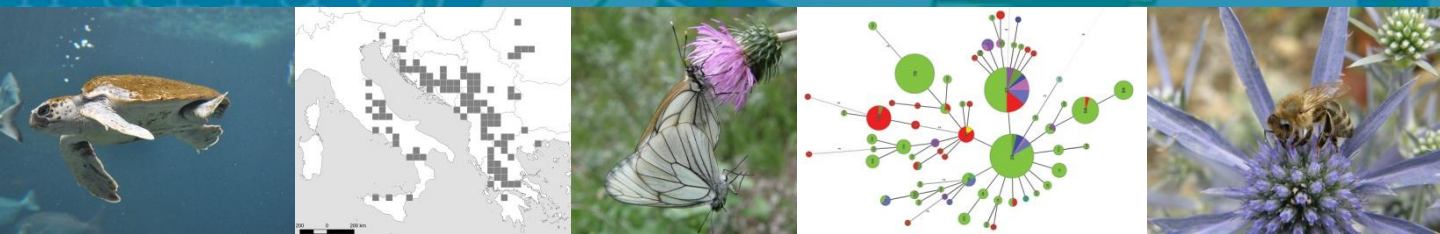




# INTERNATIONAL WORKSHOP ON CONSERVATION BIOLOGY

Programme and  
Abstract Book

Koper, Slovenia, 14<sup>th</sup> May 2013



## INTERNATIONAL WORKSHOP ON CONSERVATION BIOLOGY

Koper, Slovenia, 14<sup>th</sup> May 2013

*Department of Biodiversity*

*Faculty of Mathematics, Natural Sciences and Information Technologies*

*University of Primorska*

**Organising Committee:** Tilen Genov, Živa Fišer Pečnikar, Peter Glasnović, Jure Jugovic, Katja Kalan, Martina Lužnik, Sara Zupan, Elena Varljen Bužan

Sponsor:

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**Editors:** Tilen Genov, Živa Fišer Pečnikar & Elena Varljen Bužan

UNIVERZA NA PRIMORSKEM, Fakulteta za matematiko, naravoslovje in informacijske tehnologije

UNIVERSITÀ DEL LITORALE, Facoltà di scienze matematiche naturali e tecnologie informatiche

UNIVERSITY OF PRIMORSKA, Faculty of Mathematics, Natural Sciences and Information Technologies

Glagoljaška 8, SI - 6000 Koper, [www.famniti.upr.si](http://www.famniti.upr.si), [info@famnit.upr.si](mailto:info@famnit.upr.si)

## PROGRAMME

9:30      **Opening of the meeting: Directions in conservation biology** – Elena Varljen Bužan

MARINE ECOLOGY (Chair: Elena Varljen Bužan)

9:45      **Assessing the ecological status of marine protected areas in Slovenia through mapping habitat types** – Lovrenc Lipej, Borut Mavrič & Martina Orlando Bonaca

10:00      **Feeding ecology and trophic segregation of two sympatric shark species, *Mustelus punctulatus* and *Squalus acanthias*, in the north–central Adriatic Sea** – Romana Gračan, Dušan Zavodnik, Patrik Krstinič, Branko Dragičević, Gordana Lacković & Bojan Lazar

10:15      **Marine turtle conservation in Slovenia** – Dejan Putrle

10:30      **Foraging grounds, movement patterns and habitat connectivity of loggerhead turtles (*Caretta caretta*) from the Adriatic Sea as revealed by the satellite telemetry** – Paolo Casale, Marco Affronte, Dino Scaravelli, Bojan Lazar, Carola Vallini & Paolo Luschi

**10:45 - 11:30      COFFEE BREAK AND POSTER SESSION (see list)**

CONSERVATION & MANAGEMENT (Chair: Bojan Lazar)

11:30      **Aerial surveys on protected megafauna species in the Adriatic Sea: summer 2010 results and 2013 plans** – Caterina Fortuna, Bojan Lazar & Draško Holcer

11:45      **Habitat preference modelling reveals fine scale habitat partitioning among Chilean dolphins, Peale's dolphins and Burmeister's porpoises** – Tilen Genov, Philip S. Hammond, Marjorie Fuentes Riquelme & Sonja Heinrich

12:00      **Challenges in conservation of Slovenian newts** – Martina Lužnik

12:15      **Human impact on biodiversity – case studies from Kraški rob (SW Slovenia)** – Jure Jugovic, Sara Zupan & Elena Varljen Bužan

**12:30 - 14:00      LUNCH BREAK**

## TERRESTRIAL BIODIVERSITY (Chair: Jure Jugovic)

- 14:00      **Seasonal dynamics and population structure of cave shrimps *Troglocaris* (Crustacea: Decapoda: Caridea)** – Eva Praprotnik, Alenka Mihelčič & Jure Jugovic
- 14:15      **Influence of ecoremediation on biodiversity of centipedes (Chilopoda) and woodlice (Isopoda)** – Blanka Ravnjak & Ivan Kos
- 14:30      **A survey of small mammals on illegal dumpsites in Slovenian and Croatian Istria** – Sara Zupan, Katja Kalan, Peter Maričič, Jure Jugovic, Domen Trkov, Toni Koren & Elena Varljen Bužan
- 14:45      **A survey of selected Dipteran vectors on illegal dumpsites in the Istrian peninsula** – Katja Kalan, Vladimir Ivović, Sara Zupan, Peter Maričič, Tjaša Zagoršek & Elena Varljen Bužan
- 15:00      **Current status of phlebotomine sandflies in south-east Europe** – Vladimir Ivović

## 15:15 - 15:30      COFFEE BREAK

## SCIENCE & CONSERVATION TOOLS (Chair: Tilen Genov)

- 15:30      **Leaf anatomy as an additional taxonomy tool** – Živa Fišer Pečnikar
- 15:45      **The genus *Edraianthus* (Campanulaceae) - a model group for testing biogeographical patterns in the Balkans** – Boštjan Surina & Peter Glasnović
- 16:00      **Genetic diversity of *Daphne blagayana* Freyer based on chloroplast *matK* gene analysis** – Nataša Fujs, Živa Fišer Pečnikar & Elena Varljen Bužan
- 16:15      **Using conservation as a tool to resolve conflict: Establishing the Piran–Savudrija international Marine Peace Park** – Peter Mackelworth, Draško Holcer & Bojan Lazar
- 16:30      **Science tools in the digital age** – Scott Mills

## 16:45 - 17:30      DISCUSSION

## 17:30      CLOSURE OF THE MEETING

## POSTERS

**Estimating population density of a cryptic anuran (*Alytes obstetricans*) using a passive acoustic detector array** – Tina Centrih

**The importance of forest clearings for reptiles in Northern Dinaric region: results and conservation management recommendations** – Anamarija Žagar

**Interactions between bottlenose dolphins (*Tursiops truncatus*) and trawlers in the northern Adriatic Sea** – Polona Kotnjek, Ana Hace, Tina Centrih & Tilen Genov

