University of Glasgow Exploration Society

Ecuador 2011

Expedition Report

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Foreword

It is with great pleasure that we present this document, which details the scientific studies and methodology undertaken during the tenth University of Glasgow expedition to north-eastern Ecuador during the summer of 2011. This report also outlines the financial and logistical planning of the expedition.

We are extremely pleased with the outcome of this year's expedition and feel as though we have discovered yet more the animal life of Ecuador's north-eastern province of Orellana.

The aims of this expedition were to continue to study the ornithological and herpetological biodiversity of the region, which has been ongoing since 2000. This involved compiling species lists and undertaking population counts. New studies included mammal surveys, using camera trapping techniques, and observing the canopy using, for the first time, canopy access.

The University of Glasgow's expeditions to Ecuador are part of the larger long-term Payamino Project. This Project is in association with Aalborg Zoo in Denmark and aims to support the Payamino Community in their efforts to keep oil companies off their land (15,000+ hectares of primary Amazon rainforest) and allow the community to decide their own future.

Over the ten years the expedition has been running, we are continuing to build and maintain strong relationships with the local indigenous community and with their help we look forward to continuing our studies on the biodiversity of this fascinating environment for many years to come.

Kirstin Klimowicz

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Acknowledgements

We would like to express our deepest gratitude to all who sponsored and supported our expedition. Without their financial and logistical support, our expedition would not have been possible.

It is because of the generosity of such organisations that the University of Glasgow's Exploration Society is able to organise undergraduate expeditions and provide those students who have an interest in natural history with valuable and enjoyable experiences.

The expedition acknowledges the support of the University of Glasgow, the Carnegie Trust, the Glasgow Natural History Society - BLB, Tunnocks Ltd, RSGS and the Gilchrist Trust.

A great proportion of funds were also raised by the team members themselves. This was achieved by organising various fundraising events such as band nights, ceilidhs, bake sales and bagpacking sessions, as well as a sponsored "head shaving".

We would like to express our thanks to all those who contributed to the success of these activities. In particular, the team would like to thank the staff of ASDA Dumbarton and Newton Mearns as well as the staff in the Zoology museum who allowed us to hold so many bakesales.

The team would like to thank our referees and scientific advisors, namely Professor Roger Downie, our home agent Dr Isabel Coombs, Dr Richard Preziosi and Robyn Stewart of Calderglen Zoo.

Finally, a huge thank you to the members of the Payamino Comminuty, who made us feel extremely welcome. Their advice, knowledge and generosity were of invaluable help in allowing the expedition to achieve its aims. In particular, we would like to thank Mr Javier Patiño for all of his help throughout the expedition, as well as our local guides and many other community members who worked extremely hard and showed great patience to ensure we didn’t get lost.

Introduction

The 2011 Expedition to Ecuador, comprised of thirteen undergraduate student members, one member of staff support and a qualified canopy access expert for the first two weeks. This was the tenth such research expedition to Ecuador organised by the University of Glasgow Exploration Society since the year 2000. The three research groups, ornithology, herpetology and mammalogy, each had roughly four members. We also had an additional “group” which were involved in carrying out the canopy access tasks, making observations for all three main groups. All students worked extremely hard throughout the duration of the expedition, adding valuable data to the ever expanding records of biodiversity of this area of primary rainforest. The expedition made use of local guides and local provisions in an effort to ensure as much of our money as possible went back into the local community. This was important in achieving one of our aims: helping local communities use their environment sustainably, whilst also making a fair living for themselves. This also helped us, as we found the local knowledge our guides had of the areas and native wildlife aided in our research. We feel both parties learned greatly from each other, and hopefully this will continue for many years, and even lead by example to other conservation projects.

The expedition spent two days in Quito organising necessities and acclimatising before flying to Coca where we gathered our supplies before the final leg of our journey. We then travelled to the field site in the Napo region of Ecuadorian Amazonia to our research site at San José, where we began our research, staying on site for the full five weeks.

The group then returned to Quito for a couple of days before travelling home.

Location and Accommodation

Ecuador is unique in its biodiversity and scientific interest: lying on the equator in the North West of South America. Ecuador's location allows it to host a wide variety of habitats, including the high altitude Andes, Andean Cloud Forest, Lowland Amazon Rainforest and the Galapagos Islands. This range of habitats has made Ecuador one of the most biodiverse areas in the world. Figure 1.1 shows the location of the research area in relation to Quito.

