

**University of Glasgow
Exploration Society
Ecuador Expedition 2005**



Gladiator Tree Frog *Hyla boans* (Photograph Robyn Stewart)

Final Report

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Leafcutter ants *Atta cephalotes* (Photograph Stewart White)

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The Ecuador Expedition would not be possible and certainly only half as enjoyable without the help of our many friends in Ecuador; Darwin and Rosalva Garcia, Olmedo, Christian, Leandro and everybody in the Payamino Community.



Map of Ecuador showing Quito and the research sites in Amazonia



The Payamino area with research sites marked



Working with the Payamino children (Photograph Victoria Chisholm)

Introduction

Introduction

The 2005 Expedition to Ecuador was the fifth such research trip to be organised by the University of Glasgow Exploration Society. As in previous years a group of undergraduate students from various subjects and at various stages of their University career took part in a programme of ecological research and community work.

The Expedition spent 3 days in Quito organising permits, transport and other necessities before travelling to the field site in the Sumaco region of Ecuadorian Amazonia west of the town of Coca. The main group spent five weeks working in Amazonia, the reptile group travelled independently to Otonga in the Andes for the final week.

The Expedition members were split into three groups; a bird study group; a reptile and amphibian study group and an education/community group.

Our main contact, Darwin Garcia is the representative of the Indian tribe that owns the Sumaco Reserve. He is the son of a missionary and a member of the local tribe, who has returned to the area after completing a teaching qualification, and now represents the tribe. The tribal lands have been made into the Sumaco Reserve and the tribe wants to generate income from Eco-tourism. They have already turned down offers from outside companies to run tours in their area and recently signed an agreement with Aalborg Zoo in Denmark for long term financial support. Darwin has recently started his own business bringing tourists into the area. The main task in Sumaco was to continue building up a species list for the reserve, continuing the work done by the

bird groups since 2000 and the herpetological group in 2004. The education group spent most of their time teaching all ages of the community and were involved in the collection of tribal stories for permanent recording.



Rio Payamino (Photograph Kara Anderson)

Bird Research Project Report

The Neotropics

The Neotropical region has long been recognised as supporting a high level of biological diversity. Of the world's 9,700 bird species no fewer than 3,600 (39%) occur in the non-Caribbean Neotropics (16 % of the planet's land area) (Wege and Long, 1995). 290 of these species were, in 1995, considered at risk of extinction (Wege and Long, 1995) due to a range of anthropogenic disturbances: timber extraction, clearing for agriculture, drainage of wetland, mining, and other disturbances. Pristine habitats are becoming increasingly disturbed and fragmented. There is therefore increasing urgency to do something to halt or slow down the loss of species. One important task is to gain as much information as possible about the organisms dwelling in the remaining undisturbed areas of the Neotropics. The bird studies in the University of Glasgow Ecuador Expedition 2004 were an attempt to build on the information gathered since 2000 from two pristine sites in Ecuador, one in the Andes and one in Amazonia.

Ecuador

Ecuador has around 1,530 resident and migrant bird species (Ortiz and Carrión, 1991). Of these c.37 are endemic, 160 have restricted ranges, 6 are classified as critical, 13 as endangered, 43 as vulnerable, 46 as near-threatened and 3 as data deficient (Stattersfield *et al*, 1998; BirdLife International, 2000).

Endemic Bird Areas (EBA's) have been identified by mapping the distributions of birds which have had, in historical times, breeding ranges of less than 50,000 km². An area supporting at least two of these restricted range species is identified as an EBA, a place where global extinctions are likely to occur unless the habitat can be protected (Wege and Long, 1995). Nine of these EBA's lie partially or wholly within Ecuador. In addition 50 Key Areas, the most important places for globally threatened bird species in the Neotropics (Wege and Long, 1995), have been identified in Ecuador.

In summary Ecuador has an extensive, valuable avifauna much of which is under threat. The more that is known about it the more able we will be to protect it for future generations to enjoy.

Ornithological Survey of Sumaco Reserve, Napo Lowlands

Introduction

Sumaco reserve is a newly created reserve in an area of relatively undisturbed lowland rainforest in the Napo Lowlands area of Ecuador at approximately 77 10' W, 0 25' S. Mist-netting and visual observation were conducted during July 2005. The first aim was to continue with the work done in previous Glasgow Expeditions in building a species list for the area, the second to continue the capture-recapture study started in 2000. The third important aspect of the work was to generate further ecological information for our local contact, Darwin Garcia.