**Biodiversity of seven caves from flysch and limestone regions in SW Slovenia** – Alenka Mihelčič, Blanka Ravnjak, Eva Praprotnik & Jure Jugovic

***Upogebia pusilla* (Decapoda: Thalassinidea) from two localities with different conservation status on Slovenian coast** – Eva Horvat, Jure Jugovic, Liljana Rušnjak & Alenka Koželj

**The impact of grazing on the occurrence of Black-veined White, *Aporia crataegi* (Lepidoptera: Pieridae)** – Mitja Črne, Martina Lužnik & Jure Jugovic

**Habitat preferences of dung beetles (Coleoptera: Scarabaeoidea) on Kraški rob (SW Slovenia)** – Nataša Koprivnikar, Jure Jugovic & Toni Koren

**Winter distribution of the Wallcreeper *Tichodroma muraria* on Kraški rob in Slovenia and its conservation status in the country** – Domen Stanič & Tjaša Zagoršek

**Genetic diversity of *Daphne blagayana* Freyer based on chloroplast *matK* gene analysis** – Nataša Fujs, Živa Fišer Pečnikar & Elena Varljen Bužan

```
function quicksort(array)
  var list less, equal, greater
  if length(array) <= 1
    return array
  select a pivot value pivot from array
  for each x in array
```

## ABSTRACTS

### TALKS

#### DIRECTIONS IN CONSERVATION BIOLOGY

Elena Varljen Bužan<sup>1,2</sup>

- (1) *University of Primorska, Faculty of Mathematics, Natural Sciences and Information Technologies, Glagoljaška 8, Koper, Slovenia*
- (2) *University of Primorska, Science & Research Centre, Garibaldijska 1, Koper, Slovenia*

We live in an age where humans place exceptional strain upon the natural resources of the world. Earth has evolved a complex biosphere at the interface of the land, sea and atmosphere that maintains the conditions required for life, the precise mechanisms of which are not well understood. Human populations are aggregated around biodiversity hotspots where fertile soils provided the right conditions for agriculture and the development of sedentary life. Climate change and loss of habitat are a direct result of this human activity. The planet has undergone a number of mass extinctions, the last of which occurred ≈66 million years ago. There is general scientific consensus that we have now entered such a phase by anthropogenic means. Our University works to enhance human knowledge about complex biological phenomena, providing decision makers with evidence based research to maximize both biodiversity and socioeconomic outcomes. In biodiversity group we have 30 dedicated staff that research in the area of conservation biology and teach more than 100 students. Today I am pleased to share and showcase the work of my colleges and international collaborators. Together we work on a diverse range of topics across the tree of life to study, monitor and conserve. Our research focuses on taxonomy, field ecology and genetics.

#### ASSESSING THE ECOLOGICAL STATUS OF MARINE PROTECTED AREAS IN SLOVENIA THROUGH MAPPING HABITAT TYPES

Lovrenc Lipej<sup>1</sup>, Borut Mavrič<sup>1</sup> & Martina Orlando Bonaca<sup>1</sup>

- (1) *Marine Biology Station, National Institute of Biology, Piran, Slovenia*

Three marine protected areas (MPA) are at now present in the Slovenian part of the Adriatic sea: the Strunjan nature reserve and Cape Madona and Debeli rtič natural monuments. In the period from 1999 to 2010, 36 transects (sampling stations) were surveyed in coastal waters. Habitat types cartography was carried out by SCUBA diving along a 100 m long transect line, with direct mapping on a slate and filming with an underwater camera. After filming, the visual census of coastal fish assemblage was performed along the same transect. In the laboratory, films were analysed together with data obtained by diver's direct observations and those results were used for drawing habitat types. Additionally, we started the development of a new index for the assessment of the ecological status (ES) of marine infralittoral habitats. The variables considered in the development of the index were the degree of spatial heterogeneity, the vegetation coverage and the labrid density. Among sampling stations, 9 were inside MPA and 27 outside MPA. With the use of this index, only one sampling station was evaluated as high ES. Seventeen stations were assessed as good (47%) 12 as moderate (33,3%) and 5 as poor ES (14%). Among MPA, 6 stations were assessed with good ES, while 3 stations did not fulfill the good ES requirements. According to this preliminary assessment, there are many stations outside MPA which have similar ecological characteristics as marine protected areas. To this end, having in mind the fact that the index is still in phase of development and further testing, the biodiversity of the Slovenian coastal sea is still impressive, also in areas which are not receiving any protection.



## FEEDING ECOLOGY AND TROPHIC SEGREGATION OF TWO SYMPATRIC SHARK SPECIES, *MUSTELUS PUNCTULATUS* AND *SQUALUS ACANTHIAS*, IN THE NORTH-CENTRAL ADRIATIC SEA

Romana Gračan<sup>1</sup>, Dušan Zavodnik<sup>2</sup>, Patrik Krstinić<sup>3</sup>, Branko Dragičević<sup>4</sup>, Gordana Lacković<sup>1</sup> & Bojan Lazar<sup>1,5</sup>

- (1) Department of Zoology, Division of Biology, Faculty of Science, University of Zagreb, Rooseveltov trg 6, HR-10000 Zagreb, Croatia
- (2) Center for Marine Research, Ruđer Bošković Institute, G. Paliaga 5, HR-52210 Rovinj, Croatia; present address: Vitomira Širole-Paje 6, HR-52210 Rovinj, Croatia
- (3) Public Institution for Managing protected Nature Areas, Grivica 4, HR-51000 Rijeka, Croatia
- (4) Institute of Oceanography and Fisheries, Šetalište I. Meštrovića 63, HR-21000 Split, Croatia
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We analysed the ecological roles and trophic interactions of two commercially important shark species, *Mustelus punctulatus* and *Squalus acanthias*, co-occurring in the shallow continental shelf of the north-central Adriatic Sea. We collected 185 *M. punctulatus* specimens (96 males and 89 females) and 157 individuals of *S. acanthias* (95 females and 62 males), obtained by on-board observers on commercial bottom trawls from April 2005 to April 2007. *M. punctulatus* dominantly preyed on benthic scavenger crabs like *Liocarcinus depurator* and *Liocarcinus corrugatus*, showed wide niche breadths and gradually specialized with increase in size. *S. acanthias* targeted small pelagic schooling fish like *Engraulis encrasicolus* and *Sardina pilchardus*, exhibited ontogenetic niche shift and extended its trophic spectrum with increase in size. Estimated trophic level (TL) for *M. punctulatus* was 3.69, while that of *S. acanthias* was higher (TL = 4.23). Dietary overlap was not significant between the species (Pianka's overlap  $O = 0.55$ ), except during spring season ( $O = 0.70$ ) when both species selected small pelagic fish. Analysed shark species in the north-central Adriatic exhibited trophic segregation in resource partitioning, showed different feeding strategies and indicated that these predators should be managed separately.