Fig 1: Satellite image of research site in North Eastern Ecuador.

Figure 1.1: Map of the research area in Orellana, showing the locations of our research site along the Rio Napo.

The expedition conducted research at a site of primary and secondary lowland tropical rainforest in the Napo Region of eastern Ecuador's province of Orellana; San José de Payamino (00°28'55"S, 77°17'06W).

Ornithology Report: Mist-netting and Observational Work

Introduction

The Amazon Rainforest is not only the largest tropical rainforest on the planet but one of the most biodiverse, particularly for birds. Already being well studied in temperate regions of the Earth, the biodiversity and ecology of birds remains to be thoroughly studied in tropical regions. Due to the rapid deforestation of pristine primary rainforest occurring throughout Amazonia by oil and timber companies, conservation concerns are on the increase and so is the need for rapid assessment techniques to assess tropical diversity and its changes. Traditional survey methods used commonly in temperate forests are not practical in tropical forests due to the need for long term studies and the higher density of vegetation and the topography of the land. Rapid assessment methods were developed to overcome these problems and provide a quick, simple and flexible way to ascertain levels of diversity.

Ecuador is classed by the World Conservation Monitoring Centre as a 'megadiverse' country due to its large number of bird species, 1600. This is 15 percent of the world's known bird species. 38 of Ecuador's bird species are endemic in the Galápagos Islands. This illustrates the importance of the need for rapid assessment in this country, due to the importance of the area for bird species as well as many other animal groups. If more is known about the habitats and their wildlife, the more we could begin to understand their vulnerability and the threats they are facing. After such assessments, projects can be designed to monitor and attempt to mitigate any foreseeable threats before they become significant.

This study aims to determine the relative avian diversity and abundance of one primary evergreen forest site within the Payamino region of north eastern Amazonian Ecuador whilst adding to the Total Species Count for the Sumaco Region, building upon work carried out by the expedition since 2000.

Methods

The Sumaco reserve is relatively new reserve created in undisturbed lowland rainforest in the Napo Lowlands region of Ecuador at approximately 77 10'W, 025'S. The sites sampled were predominantly terra firma interspersed with pockets of várzea. Rapid assessment 10-species MacKinnon Lists and ground level mist-netting were used to assess diversity. MacKinnon Lists are a widely used technique in the tropics: observational studies are carried out and the first ten bird species recorded. Each species only appears on each list once. To avoid bias, unidentified species were given a temporary name and a detailed description for later identification. The majority of observational studies were done in clearings, along main tracks and out over the rivers, however at some sites it was possible to observe within the vegetation.

Mist netting occurred throughout the jungle in cleared transects, however sampling effort was not constant for all sites. Mist netting would begin shortly before dawn, approximately 5.30am, using 6 18m x 2.5m, 33mm mesh-size mist-nets. The nets were checked hourly to remove captured birds, this time period being ample to allow efficient capture of birds without endangering their health or lives. Any captures were transported back to base to be identified, ringed, measured and released. Those captured in nets further away from where the research was based were returned to the area they were captured. All identifications were made using reference books on South American avifauna (Ridgely and Tudor, 1989, 1994; Ridgely and Greenfield, 2001 a, b). Mist netting continued until midday, after which the nets were taken down and moved to new site, unless further sampling was required within the same site. In general, the nets were moved after each day in order to gain a larger sample size and to avoid the birds becoming habituated to the nets.

The canopy access team rigged several trees around our sample sites and the canopy nets were suspended at 25m approximately. Due to the difficulty of moving and setting up the canopy nets, they were left in the same location for several days

before a new tree had been rigged. As with the ground mist netting, the canopy nets were checked every hour for captured birds.

Results

The MacKinnon lists recorded 114 species and mist nets recorded 67 species, but a small number of species (20) were recorded by both methods meaning that in total 161 species were recorded during the study.

Mist nets tend to be biased towards smaller understory species and MacKinnon lists tend to be biased towards larger species. Neither method alone succeeds in sampling the full complement of species; however the weaknesses of one method are compensated for by the strengths of the other. So to accurately determine tropical avian diversity it is suggested that a combination of methods should be used.