Methodology

Mist netting was conducted at three sites; San José de Payamino close to the Rio Payamino; Sacha Wasi several kilometers inland from the river and on the Rio Paushiyacu. Six 18m x 2.5 m., 33mm mesh size mist nets were erected each day between 06.00 and 12.30. Visual observation was conducted informally at all times during the day. All identifications were made using reference books on South American avifauna (Ridgely & Tudor, 1989, 1994; Ridgely & Greenfield, 2001a, b).

Results

A total of 306 birds in 64 species were captured, and many more species observed or recognized by their call, taking the overall species list for the area to 214. A paper on the first five years of the bird survey in Payamino is nearing completion.

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Collared Puffbird *Bucco capensis* (Photograph Stewart White)

Small Research Projects

The Effects of Bill Size and Bird Weight on Nest Morphology

The nest architecture of birds is a subject of great diversity and each nest has a specific design that is determined by its constructor. In this study the details of nest architecture was explored for species residing in the tropical regions of north east Ecuador. There were three main aims addressed; i) describing general nest morphology, ii) to determine if a relationship existed between nest attachment and the weight of the constructor and iii) to determine if there was a relationship between bill length and nest material length. Interesting findings including the possible ectoparasite repulsion properties of the moss like green material found in a large percentage of the nests made up the first part of the results. Also there was the preferred lining material of skeletalised leaves the properties of which are also very interesting and are likely to play an important part in the thermal regulation of the nest. A top attachment was found in 78 of the nests comprising the study sample. This in low nesting species is likely to have camouflage properties in an anti-predator effort. There was no significant relationship between bird weight and nest volume ($R^2=0.388$ $P=0.190$) however it was established that clutch size and the presence of altricial or precocial young have more influence on nest volume than bird weight. In addition there was also no significant correlation between bird weight and attachment

area ($R^2=0.136$ $P=0.674$) and nest volume and attachment area ($R^2=0.173$ $P=0.255$) thus concluding that neither the bird weight or the nest volume has an effect on the attachment area, it is likely to be factors such as clutch size and the actual attachment mechanism including the attachment materials that are significantly involved. Finally there was a significant correlation between bill length and material length ($R^2=0.573$ $P=0.041$). The results showed a positive relationship that as bill length increased so the nest material length increased. The bill length and shape are adapted to environmental pressures including food availability and it is these pressures that are more likely to affect the bill size not the available material for nest construction. It is assumed therefore that nest material size is selected according to the bird's ability to handle and manipulate it, using their bill, for nest construction. Similarities between the material size that they are able to manipulate into the nest construction and the food size that they are able to manipulate for consumption are more than likely, however this is an area for further study.

Elizabeth Curry

A Comparison of Wing Morphology in Relation to the Ecology of Four Families of Rainforest Birds

Wing morphology is central to a bird's ability to fly and many birds are adapted in different ways to suit their flight demands. While a lot of research has been done into determining how the various wing characteristics affect flight, little has been done on examining how bird families and species are uniquely adapted to suit their ecology. Wing data has been collected in four families of Ecuadorian rainforest birds and this has been related to the different flight behaviours of the birds. Wing loading and aspect ratio were the key characteristics in quantifying a wing's morphology. Woodcreepers (Dendrocolaptidae) had the lowest wing loading, hummingbirds (Trochilidae) had the greatest wing loading, antbirds (Thamnophilidae) had a wing loading in the mid range and manakins (Pipridae) were spread throughout the range. Only hummingbird aspect ratio was significantly greater than those of the other bird families. The manakins differed significantly in wing loading between species. These results support the view that there is more variation in wing morphology than previously thought; this is likely due to different species or families exploiting different habitats and behaviours. The difference between the Passeriform families and the hummingbirds was not as great as expected, based on previous findings. This suggests that there is a profound difference between the migratory North American species and the non-migratory South American species.

Site Selection and Repairing Behaviour in Orb and Sheet weaving Spiders

When similar species of predator exist in the same habitat, competition for resources can occur. Spatial distribution and partitioning of resources are methods of permitting simultaneous existence. This study investigated characteristics of web structure in relation to the use of surrounding vegetation between two different web types. It focused on the structure of orb and sheet webs within an area of primary rainforest and what features of vegetation are typical for each web in site-selection. Additionally a study into the probability of web repair was carried out as a measure of web maintenance between the two web building species. Orb webs built their webs higher in the vegetation than sheet webs, preferred living opposed to dead substrata in

structural support and were predominantly found built among plant species (Lespedeza species). Sheet webs were built low to the ground supported by dead substrata among tree species.

