identificación de especies de Ithomiinae y Heliconiinae. (GL, JM)
1730-1800: Preguntas

DÍA 2 *Biología y evolución de las mariposas*

0830-0900: Charla introductoria: Biología y evolución de Nymphalidae (JB)
0900-0930: Diversidad de mariposas a lo largo de gradientes elevacionales en los andes (BH).
1000-1200: Practica de campo: Nymphalidae (JB)
1200-1300: Almuerzo en el campo
1300-1600: Práctica de campo: *Elevación y distribución de mariposas*. Cambios de la diversidad y comunidad de mariposas sobre un gradiente elevacional. Métodos de captura (BH/GL/FG).
1600-1630: Receso y regreso a la estación
1630-1730: Evolución de especies en la naturaleza (JM)
1730-1800: Preguntas

DÍA 3 *Conservación y estudio de las Mariposas Andinas*

0830-0900: El impacto de la cría de mariposas en la investigación. (JL)
0900-0930: Biología y evolución de Heliconiinae. (JM)
0930-1000: Evaluación de especies de mariposas para su conservación (BH)
1000-1200: Practica de campo: Mecanismos de defensa de las mariposas (JM/GL)
1200-1300: Almuerzo en el campo
1300-1600: Practica de campo: Ecología y comportamiento de las mariposas de bosques nublados. Estados Inmaduros (JL/JB); Adultos (JM/GL).
1600-1630: Receso y regreso a la estación
1630-1700: Charla Investigador Nacional (FG)
1700-1730: Elaboración de proyectos de investigación y financiación. (BH)
1730-1800: Preguntas

DÍA 4 *Simposio y proyectos de investigación*

0830-0900: Museos: Importancia y mantenimiento de colecciones (BH)
0900-1000: *Presentaciones de los participantes de los cursos 2006*. Estado actual de las investigaciones en curso, lecciones y progresos. Cuatro presentaciones de 15 minutos cada una incluyendo preguntas.
1000-1030: Receso

1030-1200: *Presentaciones de los participantes de los cursos 2006*. Propuestas para financiación o proyectos de grado. Cuatro presentaciones de 15 minutos cada una incluyendo preguntas.
1200-1300: Almuerzo
1300-1600: Práctica de campo. Reconocimiento del terreno y diseño de proyectos practica final. Organización de grupos de trabajo, entrega de materiales, primeros resultados.
1600-1630: Receso y regreso a la estación
1630-1800: Discusión de resultados preliminares, procesamiento de muestras, datos, asesoría de grupo con cada tutor.

DÍA 5 *Mini proyecto de investigación*

0800-1600. *Práctica final de campo.* Caminata a lo largo de un transecto elevacional, desde 2600m hasta 1800m; muestreo cualitativo y cuantitativo; reemplazo de especies a lo largo de un gradiente elevacional; influencia de hábitats sobre la fauna.
1200-1300: Almuerzo en el campo.
1600-1900: Análisis y procesamiento de muestras, datos, asesoría de grupo con cada tutor.

DÍA 6 *Análisis de datos y conclusiones*

0800-1000: Presentaciones mini proyectos de campo por grupos (15 min. cada uno).
1000-1030: Receso
1030-1230: Entrega de equipos, certificados, toma de fotos y despedida.

FIN DEL CURSO, Gracias por asistir!

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Tropical Andean Butterfly Diversity Project

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Proyecto Diversidad de las Mariposas Andinas Tropicales

SEGUNDO CURSO INTERNACIONAL TEÓRICO-PRÁCTICO
Métodos Avanzados en el Estudio en Campo de las Mariposas Tropicales (Lepidoptera: Papilionoidea)

San Francisco, Parque Nacional Podocarpus, Zamora-Chinchipe, ECUADOR

Septiembre 17-21, 2007

Museo Ecuatoriano de Ciencias Naturales, Quito
Fundación Ecológica Arcoiris, Loja
Florida Museum of Natural History, Gainesville

Conferencistas (en orden alfabético)

- Lic. JUDITH BORJA (JB), Bióloga-Consultora, Fundación Ecológica Arcoiris, Loja, Ecuador
- Dr PATRICIO PONCE (PP), Director to Investigaciones del McGuire Center en el Ecuador, Quito, Ecuador
- Lic. SANTIAGO VILLAMARÍN (SV), Curador de la Division de Invertebrados, Museo Ecuatoriano de Ciencias Naturales, Quito, Ecuador
- Dr KEITH WILLMOTT (KW), Curador de Lepidoptera, McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Gainesville, FL, USA
- Sr RAUL ALDAZ, Entomólogo y Guía Ecológico, Lita, Ecuador

Temas

- Biología, evolución y identificación de Ithomiinae y Satyrinae
- Hábitats y su influencia sobre abundancia y comportamiento; enfásis en Lycaenidae y Riodinidae
- Mariposas del páramo
- Influencia de elevación sobre diversidad y distribución
- **Presentaciones de estudiantes**. Cada estudiante debe hacer una presentación de 10-15 minutos sobre una investigación actual de mariposas, o sobre un proyecto futuro de investigación, como para aplicar por una beca. Los conferencistas evaluarán cada presentación y ofrecerén comentarios. Más información será disponible pronto en la página web.

