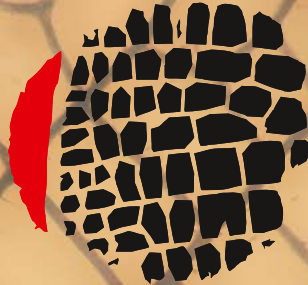


International Zoological Congress of “Grigore Antipa” Museum

C Z G A



International Zoological Congress
of "Grigore Antipa" Museum

**22 - 25 November 2017
Bucharest - Romania**

Book of Abstracts

Edited by:

**Luis Ovidiu Popa, Costică Adam, Gabriel Chișamera,
Elena Iorgu, Dumitru Murariu, Oana Paula Popa**

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Popa, L. O., C. Adam, G. Chișamera, E. Iorgu, D. Murariu, O. P. Popa (eds) 2017.
International Zoological Congress of “Grigore Antipa” Museum - Book of abstracts.
“Grigore Antipa” National Museum of Natural History, Bucharest, Romania.

ISSN: 2457-9777

ISSN-L: 2457-9769

Cover design: **Adrian Mihalcea-Suru**

Editorial assistance: **Mihaela Barcan-Achim**

Ana-Maria Krapal

© 2017, “Grigore Antipa” National Museum of Natural History, Bucharest, Romania

Printed by S.C. “INTERBRAND IMPEX” S.R.L.

Str. Oboga, nr. 19-23, sector 6, București, România,

Tel.: 004/031/401.61.62; 004/031/401.61.63; 004/073/308.74.58

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CZGA 2017 PROGRAMME

WEDNESDAY, THE 22nd OF NOVEMBER 2017

09:00-12:00

Registration

09:30-09:40

Luis Ovidiu POPA - Welcome and Greetings

09:40-10.30

Foreword from representatives of the Royal House of Romania, Romanian Ministry of Culture, Romanian Academy and University of Bucharest

Invited speaker

10:30-11:15

Luis Ovidiu POPA, Oana Paula POPA - Grigore Antipa – Beginnings

11.15-11:45

Coffee break

Invited speaker

11:45-12:30

Dumitru MURARIU - Scientific research on natural history in today's society

Studies and recovery of the natural history museum patrimony

Chair: Luis Ovidiu POPA (Bucharest, Romania)

12:30-12:45

Maria Mădălina CHERĂȚOIU, Ștefan VASILE - Dusting off the cave bears – salvaging the University of Bucharest Laboratory of Palaeontology *Ursus spelaeus* collection

12:45-13:00

Katarzyna KOPEĆ, Wiesław KRZEMIŃSKI, Kornelia SKIBIŃSKA, Bronisław W. WOŁOSZYN - Natural History Museum, Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Krakow, Poland

13:00-13:15

Iorgu PETRESCU, Melanya STAN, Ana-Maria PETRESCU - New species dedicated to the memory of Grigore Antipa: an homage for his 150 years anniversary

Taxonomy. Faunistics. Zoogeography

Chair: Margarita G. PONOMARENKO (Vladivostok, Russian Federation)

13:15-13:30

Mohammad KHANJANI - Mites of the genus *Ledermuelleriopsis* (Acari: Stigmaeidae) from Iran

13:30-14:30

Lunch Break

Invited speaker

14:30-15:15

Margarita G. PONOMARENKO - Modern problems in phylogenetic and taxonomic analysis (on the example of micromoths)

Taxonomy. Faunistics. Zoogeography

Chair: Margarita G. PONOMARENKO (Vladivostok, Russian Federation)

15:15-15:30

Ioana-Cristina CONSTANTINESCU, Gabriel Bogdan CHIȘAMERA, Angela PETRESCU, Costică ADAM - Old preserved bird specimens, new feather mite species

15:30-15:45

Ionuț Ștefan IORGU - The acoustic component in the mating system of the Carpathian Plump Bush-crickets (Insecta: Orthoptera: Tettigoniidae: *Isophya*)

15:45-16:00

Dumitru GALUPA, Nadejda MOCREAC-STAHİ, Elena ERȘOVA, Vladimir BULGARU, Serghei VASILCIUC - The monitoring of leafroller and pyralid moth species (Tortricidae, Pyralidae) in the oak woods of the central part of the Republic of Moldova

16:00-16:15

Irinel Eugen POPESCU, Irina Neta GOSTIN - Update to almost unknown fauna of Chalcidoidea (Insecta: Hymenoptera) from the Maldives Archipelago

16:15-16:30

Irinel Eugen POPESCU, Irina Neta GOSTIN - First record of the genus *Xerephedromyia* in Romania, with *Xerephedromyia ustjurtensis* (Diptera: Cecidomyiidae) from galls on stems of *Ephedra distachya* (Ephedrales: Ephedraceae)

16:30-16:45

Alexandru IFTIME, Oana IFTIME - New herpetological records from the middle Ialomița River valley (Romania)

16:45-17:00

Tiberiu C. SAHLEAN, Alexandru STRUGARIU - The favorability of the Natura 2000 Sites of Community Importance (SCI) for the blotched snake (*Elaphe sauromates* Pallas, 1811) in Romania

17:00-17:15

Natalia CARAMAN, Victoria NISTREANU - Small mammal (Insectivora, Rodentia) fauna of Chișinău, Republic of Moldova

17:15-18:00

Coffee, Tea and Posters

18:00 – 20:00

Official Opening of the Exhibition “A Royal Friendship” - at the “Grigore Antipa” National Museum of Natural History in the presence of Her Royal Highness Princess Margareta

THURSDAY, THE 23rd OF NOVEMBER 2017

09:00-10:00

Registration

Invited speaker

10:00-10:45

Johan MICHAUX - The revolution of new genetic tools for the study of the ecology of rare or elusive species, using non-invasive approaches

10.45-11:15

Coffee break

Invited speaker

11:15-12:00

Dan COGĂLNICEANU, Laurențiu ROZYLOWICZ, Ruben IOSIF, Florina STĂNESCU, Paul SZÉKELY, Ciprian SAMOILĂ - Mapping the distribution of amphibians and reptiles in Romania - present situation and trends

Ecology

Chair: Johan MICHAUX (Liège, Belgium)

12:00-12:15

Maria CARARE, Victor SURUGIU - Life cycle, population dynamics and production of *Ecrobia maritima* (Milaschewitsch, 1916) (Gastropoda: Prosobranchia) at the Romanian coast of the Black Sea

12:15-12:30

Laura M. ȘTEFAN, Wolf ISBERT, Elena GÓMEZ-DÍAZ, Sergey V. MIRONOV, Karen D. MCCOY, Jacob GONZÁLEZ-SOLÍS - Feather mite diversity and community structure in NE Atlantic and Mediterranean seabirds

12:30-12:45

Leïla BENFEKIH, Faïza MARNICHE, Redha BENDJILLALI, Asma ABBAD, Mohamed El Fodhil AROUN, Malik LAAMARI - Insect fauna biodiversity of El Hamma Botanical Garden: a focus on recent data from beneficial communities and tritrophic interactions

12:45-13:00

Mircea VARVARA, Alexandru DASCĂLU - Diversity, abundance and dominance of the epigeic arthropods in four ecosystems, Zvoriștea, Suceava County, 1998, Moldavia, Romania

13:00-13:15

Soumia LOULIDA, Mohammed ZNARI, Mohamed NAIMI, Safaa BENDAMI - Body size and population structure in the Sahara Blue-eyed turtle, *Mauremys leprosa saharica*, from a marginal isolated pond in southern Morocco

13:15-13:30

Safaa BENDAMI, Mohammed ZNARI, Soumia LOULIDA - Diet and food consumption of the Moroccan Spiny-tailed lizard, using microhistological analysis and calibrated production of feces

13:30-14:30

Lunch Break

Invited speakers

14:30-15:15

Dragan P. CHOBANOV - Species delimitation in singing Orthoptera: markers, problems and (sometimes) solutions

15:15-16:00

Oana Teodora MOLDOVAN - Subterranean fauna as proxy for the climate change impact on surface ecosystems

Ecology

Chair: Johan MICHAUX (Liège, Belgium)

16:00-16:15

Kamilia FARHI, Farid MEZERDI, Mohamed BELHAMRA - Effect of bioclimate parameters on group size of Black bellied sandgrouse (*Pterocles orientalis*, L.1758) in watering site of South-Eastern Algeria

16:15-16:30

Victoria NISTREANU, Alina LARION - Mammal fauna of Chişinău airport, Republic of Moldova

16:30-16:45

Victoria NISTREANU, Vlad CĂLDARI, Natalia DIBOLSCAIA, Alina LARION - New bat maternity colonies in central and northern zones of the Republic of Moldova

16:45-17:00

Dragoş Ş. MĂNTOIU, Ionuţ C. MIREA, Ionuţ C. ŞANDRIC, Iulian GHERGHEL, Suren GAZARYAN - Predicting range shifts for European Community Interest bat species based on future climatic predictions: will Natura 2000 Network provide an adequate coverage?

Invasive species

Chair: Marius SKOLKA (Constanţa, Romania)

17:00-17:15

Cristina PREDA, Helen ROY - Horizon-scanning for alien species likely to have an impact on European biodiversity

17:15-17:30

Christian COZMA, Oana Paula POPA, Mihaela Isabela VADANA, Ana-Maria KRAPAL, Marianna SOROKA, Elena Iulia IORGU, Andrea Cristina STAICU, Luis Ovidiu POPA - Genetic structure of *Dreissena rostriformis bugensis* (Mollusca: Bivalvia) populations from Danube Basin and Poland

17:30-18:00

Coffee, Tea and Posters

FRIDAY, THE 24th OF NOVEMBER 2017

09:00-10:00

Registration

Invited speaker

10:00-10:50

Frank Emmanuel ZACHOS - Species. Old problems, new insights

10.50-11:15

Coffee break

Invited speaker

11:15-12:00

Eduardo ROLDÁN - Male reproductive function and assisted reproductive techniques for endangered felids and ungulates

Parasitism in the animal kingdom

Chair: Dumitru MURARIU (Bucharest, Romania)

12:00-12:15

Elena IURCU-STRĂISTARU, Ion TODERAȘ, Alexei BIVOL, Ștefan RUSU, Nicola SASSANELLI, Marek RENCO, Nicolai BOTNARU - Parasitic nematode fauna in peach culture from various orchards of the Republic of Moldova

Palaeontology

Chair: Dumitru MURARIU (Bucharest, Romania)

12:15-12:30

Lea RAUSCH, Marius STOICA - Paratethyan ostracod studies - a historical perspective

12:30-12:45

Ovidiu FLINTAȘU, Ștefan VASILE, Zoltan CSIKI-SAVA, Dan GRIGORESCU - Preliminary data on the dinosaur eggshells from Livezi (Hunedara County, Romania) – new hints of megaloolithid variability in uppermost Cretaceous deposits of the Hațeg Basin

12:45-13:00

Ana-Voica BOJAR, Ovidiu GUJA, Andrzej PELC, Ștefan VASILE Natalia PIOTROWSKA - One of the last free-roaming wisents (*Bison bonasus*) in the Bihor Mountains (western Romania) and its tale of past times

Biodiversity Conservation

Chair: Eduardo ROLDÁN (Madrid, Spain)

13:00-13:15

Laurențiu ROZYLOWICZ, Athanasios GAVRILIDIS, Iulia V. MIU, Marius MATACHE, Steluța MANOLACHE, Cristiana PIOARCA-CIOCANEA, Cristian MOALE, Andreea NIȚĂ, Florian BODESCU - Evaluation of Argos telemetry accuracy in Romania compared with GPS data

13:15-13:30

Alexandra SALLAY-MOSOI, Armin ZOTTER - Evaluating the deterrent efficiency of non-lethal ammunition EM-A/B for the application in nuisance wildlife management

13:30-14:30

Lunch Break

Invited speaker

14:30-15:15

Stylianios SIMAIAKIS, Cyril HAMMOUD, Sanne JUCH, Kenneth RIJSDIJK - Diversity and distribution patterns of centipedes (Myriapoda: Chilopoda) in the Aegean Archipelago (Greece)

Biodiversity Conservation

Chair: Eduardo ROLDÁN (Madrid, Spain)

15:15-15:30

Elena Iulia IORGU, Ionuț Ștefan IORGU, Peter KAŇUCH, Oana Paula POPA, Ana-Maria KRAPAL, Alexandra Florina POPA, Anton KRIŠTÍN, Luis Ovidiu POPA - Exploring the genetic diversity in an endemic Carpathian species: case study of the Transylvanian Dark Bushcricket (*Pholidoptera transsylvanica*)

15:30-15:45

Alexandru BURCEA, Gina-Oana POPA, Sami GHARBIA, Iulia Elena FLORESCU (GUNE), Andreea DUDU, Sergiu Emil GEORGESCU, Anca HERMENEAN, Marieta COSTACHE - The qPCR expression of genes possibly involved in the sexual development of individuals from two sturgeon species

15:45-16:00

Elena BUHACIUC-IONIȚĂ, Dan COGĂLNICEANU - Trophic resource exploitation by a *Pelobates syriacus* population at the northern limit of the distribution range

16:00-16:15

Mihaela CIOBOTĂ, Andreea CIOBOTĂ, Dumitru MURARIU - Water level management influence on the fall passage of Black Stork populations at Dumbrăvița Fishing Complex (Brașov County, Romania)

16:15-16:30

Simona MIHĂILESCU, Vasile CRISTEA, Dumitru MURARIU, Eliana SEVIANU, Gabriel Bogdan CHIȘAMERA - Is relocation of mammals an effective measure of their conservation in Romania?

16:30-16:45

Bronisław W. WOŁOSZYN, Dumitru MURARIU - The image of animals in sacral architecture

16:45-17:00

Bronisław W. WOŁOSZYN, Roksana SOCHA, Dumitru MURARIU - Sacral architecture in animal protection and humane interest to preserve them

17:00-17:45

Coffee, Tea and Posters

18:00-19:30

Visit of the permanent exhibition of “Grigore Antipa” National Museum of Natural History

19:30-20.00

Poster Awards

20:00-22:00

Gala Dinner

SATURDAY, THE 25th OF NOVEMBER 2017

Whole day excursion to Peleş and Pelișor Castles, Prahova County

Poster Presentations

Studies and recovery of the natural history museum patrimony

P 01.

Liudmyla GAPONOVA, Melanya STAN - On the cyclopids (Crustacea: Copepoda: Cyclopidae) from the collection of “Grigore Antipa” National Museum of Natural History (Bucharest, Romania)

P 02.

Melanya STAN, Andreea-Cătălina DRĂGHICI - On the *Osmoderma* (Coleoptera: Scarabaeidae: Cetoniinae: Trichiini) from the collection of “Grigore Antipa” National Museum of Natural History (Bucharest, Romania)

P 03.

Sanda MAICAN, Rodica SERAFIM - The New Leaf Beetle Collection (Coleoptera: Chrysomelidae) of “Grigore Antipa” National Museum of Natural History (Bucharest)

P 04.

Mirela Sabina RIDICHE - The documentary-scientific and cultural-educational value of the Ornithological Collection of the Museum of Oltenia Craiova

P 05.

Angela PETRESCU, Ana-Maria PETRESCU, Gabriel Bogdan CHIȘAMERA - “Robert Ritter von Dombrowski” bird collection of “Grigore Antipa” National Museum of Natural History – after 100 years

Phylogenetics, Evolution and Systematics

P 06.

Nino GABROSHVILI, Nana BAKHTADZE, Nino CHAKVETADZE, George BAKHTADZE, Edisher TSKHADAIA - Karyological investigation of terrestrial molluscs (Mollusca: Gastropoda) from Georgia

P 07.

Georgi HRISTOV, Dragan P. CHOBANOV - Species phylogeography and systematics of the *brevipennis*-group in the cockroach genus *Phyllodromica* (Blattodea: Ectobiidae) in the Balkan Peninsula

P 08.

Olena HOLOVCHENKO, Kseniia KRAVCHENKO, Anton VLASCHENKO - Whose females are larger? Sex dimorphism in skull parameters of two air-hawking Vespertilionidae bats

Taxonomy. Faunistics. Zoogeography

P 09.

Anda Felicia BĂBĂLEAN - On the tricladid fauna of Romania (Platyhelminthes, Tricladida) – a critic checklist of species

P 10.

Omid JOHARCHI - Laelapid mites (Acari: Mesostigmata) associated with scarab beetles (Coleoptera: Scarabaeidae) in Markazi province, Iran

P 11.

Amir Hossein EGHBALIAN - Some cunaxid mites (Acari: Cunaxidae) from Hamedan region, Western Iran

P 12.

Masoumeh KHANJANI, Mohammad KHANJANI, Fatemeh AMINI - Fauna of the family Caligonellidae mites (Acari: Prostigmata) in Hamedan and Kurdistan provinces, Iran

P 13.

Constanța-Mihaela ION, Dumitru MURARIU - Exploring the scientific research on centipedes (Myriapoda: Chilopoda). Mapping science using bibliometric methods

P 14.

Andrei GIURGINCA, Ștefan Cătălin BABA - The Oniscidea, Diplopoda, Chilopoda and Symphyla of the Buzău Land Geopark (Buzău Mountains, Romania)

P 15.

Galina BUȘMACHIU - Collembola (Hexapoda) species diversity of the Yagorlyk Reserve

P 16.

Ionela Marilena SLEJIUC, Ioan-Alexandru RĂDAC - First records of *Paromius gracilis* (Rambur, 1839) and *Kleidocerys privignus* (Horváth, 1894) in Romania

P 17.

Mircea D. MITROIU, Vlad Ș. DORIN, Maria-Magdalena DASCĂLU, Lucian FUSU, Ovidiu A. POPOVICI, Mădălina I. VICIRIUC - Enhanced biological control through integrated taxonomy: the case of the invasive green vegetable bug *Nezara viridula* (Insecta, Hemiptera) and its parasitoids (Insecta, Hymenoptera)

P 18.

Adrian RUICĂNESCU, Gabriela CUZEPAN-BEBESELEA, Andreea-Cătălina DRĂGHICI - Comments on *Anthaxia (Anthaxia) salicis* (Fabricius, 1777) species complex (Coleoptera: Buprestidae) in Romania

P 19.

Masoumeh Sadat Karimi, Saeed Mohamadzade Namin - First record of *Neoparoeus tibialis* Yarom (Diptera: Lauxaniidae) in Iran with notes on its variation

P 20.

Stoe SMILJKOV, Radmila ILIESKA, Ruzica PETRUSEVSKA - Qualitative composition of chironomid larvae fauna (Diptera: Chironomidae) from Mladost Lake

P 21.

Diana-Alexandra NICULAE, Otilia ZĂRNEȘCU - Comparison of erythrocytes and thrombocytes sizes from eleven freshwater ornamental aquarium fish species

P 22.

Raluca-Cristina ANDREI (GURIENCU), Victor CRISTEA, Mirela CREȚU, Lorena DEDIU, Alina MOGODAN - The effects of acclimation temperature on the Q10 values of the routine metabolic rates in Sterlet sturgeon juveniles (*Acipenser ruthenus*)

P 23.

Ana-Maria MIHALCESCU, Mihaela-Cristina MARTIN - The variation in the neuromast cephalic system of three Romanian pontocaspian gobies

P 24.

Eliana SEVIANU, Anca MARCOCI, Alin DAVID, Alexandru STERMIN - How many are there? Estimation of crested newt (*Triturus cristatus*) population size by dip netting in a small sized pond

P 25.

Vladimir ȚURCAN, Victor SÎTNIC - Study on the herpetofauna formation of the Prut-Nistru space

P 26.

Victor SÎTNIC - Intraspecific variation of the venom proteins from wild and captive *Vipera berus*

P 27.

Florinel Dănuț DRĂGAN - The breeding bird atlas of Bucharest (Romania): results from the first two years of fieldwork.

P 28.

Andrei GIURGINCA - First data regarding the avifauna of the Buzău Land Geopark (Buzău Mountains, Romania)

P 29.

Răzvan POPESCU-MIRCENI, Răzvan ZAHARIA - Data on the distribution and behaviour of *Puffinus yelkouan* (Acerbi, 1827) in the Western Black Sea basin within the period 2016-2017

P 30.

Viorel-Dumitru GAVRIL, Angela PETRESCU, Gabriel Bogdan CHIȘAMERA, Ioana COBZARU, Cristian MIHAI - Review on the presence of Greater flamingo (*Phoenicopterus roseus* Pallas, 1811) in Romania

P 31.

Anastasia LUNGU-BUCȘAN, Anatol SAVIN, Victoria NISTREANU - Impact of climatic conditions on the reproduction of Common Pheasant (*Phasianus colchicus*) in the natural populations of the Republic of Moldova

P 32.

Andrei GIURGINCA - The Griffon Vulture (*Gyps fulvus*) in Bucharest

P 33.

Florian BODESCU, Steluța MANOLACHE, Athanasios GAVRILIDIS, Iulia V. MIU, Marius MATAȘE, Cristiana PIOARCA-CIOCANEA, Cristian MOALE, Andreea NIȚĂ, Laurențiu ROZYLOWICZ - Argos based applications for real time wildlife monitoring in Romania (BioMoveFix)

P 34.

Edoardo VERNIER, Bronisław W. WOŁOSZYN - Status of Bats (Mammalia: Chiroptera) in the Veneto Region (N.E.Italy)

Ecology

P 35.

Valeria PURCĂREA-CIULACU, Alexandru Filip VLADIMIRESCU, Alexandru Ionuț PETRIȘOR, Gabriela DUMITRESCU, Daniela SAIZU, Elena SAVIN, Camelia SEMEN, Florin MIHAI, Gabriela NICOLESCU - Endemic presence of West Nile virus in Romania

P 36.

Rodica PLĂIAȘU, Andrei GIURGINCA, Augustin NAE, Ionuț POPA, Ștefan Cătălin BABA, Eugen NIȚU, Vali TOMA, Alexandru PETCULESCU - Biodiversity of artificial cavities from rupestral assembly Aluniș – Nucu (Buzău)

P 37.

Manuela Diana SAMARGIU, Adrian FILIMON, Daciana SAVA, Anca PETU - Ecological considerations regarding invertebrates' fauna associated with *Cystoseira barbata* in south part of the Romanian littoral

P 38.

Marius SKOLKA, Cristina PREDA, Florina STĂNESCU, Elena TEMNEANU, Daniyar MEMEDEMİN - Coleoptera diversity in anthropogenic habitats in south-western Dobrogea

P 39.

Daria JABINET, Anna MOLDOVAN, Ion TODERAŞ, Natalia MUNTEANU-MOLOTIEVSKIY - Genetic analysis of *Eusomus ovulum* (Coleoptera: Curculionidae) populations in the Republic of Moldova

P 40.

Cristina-Maria POPESCU, Simona LUNGU, Geta RÎŞNOVEANU - Potential bioindicators for land use changes: insights from genera of Calliphoridae (Diptera) family

P 41.

Dorel URECHE, Camelia URECHE - Recent data on the structure of fish communities in the lower basin of Bistriţa River (2015-2016), Romania

P 42.

Katarina TOŠIĆ, Elena TAFLAN, Mitică CIORPAC, Aurel NĂSTASE, Mirjana LENHARDT - Ecological screening of Pontic shad (*Alosa immaculata*) during spawning migration into the Danube River

P 43.

Gabriel BĂNICĂ - Dynamics of waterbirds in Constanţa Port (Romania) within the period 2007 – 2015

P 44.

Andrei MUNTEANU, Nicolai ZUBCOV, Ludmila BUCIUCEANU, Larisa BOGDEA - Diversity of avifauna from ecotone area and adjacent habitat in the Central Region of the Republic of Moldova

P 45.

Grzegorz KŁYS, Aleksandra ZIARKIEWICZ, Bronisław W. WOŁOSZYN - Hibernation of lesser horseshoe bat *Rhinolophus hipposideros* in the coal mine of Sławniowice

P 46.

Andrei MUNTEANU, Veaceslav SÎTNIC - Spatial-behavioural structure of rodent populations by switching from colonial to solitary phase and vice versa

P 47.

Victoria BURLACU, Victoria NISTREANU, Natalia CATERINCIUC, Alina LARION, Tatiana CIRLIG - Small mammal fauna (Rodentia, Insectivora) from middle course of Nistru River and its importance in maintaining leptospirosis outbreaks

P 48.

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INVITED SPEAKERS

Species delimitation in singing Orthoptera: markers, problems and (sometimes) solutions

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Key words: species delimitations, Orthoptera, acoustics, phylogeny.

Delimiting species is not only a theoretical issue concerning taxonomy and related disciplines, but a major practical problem concerning nature protection, mankind feeding and health, ecosystem services, etc. Recently, a vast increase in the methodology for delimiting species accumulated, yet, obviously, the variety of mechanisms that lead to lineage divergence and isolation by far exceeds our practical resources. Speciation may be driven and reinforced by sexual selection and sexual conflict and thus new lineages evolve and stabilize independence of ecological selection. Speciation directed towards changes in behaviour and physiology challenges the traditional systematics. There are many groups where morphology and anatomy, based on weak divergence (sometimes possibly due to methodological imperfections), cannot help in revealing species relationships. On the other hand, in recently diversified groups, especially in the cases of parapatry where gene flow occurs or have occurred recently, certain phylogenies and automatic species delineations may reveal misleading relationship results.

Representing a main factor in species and sex recognition within Orthoptera, acoustic communication is narrowly linked with and subjected to sexual selection and thus may lead to the rapid evolution of prezygotic reproductive isolation by changes in song parameters. Though the acoustic communication is a major information carrier even for humans, we still know little about the general song diversity in singing insects, about their intraspecific variation and interspecific acoustic relationships. Yet, the issue may be further complicated in groups where songs are quite stable in allopatric forms or may be variable within the same species.

Herewith I will present some examples of studies dealing with the relationships and taxonomic status of acoustically communicating orthopterans.

Mapping the distribution of amphibians and reptiles in Romania - present situation and trends

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Key words: species distribution, species range, biodiversity data, mapping.

Mapping species distribution data is a popular way of assembling and presenting spatial information, the end product being a distribution atlas. The occurrence data can be further analyzed and allow answering fundamental questions in ecology and macroecology, such as patterns of abundance, rarity, richness, turn-over and assemblage composition at different spatial scales and can be used in conservation planning, survey design, assessing species-environment associations, modeling species distribution or assess the level of threat. Thus detailed and accurate distribution data are vital in assessing the impact of global changes and biodiversity management. The Global Amphibian Assessment and Global Reptile Assessment carried out more than a decade ago are being updated, highlighting the importance of these type of assessments.

The first maps on the occurrence of amphibians and reptiles in Romania were published in the early 1930, independently by Călinescu Raoul and Kirîțescu Constantin. The two monographs published 30 years later by Dr. Ionel Fuhn on Amphibians (1960) and together with Ștefan Vancea on Reptiles (1961) contained the first consistent national distribution maps. Several updates on their distribution were made after decades in 1991 and 2000 (for amphibians) and 2013 (for both amphibians and reptiles). The number of occurrences raised over time from less than a couple of hundred for both amphibians and reptiles, to over 50,000 presently. The rate of new sightings is exponentially increasing so there is a constant need to update the distribution maps and connect local, regional and national mapping projects to existing continental (e.g. NA2RE) and global scale ones (e.g. GBIF).

What are the future directions of research in the mapping of amphibians and reptiles in Romania? Since roughly half of the amphibian and reptile species reach in Romania the limit of their geographic range and are thus excellent indicators of global changes, precise mapping of their range limit and identification of potential recent shifts are needed. For example, there are still uncertainties regarding the northern and western limits of *Pelobates syriacus*, the level of expansion along the Prut River of *Triturus dobrogicus* or the range limit and overlap between *Lissotriton vulgaris ampelensis* and *L. montandoni*. Based on detailed distribution records, species distribution models could help identify new populations with local

distribution and specific habitat requirements (e.g. *Vipera ursinii* or *Eryx jaculus*). There is also the issue of alien species that entered the country as pets and ended released in the environment. Especially along the southern border of Dobrogea it is expected to find new species like geckoes (e.g. *Mediodactylus kotschy* reported close to the border) or *Ophisaurus apodus* that occurs less than 20 km south of the border. We are also facing severe problems related to taxonomic inflation, several species were split based on molecular data, without clear morphological criteria for identification and without an adequate geographic coverage at national level for delineation: *Bufo viridis* was split in *Bufo viridis/variabilis*, *Anguis fragilis* in *fragilis/colchicus* and *Hyla arborea* in *arborea/orientalis*. At least in the latter species, no samples were used in the study from Romania, but still the presence of *orientalis* was assumed based on extrapolation.

An assessment study that evaluated the quality of distribution data in 80 recent publications highlighted a series of difficulties in collecting, use, and exploitation of the published distribution data. The main shortcomings were related to the format and completeness of the data and associated metadata (e.g. ambiguous, incomplete, and scattered throughout text, inconsistent format). Several examples of bias in distribution data publications will be presented together with a set of recommendations for improving the quality of published data.

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The revolution of new genetic tools for the study of the ecology of rare or elusive species, using non-invasive approaches

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Key words: Next Generation Sequencing methods, metabarcoding, non invasive approaches, threatened species, diet.

Since the last decade, the development of new molecular biology technologies and particularly the Next Generation Sequencing methods have revolutionized the study of biodiversity. Using non-invasive approaches (collect of faeces, hairs, urine, saliva), these methods presently allow to detect the existence of cryptic species, to estimate gene flow among isolated populations, their population size but also to study the ecology of rare or elusive species, like their diets, their microbiomes, their sex ratio, their daily movements or their putative niche overlapping or hybridations with closely related species. More particularly, these new genetic methods are interesting for the study of threatened species, in order to propose the best management measures for them.