Both web building species preferred not to repair damage inflicted upon the web whilst foraging in day light hours however all repairs were completed over night in sheet web spiders and full renewal of the orb webs were also made during this time.

Victoria Tough



Female Micrathena sagittata (Photograph Victoria Tough)

Habitat Characteristics and Their Effects on the Species Composition and Feeding Ecology in a Fish Assemblage

The study attempted to identify the habitat characteristics that are responsible for shaping the species composition of a neotropical fish assemblage and to determine if the habitat parameters are related to the trophic structure and feeding habits of a fish assemblage. The study was conducted over a four week period during the region's wet season from mid-June 2005 to mid July 2005.

Fish assemblages were sampled using a gill-net at four different sites all with very different habitat characteristics. Habitat parameters considered were river width, depth, substrate type and velocity as well as basic descriptions of the sites. Sampled fish were dissected and stomach contents were examined under a microscope. After identification of stomach contents fish were placed into five distinct feeding guilds: detritivores, piscivores, herbivores, omnivores and invertivores. Basic morphological measurements were taken, standard length, head width and head length, as well as weight. The morphological measurements were used to calculate fish proportions to assess any apparent differences in fish morphology between sites. Abundance, diversity, trophic structure and morphology were then compared between sites. The

hypothesis that species abundance and diversity differ with site could not be accepted, however, this lack of significance could be due to a small sample size. Species composition differed dramatically with site. The dominant species at each site coincided with the most dominant feeding.

Fraser Malcolm

Herpetological Research Project Report

Sumaco National Reserve

The field data was gathered during the months of June and July 2005 in several localities within the San Jose de Payamino Reserve, an area of lowland tropical rainforest in the Napo region of Ecuador. The 3 research sites were:

- San Jose de Payamino Research Station
- Sacha Wasi Lodge
- Paushiyacu Lodge

This was the second year of the Herpetological Study and the San Jose de Payamino Lodge and Paushiyacu Lodge were both previously unsampled sites, although Sachi Wasi was visited in 2004. The research team consisted of Robyn Stewart BSc, and 2 undergraduate field assistants Ciaran Kelly and Victoria Tough.

The methods used for sampling reptile and amphibian diversity were pitfall traps with 5m drift fences and Time-Constrained Active Searches (TCAS), as well as opportunistic captures. Pitfall traps were kept within 500m of our campsites to allow ease of frequent checks. TCAS were carried out along natural paths, primarily along river banks and swampy areas where herpetological diversity is favoured, and to minimise human disturbance. TCAS consisted of 90 minute walks at dawn and 150 minute walks at dusk (dependent on weather conditions). All reptiles and amphibians sighted were recorded and captured by hand and taken back to the lab for identification. Upon the capture of an individual the exact time, date and location was recorded along with environmental variables like temperature, humidity and light intensity. Various biological measurements were also taken, including snout-to-vent length, tail length where appropriate and sex.



An unfinished pitfall trap: the drift fence intercepts animals crossing the clearing and deflects them towards the waiting buckets at both ends of the fence. (Photograph Robyn Stewart).

Results

A total of 123 reptile and amphibians in 62 species were recorded at the 3 sites, of which 25 species had been recorded the previous year. The level of diversity within the Payamino Reserve is massive, and we have only sampled a relatively small area in comparison to the total area of the Reserve. The number of amphibians found outnumbers that of all the other herpetological groups simply on the basis that they are easier to locate due to their behaviour of calling from foliage alongside riverbanks. The capture of snakes, lizards and so on does tend to be far more opportunistic, although the pitfall traps proved to be very successful at the San Jose de Payamino Lodge with 5 new species of lizard being recorded there, as well as 2 frog species.

Type of Herpetofauna	No. of Species
Amphibian	31
Snake	17
Lizard	11
Crocodile	1
Turtle	1
Amphisbaenian	1

Several species of interest were found: the Sharp-Nosed toad *Bufo dapsilis*, the Forest Bromeliad Treefrog *Osteocephalus cabrerai*, and the Flat-Headed snake *Xenopholis scalaris*. All of these species are considered uncommon to rare residents of primary rainforest which is a significant finding towards the future preservation of the

Payamino Reserve (source: the Global Amphibian Assessment and Bartlett & Bartlett (2003)).