## MARINE TURTLE CONSERVATION IN SLOVENIA

Dejan Putrlj<sup>1</sup>

- (1) Biocen, Institute for Ecological Research, Consulting and Education, Piran, Slovenia

In the Northern Adriatic only one species of marine turtles is appearing regularly – the loggerhead turtle (*Caretta caretta*). Gulf of Trieste represents their typical feeding area that is particularly corresponding to juvenile specimens. After successful hatching, the juvenile turtles are coming to Northern Adriatic mainly from Greek islands and it is believed that they are staying here until their sexual maturity. In this environment threatening factors are pollution, water transport and bycatch. Organised marine turtles conservation started in Slovenia in 2003 with joining efforts of The Institute of the Republic of Slovenia for Nature Conservation Regional Unit Piran and Aquarium Piran of Maritime and Technical High School Portorož. In 2008 Biocen, Institute for Ecological Research, Consulting and Education Piran, joined as a field work coordinator and database manager. Conservation efforts were mostly aimed at education and awareness among the general public and some targeted professional groups about the importance of preserving healthy marine environment, education of fishermen regarding the proper handling of turtles in the case of bycatch and determining the migration routes of loggerhead turtles. The problem of implementation of activities regarding conservation is largely related to the fact that the relevant ministry still did not adopted action plan about it. Funds have so far been provided only by donors and therefore it is not possible to ensure continuity of monitoring and actions, even though the vast majority of previous work was carried out on a voluntary basis.

## FORAGING GROUNDS, MOVEMENT PATTERNS AND HABITAT CONNECTIVITY OF LOGGERHEAD TURTLES (*CARETTA CARETTA*) FROM THE ADRIATIC SEA AS REVELED BY THE SATELLITE TELEMETRY

Paolo Casale<sup>1,2</sup>, Marco Affronte<sup>3</sup>, Dino Scaravelli<sup>4</sup>, Bojan Lazar<sup>5</sup>, Carola Vallini<sup>6</sup> & Paolo Luschi<sup>7</sup>

- (1) Department of Biology and Biotechnologies "Charles Darwin", University of Rome "La Sapienza", Viale dell'Università 32, Rome, Italy
- (2) WWF Italy, via Po 25c, Rome, Italy
- (3) Fondazione Cetacea onlus, via Torino 7/A, Riccione, Italy
- (4) Large Pelagic Vertebrates Research Group, Faculty of Veterinary, University of Bologna, via Vespucci 2, Cesenatico, Italy
- (5) Department of Biodiversity, Faculty of Mathematics, Natural Sciences and Information Technologies, University of Primorska, Glagoljaška 8, Koper, Slovenia
- (6) A.R.C.H.E., Research and Educational Activities for Chelonian Conservation Onlus, via Mulinetto, 40/A, Ferrara, Italy
- (7) Dipartimento di Biologia, University of Pisa, Via A. Volta 6, Pisa, Italy

Identification of highly frequented marine habitats and migratory routes are priorities for sea turtle conservation, but the movement patterns and habitat use of juveniles remain mostly unknown. The Adriatic Sea hosts one of the two most important critical marine habitats for this endangered sea turtle species in the Mediterranean shared by juveniles and adults, but movement patterns of juveniles frequenting the Adriatic have not been investigated yet, although they represent the bulk of populations. Therefore, we tracked by satellite telemetry six juvenile and one adult female loggerhead from the north Adriatic. The results indicated that loggerhead juveniles (i) can either show a residential behaviour remaining in the Adriatic throughout the year or perform seasonal migrations to other areas; (ii) can remain even in the coldest, northernmost area during winter; (iii) can frequent relatively small foraging areas; (iv) mostly frequent the eastern part of the Adriatic; and (v) follow preferred migratory routes along the western and eastern Adriatic coasts. The movements of the adult turtle also revealed (vi) a behavioural polymorphism in Mediterranean adults, which included a lack of area fidelity and connection between distant neritic foraging grounds. Results have emphasized shallow waters of the northern Adriatic (< 100 in depth) as the critical marine habitats for juvenile loggerheads in the Adriatic Sea.

## AERIAL SURVEYS ON PROTECTED MAGAFAUNA SPECIES IN THE ADRIATIC SEA: SUMMER 2010 RESULTS AND 2013 PLANS

Caterina Fortuna<sup>1</sup>, Bojan Lazar<sup>2</sup>, Drasko Holcer<sup>3,4</sup>

- (1) Italian National Institute for Environmental Protection and Research, via di Casalotti 300, 00166 Roma, Italy
- (2) Department of Biodiversity, Faculty of Mathematics, Natural Sciences and Information Technologies, University of Primorska, Glagoljaška 8, Koper, Slovenia
- (3) Blue World Institute of Marine Research and Conservation, Kaštel 24, 51551 Veli Lošinj, Croatia
- (4) Natural History Museum of Zagreb, Demetrova 1, HR-10000 Zagreb, Croatia

In summer 2010 the first aerial cetacean survey in the Adriatic Sea was carried out within the framework of research activities due to fulfil the Italian obligations to Regulation (EC) n. 812/2004 and in line with the ACCOBAMS ratification laws. The Italian Institute for Environmental Protection and Research (ISPRA), in cooperation with the Blue World Institute of Marine Research and Conservation (Croatia) conducted the first aerial survey in order to provide the first basin-wide information on abundance and distribution of cetaceans - particularly the common bottlenose dolphins (*Tursiops truncatus*) - and other protected species in the Adriatic sea, such as sea turtles and giant devil rays (*Mobula mobular*). This information constituted a fundamental contribution to the Initial Assessment on these species under the Marine Strategy Framework Directive (2008/56/EC). As a follow up of that initiative, next summer a second aerial survey over the entire Adriatic Sea will be carried out. This new survey is funded under a IPA Adriatic project named NETCET (Network for the Conservation of Cetaceans and Sea Turtles in the Adriatic; 2°ord/0048/).