Using different examples developed in my laboratory, I will enhance the interest of such studies, as complementary tools to other methodologies developed in the fields. As an example, these studies evidenced the most precise information concerning the diets of the Polar bear populations living in northern Canada, the European otter living in France, the Pyrenean Desman, the aquatic shrew or different African and Asian primate species, like the apes and the gorillas. These information are of a prime interest to better understand the impact of habitat destruction on the food availability, and how these threatened species can adapt themselves to survive to global changes. On a more fundamental aspect, these studies evidenced how species having a close ecological niche, like the Pyrenean desman and the aquatic shrew can live within the same area, by shifting their diets, in order to avoid competition.

Subterranean fauna as proxy for the climate change impact on surface ecosystems

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Key words: caves, lanscape evolution, phylogeny, Coleoptera, fossil invertebrates.

There was and still is much emphasis on the climate variations during the Holocene, mostly due to limited techniques for investigations of much older periods, at least until recently. However, the last decade brought an immense afflux of information that made possible the understanding of processes in the surface ecosystems way beyond Holocene. Subterranean fauna, better known as cave fauna, confined to deep habitats mostly in soluble rocks, is highly endemic and displaying peculiar adaptations, such as depigmentation, lack of eyes, elongated appendices, slow metabolism, few offspring, etc. The typical representatives, named troglobionts, are endemic on small areas and their subterranean colonisation was traced back even to Oligocene by using molecular clocks. By studying their present distributions and phylogenies past processes of lanscape evolution on the surface can be better understood. We use the example of the Carpathians cave Coleoptera to explain the evolution of the surface lanscape and of some forest ecosystems. Moreover, the researches on cave sediments brought in our attention the existence of a novel proxy for climate change represented by fossil invertebrates (mainly ostracods and mites). They were found in million-years old sediments and provide data on past environments, temperature changes, and hydrologic behaviours by the time of deposition. All are information that could not be obtained through other methods or proxies and could never be obtained from surface continental deposits, except ice cores. Despite the global coverage of present researches and the tremendous information about surface ecosystems, subterranean ecosystems remain highly underestimated for their potential as natural laboratories and in understanding past processes.

Scientific research on natural history in today's society

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Key words: natural history, modern disciplines, biodiversity, interdisciplinary co-operation, suitable relation with nature.

Today, natural history occurs into extremely diversified disciplines which are included in natural sciences field as well as into some medical specializations like embryology, physiology, genetics, etc. Decline of interest in research and education in natural sciences is followed by alarming consequences in young people's attraction to this field and within education curricula and research activities to support development of society. Inventory, identification and monitoring of biodiversity, the protected areas management, landscaping, designation of places for recreation, agricultural and livestock production, food security, public health, etc. are bringing progress and benefits to science and for humankind – conservation of the environment, of biodiversity, in biological control, to public health, pharmaceutical research, agriculture, food security, recreation, etc. All naturalists (morphologists, zoological and botanical systematists, ecologists, evolutionists, populational geneticists, etc.) must make a common front against the trends of making biology “in house” (indoor), on the “dead work” and technology without direct contact and personal experience in nature. The value of environmental prediction and restore populations of endangered species will depend on future biodiversity. As vital and prolific domain, natural history has the mission to formulate concepts that enable the perception of order in nature. Educational agenda for the 21st century should recognize the need of co-operation between related disciplines with natural history, to include more and more participants in this agenda and to disseminate information with a serious effort of specialists, of educational institutions and scientific research as parts of the interested society. As fundamental knowledge will be applied *extramuros* and extent of use of new technologies, the natural history of the 21st century will look differently from that of the 19th century. Despite the current crisis, the importance of natural history and management of natural resources policies for science and society remains eternal.

Modern problems in phylogenetic and taxonomic analysis (on the example of micromoths)

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Key words: integrative taxonomy, functional morphology, molecular phylogenetics.

In modern taxonomy, a new direction, named integrative taxonomy, is intensively developing. It is based on interdisciplinary approach with use of complex methods belonging to a number of disciplines, among which traditional morphology and molecular phylogenetics are combined more often than others. Despite the rapid development of the integrative approach, many problems of taxonomy have not been overcome, yet. The problem with incorrect homologization of compared structures is not new, but still remains relevant. Researchers have not always effective tools to identify homologous and convergently similar structures. The formal approach to homologizing of structures by external similarity is often accompanied by their erroneous designation. The latter leads to an incorrect interpretation of the characters and their states. The erroneous coding of characters and their states in the matrices directly affects the final result of the phylogenetic analysis. The establishing of the genital structures homology and the detection of homoplasies by the method of comparative functional morphology, as well as examples of incorrect use of terms are shown on the examples of Lepidoptera.

Other problems are associated with the molecular method of revealing of phylogenetic relationships of any taxonomic group. Among them, carrying out phylogenetic constructs and proposing subsequent taxonomic changes based on the analysis of too short nucleotide sequences is one of the main problems. Taking into account the size of the insect genome, which is 175-480 Mbp, it seems unlikely to shed light on the phylogenetic relationships of any group when analyzing only 0.001-0.004% (5,000-20,000 bp) of the whole genome. Including into the analysis of samples with selectively “read” nucleotide sequences is another problem, complementing the previous one. But the most important problem, which is often leaving out, is unreasonable assessment of the species diversity of a group, accompanied by descriptions of new species-rank taxa, without special studies on the scope of intraspecific and interspecific variability in concrete group of organisms. Special studies have shown that the intervals of genetic intraspecific and interspecific variability are overlapped in a number of groups and it can be quite difficult to unambiguously distinguish a diverged conspecific population and / or a new species. The report is based on the author’s original research and analysis of taxonomic publications.

Grigore Antipa – Beginnings

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Key words: history of science, scientific biography, contextualized biography.

As a scientist Grigore Antipa was undoubtedly a “romantic genius”, as proved by him being awarded by Ernst Haeckel the honor *summa cum laudae* for his PhD thesis, a distinction that Haeckel only awarded three times during his long career as a professor in Jena.

However, Antipa’s activity span over different subject areas: zoology, hydrobiology, ecology, economics, diplomacy. In fact, even in 1892, after returning to Romania, he was appointed director of the zoological collections of the Natural History Museum, he started to develop the National Fisheries and to organize the first Romanian scientific explorations of the Black Sea, aboard military vessels.

In most of his professional life, Antipa was a visionary. The Natural History Museum he developed was one of the most modern of the time, with *dioramas* as displaying innovations. He was the first to study the ecology of the Black Sea (he used the term *bionomy*) and he used the principles of the newly established science to organize an efficient and sustainable exploitation of fish stocks in the Danube. Grigore Antipa proved himself as an able manager of science as well. Thus, along the Museum, established as a true Zoological Institute, he also founded or co-founded several other Romanian institutes: the Institute of Geology, the Danube Delta, Nucet and Cavarna Fisheries Research Stations, the Bio-Oceanographic Institute, and the Institute of Agricultural Research.

In this work, we are making the claim that the accomplishment of Grigore Antipa in so many fields was favored by his contact to remarkable teachers and peers throughout his education years.

Male reproductive function and assisted reproductive techniques for endangered felids and ungulates

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Key words: inbreeding, heterozygosity, genome resource banks, sperm DNA integrity, assisted reproductive techniques.

Among endangered species, it is important to assess the impact of inbreeding on reproduction, to establish strategies to bank genetic resources, particularly gametes and embryos, and to develop assisted reproductive techniques to facilitate genetic management. Inbreeding is known to cause deleterious effects upon reproduction and survival. The relation between inbreeding, heterozygosity, and reproductive fitness has been scarcely studied in endangered populations and there is considerable debate as to whether inbreeding (determined from pedigrees) or marker heterozygosity (calculated from microsatellites) better reflect inbreeding depression. In our experience, in captive breeding programmes of critically endangered Mohor gazelle and the Iberian lynx, marker heterozygosity (but not inbreeding coefficient) was associated with semen quality as measured by the proportion of normal sperm in the ejaculate. Thus, examination of heterozygosity-fitness correlations was found to be an effective way to detect inbreeding depression, particularly if the pedigree does not accurately reflect the history of inbreeding. We have also analyzed, among endangered gazelles, the relationship between inbreeding and sperm DNA integrity, and whether levels of sperm DNA fragmentation are associated with semen quality. There was an extremely high prevalence of sperm DNA damage in two gazelle species with high levels of inbreeding (*Gazella cuvieri* and *G. dama mhorr*) when compared to a species with low levels of inbreeding (*G. dorcas*), and to values previously reported for outbred populations. Increased DNA damage in sperm was associated with increased sperm head abnormalities and poor motility. The deleterious effects of inbreeding upon the paternal genome likely decrease male fertility and may cause genetic damage to future generations. Furthermore, sperm DNA damage may influence offspring survival; this possibility has not been explored before. We therefore examined maternal, paternal and individual factors that may influence offspring survival in the species of endangered gazelles with a very high inbreeding levels (*G. cuvieri*). We found that sperm DNA damage had an important impact upon offspring mortality with a significant interaction between this variable and maternal factors so that offspring born to primiparous mothers were more likely to die if their father had high levels of sperm DNA damage. As part of our effort to develop semen evaluation protocols and assisted reproduction methods we have characterized, for both gazelles and the Iberian lynx, techniques for in vitro fertilization and artificial insemination. We have also developed methods of xenotransplantation of testicular tissue for the generation of spermatozoa from males that die before reaching reproductive maturity. We have also found that the management and success of conservation strategies, and development of new assisted reproductive techniques, depend on the institutional framework in which the different initiatives take place.

Diversity and distribution patterns of centipedes (Myriapoda: Chilopoda) in the Aegean Archipelago (Greece)

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Key words: area-distance fluctuations, endemic species, island biogeography, palaeogeography, sea-level changes, species-area relationship.

The Aegean archipelago is a highly fragmented landscape with more than 7500 islands, islets and rocks (Triantis & Mylonas, 2009). It is the seventh largest archipelago in the world, in terms of the number of islands, and covers almost one-quarter of the geographical area of Greece. The Aegean Sea comprises continental islands of different size and origin, constituting an ideal geographical area for ecological and evolutionary research (Sfenthourakis & Triantis, 2017). It shows great heterogeneity in terms of environmental properties and geological history.

The inclusion of geological and palaeogeographical data in any analysis of biodiversity across time and space leads to a better understanding of it. For example, the sea-level rise that followed the last glacial maximum (LGM) has had a major contribution in shaping the biogeographical patterns of all recent taxa on the Aegean islands, due to important events: (1) the size of insular surfaces has been reduced, (2) the distance from islands to other islands or to the mainland has increased, (3) palaeo-islands have become fragmented, resulting in the formation of numerous smaller islands, and, (4) parts of the mainland coast have become isolated, forming new land-bridge islands (Hammoud, 2016; Simaiakis et al., 2017).

Over the last decades, the biogeographical research in the Aegean Archipelago has increased and provided new data on several animal groups, focusing on soil arthropods. Among other soil animals, the chilopod fauna of the Aegean area has been the subject of numerous studies (e.g., Matic, 1980; Matic & Stavropoulos, 1993; Simaiakis et al., 2004, 2005; Simaiakis & Mylonas, 2008; Simaiakis & Martínez-Morales, 2010). Chilopods or centipedes are a monophyletic clade within arthropods with more than 3000 described species worldwide (Bonato et al., 2011). Centipedes are an ideal group to investigate processes that underlie patterns of biodiversity in insular Greece, due to their geographical diversification, their relatively low dispersal ability, and their relatively high degree of endemism (Simaiakis et al., 2017).

Currently, the advantages of modern geological and ecological methods have significantly helped to understand present distribution patterns and biodiversity synthesis. As far as centipede species richness is concerned: (1) it is strongly determined by present-day area, (2) it is higher on palaeo-peninsulas, and, (3) it is influenced by the rate of area loss (Simaiakis et al., 2017). As a result, total and native species richness is positively correlated with the rate of area loss. This

means that islands that endured quicker changes of area host a higher diversity of centipedes, implying that faster area changes do not lead to more or quicker extinctions on islands (Hammoud, 2016).

Furthermore, the arrangement of the centipede fauna into biogeographical subregions is consistent with the palaeogeography of the Aegean Archipelago. With respect to this point, the formation of the mid-Aegean trench (MAT), approximately 12 to 9 million years ago, has been found to have acted as a major factor determining the biogeographical patterns of centipedes. The identification of Crete as a potential centre of diversity is in agreement with its degree of isolation (Juch, 2017), its high environmental heterogeneity and its known role as a Pleistocene glacial refugium. The main factors influencing the centipede endemism are the degree of isolation and the island type. In general, islands further from the mainland tend to host more endemics.

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Species. Old problems, new insights

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Key words: fractal pattern of the Tree of Life, fuzzy boundaries, species concepts, species delimitation, taxonomy.

Discussions about species concepts are often passionate and even more often fruitless. I will not discuss any of the 34 or so different concepts in detail; instead, I will focus on the following issues: (i) species homonymy, i.e. the very different meanings of the term “species” (species *category* vs. species *taxon*; taxonomic, or T species vs. evolutionary, or E species); (ii) a conceptual advance that distinguishes ontological and operational concepts; and (iii) the ramifications of species concepts and species delimitation outside the realm of systematics and taxonomy. This latter point is in my view one of the most pressing dilemmas in biology because the relevance of the consequences of how we define and delimit species can hardly be overestimated. I will argue that there is a level in the Tree of Life where completely objective species delimitation is impossible, and that this grey area of taxonomy introduces potentially serious biases into quantitative studies as diverse as macroecology, evolutionary biology, conservation biology and environmental policy. We are far from a solution, unfortunately, and at the moment it is not even clear if and how this problem can be solved. Standardized and thus repeatable taxonomic procedures to delimit species based on partly arbitrary but consistent cut-off criteria (such as the so-called Tobias criteria in ornithology) are hard to swallow but may turn out to be the best we have.

ORAL PRESENTATIONS

Dusting off the cave bears – salvaging the University of Bucharest Laboratory of Palaeontology *Ursus spelaeus* collection

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Key words: collection management, cave bear, fossil vertebrates, online database.

Founded in 1905, by Gregoriu Ștefănescu, a prominent figure of Romanian palaeontology, the Laboratory of Palaeontology from the University of Bucharest is home to one of the largest collections of fossils in Romania. Fossil vertebrates are an important part of this collection, including specimens belonging to various vertebrate groups of all Phanerozoic eras.

Cave bear (*Ursus spelaeus*) remains are present in significant numbers, not surprisingly, since it is a common find in Romanian Pleistocene cave deposits. Save for some material registered as being collected from Cioclovina Cave, most cave bear specimens from the Laboratory of Palaeontology, stacked in dusty drawers, are not registered and lack any information regarding the geographical or stratigraphical context of their discovery. Since such information is essential in any relevant palaeontological study, we believe the only way this collection can be useful now is to illustrate the morphological features and size range of various bones belonging to the cave bear.

After the removal of a few specimens belonging to other taxa and incorrectly labeled as cave bear, the sample includes 275 specimens positively assigned to *U. spelaeus*. All specimens were cleaned and consolidated using Paraloid B72. All anatomical regions are represented, making the sample very useful in illustrating the morphology of most cave bear bones. The specimens were measured according to the procedure proposed by Tsoukala & Grandal-d'Anglade (2002), and photographs of all relevant views were taken. The pictures and measurements obtained are currently being processed and will be posted on a dedicated website to serve anyone who might need such information.

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Key words: natural history museum, paleontology collection, Starunia.

The Natural History Museum in Kraków originated in the Physiographic Commission of Cracow Scientific Committee which was established in 1856. During that time, the museum held three collections: geology, flora and fauna. The first exhibition was opened to the public in 1888. Wodzicki's ornithology collection, geology and paleontology collections were displayed. In 1930, the Museum obtained a unique specimen of 30,000 years old woolly rhinoceros from the Starunia village (Eastern Carpathians).

Thanks to the purchasing of an old bath house establishment, in St. Sebastian street, in 1992, it was possible to move the museum collections from the main quarters of the Polish Academy of Sciences to the new place. After the initial redesigning of the building, the first exhibition of sea shells was opened in January 1993. Since then 79 temporary exhibitions already took place.

Recently, our collections comprise over 2 million specimens and are still growing. Currently in the Museum we organize exhibition and educational activities along with the scientific researches focused on fossil insects.

We would like to establish closer relations with the "Grigore Antipa" National Museum of Natural History of Bucharest. In order to start ease cooperation ground, this presentation offers an information on our Museum and serves as invitation to our collections.

New species dedicated to the memory of Grigore Antipa: an homage for his 150 years anniversary

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Key words: Grigore Antipa, collection, type specimens, 150 year anniversary, museum.

Our study represents an updated list of taxons dedicated to the memory of Grigore Antipa, the great Romanian scientist, on the occasion of his 150 years anniversary.

A total of 28 new species and one genus had been dedicated to the memory of Grigore Antipa and were described between 1891 and 2005. Most of the taxa (crustaceans and insects) had been described by specialists from “Grigore Antipa” National Museum and are present in the type specimen collection, ranked as treasury. These are included in major groups such as: Rhodophyta, Gastrotricha, Plathelminthes, Nemertea, Annelida, Acari, Crustacea (Amphipoda, Cumacea, Isopoda, Tanaidacea), Myriapoda, Coleoptera, Diptera, Mecoptera, Lepidoptera, Hymenoptera, Pisces and Mammalia. The new specimens originate in Romania, Cape Kaliakra (now in Bulgaria), in Indonesian Archipelago (Romanian expedition from 1991, mostly from Bunaken Island), from Eastern Atlantic (Ibero-Moroccan coasts), Western Atlantic (Bahamas caves), South Atlantic Ocean (from “USS Eltanin”, “RV Vema” and “Geocosta Rio” Expeditions), and in the Caribbean Sea.

During his lifetime, his close collaborators dedicated no more than 7 new species (one fossil). In two issues of the 8th volume of *Travaux du Muséum National d’Histoire Naturelle “Grigore Antipa”*, dedicated to Antipa centenary (published in 1968), 9 new taxons had been described (Achim Barcan, 2004). Afterwards, 12 new species had been published in different journals from Romania, Italy and The Netherlands.

Nowadays, one genus, three species and one subspecies were synonymized. The most numerous taxa described belong to Crustacea (9 taxa) and Insecta (8 taxa). One species is considered to be extinct.

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Mites of the genus *Ledermuelleriopsis* (Acari: Stigmaeidae) from Iran

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Key words: predator, spider mite, small arthropods, moss, lichen.

Members of the family Stigmaeidae are predators; they feed on spider mites, scale insects, especially their eggs, and also small arthropods (Khanjani et al., 2010). Genus *Ledermuelleriopsis* was created by Willmann (1953) and known species are found in most parts of the world (Fan et al., 2016). They live in soil, litter, grass, moss, lichen, decayed stump, bark trees and old dune sand (Bingül & Doğan, 2016). Up to now, 33 species of this genus are described worldwide (Fan et al., 2016; Bingül & Doğan, 2016) of which nine species have been recorded and described from Iran, namely: *Ledermuelleriopsis ariyai* Khanjani et al., 2012, *L. ayhani* Maleki & Bagheri, 2013; *L. dogani* Khanjani et al., 2012; *L. medicae* Khanjani & Ueckermann, 2002; *L. plumosa* Willmann, 1951 (by Khanjani & Ueckermann, 2002); *L. punicae* Khanjani, et. al., 2012; *L. tamariski* Maleki & Bagheri, 2013; *L. terrulenta* Ueckermann & Meyer, 1987; *L. zahiri* Khanjani & Ueckermann 2002 and *L. aminiae* Nazari & Khanjani, 2017. Among them *L. zahiri* is widely distributed and recorded from most parts of Iran.

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Old preserved bird specimens, new feather mite species

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Key words: feather mites, taxonomy, new species, Indonesia.

In natural science museums patrimony is often underestimated, and more in-depth research can bring out new scientific discoveries, that increase the scientific value of collections. Sometimes an old museum piece lying forgotten in a box can be brought back to the attention of the scientific community. Basically, this old piece of the museum’s collection can be the basis of new scientific discoveries. One such example is a small collection of birds from “Grigore Antipa” National Museum of Natural History, result of an expedition conducted in the Indonesian Archipelago by the specialists of this institution in 1991. We have checked 69 bird collected specimens and we have found 11 new feather mites species. A first paper describing two of these new species identified on the bird host *Copsychus saularis* (L.) is already in press.

Studies on feather mites in the Indonesian archipelago began over 100 years ago, with the first papers realized by early acarologists on the feather mite fauna associated with parrots (Trouessart, 1884; 1885; Favette and Trouessart, 1904). There are 1748 species of birds in Indonesia, and each of these is a potential host for several feather mite species, so it is evident that the investigation of this group in this country is far from being exhaustive.

The two new feather mite species from the bird host *Copsychus saularis* (Linnaeus) collected in Indonesia (Kalimantan) are described: *Dolichodectes* sp. n. (Proctophylloidea, Pterodectinae), and *Trouessartia* sp. n. (Trouessartiidae). The new species of *Dolichodectes* has the following distinctive characters: in males, the opisthosomal lobes are widened in the posterior half; the opisthoventral shields are fused, forming a single shield that covers ventrally the posterior quarter of the body; legs I have longitudinal crest-like processes; and setae *ra* on these legs are spiculiform. In females the posterior margin of the hysteronotal shield has a deep median invagination, and epimerites II extend to the level of the anterior margin of epigynum. Males of the new species of *Trouessartia* have the adanal apodemes with two narrow lateral membranes, and the females have the terminal cleft width smaller than the opisthosomal lobe width.

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The acoustic component in the mating system of Carpathian Plump Bush-crickets (Insecta: Orthoptera: Tettigoniidae: *Isophya*)

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Key words: *Isophya*, acoustics, duet.

The brachypterous *Isophya* Brunner von Wattenwyl bush-crickets form one of the richest in species phaneropterinae genera, also being the largest group of endemic orthopterans within the Carpathians. *Isophya* is considered one of the most problematic genera regarding its species-level taxonomy, as lack of internal sclerotized male genitalia makes their identification problematic. However, the rhythmic structures of male song are extremely diverse within this genus and the typical phaneropterinae species-specific acoustic mating recognition behaviour is unique amongst ensiferans (Heller et al., 2004; Orci et al., 2010).

The production of sound signals is a distinctive behaviour of orthopteran insects, typically males stridulating spontaneously and females approaching phonotactically. As it is usual in the subfamily Phaneropterinae, and particularly in *Isophya* species, when the female is willing to copulate with the singing male, she replies to his stridulation, forming an acoustic duet. Even if the syllable repetition pattern of a male is variable, the female produces her response during an approximately constant, species-specific time window in relation to the male signal. The recent experimental studies testing the efficiency of differences in male song as premating barriers (Orci, 2007; Orci & Iorgu, 2017) showed, as expected, that females responded to the male song of their own subspecies/species with significantly higher probability than to heterosubspecific and heterospecific songs. For the present study, we recorded the female preferences in ten Carpathian species.

This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS – UEFISCDI, project number PN-II-RU-TE-2014-4-2093.

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The monitoring of leafroller and pyralid moth species (Tortricidae, Pyralidae) in the oak woods of the central part of the Republic of Moldova

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Key words: leafroller, pyralid, moths, defoliators, Tortricidae, Pyralidae, woods, Republic of Moldova.

The forests that grow in the hilly part of central Moldova have name Codru or Codrii in English it means forests or woods. This forest massif is located on the Plateau of Central Moldova which is a hilly center of the Republic of Moldova occupying approx. 40 % of the area of this high plateau. The forests occupy mainly the maximum altitudes, between 200 and 430 m., and are extends largely in the Straseni, Hincesti, Calarasi, Orhei and Nisporeni districts.

Besides the species *Tortrix viridana* Linnaeus, 1758, *Operophtera brumata* (Linnaeus, 1758) and *Erannis defoliaria* (Clerck, 1759) which are the most important pest in this woods during the years we have collected other moths species like leafroller (Tortricidae) and pyralid (Pyralidae): *Aleimma loeflingianum* (Linnaeus, 1758), *Archips crataegana* (Hübner, 1799), *Archips xylosteana* (Linnaeus, 1758), *Choristoneura hebenstreitella* (Müller, 1764), *Pandemis cerasana* (Hübner, 1796), *Tortricodes alternella* ([Denis – Schiffermüller], 1775), *Eudemis profundana* ([Denis et Schiffermüller], 1775), *Acrobasis consociella* (Hübner, 1813), *Phycita roborella* ([Denis – Schiffermüller], 1775) and *Conobathra repandana* (Fabricius, 1798). This species duty to whether conditions from the last years have increased the density of the populations, thus becoming pest for the first grade besides the above-mentioned species.

During of vegetation period in 2013 on the permanent sample from Strășeni Forestry District, per 100 grams of oak leaves were collected 192.18 larvae of leafroller and respectively 4.744 larvae of pyralid moths. Due to the growing population which led to appearance and development of outbreaks on large areas it is necessary to treat forests every year. In order to observe the assessments of the outbreaks (their density and surfaces) of these defoliators, in this paper are used the data from 2008 to 2016 from the permanent samples from Strășeni, Orhei, Hîncești and Nisporeni Forestry Districts.

Update to almost unknown fauna of Chalcidoidea (Insecta: Hymenoptera) from the Maldives Archipelago

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Key words: Chalcidoidea, Hymenoptera, Insecta, fauna, distribution, Maldives archipelago.

The Maldives archipelago is located in South Asia in the Indian Ocean (Arabian Sea), southwest of Sri Lanka and India. The archipelago contains 26 atolls located atop the Chagos-Maldives-Laccadive submarine mountain with more than 1100 coral islands, being the lowest country in the world with 1.5 meters average natural ground levels and 2.4 meters highest natural point. Maldives is one of the world's most geographically dispersed countries and the smallest Asian country with around 430.000 inhabitants very unequal distributed on some islands. More than 80 percent of the archipelago rise less than one meter above sea level, being at high risk of being submerged due to rising sea levels and the inhabitants will become climate refugees.

Chalcidoidea fauna of Maldives archipelago are almost unknown. According to Noyes (2017) just four species from two families from Chalcidoidea was mentioned in various papers, three from Aphelinidae: *Encarsia dispersa* Polaszek, 2004 (Schmidt & Polaszek 2007), *Encarsia abundantia* Chou and Su, 1996 (Huang & Polaszek 1998), *Encarsia smithi* (Silvestri, 1926) (Myartseva & Evans 2008) and one from Eulophidae: *Platyplectrus orthocraspedae* Ferrière, 1941 (Zhu & Huang 2004).

In the period 16-26.07.2017 we made an expedition on Maldives archipelago and collect entomological material from Chalcidoidea superfamily. This superfamily doesn't have conservative importance according to IUCN or other recognized international databases. We collect the material using an entomological net extracting just the Chalcidoidea specimens with an exhaustor, this being the most selective and noninvasive method for no affecting other species from local fauna. We collect material from five islands: Nalaguraidhoo (Sun Island, from Alif Dhaal Atoll), Dhigurah (from Alif Dhaal Atoll), Maamigili (from Alif Dhaal Atoll), Dhiffushi (Holiday Island, from Kaafu Atoll) and Hulhumale (from North Male Atoll). The material contains specimens from seven families from Chalcidoidea: Chalcididae, Eurytomidae, Eupelmidae, Pteromalidae, Perilampidae, Encyrtidae, Eulophidae, all with the exception of Eulophidae being for the first time recorded from Maldives archipelago.

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First record of the genus *Xerephedromyia* in Romania, with *Xerephedromyia ustjurtensis* (Diptera: Cecidomyiidae) from galls on stems of *Ephedra distachya* (Ephedrales: Ephedraceae)

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Key words: *Xerephedromyia ustjurtensis*, Diptera, Cecidomyiidae, galls, *Ephedra distachya*, Romania.

Ephedra distachya L. (Ephedrales: Ephedraceae) is a dioecious shrub with a large areal from southern Europe (Spain, France, Italy, Greece) to Ukraine, Turkey, Central Asia (Kazakhstan, Turkmenistan) and Iran, being a xerothermic postglacial relict. It has a status of LC (Least Concern) in the IUCN Red List of Threatened Species (Bell & Bachman, 2011). The usual habitats are the xerothermic sandy grassland, arid steppes, dunes and seaside. Usually it's found in scattered populations because of the specific habitats. The decline of the populations is because of the destructions of the native habitats and the overgrazing, especially by sheep and goats. In Romania, it is found in sporadic populations in Alba, Cluj, Caraș-Severin, Mehedinți, Buzău, Constanța, Tulcea and Vaslui counties (Ciocârlan, 2000).

Xerephedromyia Mamaev, 1972 (Diptera: Cecidomyiidae) is a genus with a Palearctic distribution having just three species primarily restricted to Central Asia: *X. bipartita* Mamaev (Uzbekistan), *X. mitroshinae* Fedotova (Turkmenistan) and *X. ustjurtensis* Fedotova (Kazakhstan). *X. bipartita* was obtained from *Ephedra strobilaceae*, *X. mitroshinae* from *E. strobilaceae* and *E. lomatolepis* and *X. ustjurtensis* from *E. distachya* (Gagné, 2010). Just *X. ustjurtensis* Fedotova, 1992 have a disjunctive Euro-Asian area of distribution being found in Kazakhstan near the Caspian Sea (Fedotova, 1992, 2000) and also in Europe, in Ukraine (Karadag Nature Reserve, Crimean Peninsula) (Patra et al., 2012), southern France (Skuhravá et al., 2005) and northeastern Spain in Monegros area (Zaragoza) (Skuhravá et al., 2002, 2006).

