



BIOTALENT – Talent in Biodiversity

Innovative education and new skills to increase engagement in Science

REPORT

INTELLECTUAL OUTPUT O5

ONLINE LEARNING COMPONENT

ACTIVITY LEADING ORGANISATION: HHNM

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Erasmus+ KA2 Strategic Partnerships for vocational education and training

Grant Agreement: 2016-1-BE02-KA202-017356

Start - End: 01/09/2016 - 31/08/2019

Document approved by BIOTALENT Consortium

Date: August 2019

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1. INTRODUCTION

The pilot course '**BIODIVERSITY IN A CHANGING CLIMATE: E-LEARN MORE**' targets biodiversity and climate change using climate sensitive model species in order to develop learners' competences in those key fields. The training programme is centred on two groups of model organisms on which best practices in blended educational programmes in biodiversity can be worked out and demonstrated. Learners gain insight into the problem of biodiversity loss and climate change and will learn about the model organisms that:

1. reflect the profound changes of the global environment, and
2. show painfully what we are losing.

The 80 learning hours blended training programme consists of two main learning components: (i) an online learning component with a general module and a case study module (40 learning hours) and (ii) an attended learning component with a training on-the-job module (40 learning hours).

In the general module '**Biodiversity and Climate Change**' learners study biodiversity, its importance to the planet, investigate the causes of climate change and its consequences for biodiversity. After successfully completing the general module, learners can choose either **Herpetofauna** or **Medicinal plants** as case study organisms to continue the BIOTALENT course.

2. COURSE OVERVIEW AND TIMING

The online part of the course started on 7 January 2019 and ended on 31 March 2019.

General module - BIODIVERSITY and CLIMATE CHANGE

6 weeks - 20 learning hours - 3-4 h weekly commitment

Text: Gergely Babocsay, HNHM & Petros Lymberakis, NHMC-UoC

Copy editor and lay-out: Isabella Van de Velde, RBINS

IBL methodology: Catherina Voreadou, NHMC-UoC & Tine Geunis, RBINS

E-learning course moodle: Carlos Rodrigues, EduFor

Theme 1. Introducing biodiversity

- 1.1 What is biodiversity? ♦ Gergely Babocsay - Readings
- 1.2 Origin of biodiversity ♦ Gergely Babocsay - Readings
- 1.3 Agrobiodiversity – Genetic diversity ♦ Gergely Babocsay - Readings
- 1.4 Biodiversity hotspots ♦ Gergely Babocsay - Readings



1.5 A short history of biodiversity ♦ Petros Lymberakis - Reading

Relicts of a past climate - Video

1.6 What is a species? ♦ Petros Lymberakis - Reading

Theme 2. Exploring biodiversity

2.1 Relationship of organisms in ecosystems, ecological niche ♦ Petros Lymberakis - Reading

2.2 Documenting biodiversity - scientific collation ♦ Gergely Babocsay - Readings

Keeping track of changes: monitoring the living world around us - Video

2.3 Biodiversity patterns and processes regulating species diversity ♦ Petros Lymberakis - Reading

2.4 Importance of biodiversity for humans ♦ Gergely Babocsay - Readings

Theme 3. Threats to biodiversity in a changing climate

3.1 Habitat loss, fragmentation and degradation ♦ Gergely Babocsay - Readings

Studying genetic diversity for species conservation - Video

3.2 Overexploitation of wildlife ♦ Gergely Babocsay - Readings

3.3 Invasive alien species ♦ Gergely Babocsay - Readings

3.4 Climate change ♦ Gergely Babocsay - Readings

After successfully completing the general module, learners choose one of the case studies Herpetofauna or Medicinal Plants.

Case study module – HERPETOFAUNA

6 weeks - 20 learning hours - 3-4 h weekly commitment

Text: Gergely Babocsay, HNHM, Judit Vörös, HNHM & Petros Lymberakis, NHMC-UoC

Copy editor and lay-out: Isabella Van de Velde, RBINS

IBL methodology: Catherina Voreadou, NHMC-UoC & Tine Geunis, RBINS

E-learning course moodle: Carlos Rodrigues, EduFor

Theme 1. Origin of the herpetofauna

1.1 Origin of the amphibians ♦ Judit Vörös - Reading

1.2 What is a reptile? ♦ Petros Lymberakis - Reading

Theme 2. Diversity of the herpetofauna

2.1 Diversity of amphibians ♦ Judit Vörös - Reading

2.2 Climate change in Europe ♦ Petros Lymberakis - Reading

2.3 Studying diversity of amphibians and reptiles ♦ Petros Lymberakis & Judit Vörös - Readings

Diversity of amphibians and reptiles: Herpetological collections - Video

Theme 3. Physiology and ecology of the herpetofauna

- 3.1 Physiology of amphibians ♦ Judit Vörös - Reading
- 3.2 Ecological adaptations of amphibians ♦ Judit Vörös - Reading
- 3.3 Physiology of reptiles ♦ Petros Lymberakis - Reading
- 3.4 Ecological adaptations of reptiles ♦ Petros Lymberakis - Reading

Theme 4. Threats to the herpetofauna

- 4.1 Habitat loss, degradation and fragmentation ♦ Gergely Babocsay - Readings
- Threats to Herpetofauna: Snake in the city - Video
- 4.2 Invasive alien species ♦ Gergely Babocsay - Readings
- 4.3 Diseases ♦ Gergely Babocsay - Readings
- 4.4 Overexploitation ♦ Gergely Babocsay - Readings
- 4.5 Climate change ♦ Gergely Babocsay - Readings