## HABITAT PREFERENCE MODELLING REVEALS FINE SCALE HABITAT PARTITIONING AMONG CHILEAN DOLPHINS, PEALE'S DOLPHINS AND BURMEISTER'S PORPOISES

Tilen Genov<sup>1,\*</sup>, Philip S. Hammond<sup>1</sup>, Marjorie Fuentes Riquelme<sup>2</sup> & Sonja Heinrich<sup>1</sup>

(1) *Sea Mammal Research Unit, School of Biology, University of St Andrews, Fife KY16 8LB, St Andrews, UK*

(tilen.genov@gmail.com)

(2) *Yagu Pacha Chile, Valencia 2125, Santiago, Chile*

The Chilean dolphin (*Cephalorhynchus eutropia*), Peale's dolphin (*Lagenorhynchus australis*) and Burmeister's porpoise (*Phocoena spinipinnis*) are poorly known species, endemic to South America. They face several anthropogenic threats, many of which are poorly understood and unquantified. The Chilean dolphin is listed as 'near threatened' by the International Union for Conservation of Nature (IUCN), while Peale's dolphin and Burmeister's porpoise are 'data deficient'. Obtaining information on distribution, habitat use and conflict with human activities is listed among the priority conservation actions for these species. Their habitat preferences in relation to environmental and anthropogenic variables in southern Chile were modelled using Generalized Additive Models (GAMs), to identify important areas and determine which environmental variables were good predictors of their distributions. Data were collected through systematic boat surveys during austral summers 2001–2012. A total of 489 surveys were carried out, resulting in 30,736 km on effort. A total of 531 sightings of Chilean dolphins, 353 of Peale's dolphins and 67 of Burmeister's porpoises were available for modelling. Uncertainty was explicitly accounted for via bootstrapping, to provide the relative measure of importance of different areas. Despite the overlap in distribution between the three species, models showed fine scale habitat partitioning among them. All were coastal, but porpoises were 'less coastal' than dolphins, which in turn had different preferences for shallow habitat. Chilean dolphins preferred areas close to shore, near river mouths, in shallow bays and channels, close to mussel farms, and were clearly concentrated in three core areas. Peale's dolphins occurred close to shore, in shallow waters along open shores, and further from mussel farms. Porpoises occurred further from shore, in deeper water, close to salmon farms. Conservation implications are particularly evident for Chilean dolphins, which show strongest site fidelity and preference for specific environmental features, while possibly competing for space with mussel farms.

**\*Present address:** University of Primorska (UPR), Faculty of Mathematics, Natural Sciences and Information Technologies, Koper / UPR, Science & Research Centre, Koper / Morigenos – Slovenian Marine Mammal Society, Piran

## CHALLENGES IN CONSERVATION OF SLOVENIAN NEWTS

Martina Lužnik<sup>1</sup>

(1) *University of Primorska, Faculty of Mathematics, Natural Sciences and Information Technologies, Glagoljaška 8, Koper, Slovenia (martina.luznik@upr.si)*

Three species of newts (Lissamphibia, Salamandridae) inhabit Slovenia and all are denoted as "vulnerable" on the national Red list. One of the main threats to these pond-breeding amphibians is habitat loss due to degradation. This is especially true in the dry karstic landscape in SW Slovenia where a shift in agricultural practices threatens amphibian breeding habitats. The purpose of this study was to evaluate the conservation status of the smooth newt *Lissotriton vulgaris* and Italian crested newt *Triturus carnifex* in a system of isolated karstic ponds. The survey was divided in two parts; a phylogeographic analysis based on mtDNA isolated from populations in Slovenia and Croatian Istria, and a demographic study of populations from the area of the Karst edge. Results showed different patterns of phylogeographic structure between the smooth and Italian crested newt. This was due to less divergence amongst the Italian crested newt, while the smooth newt exhibited four distinct lineages across Slovenia and Croatian Istria. Over the three year survey the abundance of smooth newts was quite stable in the area, with numbers that suggest they are above the minimal viable population (MVP) threshold. This was not the case for the Italian crested newt in karstic ponds that appear to be on the cusp of the MVP threshold indicating a need for further investigation. These results complement the overall picture of phylogenetic structure of these species and contribute to the understanding of their demographic processes. The study contributes to defining the threats and conservation status of both species of newts. An ongoing population genetic study based on microsatellite loci could shed light on the metapopulation structure of newts in this system.

## HUMAN IMPACT ON BIODIVERSITY – CASE STUDIES FROM KRAŠKI ROB (SW SLOVENIA)

Jure Jugovic<sup>1,2</sup>, Sara Zupan<sup>1,2</sup> & Elena Varljen Bužan<sup>1,2</sup>

- (1) University of Primorska, Faculty of Mathematics, Natural Sciences and Information Technologies, Koper, Slovenia  
 (2) University of Primorska, Science & Research Centre, Koper, Slovenia

Within the project BioDiNet (Network for the protection of biodiversity and landscape), we have estimated biodiversity and human impact on selected taxa that can be used either as bioindicators or live in fragile ecosystems. In Karstic meadows in Kraški rob (SW Slovenia), population structure of a butterfly *Aporia crataegi* (Pieridae) that is still common in the SW Slovenia but declining in many other parts of its areal, was studied. The main result shows significant differences in butterfly's abundances depending on land use. Lower densities were detected on pastures, while much higher abundances were detected on dry karstic meadows, especially on parts where many feeding plants of their larvae are present. On the contrary abundances of dung beetles (Coleoptera: Scarabeoidea) and other ground living invertebrates were highest on pastures (with cattle or goats and sheeps), especially on overgrowing areas, whereas they were lower on the edges of pastures. As human impact on karstic landscape may strongly influence the cave biota as well, we also estimated cave diversity of seven selected caves from the area. Similarity dendrograms show that most important factor influencing the local cave fauna seems to be type of the bedrock and presence of underground water. As the latter is also most important source of potable water in the area, we tested whether cave shrimps (*Troglocaris*) could be used as a biondicator of quality of underground water. As these animals are quite common and widespread through the Dinarides, and show no seasonal dynamics in their abundances, they could be used for indication of changes in underground systems, such as pollution coming from the outside. It is evident that karstic systems are fragile and should be used with care, most preferably with traditional type of land use that would allow the maintenance of mosaic land structure.

## SEASONAL DYNAMICS AND POPULATION STRUCTURE OF CAVE SHRIMPS *TROGLOCARIS* (CRUSTACEA: DECAPODA: CARIDEA)

Eva Praprotnik<sup>1</sup>, Alenka Mihelčič<sup>1</sup> & Jure Jugovic<sup>1,2</sup>

- (1) University of Primorska, Faculty of Mathematics, Natural Sciences and Information Technologies, Koper, Slovenia  
 (2) University of Primorska, Science & Research Centre, Koper, Slovenia

Almost half of Slovenia is karstic. Dominant type of rocks are limestone and dolomite, which enable formation of different karst phenomena. One of the important karst ecosystems are caves. Cave animals and their population size estimation are not very often an interest of study but are basic parameters in ecological and nature conservation studies. We have estimated population size of *Troglocaris anophthalmus sontica* (Crustacea: Decapoda: Caridea) from its type locality (Vipavska jama, Slovenia). Our goal was to provide knowledge on seasonality of population size, sex ratio, distribution of age groups and egg laying of this taxon, which is narrowly endemic to the northwesternmost border of the Dinarides from Slovenia and Italy. Data collected with multiple counting methods of mark-release-recapture techniques do not show seasonality in neither of the investigated parameters. These cave shrimps are abundant in slow flowing sinking rivers and lakes of the Dinaric karst, and are relatively easy to collect and mark. Therefore they could be used as bioindicators of other cave fauna and quality of potable water.

```
function quicksort(array)
  var list less, equal, greater
  if length(array) <= 1
    return array
  select a pivot value pivot from array
  for each x in array
```