On 4.06.2017, on the beach from Vadu (Constanța County), in the southeastern part of Romania, we found many galls of *Xerephedromyia ustjurtensis* on stems of *E. distachya*. We collect the galls and rearing in laboratory conditions adults of *X. ustjurtensis*.

I express my gratitude to Dr. Z. A. Fedotova from All-Russia Scientific-Research Institute of Plant Protection, Pushkin, St. Petersburg, Russia, for confirming the correct identification of *Xerephedromyia ustjurtensis*.

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New herpetological records from the middle Ialomița River valley (Romania)

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Key words: Ialomița river valley, amphibians, reptiles, records, confirmation.

The middle valley of the Ialomița River, encompassing the counties of Dâmbovița, Prahova and Ilfov, is rich in herpetological records (see, e.g., Cogălniceanu et al., 2013a,b) – but many such records are old and substantial areas are not thoroughly investigated from a herpetological and faunistic point of view. The middle Ialomița River valley is characterized by diverse habitats: the natural vegetation is deciduous forest, with numerous wetland areas, but human activity has created a mosaic where patches of natural habitat are more or less connected in a landscape of cultivated land and human habitation.

Our results include new records for 17 species of amphibians and reptiles, as well as two cases of hybridization in amphibians: introgressive hybridization between *Bombina bombina* and *B. variegata* (which has the appearance of an ecological gradient mosaic hybrid zone) and the widespread *Pelophylax* complex. Our data expand the known area of hybridization between the two *Bombina* species at the south of the Carpathians and clarify the distribution of the *Pelophylax* complex, producing new records of the relatively little-known species *P. lessonae*. Also, we give new records for various other species, including the first record for *Pelobates fuscus* in Prahova county, numerous records for species of conservation importance such as *Emys orbicularis* and *Triturus cristatus*, etc.

Our data take into account the habitat context of our findings in an attempt to contribute to the delineation of ecological preferences for protected species in a landscape where, despite significant human impact, the conservation potential is still great.

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**The favorability of the Natura 2000 Sites of
Community Importance (SCI) for the blotched snake
(*Elaphe sauromates* Pallas, 1811) in Romania**

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Key words: *Elaphe sauromates*, SCI, distribution, Maxent, SDM.

The blotched snake (*Elaphe sauromates*) is a large, heavy-bodied snake primarily inhabiting steppes, semi-deserts and forest-steppes from flat or mountainous regions; the species is highly elusive and characterized by low population densities which, along with other factors, has led to it being listed on Annex II of the Habitats Directive (92/43/EEC). In Romania, little above 50 individuals have ever been found, with the distribution range roughly covering the south-eastern part of the country; the blotched snake is included on Annex 3 of OUG 57/2007 approved by Law 49/2011 and is a priority species in 11 SCI sites across its distribution range in Romania. The aim of the current study was to assess the favorability of those Natura 2000 SCI sites for *E. sauromates* and the overall favorability of environmental space across Romania.

We used Maxent 3.4.1 to model the actual distribution for the blotched snake and ran statistics for the sites where the species was deemed present as well as for the whole projected distribution space.

Maxent identified landcover as the most important variable used to construct the model and only 5 variables were used to create the final model, which correctly identified Dobrogea and areas along the Curvature Subcarpathian as areas with maximum favorability for the species. Mean favorability of Natura 2000 sites where the species was identified varied from 31% to 88%, and overall mean favorability across the projected space of 20%; mean favorability for *E. sauromates* in Dobrogea was ~41%.

Small mammal (Insectivora, Rodentia) fauna of Chişinău, Republic of Moldova

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Key words: small mammals, urban ecosystems, Chisinau city, diversity.

In the last decades, the urban ecosystems and the natural ones, located near cities, are subjected to rather high anthropogenic pressure. In such conditions the adaptation of animal species, including mammals, to new environment occurs and this process is developing now. The small mammal fauna is an indispensable component of urban ecosystems and can serve as ecological indicator of ecosystem stability and of the urban coenoses status. The studies were accomplished during spring-autumn period of 2008-2013, in various types of ecosystems of Chişinău city and its surroundings: city parks, Botanical Garden, forest plantations and remains of natural forests around the city, agrocenoses (orchards, gardens, cereal crops, etc.), wet biotopes. The used methods were the direct observations during several days each month (March-October), catching with traps.

The mammal fauna of Chişinău and its surroundings is rather rich, being registered 23 small mammal species. There were recorded 6 insectivore species (*Erinaceus concolor*, *Talpa europaea*, *Sorex araneus*, *S. minutus*, *Crocidura leucodon* and *C. suaveolens*), 17 rodent species (*Dryomys nitedula*, *Muscardinus avellanarius*, *Sciurus vulgaris*, *Nannospalax leucodon*, *Ondatra zibethicus*, *Apodemus sylvaticus*, *A. uralensis*, *A. flavicollis*, *A. agrarius*, *Mus musculus*, *Mus spicilegus*, *Rattus norvegicus*, *Arvicola terrestris*, *Microtus arvalis*, *Microtus rossiaemeridionalis*, *Cricetulus migratorius* and *Myodes glareolus*). The Semi-aquatic water vole was recorded in or near various water basins (lakes, ponds, rivers, swamp sectors) within forest biotopes from the city surroundings and in city parks, the arboreal rodents were registered in parks, and in forest ecosystems around the city. The majority of the species have rather well adapted to anthropic disturbances and recreational activity of people, while other species became very rare in surroundings of the city, such as Pigmy shrew and Forest dormouse. After the ecological analysis of mammal groups, it was emphasized that the species diversity (Shannon index) is rather low, ranging from 0.48 to 1.0, the highest being recorded in abandoned orchards and gardens and the lowest in cereal crops.

The studies were performed within the project 15.187.0211F.

**Life cycle, population dynamics and production of
Ecrobia maritima (Milaschewitsch, 1916) (Gastropoda:
Prosobranchia) at the Romanian coast of the Black Sea**

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Key words: Black Sea, Gastropoda, *Ecrobia maritima*, life cycle, population dynamics, secondary production.

Life cycle, population dynamics, growth, and annual production of *Ecrobia maritima* (Milaschewitsch, 1916) associated with the dwarf eelgrass *Zostera (Zosterella) notei* seagrass bed from the southern part of the Romanian Black Sea coast were investigated, forming part of a larger benthic survey. Quantitative random samples were taken at regular intervals over a period of 5 months using a hand-held corer, and collected snails of *E. maritima* were counted, measured and weighted. The average fresh weight of individuals was calculated from the following length-weight relationship $FW = 0.3449 \cdot L^{2.0494}$ ($n = 181$, $r = 0.9164$). *E. maritima* is a strictly annual species in the study area. Sexual maturity is attained at 6 months and a shell length of 2.5–3.0 mm. The average life span was estimated at approximately 12–14 months. Recruitment took place over a brief period in May and June, after which the breeding population died. Growth of the cohort C1 was slow during the cold season, probably due to the drop in the temperature. A period of rapid growth of the new generation C2 took place in June–July. Under unfavourable conditions (strong storms, low temperature, high pressure from predators) *E. maritima* was observed to burrow deeply into the sediment. Therefore, during the study period, the population of snails showed considerable variations of the above-ground density. The maximum above-ground density of snails was 4248 ind. · m⁻² and the maximum biomass was 12.48 g fresh wt · m⁻² in July 2015. Annual cohort production was estimated as 5.961 g fresh wt · m⁻² · a⁻¹. The obtained value for annual turnover ($P/\bar{B} = 1.86$) was comparable to the estimates for other species of *Hydrobia*, in similar habitats.

Feather mite diversity and community structure in NE Atlantic and Mediterranean seabirds

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Key words: Procellariiformes, Astigmata, ectosymbionts, seabird-mite associations, host specificity.

Feather mites (Astigmata: Pterolichoidea and Analgoidea) are the most common and diverse ectosymbionts living permanently on birds, but only a small part of their diversity has been described and examined so far and their degree of host specificity remains unclear. Seabirds are particularly interesting hosts because they harbour a rich feather mite community and breed in large colonies, sometimes in close contact among species, providing opportunities for parasites to exploit several host species. Here, we explored the diversity and community structure of feather mites in Procellariiformes breeding in the northeast Atlantic Ocean and the Mediterranean Sea. We examined feather mite infracommunities in 11 seabird species at 28 breeding colonies. Based on morphological criteria, we identified 33 feather mite species, of which 11 were new species. These species belonged to eight genera and three families: *Zachvatkinia*, *Rhinozachvatkinia*, *Promegninia* (Avenzoariidae), *Microspalax*, *Brephosceles*, *Plicatalloptes* (Alloptidae), *Ingrassia* and *Opetiopoda* (Xolalgidae). Among hosts, the highest feather mite richness was found on *Calonectris* shearwaters (nine species) and *Bulweria bulwerii* (eight species), whereas *Pterodroma feae* harboured the lowest (three). Amongst the 11 new species, four were found in Bulwer's petrel and three in *Puffinus* shearwaters. At community level, our results showed that the mite community was clearly structured by host genera, whereas the geographic structuring of feather mites within host genera or within a single host species (sampled across several localities) was relatively weak and sometimes negligible. Instead, three mite species were shared by two closely related host genera, *Calonectris* and *Puffinus* shearwaters. Our results also showed that a proper characterization of host-specificity patterns needs a complete sampling of all closely related host species. This study highlights the vast, and largely unrecognized, diversity of feather mites harboured by seabirds and host-genus specificity in most mite species as the main factor explaining community structuring. Our findings also illustrate the need to carefully investigate genetic, morphologic and ecological data on these ectosymbionts for better understanding the processes that have led to their high diversity.

Insect fauna biodiversity of El Hamma Botanical Garden: a focus on recent data from beneficial communities and tritrophic interactions

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Key words: El Hamma botanical garden, insect fauna, beneficial enemies, trophic relationships, Aphidiinae.

Founded in 1832, the Hamma Botanical Garden, internationally renowned, covers a 32 hectares area and contains more than 1500 plant species which are increasing year by year thanks to the garden acquisitions (ANN, 2000). Thus, study of the evolution of insect fauna populations in various biotopes is of interest in terms of its effect on El Hamma Garden biodiversity. As insects play an important role as beneficial enemies, the establishment of trophic relationships is therefore essential information to consider appropriate actions for the maintenance of these natural agents or enhance their biological regulation effect (Delvare, 2000).

The diversity of the auxiliary insect fauna was studied during a four months period between February and May 2016, in four selected habitats of El Hamma Botanical Garden situated in the center of the capital Algiers (Algeria). Weekly surveys and observations were carried out on leaves, young shoots infested with alive and parasitized insects mostly aphids, and also from yellow sticky traps captures. Our results revealed an overall richness of 58 species of auxiliary insects distributed in 5 orders and 20 families.

During the sampling period, we have inventoried 7 aphid parasitoids species including 4 primary parasitoids belonging to Braconidae family and Aphidiinae subfamily (Tomanović et al., 2009), represented by 4 species *Lysiphlebus testaceipes*, *Aphidius colemani*, *Trioxys acalephae* and *Trioxys angelicae*, which were collected from 9 aphid species mummies associated with 19 plant species, with a total of 23 trophic associations (Buschke et al., 2011). The species *L. testaceipes* was found to be the most abundant and the most representative in terms of emergence and parasitism. Hyperparasitoids belonging to Pteromalidae and Figitidae families and Asaphiinae, Pteromalinae, Alloxystinae subfamilies were respectively *Asaphes* sp., *Pachyneuron* sp., *Phaenoglyphis villosa*. Primary parasitoids were the most represented with 96.10%, while secondary parasitoids were very poorly represented with only 3.90%. Composition and diversities of insect communities are presented.

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Diversity, abundance and dominance of the epigeic arthropods in four ecosystems, Zvoriștea, Suceava County, 1998, Moldavia, Romania

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Key words: Epigeic arthropods, abundance, dominance, grassy associations, poplars forest, beech forest, spruce fir forest.

The paper is the synthesis of the original collecting data on the epigeic arthropods from four ecosystems: grassy association, poplars forest, beech forest, spruce fir forest, from Zvoriștea, in 1998.

The aim of the work is to present the variation of the relative abundance and dominance of the epigeic arthropods (classes, orders of insects, families of Coleoptera, species of Carabidae) from four ecosystems mentioned above.

The material is original and it was collected from four biocoenoses, the locality Zvoriștea, Suceava County, 1998, Central Moldavian Plateau, using 6 Barber pitfalls in each habitat, with preservative liquid, 4%, formalin solution, protected against rainfalls.

The pitfalls functioned continuously, from May, 15th to September, 16th, 1998, 48 samples being collected and examined.

Totally, 3,106 specimens of epigeic arthropods were collected, of which 864 individuals (27.82%) from grassy association; 752 (24.21%), poplars forest; 705 (22.70%), beech forest; 785 (25.27%), spruce fir forest.

From the grassy association, four classes of arthropods were collected; **insects** were eudominant, 659 specimens (76.27%); eight orders of insects, **Coleoptera** 491 (74.51%); 11 families of coleopterans, family **Carabidae** 391 (79.63%), with 15 species, *Pseudoophonus rufipes* De Geer, 1774 with 131 specimens (33.50%).

In the poplar forest, four classes of insects were collected; insects 677 (90.03%); nine orders of insects, **Coleoptera** 514 (75.92%); ten families of coleopterans, **Carabidae**, 460 (89.49%) and 17 species, *Pterostichus melanarius* Illiger, 1798 with 236 individuals (51.30%).

In the beech forest, collected insects reached 630 specimens (89.36%); 8 orders of insects, **Coleoptera** 507 (80.48%); 10 families of Coleoptera; **Carabidae**, 413 (81.46%); 15 species, *Pterostichus melanarius* 240 (58.11%), *Pseudophonus rufipes* 54 (13.08%).

In the spruce fir forest, collected **insects** counted 691 specimens (88.03%), 9 orders, **Coleoptera** 463 specimens (67.00%), 10 families of Coleoptera, **Carabidae**, 390 specimens (84.23%), 15 species of Carabidae, *Pterostichus melanarius* 225 (57.69%).

The presence of taxa in all those four ecosystems is the following: four classes Crustacea (Isopoda), Arachnida, Myriapoda, Insecta; eight orders of insects (Collembola, Orthoptera, Dermaptera, Homoptera, Hymenoptera, Coleoptera, Lepidoptera, Diptera); six families of Coleoptera (Carabidae, Silphidae, Staphylinidae, Dermestidae, Elateridae, Chrysomelidae); seven species of Carabidae (*Carabus cancellatus*, *Broscus cephalotes*, *Pseudoophonus rufipes*, *Poecilus cupreus*, *P. versicolor*, *Pterostichus melanarius*, *Calathus fuscipes*).

Body size and population structure in the Sahara Blue-eyed turtle, *Mauremys leprosa saharica*, from a marginal isolated pond in southern Morocco

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Key words: *Mauremys leprosa saharica*, peripheral population, Sahara Desert, body size, sexual dimorphism, population structure.

The marginal populations of the Sahara Blue-eyed pond turtle, *Mauremys leprosa saharica* (Testudines: Geoemydidae) in the southernmost species distribution range in the pre-saharan area in the Lower Draa valley, Southern Morocco, are faced to extreme environmental conditions of arid climate and anthropogenic and climate change mediated water and land salinization. In the present work, we investigated a small and isolated population of the Blue-eyed Pond turtle at Sidi El Mehdaoui oasis, Lower Draa, in order to determine its structure and morphometric characteristics. Water salinity was about 24% seawater and dissolved oxygen concentration was less than 3 mg l⁻¹ (sub-hypoxia). Upon *insitu* captures, turtles were sexed, weighed and measured for the carapace dimensions. The studied population has a small size with a predominance of adults (75%) probably due to a low demographic turnover rate. The average body size of adults (carapace length) was much smaller than those in other Moroccan populations. Among the apparently adult individuals, the mean carapace lengths were 102.94±20.99 and 104.38±34.85mm, respectively for males and females. The corresponding mean body weights were 172.68±92.39 and 134.56±51.16g. There were no significant differences between sexes ($P>0.05$, in both cases). There is a significant sexual shape dimorphism, but no significant sexual size dimorphism with the lowest level (Sexual Dimorphism Index (SDI) close to zero) ever observed in relation to the low productivity of its marginal isolated habitat. The increased drought and salinization related to anthropogenic activities and climate change, are great threats to the long-term persistence of the vulnerable peripheral populations of the Saharan Pond turtle and their habitats. So, conservation measures of these populations are very urgent.

Diet and food consumption of the Moroccan Spiny-tailed lizard, using microhistological analysis and calibrated production of feces

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Key words: diet, food consumption, *Uromastyx nigriventris*, calibrated feces production, microhistology.

Data on the diet composition and daily food consumption are of great importance in nutritional ecology of wild animals. However, quantifying the proportions of the different food items within the diet of a free-ranging animal is quite difficult. One possibility is to estimate indirectly the daily food consumption and percents of the different food components, respectively from the calibrated production of feces and calibrated numerical frequencies of specific items in the diet. Diets and food consumption of the herbivorous Moroccan spiny-tailed lizard, *Uromastyx nigriventris*, from three distant localities along a Mediterranean-Pre-Saharan aridity gradient in Morocco, were investigated in spring and autumn of 2015 using microhistological analysis and calibrated production of feces in Spiny-tailed lizards from three localities along a northeast Mediterranean to Southeast Atlantic coast aridity gradient in Morocco. The obtained results showed that individual lizards fed on 4 to 11 different plant species at variable proportions, depending on locality and season. The daily food consumption, calculated from the highly significant correlation between this later and the 10-day feces production in captive food-deprived lizards, was not significantly different among the three studied populations or between the seasons. The average daily food consumption was 4.49 ± 1.92 g fresh mass/100 g body weight (range: 1.82-9.34). There was a highly significant correlation between dry mass percents of selected plant species from the habitat and the corresponding numerical frequencies of their fragments in subsamples from an artificial mixture, determined by microhistological analysis.

This significant relation allowed to estimate the proportion of each plant species within an individual lizard's diet. The combined methods used in this study, namely microhistology and calibrated feces production, would be very helpful in quantifying various specific nutritive and energetic components from the different food plant species.

Effect of bioclimate parameters on group size of Black bellied sandgrouse (*Pterocles orientalis* L., 1758) in a watering site of South-Eastern Algeria

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Key words: black bellied sandgrouse, group size, bioclimate parameters, watering site, south-east of Algeria.

The Black bellied sandgrouse (*Pterocles orientalis* L., 1758) appears to be one of the most adapted species to extreme conditions of arid regions. However, implementing actions to promote in situ conservation based on an understanding of the behavioral ecology of the Black bellied sandgrouse populations concerned and the biological and ecological processes involved.

We opted to study the direct effects of changes in physical parameters of bio-climate (temperature, precipitation and time of sunrise) on the abundance of the Black bellied sandgrouse in the drinking site (Bir Naam), by using the scan sampling method (Altmann, 1974). The study was conducted from October 2014 to September 2015.

Our results reveal that the Black bellied sandgrouse density at the watering site is strongly influenced by the variation in temperature and precipitation, we noted a high abundance of black bellied sandgrouse during the warmest months and the months with the lowest precipitation. We also recorded a strong correlation between the arrival time of the Black bellied sandgrouse at the watering site and the sunrise time, with a mean arrival time of 02 h 42 min \pm 00: 23 min after sunrise, ranged between a minimum of 02 h 16 min and a maximum of 03 h 26 min.

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Mammal fauna of Chişinău airport, Republic of Moldova

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Key words: Chişinău airport, mammals, biotopes, abundance, rare species.

The studies were performed during 2012-2014 on the territory of Chişinău airport and its surroundings. Airport territories are large, contain a high variety of biotopes, mostly open type, and are relatively protected against intense human activity, thus creating favorable conditions not only for a large number of birds, but also for many mammal species. The presence of mammal species, especially of rodents, on the airport territory creates favorable conditions for the occurrence of rather high number of birds of prey, which represent a threat for the safety of aircraft flights. During the study, 31 mammal species have been registered: 5 insectivore species, 7 bat species, 14 rodent species, 1 hare species and 4 carnivorous species. The rodents and the fox were the most widespread, common and abundant. For small rodent species the presence of cultivated lands in airport surroundings is favorable. The individuals migrate on the airport territory, where they can also find favorable trophic conditions, shelter and the anthropogenic disturbance is low. The Field vole colonies have the average density of 12-15 col./ha, being denser near the perimeter (up to 25 col./ha) and about 5-6 col./ha in the middle area. Among small rodent species the most abundant is the Wood mouse with 73%, followed by the Field vole (19%), *A. uralensis* (4%), House mouse (2%) and Mound building mouse (2%), caught only near airport perimeter. The synanthropic species *R. norvegicus* and *M. musculus* were registered mostly near various buildings from the airport territory with intense anthropic activity and accumulation of household waste. The fox was registered on the airport territory as well as on adjacent cultivated land and fallow ground with a density of about 20 ind./ha. Among mammal fauna 7 species are rare and 5 species are protected – Bicolor shrew and 4 bat species (Red Book of Moldova, 2015).

New bat maternity colonies in central and northern zones of the Republic of Moldova

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Key words: bats, reproduction, maternity colonies, Hordinesti, Viscauti, stone quarries, grotto.

The studies were performed in June-July 2017 in near Hordinesti village from the northern zone and near Viscauti village in the central zone of the Republic of Moldova. The stone quarries near Hordinesti are situated at 48°09'89" N and 27°08'96" E, at the altitude of 166 m and have several entrances. Near Viscauti two sites were investigated: abandoned stone quarries at 47°25' 12" N and 29°03'36" E, elevation 106 m, at about 900 m distance from Nistru river and a natural grotto situated at 47°25'09" N and 29°04'08" E, elevation 101 m at 300 m distance from Nistru river.

In stone quarries near Hordinesti in June a large maternity colony of *M. blythii* was found. The colony consisted of about 400 females with juveniles of various ages – from several days old to 15 days old. Some of the females were still pregnant. The colony was divided in several groups: the largest one included about 300 individuals, three smaller of about 200 individuals and 5 small groups of several dozen females with juveniles.

In July, in the stone mine of Viscauti, a maternity colony of *Myotis daubentonii* was found of about 200 individuals. The colony was divided in three compact groups of 50-80 individuals. All juveniles were rather mature and constituted $\frac{1}{2}$ or $\frac{3}{4}$ of female body size. They were 3-4 weeks old and most of them were independent. In the grotto with a very narrow entrance, a maternity colony of *Rhinolophus hipposideros* was recorded of about 40 females, all with a juvenile attached to the ventral part. The colony consisted of two groups and some solitary individuals with juveniles situated at 0.5-1 m. Within the groups, the females were situated at 2-10 cm from each other. The juveniles were 2-3 weeks old and didn't fly independently.

The existence of stone mines and of grottoes in the studied zones, low anthropogenic activity, the proximity of water basins, rich vegetation and abundant trophic sources favor the occurrence of maternity colonies and the prosperity of bat species in the area.

Predicting range shifts for European Community Interest bat species based on future climatic predictions: will Natura 2000 Network provide an adequate coverage?

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Key words: bats, conservation, climate change, environmental modelling, maxent.

Based on current climatic predictions and future scenarios, it is estimated that many species may shift their ranges in order to adapt to the new conditions. In this study, we focused on 13 bat species listed in Annexes II, IV and V of the Habitats Directive, mostly resident or regional migrants. We determined their current ranges for the West Palearctic area using both Maxent habitat suitability modelling and distributional records, and predicted their future range shifts according to six climatic models and three scenarios per each model. Presence data were obtained from large data repositories, such as the Global Biodiversity Information Facility, own records, published locations and museum collections. The study area was confined to European ranges of currently recognised species or genetically distinct subspecies. The analysis was performed at 5 arcminutes' resolution. A correlation matrix was obtained using the R 3.4.2. Strongly correlated variables were excluded from the models. We have tested multiple variable scenarios for each species, starting from a general model using all non-correlated variables. In the following step, we have selected all variables from the previous models, with more than 5% contribution. The final step was to assign variables based on expert opinion. Models were compared using Akaike Information Criterion and assessed using the area under the curve (AUC - ROC – receiver operating characteristic). Results show expansion of suitable habitats for the Mediterranean species, and northward shift for boreal species, such as *Myotis dasycneme*, severely changing the species richness and composition of the existing Natura 2000 sites in Europe.

Horizon-scanning for alien species likely to have an impact on European biodiversity

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Key words: biological invasions, prioritisation, risk assessment, impact.

Alien species are introduced to Europe at an increasing rate, threatening biodiversity and related ecosystem services as well as economy and human health. Recently, the European Union (EU) adopted EU Regulation 1143/2014 that aims to prevent, minimise and mitigate the negative impacts of invasive alien species through the development of a list of invasive alien species of EU concern (the Union list). The Union list is regularly updated and currently contains 49 species of animals and plants for which concerted measures are required across the EU.

Prevention of new introductions is particularly emphasized as established populations of alien species have higher costs of management and are nearly impossible to eradicate. Horizon-scanning can contribute to the identification of potentially new invasive alien species and inform future updates of the Union list. Therefore, a horizon-scanning exercise was performed in order to derive a list of alien species which are likely to arrive, establish, spread and have an impact on European biodiversity over the next decade (Roy et al., 2015). Despite the difficulties of this task (e.g. limited information, predicting which species will become problematic), a preliminary list of invertebrate, vertebrate and plant species was compiled. The preliminary list was reviewed and refined using consensus approaches in order to make recommendations on the species of highest concern for the EU that should be prioritised for risk assessments.

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Genetic structure of *Dreissena rostriformis bugensis* (Mollusca: Bivalvia) populations from Danube Basin and Poland

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Key words: *Dreissena*, microsatellites, genetic diversity, invasion genetics.

The quagga mussel, *Dreissena rostriformis bugensis* (Andrusov, 1897), is one of the most problematic invasive species across Europe and North America due to its great economic impact. It is also a threat to local biodiversity and an invasive ecosystem engineer mainly because it alters the benthic substrate. This study presents data on the genetic variability of four European quagga mussel populations.

Adult mussels were collected from four populations across Lower Danube Basin and Szczecin Lagoon: Danube at Galați (Romania), Ogosta Reservoir (Bulgaria), Balaton Lake (Hungary), and Szczecin Lagoon (Poland). For genetic diversity and population structure assessment, 154 individuals were analyzed using 8 microsatellite markers: Dbug1-Dbug5, Dbug75, Dbug93, and Dbug110 (Wilson, et al., 1999; Feldheim, et al., 2011).

All microsatellite loci analyzed were polymorphic in all populations. Significant deviation from Hardy-Weinberg equilibrium was detected in 7 out of 32 single locus tests. Out of the 215 identified alleles, 23 were private alleles. Null alleles were identified in 5 out of 8 microsatellite loci. The mean expected heterozygosity ($H_E=0.872$) was overall similar to the mean observed heterozygosity ($H_O=0.830$) across all populations.

The results show that genetic diversity within each population is moderate, while among populations it is low. The fixation index value ($F_{ST}=0,029$) indicates a weak genetic differentiation among the analyzed populations. *STRUCTURE* software analysis revealed that the genetic structure of the populations from the Lower Danube Basin is not significantly different from that of the population from the Szczecin Lagoon. The evolution of the invasive process of *Dreissena rostriformis bugensis* cannot be fully solved, as the presence of private alleles is most probably due to the genetic drift effect that took place during the repeated colonizing events. The present data does not support population genetic structure differentiation by geographic distance, which could be explained by the fast dissemination and high invasivity of this species.

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Parasitic nematode fauna in peach culture from various orchards of the Republic of Moldova

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Key words: parasite, phytonematodes, peach tree, orchard.

The damage and losses of agricultural production, despite favorable conditions, provoked by phytonematodes as phytopathogenic agents, is of particular importance through identifying the structure of associated complexes structure capable of causing pathogen-specific phytohelminthoses and as intermediary viral vectors, with serious consequences on peach trees.

The comparative studies of the phytosanitary monitoring surveys were carried out on over 500 ha of peach plantations in the Central and the South – Eastern zones of the republic, with the collecting of soil samples from the tree rhizosphere, establishing the relevance of extensibility degree of phytoparasite nematode complexes and vectors with the determination of the phytohelminthological impact on peach plantations.

As result of the laboratory analyzes, variable values were found regarding the number density of 780-2640 ind./100 g of soil in sectors from the central zone compared to the South-Eastern zone where the amplitude of the values is lower (570-1970 ind./100 g of soil) by 25-27%, due to the long pedological drought and high temperatures on the South-East areas. The structure of the phytonematode complexes in peach orchards and taxonomic diversity during the study period consist 42-46 species of parasitic phytonematode species in the Central zone and 39-48 species of the Southeast zone with diverse phytoparasitic trophic specialization included in 6 groups with the predominance of 42-50% of ectoparasite species (21-26 species) with specific helminthological effect, followed by the endoparasite groups and vectors of nepo-viruses more increased in the Central zone (6-10 species). The frequency and abundance of registered species, more frequently associated in communities, is composed of the genera: *Xiphinema*, *Pratylenchus*, *Paratylenchus*, *Helicotylenchus*, *Mesocriconema*, *Criconemoides* etc. the species-vectors of nepo-viruses were highlighted, such as: *X. brevicole*, *X. vuitennezi*, *Longidorus elongatus*, with evidence of viruses in 5-15%, through the symptoms of the short bites of the sprouts, chlorosis and corrugating with irreversible pathological consequences for peach trees.

Paratethyan Ostracod Studies- a Historical Perspective

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Key words: Paleoecology, stratigraphy, taxonomy, morphological variation, revision.

Ostracods have been an extensively studied object of research in the last century and are nowadays commonly used in paleoenvironmental reconstruction. Looking through past studies of Paratethyan ostracods one can find at least two pronounced issues involving working with the literature. The first one is related to relative sea level fluctuations and therefore the evolution of the Paratethys itself. The second one is represented by different authors approaches.