Theme 5. Herpetofauna and humans

- 5.1 Herpetofauna as source of scientific disciplines ♦ Judit Vörös - Reading
- Conservation and evolutionary ecology of Amphibians - Video
- 5.2 Herpetofauna as source for future human welfare ♦ Gergely Babocsay - Readings
- 5.3 Effect of herpetofauna on human life ♦ Gergely Babocsay - Readings
- 5.4 Conservation of herpetofauna, organisations, citizen science ♦ Petros Lymberakis - Reading

Case study module - MEDICINAL PLANTS

6 weeks - 20 learning hours - 3-4 h weekly commitment

Text: Zoltán Barina, HNHM & Manolis Avramakis, NHMC-UoC

Copy editor and lay-out: Isabella Van de Velde, RBINS

IBL methodology: Catherina Voreadou, NHMC-UoC & Tine Geunis, RBINS

E-learning course moodle: Carlos Rodrigues, EduFor

Theme 1. Plant diversity

- 1.1 How many plant species are there? ♦ Zoltán Barina - Readings
- Botanical collections - Video
- 1.2 Plant and habitat diversity ♦ Zoltán Barina - Readings

Theme 2. Complexity of plant biogeography

- 2.1 Environmental adaptation and tolerance of plants ♦ Zoltán Barina - Readings
- 2.2 Dynamics in plant distribution and dispersal ♦ Zoltán Barina - Readings
- Unique habitats, isolated hotspots - Video
- 2.3 Complexity of biogeography ♦ Zoltán Barina - Readings

Theme 3. Plants and climate change

3.1 Climate changes and postglacial migration of plants ♦ Manolis Avramakis - Reading

3.2 Plant responses to climate change ♦ Zoltán Barina - Readings

Theme 4. Plants as source for the future

4.1 Everyday uses of plants ♦ Manolis Avramakis - Reading

4.2 Fuel from plants ♦ Manolis Avramakis - Reading

4.3 Food from plants ♦ Manolis Avramakis - Reading

4.4 Industrial uses of plants ♦ Manolis Avramakis - Reading

4.5 Medicinal plants. Past, present and future ♦ Manolis Avramakis - Reading

Theme 5. Threatening factors of plant diversity

5.1 Plants in the Anthropocene ♦ Zoltán Barina - Reading

5.2 Threats to plant diversity ♦ Zoltán Barina - Readings

The importance of botanical gardens. The Fűvészkert in Budapest. - Video

5.3 Herbs vs nature conservation ♦ Manolis Avramakis - Reading

Appendix: Annotated checklist of medicinal plants.

Medicinal plants in the lessons and their medicinal use.

♦ Zoltán Barina, HNHM & Isabella Van de Velde, RBINS - Reading

3. PARTICIPANTS

The online part of the course aimed at unlimited participation and provided open access to anyone interested to join the course. Given the training topic there is a huge potential audience to reach. To enable a good follow-up and analysis of the pilot course in the present project, it was initially decided to limit the number of participants to 400.

In order to have an idea about learners' interest to follow the course topic, a pre-registration was announced and 614 people pre-registered. At the course start, 497 people enrolled to the course, exceeding the expectations. A diverse group of learners from across Europe and beyond participated in the on-line part of the course.

4. COURSE PEDAGOGICAL APPROACH

The entire course is based on the Inquiry Based Learning (IBL) methodology, which is a constructivist approach where the overall goal is for learners to build knowledge by themselves. Inquiry Based Learning incorporates many current learning approaches such as project-based learning, problem-based learning, design thinking, etc. Equal emphasis is given on content and in the process of learning, learners are actively involved in constructing understandings through research and several consolidation activities, many of which bring them outside of their learning settings.

Each course theme includes different steps through which learners build knowledge by themselves. In Step 1, learner's prior knowledge is ascertained through a quiz or problem-based activity. In Step 2, after going through carefully selected resources, learners retake the quiz or confirm their answer of the problem-based activity. In Step 3 they work out assignments in the consolidation activities. All learners' work is uploaded on their workspace (padlet) and posted to a wall (lino). Through a procedure of 'Meet and Share' in Step 4, learners have the possibility to share their understanding and findings with their co-learners, learning thus from and with each other. They can comment, compare and evaluate their co-learners work. The course structure and different IBL steps are illustrated in Fig. 1-9.

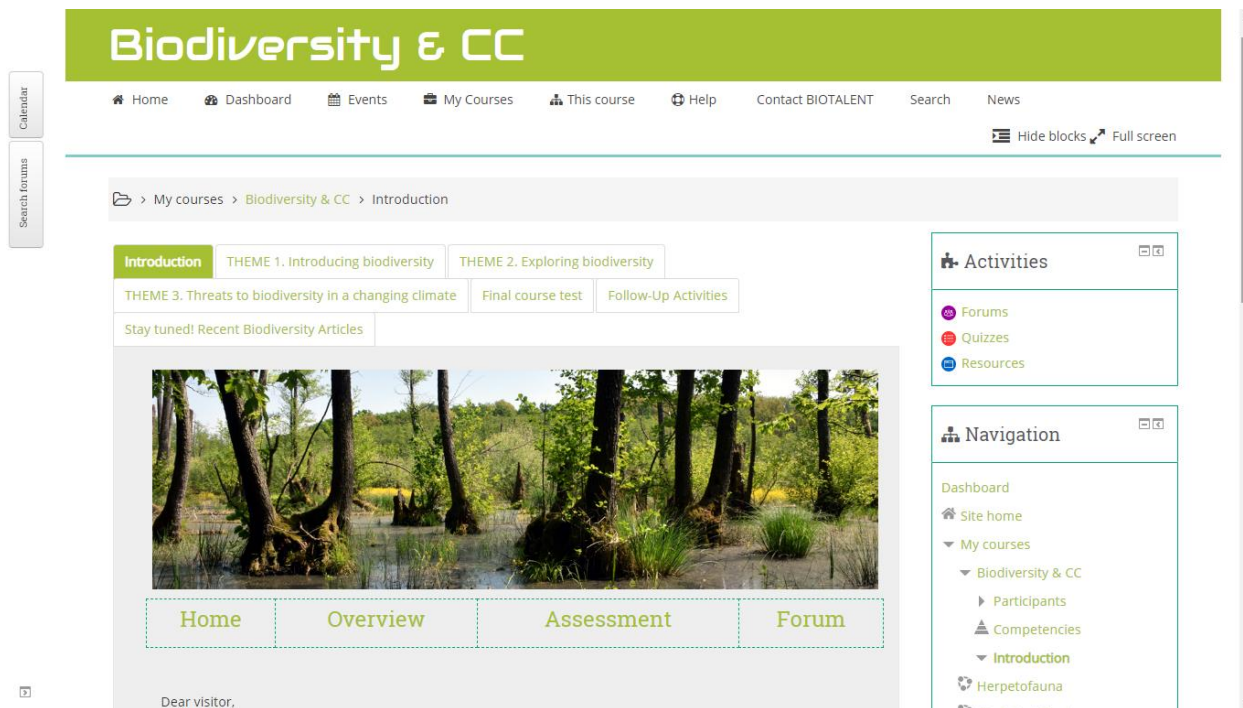


Fig. 1 General course module, introduction page

The screenshot shows the 'Biodiversity & CC' course interface. The top navigation bar includes links for Home, Dashboard, Events, My Courses, This course, Help, Contact BIOTALENT, Search, and News. A sidebar on the left contains a Calendar and Search boxes. The main content area displays the course structure with tabs for Introduction, THEME 1. Introducing biodiversity (selected), THEME 2. Exploring biodiversity, THEME 3. Threats to biodiversity in a changing climate, Final course test, and Follow-Up Activities. Below these tabs, a progress bar shows the current step: STEP 1. ACTIVATE YOUR PRIOR KNOWLEDGE - take the quiz. The main content area is divided into four sections: Home, Overview, Assessment, and Forum. The right sidebar contains an Activities section with links to Forums, Quizzes, and Resources, and a Navigation section with links to Dashboard, Site home, My courses, Biodiversity & CC, Participants, Competencies, and THEME 1. Introducing biodiversity.

Fig. 2 General module – IBL methodology learning steps

The screenshot shows the 'Biodiversity & CC' course interface, specifically the 'STEP 2. RESEARCH and DISCOVER' section. The top navigation bar and sidebar are the same as in Fig. 2. The main content area displays the title 'STEP 2. RESEARCH and DISCOVER' and a box containing the following text:

Research based on multiple resources
 Quiz will count for 5% of the total mark.

- » Synthesize information from the selected resources of THEME 1 or from your own research and improve your knowledge. This will provide you with necessary insights to correctly answer the previous same quiz in STEP 1.
- » After going through the resources and after reading Topic 1.5 'A short history of biodiversity', you are ready to watch the video 'Relicts of a past climate'.
- » Once you went through all the resources, **retake the quiz**. You will have the possibility to correct your answers given in STEP 1.

Note: the answers to the questions will be shuffled!

Below the text box, a list of resources is shown:

- 1.1 What is biodiversity - Discover and Learn.pdf
- 1.1 What is biodiversity - Read and Think.pdf
- 1.1 What is biodiversity - Read more and Immerse.pdf
- 1.2 Origin of biodiversity - Discover and Learn.pdf
- 1.2 Origin of biodiversity - Read and Think.pdf

The right sidebar contains a Navigation section with links to Dashboard, Site home, My courses, Biodiversity & CC, Participants, Competencies, and STEP 2. RESEARCH and DISCOVER (selected).

Fig. 3 General module - IBL Step 2

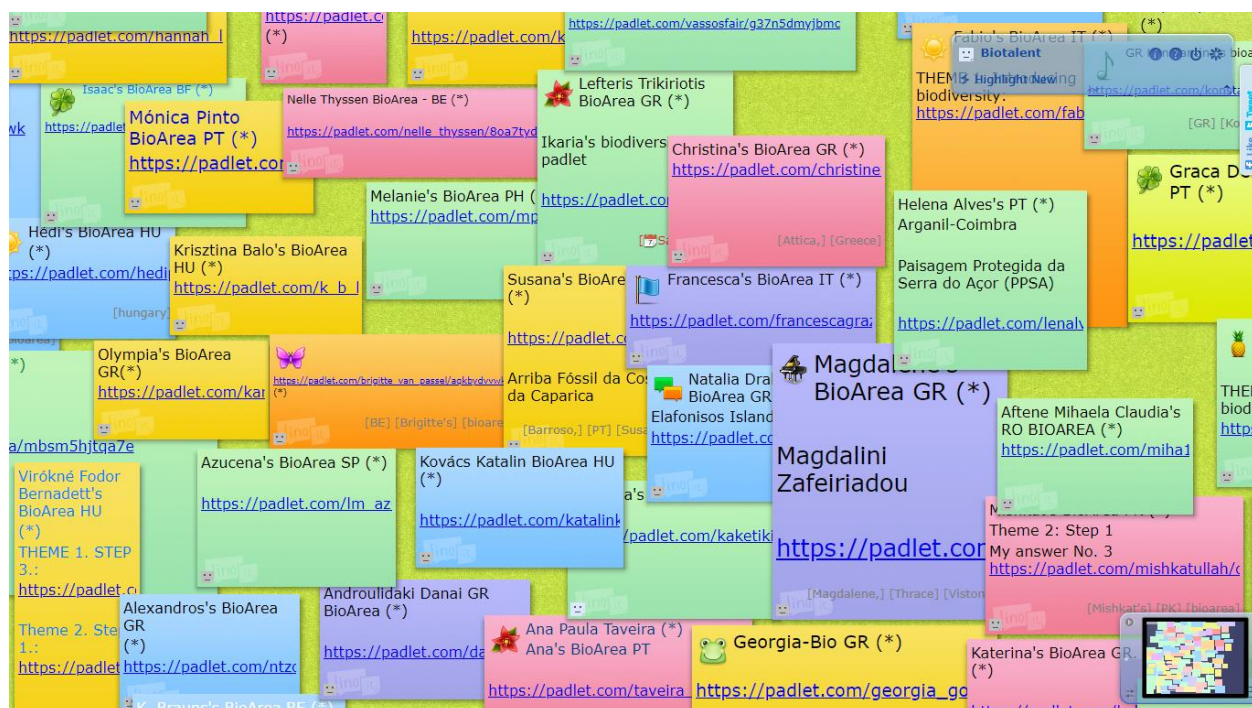


Fig. 4 General module - IBL Step 3 – 4: posted links of learners' padlet on the wall (lino)

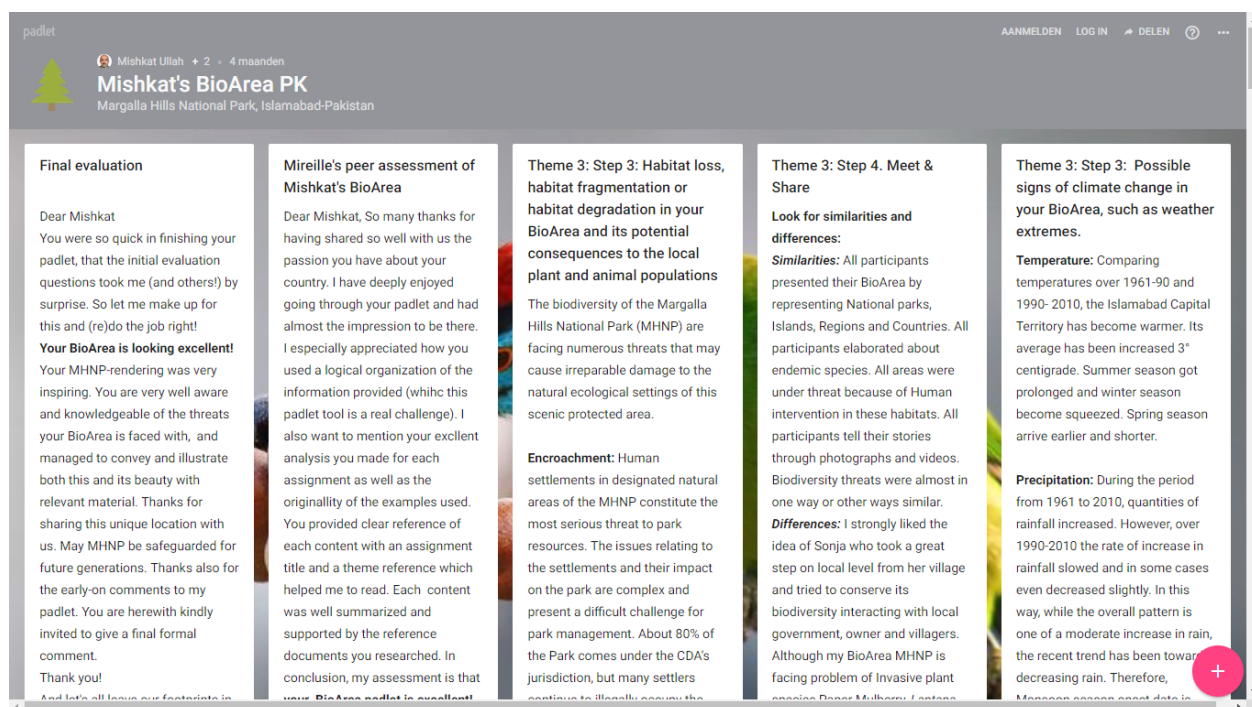


Fig. 5 Course module IBL Step 3-4: example of a learner's padlet

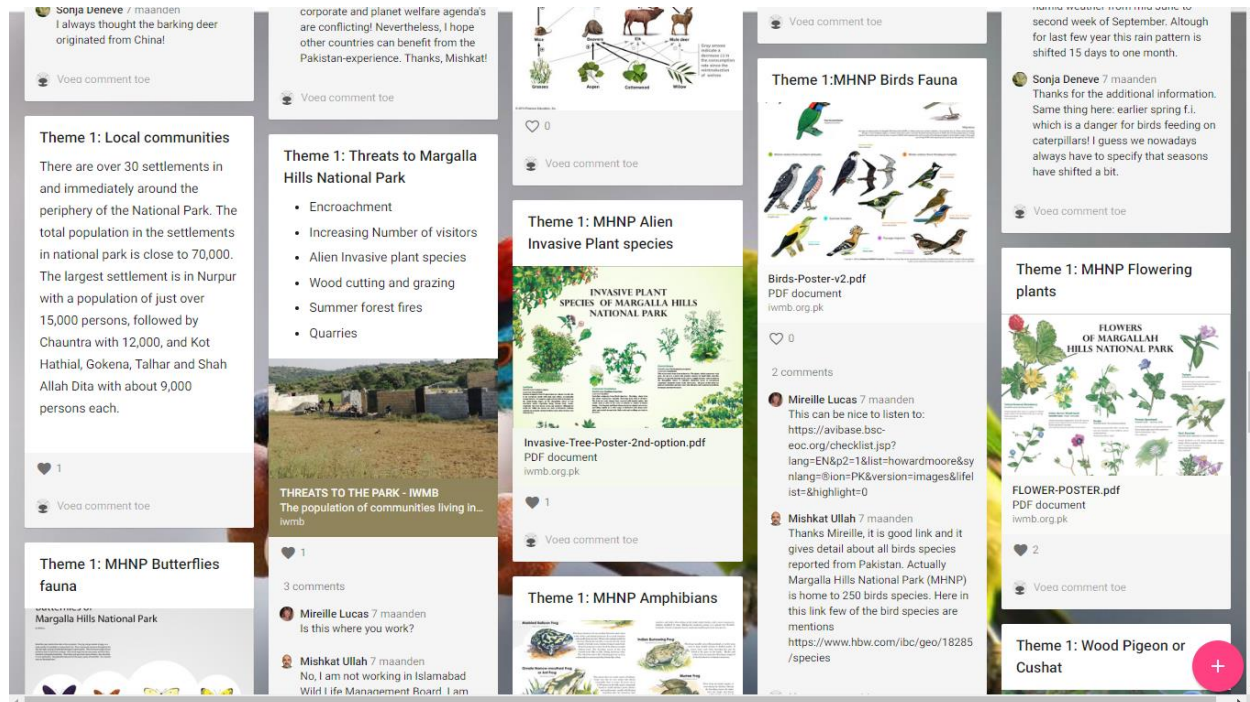


Fig. 6 Course module IBL Step 3-4: example of a learner's padlet

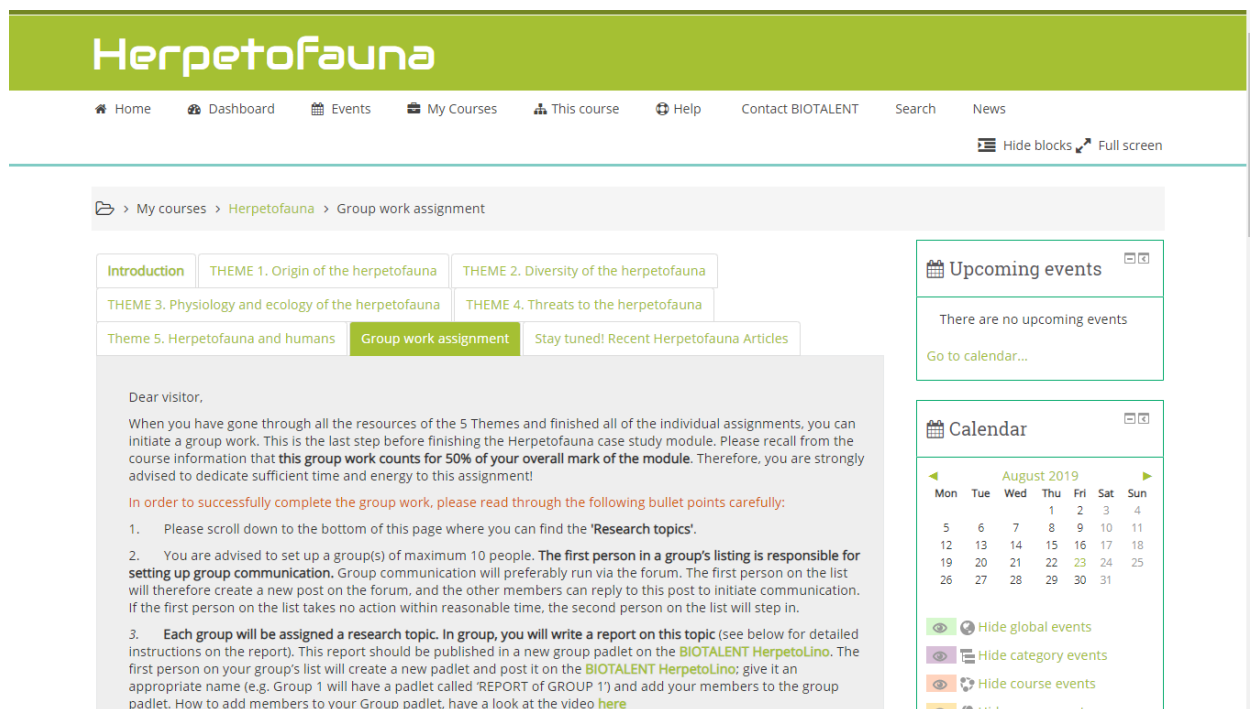


Fig. 7 Case study module: group work

padlet | Giuliana Finotti + 5 • 5 maanden

REPORT GROUP 6

Medicinal Plants module - Group work assignment

Research Topic

Work assignment - Group 6

Provide a description of plant species living in the most extreme environment of your PlantArea, with notes in particular on how they manage to survive.

0

Voe comment toe

REPORT

Title

Plant adaptations to drought environments in the Mediterranean and Carpathian Basins

0

Voe comment toe

Authors and Affiliation

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Introduction

On a global basis, drought, referred to soil and/or atmospheric water deficits in conjunction with coincident high temperature and radiation, imposes the most important environmental constraints to plant survival and to crop productivity.

In nature, plants can either be subjected to slowly developing water shortage (within days to weeks or months) or face short-term water deficits (hours to days). In the case of slowly developing water deficits, plants can either escape dehydration by shortening their life cycle or optimizing their resource gain in the long term through acclimation responses. In the case of rapid dehydration,

Preliminary results for each PlantArea

Drought adaptation in plants of Mediterranean maquis and garrigue of Italy

Italy is an European peninsula located in the heart of the Mediterranean Sea. Thanks to its geomorphological complexity (Doglioni & Flores 1997) and its considerable development in latitude, Italy hosts an incredible variety of habitats. Central-south territory is dominated by the **mediterranean maquis and garrigue** with densely packed bushes, evergreen small trees with coriaceous leaves and ephemeral herbaceous species able to grow in cravasses or gorges of rocky slopes and on sandy dunes.

