

SYLLABUS DEL CORSO

Analisi e Gestione della Biodiversità Animale

2324-1-F0601Q112

Aims

This course examines the definitions, patterns, estimates and conservation of animal biodiversity. Topics include planning a biodiversity research, techniques and analyses to be used to study animal biodiversity, conservation biology and genetics, threats to biodiversity, instruments to manage, preserve and restore animal biodiversity.

Contents

Definitions and estimates of biodiversity, instruments and techniques to study and preserve animal biodiversity, conservation biology and genetics.

Detailed program

What is the biological diversity.

Introduction and structure of the course. Definitions of biodiversity from genes to ecosystems and functional biodiversity. Measuring biodiversity.

Patterns of biodiversity.

The magnitude of the known animal biodiversity. Temporal and spatial patterns of animal biodiversity. Biodiversity hotspots.

Threats to animal biodiversity.

Human impacts and their effect on animal biodiversity. Habitat degradation, loss, and fragmentation. Pollution. Overexploitation. Invasive species and diseases. Global climate change.

Biodiversity, ecosystem functioning and services.

Contribution of animal biodiversity to ecosystem functioning and ecosystem services. The value of biodiversity and ecosystem services.

Planning a biodiversity research and sampling.

Planning a biodiversity research. Sampling strategies. Monitoring and sampling techniques.

Phenotypic and genetic variation.

Phenotypic diversity. Genetic diversity from chromosomes to single nucleotide polymorphisms.

Nucleic acid sequencing.

Nucleic acid extraction. Sequencing technologies from first to third generation sequencing. Sequencing methodologies including whole genome sequencing, reduced representation sequencing, transcriptomics and other 'omics'.

Phylogenetic inference.

Theory and definitions. Methods for reconstructing phylogenies. Application of phylogenetics in animal biodiversity studies.

Population-level variation.

Introduction to population genetics. The Hardy-Weinberg principle and deviations from its assumptions. Genetic drift. Effective population size. Natural selection. Population subdivision. Gametic disequilibrium.

Evolutionary responses to impacts.

Hybridization, invasive species, exploited populations, and climate change.

Conservation genetics.

Inbreeding depression. Demography and extinction. Population connectivity. Conservation breeding and restoration. Genetic identification and monitoring. Conservation units.

Conservation planning and prioritization.

Species level conservation and the IUCN Red List. Site level conservation and protected areas. Ecosystem management. Animal conservation in urban landscapes. Restoration.

Legal framework of conservation biology.

Environmental laws and policies at the International and national level.

Seminars and case studies.

Prerequisites

None

Teaching form

Frontal lessons

Textbook and teaching resource

PowerPoint Slides

Scientific Papers

Conservation Biology: Foundations, Concepts, Applications (3rd Edition). Fred Van Dyke, Rachel L. Lamb. Springer

Conservation and the Genomics of Populations (3rd Edition). Fred W. Allendorf et al. Oxford University Press

Semester

First semester

Assessment method

Oral examination on the topics treated during lessons + presentation of a case study (scientific paper) about the topics of the course (to be agreed with the lecturer).

Mark range: 18-30/30

Office hours

By appointment by sending an email to the lecturer (davide.maggioni@unimib.it)

Sustainable Development Goals

CLIMATE ACTION | LIFE BELOW WATER | LIFE ON LAND