Throughout periodical and continuous palaeoenvironmental changes in time and space along Paratethyan basins, the biota (including ostracods) repeatedly underwent conditions of extensively high pressure, that lead to an increasing rate of speciation. The high diversity in shape, size and ornamentation patterns of ostracod shells have evolved over time. The variety of paleoecological domains inside Paratethyan basins additionally encouraged the lateral diversification along the same basin. Studying only fossil material with no access to the soft tissue of the animal makes it challenging and somewhat questionable to be sure if one is in the presence of a new ostracod species or dealing with a morphotype which evolved due to local environmental changes. The so-called Pontocaspian ostracod fauna is amongst other things characterized by their endemism, which can be observed along the Paratethys. This aspect leads to a high number of newly described species by different authors, often based on almost unnoticeable morphological features. As a result, the scientific community faces a challenging identification and designation of Paratethyan ostracod which has become problematic regarding reliable and uniform information on biostratigraphy and paleoenvironmental reconstruction.

Most of the Eastern Paratethyan ostracods were previously described by pioneering authors like Livental, 1929; Svejler, 1949; Suzin, 1956; Mandelstam & Schneider, 1963; Agalarova, 1967 and Vekua, 1975, using hand drawings. Unfortunately, the quality of the drawings varies drastically and often the described species is beyond recognition. During the last 30 years, authors have tried to recognize the described species in their material but often end up with proposing additional new taxa. Recently ostracodologists working on Pontocaspian ostracods have published a series of papers utilizing more modern imaging approaches (Yassini, 1986; Boomer et al., 2005; Rostovtseva & Tesakova, 2009; Gliozzi et al., 2013; Van Baak et al., 2013, 2015; Chekhovskaya et al., 2014; Popov et al., 2016; Stoica et al., 2013, 2016)

The reevaluation of originally described species, based on type collections and sections is urgently required. The implementation of taxonomic harmonization (Danielopol et al., 2015), using high-resolution SEM pictures and modern morphological investigation with specialized software (see *Morphomatica*) will bring a coherent vision on Paratethyan ostracods.

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Preliminary data on the dinosaur eggshells from Livezi (Hunedara County, Romania) – new hints of megaloolithid variability in uppermost Cretaceous deposits of the Hațeg Basin

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Key words: Hațeg Basin, Maastrichtian, dinosaur eggshells, eggshell thickness.

Dinosaur eggshells of the megaloolithid morphotype are a common find in the uppermost Cretaceous (Maastrichtian) deposits of the Hațeg Basin, occurring either as isolated fragments or as egg fragments associated in clutches. The most significant occurrences are those from Tuștea, Nălaț-Vad and Totești, where clutches were found, the contained eggshells being assigned to the *Megaloolithus siruguei* oospecies (e.g. Grigorescu et al., 2010, and references therein). Since no dinosaur embryos were discovered so far, it is still uncertain which dinosaur group laid the megaloolithid eggs found in the Maastrichtian deposits of the Hațeg Basin. Two dinosaur groups are linked to the eggs, based on contextual evidence: hadrosaurs (Grigorescu et al., 2010) and sauropods (Grellet-Tiner et al., 2012).

The discovery of egg clutches at Livezi, an eggshell site only recently discovered (Grigorescu & Csiki, 2008), adds new information to the variability of megaloolithid eggshells and egg clutches in the Hațeg Basin. The eggs and eggshells found here were compared to those from other sites in the Hațeg Basin (Tuștea, Nălaț-Vad, General Berthelot 1, Crăguiș 1, Crăguiș 2) in terms of egg diameter (where egg clutches were present) and eggshell thickness.

The eggs from Livezi (egg nest R.2548) measure 195-210 mm in diameter, being significantly larger than those from Tuștea (egg nest R.2150) that are only 155-170 in diameter. The average thickness of the eggshells from Livezi (3.17 mm) is also larger than the general thickness of the eggshells previously known from the uppermost Cretaceous deposits of the Hațeg Basin (2.3-2.4 mm, Grigorescu et al., 2010). Eggshell thickness distribution is bimodal or polymodal for several sites across the basin, suggesting a greater variability than previously reported. The cause of this variability (parataxonomical or taphonomical) is still uncertain, and more detailed studies are needed in order to understand it.

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One of the last free-roaming wisents (*Bison bonasus*) in the Bihor Mountains (western Romania) and its tale of past times

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Key words: radiocarbon dating, stable isotopes, palaeoenvironment reconstruction, European bison.

Stable isotope analyses are well established as tools of reconstructing various aspects related to the palaeoenvironment various organisms lived in. Since it is most resistant during diagenesis, tooth enamel is, in the case of large mammals, the best supplier of samples for such investigations. Since all large mammals are obligate drinkers, the oxygen isotopic ratio from the enamel hydroxylapatite is a good proxy for the oxygen isotopic ratio of the meteoric water drunk by the mammal and relative humidity. In contrast, structural carbon incorporated in apatite is assimilated from plants eaten by herbivores, and related to the dominant type of food ingested by the animal.

The discovery of a partial wisent (*Bison bonasus* Linnaeus, 1758) skeleton (skull and dentition included) in an open pit from the Șesu Gârzii karst plateau (Bihor Mountains, western Romania) presented a good opportunity for isotopic and morphological investigations, the results offering insights into the ecophysiology and environment of the animal.

Radiocarbon dating indicates that the wisent lived around AD 1650, representing one of the last free European bisons of the Apuseni Mountains, the last of its kind to live in Romania being hunted in the northern part of the Eastern Carpathians, in the late 1700s.

The oxygen isotope composition suggests drinking from local ponds subjected to evaporation during a LIA (Little Ice Age) period associated with lower humidity. The stable carbon isotope composition shows that the bison was grazing C₃ grasses, a dominant part of the local vegetal assemblage.

Evaluation of Argos telemetry accuracy in Romania compared with GPS data

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Key words: telemetry errors, Platform Transmitter Terminal, location classes, animal movements.

Collecting movement data by means of tracking animals is a challenging task due to the technological and data quality constrains (Turchin, 2015). The use of global navigation satellite systems such as GPS, dramatically increased the quality and amount of data received, however, for a consistent two-way communication there is a need for a reliable power source. Tracking devices equipped with GPS offer acceptable reception and data quality, but are particularly heavy and not suitable for many species. For small size species, Argos systems is more appropriate, but the location of a Platform Transmitter Terminals by using Doppler effect, influence the accuracy of location (McClintock et al., 2015). Argos operator, Collecte Localisation Satellites - CLS, attribute the position of a PTT to a location class based on geometrical conditions of the satellite pass and stability of the transmitter frequency (Madry, 2015), however, little is known about the degree of the accuracy of error prediction in Romania. To overcome the lack of data about Argos telemetry accuracy in Romania, we deployed 5 low power solar PTT's (GeoTrak, Inc. USA, 23 g) in 4 geographic locations in static, low speed, and high-speed tests. We compared Argos and GPS (i.e. true) locations, analyzed the error structures and tested the influence of filtering methods on the quality of Argos location datasets (i.e. retaining best location classes, keeping only the locations complying with the maximum speed of the studied animal, Douglas Argos filter based on spatial redundancy, movement rate and angles (Douglas et al., 2012)). We conclude that Argos locations in Romania exceed the error values assigned by CLS and the data need to be filtered and tested before movement analysis. The authors were supported by a grant of the Romanian National Authority for Scientific Research, PN-III-P2-2.1-PED-2016-0568 Argos based applications for real time wildlife monitoring in Romania (BioMoveFix).

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Evaluating the deterrent efficiency of non-lethal ammunition EM-A/B for the application in nuisance wildlife management

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Key words: nuisance, deterrent, non-lethal, ammunition, wildlife, management.

The EDM-company is leading in the sector of non-lethal ammunition on a kinetic basis for police operation purposes in the German-speaking region. On this background, requests from shepherds have resulted in advanced processed products (EM-A/B) targeted at animal defense use for „protected species“. It remained to be clarified whether these prototypes based on super-sock-technology also provide the intended functional purpose from the wild-biological point of view, while respecting the basic conditions of animal ethics and biodiversity. Therefore, the IWJ was asked to evaluate scientifically whether this high-tech-invention has advantages over conventional types (rubber pellets, rubber ball) and for which species (wolf, bear, wild boar) this ammunition is suitable for the protection of herds, prevention of crop damage, as repellent measure or for the defense of attacks on researchers during animal monitoring projects. The first evaluation in practice, regarding the effect and targeting precision of non-lethal ammunition took place on the 11.05.2017 at the shooting site of the Lower Austrian provincial hunting association in Merkenstein. We tested different types and brands by shooting on simulants that in their composition resemble the skin and muscle tissue of these animals. The EM-ammunition was distinguished in comparison to conventional non-lethal projectiles by its superior targeting precision with an appropriate impact. But precisely, a high degree of accuracy is decisive for the success and safety of repellent operations. The other types of ammunition have proved to be too mild or pose a high risk of eye injury due to the large dispersion of the rubber pellets. A further aim is to test and evaluate the repellent efficiency of the EM-ammunition on the living animal in practice. This study is part of a PhD project at the IWJ which primary aim is to promote integrated wildlife management and to implement sustainable use of game in Romania.

Exploring the genetic diversity in an endemic Carpathian species: case study of the Transylvanian Dark Bushcricket (*Pholidoptera transsylvanica*)

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Key words: mitochondrial DNA, Orthoptera, alpine species.

In the last years, an increasing number of studies emphasized the importance of the Carpathians as a glacial refugium (Schmitt & Varga, 2012; Mraz & Roiniker, 2016). During the Last Glacial Maximum, a large part of the Carpathian area was not covered by the ice sheet and thus it provided suitable conditions for survival of temperate biota during Pleniglacial. *Pholidoptera transsylvanica* is a species with Ponto-Mediterranean origins, endemic to the Carpathians. Its distribution's center is in the Romanian and Ukrainian Carpathians (Iorgu *et al.*, 2008). The species is protected in Romania and Europe, being listed on Annex II and IV of the Habitats Directive. *P. transsylvanica* is a mesophytic and chortobiont species with a relatively wide ecological tolerance (Iorgu *et al.*, 2008). Its specific habitat is fragmented throughout its area, a common problem for many endemic and protected species in Europe and representing the main concern for conservation plans, as it can lead to population isolation and limit the gene flow.

In the present study we analyzed the genetic variation in the endemic bushcricket species based on a 777bp fragment of the cytochrome oxidase subunit I gene. We sampled a total of 486 individuals from 40 populations along the range of the Carpathians. We found a high genetic diversity within the analyzed populations with a total number of 100 haplotypes. Different methods employed for reconstructing phylogenies yielded congruent trees. For the Transylvanian Dark Bushcricket we identified three main monophyletic groups of mitochondrial haplotypes in the Carpathian region with somewhat localised geographic distribution. The Median Joining network shows a dumbbell pattern with a deep genetic split between major haplogroups. These results provide further support for the role of the Carpathians as a glacial refugium.

This work is funded by Romanian UEFISCDI Executive Unit for Financing Education Higher Research Development and Innovation, Grant No. 113/2014, code: PN-II-PT-PCCA-2013-4-1489.

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The qPCR expression of genes possibly involved in the sexual development of individuals from two sturgeon species

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Key words: best beluga, stellate sturgeon, sexual development, aquaculture.

The stellate sturgeon (*Acipenser stellatus*) and the best beluga sturgeon hybrid (♀ bester (♀ *Huso huso* × ♂ *Acipenser ruthenus*) × ♂ *Huso huso*) can be found in Romanian aquaculture, being some of the species with great economic value because of their caviar. Therefore, there is a high interest in the sexual development of these species that can be investigated through the qPCR expression of the *ar*, *dmrt1*, *sox9*, *wtl*, *foxl2*, *cyp17a1* and *star* genes.

Ten best beluga hybrid individuals and eight stellate sturgeon individuals from aquaculture were sacrificed and gonads, anal fin, body kidney, liver and white muscle were collected. The sex was confirmed through histology (hematoxylin and eosin staining). The total RNA was isolated with RNeasy Mini Kit (Qiagen). For reverse transcription we used the iScript Reverse Transcription Supermix for RT-qPCR (BioRad) kit and the qPCR was done with iQ SYBR Green Supermix (BioRad) kit on the iCycler iQ Real-Time PCR Detection System (BioRad). The normalization of gene data was done using the following reference genes: *actb*, *gapdh* and *rRNA 28S*. The difference in expression between males and females and between different organs was tested using one-way ANOVA with Tukey correction and student t-test.

In case of the best beluga hybrids it is observed that the *dmrt1* gene is expressed only in gonads while for the stellate sturgeon it is expressed in all the organs investigated with a higher expression in testicles than in the other organs. The difference in expression between males and females can only be observed in the gonads which is a testimony of the involvement of some of the investigated genes in the sexual development of sturgeons.

Trophic resource exploitation by a *Pelobates syriacus* population at the northern limit of the distribution range

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Key words: *Pelobates*, feeding selectivity, trophic resource, trophic spectrum, cannibalism.

Pelobates syriacus has a narrow ecological niche and the study of the trophic spectrum and feeding strategy is required for a better understanding of their trophic niche and improved conservation measures. We studied the trophic resource use and availability in a *P. syriacus* population from Grindul Lupilor, the Danube Delta Biosphere Reserve. The study was conducted during 6 months (September 2013 and March-July 2014). The trophic resource availability was estimated using pitfall traps, placed along a linear track across the studied area. The stomach content analysis was made on recent road kills of which stomach content could be collected and by collecting stomach content through stomach flushing. The stomach content of 415 *P. syriacus* individuals, both adults and juveniles, was analyzed. A total number of 2,046 prey individuals were found in their stomach content, while in the pitfall traps we collected 23,052 invertebrates. We also documented cannibalism in two large adults. Our study revealed a high seasonal dynamics of the trophic offer and its exploitation, with the highest number of prey individuals and prey taxa density in May and September, and lowest in March. The population studied was actively foraging and showed a generalist feeding strategy. The dominant prey taxa consumed were beetles (Coleoptera). Nevertheless the spadefoot toads showed selectivity towards certain invertebrate taxa: positive for Lepidoptera larvae, Coccinellidae, Curculionidae, Anelida (Lumbricidae), Gastropoda and Formicidae and negative for Araneae, Isopoda, Staphilinidae, Tenebrionidae and Hymenoptera varia. *P. syriacus* feeding behavior is opportunistic at low food availability levels when cannibalism was also described. There was no significant difference regarding the trophic spectrum between juveniles and adults, but there were differences regarding the size of prey per stomach, adults consuming larger prey than juveniles.

Water level management influence on the fall passage of Black Stork populations at Dumbrăvița Fishing Complex (Brașov County, Romania)

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Key words: *Ciconia nigra*, stopover point, fall passage, water level management.

Frequent occurrence of the umbrella species *Ciconia nigra* (Black Stork, SPEC2, Vulnerable Species – Romania) in artificial ponds during fall passage, stresses the potential value of artificial ecosystems management with regards to long-term species conservation. This study assesses the importance of hydrological management for the fall passage of the Black Stork at one of the most important stopover points for the species postnuptial migration over Romania – Dumbrăvița Fishing Complex.

The Black Stork's fall passages (August-September) for five consecutive years (2013-2015) were monitored through weekly observations, during the evening feeding period (4 P.M. – 6 P.M.). Further data processing implied using Microsoft Excel software (interpolation functions). Seasonal variation in numbers was mainly influenced by water level management at Dumbrăvița fishing complex. For each year, peak migrational points (80 storks in 2013; 54 in 2014; 67 in 2015; 44 in 2016; 51 in 2017) overlapped with the drainage of large ponds (E9, E12, I1), whereas periods of low numbers were consecutive to the temporary stop of the draining processes. Thus, data distribution was mostly shaped by the ponds drainage succession, tending to be unimodal in 2013, 2016, 2017 and multimodal in 2014 and 2015. Exceptional maximum numbers that were recorded too early for the species passage (last decade of August 2015) or belatedly (mid September 2016) were due to the same drainage succession and the intrinsic pattern of the Black Stork's fall migration on this route (migrational peaks generally recorded between the 20th of August and the 10th of September). Time dynamics registers a migrational peak for 2013, exhibiting a slow decreasing trend for the following years.

This study offers insight into sustainably managing water level in artificial wetlands for the conservation of the Black Stork. We therefore propose migration correlated drainage of the ponds, considering pond size and migrational peaks.

Is relocation of mammals an effective measure of their conservation in Romania?

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Key words: large carnivores, Habitats Directive.

Due to the biogeographical junction and the great heterogeneity of the landscape within its territory, Romania has a great diversity of species and natural habitats. Some of them were included in the Natura 2000 European ecological network.

The paper deals with the derogations that can be released for the species of community interest in order to preserve their conservation status.

Monitoring of the conservation status of the species and their habitats of Community Interest from each EU Member State is an obligation arising from Article 11 and reporting under Article 17 of the Habitats Directive 92/43 / EEC (HD). In addition, to assess the effects of conservation policies and the progress made with the implementation of HD, the European Commission requires periodically assessments of the species and habitat types at national and biogeographical levels, followed by reporting every 6 years. According to the HD, the conservation status is based on the concept of “Favourable Conservation Status” and the degree of deviation from this status.

According to the legal provisions in force, in justified cases, the competent environmental authority (Ministry of Environment) may grant derogations, by order of the head of the authority, with the prior approval of the Romanian Academy. The main condition is “there should not be an acceptable alternative and the derogatory measures should not be detrimental to maintaining populations of those species in a favorable conservation status in their natural habitat.”

Between 2012-2017 several derogations were required. The official data of the competent environmental authorities indicate a number of derogations for each county of Romania where the species were present.

For each year from 2012 to 2017 there is one study to assess mammalian populations (large carnivores and wild cats) in order to maintain a favorable conservation status and to establish the number of specimens of strictly protected species that can be harvested during the season hunting. Starting in 2016, hunting for these species was not allowed.

Environmental authorities have the National Register of by-catches and accidental murders of all bird species, as well as the strictly protected species listed in Annexes no. 4A and 4B (2012-2016).

Only in 2017, there was a need for diversion for species of bats [*Rhinolophus ferrumequinum* (Schreber, 1774), *Rhinolophus hipposideros* (Bechstein, 1800)], bison [*Bison bonasus* (Linnaeus, 1758)] and large carnivores: brown bear (*Ursus arctos* Linnaeus, 1758), common wolf (*Canis lupus* Linnaeus, 1758), Eurasian lynx [*Lynx lynx* (Linnaeus, 1758)], and wild cats (*Felis silvestris* Schreber, 1777).

The relocation was good practices into a project "Urgent actions for the recovery of European Bison populations in Romania" LIFE14 NAT/NL/000987 LIFE RE-Bison - A7.

Relocation in the case of large carnivores remains a measure of conservation partially solved for the large carnivore species in Romania.

The presence of large carnivores in Romania is causing more and more problems. On a case-by-case basis, concrete conservation measures for the target species are required as well as measures that local authorities must take to prevent human-animal conflicts.

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The image of animals in sacral architecture

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Key words: sacral architecture, bat roosts, animal images in art, human interaction with animals, biodiversity, conservation.

Far before huge skyscrapers, the first and only impressive buildings were the temples such as churches, mosques, stupas, synagogues. Around 600 BC, the wooden columns of the Temple of Hera at Olympia were replaced by stone columns. Thanks to this innovation used also in other sanctuaries at least few stone buildings have survived through the ages. Buddhist architecture developed in South Asia starting with third century BC. Post-modern architecture may be described by unapologetically diverse aesthetics where styles collide, form exists for its own sake, and new ways of viewing familiar styles and space abound.

Cavities in old trees and caves offer suitable roosting spaces for bats, but as these natural roosting sites have been lost, many bat species have adapted to using buildings for roosting. Most sacral buildings, like medieval churches, have bat roosts, and sometimes these shelters have been used for generations of bats. Bats have very specific preferences for their roosts - maternity colonies select warmer sites, and in churches they are often found in the south aisle. Some species choose cracks and crevices for roosting, while others are free hanging and need more space for taking off. Many modern buildings offer little roosting opportunity for bats, or lack features in the surrounding landscape that bats use for commuting (these are often linear features such as hedgerows and tree lines). Churches are lasting objects in a changing landscape and churchyards can offer rich habitat for wildlife, including the insects that bats hunt for.

However, in most of churches the number of bats is small and often the congregation may not even be aware of their presence. In addition to bats, many birds can find shelters here, nesting in towers and garrets of churches. *“We believe in protecting wildlife”*, many priests are saying, *“but surely our human congregation have rights as well as the bats”*. Biologists are hardly working to convince people about the need to protect all beings and firstly bats.

Animals occupied an important place in the art of medieval period. Artists readily employed animal motifs, along with foliate designs, as part of their decorative vocabulary. Early medieval jewelry, for instance, abounds with animal forms elongated and twisted into intricate patterns. Deluxe Bible and gospel books often made use of animal designs to enliven the sacred text. Animal forms were employed to imbue utilitarian objects with majesty and even with humor. The griffin, regarded in antiquity as an attendant of Apollo and a keeper of light, retained its role as a guardian figure for the dead even in later Christian contexts. Artists frequently represented the lively biblical accounts of human interaction with animals, from the days of Creation to Noah's Ark, to Daniel in the Den of

Lions. The Bible is also rich in animal symbolism. Jesus' personal humility was demonstrated by the account of his riding a donkey into the city of Jerusalem. The portrayal of exotic animals in medieval art must rely on descriptions in bestiaries and earlier representations. Such beasts were sometimes sent as diplomatic gifts to the European rulers or brought back as a treasure from pilgrimage or crusade. According to the legend, Charlemagne (Charles the Great) received an elephant from Harun-al-Rashid, caliph of Baghdad in 797. Camels were known through contacts with nearby Muslim lands.

The main idea both in art and architecture is to understand the need of beings around us, to respect them keeping shelters and foraging habitats, and to live together in balance.

Sacral architecture in animal protection and humane interest to preserve them

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Key words: sacral architecture, bat, animal protection.

For the animals using buildings as their shelter, sacral architecture is of high importance. At present, in both urbanized and country side areas, sacral architecture is a part of the landscape.

Some animal species occupying sacral architecture buildings are rare and under protection today. For the building administrators it may cause or, in most cases, it may seem to cause issues. Scientists need to step in before the conflict of interests between human and animal inhabitants will emerge.

Various groups of animals use buildings as either their temporary or long-term shelter. Cities develop, covering large surfaces occupied by the nature, and also, unexpectedly, they are creating unique eco climate inside themselves. Most of the changes have a negative effect on the animals, but some of them are trying to adapt to these new conditions that cities have to offer in terms of shelters and food sources for both invertebrates and even bigger vertebrates.

Among the latter, owls and bats are commonly recognized as inhabitants of sacral architecture buildings.

One of our goals, the most important one, beyond doubts, should determine the building administrators to realize the role of the buildings in nature protection. The hope stays with the researchers on the task to help the building administrators, to share our knowledge and help them to protect the animal inhabitants during maintenance and modernization works.

POSTER PRESENTATIONS

On the cyclopids (Crustacea: Copepoda: Cyclopidae) from the collection of “Grigore Antipa” National Museum of Natural History (Bucharest, Romania)

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Key words: Cyclopidae, collection, Romania.

Cyclopidae is one of the largest crustacean families (approx. 1010 (sub)species) (Papa & Hołynska, 2013). It is a widespread group of copepods which invaded a variety of aquatic environments and microhabitats. Cyclopoid copepods are important resource of fishery and significant components of freshwater communities.

The biodiversity of cyclopids is poorly studied on the territory of Romania. The data on freshwater cyclopoid copepods are presented in comprehensive monograph of famous Romanian copepodologist Adriana Damian-Georgescu (Damian-Georgescu, 1963).

In 2016, the cyclopids collected by A. Damian Georgescu were transferred to the “Grigore Antipa” National Museum of Natural History from the Biology Institute of Romanian Academy.

We checked 545 slides and revealed that species on 330 slides belong to the family Cyclopidae. We carried out modern taxonomic revising of cyclopoid species and we identified 39 species and subspecies which belong to 13 genera and 3 subfamilies. All the collecting sites were checked; mainly sites were represented by the Romanian fresh waters, except one site - Împutita (old name), now Vladychen, Bolhrad Raion, Odessa Oblast, Ukraine.

The 330 slides (342 specimens) were systematically organized in a collection, and a catalogue of this collection will be published.

This investigation was carried out in frame Ukrainian – Romania Joint Research Project, jointly supported by Romanian Academy of Science and the National Academy of Science of Ukraine.

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On the *Osmoderma* (Coleoptera: Scarabaeidae: Cetoniinae: Trichiini) from the collection of “Grigore Antipa” National Museum of Natural History (Bucharest, Romania)

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Key words: *Osmoderma*, Museum’s collection, Habitats Directive.

Osmoderma eremita it is one of the beetles included in Annexes II and IV of the Habitats Directive and in the Annexes 3 and 4 A of OUG 57/2007, on the regime of the protected natural areas, conservation of the natural habitats, of wild flora and fauna, amended and supplemented by Law 49/2011.

Based on genetic distance and parsimony analysis two clusters were identified: the first cluster is restricted to western Europe - *Osmoderma eremita* (Scopoli), in most of western Europe and *O. cristinae* Sparacio, endemic to Sicily and the second one to eastern Europe - *O. barnabita* Motschulsky, sensu Audisio et al. 2007 - in most of eastern Europe and *O. lassallei* Baraud & Tausin - endemic to northern Greece and European Turkey (Maurizi et al., 2017).

It is considered that the less variable trait for separation of *Osmoderma eremita* and *O. barnabita* is the shape of the parameres of the male genital organ (Lüchte & Klausnitzer, 1998). At *O. barnabita* the parameres present a very strong upward protuberance like a square bump rectangular at apex, followed by a strong concavity and then a straight slope continuing up to their base. The sexual differences in the *O. barnabita/lassallei*-group are less prominent than in the *O. eremita/cristinae*-group.

In Romania, up to now, all the papers cited specimens of *Osmoderma* as *O. eremita*. It is known from Curtea de Argeș, Brașov, Cincu, Făgăraș, Postăvarul, Comana, Deva, Hațeg, Căldărușani, Reghin, Sighișoara, Bradu, Mediaș, Orlat, Sibiu, Greci, Defileul Jiului National Park, and Cozia National Park. Studying the male genital organ of three specimens from the Coleoptera Collection of the Museum we consider that the specimens belong to *Osmoderma barnabita*. In the collection there are 48 specimens (36 males and 12 females) collected during 1949-2003, from the following sites: Azuga, Brăduleț, Săcele, Băile Herculane, Comana forest, Sântimbru Băi, Balșa, Bicz, Timișoara, C.A. Rosetti and Periprava. In the last five years, with the occasion of some projects regarding the observation, identification and evaluation of the conservation status of Natura 2000 beetle species, *Osmoderma* specimens were observed and photographed from Putna waterfalls, Galbenu Hill, Fântânele Hill, Brăduleț and Prisăcina.

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The New Leaf Beetle Collection (Coleoptera: Chrysomelidae) of “Grigore Antipa” National Museum of Natural History (Bucharest)

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Key words: Chrysomelidae, new collection, “Grigore Antipa” Museum.

In the “Grigore Antipa” Museum, the leaf beetle material is included in the old Collection of Palaearctic Coleopterans and in the recently formed Collection of Chrysomelidae.

The study and arrangement of the material in the new leaf beetle collection started in 2016. In the first two parts of the Catalogue of this Collection, data on 64 species of the Donaciinae (Donaciini, Haemoniini and Plateumarini tribes), Criocerinae and Cassidinae (Cassidini and Hispini tribes) subfamilies were published (Maican & Serafim, 2016, 2017).

Nomenclature and systematical order follows the *Catalogue of Palaearctic Coleoptera* (Löbl & Smetana, 2010).

Until now, over 2,700 leaf beetle specimens were introduced in the new Chrysomelidae collection of Museum. Most of the material originates from Romania, but collection includes some specimens collected from other areas of the Palaearctic region.

Among the rare species, newly entered in the Museum collection, we mention: *Cassida aurora* Weise, 1907, *C. azurea* Fabricius, 1801, *C. berolinensis* Suffrian, 1844, *C. margaritacea* Schaller, 1783, *C. pannonica* Suffrian, 1844, *C. panzeri* Weise, 1907, etc.

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The documentary-scientific and cultural-educational value of the Ornithological Collection of the Museum of Oltenia Craiova

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Key words: Ornithological Collection, Museum of Oltenia Craiova.

The Ornithological Collection of the Museum of Oltenia Craiova includes a number of 1808 items (1770 birds, 31 nests and 5 rings). The oldest items are from the beginning of the 20th century; among them, there are 54 specimens collected, prepared and donated to the museum by the reputed ornithologist Dionisie Linția, in 1926 (Petrescu & Ridiche 2009).

From a systematic point of view, the birds of the collection belong to 230 species, 138 genera, 58 families and 20 orders; considering the species and the types of habitats they live in, the birds of our collection fall into the following groups: 148 species come from terrestrial habitats, 78 species from aquatic habitats, while 4 are eurytopic species. The great diversity of bird species (almost 60% of the Romania's avifauna), but also the avifaunistic rarities it includes, give of the collection a significant faunistic and scientific value. In this respect we mention only a few species: *Gavia stellata*, *Phoenicopterus ruber*, *Branta ruficollis*, *Alectoris graeca saxatilis*, *Tetrao tetrix*, *T. urogallus*, *Milvus migrans*, *Gyps fulvus*, *Aegyptius monachus*, *Haliaeetus albicilla*, *Aquila* sp., *Hieraaetus pennatus*, *Falco peregrinus*, *Tetrax tetrax*, *Otis tarda*, *Burhinus oedicephalus*, *Glareola pratincola* etc. (Ridiche, 2011, 2017).

