

UNIVERSIDAD NACIONAL DEL COMAHUE

**CENTRO REGIONAL UNIVERSITARIO BARILOCHE**

# DEPARTAMENTO DE POSTGRADO

**DOCTORADO EN BIOLOGÍA**

## CURSO DE POSTGRADO

## EFECTOS DEL CAMBIO CLIMÁTICO GLOBAL EN ECTOTERMOS

**(Avalado por la Comisión de Doctorado en Biología, Res. CRUB Nº 367/13)**

DICTADO POR:Dr. Barry Sinervo (Univ. California, USA), Dr. Donald Miles (Ohio Univ., USA), Dr. Carlos Navas (Univ. Sao Paulo, Brasil), Dr. Víctor Cussac (INIBIOMA-CONICET-UNCo) y Dra. Nora Ibargüengoytía (INIBIOMA-CONICET-UNCo)

CARGA HORARIA: 40 hs totales (20 hs teóricas; 20 hs de prácticas)

FECHA de DICTADO: 09 al 13 de diciembre de 2013

LUGAR: CRUB

CUPO: 20 (mínimo); 30 (máximo)

COORDINADORES LOCALES:Dra. Jorgelina Boretto, Dra. Erika Kubisch y Biól. Facundo Cabezas Cartes

REQUISITOS: Los participantes requieren de los conceptos básicos entregados en las carreras de grado de biología o veterinaria, conocimiento del idioma inglés y computadora portátil.

**PROGRAMACIÓN:**

El curso constará de clases teóricas en Castellano e Inglés en las cuales los docentes expondrán los conceptos detallados en el programa que se presenta a continuación, acerca del estudio de los efectos del cambio climático en peces, anfibios y reptiles y las variables ecofisiológicas principales involucradas de cada grupo. Además se desarrollarán clases prácticas de uso del programa R y se mostrará la metodología para aplicar el modelo de predicción de extinciones desarrollado por el Dr. Barry Sinervo publicado en Sinervo et al. (2010).

**Programa analítico y Cronograma de las actividades teóricas y prácticas**

**Presentación del curso y fundamentación:**

Este curso tiene una importante carga horaria Teórico - Práctica, dado que se espera que al finalizar el mismo, los alumnos puedan desarrollar en forma autónoma un trabajo que integre la información de los estudios ecofisiológicos en reptiles, peces o anfibios con la filogenia y permita utilizar el modelo de detección de posibles poblaciones extintas utilizado por Sinervo et al. (2010). Las clases prácticas también estarán acompañadas de explicaciones teóricas en las cuales se espera que los alumnos incorporen la metodología estandarizada para estudios de eco-fisiología y conducirlos en el uso y aplicación de programas de análisis de información filogenética, tales como Mesquite y R. Asimismo, se realizarán clases prácticas que constarán de preparación de modelos para el estudio de la temperatura operativa para anfibios y reptiles (lagartos y tortugas). Se discutirá el significado de esta variable en peces y otros animales acuáticos. Se realizarán experimentos para medir la temperatura crítica mínima (CT*min*), temperatura crítica máxima (CT*max*), la Temperatura preferida (Tpref) y pérdida de agua por evaporación. Se propondrán trabajos científicos de base para lectura de los asistentes.

**Objetivo:** En este curso se espera que los alumnos reciban toda la información teórica y práctica necesaria para poder desarrollar en forma autónoma un trabajo que integre la información de los estudios ecofisiológicos en su grupo de interés (reptiles, peces o anfibios) con la filogenia del mismo, incorporen la metodología estandarizada y puedan utilizar el modelo de detección de posibles poblaciones extintas utilizado por Sinervo et al. (2010). El curso se dictará en Castellano e Inglés.

**Cronograma: Lunes 9 al viernes 13 de Diciembre de 2012**.

**Cada día se realizarán clases teóricas y trabajos prácticos desde las 9 a las 17 hs con un intervalo para el almuerzo y se propondrán actividades individuales diarias (homework).**

**Lunes 9 de Diciembre**

**9 – 12 hr.** **Dr. Barry** Sinervo: Demographic and ecophysiological models of climate change from 50 million years ago to the future.

**14 – 17 hr. Dres. D. Miles, B. Sinervo, C. Navas y N. Ibargüengoytía.**

1. Making agar models (for next day deployment). FrogModels.pptx

2. Model lizards, tortoises, and rodents.

**3. Homework:** Download herpnet.org data, or data for your own species, search on physiological data. Code for stripping capture locality data to unique “populations separated by 1 km: Gopherus\_herpnet.xls

Introduction to [R]

**Martes 10 de Diciembre**

**9-12 hr.** **Dr. Victor Cussac:** Temperatura, O2, UVR, y cambio climático: claves para peces silvestres y de cultivo.

**14 – 17 hr. D. Miles, B. Sinervo, C. Navas y N. Ibargüengoytía.**

1. Deploy dataloggers in the field, frog models, lizard models, and tortoise models.

Homework: Download T*e* data the next morning before 9h00 and before lunch

**Miércoles 11 de Diciembre**

**9 – 12 hr.** **Dr. Carlos Navas:** Impacto del cambio climático en anfibios anuros: consideraciones sobre la termorregulación y la flexibilidad de las temperaturas preferenciales.

**14 – 17 hr. Dr. D. Miles, Dr. B. Sinervo.**

1. Approaches for Measuring Physiological Performance

2. Thermal Performance Curves – sprint speed, endurance and jump distance. Quantifying TPCs.

3. Measuring CT*min*, CT*max*, Evaporative Water Loss.

4. Analyzing Operative Environmental data for water loss, and activity

5. Drought stress in plants.

**Jueves 12 de Diciembre:**

**9-12 hr.** **Dr. N. Ibargüengoytía:** Ecofisiología de Reptiles: heterogeneidad ambiental y cambio climático.

**14-17 hr. Drs. D. Miles and B. Sinervo**

Mezquite and [R]. Ancestral Character Estimation – Likelihood and Bayesian Approaches. Estimation of Phylogenetic Signal. Statistical Methods Incorporating Phylogenetic Information: Univariate and Multivariate Approaches: Phylogenetic Generalized Least Squares (PGLS), Phylogenetic PCA.

**Viernes 13 de Diciembre**

**9-12 hr.** **Dr. Donald Miles.** Quantifying the physiological consequences of rising temperatures using thermal performance curves and phylogenetic comparative analyses.

**14 – 17 hr. Dr. B. Sinervo, Dr. D. Miles**

1. Introduction to PopBio in [R]

Life Tables and Demographic Data

Leslie Matrices & Population Projection Methods

Population Viability Analyses

2. Quantitative Genetics and Evolutionary Adaptation

**Carga Horaria Teórica: 20**

**Carga Horaria Práctica: 20**

**Bibliografía tentativa:**

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**Peces**

**Efectos generales del cambio climático**

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**Efectos de la temperatura**

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**El cambio climático y los peces de la región**

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