In addition to this, a shed skin from the snake *Bothrops atrox*, a pit viper, was found that's total length measured 2.15 meters. This is a very large specimen as usually they only measure between 30-120cm although occasionally ones over 180cm are seen (Bartlett & Bartlett, (2003)). The skin was found at the Sachi Wasi research site which is an area of mostly terre-firme forest deeper into the jungle that is rarely visited by any members of the Payamino Community. This is an indication of the level of species richness and favourable habitat conditions that are found within the Payamino Reserve and the potential for future scientific discoveries.



Bufo dapsilis (Photograph Robyn Stewart) *Osteocephalus cabrerai* (Photograph Robyn Stewart)



Xenopholis scalaris (Photograph by David Schleser, Bartlett & Bartlett, 2003)

Future Work

Future work will be to continue with the current research while broadening the sampling area of the sites we have been to in previous years and going deeper into the forest. The research so far has barely scratched the surface of the species diversity of reptiles and amphibians in the Payamino Reserve and once a good foundation had been made with a comprehensive species list, the study can be broadened to incorporate more natural history and behavioural studies.

Robyn Stewart

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Education Project Report

An important part of the Payamino Project given more emphasis than before in 2004 and 2005 was the work done with the community. The education and community group lived and worked with the community in the village of San José de Payamino. There were various aspects to this work, much time was spent teaching children and adults some basic English and Spanish as well as aspects of conservation. Many of the community have aspirations to work as eco-tourism guides and a basic knowledge of Spanish and English are necessary for this. The language group also spent a lot of time speaking to the people outside the classroom, gathering details of the stories passed down through generations of the community and recording them for posterity. The education was by no stretch of the imagination a one way process, all expedition members and the language group in particular learnt a huge amount about the forest and the plants and animals in it. Potential sources of food and medicines were identified and methods of preparation demonstrated and much patience was required of the community in teaching craft skills to non-dextrous Europeans.



The classroom in Payamino (Photograph Helen Duthie)

Finances

In order for the expedition to go ahead a large amount of fund raising was required. Each member made a personal contribution of £700, and everybody helped in letter writing, t-shirt selling, running the snack bar, a club night, and other various activities, the University gave a generous grant of £1400, and the Carnegie Trust £2000, the Royal Scottish Geographical Society, Blodwen Lloyd Binns Bequest and the Scottish Parrot and Foreign Bird Club contributed generously. Below is the complete set of accounts for the Expedition.

Income

Personal contributions	£4900
University of Glasgow	£1450
Carnegie Trust	£2000
Gilchrist Trust	£1000
Chester Zoo	£1000
Blodwyn Loyd Binns Bequest	£ 400
Rotary Club of Corstorphine	£ 250
Scottish Parrot and Foreign Bird Club	£ 200
Exploration Society - First Aid course	£ 600
Club night	£ 290
T-shirt sales	£ 745
Calendar Sales	£ 250
Snack Bar	£ 420
Other donations and fund raising activities	£5796

Total Income **£19801**

Expenditure

Flights (International)	£7150
Flights (Internal)	£ 775
Other transport	£ 200
Insurance	£ 560
Equipment	£1000
Administration	£ 500
First Aid course	£ 850
T-shirts	£ 455
Snack Bar	£ 211
Food and accommodation	£8100

Total Expenditure **£19801**

Expedition Personnel

Kara Anderson	L3 Zoology Undergraduate
Victoria Chisholm	L2 Hispanic Studies/Philosophy Undergraduate
Elizabeth (Betty) Curry	L3 Zoology Undergraduate
Chuck the Duck	Severely abused expedition mascot
Helen Duthie	L3 Hispanic Studies Undergraduate
David Holt	L2 Zoology Undergraduate
Anya (Keeebab) Keenan	L2 English Literature/Hispanic Studies Undergraduate
Ciaran Kelly	L2 Genetics Undergraduate
Fraser Malcolm	L3 Aquatic Bioscience Undergraduate
Robyn Stewart	University of Glasgow Graduate in Zoology
Victoria Tough	L2 Zoology Undergraduate
Stewart White	University of Glasgow Staff



Expedition members and guides relax at the end of a long day in the rainforest (Photograph Stewart White)