



The Teaching of the Biological Subjects, their Connection to Research and Practice

- but not only about this...



Ingrid Turisová
Mykyta Peregrym

Department of Biology and Ecology
Faculty of Natural Sciences,
Matej Bel University in Banská Bystrica, SK



Let me introduce myself

Education

- 2014 - Assoc. Prof.
Faculty of Mining and Geology VŠB - Technical University of Ostrava.
Field of science: Environmental Protection.
Habilitation thesis: Plants as indicators of the state of the environment in natural and contaminated areas.
- 2009 - PhD.
Faculty of Science, Comenius University in Bratislava +
Institute of Botany, Slovak Academy of Sciences, Bratislava
PhD thesis: Spatial analysis of ecoelements and
phytogeographical boundaries – case study in the Zvolen basin.
- 1989 - Dr.
Faculty of Natural Sciences, Comenius University Bratislava
Thesis: Genus *Crepis* L. in Slovakia - species of mountain and alpine locations.

➡ 1998 – teacher at the Matej Bel University (MBU)

the courses which I led according to field of study

Name of the profile course	Degree	Acad. year	Field of study
Flora of habitats of Slovakia	I.	previous	Ecological and Environmental Sciences
Phytocoenology	I.	previous	Ecological and Environmental Sciences
Diversity and Phylogeny of Vascular Plants	I.	current	Teacher Training and Education Science Ecological and Environmental Sciences
Field course in botany and zoology *	I.	current	Teacher Training and Education Science Ecological and Environmental Sciences
Dendrology	I.	current	Teacher Training and Education Science Ecological and Environmental Sciences
Practical botany *	I.	current	Teacher Training and Education Science Ecological and Environmental Sciences
Habitats of Slovakia *	I.	current	Teacher Training and Education Science Ecological and Environmental Sciences
Applied botany *	II.	current	Teacher Training and Education Science Ecological and Environmental Sciences
Restoration Ecology *	II.	current	Ecological and Environmental Sciences
Biosystematic, evolution and ecology of plants	III.	current	Ecological and Environmental Sciences

* - the course is realized in cooperation with another colleague from the department or the Institute of Botany of the Slovak Academy of Sciences

2019 – we have created common workplace - Central Slovak Center for Science and Education SAS and MBU

Matej Bel University in Banská Bystrica

University in the heart of Slovakia, university with a heart.

umb
UNIVERZITA
MATEJA BELA
V BANSKEJ BYSTRICI



EKONOMICKÁ
FAKULTA UNIVERZITY
MATEJA BELA



FAKULTA POLITICKÝCH
VIED A MEDZINÁRODNÝCH
VZŤAHOV UNIVERZITY
MATEJA BELA



PRÁVNICKÁ
FAKULTA UNIVERZITY
MATEJA BELA



FILOZOFICKÁ
FAKULTA UNIVERZITY
MATEJA BELA



PEDAGOGICKÁ
FAKULTA UNIVERZITY
MATEJA BELA



FAKULTA PRÍRODNÝCH
VIED UNIVERZITY
MATEJA BELA

<https://www.youtube.com/watch?v=e3a54BSIbDg>

Faculty of Natural Sciences

1. Department of Biology and Ecology

2. Department of Physics

3. Department of Chemistry

4. Department of Mathematics

5. Department of Technology

6. Department of Environmental Management

7. Department of Geography and Geology

8. Department of Computer Science



FAKULTA PRÍRODNÝCH
VIED UNIVERZITY
MATEJA BELA



- 13 teachers, 1 postdoc, 1 assistant of head of department

our own logo katedra biológie a ekológie



Our most important principle

- to realised study programmes with emphasis on field exercises and practice

Department of Biology and Ecology

- 2 study programmes

- **Teaching of Biology** – Teacher preparation programme
degrees: | Bc. | MSc. |
 - with another subject from 3 faculties (e.g. chemistry, physics, geography, mathematics, languages, history, philosophy, psychology, art education, physical education)
 - Branch of study: Teacher Training and Education Science
 - only full time
- **Ecology and Protection of Ecosystems** | Bc. | MSc. |
- **Evolution of Ecosystems and their Protection** | Ph.D. |
 - till 2021/2022

Environmental Biology

- new, joint study programme of two departments

since 2021/2022

Field (branch) of study: **Ecological and Environmental Sciences**

Form: **full time** | Bc. | MSc. | PhD. |

external time | PhD. |

Language: **Slovak**

This study programme **replaced**:

- Ecology and Protection of Ecosystems | Bc. | MSc. |
- Environmental Safety | Bc. |
- Environmental Management | MSc. |
- Remediation of Environmental Burdens | Ph.D. |

Teaching of Biology

| Bc. |

Compulsory
courses

Course Name	Cr.	Duration
Plant anatomy and morphology	4	2P + 1C
Anatomy and morphology of animals	4	2P + 2C
Taxonomy of cyanobacteria, algae and fungi	4	2P + 1C
Microbiology	4	2P + 1C
Systematic zoology of invertebrates	4	2P + 2C
Systematic zoology of vertebrates	4	2P + 2C
Taxonomy of plants	4	2P + 2C
Field course of botany and zoology	4	100sC
Human anatomy and evolution	5	2P + 2C + 2S
Human and animal physiology	4	2P + 2C
Molecular biology and genetics	5	2P + 1C + 2S
Plant physiology	4	1P + 1C + 1S
General geology	4	2P + 1C
Fyziológia živočíchov a človeka	4	2P + 2C + 0S

Teaching of Biology | Bc. |

Compulsory elective courses

Course Name	Cr.	Duration
Microscopic and preparation techniques	3	1C + 1S
General ecology	3	2P + 1S
Practical course of plant anatomy and morphology	3	2C
Statistical methods in biology	3	2P
Biogeography	4	2P
Etology	4	1P + 1S
Theriology	3	2S
Dendrology	4	1C + 2S
Natural and artificial ecosystems	4	2P
Introduction to physics	4	2P + 2S
Global problems of the environment	4	2P + 0C + 0S

Teaching of Biology | MSc. |

Compulsory courses

- these are subjects connected with didactics and school practice

Compulsory elective courses

Course Name	Akt.	Cr.	Duration
Activating methods and forms in teaching biology	!	3	1S
Applied botany		3	1P + 1S
Practical exercises in biology teaching		3	2C
Selected chapters of molecular biology and genetics		3	2P
Applied zoology		3	1P + 1S
Practical exercises in biology teaching 2	!	3	2C
Evolutionary biology		3	1P + 1S

Environmental Biology | Bc. |

https://ais2.umb.sk/repo2/repository/default/ais/studijn_eplany/2021-2022/FPV_UMB/EN/nENBI.xml

Compulsory courses

Diversity and Phylogeny of Vascular Plants (7 credits)

- 2 h lectures/week + 3 h exercises/week
- 50 h field exercises

Habitats of Slovakia (6 credits)

- 2 h lectures/week + 3 h exercises/week

Compulsory elective courses

Practical Botany (4 credits)

- 2 h exercises/week

Environmental Biology | MSc. |

Compulsory courses

https://ais2.umb.sk/repo2/repository/default/ais/studijneplany/2021-2022/FPV_UMB/EN/nENBI_m.xml

Course Name	Akt.	Cr.	Duration
Ecological Synthesis		6	2P + 2S
Biological Foundations of Nature Conservation		6	2P + 2S
Selected Chapters from Environmental Law		5	3S
Ecosystem Services		5	2P + 1S
Environmental Impact Assessment		6	2P + 2S
Practice in Nature and Environmental Protection Organizations		5	50sC
Biological Foundations of Nature Protection - Field Exercises		4	20sC
Restoration Ecology		6	2P + 1C + 1S
Green Economy		5	2P + 1S
Methods of Scientific Work		4	3S

Environmental Biology | PhD. |

Compulsory courses

Study section

Compulsory courses

Blok - ENBI - doktorandské štúdium

Course Code	Course Name	Cr.	Duration
KBE FPV/3e-ebi-102/22	Methodology and Ethics of Scientific Work	16	26sS
KBE FPV/3e-ebi-101/22	Statistical Methods and Ecological Research Design	16	52sS
KBE FPV/3e-ebi-103/22	English Communication for Scientists	16	26sS

Compulsory elective courses

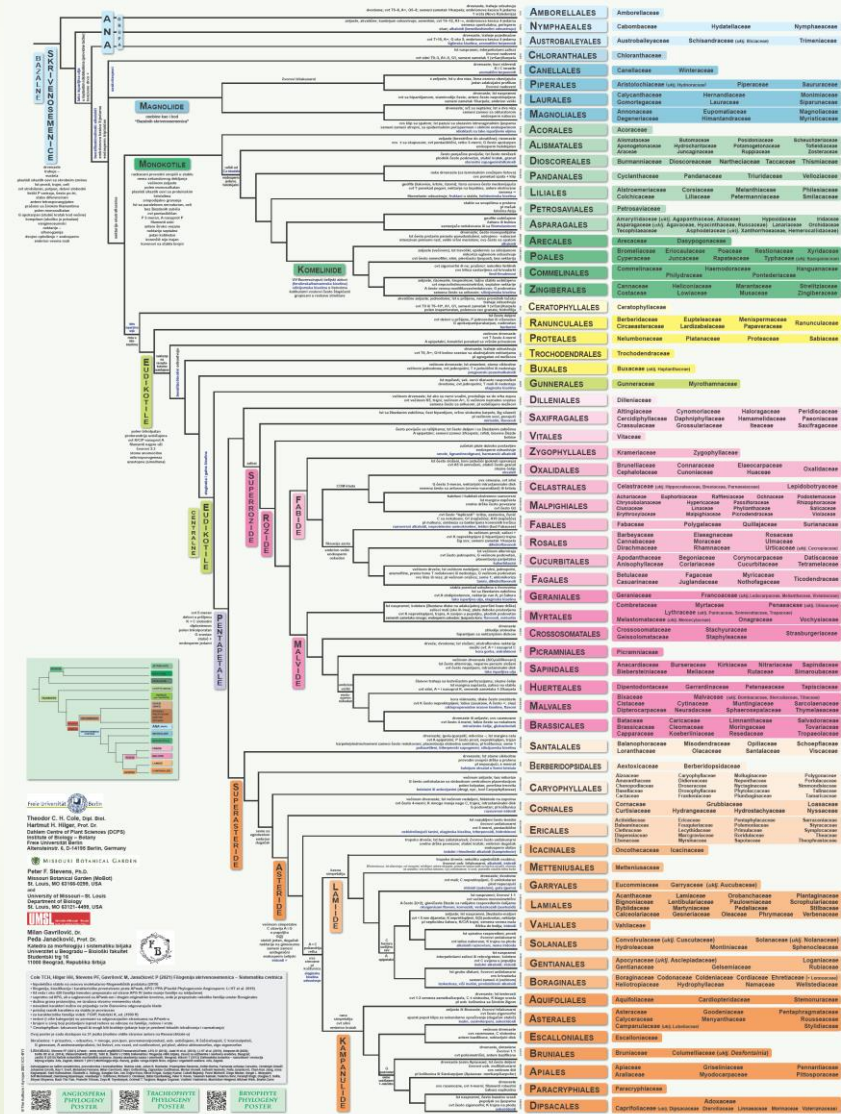
Blok - ENBI - Doktorandské štúdium

Course Code	Course Name	Cr.	Duration
KBE FPV/3e-ebi-201/22	Conservation Biology	12	52sS
KBE FPV/3e-ebi-202/22	Paleoecology: Field Methods, Data Processing And Interpretation	12	39sS
KBE FPV/3e-ebi-203/22	Environmental Microbiology and Microbial Community Ecology	12	39sS
KBE FPV/3e-ebi-204/22	Ecological Remediation of Degraded and Contaminated Environmental Components	12	39sS
KBE FPV/3e-ebi-205/22	Biosystematics, Phylogenesis, and Plant Ecology	10	26sS
KBE FPV/3e-ebi-206/22	Conservation Genetics	10	26sS
KBE FPV/3e-ebi-207/22	Adaptive Management in Area and Species Based Conservation	10	26sS
KBE FPV/3e-ebi-208/22	Geochronology and Geoanalytical Methods in Paleoecology	10	26sS
KBE FPV/3e-ebi-209/22	Global Environmental Changes in Earth Development	10	26sS

Diversity and Phylogeny of Vascular Plants

- ▶ **lectures:** according to the **cladistic system**
 - ▶ Stevens, P. F. (2001 onwards). **Angiosperm Phylogeny Website. Version 14**, July 2017 [and more or less continuously updated since]." will do.
<http://www.mobot.org/MOBOT/research/APweb/>
 - ▶ https://www.researchgate.net/publication/344193089_Plant_Phylogeny_Posters_PPP_-_poster_titles_and_languages_with_links

FILOGENIJA SKRIVENOSEMENICA SISTEMATIKA CVETNICA



Diversity and Phylogeny of Vascular Plants

➤ **exercises:** processed list for students

- 20 taxa of Bryophytae
- 20 taxa of Lycopodiophyta + Monilophyta
- 20 taxa of Gymnospermae
- 240 taxa of Angiospermae

➤ according to

- herbarium items
- live plants
- pictures

ANGIOSPERMAE - KRYTOSEMENNÉ



Bazálne vetvy krytosemenných rastlín

- rad: Nymphaeales – leknotvaré
 čeľad: Nymphaeaceae – leknovité
 1. *Nymphaea alba* VU § – leknó biele

Magnoliidová vetva

- rad: Magnoliales – magnóliotvaré
 čeľad: Magnoliaceae – magnóliovité
 2. *Magnolia* sp. – magnólia
 rad: Piperales – pieprotvaré
 čeľad: Aristolochiaceae – vlkovcovité
 3. *Asarum europaeum* – kopytník európsky

Jednoklíčnolistové

- rad: Alismatales – žabnikotvaré
 čeľad: Araceae – aronovité
 4. *Arium alpinum* – aron alpský
 5. *Lemna minor* – žaburinka menšia (Lemnaceae)
 čeľad: Potamogetonaceae – červenavcovité
 6. *Potamogeton* sp. (napr. *crispus*, *nativus*, *obtusifolius* CR) – červenavec (kučeravý, plávajúci, rupolistý)

- rad: Liliales – ľaliotvaré
 čeľad: Colchicaceae – jesienkovité
 7. *Colchicum autumnale* – jesienka obyčajná (Liliaceae)
 čeľad: Liliaceae – ľaliiovité
 8. *Gagea lutea* – krivec žltý
 9. *Lilium bulbiferum* NT § – ľalia cibulkonosná
 10. *Lilium maragon* LC – ľalia zlatohlavá
 čeľad: Melanthiaceae – kýchavcovité
 11. *Paris quadrifolia* – vranovec štvorlístý (Liliaceae)
 12. *Veratrum album* – kýchavica biela (Liliaceae)

- rad: Asparagales – asparagotvaré
 čeľad: Alliaceae – cesnakovité
 13. *Allium ursinum* – cesnak medvedí (Liliaceae)
 čeľad: Amaryllidaceae – amarylkovité





School garden



Zoology

- live contact with handicapped animals
- rescue station for handicapped animals
- a unique opportunity to observe behavior, feeding, care...



cages



stork Edo

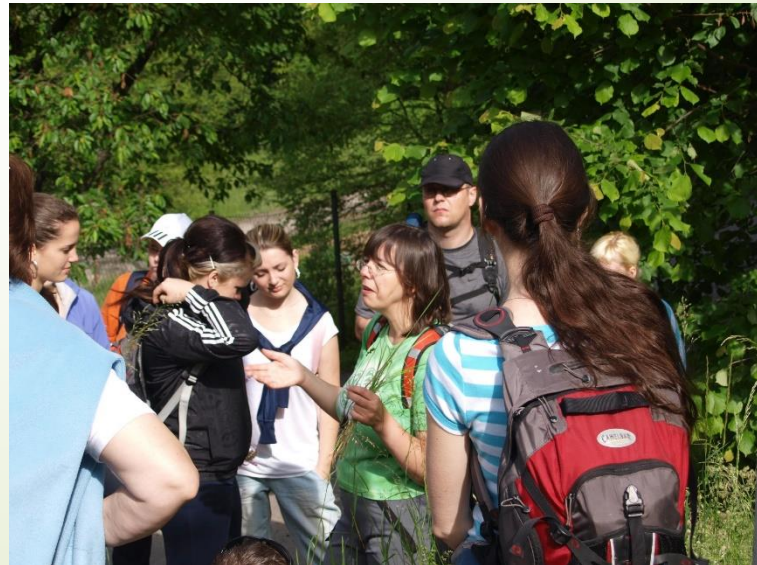
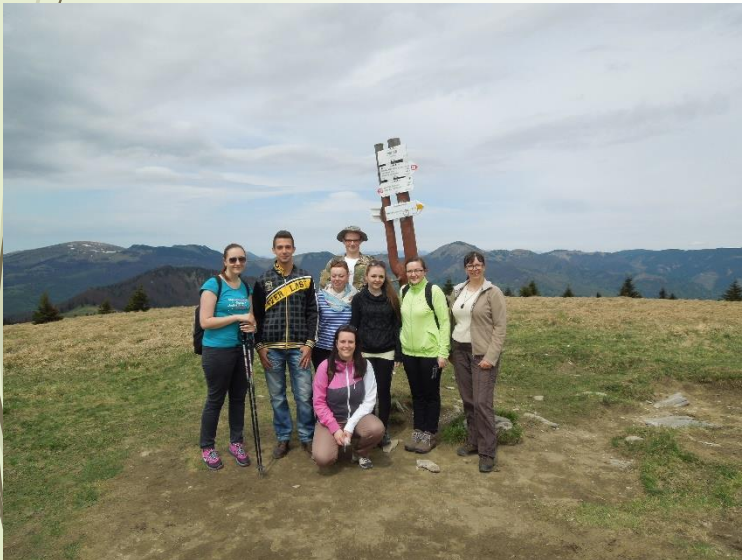


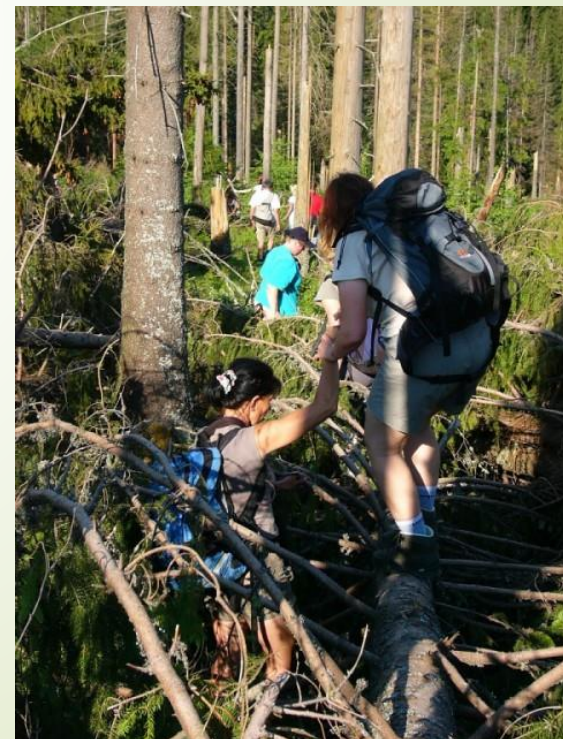
raptors



Field course of botany and zoology

- an intensive, 5-day summer course designed to teach students basic skills in field botany and zoology.
- presentation of different habitats and their biodiversity
- using traditional and online taxonomic keys to identify plants
- Collecting and preparing herbarium specimens for teaching and scientific purposes - 50 taxa









Zamenis longissimus,
syn. *Elaphe longissima*



bear den



Rupicapra rupicapra subsp. *tatrensis*

Foreign field course of zoology

- **Neusiedlersee (A)** - bird watching
- **Hortobagy National Park (HU)** - ungulate observations



Floristic courses of Czech and Slovak Botanical Society



Dr. Petr Koutecký, † Assoc. Prof. Vít Grulich, Dr. Pavol Mered'a

Floristic courses of Czech and Slovak Botanical Society





Prof. Karol Ujházy, Assoc. Prof. František Máliš

Sometimes we are like bees in a hive



Dendrology

- getting to know the trees around the school - about 30 taxa
- excursion to at least one from 3 arboretums in Slovakia



Habitats of Slovakia

Phytocoenology





Connection to Research

Participation in conducting the most important research projects over the last six years

2021 – 2024	VEGA 2/0132/21 Diversity of grasslands in Slovakia after two decades in EU
2017 – 2019	VEGA 2/0040/17 Dynamics of human-altered non-forest habitats in the process of ecological restoration
2013 – 2016	VEGA 2/0099/13 Management, restoration and diversity of grassland vegetation
2021 – 2025	APVV-20-0358 Reading in the natural archives: thousands of years of history of the environment and climate change recorded in the alpine lakes of the Ukrainian Carpathians
2019 – 2022	VEGA 1/0291/19 Imobilization of potentially toxic elements in contaminated soils of selected European Cu-deposits
2015 – 2017	VEGA 1/0538/15 Comparison of country remediation possibilities in surrounding of selected European Cu-deposits
2014 – 2018	APVV -0663-10 Štúdium kontaminácie baníckej krajiny toxickými prvkami na vybraných Cu-ložiskách a možnosti jej remediácie
RUINS 2017 – 2020	Interreg Central Europe: Sustainable re-use, preservation and modern management of historical ruins in Central Europe – elaboration of integrated model and guidelines based on the synthesis of the best European experiences





graduation 2018



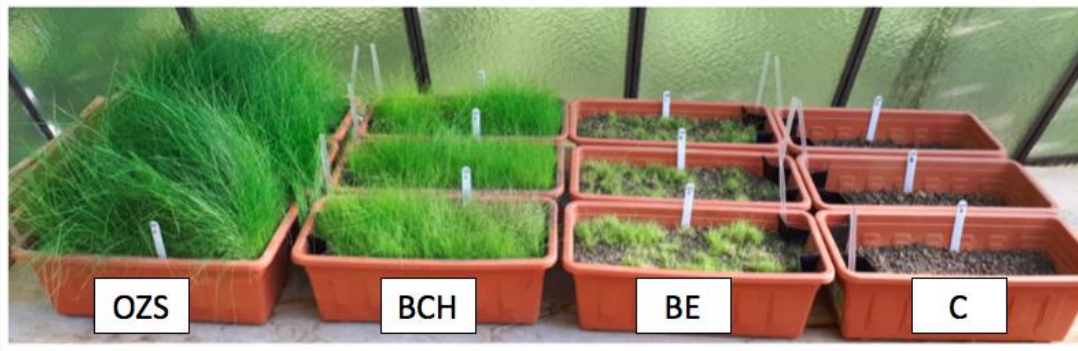
sampling of needles



wood bore; sampling of soil

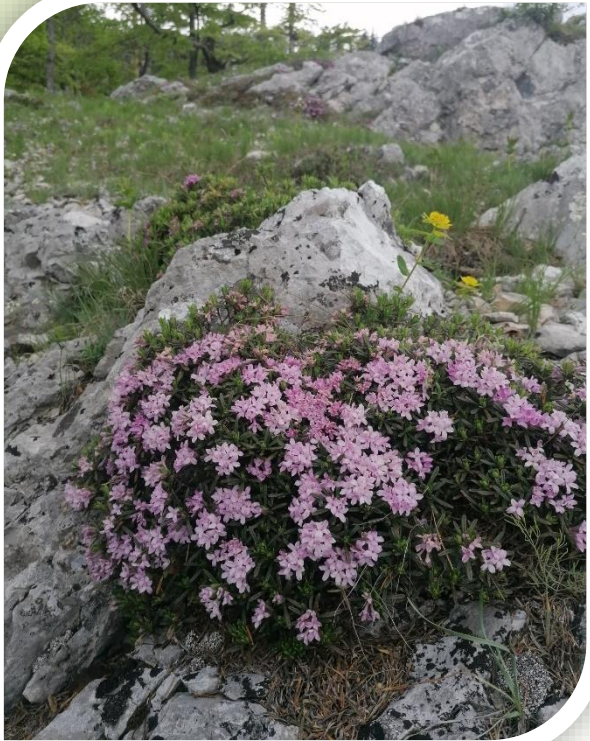


Miscanthus sacchariflorus (Maxim.) Benth. is a metallophyte suitable for the phytoremediation of mine wastes (Cd, Pb, Zn)



greenhouse experiments

Life on the edge. Evolutionary and bioecological aspects of the stenoendemic species *Daphne arbuscula* Čelak. (Thymelaeaceae)





student secured by rope

Connection with practice

➤ professional excursions and compulsory professional experience

- water management companies,
- hydrometeorological institute,
- municipal solid waste landfills,
- Slovak Environment Agency,
- State nature protection,
- environmental departments at the municipal office
- administration of national parks and protected landscape areas
- NGO
- factories



Stredoslovenská vodárenská
prevádzková spoločnosť, a.s.



SLOVENSKÁ AGENTÚRA
ŽIVOTNÉHO PROSTREDIA
SLOVAK ENVIRONMENT
AGENCY









Thank you for your attention

