



Biodiversity of Sand Dunes

Spring 2013

Dr. Elli Groner, Dr Uri Shanas

One weekly lesson (1 hour) 4 day field trip, 3 credits, Undergraduate

Course description

Biodiversity

The aim of this course is to provide the students with a hands-on experience in studying biodiversity. The world-wide sharp decline in biodiversity is a human made crisis that ecologists are trying to solve. Some of the important questions are “What and how many species exist?”; “How do we evaluate the abundance and the richness of species?”; Why is biodiversity so important? “How do we set priority regions for conservation based on biodiversity?” One of the main issues of biodiversity is the distinction between local diversity (α diversity) and species turnover between habitats (beta diversity). In order to understand the importance of habitat diversity and landscape heterogeneity, students need to understand the difference between α and beta diversity.

Sand dunes

Sand dunes are especially vulnerable and their biodiversity is under extinction processes. We will learn about the ecosystem changes of sand dunes including natural and anthropogenic processes. We will also learn about the development threats to the dunes and the politics behind it. These questions and others will be dealt with before, during and after sampling several taxonomic groups on sand dunes.

Requirements:

The students will be required to be able to assess the species turnover between habitats at where they will compare one of the largest conservation problems: the mining of dunes. The students in this course will take part in a long-term monitoring research of the sand dunes. In Samar Dunes they will take part in a long term monitoring by the Arava institute together with Haifa University.

The course is composed of a one hour introduction lecture a week and a 4 day field trip to the Samar sand dunes in Arava area (returning to Ketura every day). One paper is expected before the trip and one after. At the end of the trip the students will be required to write a paper comparing dunes at different locations. Project can be on reptiles, rodents, insects and plants (depending on the seasonality).

Grade Components

20% Participation.

20% Biodiversity paper

60% Final report

Arava Institute for Environmental Studies (ע"ר) מכון הערבה ללימודי הסביבה

www.arava.org e-mail: info@arava.org

Kibbutz Ketura D.N. Eilat 88840 Israel

Tel. 972-8-6356618 Fax. 972-8-6356634

Course Schedule and Final Readings

Lesson 1 :

Introduction

Lesson 2:

Biodiversity

What is biodiversity? Why it is important? How do we evaluate it?

Reading:

Rajvanshi and Mathur 2010 "Biodiversity conservation and development: challenges for impact assessment"

Lesson 3:

Biodiversity indices

How to measure diversity: Alpha diversity, beta diversity, gamma diversity, simpson index, Whitaker index, Bray-Curtis index of similarity. Instructions for exercise 1

Reading:

Magurran, A. E. (2003). Measuring Biological Diversity. Blackwell Science Ltd. Malden. Pages: 25- 43.

Lesson 4

Sand dunes -

What is a sand dune? The formation of sand dunes

Readings:

Shanas et al. 2009

Lesson 5

Life history of sand dune dwellers

Biology of arthropods, reptiles and rodents, their taxonomic status and ecology

Readings:

Bouskila, A. and Dickman, C.R. 2006. Species diversity of vertebrate communities in arid lands. In: M. Shachak, S. T. A. Pickett, J. R. Gosz and A. Perevolotsky (eds.) Biodiversity in Drylands: Towards a Unified Framework for Research and Management. Oxford University Press.

Expedition Samar 2nd – 5th April

Field work

The students will practice sampling in a research plot (Samar dunes), by setting rodent traps, and pitfall traps for reptiles and invertebrates. The students will practice collection, handling, identification and recording wildlife. Every day after the morning and evening sessions, the students will work on sorting and analyzing the collected data.

Lesson 6

Summary of expedition