Sitios de Campo

- San Francisco, Parque Nacional Podocarpus, Zamora-Chinchipe (2000-2200m, 3°59.30'S,79°5.58'W)
- Cajanuma, Parque Nacional Podocarpus, Loja (2800-3300m, 4°7.0'S,79°10.30'W)

Programación

Día 1 (Sep 17):

Introducción al Parque Nacional Podocarpus y la biología de Ithomiinae

0600-0900: Viaje Loja-Casa de San Francisco de la Fundación Arcoiris.
0900-0930: Llegada, café, Inscripciones y entrega de materiales (SV, KW).
0930-1000: *Estado del Proyecto Mariposas Tropicales Andinas*. Objetivos, misión, patrocinadores; breve muestra del estado actual del proyecto y breve sumario de los contenidos del curso (KW, SV).
1000-1100: *Introducción al Parque Nacional Podocarpus y sus mariposas*. Conservación y educación ambiental en el PNP; mariposas del sur del Ecuador, biogeografía y conservación (JB, KW).
1100-1200: *Biología y evolución de Ithomiinae*. Estados inmaduros, plantas hospederas, mimetismo, ecología química, evolucíon (KW).
1200-1300: Almuerzo.
1300-1630: *Salida al campo 1*: *estados inmaduros de Ithomiinae*. Colección y identificación de las plantas hospederas (Solanaceae, Gesneriaceae); colección de los estados inmaduros.
1630-1800: *Práctica 1*. Preparación de muestras de plantas; identificación y criando de estados inmaduros.

Día 2 (Sep 18):

Comportamiento y mimetismo en Ithomiinae

0800-1000: *Presentaciones de los participantes*. Ocho presentaciones de 15 minutos incluyendo preguntas.
1000-1030: Receso.
1030-1100: *Elevación y distribución de mariposas*. Cambios de la diversidad y comunidad de mariposas sobre un gradiente elevacional; competencia y reemplazo de especies; especiación entre diferentes elevaciones (KW).
1100-1630: *Salida al campo 2: Distribución y abundancia de Ithomiinae*. Mapeando la distribución de las plantas hospederas de Ithomiinae a lo largo de un transecto de 1500m entre 2000-2100m elevación. Muestreo cuantitativo de Ithomiinae a lo largo del transecto (divididos en 3 grupos). Almuerzo en el campo.
1630-1830: *Práctica 2*. Identificación de mariposas de Ithomiinae utilizando láminas de las especies. Discusión sobre los resultados del dia.

Día 3 (Sep 19):

Hábitats y abundancia de mariposas

0800-1000: *Presentaciones de los participantes*. Ocho presentaciones de 15 minutos incluyendo preguntas.
1000-1030: Receso
1030-1100: *Dimensiones espaciales y temporales y su influencia sobre abundancia y comportamiento en Lycaenidae y Riodinidae*. Comportamiento de "perching"; diversidad y conocimiento de Lycaenidae y Riodinidae en los bosques nublados (KW).
1100-1630: *Salida al campo 3*: *hábitats y influencia sobre la abundancia*. Muestreo utilizando trampas. Influencia de valle y loma, y altura sobre el suelo, sobre la abundancia y comportamiento de Satyrinae, Biblidinae, Charaxinae, Pieridae, Lycaenidae y Riodinidae. Almuerzo en el campo.
1630-1830: *Práctica 3.* Identificación de mariposas de Satyrinae utilizando láminas de las especies. Discusión sobre los resultados del dia.

Día 4 (Sep 20):

Mariposas del bosque "elfin" y del páramo

0800-0900: *Mariposas del páramo* (PP).
0900-1030: *Salida al campo 4*. Viaje a Cajanuma, Parque Nacional Podocarpus.
1030-1530: *Mariposas del bosque "elfin" y páramo.* Muestreo y identificación de mariposas del bosque "elfin" y páramo; "hilltopping" en Lycaenidae, Pieridae; Satyrinae del páramo. Almuerzo en el campo.
1530-1800: Regreso a San Francisco, identificación de muestras.

Día 5 (Sep 21):

Elevación y su influencia sobre la diversidad y distribución de mariposas

0800-1700: *Salida al campo 5.* Caminata a lo largo de un transecto elevacional, desde 2600m hasta 1800m, y con varios grados de perturbación; muestreo cualitativo y cuantitativo; reemplazo de especies a lo largo de un gradiente elevacional; influencia de habitats sobre la fauna. Almuerzo en el campo.
1800- Entrega de certificados, toma de fotos, brindis de despedida y...

Con el apoyo de: