

# Practical Course in Conservation Biology

## Case study: the marine otter (*Lontra felina*)

---

Report – February 2011



- Laboratory** : Laboratorio de Biología Molecular  
Universidad Peruana Cayetano Heredia (UPCH), Lima, Peru.
- Coordination** : Jose Espinoza, Luisa Echevarría, Rebeca Caldas  
Escuela de Postgrado, UPCH, Peru
- Teachers** : Juan Valqui, Zoological Institute,  
Christian-Albrechts-Universität zu Kiel (CAU), Germany  
Jorge Rodriguez, UPCH, Perú
- Colaboration** : Maria Lisette Delgado
- Participants** : 8 students

### 1. Introduction

In coordination with the Universidad Peruana Cayetano Heredia (UPCH), on the 25th and 26th of January 2011 in Lima, Peru, a practical course in conservation biology was given to graduate and postgraduate students from the UPCH, Universidad Nacional Agraria and the Universidad Ricardo Palma, with the aim to show the application of field and laboratory techniques, as well as the data analyses used in a research project. The marine otter study run under the “Proyecto Lontra felina” was used as an example for the context and relevance of a conservation project, showing the difficulties such a project faces in real life.

### 2. Description

#### First day

##### **Part 1 – Theory classes**

On the 25th, at 8 am a speech about the general modern concepts used in Conservation Biology was given. The case study of the marine otter and the results of the first genetic study on the species were presented.

##### **Part 2 – Field work**

That same day, at 10 am we drove to Punta Corrientes (Km 122 of the Panamericana Sur), where caves used frequently by the otters were entered (Figure 01). The place was optimal for this course as it is close to Lima and constant report of the species have been made since 2008. Otter scats (Figure 02) were spotted and described. Different samples were showed to determine freshness of the sample.



**Figure 01. Cave at Punta Corrientes**



**Figure 02. Scat sample**

3 samples were taken by each student (Figure 03, 04 and 05), put in alcohol and stored in 50 ml tubes. Afterwards, outside of the caves, direct observation of two individuals of the studied species was made (Figure 06). At 3pm we returned to Lima where the samples were stored in a refrigerator.



**Figure 03. Sample collection (1).**



**Figure 04. Sample collection (2).**



**Figure 05. Students with samples.**



**Figure 06. In situ observation.**

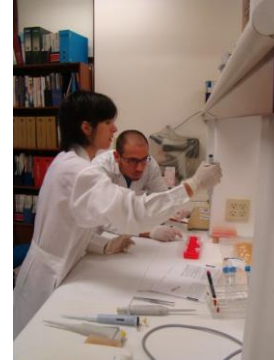
## Second day

### **Part 3 – Laboratory work**

On the 26th, at 8 am we started to work on the extraction of DNA from the collected samples, using the QIAGEN DNA Stool Minikit and according to QIAGEN DNA Stool Handbook (Figure 07 to Figure 10). Due to the lack of experience the students had on the matter and on laboratory work in general, 4,5 instead of 3 hours were used to finish the extraction. Processed sample were put into refrigeration.



**Figure 07. DNA extraction (1).**



**Figure 08. DNA extraction (2).**



**Figure 09. DNA extraction (3).**



**Figure 10. DNA extraction (4).**

Parallely, already extracted samples of Alpaca scat were prepared for a PCR. During the 3 hours of PCR, **Part 4(\*)** was worked in a class. Both PCR Alpaca and extracted otter samples were put on a electroforesis gel, and after 30 minutes a picture was taken (Figure 11). In this picture we could observe that in the Alpaca samples 4 of 16 samples were processed correctly in the PCR and in 4 of 16 samples of the marine otter extraction was done successfully (showing DNA traces).

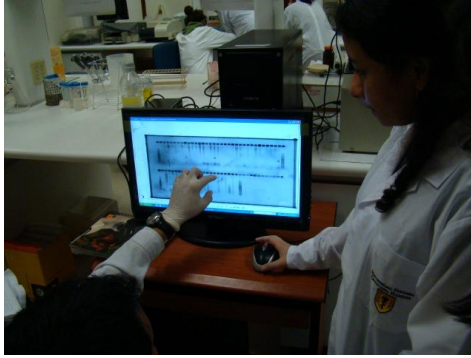


Figure 11. Electroforesis gel.

#### **(\*)Part 4 – Analysis and data calculation**

With the real database of the marine otter, haplotypic ( $h$ ) and nucleotidic ( $\pi$ ) variability concepts were explained. Students did calculations on their own, learning about the influence of the variables on the variability values.

### **3. Conclusions**

- A successful field work was done, with sample collection, observation of marine otters in their natural habitat, representing a real life situation for researchers.
- A successful laboratory work was done, showing the difficulties of extraction, PCR and electroforesis techniques
- Students could apply field and laboratory techniques used in a real research project and relate results and obtained data in the context of a conservation project.

### **4. Recommendations**

- Due to the complications in the lab, it should be taken into consideration to extend the course to 3 or 4 days.
- Due to the motivation and interest showed by the students, such courses should be repeated.

## 5. Acknowledgments

To **Rufford Small Grants**, who sponsored this project and motivated to do this course and to **Yaqu Pacha**, who supported this project financially.

To the **Zoological Institute** of the Christian-Albrechts-Universität zu Kiel, for providing the Stool Minikit, as well as several laboratory material.

To the **Laboratorio de Biología Molecular** and the **Escuela de Postgrado** of the **Universidad Peruana Cayetano Heredia** for offering their laboratories and teaching facilities.

To the **Dirección General Forestal y de Fauna Silvestre** (DGFFS) of the Ministerio de Ambiente for authorizing this study and sample collection.

To Maria Lisette Delgado for the collaboration at the laboratory work.

## 6. Bibliography

- Apaza M, Valqui J, Mangel J, Roca M, Alfaro J, Santillan L, Perret JP, Onton G., Castaneda C, Munemura G, Tovar A (2004) Estado de Conservación de *Lontra felina* (Molina 1782) en la Costa Peruana. Reporte para la Comisión Permanente del Pacífico Sur, Lima
- Ferrando A, Ponsà M, Marmi J, Domingo-Roura X (2004) Eurasian otters, *Lutra lutra*, have a dominant mtDNA haplotype from the Iberian Peninsula to Scandinavia. *J Hered* 95:430-435
- Finnegan LA, Néill LO (in press) Mitochondrial DNA diversity of the Irish otter, *Lutra lutra*, population. *Conserv Genet*. doi: 10.1007/s10592-009-9955-4
- Koepfli K-P, Deere KA, Slater GJ, Begg C, Begg K, Grassman L, Lucherini M, Veron G, Wayne RK (2008) Multigene phylogeny of the Mustelidae: resolving relationships, tempo and biogeographic history of a mammalian adaptive radiation. *BMC Biology* 6:10.
- Larivière S (1998) *Lontra felina*. *Mammalian Species* 575:1-5
- Larson S, Jameson R, Etnier M, Fleming M, Bentzen P (2002) Loss of genetic diversity in sea otters (*Enhydra lutris*) associated with the fur trade of the 18th and 19th centuries. *Mol Ecol* 11:1899-1903
- Medina-Vogel G, Merino LO, Monsalve Alarcón R, Vianna J de A (2008) Coastal-marine discontinuities, critical patch size and isolation: implications for marine otter conservation. *Anim Conserv* 11: 57-64
- Murphy MA, Kendall KC, Robinson A, Waits LP (2007) The impact of time, and field conditions on brown bear (*Ursus arctos*) faecal DNA amplification. *Conserv Genet* 8:1219-1224

- Parera A. 1996. Las nutrias verdaderas de la Argentina. Boletín Técnico. Fundación Vida Silvestre Argentina. 21:1-31
- Red List of Threatened Species. Version 2009.1. [www.iucnredlist.org](http://www.iucnredlist.org). Accessed 21 July 2009
- Sharma R, Stuckas H, Bhaskar R, Rajput S, Khan I, Goyal SP, Tiedemann R (2009) mtDNA indicates profound population structure in Indian tiger (*Panthera tigris tigris*). Conserv Genet 10:909-914
- Stanton DWG, Hobbs GI, Chadwick EA, Slater FM, Bruford MW (2008) Mitochondrial genetic diversity and structure of the European otter (*Lutra lutra*) in Britain. Conserv Genet 10:733-737
- Trinca CS, Waldemarin HF, Eizirik E (2007) Genetic diversity of the Neotropical otter (*Lontra longicaudis* Olfers, 1818) in southern and southeastern Brazil. Braz J Biol 67 (Suppl.):813-818
- UICN-OSG (1998) Simposio del Grupo especial de Nutrias de UICN. Resumen. p: 34-36.
- Valqui J, Hartl GB, Zachos FE (2010) Non-invasive genetic analysis reveals high levels of mtDNA variability in the endangered South-American marine otter (*Lontra felina*). Conserv Genet. 11:2067-2072.

## 7. Figures

Figure 01. Cave at Punta Corrientes.

Figure 02. Scat sample.

Figure 03-05. Sample collection.

Figure 06. In situ observation

Figure 07-10. Lab work.

Figure 11. Gel analysis.