Results - How plants adapt to drought environments?

Plants in their natural habitats adapt to drought stress in the environment through a variety of mechanisms, ranging from **tolerance responses** to low soil moisture and low water availability, to major survival mechanisms of **escape or avoidance** by early flowering or short vegetative cycle in absence of seasonal rainfall. Plants in naturally arid conditions retain large amounts of biomass due to drought tolerance and can be **classified into 4 many categories in relation to their adaptations.**

1

Fig. 8 Case study module: example of group work

padlet | Lefteris Trikirotis • 2 maanden

Lefteris Trikirotis - Ikaria island BioArea GR

Biotalent course

Lefteris Trikirotis 7 maanden

I feel great participating at this online course about biodiversity like a lizard by the sun

2

3 comments

Fabio Cianferoni 6 maanden

H1! I would like to know which lizard species live on this island.

Fabio Cianferoni 6 maanden

Do you like to evaluate my BioArea? It is another Mediterranean island: Montecristo (see https://padlet.com/fabio_1t/wsu71gkrmvofsi).

Lefteris Trikirotis 7 maanden

Higher monthly rain around Greece during January 2019

Ikaria weather station

0

Voe comment toe

Lefteris Trikirotis 7 maanden

Threats to biodiversity in a changing climate

Possible signs of climate change in your BioArea, such as weather extremes.

The meteorological data of Ikaria have a very short history as the weather station which sends data to the National service is a few years old

What is obvious last years is that spring, summer and autumn gets drier comparing to the past, winter is milder with very few snow or ice according to older people memories and rain is balanced between seasons

Threats to biodiversity in a changing climate

Possible invasions of

Lefteris Trikirotis 7 maanden

Invasive species in the Mediterranean Sea

Many species in Aegen sea around Ikarian coast are invasive

WATCH FOR INVASIVE SPECIES

If you see these species, send your record to observations@archipelago.gr. Your help is needed!

SEND A MESSAGE: To observations@archipelago.gr with this message: SPECIES NAME (see above for identification help) LOCATION (approximate coordinates) PHOTO (if possible) A PICTURE (if you have one)

1

Lefteris Trikirotis 7 maanden

Goldfish as an invasive species? They are taking over one Washington lake

Goldfish as an invasive species? It's ha...

The State of Washington will soon have ...

0

Voe comment toe

Lefteris Trikirotis 7 maanden

One popular rare plant of Ikaria at a local digital magazine

Fig. 9 Case study module: example of group work

5. ONLINE LEARNING MATERIAL

The course material was developed by our BIOTALENT experts exclusively for the needs of the 'Biodiversity in a changing climate: e-learn more' course. There are three main types of learning materials: Power Point Presentations (ppts), texts and videos. The layout of ppts is colourful, well illustrated with photos and texts are easy to go through. Relevant literature accompanies all resources. A glossary is included and can be consulted [here](#).

The figure displays a collection of educational materials related to biodiversity and climate change. The resources include:

- Textbooks and Course Materials:** A textbook titled "Module Biodiversity and Climate Change" and various lecture slides from a course.
- Topic 1.1: What is biodiversity?** A slide featuring a European tree frog (Hyla arborea) and a discussion on the Tree of Life.
- Topic 1.4: Biodiversity hotspots** A slide highlighting the Mediterranean Basin as a species-rich hotspot, featuring a black-headed bunting (Emberiza melanocephala) and a Greek stream frog (Rana graeca).
- Topic 3.4: Climate change** A slide discussing the impact of human activities on climate change, showing a coal mine and a power station.
- Human influences** A slide explaining how human activities contribute to climate change, specifically mentioning the release of greenhouse gases.
- Are plants affected by climate change?** A slide showing a map of Europe and discussing the impact of climate change on plant species.
- Cultivation practices** A slide discussing the impact of cultivation practices on biodiversity, showing a field of crops.
- Organic farming** A slide discussing the benefits of organic farming, showing a field of crops.
- Organic farming** A slide discussing the benefits of organic farming, showing a field of crops.
- Organic farming** A slide discussing the benefits of organic farming, showing a field of crops.