Some birds are marked with rings which together with the rings in the collection, have provided important data about the migration of these species (Ridiche, 2004).

Considering their documentary-historic value, seven specimens of birds (representing 7 species) have been classified as belonging to the Thesaurus category of the national cultural heritage, and other 85 specimens representing 44 species of birds were classified as belonging to the Stock of the cultural patrimony of Romania.

The Ornithological Collection of the Oltenia Museum is the support for many scientific studies on regional biodiversity, or of the country, and it is also an important means of documentation and education in the field of protection and biodiversity conservation, being exploited in various exhibitions that make it possible to know the wildlife and the values of natural and museum heritage.

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“Robert Ritter von Dombrowski” bird collection of “Grigore Antipa” National Museum of Natural History – after 100 years

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Key words: Robert Ritter von Dombrowski, biographical data, collection, museum, archive.

A close and reliable collaborator of Grigore Antipa, Robert Ritter von Dombrowski worked and created for 21 years at the Museum of Zoology of Bucharest, from August 1895 to August 1916. He was hired by Grigore Antipa as preparator, according to the eloquent references of the director of the Imperial Museum in Vienna. Dombrowski especially contributed to the construction of the scientific bird collection. In the museum collections, there are over 1000 skins and some hundreds of naturalized birds which were collected, identified and, some of them, donated by Robert Ritter von Dombrowski. All species of this collection originate in Romania. He had an important contribution in the opening of the museum in the building from the Kiseleff avenue, in May 1908. He collected new material which is still present in the permanent exhibition of the museum.

Robert Ritter von Dombrowski is known in the scientific world by his papers on ornithology and by his contributions in this field. His monumental paper, „*Ornis Romaniae*”, in which he presented 47 families, 347 bird species and subspecies of Romania, is the first scientific paper in which the systematics, biology and zoogeography of the birds known at the beginning of the 20th century in Romania are described. It was structured basing on a rich material collected or borrowed by the author from other ornithologists of Europe, especially for this study.

In this paper, the authors present some of Dombrowski’s biographical data, known more as a dealer of zoological exhibits and less as an author and scientist. Also, in this paper, we present the catalogues of “Dombrowski” Collection, basing on the data preserved in the museum archive and in the collection.

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Karyological investigation of terrestrial molluscs (Mollusca: Gastropoda) from Georgia

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Key words: chromosome numbers, terrestrial molluscs, Caucasus region, Georgia.

The results of the karyological investigations of Georgian (Caucasus region) terrestrial molluscs are summarized. The chromosome numbers for five Stylommatophoran and one Caenogastropod families were established. The basic chromosome number $n=27$ was registered in the family Clausiliidae Gray, 1855 (genus *Elia* O. Boettger, 1877). Two different values of basic chromosome number $n=26$ and $n=27$ were recorded for family Helicidae Rafinesque, 1815 (genera *Caucasotachea* C. Boettger, 1909 and *Helix* Linnaeus, 1758, respectively). The different numbers were found also in the family Hygromiidae Tryon, 1866. In particular, $n=23$ (genera *Circassina* Hesse, 1921 and *Fruticocampylaea* Kobelt, 1871) and $n=26$ (genus *Xeropicta* Monterosato, 1892). Approximately $2n=60-62$ somatic chromosome number was observed in Limacidae Lamarck, 1801 (genus *Gigantomilax* O. Boettger, 1883). The number $n=26$ was recorded in Oleacinidae H. Adams & A. Adams, 1855 (genus *Poiretia* Fischer, 1887) and $n=13$ for Caenogastropod family Pomatiidae Newton, 1891 (genus *Pomatias* Studer, 1789). The chromosome numbers registered in the investigated families of Georgian terrestrial molluscs are within the characteristic ranges of chromosome numbers described for these families of world malacofauna. Authors assume, that $n=23$, $n=26$, $n=27$ and ca. $2n=60-62$ are characteristic chromosome numbers for Georgian (and Caucasian) representatives of terrestrial molluscs.

**Species phylogeography and systematics of the
brevipennis-group in the cockroach genus *Phyllodromica*
(Blattodea: Ectobiidae) in the Balkan Peninsula**

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Key words: phylogeny, model group, mitochondrial gene, sequence markers, complex of species.

The comparison of the known Blattodea data from different regions of Europe shows the low level of exploration of this group on the Balkan Peninsula.

With the present study, we concentrate on the cockroach genus *Phyllodromica* (Blattodea: Ectobiidae), which is characteristic with a large share of endemics in the Balkans. We tried to investigate the phylogeny of the model group *brevipennis* of the cockroach genus *Phyllodromica* and trace the origins and ways of displacement of its representatives during the formation of the group.

For this purpose, sequences of two regions of the mitochondrial gene (COI) were obtained and used for phylogenetic reconstructions and time estimations for lineage divergence. The length of the sequence markers used is 603 bp for the first and 744 bp for the second region. For the study we used 8 morphologically delimitate taxa of genus *Phyllodromica* and one species of genus *Ectobius* for outgroup.

Of particular interest is the *brevipennis* complex, which in particular regions of the Balkan Peninsula is represented by differentiated genetic lineage - in the western part of the Balkans and especially along the coastal Adriatic mountains, dividing the individual populations of the *brevipennis* group into three branches.

In addition, group studies to show significant taxonomic contributions.

Whose females are larger? Sex dimorphism in skull parameters of two air-hawking Vespertilionidae bats

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Key words: sexual dimorphism, morphometrics, fluctuating asymmetry.

Nyctalus noctula and *Eptesicus serotinus* are two widespread European air-hawking bat species which belong to close size class. However, there are significant differences in their habitat preferences and migration behavior. Thus *E. serotinus* is a sedentary species which prefers semi-urban and rural areas, whereas *N. noctula* uses mixed migration strategy and tends to woodlands. Both species have sex-based habitat segregation during breeding season. While numbers of studies confirm female-biased sexual size dimorphism in body mass and forearm length for *N. noctula*, data about possible sexual dimorphism in *E. serotinus* remind limited. Moreover there are only few studies which show sex dimorphism in skull parameters for these two species.

The aim of the study is to demonstrate sexual differences in cranial characteristics within two species and to reveal principal morphometric differences in the skulls parameters between species.

The sample size includes 219 skulls (*N. noctula* - 117, *E. serotinus* - 102). We measured 15 craniometric variables and 4 indexes (by digital caliper) for each skull, taking into account bilateral signs.

Data analysis was performed with R software. Principal component analysis (PCA) was conducted to evaluate morphological variations between two species. Canonical variate analysis was applied after PCA in order to confirm the distinctiveness between sexual groups. The univariate measure of fluctuating asymmetry was calculated as recommended by Palmer and Strobeck (2003).

Significant sexual dimorphism in skull parameters was identified for *E. serotinus*, whereas for *N. noctula* it was expressed to a lesser degree. The most significant dimorphic feature between sexes in *E. serotinus* were height of the coronoid process, width of braincase and distance between coronoid and articular processes, where females were larger than males. Whereas in *N. noctula* males were larger than females by condylobasal length and height of skull. Moreover, sex differences in the mean asymmetry for both species were found. Thus *N. noctula* have a greater distance between the canine teeth and also a lower ratio of the height of the coronoid to the total length of the jaw compared to *E. serotinus*.

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On the tricladid fauna of Romania (Platyhelminthes, Tricladida) – a critic checklist of species

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Key words: Planariidae, Dendrocoelidae, Dugesiidae, uncertain species, uncertain synonymies, unidentified species.

The aim of this paper is to find the gaps in the knowledge of the Romanian tricladid systematic and diversity as resulted from the review of the literature. The paper gives a checklist of 36 species belonging to 3 families: Fam. Planariidae – 8 species: *Planaria torva* (Müller), *Planaria polychroa* Schmidt, *Atrioplanaria racovitzae* (de Beauchamp), *Polycelis nigra* (Müller), *Polycelis felina* (Dalyell), *Polycelis tenuis* Ijima etc.; Fam. Dendrocoelidae – 23 species: *Dendrocoelum alexandrinae* Codreanu & Balcesco, *Dendrocoelum atriostrictum* Codreanu & Balcesco, *Dendrocoelum banaticum* Codreanu & Balcesco, *Dendrocoelum botosaneanui* del Papa, *Dendrocoelum brachyphallus* (de Beauchamp), *Dendrocoelum chappuisi* de Beauchamp, *Dendrocoelum clujanum* Codreanu, *Dendrocoelum debeauchampianum* Codreanu & Balcesco, *Dendrocoelum geticum* Codreanu & Balcesco, *Dendrocoelum lacteum* Müller, *Dendrocoelum lipophallus* (de Beauchamp), *Dendrocoelum obstinatum* Stocchino, Sluys, Kawakatsu, Sarbu, Manconi, *Dendrocoelum orghidani* Codreanu & Balcesco, *Dendrocoelum polymorphum* Codreanu & Balcesco, *Dendrocoelum sphaerophalus* (de Beauchamp) etc.; and Fam. Dugesiidae – 5 species: *Dugesia gonocephala* (Dugès), *Dugesia cretica* (Meixner), *Dugesia fusca* (Pallas), *Schmidtea lugubris* (Schmidt), *Girardia tigrina* (Girard).

The analysis of the checklist reveals: a) uncertain identities – *Planaria polychroa* sensu Schmidt 1862; b) uncertain identifications, without the analysis of the copulatory apparatus, determining uncertain or erroneous records in some geographical areas, e.g. *Dendrocoelum lacteum*, *Bdelocephala punctata* (Pallas), *Schmidtea lugubris*; c) uncertain synonymies; d) the record of unidentified species of *Polycelis*, *Phagocata*, *Dendrocoelum*.

The paper concludes by expressing the necessity to reassess the Romanian freshwater tricladid systematic and diversity in the modern, integrative manner.

Laelapid mites (Acari: Mesostigmata) associated with scarab beetles (Coleoptera: Scarabaeidae) in Markazi province, Iran

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Key words: *Hypoaspis*, Laelapidae, Scarabaeidae, Iran.

Mites of the family Laelapidae are abundant in agricultural ecosystems, especially in association with scarab beetles (Scarabaeidae: Coleoptera). During this investigation, six species belonging to two genera of Laelapidae were collected and identified in Markazi province, in the western part of Iran, during 2015-2016. The genus *Hypoaspis sens. strict.* is most easily recognized by the greatly elongate setae Z4 on the dorsal shield (3–5 times longer than J4) and greatly elongate setae on some of the leg segments (Evans & Till, 1966, Karg, 1979). This diagnosis is distinguishing *Hypoaspis* from related genera. *Coleolaelaps* Berlese, 1914 has lateral incisions in the dorsal shield (except *Coleolaelaps abnormalis* Costa & Hunter, 1971 and *C. ferdowsi* Joharchi, 2012), 28 pairs of dorsal shield setae, Z4 not elongated, tarsus II without subterminal spines, and seta h3 of normal length. *Mumulaelaps* Clark, 2012 has 22 pairs of dorsal shield setae and Z4 not elongated; and *Promacrolaelaps* Costa, 1971 has 30-31 pairs of dorsal shield setae, and tarsus II without subterminal spines (Joharchi et. al., 2014). All identified species and their hosts are listed below.

Coleolaelaps costai Joharchi & Halliday, 2011 ♀ [*Polyphylla olivieri*]; *Hypoaspis integer* Berlese, 1911 ♀ [*Polyphylla* sp.]; *Hypoaspis maryamae* Joharchi & Halliday, 2011 ♀ [*Polyphylla olivieri*]; *Hypoaspis pentodoni* Costa, 1971 ♀ [*Polyphylla olivieri*]; *Hypoaspis rhinocerotis* Oudemans, 1925* ♀ [*Oryctes* sp.]; *Hypoaspis terrestris* (Leonardi, 1899) ♀ [*Polyphylla olivieri*].

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Some cunaxid mites (Acari: Cunaxidae) from Hamedan region, Western Iran

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Key words: mite, Bdelloidea, snout mites, predator, Iran.

The members of the family Cunaxidae (snout mites) are free-living predators that ambush or capture their prey with silk traps (Alberti & Ehrnsberger, 1977). They are recorded from plants, mosses, litter, decomposing bark, soil, stored products and rat burrows (den Heyer, 1981). They prey on a wide variety of small animals, such as nematodes, insects and other mites (Walter & Kaplan, 1991). These cunaxids also showed cannibalism behavior. This family belongs to the superfamily Bdelloidea (snout mites) and are counted predatory and cosmopolitan mites in suborder Prostigmata. In this order, study on identification of the mites of associated with soil and litter under cultivar and un-cultivar plants in some parts of Hamedan region, Western Iran, was carried out during 2015-2016. The collected mite specimens were directly mounted by using Hoyer's medium, and identified by means of (DIC) an Olympus microscope. In this survey, 9 species belonging to 5 genera from Cunaxidae were collected and identified. The scientific name of species according to the taxonomic position are listed as follows: *Cunaxa capreolus* Berlese, 1890, *Cunaxa setirostris* (Hermann, 1804), *Cunaxoides decastroae* den Heyer, Ueckermann & Khanjani, 2013; *Cunaxoides* sp., *Dactyloscirus* sp., *Lupaeus iranensis* den Heyer, Ueckermann & Khanjani, 2013; *Lupaeus* sp., *Pulaeus razanensis* den Heyer, Ueckermann & Khanjani, 2013; *Pulaeus* sp.

Among them *C. capreolus*, *C. setirostris* were recorded widely and abundantly from different parts of Iran.

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Fauna of the family Caligonellidae mites (Acari: Prostigmata) in Hamedan and Kurdistan provinces, Iran

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Key words: Raphignathoidea, predatory, Antarctic region, arthropod, moss.

The superfamily Raphignathoidea Kramer comprises about 900 species and 62 genera in 11 families. They are worldwide in distribution, abundant in most of the geographical regions, and are even found in the Antarctic region (Fan & Zhang, 2005). Family Caligonellidae belongs to the superfamily Raphignathoidea and was described by Grandjean (1944) based on *Caligonella humilis* Koch, 1838. Mites of the family Caligonellidae are relatively small, free-living predatory mites that feed on small arthropods. They often live on tree bark, in litter, soil, mosses, storehouses and bird nests (Khanjani, et al., 2016). During 2014-2016, fauna of the family Caligonellidae in Hamedan and Kurdistan provinces were studied. In this concern, samples were collected from litter and soil under trees, bushes and plants and taken to the laboratory. Mites extracted by Berlese funnel and mounted directly in Hoyer's medium. In total 9 species, belonging to 3 different genera were identified. Among the collected species, *Neognathus terrestris* had highest population and almost with wide distribution in these areas. The collected mites, according to the species, are as follows: *Caligonella* Berlese: *C. humilis* (Koch, 1838); *Molothrognathus* Summers & Schlinger: *M. azizi* Ueckermann & Khanjani, 2003, *M. bahariensis* Ueckermann & Khanjani, 2003, *M. fulgidus* Summers & Schlinger, 1955, *M. mehrnejadi* Liang & Zhang, 1997, *M. shirazicus* Khanjani, Bakhshi & Khanjani, 2016; *Neognathus* Willmann: *N. terrestris* Summers & Schlinger, 1955; *N. ueckermanni* Bagheri, Doğan, Haddad Irani–Nejad, Kamali, Khanjani & Saboori, 2010 and *N. sinaei* Samadpour, Khanjani & Asalifayaz, 2014.

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Exploring the scientific research on centipedes (Myriapoda: Chilopoda). Mapping science using bibliometric methods

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Key words: Chilopoda, literature, bibliometrics.

While the use of bibliometrics for the assessment of the academic output as well as the reputation of journals is under debate (Werner, 2015; Molinié & Bodenhausen, 2010) there are other practical applications that could benefit the scientists, especially juniors. Information like trends and topics of research in a domain, collaboration networks, help in planning and building retrospective or subject bibliographies, are useful. Although, in myriapodology, there are literature reviews works regarding general information about class Chilopoda (Lewis, 1981; Minelli, 2011) or about particular subjects (Bonato et al., 2010; Rosenberg & Müller, 2009), to our knowledge, no bibliometric study was done for centipedes. Therefore, we intended to map the scientific research in this field, for the last five decades.

The analysed data was extracted from the Web of Science (WOS) core collection database, searching for keyword “chilopoda” in the topic field. A total of 786 articles, proceedings papers, reviews, letters and book chapters were selected, full records were downloaded and checked for duplicates. WOS results analysis tool was used to extract record counts by certain fields, and further analysis and visualisations were implemented via VOSviewer and ArcMap.

The publication growth is unsteady, but rising from 3 records in 1975 to a peak of 61 in 2014. Publication counts for countries were compared, from the point of view of author’s country address, and the origin of collected material (when available). Dr. Alessandro Minelli and Dr. Gregory Edgecombe are the most productive authors present in WOS within the studied time frame. Articles related to zoology, entomology and ecology have publication share of over 10%. To further explore the data, collaboration and co-citation networks between researches were constructed. Also, terms with the highest citation impact were identified, compared over decades and used to map the research domains that takes centipedes into account.

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The Oniscidea, Diplopoda, Chilopoda and Symphyla of the Buzău Land Geopark (Buzău Mountains, Romania)

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Key words: Buzau Geopark, Oniscidea, Diplopoda, Chilopoda, Symphyla.

The Buzău Land Geopark (included in the Buzău Mountains) represents one of the less known geographic areas from the point of view of the faunistic studies concerning the Oniscidea and the Myriapoda.

Our work is the first attempt to investigate the Oniscidea, Diplopoda and the Symphyla of the Buzău Geopark.

For this aim, we used both qualitative and quantitative sampling methods (direct sampling, soil sampling and barber traps) from the following locations: Aluniș, Schitul Fundul Peșterii, Biserica lui Iosif, Schitul Agatonul Nou and Schitul Fundătura), all part of the Rupestral Assembly from Aluniș-Bozioru. The sampling took place between March and August 2017.

There are 7 species of Oniscidea included in 5 families: Ligiidae (*Ligidium intermedium*), Trichoniscidae (*Trichoniscus carpaticus* and *Hyloniscus riparius*), Agnaridae (*Protracheoniscus politus*), Cylisticidae (*Cylisticus brachyurus*) and Trachelipidae (*Trachelipus arcuatus* and *Trachelipus rathkii*).

The 12 species of diplopods belong to 6 families: Polyxenidae (*Propolyxenus trivittatus*), Polyzoniidae (*Polyzonium germanicum*), Paradoxosomatidae (*Strongylosoma stigmatosum*), Polydesmidae (*Polydesmus complanatus* and *Polydesmus montanus*), Mastigorphyllidae (*Heterobraueria scopifera*) and Julidae (*Cylindroiulus boleti*, *Megaphyllum projectum*, *Xestoiulus laeticollis*, *Haplophyllum mehelyi*, *Pachyiulus hungaricus* and *Unciger foetidus*).

There are 19 species of Chilopoda included in 6 families: Lithobiidae (*Lithobius conf. erythrocephalus*, *Lithobius forficatus*, *Lithobius lucifugus*, *Lithobius mutabilis*, *Lithobius muticus*, *Lithobius aeruginosus*, *Lithobius crassipes*, *Lithobius burzenlandicus*), Dignathodontidae (*Henia illyrica*), Geophilidae (*Clinopodes flavidus*, *Geophilus electricus*, *Geophilus flavus*, *Geophilus proximus*, *Pachymerium ferrugineum*), Linotaeniidae (*Strigamia acuminata*, *Strigamia transsilvanica*), Schendylidae (*Schendyla tyrolensis*, *Schendyla walachica*) and Cryptopidae (*Cryptops hortensis*).

There are only two species of Symphyla (*Hanseniella nivea* and *Scutigera orghidani*).

The differences in the number of species found in the sampling stations are detailed.

Collembola (Hexapoda) species diversity of the Yagorlyk Reserve

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Key words: protected area, soil invertebrate, preliminary data.

Yagorlyk Reserve (47°22'N 29°12'E) is a unique on the Dniester River Basin with 377 ha of dry land and 270 ha of water surface. The reserve is located within the Dubossary district, 12 km north of the Dubossary city. It was created in the 1988 for the protection of aquatic and terrestrial ecosystems and includes precious plant communities of gyps slopes and rare animal species. The protected territory covers the Yagorlyk and Sukhoy Yagorlyk Rivers, as well as the slope along the banks of the Dniester River, cutted through numerous ravines and gullies.

The scientific studies of the species diversity of the collembolan communities were performed during 2006-2017 years and the samples of the faunistic materials were collected from the soil, litter, wood decompose, moss, tree trunks, herbs and aquatic plants.

As a result of investigation 63 species of Collembola belonging to 53 genera and 14 families were found in the studied habitats of the Yagorlyk Reserve.

The highest number of the registered collembolan species were from the family Isotomidae (13 species and 10 genera), followed by the families Entomobryidae (12 species and 6 genera), Tullbergiidae (10 species and 5 genera), Neanuridae (7 species and 6 genera), Hypogastruridae (6 species and 5 genera), Onychiuridae (6 species and 3 genera) and Katiannidae (2 species and 1 genus). The families Tomoceridae, Cyphoderidae, Oncopoduridae, Sminthuridae, Sminthurididae, Neelidae and Bourletiellidae were represented by one species and genus only.

The majority of revealed species has wide geographic occurrence, namely cosmopolitan – 30.1 %, European – 25.4 %, Palaearctic – 17.5 %, Holarctic – 12.7 % and 4.7 % species with Mediterranean range.

Whilst 7.9% from revealed in the Yagorlyk Reserve collembolan species were described from Moldova or the Crimea.

The uniqueness of the reserve can be proven by the presence of such collembolan species as *Neanura moldavica*, *Pseudosinella moldavica* and *Endonura grasilirostris*, and by the revealed rare species as *Microgastrura duodecimoculata* Stach, 1922 and *Scutisotoma* sp. for which the Yagorlyk reserve is the only location.

First records of *Paromius gracilis* (Rambur, 1839) and *Kleidocerys privignus* (Horváth, 1894) in Romania

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Key words: true bugs, Lygaeidae, Heteroptera, Romania.

Romanian Lygaeidae were studied along the time by various entomologists. In 1991, Bela Kis pieced together all information, creating a checklist which covered 144 lygaeid species and their distribution in Romania according to 9 zoogeographic areas. In addition, globalization and climate change facilitated the spread of other species. Thus, in the last years, other 3 species were recorded in Romania (*Arocatus longiceps*, *Belonochilus numenius*, *Oxycarenus lavaterae*). In our study we investigated the presence of additional two species.

Paromius gracilis, a Mediterranean seed bug, which feeds on Poaceae (*Andropogon*, *Imperata*, *Erianthus*). We found this species on sunny and dry slopes with xerophytic vegetation, in the South Carpathians, near Sâmbotin and Policiori. Knowing the fact that *Paromius gracilis* is expanding its range, naturally or helped by humans, we cannot exclude so far the fact that the present populations are introduced because nearest known populations are in south Bulgaria (around 250-300 km) and the Romanian populations are in locations with high traffic or touristic areas (Jiului Gorge and Berca Mud Volcanoes).

Kleidocerys privignus is a seed bug that feeds on *Alnus*, it is mentioned from central and south Europe. In Romania, it was not recorded so far due to the fact that it is frequently misidentified as *Kleidocerys resedae*, as both species are very variable in color and size. But, *K. privignus* has usually a darker habitus with a blackish "H" shaped spot on corium and a dark line along the membrane part of the corium interrupted by a lighter band near the cuneus region. There are no visible differences between parameres of the two species, so for confirmation we sequenced 11 individuals from 7 locations. The genetic analysis confirms its presence in 6 locations and based on its habitus we point other 5 places where the species is present.

Enhanced biological control through integrated taxonomy: the case of the invasive green vegetable bug *Nezara viridula* (Insecta, Hemiptera) and its parasitoids (Insecta, Hymenoptera)

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Key words: agricultural pest, parasitoid wasp, DNA barcoding, species delimitation, cryptic species.

We are presenting the project NEVPIT that intends to provide essential tools for a fast and accurate identification of the parasitoid species that attack the southern green stink bug *Nezara viridula* (L.). This bug is the most important pentatomid pest of agricultural crops worldwide. It is a highly polyphagous herbivore attacking more than 150 plant species. The overall consequence of the attack is a reduced quality and marketability of many crops. *Nezara viridula* is also an important vector for pathogenic organisms, the feeding punctures providing access for fungal and bacterial infections. In Romania, *N. viridula* was detected in 2010 in tomato crops and its population has increased worryingly during the last years. The species is difficult to manage with pesticides because it feeds on internal plant tissues, bypassing the ingestion of contact insecticides. As a result, biological control seems to be a viable alternative. Our intent is to increase the chances of a successful worldwide biological control programs against this important pest, which might be hampered due to the incomplete or / and unreliable taxonomic information regarding its natural enemies, since misidentification of the parasitoid species is one of the most important impediments for successful biological control programs. Chalcidoidea and Platygastroidea are some of the most taxonomically difficult groups of wasps, partly because of their small size and, mostly, lack of recent revisionary studies. Our team intends to use an integrative approach for the identification of the parasitoid wasps associated with *N. viridula*, combining modern taxonomic revisions based on morphology with DNA barcodes and multilocus coalescent species delimitation. The addition of the DNA barcoding identification tool will significantly improve the non-specialists' chances of correct identifications. This approach will also enable the discovery of undescribed or neglected species, increasing our knowledge regarding the biodiversity of these economically important insects.

Comments about *Anthaxia (Anthaxia) salicis* (Fabricius, 1777) species complex (Coleoptera: Buprestidae) in Romania

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Key words: *Anthaxia salicis* complex, *A. suzannae*, new records, Romania.

The genus *Anthaxia* Eschscholtz, 1829 is distributed in the Holarctic, Oriental and Ethiopian Regions.

The *A. salicis* complex containing 23 species, belongs to the nominated subgenus *Anthaxia*. They are differentiated from other species of the subgenus by the specific pronotum microsculpture. They are distributed in Europe from the Western and Northern Caspian Sea, surrounding the Mediterranean, to the Spain and Portugal, being absent in the Scandinavian and in United Kingdom. In Northern Africa, they are distributed in Algeria and Morocco. Of the 23 species of complex, nine are endemic species, distributed in southern Caspian and around the Mediterranean Sea.

In Romania, the *A. salicis* complex is represented by 4 species: *Anthaxia midas* Kiesenwetter, 1857, *Anthaxia salicis* (Fabricius, 1777), *Anthaxia semicuprea* Küster, 1851 and *Anthaxia suzannae* Théry, 1942.

We examined 281 specimens of the *A. salicis* complex from three coleopteran collections - the study collection of the “Grigore Antipa” National Museum of Natural History, the collections of the Brukenthal National Museum of Sibiu and private collection of the first author. While *A. salicis* is the most common with 258 specimens, *A. semicuprea* is less common with 18 specimens. *A. midas*, a very rare species, is known only from Băile Herculane, been published by Ruicănescu & Serafim in 1996.

Anthaxia suzannae is recorded for the first time in Romania. Romania is included only in the distribution of *A. suzannae*, in the Catalogue of Palaearctic Coleoptera, published by Löbl & Löbl (2016). No other record of this species is given from Romania. We add certain records of the presence of *A. suzannae* in the Romanian fauna. In the collections mentioned above, we found two specimens from Băile Herculane, one specimen from Dumbrava Sibiului forest and one specimen, the most recent from, “Pădurea de stejari pufoși de la Hoia”, Cluj, 9.V.2015, legit. by A. Ruicănescu.

First record of *Neoparoecus tibialis* Yarom (Diptera: Lauxaniidae) in Iran with notes on its variation

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Key words: Diptera, Lauxaniidae, Iran, *Neoparoecus tibialis*, *Paroecus*, new species.

Neoparoecus Özdikmen & Merz, 2006 is a small genus of the family Lauxaniidae occurring in Palaearctic region. The genus name proposed by Özdikmen & Merz (2006) to avoid homonymy of *Paroecus* Becker, 1895 (Diptera: Lauxaniidae) and *Paroecus* Bates, 1863 (Coleoptera: Cerambycidae). Becker (1895) proposed a new genus name *Paroecus* with the type species *Pachycerina signatipes* (Loew, 1856) in the family Lauxaniidae. During a study on Lauxaniid fauna of Israel and visiting the Hungarian Natural History Museum, Yarom (1991) revised the genus and described *P. simplicipes* Yarom, 1991 and *P. tibialis* Yarom, 1991. Shatalkin (1998) described *P. sapromyzina* Shatalkin, 1998 and moved *Sapromyza. gorodkovi* Shatalkin, 1992 to the genus *Paroecus* and provided a key to the species of *Paroecus*. So *Neoparoecus* Özdikmen & Merz includes five species.

N. tibialis differs from *N. simplicipes* and *N. signatipes* by having apically black first flagellomere, in addition epandrium in *N. tibialis* contains two long, bayonet-like appendages ventrally and fifth abdominal sternite deeply concave with dense, black microtrichiae (epandrium without ventral projection and fifth abdominal sternite without modifications in other species of genera). In July 2014 several specimens, with completely yellow antennae, were collected from West Azerbaijan (NW Iran). At first, it was similar to *N. simplicipes* and *N. signatipes* because of its completely yellow antenna; but in male genitalia structure it was similar to *N. tibialis* because of having two long, but finger like appendages on ventral part of epandrium. It seemed to be a new species till another male of this species was collected at same place in July 2017, with two long bayonet-like appendages on ventral part of epandrium and it proved that this species is *N. tibialis* and all differences are only geographical variations.