## INFLUENCE OF ECOREMEDIATION ON BIODIVERSITY OF CENTIPEDES (CHILOPODA) AND WOODLICES (ISOPODA)

Blanka Ravnjak<sup>1</sup> & Ivan Kos<sup>2</sup>

- (1) University Botanic Gardens Ljubljana, Department of Biology, Biotechnical Faculty, Lžanska cesta 15, 1000 Ljubljana  
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In the present study the influence of ecoremediation on biodiversity of centipedes (Chilopoda) and woodlice (Isopoda) was studied. We used data obtained with sampling of the soil fauna during the project »Ecoremediation of sterile soil and revitalisation of soil fauna biodiversity on Duplica and TEŠ RLV Velenje landfills«. The two representatives of soil fauna were chosen because they are good indicators of environmental changes and can be used as bioindicators. They also play an important role in the nutrient cycling in the environment, woodlice as decomposers and centipedes as predators. The influence of ecoremediation on their biodiversity was studied on four sampling sites at the Duplica landfill, while the nearby wood was chosen as the reference point. For both groups of soil fauna the quantitative and qualitative sampling method were used. The dependence of species structure and abundance on form of remediation for woodlice and centipedes was compared between individual areas of remediation. We also tried to establish if the species structure is similar to that of the nearby wood and this wood represents the source of species living in the landfill, or the species structure in the landfill is different and the landfill can represent a source of new species. The material used for remediation was namely brought from elsewhere. In the landfill altogether 7 woodlice species and 19 centipede species were caught. The highest number of woodlice species (7) was found in outgrowth on the landfill while the highest number of centipede species (15) was found in the tree plantation on the landfill. In comparison to the wood as a reference point as much as 8 species were found only in the landfill. Here particularly the species *Pachymerium ferrugineum*, that was found only in two more localities, stands out. However on the Duplica site 74 specimens were found while only 10 specimens were found on both other locations together. We also found the species *Lamyctes emarginatus*, which until now was seen only in Cerkno. In this way the presence of some species, until now not present in the natural habitats in vicinity of the landfill, could be a consequence of deposition of material (soil and vegetation) from other areas in Slovenia.

## A SURVEY OF SMALL MAMMALS ON ILLEGAL DUMPSITES IN SLOVENIAN AND CROATIAN ISTRIA

Sara Zupan<sup>1,2</sup>, Katja Kalan<sup>2</sup>, Peter Maričič<sup>1,2</sup>, Jure Jugović<sup>1,2</sup>, Domen Trkov<sup>1</sup>, Toni Koren<sup>2</sup> & Elena Varljen Bužan<sup>1,2</sup>

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In this study we investigated if illegal landfills are alternative habitats for small mammal species. This study is important because small mammals incidentally transported between human dwellings and illegal landfills increase the possibility of pathogen transmission between wild and synanthropic species. Between October 2011 and March 2013 illegal landfills and control sites on the Istrian Peninsula in both Slovenia and Croatia were sampled for small mammal densities. Classical morphological taxonomy and DNA barcoding were used to determine trapped individuals to species. A total of 214 small mammals were caught belonging to the following species: *Mus musculus*, *Apodemus sylvaticus*, *Apodemus flavicollis*, *Apodemus agrarius* and *Rattus rattus*. The number of animals was highest in the two largest landfills (Umag and Pula) with *M. musculus* and *R. rattus* accounting for 58,5% of all species trapped. The Bray-Curtis similarity index differentiated between four habitats: natural forest habitats, semi-natural habitats, anthropogenic habitats and landfills. Our analysis supports the hypothesis that the composition of small mammals in landfills is unique to this habitat. In particular, smaller illegal dumpsites exhibited a mix of both wild and synanthropic species, the latter taking advantage of refuse as habitat and as a food source. Our findings indicate that illegal dumpsites are an important alternative habitat for small mammals and provide a strong foundation for future research into the role of small mammals as disease vectors. Research is required into the rehabilitation of these habitats and how this impacts upon small mammal species composition.

## A SURVEY OF SELECTED DIPTERAN VECTORS ON ILLEGAL DUMPSITES IN THE ISTRIAN PENINSULA

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A survey of mosquitoes (Diptera: Culicidae) and phlebotomine sandflies (Diptera: Psychodidae) was carried out in 2011 and 2012 on illegal refuse dumpsites and sites on the Istrian peninsula. Both families are important vectors of pathogens, which can cause severe diseases in humans and animals. Five mosquito species were collected using a BG sentinel trap, three important pathogen vectors *Aedes albopictus*, *Ochlerotatus caspius* and *Culex pipiens* and two additional species *Culiseta longiareolata* and *Culex hortensis*. Two species, *A. albopictus*, an invasive species, and *C. pipiens*, represented 64 % of trapped mosquitoes. A targeted sampling of phlebotomine sandflies using a CDC light trap was carried out in 2012 on three sites in Croatia and Slovenia, three species were caught: *Phlebotomus neglectus*, *Phlebotomus perniciosus* and *Sergentomyia minuta*. A few individuals of *P. perniciosus* were caught in the BG sentinel traps used to capture mosquitoes at the illegal dumpsites. Two species *P. neglectus* and *P. perniciosus* are major vectors of *Leishmania infantum* in the Mediterranean region but tested negative for the pathogen. Further investigation is required to fully quantify the distribution and abundance of the sampled vectors.

## CURRENT STATUS OF PHLEBOTOMINE SANDFLIES IN SOUTH-EAST EUROPE

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Leishmaniasis is endemic in all countries of South Europe, with more than 750 autochthonous human cases reported each year. Although in the Mediterranean leishmaniasis is generally associated with *Leishmania infantum*, new species, such as *L. donovani* and *L. tropica*, may colonize European sand fly vectors as well. The distribution of this re-emerging disease is influenced by factors linked to both human activity and climatic changes. Phlebotomine sand flies (Diptera: Psychodidae) are the suspected or proven vectors of *Leishmania spp.* in more than 90 countries and have also been shown to carry and transmit other zoonoses. Being a bridge between Europe and Asia, the region of south-east Europe hosts the richest number of sand fly species (>15) in Europe. Some, including *Phlebotomus neglectus*, *P. tobbi* and *P. sergenti*, are confirmed vectors of *L. infantum*, and others are very likely to turn out to be. Generally, most species belonging to the Larrousius genus are potential vectors, and evidently due to rapid climatic changes, two of these are showing rapid aerial expansion. In 2003, the westernmost point of the range of *P. kandelakii* was Montenegro while in 2008, we have collected it further to the west, at the coast of Croatia (Krk island). Another fast spreading species and even more important vector, *P. neglectus* regularly situated in the Balkans, was recently found near Budapest (Hungary). Thanks to the attention recently drawn to the formerly neglected discipline of medical entomology, the latest results show the widening of the sand fly distribution range to regions where they have never been found before. Changes in the environment and migrations which lead to changes in the range and densities of the vector and reservoir populations, result in increased human exposure to infected sand flies and a subsequent reemergence of leishmaniasis and other vector-borne diseases may be expected.