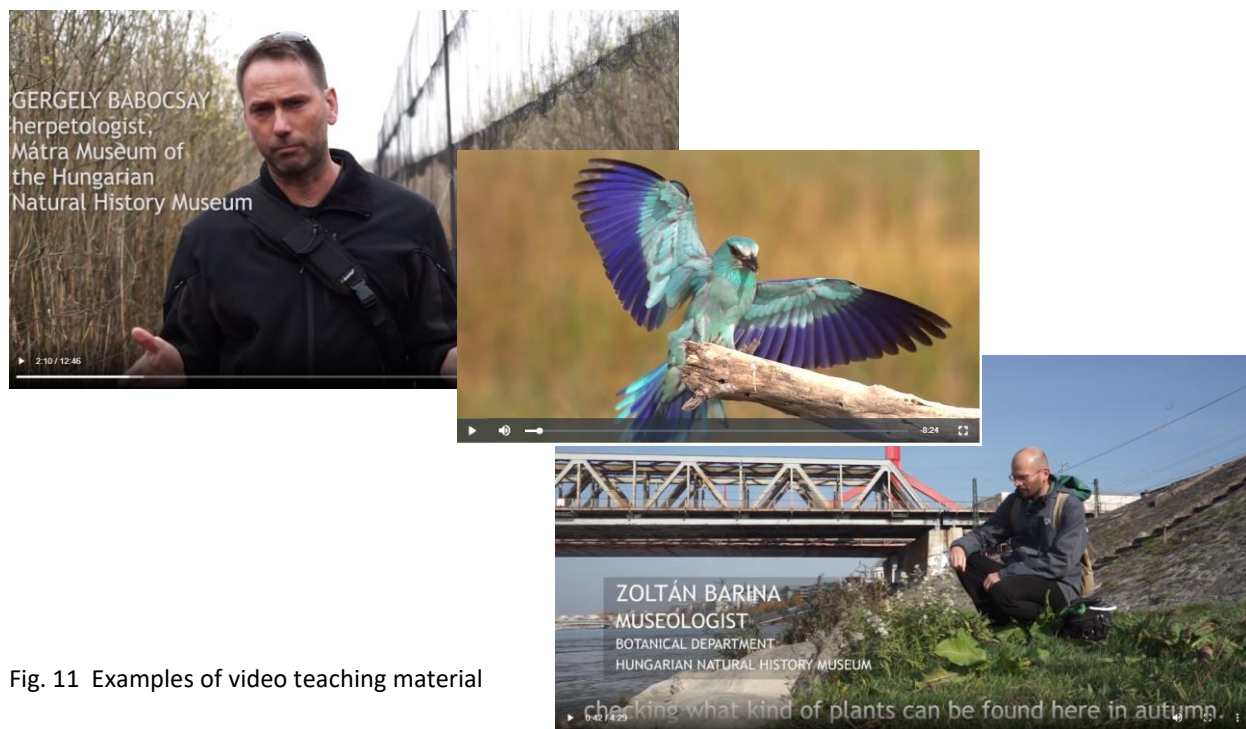


Fig. 11 Examples of video teaching material

Open educational resources

Except where otherwise specified, all course resources are: “© BIOTALENT project”, published in open access and distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0) which permits remix, transform and build upon the material non-commercially, as long as the original author and source are credited and new creations are distributed under the same license as the original.

6. LEARNING OUTCOMES

General module - BIODIVERSITY and CLIMATE CHANGE

By the end of this course, learners will have the knowledge, skills and competences in order to:

Learning area

Theme 1. Introducing biodiversity

Define the concept of biodiversity.

List and explain the key elements of biodiversity.

Use the most widely applied diversity indices.

List the main factors driving evolution.

Explain how the Darwinian algorithm works, and how the changing environment (especially climate) drives evolution.

Define the concept of agrobiodiversity.

Compare agrobiodiversity to natural diversity and identify the differences and similarities between them.

List some examples of highly diverse cultivated organisms.

Explain why loss of agrobiodiversity is detrimental to societies.

Identify natural sources that improve agrobiodiversity.

Explain which factors determine the distribution of biodiversity.

Identify biodiversity hotspots, summarise their criteria, and demonstrate their global distribution.

Compare biodiversity hotspots to hotspots of particular taxa (e.g. mammals or birds).

Compare the diversity of organisms among different areas.

Describe some hotspots and include characteristic species.

Illustrate the appearance and history of the main organismal groups.

List the factors shaping biodiversity.

Define species concept.

Differentiate the principle methods of taxonomy and systematics.

Interpret phylogenetic trees and cladograms.

Summarise the main species concepts.

Learning area

Theme 2. Exploring biodiversity

Explain the concept of an ecological niche, and how it relates to adaptation and competition.

List the different possible relationships between organisms.

Explain trophic pyramids and food webs.

Identify how they contribute to constitution ecosystems.

Explain how large scaled and/or local ecological processes maintain diversity.

Illustrate how diversity creates more diversity.

Argue for the importance of scientific collections.

Explain how they are built and help taxonomy and other aspects of science.

Relate to scientific collections as sources of biodiversity related data.

Explain patterns of biodiversity, and identify factors and processes regulating biodiversity.

Explain speciation and extinction.

Explain how organisms may affect human health.

Explain bioprospecting and the way it investigates natural compounds as sources for biodiversity.

Contrast natural-selection tested properties of organisms with artificial compounds, and their relative values as targets for pharmaceutical research.

Present scientific collections as important resources for solving epidemiological problems.

Link biodiversity to economy: potential new crops, industrial raw material, pests, etc.

Evaluate how ecosystem services contribute to all levels of the economy.

Learning area

Theme 3. Threats to biodiversity in a changing climate

Identify the main causes of biodiversity loss.

Explain, by using examples, how habitat loss and degradation impedes evolutionary and ecological processes resulting in decline of biodiversity.

Explain how humans, by over harvesting species, drive them to (near) extinction.

Evaluate which activities put the highest pressure on populations.

List the key characteristics of an invasive alien species (IAS).

Differentiate between the characteristics of IAS and non-invasive species to demonstrate how non-invasive species become invasive.

Explain how IAS drive habitat degradation, habitat loss and extinctions.

Define climate change and list the factors causing it.

Explain how climate change drives range shifts of organisms, causes extinctions or recolonisations.

Summarise why the present climate change drives large scale extinctions as organisms are captured in small natural islands called nature reserves and large scale evolutionary and ecological processes are hampered.

Summarise the large climate changes in the history of Earth and their effect on evolution.

Illustrate the ways biota reacts to climate change, using the Pleistocene glaciations and the subsequent Holocene warming and climatic stability as an example.

Explain the climate change driven movement of biota: retreat, recolonisation, adaptive colonisation.

Case study module - HERPETOFAUNA

By the end of this course, learners will have the knowledge, skills and competences in order to:

Learning area

Theme 1. Origin of the herpetofauna

Identify the main inventions developed in the course of amphibian evolution.

Describe the phylogenetic relationships among the main groups of amphibians.

Demonstrate the main differences among the main amphibian orders.

Define a reptile.

Indicate the main differences between amniotes and anamniotes.

Identify the main inventions developed in the course of evolution.