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Qualitative composition of chironomid larvae fauna (Diptera: Chironomidae) from Mladost Lake

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Key words: Mladost reservoir, chironomid larval fauna, quality composition.

The subject of this paper is the analysis of the quality composition of the chironomid fauna in the Mladost reservoir. Mladost Reservoir is artificial lake in the central part of Republic of Macedonia. It is located 8 km north from the city Veles. The lake is created with partitioning off the river Otovica with concrete dam high 27m, elevation 256m, the dam is constructed back in year 1959. A total of 19 species were found, from three subfamilies of the family Chironomidae.

The subfamily Chironominae is dominant with 10 species: *Cladotanytarsus mangus*, *Microspectra praecox*, *Paratanytarsus siderophila*, *Paratanytarsus confuses*, *Chironomus plumosus*, *Chironomus thummi*, *Cryptochironomus defectus*, *Endochiromomus dispar*, *Microtendipes pedellus*, *Polipedilum aberrans*; the subfamily Orthocladiinae is represented with 6 species: *Prodiamesa olivacea*, *Cricotopus sylvestris*, *Cricotopus algarum*, *Cricotopus fuscus*, *Eukiefferiella brevicealcar*, *Eukiefferiella quadridentata*; and the subfamily Tanypodinae with three species: *Procladius choreus*, *Procladius sp.* and *Tanypus punctipennis*.

According to the comparison of the chironomid fauna in the Mladost reservoir, Ohrid and the Doiran Lakes, common species for the three lakes are: *Cricotopus algarum* and *Eukiefferiella quadridentata* from the subfamily Orthocladiinae; *Chironomus plumosus*, *Cryptochironomus defectus*, *Endochiromomus dispar* and *Microtendipes pedellus* from the subfamily Chironominae, *Tanypus punctipennis* from the subfamily Tanypodinae.

The analysis of the water quality from the Mladost reservoir points to a relative pollution of the water, especially around the ship Panini and the mouth of the river Otovica, the water here is of somewhat strong eutrophic character.

Comparison of erythrocytes and thrombocytes sizes from eleven freshwater ornamental aquarium fish species

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Key words: aquarium fish, erythrocytes morphology, thrombocytes morphology, erythrocytes size, thrombocytes size, erythrocytes nuclear size.

Fishes are the most numerous (27,000 species) and diverse of all vertebrate groups, making generalizations regarding hematology difficult, if not impossible (Claver & Quaglia, 2009). Study of blood cells in many different species of fishes provides an interesting comparison of cell size in relation to their activities and habits (Kumar, 2016). To notice if there are similarities regarding the morphology and the size of erythrocytes and thrombocytes of different species of fish, we analyzed blood smears that have been obtained from the peripheral blood of eleven species of aquarium fish: *Astronotus ocellatus*, *Poecilia latipinna*, *Melanotaenia papuae*, *Hemichromis lifalili*, *Thorichthys meeki*, *Megalechis thoracata*, *Trichopodus trichopterus*, *Carassius auratus*, *Cyprinus carpio*, *Barbus tetrazona* and *Pterophyllum scalare*.

Morphology of erythrocytes and thrombocytes has been evaluated by light microscopy after Wright staining and by fluorescence microscopy after Nile Red-DAPI staining. Morphometric analysis of the long diameter of erythrocytes, thrombocytes and erythrocytes nucleus was made using an ocular micrometer on preparations stained by Wright, at a magnification of 40x. All data were calculated as mean and standard deviation (SD).

Our study shows that there are significant statistical differences between related taxonomic species regarding erythrocyte size. The largest diameter of the erythrocytes was found in *Cyprinus carpio* and the smallest one, in *Poecilia latipinna* and *Melanotaenia papuae*. These differences are also recorded in the case of the size of the erythrocyte nucleus. Another aspect that our study indicates is that the largest diameter of the thrombocytes were found in *Pterophyllum scalare* and the smallest, in *Carassius auratus*.

Also this study revealed that there is no correlation between erythrocyte and thrombocyte size and the weight of the species from where the blood was collected.

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The effects of acclimation temperature on the Q10 values of the routine metabolic rates in Sterlet sturgeon juveniles (*Acipenser ruthenus*)

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Key words: sterlet sturgeon, respirometry, temperature.

Understanding how the current warming trends affect fish populations is critical for successful conservation programs and management. Fishes are exemplar poikilotherms – incapable of maintaining body temperatures different from the surrounding water. The relationship between ambient temperature variation and metabolic rate is measured as a temperature quotient or Q10 response. To help define proper thermal environment for juvenile Sterlet sturgeon (*Acipenser ruthenus*), the thermal quotient was calculated for four different temperatures (10, 15, 20 and 24°C). The experiment was conducted at the Romanian Center for the Modeling of Recirculating Aquaculture Systems (MoRAS), facilities of University Dunărea de Jos, Galați. The experiment consisted in measuring the routine metabolic rate (mg O₂/kg/h) at four different water temperature. Fishes in trials had mean weight of 57.24 ± 4.53 g. For each temperature, fasted fish were maintained within the respirometer up to 24 h for acclimation before it was moved to respirometer chamber. Rates of oxygen consumption were measured using 2,3 L intermittent flow respirometry systems (Loligo Systems, Denmark). After the experiments ended, we calculated the Q10. The temperature coefficient (Q10) values of the routine metabolic rates ranged between 1.48 and 6.06, with the largest Q10 values occurring between 10 and 15 °C. The relationships between temperature and metabolic rate in sturgeon might reflect the importance of fish size/age, or it may be related to differences in thermal sensitivities of the fish species or the range of temperatures used. Thus, future studies are needed to further our understanding of temperature and resting metabolic rate relationships in sturgeon.

The variation in the neuromast cephalic system of three Romanian pontocaspian gobies

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Key words: gobies, neuromast cephalic system, individual variation.

The species of Gobiidae, the largest family of Perciformes, are small fishes characterized by the presence of a pelvic suctorial disc resulted from the union of ventral fins and lack of lateral line canal on the side of the body. That's why they have a very developed cephalic system with supraorbital, postocular and preopercular canals and with neuromast organs (sensory papillae, genipores, cyathiform organs) disposed on the head (supracephalic and infraorbital) or body. Because the cephalic system is characteristic of each genus, it is very important in goby systematics. In this paperwork we try to describe the individual variation of the neuromast organ models in three species: *Apollonia melanostomus* (round goby), *Ponticola cephalargoides* (Pinchuk's goby) and *Mesogobius batrachocephalus* (knout goby). They are pontocaspian gobies which populated Romanian coastal waters and have local importance in fishery. All species show abnormalities of the number of infraorbital or supracephalic neuromast which consist in: total or partial lack of one or more vertical or horizontal series of neuromast, the lack of some branch or appearance of some extra branch of genipores. It was noticed that the anomalies appeared on high number of individuals, indicating a great genetic lability. In most cases, the specimens with abnormal model of neuromast organs show two or more variations at the same time.

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How many are there? Estimation of crested newt (*Triturus cristatus*) population size by dip netting in a small sized pond

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Key words: protected species, conservation, pattern recognition.

The crested newt is a protected species under the Habitat Directive, and effective conservation measures imply reliable estimation of population size. In many aquatic habitats direct counting methods cannot be applied, so usually population size is estimated by catching individuals with dip nets, traps or drift fences. The most efficient method of capturing crested newts for quantitative studies is still debated in literature. Some studies show that dip netting allows for a standardization of catching effort and therefore comparisons across different ponds, or different moments in time are possible. The recommended method for monitoring conservation status in Romania is dip netting for adult crested newts. We attempted to find a relationship between the number of individuals captured during one dip netting capture session and the population size in a small (315 sq m), quite recent artificial pond, situated in an agricultural landscape in Cluj County, Romania. The catching effort was standardized by dip netting for 60 minutes, by the same investigator, during 8 capture sessions, between April and July 2016. A database with digital photographs of all captured crested newts was created and belly patterns were analyzed using I3S Pattern+ software for individual recognition. The minimum number of captures/session was one (July), and the maximum was 17 (mid-June). We captured a total of 59 individuals in 61 captures, with only 2 recaptures. The small number of recaptures showed a very low catchability for crested newt, probably due to dense aquatic vegetation, and did not allow for capture-mark-recapture population estimation. The minimum population size was considered 59 individuals, much higher than the highest number of individuals captured during one single session. Our results show that, at least in some particular situations, due to pond characteristics, a single capture session might result in potentially severe underestimation of the crested newt population size.

Study on the herpetofauna formation of the Prut-Nistru space

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Key words: Pruto-Nistrean interfluvium, herpetofauna, formation, spreading, systematic status.

Recent studies of the morphology and phylogeny of some species of reptiles within last years showed new divergences (or conversely, similarities) between different populations and, therefore, the systematic position of certain species was reviewed periodically. Based on these studies, some subspecies have been passed to the rank of species, also some species have been assessed as subspecies. As a result, have appeared a lot of questionable taxonomic categories. From this point of view there is an interest for both taxonomic and phylogeographic aspects of the herpetofauna between Prut and Nistru.

In order to outline the historical appearance of the herpetofaunistic complex formation in this space it have been done an multi-annual research directed towards determining the morphological particularities, areas, and the distribution of herpetofauna in the current landscape. Based on the obtained data and literature analysis it has been done an attempt to elucidate the evolution of formation and spreading of the herpetofauna in the region of South-Eastern Europe, which was largely under the influence of a number of factors such as geographical, environmental and historical and within the limits of relatively long periods. It is obvious that the evolution of formation of herpetofauna in the interfluve Prut-Nistru is related to Pleistocene paleogeographic events that took place in the region of Ponto-Caspian and Mediterranean basins, but also in Central Europe. These events caused fragmentation and isolation of the integrity of populations on the periphery areas, thus accelerating their morphogenetic process of differentiation. Study of data concerning the morphology, phylogeny and spreading of some poly typical species (*Vipera berus*, *Podarcis tauricus*, *Lacerta agilis*, *Elaphe quatuorlineata*, *Coluber jugularis*, etc.) suggests the need for revision of their systematic position, origin and spread character in the Prut-Nistru space.

Intraspecific variation of the venom proteins from wild and captive *Vipera berus*

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Key words: snake venom, proteins, toxins, intraspecific variation, environmental factors.

Venomous snakes have a special venom injection mechanism that was developed in parallel with the evolution of protein toxins which are produced by venomous glands. These toxins are directed to damage important physiological targets of the prey organisms, thus playing a determining role in the predator-prey relationship. Previous studies have shown that the composition of snake venom proteins can be influenced by such factors as sex, age, geographical distribution and climate. This study represents a first step in the research of snake venom in the Republic of Moldova and comes to highlight the intraspecific variation of *Vipera berus* venom proteins between long term captive and recently captured individuals. The research has been performed on two experimental groups of vipers: group no. I composed of 8 individuals kept in captivity for over 6 months (this time includes the hibernation period) and group no. II that consists of 7 recently captured vipers. In order to establish the proteic differences between the two types of venoms *Ion Exchange Chromatography on Resource S* has been performed. The chromatography showed that conditions of captivity influences the protein composition of the venom, the captive group showing 5 important proteic fractions while the wild group - 4. A cause of this phenomenon is that captive individuals have 2 isoenzymes of phospholipase A₂. The recently captured vipers showed instead an increased level of hyaluronidase. This enzyme facilitates the spread of venom in the body thus leading to faster target damage. Considering this, it can be inferred that the conditions of captivity decreased the level of hyaluronidase and increased the number of phospholipase A₂ isoforms.

The breeding bird atlas of Bucharest (Romania): results from the first two years of fieldwork

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Key words: birds, atlas, distribution, Bucharest.

The breeding bird atlas of Bucharest first started in 2016 and it is coordinated by the Romanian Ornithological Society, the BirdLife partner in Romania (SOR/BirdLife), with data collected by the staff and volunteers. The project has three main objectives: to identify the breeding species and to establish their distribution; to evaluate the abundance and their breeding status; and to analyze the changes in the composition and distribution of species by annual evaluation.

Bucharest city was divided into 1x1 km squares resulting a total of 251 squares. Observations were made by active timed area search (one hour inside the square, four visits per square). Occasional observations were accepted as well. Data records were collected through mobile application ObsMapp and registered in Ornitodata (<http://pasaridinromania.sor.ro/ornitodata>), the database of SOR.

In the two years of fieldwork, period March-May 2016 and 2017, the participants (7 participants in 2016 and 18 in 2017) managed to collect data from 111 squares, summing over 5500 observations. In 2017, for the first time, observations from 100 nest boxes installed in the parks by SOR were made. A total of 115 species were observed, the most abundant ones were *Passer domesticus*, *Columba livia* f. *domestica*, *Sturnus vulgaris*, *Streptopelia decaoct*, *Apus apus* and *Turdus merula*. Similar to the previous year, squares with higher percentage of lakes, parks or gardens are richer in species, compared to those with urban structures.

First data regarding the avifauna of the Buzău Land Geopark (Buzău Mountains, Romania)

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Key words: Buzău Geopark, Aves.

There are only two papers dealing with the avifauna of the Buzău County: the first of Catuneanu (1934) recording 102 species of birds in the Tohani region, the western limit of the county. The second paper (Giurginca & Vanoaica, 2005) records 53 species of birds in the Meledic Plateau (the southern area of the Buzău Mountains). As a consequence, our work represents the first attempt to investigate the avifauna of the south-western part Buzău Land Geopark, thus continuing our observations on the avifauna of the Buzau County.

The observations took place between March and August 2017 at the following locations Aluniș (647.72 m altitude), Schitul Fundul Peșterii (716 m altitude), Biserica lui Iosif (823.5 m altitude), Schitul Agatonul Nou (960.1 m altitude) and Schitul Fundătura (715.88 m altitude), all part of the Rupestral Assembly from Aluniș-Bozioru.

There are 38 bird species belonging to 8 orders and 22 families. Most orders (Ciconiiformes, Accipitriformes, Falconiformes, Columbiformes, Cuculiformes, Coraciiformes and Piciformes) are represented by only one family, while the Passeriformes includes 15 families.

The Turdidae (5 species), the Paridae (4 species), the Fringillidae (4 species), the Accipitridae (3 species) are the best represented families.

Out of the 38 species, 5 are included in the Red List of the Vertebrates of Romania (*Ciconia ciconia*, *Pernis apivorus*, *Falco peregrinus*, *Corvus corax* and *Ficedula albicollis*), 27 species are included in Bern II, 8 species in Bern III, 14 species in Bonn II. The species *Ciconia ciconia* is also included in the AEWB.

Also, four species are included in the CITES: *Falco peregrinus* in CITES I and *Pernis apivorus*, *Buteo buteo* and *Accipiter nisus* in CITES II.

Data on the distribution and behaviour of *Puffinus yelkouan* (Acerbi, 1827) in the Western Black Sea basin within the period 2016-2017

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Key words: *Puffinus yelkouan*, Yelkouan shearwater, distribution, behavior, Black Sea.

Puffinus yelkouan is an elusive species due to its open-sea way of life, stated as “Vulnerable” on the IUCN Red List (BirdLife International, 2016) and very little information exists about its distribution and activity in the Black Sea offshore. During spring and autumn 2016 and autumn 2017, being onboard the vessels conducting geophysical studies for the Romanian company “Black Sea Oil & Gas”, we had 359 observations of this species totaling approximately 7000 individuals. For each observation we recorded date and time, GPS coordinates, number of individuals as well as their type of activity. We distinguished between four types of activities: flight - for which we also recorded flight direction using compass fitted binoculars, feeding, roosting - large resting gatherings, on water - for solitary individuals or small groups observed just floating. The majority of the individuals were observed flying and feeding. Considering the number of individuals per observation, a clear area of concentration appears on southeastern region of our study zone, where the observations gather more than 60% of the individuals recorded during the whole period of the study.

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Review on the presence of Greater flamingo (*Phoenicopterus roseus* Pallas, 1811) in Romania

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Key words: *Phoenicopterus roseus*, Greater flamingo, distribution, Romania.

Greater flamingos (*Phoenicopterus roseus* Pallas, 1811) have a very large distribution range, with populations ranging from South-East Spain, Southern France, Africa, Madagascar and East to Kazakhstan, through Middle East and up to India and Sri Lanka (del Hoyo et al, 2014). They prefer shallow, brackish and saline lagoons and marshes where they feed on small invertebrates and algae by filtering the water. In Romania it is considered a vagrant species with only a handful of observations during the last century.

This study represents an analysis of the historical and current distribution status for this species in Romania starting with the first record dating from 1900.

We analysed all available bibliographic references and museum collections and extracted 20 references for the species in the last century. These records are completed with 3 original sightings, from 2016 and 2017.

Greater flamingo was present in 14 locations summing up 11 historical, 1 unpublished *in verbis* location from the 60's, 2 original new locations, and a reconfirmation of a historical location, at Techirghiol in Constanța County. Locations ranged from the brackish lakes from the Black Sea coast, to the lower Danube area and a pond from the western plains of Timiș County. The two new locations represented a novelty from previously known distribution due to the fact that they were from two salty lakes in the middle of the Romanian plains, in Ialomița and Buzău County.

The IUCN Red List places this species at a Least Concern category, facing many threats, ranging from low breeding success due to nest disturbance and habitat changes, to pollution and even pressure from hunting and poaching, also noting that even many of the early sightings in Romania were from hunters that shot the bird due to its strange appearance. In the Romanian legislation the Greater flamingo has the status of protected species under national and European legislation.

Acknowledgements: the study was partially funded by project no. RO1567-IBB04/2017 from the Institute of Biology Bucharest of Romanian Academy and the Oceanographic Research and Marine Environment Protection Society Oceanic-Club.

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Impact of climatic conditions on the reproduction of Common Pheasant (*Phasianus colchicus*) in the natural populations of the Republic of Moldova

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Key words: pheasant, climatic conditions, low temperature, hunting species.

This study comes to highlight the influences of the climate factors on the reproduction of the Common Pheasant (*Phasianus colchicus*) in their natural populations. The research has been performed in 2017 year on the territory of the Republic of Moldova. In its natural habitat the common pheasant lives in grassland near water with bush, forest edge, agrocenoses, ecotone areas, open land habitats and wetlands. The total optimal surface for the reproduction of the Common Pheasant in our country is 170000 ha. The general conditions are favorable in the center and south of the country, because here there is a better microclimate from autumn to spring, therefore the individuals' number is higher in the central and southern part of the republic, constituting 70-80 of pheasants/1000 ha. The breeding season lasts from March to June. Pheasants build their nests mainly with branches, fallen leaves, dry grass and feathers. The second half of April was recorded unusually unfavorable weather conditions, with low temperatures and snow fall, which negatively influenced on the reproduction of pheasants. The period of cold rains after the snow melting had a negative impact on the laying of the eggs and the hatching. Due to the extension of the incubation period, the chickens hatched later compared to other years, also many chickens have died. The March-June period is decisive for the laying and hatching of pheasant eggs, this period being considered the best for reproduction. Due to unfavorable conditions this year 20-30% of the hatching eggs were destroyed. The changes of climate conditions affected the reproduction process of pheasants in the spring period which caused the cooling of the hatching eggs, thus leading to the abandoning of nests. The pheasant females, due to the reproductive instinct, were enforced to lay and hatch other eggs so the chickens hatched later than usually. Young individuals were registered even at the beginning of August. The impact of climatic conditions is an important factor for common pheasant reproduction in nature.

The Griffon Vulture (*Gyps fulvus*) in Bucharest

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Key words: Griffon Vulture, Bucharest.

Considered as belonging to the Mongol type of avifauna (Radu, 1962), the griffon vulture used to be a widespread and numerous bird species in Romania a century ago (Munteanu, 2009) but, following a catastrophic decline due to anthropic factors, it disappeared as a nesting bird around 1950.

However, solitary individuals have been recorded even after this year: in 1997 and 1999 in Dobrogea, in 1998 in Bucegi, in 2001 in Maramureş, in 2007 in Suceava County near Marginea and the Suceava airport and, finally, in 2008 in Bucegi again, close to the Tătarului Gorges (Munteanu, 2009) to list only the most recent observations.

The griffon vulture was recorded in the Ilfov County, but not inside Bucharest (Papadopol & Tâlpeanu, 1979; Papadopol & Petrescu, 1991).

Within this context, we record the presence of a juvenile griffon vulture on 2nd of April 2017, during the spring passage, flying on a SSE-WNW direction over Piaţa Iancului. The bird was identified as a juvenile on the basis of its pale underbody and under-wing coverts contrasting strikingly with the blackish secondaries, primaries and tail (Porter, et al., 1992).

The observation of the griffon vulture in Bucharest increases the knowledge on this critically endangered species in Romania.

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Argos based applications for real time wildlife monitoring in Romania (BioMoveFix)

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Key words: wildlife monitoring, animal tracking, data quality, Argos instruments, GNSS.

The project aims to develop demonstrative applications for Argos platform transmitters (Argos PTT) in Romania by providing tools for improving data quality, promoting state of the art research in movement ecology, and encouraging the involvement of the local industry in real-time wildlife monitoring. The project objectives are to review the potential use, costs, and technical reliability of existing satellite platform transmitters; to perform field experimental usage of Argos transmitters in order to assess their potential use and effectiveness in the conditions of Romania; to develop correction filter locations suitable in Romanian territory; and to develop movement ecology services for real-time wildlife monitoring in Romania and Eastern Europe.

To achieve the objectives, we collected experimental PTTs and GPS data using 5 replicate in 4 geographic locations. We performed the experiments in static and mobile conditions. Then, we assessed location errors and the performance of existing filters (e.g. LS, Kalman, Douglas). Finally, we formulated specification for improvement of data filtering for Romania, produce an open-source R script for data filtering, and disseminate the results to wildlife scientist for testing and using.

The producers of Argos devices, as well as Argos instruments developers (e.g. ESA), will have reliable data from Romania to calibrate their products, and the primary users (e.g. wildlife managers) a tested protocol, allowing them to carry out quality animal monitoring programs and produce practical conservation measures with minimal associated costs (Douglas et al., 2012; Madry, 2015; Hooten et al., 2017).

The grant is financed by the Romanian National Authority for Scientific Research, PN-III-P2-2.1-PED-2016-0568 Argos based applications for real time wildlife monitoring in Romania (BioMoveFix).

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Status of Bats (Mammalia: Chiroptera) in the Region Veneto (N.E.Italy)

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Key words: Bats, Bat distribution, Rhinolophidae, *Pipistrellus pygmaeus*, Veneto.

Placed in northern Italy, the Region Veneto (19.364 kmq) is the greatest of the three regions of N.E.Italy. From the sea level to high mountains (up to 3263 m asl), several different landscapes provide good habitats for many different species of bats.

The bat fauna of Veneto includes these 28 species (80 % of all Italian bat species), of three different families (Rhinolophidae, Vespertilionidae, Molossidae): *Rhinolophus ferrumequinum* (Schreber, 1774), *Rhinolophus hipposideros* (Bechstein, 1800), *Rhinolophus euryale* (Blasius, 1853), *Myotis mystacinus* (Khul, 1817), *Myotis nattereri* (Khul, 1817), *Myotis emarginatus* (Geoffroy, 1806), *Myotis bechsteinii* (Khul, 1817), *Myotis Blythii* (Tomes, 1857), *Myotis daubentonii* (Khul, 1817), *Myotis capaccinii* (Bonaparte, 1837), *Myotis myotis* (Borkhausen, 1797), *Pipistrellus pipistrellus* (Schreber, 1774), *Pipistrellus pygmaeus* (Leach, 1825), *Pipistrellus nathusii* (Keyserling & Blasius, 1839), *Pipistrellus kuhlii* (Kuhl, 1817), *Hypsugo savii* (Bonaparte, 1837), *Eptesicus serotinus* (Schreber, 1774), *Eptesicus nilssonii* (Keyserling & Blasius, 1839), *Vespertilio murinus* – Linnaeus, 1758, *Nyctalus noctula* (Schreber, 1774), *Nyctalus lasiopterus* (Schreber, 1780), *Nyctalus leisleri* (Kuhl, 1817), *Plecotus auritus* (Linnaeus, 1758), *Plecotus austriacus* (Fisher, 1829), *Plecotus macrobullaris* – Kuzjakin, 1965, *Barbastella barbastellus* (Schreber, 1774), *Miniopterus Schreibersii* (Kuhl, 1817), *Tadarida teniotis* (Rafinesque, 1814).

A brief review is given for each species. The status of Rhinolophid bats appears to be better compared to twenty years ago, with increasing populations of *Rhinolophus ferrumequinum* and of number of roosts recorded, with nursery colonies increased in total number and for number of specimens; an increase in number of *Rhinolophus hipposideros* was also recorded, with several new colonies recorded (also some nurseries), and more roosts with presence of both species (*Rhinolophus ferrumequinum* and *Rhinolophus hipposideros*). *Rhinolophus euryale* remains a rare and localized species in Veneto.

The most important bat colonies recorded in the region were nursery colonies of Vespertilionidae (colony of *Myotis myotis* and *Myotis blythii*, and of *Miniopterus schreibersii*) with hundreds and sometimes thousands of individuals. In the last 30 years an increasing in the populations of *Pipistrellus kuhlii* and *Hypsugo savii* was observed in lowlands and urban areas, and *Myotis daubentonii* became the most recorded *Myotis* species in the region.

In the group of cave-dwelling bat species, *Miniopterus schreibersii* presented great fluctuations in number; in some years its populations appeared to be halved,

but in last years this species presented a sensible increasing of cave aggregations. *Pipistrellus pygmaeus* was recorded for first time in the region in summer 2016 (in a mountain locality, at elevation of 1450 m a.s.l.).

Tadarida teniotis was recorded in all the seven provinces of the region, but it is abundant and widespread only in the regional Park of Lessinia (in province of Verona), close to the area of the great lake of Garda.

Endemic presence of West Nile virus in Romania

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Key words: West Nile virus, WNV human neurological infections, endemic circulation, integrated mosquito control programmes.

The circulation of West Nile virus (WNV) takes place in cycles between mosquitoes and birds as main hosts, and the mammals including humans as tangential hosts. The WNV circulation was documented in Romania beginning with the '50s by serological investigations on healthy humans and domestic animals and the confirmation of sporadic cases or small epidemic episodes of human neurological infections. An outbreak of about 1000 human WNV neurological infections (mainly meningo-encephalitis) appeared in South Romania in 1996 among causes being the increase of WNV circulation especially because of the global climatic changes. The WNV infections continued to appear yearly on more extended areas and having epidemic aspect in the last years. Our multidisciplinary investigation using entomological, immunological, virology and molecular biology techniques have been performed on the elements of the transmission cycles of WNV in natural and anthropic ecosystems on large territories in Romania.

The involvement of vertebrate hosts in WNV circulation and the evolution of the mosquito vector populations in correlation with the environmental factors leading to the appearance of human infections have been put in evidence. The virus was detected in its main vector in Romania, *Culex pipiens*, including the *pipiens* and *molestus* ecological forms, and in other several vector species. The isolated viral strains were molecularly characterized. It has been confirmed the endemic circulation of WNV on extended territories in Romania and the permanent risk of its transmission to humans. The integrated mosquito control programmes are implemented in areas at risk in Romania.

Biodiversity of artificial cavities from rupestral assembly Aluniş – Nucu (Buzău)

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Key words: rupestral assembly, biodiversity, artificial cavities.

Underground artificial cavities generated for various purposes by anthropogenic activities form into subterranean environments that have similar characteristics to caves. These cavities might provide important habitats for some animals and appear to harbour relatively high species richness. Most subterranean artificial cavities have both cultural and natural importance but in their assessment only the cultural value is assumed to be significant and the natural importance is often ignored.

In this study we aimed to: (i) inventory the macroinvertebrate community on the walls of subterranean artificial cavities and (ii) identify how wall characteristics are related to the occurrence and the richness of macroinvertebrate species.

We sampled 6 cavities from the rupestral assembly Aluniş – Nucu, Buzău County, Romania, in September 2017. The macroinvertebrates were collected both inside and outside of the cavities along wall transects of 1 m length. For each cavity we recorded the temperature (T) and the relative humidity (RH), presence of vegetation, slope exposure and number of joints. The temperature was lower whereas the relative humidity was higher inside (T = 11.3-16.1 °C; RH = 63.7-69.9%) than outside (T = 13.2-20 °C; RH = 44.2-63.7%) of the rupestral cavities. Our results showed that the species richness was higher inside than outside of the cavities. The most frequent macroinvertebrate groups inside of the cavities were Araneae, Diptera and Opiliones whereas outside the cavities were Araneae, Hymenoptera and Coleoptera. In 8% of the sampled transects we did not detect macroinvertebrates. These transects were outside of the cavities, mostly dry and less covered by moss.

Our study suggests that subterranean artificial cavities play an important role for the macro- invertebrate community and their conservation and management might enhance and maintain species richness in areas where the native vegetation has been negatively affected by forestry.

Ecological considerations regarding invertebrates' fauna associated with *Cystoseira barbata* in south part of the Romanian littoral

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Key words: Black Sea, zoobenthos, invertebrates, *Cystoseira barbata* seaweed.

It is wellknown that one of the most important benthic littoral biocoenosis in the south part of the Romanian coast was considered the *Cystoseira barbata* belt, which was very developed in the first decades of the 20th century, until the decade 1970-1980, when a series of environmental natural and antropogenic factors have led to substantial alterations and reduction of these perennial algal fields (Bavaru, 1972; Bologna & Bavaru, 1998).

Along the time, Romanian scientists studied the fauna associated with those fields, due to the great biodiversity of it, in the middlittoral and infralittoral biocoenosis in the south part of the coast, on hard substrata, especially in Mangalia and Vama Veche (Muller et al., 1969; Țigănuș, 1972).