## LEAF ANATOMY AS AN ADDITIONAL TAXONOMY TOOL

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For hundreds of years botanists used morphology to identify and classify plants. Although morphological systematics has been important for understanding the evolutionary relationships of plants it has limitations. In recent decades molecular markers, such as DNA barcodes, have become increasingly important for taxonomic identifications as they directly access the mechanism of inheritance. However, molecular studies rely upon the successful amplification and sequencing of genetic material that is often problematic for old or inappropriately stored material. Where molecular tools cannot be used researches must rely upon morphological traits, in such cases using the broadest possible number of characters increases the confidence of a morphological species diagnosis. Leaves are a good candidate as an additional trait for species identification as they exhibit a great deal of variation within families or even genera. In this presentation I will present the most important leaf characters for taxonomic work and the techniques used to study them.

## THE GENUS *EDRAIANTHUS* (CAMPANULACEAE) - A MODEL GROUP FOR TESTING BIOGEOGRAPHICAL PATTERNS IN THE BALKANS

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The genus *Edraianthus* (Campanulaceae) has the centre of its distribution in western Balkans with disjunctions in the Apennines, Sicily and S Carpathians. It has been extensively studied since the end of the 19<sup>th</sup> century. Initially particular interests were raised to taxonomical and chorological problems, while recent research efforts have been focused on phylogenetic and phylogeographic relationships both between the closely related genera and within the genus. Furthermore, quaternary range shift patterns of some representatives were studied based on the molecular data. Consequently, accurate published data on *Edraianthus* species occurrences are today available along with existing herbarium specimen collections. The development of GIS software allows us to properly collect and process such data and when combined with environmental data and ecological niche modelling (ENM) we can predict species distribution in a geographic space according to a prediction of their environmental space. Models projected to past environmental conditions can help understanding late quaternary range shifts and to locate potential Pleistocene refugia. Combining standard taxonomic methodology with molecular methods, GIS and standard statistic methods allows us to recognize distributional patterns or biogeographically distinct entities. Here we present the results of our work on the distribution of some taxa of the genus *Edraianthus* using molecular methods and GIS methodology with available environmental data.

```
function quicksort(array)
var list less, equal, greater
if length(array) > 1
return array
select a pivot value pivot from array
for each x in array
```



## GENETIC DIVERSITY OF *DAPHNE BLAGAYANA* FREYER BASED ON CHLOROPLAST *matK* GENE ANALYSIS

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*Daphne blagayana* Freyer (Thymelaeaceae), an endangered evergreen small bush is distributed across the Balkan Peninsula, where several disjunctive populations can be found. In the central area of distribution it mainly reproduces sexually, meanwhile in other disjunctive areas vegetative reproduction dominates. It grows on mountain serpentines, limestone and dolomite substrate. In the analyses of genetic diversity of Blagay's *Daphne*, 70 samples from whole distribution area were used. A minimum spanning tree of the investigated populations indicated several differences in nucleotide sequences of *matK* region. Based on these differences we determined genetically similar populations, which in most cases coincides with geographical location – populations geographically closer to one another are genetically more similar. Italian population and most of Slovenian samples from northwestern part of its distribution area share the same haplotype. Edge haplotypes, however, were found in samples from Montenegro, Romania and some samples from Bosnia and Herzegovina and Slovenia. Population from Macedonia, Montenegro and Romania are phylogenetically closer to Bosnian central population than to Slovenian population, which further coincides with their geographical origin. The author believes that gene *matK* represents adequate genetic marker for determining population's structure of Blagay's *Daphne*.

## USING CONSERVATION AS A TOOL TO RESOLVE CONFLICT: ESTABLISHING THE PIRAN–SAVUDRIJA INTERNATIONAL MARINE PEACE PARK

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Border disputes between neighbouring States are a regular occurrence and have the potential to undermine relations at national, regional, local and even individual level. In this instance the conflict over Piran Bay in the Northern Adriatic Sea has led to conflict between the neighbouring States of Croatia and Slovenia. The lack of resolution of this conflict resulted in Croatia being delayed in its accession into the European Union (EU). The border dispute remains unresolved and will go to international arbitration in 2013. Yet it is unlikely that arbitration will provide a solution agreeable to all stakeholders. It is likely that residual feelings of injustice will remain, especially at local level. Analysis of the political context of the dispute and recognition of the biological importance of the region has led to opportunity to combine politics and biological conservation to establish an International Marine Peace Park (IMPP) as a potential mitigation measure to help resolve the conflict. This initiative aims to develop regional ownership over a shared marine space linking the local communities of Slovenia and Croatia that co-habit the adjacent Istrian peninsula. The area of the proposed Piran–Savudrija IMPP hosts numerous habitat types and species which are representative of the region and are of international and national conservation importance. The policies and opportunities associated with EU accession provide the potential political, economic and environmental frameworks to develop a regional agency or a bi-national steering committee for the management of the area. This could allow local communities to develop equitable management and restore good relations while preserving an important regionally representative marine area.



## SCIENCE TOOLS IN THE DIGITAL AGE

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- (3) *InFusion Consulting*

Digital tools are changing the way we do science. The ubiquity of mobile computing with integrated sensors, as found in smartphones, provide the opportunity for accurate measurement of the world around us. These tools are democratised and available to all; this has seen a rise in citizen science where the scale and scope of research programs have increased to unprecedented levels. Initiatives such as iNaturalist are tackling taxonomic identification at a global scale, linking amateur and professional taxonomists. The Australian government has made a significant investment into the Atlas of Living Australia for the visualisation of species distributions. Phylo has gamified and crowd sourced DNA sequence alignments. In this presentation I will introduce listeners to these innovations giving insight into how the collection, visualisation and analysis of scientific data have evolved.

## POSTERS

### ESTIMATING POPULATION DENSITY OF A CRYPTIC ANURAN (*ALYTES OBSTETRICANS*) USING A PASSIVE ACOUSTIC DETECTOR ARRAY

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The estimation of animal abundance or density is a fundamental requirement for effective management and conservation of animal populations. This information can be particularly challenging to obtain if the species of interest are cryptic, nocturnal or at low densities. Passive acoustic survey techniques have great potential for assessing cryptic species that are vocally active. The common midwife toad (*Alytes obstetricans*) is a case in point. Males of the species have a distinct mating call and can be heard vocalizing throughout the breeding season. Methods are developed for estimating the size/density of populations using data collected with a set of passive acoustic detectors. The methods convert the number of detected acoustic cues into animal density by accounting for the probability of detecting cues and the rate at which animals produce cues. This is the essence of acoustic spatially explicit capture-recapture (SECR) methods. We applied two likelihood SECR models on data collected on a breeding population of *A. obstetricans* in northern Spain. Over a 3 day period in June 2012 male mating calls were recorded with an array of 6 microphones. Even though rough weather conditions affected the detection probability, we were able to obtain animal density estimates in three habitat types of the study area. The resulting estimates of animal density [animals per ha] in the three habitats were  $4.554 \times 10^{-3}$ , CI =  $(0.292 \times 10^{-3}, 8.816 \times 10^{-3})$ ;  $0.1 \times 10^{-1}$ , CI =  $(0.065 \times 10^{-2}, 0.1935 \times 10^{-1})$  and  $0.1197 \times 10^{-1}$ , CI =  $(0.075 \times 10^{-2}, 0.2318 \times 10^{-1})$  estimated with the first SECR model and  $4.683 \times 10^{-3}$ , CI =  $(0.301 \times 10^{-3}, 9.066 \times 10^{-3})$ ;  $1.062 \times 10^{-2}$ , CI =  $(0.070 \times 10^{-2}, 2.055 \times 10^{-2})$  and  $1.190 \times 10^{-2}$ , CI =  $(0.075 \times 10^{-2}, 2.306 \times 10^{-2})$  estimated with the second SECR model. Time constraints and rough weather conditions prevented us to obtain acoustic recordings over the entire study area. In order to acquire reliable density estimates of the midwife toad population in question, additional data collection over a longer time period is needed. The methods used are potentially applicable to other calling anuran species that are hard to survey using conventional visual methods and can be used when a more quantitative estimate of population density is required.

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## THE IMPORTANCE OF FOREST CLEARINGS FOR REPTILES IN NORTHERN DINARIC REGION: RESULTS AND CONSERVATION MANAGEMENT RECOMMENDATIONS

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Reptiles are ectothermic organisms thus need heat from an outside source (like sun) in order to become active. Different forest clearings (open areas) with exposure to sunlight represent such suitable places for reptiles in a forest landscape. The role of these kinds of open areas in a forest landscape in a study area in Northern Dinaric region, S Slovenia, has been investigated. The research compared reptile fauna of eight different habitat types, of which six represented open areas and two represented forest. A survey of reptile fauna was done using line transect method, which was supplemented with all other coincidental finds of reptiles within the study area. The important aims of the study were to determine the differences between species composition and richness of different habitat types. Our results showed that open areas in forest landscape are very important if not even crucial for the occurrence of reptiles. We recorded 10 reptile species with a maximum relative abundances and species richness on artificial rock walls, whereas in the dense forest we found only in one occasion one specimen of a slow worm (*Anguis fragilis*). A comparison of natural and artificial open areas showed that both are important for the occurrence of different species of reptiles with differences in relative abundances that was higher in the natural open areas. Furthermore, different kinds of water banks appeared to be important; the river Kolpa proved to be the most important, where we recorded five different species and the highest relative number of reptiles. With this study we evaluated the importance of different open areas in the forest landscape in the study area for the reptiles that can serve as a base line to identify the main possible threats and give possible management recommendations.

## INTERACTIONS BETWEEN BOTTLENOSE DOLPHINS (*TURSIOPS TRUNCATUS*) AND TRAWLERS IN THE NORTHERN ADRIATIC SEA

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Interactions between cetaceans and fisheries are a widespread occurrence in the Mediterranean Sea and worldwide, effects of which range from positive to negative for one or both sides involved. We studied interactions between common bottlenose dolphins (*Tursiops truncatus*) and different types of trawlers in Slovenian and adjacent waters, as part of a long-term study on bottlenose dolphin ecology and conservation. We carried out visual boat- and land-based surveys between 2002 and 2012. During boat surveys, we opportunistically inspected operating trawlers for dolphin presence. When encountered, with or without trawlers, dolphins were followed for a variable amount of time, and photographed for identification purposes. Out of 209 recorded sightings, 22% involved an interaction with trawlers. 52,2% of those interactions were with pelagic pair trawlers, while 47,8% were with (single) bottom trawlers. Group size during interactions ranged from 1 to 30 individuals. Calves were present in 43,5% of all interactions, but were more often present during interactions with pelagic pair trawlers. The animals followed trawlers for a variable amount of time, from 9 to 149 minutes. On some occasions, dolphins remained close to trawlers even after the retrieval of nets, followed the boats during transit, waited for trawling to resume and then continued their pursuit. Photo-identification data showed that most recorded interactions involved the same identified individuals, while such behaviour was never observed in others. No evidence of bycatch was found. Both types of trawlers appear to attract dolphins and thus alter their distribution, movements and behaviour.

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## BIODIVERSITY OF SEVEN CAVES FROM FLYSCH AND LIMESTONE REGIONS IN SW SLOVENIA

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Faunal lists are fundamental aspect for biodiversity assessments and their conservation. As the biodiversity of the Dinaric caves is known to be most rich in the world, we tried to estimate the differences in biodiversity among seven caves from two types of rocks (limestone and flysch) at the regional scale, taking also habitat types in account. Altogether, 74 taxa (excl. Coleoptera) were collected and 24.3 % of them are troglobitic. The difference in taxa assemblages are best explained by two factors, (1) bedrock (i.e. flysch vs. limestone) and (2) water (sinking river) presence. Although similarity index yielded results that are well connected to the geographic distances between the caves, the bedrock seems to be most important factor influencing their diversity. Furthermore, each of the investigated caves is very unique, proving high biodiversity of the Dinaric caves and support the need for their conservation. As the caves are fragile ecosystems and constantly threatened by human activities on the surface (e.g. by waste waters, dumping sites, tourism) and underground is also an important reservoir of (potable) water, these ecosystems should be hadled by care.

## UPOGEBIA PUSILLA (DECAPODA: THALASSINIDEA) FROM TWO LOCALITIES WITH DIFFERENT CONSERVATION STATUS ON SLOVENIAN COAST

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In the Mediterranean sea, *Upogebia pusilla* (Petagna, 1792) is one of the most common burrowing animals in mediolittoral soft sediments. We collected samples monthly (in alternation) from two sampling localities at the Slovenian coast in order to explore biometric characteristics and temporal abundance of animals, as well as to notice whether there is a visible human impact on populations (one of the localities is under protection whether the other is not). Species is known to be a food resource for a variety of fishes and birds and has been used as fishing bait by man as well. From October 2011 to September 2012 we collected 660 animals in Lazaret and 520 in Strunjan (6 sampling occasions with 3 sampling plots at, below and above average sea level at each location). Population density was the highest in June (20–118 ind./m<sup>2</sup>). With the beginning of breeding period in April number of animals increased. Ovigerous females were found from April to July, with the peak incidence in June. A positive correlation exists between population density and air temperature. Females were a bit larger than males. In Strunjan population animals have only a bit larger average total length (TL; 39.0 mm) than in Lazaret (38.0 mm). Although the average sizes (TL) from both locations are fairly the same, size frequency distribution of the animals from both locations shows that animals are most common in size classes 30–40 mm and 40–50 mm in Lazaret, while in Strunjan they were grouped mainly in classes 40–50 mm and 50–60 mm. We noticed fishermen collecting *Upogebia* in Lazaret. Although we did not see fishermen collecting the animals in Strunjan (as the area is under protection), we did noticed many wooden boards in the sediment that they probably used for standing on it while collecting animals. Considering that the species is collected to be used as a bait, it is evident that animals which are approximately 30 mm in total length or more are more suitable for this purpose and therefore we can notice the lack of these in Lazaret in comparison to Strunjan. Nevertheless, Lazaret area is much larger than Stjuža in Strunjan hence we suppose that the human impact on population is not much affecting their abundance yet (in neither of both localities).