In total 393 birds were captured, of these 93 were recaptures, 39 of which were recaptures from previous years, resulting in 300 newly captured individual birds within this expedition. These birds comprised of 73 species, 6 of which were new species for 2011. These add to the total species count for Payamino to give a count of 327 species. We are pleased to say that we have now recorded 32 of the 33 indicator species for the area (Stotz et al. 1996).

The 2011 expedition experienced several days of extremely high rainfall which affected mist-netting and may have affected the capture rate as compared with those recorded in previous years.

This emphasises the need for rapid assessments. If an area which contains one of these species were to be destroyed then certain species may be lost from the Sumaco region which would have a significant impact on the biodiversity. However, the sampling effort carried out in each area may not have produced an entirely

accurate representation of the species within the area therefore it cannot be said with great certainty that if a species was found in one area only then that is the only area it inhabits. Bird species may not always be captured by mist-netting therefore any study that looks to investigate the distribution of possible vulnerable species would have to use a combination of sampling methods and for a longer time period as to avoid any inaccurate findings.

New Species for 2011

Military Macaw (*Ara militaris*)

Blackish Nightjar (*Caprimulgus nigrescens*)

Chestnut-winged Foliage-Gleaner (*Philydor erythropterus*)

Amazonian Barred-Woodcreeper (*Dendrocolaptes certhia*)

Black-banded Woodcreeper (*Dendrocolaptes picumnus*)

Striated Antthrush (*Chamaeza nobilis*)

Conclusion

It is difficult to draw reliable conclusions about the relative diversity and abundance at this site from this study without further research. Further studies would be required to investigate the area in more depth and to determine if it contained vulnerable species and if this is the case then conservation programmes would have to be implemented to prevent the loss of species and biodiversity for the area.

Striated Antthrush (*C.nobilis*)

Herpetology Group

Introduction

The Payamino Reserve lies within the boundary of the Napo Biodiversity Hotspot – one of 25 most biologically rich areas under the greatest threat of destruction, as defined by Conservation International. This was the sixth year the Herpetological project was conducted at the Payamino Reserve and up until this year's expedition a species list of 73 has been compiled since research started in 2004. While this is extremely encouraging, there are still so many more species to find. Species discovery rates have actually increased since the project started indicating that the potential for further research is huge. Now that we have good knowledge of the more common species and the geography of the area we can start long-term studies into species composition and population numbers. Monitoring of amphibian populations

in areas of tropical lowland rainforest is virtually non-existent and in light of the global amphibian crisis, this study will be invaluable with all findings passed onto the Global Amphibian Assessment and the Pontificia Universidad Catolica del Ecuador.

Amphibian populations are declining all over the world (Houlahan *et al.,* 2001), and Ecuador is an important area for amphibian study since, “The largest numbers of threatened species occur in Latin American countries such as Colombia (209), Mexico (198), and Ecuador (163)” (IUCN *et al.,* 2006). Also, many species which are data deficient for endangered classification could potentially be threatened (Stuart *et al.,* 2004). For these reasons it is important that more studies are carried out on amphibians in Ecuador, and around the world, in order to gain significant data to effectively evaluate the amphibian decline (Young *et al*., 2000; McCallum, 2007). Another point of importance for this study was as part of Project Payamino: a conservation initiative in the Payamino region in partnership with ‘Zoos Go Wild’ and Aalborg Zoo in Denmark, which strives to protect the biodiversity and culture of the area.

The aims of this project were to create an inventory of the amphibian species found and assess the species richness and abundance in comparison with previous years.

Polkadot Tree-frog (*Hypsiboas punctata*)

Methods

Transects were cut at each site in areas close to base camp and accessible by local paths. Guides assisted in finding suitable areas for transects and, using machetes, cut five parallel 100m tracks separated by four 20m tracks to allow crossing between (see Figure 3.1). After cutting, transects were given a day to allow the habitat to settle before sampling began.

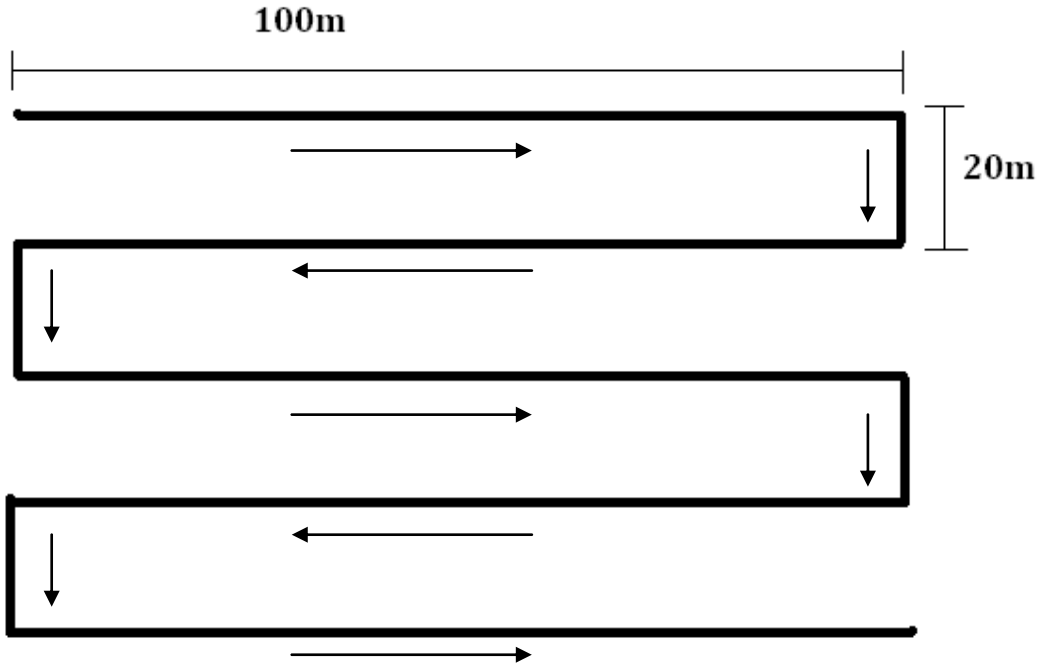

Figure 3.1: Diagram of layout of transects as seen from above with arrows denoting the direction of travel.

Visual Encounter Surveys:

At each of the sites five evening VESs were carried out on successive nights from 7pm in order to sample nocturnal species. Three daytime surveys were also carried out on odd days from around 11.30am to include opportunity to collect diurnal species. The majority of searches were nocturnal because these have been found to be more successful than diurnal searches (Pearman *et al.,* 1995).

During VESs, one team member walked at the front attempting to catch specimens, two further members followed behind, focusing on either the left or right side while the last member checked under logs and debris. Each VES included 1m either side of the transect and 2m up from the forest floor.

Collection methods:

When specimens were caught they were placed in a zip-lock bag with a leaf and a breath of air, then numbered in the order they were caught. The area they were found was also marked to allow return to the area in which the specimen was found. Once all five transects had been searched, bags were taken back to the lab and hung from a line until the morning when they were identified.

Identification:

Amphibians were identified as far as possible using two books: Reptiles and Amphibians of the Amazon: An Ecotourist's Guide, Bartlett and Bartlett (2003) and Cusco Amazonico: The Lives of Amphibians and Reptiles in an Amazonian Rainforest, Duellman (2005). Additional information was collected for each specimen. Weight and length measurements were also taken for each individual. It was decided that toe clipping would not be used to remove data from recaptures as it has been found that toe clipping may reduce return rates, cause inflammation or infection and decrease survival of subjected anurans (Waddle *et al.*, 2008).

Results

Species Inventory – Anurans:

The species inventory shows a total of 58 individuals from 20 different species found at San Jose de Payamino were captured. This may not be a true representative sample of the amphibian wildlife found in the area as our sampling methods were confined to sampling those within our reach. That is, arboreal species were unable

to be fully sampled. Our studies were also mainly focussed on nocturnal species and, although this is when most amphibians are active (Pearman *et al.,* 1995; Parris *et al.,* 1999), it did mean that diurnal species were not sampled fully. For these reasons, it can be said that the species inventories contain a fair representation of the nocturnal terrestrial amphibian species in the areas sampled, but are likely to be data deficient for arboreal and diurnal species.

Conclusions

It was encouraging having the opportunity to use canopy access this year. Arboreal species were found to inhabit the outer extremities of the canopy – an area which was unreachable even with canopy access equipment. For this reason, in the future, invertebrate sampling, as well as visual encounters, will be carried out as a method to estimate the arboreal populations.