In recent years, a revival of the ecosystem in these areas has been observed but without reaching the development and biomass of the past. But by the end of the 1990s and after the 2000s, the *Cystoseira* talus had become more and more present in the rocky bottoms in the Mangalia and Vama Veche area.

The importance of these biotopes lies in the fact that they can be places for refuge, feeding and breeding, both for benthic invertebrates and for some species of coastal benthic fishes.

The study is based on quantitative samples of seaweeds collected from 0.5 – 2 m deep at Mangalia and Saturn, on hard substrata. Sampling was done during autumn of 2016 and spring of 2017.

A list with identified invertebrate groups and taxa will be presented. Representatives of 38 species belonging to 5 taxonomic groups were recorded: Anthozoa, Plathelminthes Polychaeta, Mollusca and Crustacea. Considerations regarding the structure of the invertebrate populations in different sites and the proportion of the species will be done. The frequency, dominance and significance ecological indices for each species and their status in the studied ecosystems will be presented. A brief comparative analysis with existing data from the literature will highlight the possible changes in the current structure of zoobenthos composition in the studied area.

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Coleoptera diversity in anthropogenic habitats in south-western Dobrogea

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Key words: Carabidae, vineyards.

Large areas of land are currently occupied by agricultural ecosystems, replacing natural habitats with less complex structures in terms of biodiversity. Beetles and especially ground beetles are one of the insect groups that manage to adapt to most of the special environmental conditions of anthropogenic habitats (Bruggisser et al., 2010; Goulet et al., 2004).

During 2016 and 2017, a study conducted in several vineyards from southwestern Dobrogea (Ostrov and Lipnița - Galița areas) revealed similarities in the fauna of beetles and especially for Carabids associated with this type of habitat. The vegetation cover of the inter-rows and type of soil management are important factors to be considered in beetle associations.

The number of ground beetle species identified in pitfall traps was relatively high, namely 53 species. The most abundant species of Carabids proved to be predatory (e.g. *Carabus coriaceus*, *Calathus fuscipes*) and granivores (e.g. *Amara lunicollis* Schioedte, 1837, *Harpalus griseus* (Panzer, 1797), *Harpalus rufipes* (De Geer, 1774), *Zabrus tenebrioides* (Goeze 1777)). Other species were represented by fewer individuals (e.g. *Licinus cassideus* (Fabricius, 1792), *Carabus ulrichi* Germar, 1824, *Calosoma aureopunctatum* (Herbst, 1784), *Ophonus ardosiacus* (Lutshnik, 1922), *Pterosticus hungaricus* (Dejean, 1828)).

The data was obtained within the research project UEFISCDI PN3-P3-61/12.17.2015, Nr. 21/2015 “Management concept for Central European vineyard ecosystems: Promoting Ecosystem Services in Grapes - PromESSinG” under European and international cooperation program - Horizon 2020, BiodivERSA / FACCE-JPI, part of the ERA-NET scheme of the European Union (FP7) and the samples were taken from experimental plots provided by Terasale Dunării Ostrov Association.

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Genetic analysis of *Eusomus ovulum* (Coleoptera: Curculionidae) populations in the Republic of Moldova

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Keywords: *Eusomus ovulum*, population structure, diversity, natural areas, Republic of Moldova.

Eusomus ovulum Germar 1824 (Coleoptera: Curculionidae) is an economically important insect pest, inhabiting fields and forest belts and causing damages to young leaves and roots. Being a broad polyphagous species, *E. ovulum* is harmful to agricultural crops (beetroot, sunflower, soybean, alfalfa, sainfoin), horticultural crops (plum, apple, blackthorn) and medicinal plants (wormwood, yarrow, nettle).

Present study investigates genetic structure of *Eusomus ovulum* populations in the Republic of Moldova. Specimens were collected from 10 localities across the territory of the country. As a result of conducted research, 621 bp fragments of mitochondrial cytochrome oxidase I (COI) gene from 19 individuals were sequenced. Obtained sequences were analyzed using DnaSP 5.10 software.

Altogether, 17 haplotypes were identified. The haplotype diversity (H_d) was 0.988, while the variance of the haplotype diversity was 0.00044, and the standard deviation of the haplotype diversity was 0.021. The total number of invariable (monomorphic) sites for 19 sequences were 554 bp, and the variable (polymorphic) sites were 67 bp, the total number of mutations of Eta (η) was 71. Nucleotide diversity (π) indicating the average proportion of nucleotide differences between sequences of individuals in the population was 0.0228.

Seventeen haplotypes were grouped into two clusters in both NJ and MP trees. The first group included 14 haplotypes from 9 populations. The second group included three haplotypes from two populations, bootstrap value for first group being 100% in NJ and MP trees, while for second 100% and 99%, respectively.

Obtained results indicate that the flow of genetic material on the investigated territory follow the boundaries of national and international biological corridors which contributes to more favorable conditions for migration of the species *Eusomus ovulum* Germ. Data on genetic structure of insect species populations can be used in integrated plant protection and biodiversity conservation programs.

Potential bioindicators for land use changes: insights from genera of Calliphoridae (Diptera) family

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Key words: land use changes, bioindicators, Calliphoridae genera, baited traps, Gorj County.

Land use changes lead to changes in the state of natural and semi-natural ecological systems with negative impact on the supply of ecosystem services and so, on human's health and well-being. In the attempt to evaluate in what extent the state of ecological systems was changed and to test the efficacy of conservation or restoration efforts, research was focused on bioindicators. The Class Insecta proved to have a large number of orders and species that respond to different type of human pressure.

Developed with the goal to identify the terrestrial necrophilous insect's responses to different types of habitat patches, a field experiment was conducted. During 14-19 august 2016, chicken liver baited traps were suspended in a riparian forest, in a pasture and in an agricultural land from Bercești village, Gorj County, Romania.

The results highlight that habitat type has no influence on Calliphoridae (Diptera) communities' composition. Instead, the occurrence frequencies, densities and abundances of Calliphoridae genera depended on habitat type in spite of the short distance between the three types of habitats.

Considering our results, it worth further investigate the potential of Calliphoridae genera as bioindicator of land use changes. Such results are valuable in environmental management and restoration to help assessment and maintaining the state of ecological systems.

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Recent data on the structure of fish communities in the lower basin of Bistrița River (2015-2016), Romania

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Key words: ichthyofauna, fish communities, biodiversity, Bistrița River.

The importance of the ichthyofauna for the assessment of the water quality is well known, as well as the advantages of using the fish as bioindicator organisms.

This is the main reason for scientists to update the scientific data regarding the structure of the fish communities relative to the significant environmental changes in the last decades, mainly induced by the human activities.

The study was carried out in the lower basin of Bistrita River, on the main course of the river and on some of its tributaries during the years 2015 and 2016. The aim of the study was to assess the actual state of fish communities in the study area, and also to highlight significant changes in fish communities, based on the ecological analysis. The biological material was sampled by electrofishing from 27 sampling sites (18 in 2015 and 9 in 2016), it was identified and immediately released. The taxonomic analysis highlights the presence of 20 fish species (20 in 2015 and 13 in 2016) one of them being non-native: *Pseudorasbora parva*.

Since the study area overlaps the chub zone, the common fish species are: *Squalius cephalus*, *Alburnus alburnus*, and *Gobio obtusirostris*.

Some of the ecological indices were calculated, as well as biodiversity indices (Margalef, Menhinik, Shannon-Wiener), evenness (equitability), and fish stocks. The ecological analysis revealed some interesting aspects of fish communities structure and also of biodiversity.

The sampling site placed on Dragova tributary, upstream Dragova-Bistrița confluence has the highest species richness (4.830, and 0.744 respectively) according to Margalef and Menhinick indices.

In an overview on the fish fauna in the study area, we consider that the fish communities appear quite different, the species richness in sampling sites proving that the environmental conditions are still favorable and stable.

Ecological screening of Pontic shad (*Alosa immaculata*) during spawning migration into the Danube River

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Key words: Pontic shad, Danube River, spawning migration, morphometrics.

The Pontic shad (*Alosa immaculata* Bennett 1835) is an anadromous fish belonging to the Clupeidae family that spends the majority of its life growing to reproductive age in the Black Sea and migrates into rivers to spawn, including the Danube via all three branches of the Danube Delta. Its migratory route up the Danube was shortened to 863 km by the construction of the Iron Gates II dam in 1984. Despite its high commercial and cultural value on one hand, and population decline earning it Vulnerable status in the IUCN Red List on the other, knowledge of the life history of the Pontic shad remains surprisingly obscure and there have been almost no investigations into the details of its migratory behavior in the Danube. To obtain a more detailed image of the Danubian meta-population ecology, during 2016 and 2017 we sampled in a variety of locations, throughout the spawning migration period.

This work presents population characteristics and trends we have identified at the local and regional scale during the last two spawning seasons. Pontic shads migrate into the Danube for spawning at different times, as early as March and as late as July, travelling various distances upstream. Our data regarding length and weight variation, body shape, feeding behavior and endoparasite infestation of spawners provide new insight into the adaptation of populations in the Danube to specific environmental conditions. Additional data from genetic and otolith analyses, together with carefully designed sampling plans that would include earlier developmental stages in upcoming seasons will enable us to describe the spawning ecology and life history of the Pontic shad in better detail. Our data, together with information from future studies can facilitate reexamination of current stock management strategies or the development of an entirely new management approach.

This work was supported in part by COST Action FA 1304 FITFISH, and by the Romanian Nucleus Programme, contract no. 47N/2016, project nos. 16 28 01 11 and 16 28 02 01.

Dynamics of waterbirds in Constanța port (Romania) within the period 2007 – 2015

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Key words: waterbirds, port (harbour), dynamics, winter, cereals.

Usually, the economic activities of the people are wounding nature and biodiversity. But, sometimes, there are some activities that help birds to survive, especially in winter. One of these situations occur in the Port of Constanța (Romania – the Black Sea).

Beginning with the 2006 – 2007 winter and finishing with the winter of 2015 – 2016., we made four trips of observations each winter. We used a motorboat and a car. The transect laid from the Green Light House till the birth 79. The main observation points (Vantage points) were the Green Light House, birth 22, birth 39, birth 49, birth 59 and birth 79.

In Constața Port, waterbirds feed with the cereals that the vessels are loosing in the operations of discharging or loading. According to the data from Constanța Maritime Port Administration, from 2005 till 2015, the import and the export of the cereals increased. At the same time, the naval traffic decreased.

For this reason we could observe a growth of the number of waterbirds. More food and good places to rest. In 2006 – 2007 winter, the number of birds was between 1000 – 3000 birds and in 2015 – 2016 winter the number of the birds was between 7000 – 9000 birds.

The main species we could observe here were: Mute Swan (*Cygnus olor*), Mallard (*Anas platyrhynchos*), Pochard (*Aythya ferina*), Tufted Duck (*Aythya fuligula*), Black-throated Diver (*Gavia arctica*), Great Cormorant (*Phalacrocorax carbo*), Great Crested Grebe (*Podiceps cristatus*), Black-necked Grebe (*Podiceps nigricollis*), Coot (*Fulica atra*), Lesser Black-backed Gull (*Larus fuscus*), Yellow-legged Gull (*Larus michahellis*), Common Gull (*Larus canus*), Mediterranean Gull (*Larus melanocephalus*), Black-headed Gull (*Larus ridibundus*), Little Gull (*Larus minutus*). Of course, there are many other species you occur here, in the harbour, but they are not common birds and their number is smaller.

From ashore and from the town other species come for foraging: Collared Dove (*Streptopelia decaocto*) – hundred of birds, Starling (*Sturnus vulgaris*) – thousands of birds and of course, the Sparrow (*Passer montanus* and *Passer domesticus*).

The reasons for this abundance of birds:

- A lot of food and easy to have it;
- Protection against wind, waves and bad weather;
- No hunting;
- No predators.
- For the moment, in the Port, the Companies are still building new Silo for grains.
- New chances for some species of birds to survive?

Diversity of avifauna from ecotone area and adjacent habitat in the Central Region of the Republic of Moldova

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Key words: avifauna, ecotone, adjacent habitat, ecological index, similarity, biodiversity.

Modified natural landscape, with small islands of steppe, meadow and forest inside arable lands, has created a rich network of marginal areas between adjacent ecosystems, called an ecotone. Under these conditions, when the ecotone length increases and the area of habitat is reduced, the evolutionary adaptation of some terrestrial fauna species is increasing and is reducing for others. Avifauna investigations have been carried out in ecotone and adjacent ecosystems: forest-meadow, forest-forest, forest-agricultural crops, etc. The comparison of ecological indicators of avifauna from ecotone and adjacent habitats shows that number of bird species and Shannon biodiversity index (I_{sh}), usually is bigger than in adjacent habitats. For example, the ecotone between forest-meadow is populated by 26 bird species, $I_{sh}=2.97$, forest – 25 species, $I_{sh}=2.47$, meadow – 9 species, $I_{sh}=1.93$. The ecotone between forest-forest is populated by 27 bird species, $I_{sh}=3.08$, forest – 27 species, $I_{sh}=2.77$, forest -21 species, $I_{sh}=2.52$. The ecotone between forest and agricultural land is populated by 26 bird species, $I_{sh}=1.29$, forest – 29 species, $I_{sh}=1.33$, agricultural land – 7 species, $I_{sh}=0.45$. The ecotones with the highest similarity of bird fauna have, at the same time, the lowest degree of similarity according to the number of birds. When avifauna is less similar between forest, ecotone and meadow, bird population density has a maximum similarity. Thus, under agrobiocenosis conditions the ecotonic effect on avifauna occurs. Perhaps this is explained by the diversity of phytocoenoses from ecotones.

Hibernation of lesser horseshoe bat *Rhinolophus hipposideros* in mine in Sławniowice

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Key words: *Rhinolophus hipposideros*, hibernation, refugioclimate.

The ability to hibernate is one of the key aspects of settling high latitudes by bats. In winter, in temperature zone, bats utilize possibility to shelter in various kinds of underground systems. They are used mainly for hibernation, because they provide sufficient set of physical conditions essential to survive winter period without food.

Mine in Sławniowice (E 17° 16' 4; N 50° 20' 1) is an artificial underground mine located near Sławniowice village within marble mine area. It is included in Natura 2000 network Ostoja Sławniowicko-Burgrabicka (site code: PLH160004), which aim is to maintain endangered in whole Europe specified types of natural habitat and species. This area is of a great importance for the Lesser horseshoe bat (*Rhinolophus hipposideros*) protection. In 2006-2007, here, about 200 specimens of this species hibernated (Szkudlarek & Paszkiewicz, 2003; Kepel et al., 2005). Lesser horseshoe bat's nursery colony is located nearby.

Earlier researches in this underground (Kłys, 2013) to concerned physical conditions of refugioclimate (Kłys & Wołoszyn, 2005). Recent studies are directed to determine abiotic factor effect on hibernation site selection and assignation of thermal comfort of this species. During hibernation lost energy of the organism is compensated by backup substances, i.e. hibernating bat organism is in thermal (energy) balance. Bat can achieve thermal balance in fairly wide range of physical parameters of the environment and their changes through thermoregulation. All the time bats must keep the constant temperature, slightly higher to the environment but in the optimum range. Specialized species like *Rhinolophus hipposideros* are able to cope with environmental physical conditions. Lesser horseshoe bats have unique hibernation method - loosely hangs and at ceiling underground system and wrap up the volatile membrane. Bats are able to unfold or tightly wrap his volatile membranes in order to achieve thermal balance and provide hibernation comfort.

This species has large requirements related with refugioclimate, and needs a stable microclimate inside an underground system. During studies, we observe that most of the specimens hibernate at the temperature 7.0°C - 8.8°C, relative humidity 98-100% and air flow speed 0.04 – 0.09 m/s. We suppose that they are optimal conditions for hibernation. Joint interaction this factors we can term as the thermal comfort of hibernating, which presented in digital form would give hibernation coefficient.

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Spatial-behavioral structure of rodent populations by switching from colonial to solitary phase and vice versa

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Key words: spatial-behavioral structure, colonial, solitary, *Microtus arvalis*, population dynamics, tolerance.

Recent research on the spatial-behavioral structure of rodent populations admits that, in addition to the existing colonial and solitary forms of animals in populations, there are interim variants that are not clear described yet (Gromov, 2008). The ecological and behavioral research of small rodent populations, especially of the *Microtus arvalis* species carried out at different stages of population dynamics in agrocenoses, has demonstrated various adaptive strategies through the variability of spatial-behavioral structure organization. *Microtus arvalis* is characterized as a colonial species, dominant in different phases of population dynamics, but in the peak stage predominates the solitary form. The German researchers (Boyce & Boyce, 1988) confirm this conclusion. The analysis of population dispersion coefficient in the peak phase of population dynamics demonstrates a uniform distribution of individuals in space, indicating a tolerance of the females relative to the other individuals. Solitary females reproduce offspring who disperse from forage crops and meadows to autumn cereals. Individuals from the first generation of solitary females install themselves apart on a distance of a few meters one from another, where they arrange their nest with 2-3 galleries to the soil surface. According to the findings of the researchers (Boyce & Boyce, 1988), solitary females are more fertile, and their offspring are more resistant and mature earlier. In order to evaluate the factors that limit and regulate the number of solitary and colonial reproductive females in the population, there is a need for new investigations, combining ecological-behavioral research with the genetic structure of the species population. It is known that at different stages of population dynamics predominate heterozygous or homozygous females whose reproductive and resistance capacities are different.

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Small mammal fauna (Rodentia, Insectivora) from middle course of Nistru River and its importance in maintaining leptospirosis outbreaks

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Key words: small mammals, ecosystems, middle Nistru, diversity, leptospira, epizootic process.

The studies were performed in 2010-2016, in various ecosystems from the middle course of the Nistru River basin. Several types of ecosystems were studied: forest, paludous, agrocenoses, rural, forest-paludous ecotone and forest-agrocenoses ecotone. In total, 3425 trap/nights were processed, 934 small mammals from 17 species were registered: *Apodemus uralensis*, *A.sylvaticus*, *A.agrarius*, *A.flavicollis*, *Mus spicilegus*, *M.musculus*, *Micromys minutus*, *Rattus norvegicus*, *Cricetulus migratorius*, *Myodes glareolus*, *Arvicola terrestris*, *Microtus arvalis*, *M. rossiaemeridionalis*, *Sorex minutus*, *S.araneus*, *Crocidura suaveolens*, *Neomys anomalus*). The highest mean multiannual trappability index was recorded at ecotone forest-paludous (34.9%), forest-agrocenoses (29.5%) and in agrocenoses (29.2%), followed by rural ecosystems (26.3%), paludous and forest ecosystems (24.8% and 24.5%). The highest diversity was registered in paludous biotopes ($H^2=1.114$), at ecotone f (1.024), forest-paludous (0.719), in agrocenoses (0.778), followed by forest ecosystem (0.699), while the lowest diversity was found in rural ecosystems (0.477). The most abundant and dominant in the studied ecosystems were the species of genus *Apodemus*. The wood mouse and the striped field mouse are the most spread with a frequency of 100%.

In laboratory, investigations on 6 species (*A.uralensis*, *A.sylvaticus*, *A.flavicollis*, *A.agrarius*, *M.minutus*, *R.norvegicus*) led to positive results on leptospira, which proved a high species diversity involved in leptospirosis epizootic process. The circulation of pathogen agent was recorded more intensely in small rodent communities from paludous ecosystems and ecotone forest-paludous with a ratio of 5.6% and 5.3% from the total number of investigated animals. In agrocenoses, the circulation of leptospira was of 2.1% and in forest ecosystems – 0.4%. In small rodent populations specific antibodies for three leptospira serotypes were identified: *L.icterohaemorrhagiae*, *L.pomona*, *L.canicola*. The obtained data confirm the importance of rodent species as hosts for leptospira and its maintenance in the environment.

The study was performed within the collaboration contract between Institute of Zoology of A.S.M. and National Centre of Public Health and within the fundamental project 15.187.0211F.

Behavioral peculiarities of *Apodemus uralensis* in ecotone communities of small rodents from the Republic of Moldova

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Key words: ecotone, small rodents, behaviour, pair encounters, *A. uralensis*, exploratory behavior.

The ecotone represents the transition between two or more different communities. This contact zone, or “tension” zone, is the territory of neighboring communities, where the number of species and population density of some of them is often higher than in the communities lying on either side of it. Despite the significant role and high spreading of ecotones in nature, they have not been sufficiently studied.

The species composition of small rodents that inhabit the boundary between a wheat field and a forest shelter belt was studied, the interspecific relationships of the males (*Mus musculus*, *Mus spicilegus*, *Apodemus uralensis*, *Apodemus sylvaticus*, *Apodemus flavicollis* and *Myodes glariolus*), as well as the exploratory behavior of one of the most numerous species of the community – *A. uralensis*. Interspecific relationships were studied by pair encounters.

As a result of the studies, tension relations were revealed in the contacts between males. This was expressed in low indicators of the complex of initial meeting behavior and the prevalence of complexes of aggressive, defensive and conflicting behavior, the lack of elements of friendly behavior and very few manifestations of comfortable behavior.

Orientation-exploratory behavior of *A. uralensis* was studied by the “open field” method. In these experiments, there were low indices of the latent period of exit from the portable box into the “open field” in both sexes, the presence of strong positive correlation between horizontal and vertical activities (in males $r = 0.98$, females $r = 0.997$), strong negative correlations of freezing with the values of horizontal ($r = -0.79$ in males and $r = -0.87$ in females) and with vertical activities ($r = -0.89$ and $r = -0.88$, respectively), low rates of emotional response to new environment. All mentioned peculiarities of the orientation-exploratory behavior of the representatives of *A. uralensis* lead to the conclusion that this species has high adaptive abilities and great potential and resistance to overcoming the negative conditions of “tension” occurring in the ecotone communities. This conclusion is confirmed by the fact that *A. uralensis* is one of the dominant species in agrocenoses of Moldova.

Preliminary study regarding the presence of the Pacific oyster (*Crassostrea gigas*) in natural habitats of the Black Sea, Romania

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Key words: invasive species, *Crassostrea gigas*, Black Sea, aquaculture, benthic habitats.

Originally from the Pacific Ocean, coast of Asia, the Pacific oyster *Crassostrea gigas* is in the present an invasive species in North America, Australia, Europe and New Zealand, being introduced through aquaculture. The presence of the species in the Black Sea, was reported following solitary individuals records from the south east and south west of Crimea and from the north east of the Caucasian coast of the Black Sea. In Romania, *Crassostrea gigas* was introduced through oyster farming attempts in constant environmental conditions.

In august 2017, we started a study concerning the benthic habitats from Constanta and Agigea (Black Sea Romanian coast), during which we found several individuals of *Crassostrea gigas*, in natural habitat. Accordingly, we started a secondary survey on the presence and distribution of the Pacific oyster, in the Romanian Black Sea waters. We performed a preliminary quantitative survey of the macrozoobenthos using the samples procedures method. During the first stages of this study we found two locations with 12 respectively 38 individuals, which could represent the start of a new *Crassostrea gigas* population. The Pacific oyster individuals were using *Mytilus galloprovincialis* colonies as a substrate.

Although *Ostrea edulis* is a native oyster species to the Black Sea, her populations were critically declined by the invasive whelk *Rapana venosa*. Therefore, *Crassostrea gigas* could occupy the niche of *Ostrea edulis*.

Alien and invasive species of insects in Constanța in 2017

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Key words: alien species, invasive species, Constanța, Dobrogea.

The year 2017 was in some respects a special year for some alien species of insects reported in the coastal Black Sea zone. Severe winter of 2017 did not prove to be a limiting factor for populations of alien or invasive insect species, even if they are species of southern origin. Anthropogenic habitats in littoral area currently contain quite a number of alien species, some of them with strong visual impact, but most are much less noticeable, even in recent years they have become relatively common. The capacity of an alien species to establish populations in natural habitats is another step that not all of these species could surpass. Only two of them – *Harmonia axyridis* and *Metcalfa pruinosa* were observed in relevant populations in natural habitats, the first species all over Dobrogea, and the second one in ROSCI0083 Fântânița Murfatlar.

Among insect alien species that appeared in recent years in littoral area, some with southern origin that are clearly spreading north or north-eastwards in last decade are worth mentioning *Oxycarenus lavaterae* (Heteroptera: Oxycarenidae), *Nezara viridula* (Heteroptera: Pentatomidae) and the tiger mosquito *Aedes albopictus* (Diptera: Culicidae) (Prioteasa et al., 2015). First two species are mentioned in Romania for some time - *Oxycarenus lavaterae* from 2009 and *Nezara viridula* from 2012 (Bărbuceanu & Niculescu, 2012; Grozea et al., 2016). Both species were present in the coastal area since at least 2015, but in the summer of 2017 their presence has become evident. *Oxycarenus lavaterae* was reported in a location near the sea, in huge aggregation of individuals on the *Tilia* trunks. *Nezara viridula* became very common especially at the end of the summer, when thousands of specimens were observed searching for refuge. The tiger mosquito *Aedes albopictus*, who developed relevant populations in 2016 – was also observed, but in small effectives comparatively with last year.

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Alien seed beetles and true bugs in Romania

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Key words: invasive species, allochthonous species, Bruchidae, Heteroptera.

The alien species represents one of the most dangerous threats to biodiversity, being overcome only by the habitat destruction. So far, in Europe there have been detected over 1000 of allochthonous insect species, from which 42 are seed beetles and 22 are heteroptera species. In Romania it is known to occur 5 alien seed beetle species and 5 true bugs.

In our study we investigated the possible presence of some allochthonous insects in Romania, species that were already recorded from at least one neighbor country. For the seed beetles, we collected from different areas pods of 3 different ornamental trees (*Gleditsia triacanthos* L., *Albizia julibrissin* Durazz., and *Cercis siliquastrum* L.) in order to obtain adults in the laboratory. For the heteroptera species, we investigated the different microhabitats like under the bark of the trees, leaf clusters and certain host plants (*Platanus*, *Quercus*, *Buxus*).

As a result of our study, we identified 4 new seed beetle species (*Megabruchidius dorsalis* (Fåhraeus, 1839), *Megabruchidius tonkineus* (Pic, 1914), *Bruchidius terrenus* (Sharp, 1886), and *Bruchidius siliquastrum* Delobel, 2007) and 6 new heteroptera species (*Amphiareus obscuriceps* (Poppius, 1909), *Anthocoris butleri* Le Quesne 1954, *Arocatus longiceps* Stål 1872, *Belonochilus numenius* (Say, 1832), *Corythucha arcuata* (Say, 1832) and *Perillus bioculatus* (Fabricius, 1775)) for Romania, all of them allochthonous. Some species are widespread (*M. dorsalis*, *M. tonkineus*, *A. obscuriceps*) but most of them are occurring only in west and south Romania and two of them being recorded only in one location (*B. numenius* and *P. bioculatus*). The apparently restricted distribution is a consequence of mild winters in the area which permits an easier colonization for the thermophilic species. Also, west and south Romania has a more intense trade and more developed traffic infrastructure which may facilitate the introduction of alien species.

Presence of *Phlogotettix cyclops* (Mulsant & Rey, 1855) (Cicadellidae: Deltocephalinae) in vineyards of Romania

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Key words: *Phlogotettix cyclops*, Romanian vineyards.

Phlogotettix cyclops (Mulsant & Rey, 1855) is an invasive leafhopper species from Auchenorrhyncha group originating in Asia, which has lately invaded the grapevine in Europe. This insect is regarded as a potential threat for the grapevine crops because it is suspected to be an important vector of the phytoplasma producing the *Flavescence dorée* (FD) disease. Adults of *P. cyclops* collected from vineyards in important vine-growing countries, Austria and Croatia, have been found infected with FD.

In Romania, we detected the leafhopper *P. cyclops* in 2016, on various plant species in urban and rural areas in the Southern part of the country, but also in vineyards from the Western and Eastern parts of Romania. This paper presents the results on the presence of *P. cyclops* in vine plantations, newly created through the restructuring and reconversion program in Romanian viticulture, in three important viticulture regions, Banat, Crișana and Moldova. The insects were collected on yellow sticky traps from early June to mid October 2016-2017. The data from this study indicate for the first time the presence of *P. cyclops* in grapevines in Romania, and they can also complete the current spreading map of this insect in Europe.

This study was financed through the ADER Programme, Project 412/2015.

Reproductive capacity of *Syngnathus abaster* Risso females from lower Nistru

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Key words: oocyte, ovary, reproduction, gonadosomatic index (GSI), absolute fecundity (AF).

Syngnathus abaster after its reproduction mode refers to the ecological group of fish, in which males provide care for the offspring in the form of egg and developing embryos bearing. Black-striped pipefish *Syngnathus abaster* living in the lower Dniester is a polygamous species, because one male simultaneously nurtures offspring from several females. The spawning begins in the month of May, when the temperature of the reservoir is 17.3°C. During the breeding season, the female lays three generations of eggs. Ovulation of eggs of each generation occurs in small portions and at different times, as a result, the filling of the brood chamber of the male occurs from different females. The reproductive cycle in females is completed in July, when the water temperature in the river reaches above 24°C. The weight of gonads and GSI, during this period, have the minimum values. The decrease of mature egg number is due to the presence in the ovary of resorptive eggs during the homogenization of the yolk. As studies have shown, with age in *Syngnathus abaster* females in the Lower Dniester the value of the GSI and, correspondingly, the number of eggs increases. In three-year-old individuals this indicator is slightly higher than in two-year-old fish, but their values do not have significant differences $P \leq 0.95$. One of the important factors limiting the reproductive potential of females is the long period of gestation of embryos by males, during which they are excluded from the reproductive process. The average value of AF in Dniester females, for the entire breeding season, constitute 84 ± 12.0 pcs of eggs. The maximum content of ovules in the ovary of three-year-old individuals with a length of 17.6 cm and weight 2.93g, can reach 163 pcs, while for yearlings, with a length of 12.1 cm and a weight of 1.09 g - 24 pcs. The brood chambers of the male *Syngnathus abaster* of the Lower Dniester, with a length of 13.1-15.4 cm and weight of 1.7-2.3 g contain 37-68 eggs, respectively. On average, the number of offspring produced by males is 54 ± 8.7 embryos at different stages of development. Based on the above mentioned, it can be argued that the potential reproductive level of females is higher than in males: some individuals produce more eggs than males can bear.