## THE IMPACT OF GRAZING ON THE OCCURENCE OF BLACK-VEINED WHITE, *APORIA CRATAEGI* (LEPIDOPTERA: PIERIDAE)

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The population size and abundance of Black-veined White, *Aporia crataegi* (Lepidoptera: Pieridae) on pasture and two dry karstic meadows located on Kraški rob (SW Slovenia) were surveyed in spring 2012. Field work was done from May 15<sup>th</sup> to June 29<sup>th</sup>. With the method of mark, release and recapture (MRR, Jolly-Cormack-Seber model), we noticed a significant difference in abundance of Black-veined White subpopulations between sites, with the estimations 478, 1696 and 443 animals at first and second (near village Rakitovec: R1, R2) dry meadow and pasture (near village Zazid: Z), respectively. As the area of the three sampling plots was unequal, densities of butterflies were calculated, confirming higher densities on dry karstic meadows in comparison to the pasture (Z). Higher densities of butterflies in karstic meadows *versus* pasture showed the importance for maintaining the mosaic structure within the area, as the pastures, although extensive, are not best surrogate habitats for butterfly fauna. Nevertheless, grazing that hinders the overgrowing processes might also have some positive effects for the species that live in open habitats. In mosaic land structure, there are always some plants available for feeding, resting and egg-laying.

## HABITAT PREFERENCES OF DUNG BEETLES (COLEOPTERA: SCARABAEOIDEA) ON KRAŠKI ROB (SW SLOVENIA)

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Dung beetles play a remarkable role in nature; by burying and consuming dung, they improve nutrient recycling and soil structure. They also protect livestock, such as cattle, by removing the dung which, if left, could provide habitat for pests and molestants such as flies. Kraški rob is an geologically interesting area, in which karstic hills meet the flysch Istrian soils. To gain an insight into the diversity and habitat preferences of dung beetles on Kraški rob, we compared the abundances of dung beetles and other ground living invertebrates in two pastures on Kraški rob, one with cattle and other with small ruminants (sheeps and goats). Three different sampling sites were chosen on each of the two pastures: D1 (open pasture; most degraded), D2 (overgrowing part of the pasture), and D3 (wood edge near the pasture). During spring 2012, pitfall traps were used to sample ground living animals on two pastures near Rakitovec and Zazid. For each of the three sampling plots per locality, four traps were used, two without and two with a bait (cattle dung). Samples were collected in two intervals: after four days and a fortnight. Over 25 species of coprophagous beetles from at least eight genera were collected. Statistical tests showed significant differences in numbers of dung beetles and other ground living invertebrates caught in traps with and without baits, with more animals caught when bait was used. Moreover, significant differences for other ground living invertebrates were found also between the two sampling localities (more animals were caught in Hrastovlje) and different time intervals (four days versus 14 days, more animals were caught during longer sampling period). Within each of the two localities, significant differences among sampling sites were also found. For both, dung beetles and other ground living invertebrates, abundances are highest on overgrowing part of the pasture (D2). To conserve such diversity of ground beetles on Kraški rob, it is important to maintain a mosaic structure of a landscape, including pastures; preferably with traditional land use.

## WINTER DISTRIBUTION OF THE WALLCREEPER *TICHODROMA MURARIA* ON KRAŠKI ROB IN SLOVENIA AND ITS CONSERVATION STATUS IN THE COUNTRY

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The Wallcreeper *Tichodroma muraria* is the only species of the *Tichodromidae* family in Europe. The species is not well researched and little is known about its non-breeding habits. The study will take place on the Kras plateau, which is an IBA (Important Bird Area) under the Natura 2000 network. The Wallcreeper is a typical habitat specialist, which lives in rocky terrain on sheer cliffs and often inaccessible sites. These are usually located in mountainous areas (1000–3000 m) with a limestone base. In Slovenia the species breeds in the Alpine mountain range where it inhabits moist cliff faces, gorges and valleys near water. Breeding takes place between May and June. After the breeding season it descends to lower levels (altitudinal migration) where it overwinters. It chooses similar rocky areas such as steep cliffs, quarries and sometimes buildings. In winter it is mainly found on the Kras plateau (Karst) and rarely in continental Slovenia. The aim of the study is to determine the size of the wintering population of the Wallcreeper on Kraški rob (Karstic edge) in Slovenia. The authors hypothesize the area is one of the most important wintering sites for the species in Slovenia. Thus data collection could contribute to further knowledge and conservation of the species in this habitat. The census of the Wallcreeper will be carried out in the forthcoming winters, in the areas where the species is known to be present at that time. The study area will comprise the Kraški rob (Karstic edge) stretching from Osp to Rakitovec in south-western Slovenia. Fieldwork will mainly include observation with the aim of binoculars and telescopes. The census points will be checked on a regular basis throughout the winter period to confirm the presence/absence of the species. The number of individuals will be noted on each point, as well as the time of the observation, habitat type, exposure of the cliff and weather conditions.

## GENETIC DIVERSITY OF *DAPHNE BLAGAYANA* FREYER BASED ON CHLOROPLAST *MATK* GENE ANALYSIS

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*Daphne blagayana* Freyer (Thymelaeaceae), an endangered evergreen small bush is distributed across the Balkan Peninsula, where several disjunctive populations can be found. In the central area of distribution it mainly reproduces sexually, meanwhile in other disjunctive areas vegetative reproduction dominates. It grows on mountain serpentines, limestone and dolomite substrate. In the analyses of genetic diversity of Blagay's *Daphne*, 70 samples from whole distribution area were used. A minimum spanning tree of the investigated populations indicated several differences in nucleotide sequences of *matK* region. Based on these differences we determined genetically similar populations, which in most cases coincides with geographical location – populations geographically closer to one another are genetically more similar. Italian population and most of Slovenian samples from northwestern part of its distribution area share the same haplotype. Edge haplotypes, however, were found in samples from Montenegro, Romania and some samples from Bosnia and Herzegovina and Slovenia. Population from Macedonia, Montenegro and Romania are phylogenetically closer to Bosnian central population than to Slovenian population, which further coincides with their geographical origin. The author believes that gene *matK* represents adequate genetic marker for determining population's structure of Blagay's *Daphne*.