Camera Trapping

Introduction

Studying tropical rainforest mammals can be tricky. The elusive behaviour, especially of the carnivorous mammals, low densities and the dense coverage of their habitat can make visual methods of sampling difficult. For this reason scientists have adopted “camera-trapping” as a sampling method to overcome these constraints.

A network of camera traps can be set up in various locations around the forest which aim to capture photographic images and provide scientific information about endangered and elusive species. Cameras detect movement when the targeted animals moves into range and takes digital photographs which can then be uploaded onto a database and studied in more detail.

Methods

The team first of all carried out several treks into the forest with local guides to assess the probable sites in which large mammals may be found. Sites were chosen based on tracks, scats, existing trails and access to a water source. Six sets of camera traps were placed in various locations around the study site for five weeks. Cameras were positioned in the afternoon, left overnight and then brought back in the morning to upload and study any images.

Results

Using the camera-trapping technique we were successful in capturing many images of rainforest animals, including several of the larger carnivorous mammals such as the ocelot,

Table 1: List of animals successfully captured by camera-trapping methods.

Species recorded by camera-trapping method
Ocelot - *Leopardus pardalis*
Puma – *Puma concolor*
Margay - *Leopardus wiedii*
Brazilian Tapir - *Tapirus terrestris*
Tayra (Large Mustelid) - *Eira barbara*
Armadillo (Unidentified species)
Various opposums and rodents
Unidentified snake
Unidentified birds

Photographic images of some of captured animals

Figure 2: Brazilian Tapir - *Tapirus terrestris.*

Figure 3: Puma - *Puma concolor*.

Figure 4: Ocelot - *Leopardus pardalis.*

Conclusions

This was a very successful pilot study, in that we were able to identify several species of mammal in the area. This is the first time that camera trapping had been properly used on an expedition so the team itself were learning through trial and error. We had positive interactions finding a large number of species, four of which could be properly identified. In future, a more thorough study should be carried out in order to gain a more accurate recording of mammal species in the area. Techniques such as baiting the traps with food were successful; however using a more familiar food source for the carnivorous species may be more beneficial. In order to evaluate whether the mammal species in the area are at a healthy density, a lot more research must be carried out, investing in colour camera traps and video camera-trapping could aid in identification, using GPS to mark the locations of each camera trap station, are thus the GPS locations of each positive interaction. The more information that we can collect, the easier it will be to diagnose the health of these mammal populations.

Practicing the technique beforehand on Scottish wildlife may also be beneficial

Canopy Access

Introduction

It is thought that 70-90% of rainforest life is found in the canopy. For the first time the Ecuador expedition will have the opportunity to explore this understudied area of the rainforest. The study will focus on mid and upper canopy mist netting and canopy herpetology studies. Using climbing techniques and training delivered by Canopy Access Ltd the expedition aims to do a comparative study between ground and canopy mist netting for local bird species.

Methods

Two trained and qualified members of the expedition were under the supervision of experienced canopy access trainer, Vicki Tough. The trained members were in charge of determining the safety of the study site and also keeping other members of the expedition safe while they are working in the canopy.

Individual trees were examined to determine their safety. Trees that were safe to climb were rigged using a rope and pulley system. Canopy nets, measuring six meters tall and two meters wide, were suspended at approximately 25 meters in the targeted tree. Canopy nets were suspended first thing in the morning as with the ground mist nets and were checked every hour for captured birds. Canopy nets were moved to a different location every week.

The herpetological study will involve ascending a selection of trees and observing all reptile and amphibian species seen on and around each tree. Observational climbs will be carried out both during the day and at night as a comparative study of nocturnal and diurnal species. Camera traps will be set up at various heights in all observation trees to examine non captured species.

Results/Conclusion

The pilot was successful in that we were able to gain new insight into life in the canopy. Camera trapping was able to capture images of a number of unidentified snakes. Using canopy nets came with its own difficulties in transporting the equipment, positioning the suspended nets to avoid getting tangled in canopy foliage and also storing the equipment appropriately so as not to attract any inquisitive animals.