Learning area

Theme 2. Diversity of the herpetofauna

Recognise the past and present diversity and relationships of amphibians and reptiles.

Illustrate the richness of the amphibian and reptile fauna of the world.

List the factors that determine and influence the distribution of amphibians and reptiles across the globe.

Exemplify the distribution of species richness of amphibians and reptiles through selected reptile families.

List the main methods used in describing taxa of amphibians and reptiles.

Describe how glaciations affected the fauna and flora of Europe.

Illustrate how the fauna and the flora of Europe recolonised Europe in the Holocene.

Learning area

Theme 3. Physiology and ecology of the herpetofauna

Contrast the physiology of amphibians and reptiles in light of the environments they are capable to inhabit.

Give examples of adaptations of amphibians and reptiles that enables them to inhabit a wide range of environments.

Learning area

Theme 4. Threats to the herpetofauna

List the factors threatening the amphibians and reptiles of the world and describe the mechanism how these factors cause decline of the populations.

Illustrate how the various threatening factors cause decline of amphibian and reptile populations.

List the most important plagues threatening the world's herpetofauna and describe the way they compromise the health of frogs, salamanders and snakes.

Give examples on how climate change influences the survival of amphibians and reptiles.

Illustrate how the herpetofauna copes and coped with the environmental changes imposed by recent and today's climate changes.

Learning area

Theme 5. Herpetofauna and humans

Demonstrate the ways amphibians and reptiles are useful objects to study the theory of systematics, evolution, ecology and other realms of biology.

Give examples of traits of amphibians and reptiles that could prove useful for future development.

Illustrate how the herpetofauna may affect human life negatively.

List global and regional organisations dealing with the conservation of amphibians and reptiles.

Case study module - MEDICINAL PLANTS

By the end of this course, you will have the knowledge, skills and competences in order to:

Learning area

Theme 1. Plant diversity

List the characteristics of plant diversity.

Identify the plant diversity hotspots.

List the requirements and main methods of describing new plant taxa.

Describe the principles of naming plants and the history of plant naming.
Explain the reasons of scientific disagreements.
Discuss the problems encountered when describing plant diversity.
Illustrate the nature of financing scientific research and scientific publications.

Learning area

Theme 2. Complexity of plant biogeography

List and describe the different biogeographic regions.
Explain the occurrence of plants of the same species in different habitats.
Explain the importance of substrate types for the distribution of plant species.
Describe the characteristics of stationary life.
Illustrate the distribution ranges of plant species.
Compare (oceanic) islands with habitat islands.
Give examples of the phenology of individual plants.
Explain the history of recent plant biogeography.
Compare the ecological preferences of co-existing plant species.

Learning area

Theme 3. Plants and climate change

Explain why some plant species are “moving north”.
Relate reduced yields of crops with climate change.
Experience climate change outside of an air-conditioned room.
Distinguish between climate change and weather change.
Explain why it is difficult to study the impact of climate change.
Give examples of simultaneously interacting phenomena influencing climate change.
Illustrate the serious impact of plant introduction.
Define plant phenology.
Explain the link between speciation and climate change, taking into account the time factor.
Identify the spreading of invasive alien plant species.
Propose escape routes for plants in a changing climate.

Learning area

Theme 4. Plants as source for the future

Describe the decreasing dependence on wild plants for food once people started domesticating plants.
Propose a way plants can help us to reduce the use of plastic bags.
List the main biofuel crops.
Summarise the controversy and problems with biofuels.
Describe the worldwide importance of cereals for our need for proteins.
Compare the uses of different edible oils.
Explain which parts of plants are used as spices and give examples.
List the most important plants used in the fiber industry.

List the four major biochemical classes of medicinal compounds found in plants.
Explain why in a lot of places people still use herbs, instead of synthetic drugs.

Learning area

Theme 5. Threatening factors of plant diversity

Explain the irreversible consequences of species extinctions.
List some natural mechanisms that are disadvantageous in a fast changing environment.
Discuss the impact of fast and slow climatic changes on plants.
Explain the importance of invisible plant diversity.
Illustrate the disadvantages of decreasing biodiversity in horticulture.
Illustrate how spreading human populations causes decline of natural habitats.
Explain why human transport drastically transforms global biogeography.
Illustrate the spread of invasive alien species in time.
Name the inventories of threatened plant taxa.
Distinguish in situ from ex situ conservation of medicinal plants.
Explain why natural reserves and wild nurseries play an important role in medicinal plants conservation.

7. COURSE CERTIFICATES

In the framework of the ERASMUS+ programme, participants received upon successful completion of the course the **BIOTALENT ECVET* Certificate** and the **Europass Certificate Supplement**, confirming the knowledge, skills and competences they gained.

Online part: 4 ECVET points

Attended part: 4 ECVET points

* European Credit system for Vocational Education and Training

Pre-registrations via BIOTALENT website (21/12/2018)	614
General Module: Biodiversity and Climate Change (07/01/2019 – 11/02/2019)	
Total learners enrolled	497
Learners passed (score $\geq 60\%$)	176
Case study module: Medicinal Plants (18/02/2019 – 31/03/2019)	
Total learners enrolled	99
Learners passed (score $\geq 60\%$)	67
Case study module: Herpetofauna (18/02/2019 – 31/03/2019)	
Total learners enrolled	67
Learners passed (score $\geq 60\%$)	44

8. REFERENCES

BIOTALENT e-learning platform:

<http://biotalent.ucdc.uoc.gr/>

[General course information](#)

[General course module 'Biodiversity and Climate Change'](#)

[Case study module 'Herpetofauna'](#)

[Case study module 'Medicinal Plants'](#)

In order to have access to the course information and resources, please create an account on the e-learning platform.

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