Herpetological studies were not as successful as we had hoped, this is primarily due to the anurans being found in the 'unreachable' outer extremities of the trees. The 2012 expedition plan to overcome this by carrying out various insect biodiversity studies in the canopy as an indicator of the anuran species found in the canopy.
The team worked extremely hard throughout the entire expedition, working mainly by trial and error. The 2011 expedition allowed us to rule out the techniques which were unsuccessful, allowing the future expeditions to build on the knowledge we gained during the five weeks. I feel the 2012 expedition will be much better prepared and therefore more successful in gaining the desired data.

Financial Report:

Income	**Amount (£)**
Personal contributions	11200
Bag Packing	2118.66
Bake Sales	978.99
Band Night	175.35
Bucketing	52.53
Car Washing	150
Carnegie Trust	2000
Carnival	85.91
Carol Singing	117.25
Ceilidh	516.32
DEEB Quiz	60
Gilchirst	500
GNHS – BLB	700
Pancakes	46
Poetry Reading	120
Pub quiz	77.56
RSGS	250
Tunnocks	50
University of Glasgow	1700
Total	**20,898.39**

Expenses	**Amount (£)**
International Flights	11900
Internal Flights	1145
Accommodation – Payamino	7100
Accommodation – Quito	980
Accommodation – Coca	340
Food	1250
Equipment/licenses	1000
Canopy Access Training (595 (+VAT)x 2)	1428
Canopy Equipment	975
Reports	300
Taxis	65
Exit Tax	400
Subtotal	24480
10% contingency	2448
TOTAL	**29331**

Expedition Personnel

Ornithology Group:
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Kirsty Sichi
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References

Bartlett, R.D. and Bartlett, P (2003) Reptiles and amphibians of the Amazon: an ecotourists guide. Gainesville, University Press of Florida.

Duellman, W.E. (2005) Cusco Amazónico: the lives of amphibians and reptiles in an Amazonian rainforest. Ithaca, Cornell University Press.

Houlahan, J.E., Findlay1,C.S., Schmidt, B.R., Meyer, A.H. and Kuzmin, S.L. (2000) Quantitative evidence for global amphibian population declines. Nature **404**, 752-755.

McCallum, M.L. (2007) Amphibian decline or extinction? Current declines dwarf background extinction rate. Journal of Herpetology, **41(3),** 483-491.

Parris, K.M., Norton, T.W. and Cunningham, R.B. (1999) A comparison of techniques for sampling amphibians in the forests of south-east Queensland, Australia. Herpetologica, **55(2),** 271-283.

Pearman, P.B., Velasco, A.M. and Lopez, A (1995). Tropical amphibian monitoring - a comparison of methods for detecting inter-site variation in species composition. Herpetologica, **51(3),** 325-337.

Ridgely, R.S. and Greenfield, P.J. (2001a) The birds of Ecuador, Status, distribution & taxonomy, volume1. Ithaca, Cornell University Press.

Ridgely, R.S. and Greenfield, P.J. (2001b) The birds of Ecuador, a field guide, volume 2. Ithaca, Cornell University Press.

Ridgely, R.S. and Tudor, G. (1989) The birds of South America: The oscine passerines. Oxford, Oxford University Press.

Ridgely, R.S. and Tudor, G. (1994) The birds of South America: The suboscine passerines. Oxford, Oxford University Press.

Stotz, D.F., Fitzpatrick, J.W., Parker, T.A. and Moskovits, D.K. (1996) Neotropical Birds: Ecology and Conservation. Chicago, University of Chicago Press.

Stuart, S.N., Chanson, J.S., Cox, N.A., Young, B.E., Rodrigues, A.S.L., Fischman, D.L. and Waller, R.W. (2004). Status and trends of amphibian declines and extinctions worldwide. Science, **306(5702),** 1783-1786.

Waddle, J. H., Rice, K. G., Mazzotti, F. J. and Percival, H. F. (2008). Modeling the effect of toe clipping on treefrog survival: beyond the return rate. Journal of Herpetology, **42(3),** 467-473.

Young, B.E., Lips, K.R., Reaser, J.K., Ibanez, R., Salas, A.W., Cedeno, J.R., Coloma, L.A., Ron, S., La Marca, E., Meyer, J.R., Munoz, A., Bolanos, F., Chaves, G. and Romo, D. (2001) Population declines and priorities for amphibian conservation in Latin America. Conservation Biology, **15(5),** 1213-1223.