The biological progression of *Rhodeus amarus* (Bloch, 1782) species in aquatic ecosystem of Republic of Moldova and provocative factors

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Key words: fish, aquatic ecosystem, bioinvasion, anthropic factor, biotopic fragmentation.

Rhodeus amarus (Bloch, 1782) is a short-lived and short-life fish species that is currently showing clear biological progress in most of the aquatic ecosystems in the Republic of Moldova. According to the scientific investigations in Dniester and Prut Rivers, in 2015-2016 (the Republic of Moldova limits), in most of the collection stations, the species ranged in the categories of dominant and eudominant (D4-D5) > 5,1%, constant – euconstant (C3-C4) > 50,1% and characteristic (W4-W5) > 5,1% (Bulat, 2017).

Analysis of the increase character of the *bitterling* in Dniester River (Criuleni station) using the Bertalanffy model reveals a significant growth rate (k length – 0,53 and k for weight – 0,45) to reach the maximum gravimetric physiological values (l_{∞} = 6,38 cm and W_{∞} = 7,66 g). The maximum empirical values (at the age of 5+ years, l_{stand} = 6,22 cm and W = 6,49 g) are very close to the maximum physiological values mathematically estimated, which denotes a complete, balanced and anthropically unaffected age structure. When analyzing the length-weight correlation, we observe the value of $b = 3,100,097$, indicating a positive allometry, favoring weight gain over that in length.

Among the main factors stimulating the increase of the effective population can be mentioned: the degradation of the ichthyophagous trophic level due to the illegal fishing with a stressed selective effect, the abundance of the reproductive substrate (ostracophilous species) and the significant improvement of the natural trophic base (phytoplanktonophagous species) under conditions of active ecosystems eutrophication. Thanks to the ostracophilous reproduction mode, *bitterling* fertilized egg are effectively protected from large and frequent changes in water levels in multiple fragmented rivers from the Republic of Moldova.

The species is found in significant quantities also in some habitats intensely polluted. In some drainage channels that have become spatially isolated from the Dniester River and the Lower Prut, the taxon has formed numerous populations despite the absence of the characteristic reproductive substrate (such as *Unio* species and *Anodonta* species) which creates premise to suppose that it can manifest itself as a polyphylous species.

The study was performed within the national project 15.817.02.27A.

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Detection and molecular identification of *Borrelia burgdorferi* s.l. and *Babesia* spp. in ixodid ticks collected from domestic dogs in Chişinău, Republic of Moldova

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Key words: ticks, dogs, host-parasite associations.

Transmissible diseases of dogs - a group of diseases dangerous to the health and life of animals. One of the main vectors of such diseases are ixodid ticks. The most common and clinically significant for dogs are babesiosis, tick-borne borreliosis.

In 2015-2016, ticks were collected from domestic dogs in the veterinary clinics. In total, four veterinary clinics located in different districts of Chisinau city submitted ticks found on domestic dogs. All collected ticks were stored in 70% ethanol. DNA was extracted with the *DNA-Technology's PREP-NA extraction kit* following the manufacturer extraction protocol for ticks. We screened ticks for the presence of *Borrelia burgdorferi* s.l. and *Babesia* species. Detection of *Borrelia b. s.l.* was performed by RT-PCR with the help of commercial kit from *DNA Technology*. Detection of DNA of *Babesia* spp. was carried out with a conventional PCR targeting the partial 18S rRNA gene (primers BJ1, BN2). All *Babesia*-positive amplicons were sequenced. For four randomly-chosen *Borrelia b. s.l.*-positive samples additional PCR was performed targeting 5S-23 spacer (primers rrf, rrl) followed by amplicons sequence.

On proprocession of two seasons (2015 and 2016), from the 102 dogs 182 ticks were collected. Most collected ticks (92%; n=168) were *Ixodes ricinus*, followed by *D. marginatus* (5%; n=10) and *D. reticulatus* (3%; n=4). Total of 18.6% (n=34) of the ticks were positive for infection with *B. burgdorferi* s.l., all of *Borrelia*-positive ticks were identified as *I. ricinus*. Four randomly-chosen sequences showed 100% similarity with *Borrelia afzelii*. Three ticks were positive for *Babesia* species, two ticks were identified as *I. ricinus*, and one as male *D. reticulatus*. Sequence analysis showed that *I. ricinus* ticks were infected with *Babesia microti* and *D. reticulatus* was infected with *Babesia canis canis*.

To our knowledge this is the first case of molecular identification of *Babesia canis* in Republic of Moldova.

New datae on the trematode fauna of green ranids (Amphibia: Ranidae) from the central part of the Republic of Moldova

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Key words: trematode fauna, Ranidae, aquatic ecosystems, Moldova.

The Ecaudatess amphibians serves as hosts for a broad spectrum of helminths while their parasitic fauna is a part of the aquatic ecosystems. Both amphibians and their parasitic fauna may offer the information on the status of the ecosystem. The parasitic fauna diversity is one of the major biotic factors influencing the structure and overall ecosystem functioning.

The aim of this study was to identify the trematode fauna specific to green frogs *Rana ridibunda*, *Rana lessonae* and *Rana esculenta* inhabiting different aquatic ecosystems from the central part of the Republic of Moldova.

The amphibians have been collected from natural and artificial water lakes as of the central area of Moldova during May to October 2013-2017. The parasitological analysis was conducted according to standard methods proposed by Skrjabin (1928). The collection, anchoring and preparation of material was conducted pursuing the methods proposed by Ryzhikjv et. al. (1980).

The parasitological research of species *Rana ridibunda*, *R. lessonae* and *R. esculenta* in natural and artificial water lakes has established the presence of 10 species of trematodes in their digestive tract and lungs: *Opisthioglyphe ranae*, *Haematoloechus variegatus*, *Cephalogonimus retusus*, *Gorgoderia varsoviensis*, *Pleurogenes claviger*, *Candidotrema loossi*, *Pleurogenoides medians*, *Prosotocus confusus*, *Diplodiscus subclavatus*, *Codonocephalus urniger*, belonging to 10 genus (*Opisthioglyphe*, *Haematoloechus*, *Cephalogonimus*, *Gorgoderia*, *Pleurogenes*, *Candidotrema*, *Pleurogenoides*, *Prosotocus*, *Diplodiscus*, *Codonocephalus*) 6 families (*Plagiorchiidae*, *Cephalogonimidae*, *Gorgoderidae*, *Pleurogenidae*, *Diplodiscidae*, *Diplostomidae*) and 3 orders (*Plagiorchiida*, *Echinostomatida*, *Strigeida*).

The parasitologic investigations revealed that the parasite host indicates a different infestation level.

Therefore, for the first time the trematode fauna of the species *Rana ridibunda* and *R. lessonae* and *R. esculenta* from the center of Moldova was studied, which includes 10 trematode species, belonging to 10 genera, 6 families and 3 orders. In contrast to the *Rana ridibunda* species, *R. lessonae* and *R. esculenta* species is characterized by a low level of infestation.

The study was performed within the projects 15.817.02.12F and 16.80012.02.16F.

Archaeozoologic and archaeogenetic data concerning the Iron-Age and Romansettlements from Niculițel (Tulcea County, Romania)

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Key words: archaeozoology, archaeogenetics, Niculițel, domestic species, wild species.

From the Niculițel area, located in the central-northern part of the Tulcea County, faunal samples from two sites were analysed: a Roman settlement and an Iron Age settlement (Cornet point - at about 5 km distance from the Roman site).

A variety of faunal remains was described in both archaeozoologic samples, comprising both domestic (*Bos taurus*, *Ovies aries*, *Capra hircus*, *Sus domesticus*, *Equus caballus*, *Canis familiaris*, *Felis domesticus*) and wild animals (*Cervus elaphus*, *Sus scrofa*, *Capreolus capreolus*, *Bos primigenius*, *Lepus europaeus*, *Canis lupus*, *Ursus arctos*, *Meles meles*, *Vormela peregusna*). In all samples the prevalence of domestic animals was noticed, suggesting the high importance of animal husbandry in these regions during the Iron Age and the Roman period. Still, the identification of wild animals proves that hunting was also practiced. Among the domestic animals, the most frequent is *Bos taurus*, followed by *Ovies/Capra* and *Sus domesticus*. The highest frequency among the wild animals was identified for *Cervus elaphus* and *Sus scrofa*.

A total of seven *Sus* sp. samples were subjected to archaeogenetic analysis: three domestic individuals from Niculitel-Cornet and four, out of which one wild, from Niculitel (Roman site). After the samples processing, from DNA extraction to DNA sequencing, six of the samples presented viable DNA and among them two different haplotypes were identified: ANC-Aside haplotype for the domestic individuals and ANC-Cside for the wild individual. One domestic *Sus scrofa* individual from Niculitel-Cornet site could not be sequenced.

Both haplotypes identified at the Niculitel site are European haplotypes, proving that by the Iron Age the introduced pigs from the Near East were assimilated by the pig stocks with the European genetic signature.

This paper was supported by a grant of Ministry of Research and Innovation, CNCS – UEFISCDI, project number PN-III-P4-ID-PCE-2016-0852, within PNCDI III.

Prehistorical wild bony birds remains found in the archaeological site of Vorniceni-Pod Ibăneasa (Botoșani County)

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Key words: hunting, bony remains, wild birds, prehistory, archaeology, Vorniceni.

This study analyses 19 bony remains of wild birds, which had been found during the archaeological campaigns which took place between 2000 and 2010 in the archaeological site of Vorniceni-Pod Ibăneasa from Botoșani County. The archaeozoological interpretation of the osteological remains implies: ageing, sexing, measuring the fused bones and the description of the taphonomical traces.

In the Chalcolithic level of the archaeological site had been discovered 13 bony birds remains of common mallard (*Anas platyrhynchos*), inside of the dwelling L14 (proximal part of a sinsacrum and of a scapula, a distal part of sternum, left and right humeri, left and distal part of a radius, a proximal right part and a left diaphysis of two ulnas, a fused right and complet femur and a wing phalanx. The radius and the proximal part of the ulna had been manufactured as smoothers.

Outside of the dwelling L6 (Cucuteni level) had been discovered a diaphysis of humerus of the white stork (*Ciconia ciconia*) having three cut-marks (two transversally and one along it). The bone had been used as duble chisel by prehistorical community.

Inside of the gr. 40 had been discovered two bony bird remains (a proximal left part and a right diaphysis of ulnas) of northern goshawk (*Accipiter gentilis*): Passim had been found a diaphysis of ulnae of peregrin falco (*Falco peregrinus*), which had been used also as chisel.

In the ashtray of the Bronze Age level revealed in the archaeological site had been found two bony remains: a neurocranium attached to a basal bill belonging to tawny owl (*Strix aluco*) and a left and complet tibiotarsus of a wild goose (*Anser anser*). The bony remains were attributed to adult individuals, which had been hunted not only for meat, but to reveal the social status in prehistorical times.

Estimating the height of the withers for mammal species with palaeoeconomical importance in the prehistoric community of Vorniceni-Pod Ibăneasa from Botoșani County

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Key words: estimation, height of the withers, mammals, paleoecomy, prehistory, Vorniceni.

The interpretation of osteometrical data taken on the fused and complete bony remains of mammals with paleoeconomical importance in the prehistorical community of Vorniceni-Pod Ibăneasa from Botoșani County give us useful informations about the human populations food prefferances (given by domestical mammals) and the distribution of wild mammals.

The bony animal remains which had been measured in the archaeological site of Vorniceni –Pod Ibăneasa were represented by fused and complete horncores, antlers, short, long, width bones and teeth belonging to domestic and wild mammals with paleoeconomical importance in prehistorical community. The osteometrical data give us information about the hibridation processes between wild and domestic animals in semi-freedom living condition or the seson and the butchering age of the ritual animal deposition.

For domestic and wild mammals, the measurements were useful in estimating the height of the withers, ageing and sexing animal bones as well as revealing the differences between species belonging to the same genus (pig and boar; cattle and aurochs) or to the same archaeozoological group (sheep and goat).

The bony animal remains were discovered during the archaeological campaigns taken between 2000 and 2010, which took place in the site of Vorniceni-Pod Ibăneasa from Botoșani County. Out of 9878 bony remains indentified in the Chalcolithic and Bronze Age levels of the studied site, 4653 osteological mammals remains were measured. The mammals involved in this study are represented by domestic animals (cattle, sheep, goat, pig and dog) and wild mammals (red-deer, roe-deer, boar, aurochs and brown hare).

Vitellogenin expression *in vivo* assessment in transgenic *Caenorhabditis elegans* induced by some cationic and amphoteric surfactants

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Key words: cationic/amphoteric surfactants, vitellogenin genes, transgenic *Caenorhabditis elegans*.

The model nematode *Caenorhabditis elegans* has been used in toxicity testing of certain Endocrine Disruptor Chemicals (EDCs), including Bisphenol A (BPA) or 17- α -Ethinylestradiol (EE₂). In this study, we evaluated the oestrogen mimic potential of both amphoteric surfactants: Cocamidopropyl betaine [CAPB], and Cocamidopropyl hydroxysultaine [CAPHS] and cationic surface tension agents: Hyamine 1622 and Tetranyl. A *C. elegans* reporter strain (*vit-2*: GFP) has been exposed to concentrations ranging between 0.01 and 0.000001 mg/l of surfactant. GFP measurements were performed in larvae (L) after 24 h (L2-L3), late larvae (L4) and young adults after 48 h and in adults after 72 h and 92 h.

Bisphenol A was a strong inducer of the *vit-2* gene in L2-L3 (up to 2.9 fold increase) for all doses, and increased expression up to 4 fold in the L4 stages. On the other hand, EE2 down regulated the *vit-2* gene after 24 h (L2-L3) but up regulated it after 48 h at the highest doses tested, by between 1.6 (96 h, 10⁻² mg/ml) and 3.9 fold (72 h, 10⁻² mg/l). CAPB induced vitellogenin expression in all larval stages at the concentration of 0.01 mg/ml, but CAPHS has no significant effects in larvae. Hyamine 1622 down-regulated the *vit-2* expression at all time points at the highest concentration tested (0.001 mg/l). Tetranyl 0.001 and 0.01 mg/l induced early up-regulation compared to control by 1.5 fold, but only after 24 h (L2-L3).

Genetic structure of *Bombina variegata* (Anura, Bombinatoridae) from Cozia National Park and adjacent areas

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Key words: *Bombina variegata*, populations genetics, microsatellite markers, fragmentation, effective population size.

The yellow-bellied toad, *Bombina variegata* (L., 1758), is a Natura 2000 amphibian species, easily disturbed by human activities and pollution. The long term conservation of this species needs to take into account keeping an optimal genetic diversity within the populations in order to reduce the effects of the genetic drift on said populations. Genetic conservation studies such as this may have major consequences in conservation strategies by identifying populations or communities with high genetic diversity and / or by identifying potential biodiversity hot spots.

Six populations from Cozia National Park and surrounding areas have been tested for possible fragmentation and genetic decline in the context of increased human activity in the region. The populations were sampled during a three year period (2014-2016) and a total number of 234 individuals were analyzed using seven highly polymorphic nuclear microsatellite markers.

Preliminary genetic structure results suggested a very low genetic differentiation between the studied populations, with a significantly distinct allelic pattern in only one population (Krapal et al., 2016). The fixation index values ($F_{ST} \leq 0$) indicate the studied populations are interbreeding freely, as they seem to share the same alleles between them. The Mantel test showed no correlation between genetic and geographic distances, this fact implying that there is no structure in the genetic variation among samples in relation to geographical distance. This result could be explained by the biology of the species, the interbreeding of populations and/or the relatively high dispersal ability that help in maintaining the constant gene flow between populations.

The population effective size was also estimated, with a minimum of 38.6 reproductive individuals (CI 24.9-71.9) for population LOT, and a maximum of 242.9 reproductive individuals (CI 108.2-infinite) for population SPI. These values may indicate the beginnings of a fragmentation pattern in the area, due mostly to anthropogenic activities and geographical features.

This work is funded by Romanian UEFISCDI Executive Unit for Financing Education Higher Research Development and Innovation, Grant No. 113/2014, code: PN-II-PT-PCCA-2013-4-1489.

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Histopathological alterations induced by nickel chloride in *Astacus leptodactylus* (Crustacea: Decapoda) ovary

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Key words: heavy metal, nickel chloride, ovary, *Astacus leptodactylus*, Crustacea, Decapoda.

Our study focuses on the characterisation of structural and ultrastructural alterations induced by nickel (II) on different compartments in the ovarian structure of narrow-clawed crayfish, *Astacus leptodactylus*.

The crayfish females were collected monthly from aquatic sites from the southern part of Romania, Danube and tributaries. The specimens were acclimatized to laboratory conditions for two weeks, in aerated 180 L glass aquaria, with dechlorinated tap water and constant room temperature (25°C). At the beginning of the nickel exposure and during the experiments, food was withheld (for both control and exposed crayfish), to minimize the effects of feeding on metabolic processes. The experimental lot was intoxicated with 70 mg/L NiCl₂ dissolved in the aquarium water. The animals were sacrificed at different intervals of time (24 hours, 3 days and 7 days).

Normal and pathological structure of the ovary was assessed in light microscopy using hematoxylin eosin alcian blue staining. For transmission electron microscopy small fragments of ovary were fixed in glutaraldehyde, stained with uranyl acetate and lead citrate. Nickel was detected by autometallographic method.

Our study reveals major alterations in different ovarian compartments, muscle cells, follicular cells, and oocytes in different developmental stages. The most frequent cellular alterations observed during the experiment occurred in the cytoplasm and the nucleus.

For the first time in invertebrates, nickel grains were identified in the ovary. Uniform distribution of the metal had been observed in the cytoplasm, nucleus and nucleoli of previtellogenic oocytes, in the follicle cells and in the basal matrix that separates the ovarian follicle compartment from the ovarian interstitium.

This is the first demonstration of the effects of this heavy metal, which could exist in the living environment, during the reproductive cycle of astacids.

Haplotype diversity in some populations of *Cerambyx cerdo* (Linnaeus, 1758) from Romania

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Key words: saproxylic, conservation, COI, genetic diversity.

Cerambyx cerdo Linnaeus, 1758 (the Great Capricorn beetle) is a coleopteran saproxylic species associated with oak forests and widespread in most parts of Europe. The species is considered an ecosystem engineer and umbrella species, being protected under national and European legislation (European Habitats Directive – Annex II and IV). The saproxylic beetles are one of the most threatened species due to human activity and for this reason long term effective conservation measures are needed.

In the present study we compare the genetic diversity of 14 Romanian populations of *C. cerdo* and three populations from the Czech Republic, using a fragment of cytochrome C oxidase subunit I mitochondrial gene (COI). We analysed a total of 161 sequences, 11 available in GenBank from Czech Republic and 150 obtained during the present study. One Romanian population was sampled for four consecutive years.

The resulted median-joining (MJ) network has a star-like topology, with a common ancestral-like haplotype in the center. We identified 27 haplotypes, with a haplotype diversity (h) of 0,5046 and 25 polymorphic sites, of which 16 were parsimony informative. Nucleotide diversity was low ($\pi=0.0016$). Three haplotypes are common between Czech Republic and Romanian samples, 17 were private for the Romanian samples and 7 for the Czech ones. Our results are similar with those publish from the Czech Republic (Drag & Cizek, 2015). We performed a Mantel test which revealed a corellation between genetic and geographic distances. The AMOVA analysis between four generations of the same Romanian population of *C. cerdo* indicate that the highest percentage variation (99%) from the total variation was found within the four analysed generations and only a small amount of the total variation was attributed to the variation among generations. This fact could be explained by the biology of the species whose life cycle lasts between three to five years, thus two successive generations beeing isolated one from another.

For a species with a long life cycle and fragmented habitat such as *C. cerdo*, the study of genetic diversity is mandatory for efficient conservation measures. The star-like shaped pattern obtained in this study could be the result of a potential bottleneck in recent evolutionary history, followed by an expansion of the species. For a better understanding of the genetic background of *C. cerdo* the use of

mitochondrial and nuclear markers is necessary for analyses, due to the different evolutionary constraints that these types of markers are under.

This work is funded by Romanian UEFISCDI Executive Unit for Financing Education Higher Research Development and Innovation, Grant No. 113/2014, code: PN-II-PT-PCCA-2013-4-1489.

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Lepidoptera (Insecta: Lepidoptera) from “Turbăria Lozna”, Botoșani County, Romania

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Key words: Lepidoptera, protected species, *Arytrura musculus*, Romania.

This paper contains the results of the researches carried out in the Lozna peat swamp, between 1985 and 2017. The studied area is a muddy eutrophic swamp capable of regeneration, with an area of about 20 ha. It is placed at about 300 meters in the north of ROSCI0255 “Turbăria de la Dersca”. The peat from Lozna was exploited before 1990.

The researches were focused especially on macrolepidoptera, and in this period (1985–2017) we were able to identify 338 species. From these, the following protected species are mentioned in the EU Habitats Directive (92/43 EEC), in ANNEX 2: *Lycaena dispar* (Haworth, 1802), *Phengaris nausithous* (Bergsträsser, 1779), *Arytrura musculus* (Ménétriés, 1859), *Euplagia quadripunctaria* (Poda, 1761) and in ANNEX 4: *Proserpinus proserpina* (Pallas, 1772), *Lycaena dispar* (Haworth, 1802), *Phengaris nausithous* (Bergsträsser, 1779), *Arytrura musculus* (Ménétriés, 1859).

The presence of the moth *Arytrura musculus* (Ménétriés, 1859), reported on July 7, 2014 is very important because it is the first evidence of this species of community interest, documented in ROSCI0255 “Turbăria de la Dersca”.

Another important species found here is *Phengaris nausithous* (Bergsträsser, 1779) which feeds on the host plant *Sanguisorba officinalis* L.

The following rare or interesting species are also remarkable for northern Moldavia: *Hepialus humuli* (Linnaeus, 1758), *Nymphula nitidulata* (Hufnagel 1767), *Nascia ciliaris* (Hübner, 1796), *Lasiocampa (Pachygastris) trifolii trifolii* (Denis & Schiffermüller, 1775), *Euthrix potatoria potatoria* (Linnaeus, 1758), *Hyles gallii* (Rottemburg, 1775), *Lycaena thersamon* (Esper, 1784), *Cupido (Everes) alcetas* (Hoffmannsegg, 1804), *Aricia eumedon* (Esper, 1780), *Nymphalis xanthomelas* (Esper, 1781), *Scopula (Scopula) corrivalaria* (Kretschmar, 1862), *Simyra nervosa* (Denis & Schiffermüller, 1775), *Calyptra thalictri* (Borkhausen, 1790), *Acontia (Emmelia) candefacta* (Hübner, 1831), *Eucarta amethystina* (Hübner, 1803), *Eucarta virgo* (Treitschke, 1835), *Hydraecia ultima* Holst, 1965, *Photedes extrema* (Hübner, 1809), *Photedes morrisii* (Dale, 1837), *Hyssia cavernosa* (Eversmann, 1842), *Mythimna (Mythimna) pudorina* (Denis & Schiffermüller, 1775), *Senta flammea* (Curtis, 1828), *Agrotis bigramma* (Esper, 1790), *Laelia coenosa* (Hübner, 1808).

Identification of sturgeon species and interspecies hybrids using *RPIS7* nuclear marker

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Key words: *Huso huso*, *Acipenser ruthenus*, nuclear markers, interspecific hybrids.

Sturgeons belong to Acipenseriformes order, forming one ancient group of fish. Despite the fact that they are of particular scientific and commercial importance, they have been overexploited through overfishing and poaching. At present, it can be noticed a remarkable decline of sturgeon populations from all over the world. In natural conditions, sturgeons are capable of interspecies hybridization when their breeding sites overlap in time and space. Due to the advantages they have compared to pure species (early sexual maturation, better growth rate, etc.), hybrids are frequently produced in aquaculture. Very often, the hybrids are alike one of the genitor species and their classification based on morphometric features is impaired.

Interspecific hybrids can be identified by different molecular methods implying microsatellite and nuclear genes analysis. Because *DNA barcoding* have not proven useful in discriminating between pure species and hybrids, it is required the optimization of a set of nuclear markers.

The aim of this study was to analyze the utility of the nuclear marker *RPIS7*, for sturgeon species and hybrids detection using both universal primers and specific primers. For this, individuals of *Huso huso* and *Acipenser ruthenus* species and interspecies hybrids of them (bester, sterbe and best beluga) have been analyzed. DNA samples were isolated from fin fragments and the PCR conditions were optimized. The obtained amplicons have been analyzed by agarose gel electrophoresis.

A different pattern of electrophoretic bands (900 bp/ 700 bp) have been observed in the analyzed individuals. *RPIS7* has the capacity to discriminate between hybrids categories and also the two pure sturgeon species and can be included in a panel of DNA markers useful for molecular identification of sturgeons.

Beluga Sturgeon in the Lower Danube: genetic status and advances towards uncovering the meta-population structure

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Key words: *Huso huso*, genetic diversity, meta-population structure.

The sturgeons represent an extremely valuable natural heritage of the Danube River Basin from the biodiversity, scientific and socio-economic points of view. Caviar-producing species are particularly vulnerable due to overexploitation and habitat fragmentation, which have brought them to the brink of extinction. The International Union for Conservation of Nature (IUCN) classifies Beluga Sturgeon as critically endangered, highlighting the need for special conservation programs. In 2006, the Romanian government issued a ban on the commercial fishing of all wild sturgeon species for a ten-year period, which has since been extended. To assess Beluga Sturgeon (*Huso huso*) wild stock dynamics and the impact of conservation management on wild stock recovery, we combined capture data with mitochondrial DNA analysis in offspring captured during the last two decades. This paper presents the trends of the Beluga Sturgeon meta-population from the Lower Danube based on yearly offspring recruitment indices, the number of inferred haplotypes and its genetic structure. Our analysis revealed a complex meta-population structure, multiple declines and a specific pattern of recruitment fluctuations. These fluctuations are strongly correlated with the female maturation spawning cycle, whereas the long-term declining trends are related to the period of overfishing prior to 2006. The Lower Danube Beluga Sturgeon wild stock has definitely encountered a bottleneck event, sometime before the ban on commercial fishing, with a long-term ripple effect on wild stock recovery. The fluctuation and the long-term ripple effect were strongly confirmed by annual presence of haplotypes in downstream migrating offspring, distance between annual migratory groupings, and genetic structure of the meta-population.

This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CCCDI – UEFISCDI, project number ERANET-COFASP -DASTMAP, within PNCDI III.

The effects of starvation and refeeding on Hsp protein level in *Acipenser stellatus* (Pallas, 1771) under aquaculture conditions

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Key words: *Acipenser stellatus*, starvation-refeeding regime, cellular stress, Hsp proteins.

Acipenser stellatus represents a critically endangered sturgeon species, being massively captured due to its high economical value. As a consequence, stellate sturgeon is raised intensively in fish farms. Aquaculture aims to develop a new feeding strategy in order to lower the costs of raising the juveniles without affecting their health. This study aimed to determine if *Acipenser stellatus* can adapt to a starvation-refeeding regime by assessing the effects of this diet on stress biomarkers such as the level of Heat shock proteins.

Forty-eight juveniles were subjected to different feeding programs in aquaculture conditions: a) a control group was fed constantly, b) a control group was starved constantly, c) a group was starved for 7 days, d) a group was starved for 14 days, e) a group was starved for 7 days and refed and f) a group was starved for 14 days and refed. For each individual liver homogenates were obtained and the protein level of Hsp 70 and Hsp 90 stress biomarkers was determined by Western-Blot analysis.

The level of Hsp 90 protein was reduced in the liver of juveniles subjected to both starvation-refeeding regimes. However, the 7 day starvation-refeeding regime induced a decrease of Hsp 70 protein level, while the 14 day starvation-refeeding regime induced an increase of Hsp 70 level compared to the fed control. These results suggest that the 7 day starvation-refeeding regime induced cellular stress in a lesser extent compared to the 14 day starvation-refeeding regime since it reduced the level of both Hsp 70 and Hsp 90 proteins.

In conclusion, a 7 day starvation period followed by 21 days of refeeding can be used to optimize the feeding strategy in fish farms in order to enhance the profitability of raising the *Acipenser stellatus* juveniles without affecting their stress level.

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The condition of the reproductive system of two carp breeds of new generations of Moldovan selection before wintering

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Key words: breed, female, oocytes, generation, reproduction, carp.

The reproductive indices of females and males of new generations of two approved Moldovan carp breeds are analyzed: the Carp Kuboltskiy Scaly and the Carp Myndyckiy with dispersed Scaly, seventh generation of selection before wintering.

The gonads of all females were in the fourth stage of maturity. According to the morpho-physiological indicators, females and males of different breeds are not homogeneous: the mean values of the gonadosomatic index of the Carp Myndyckiy are significantly lower ($P \geq 0.99$) than Kuboltskiy's, which indicates a higher fertility and reproductive capacity of the latter. Values of the fatness coefficient in males are significantly higher ($P \geq 0.99$) than those of females and are 2.19 ± 0.005 on average for two breeds, and in females - 1.90 ± 0.004 , which is explained by higher energy costs for generative exchange in the period of intensive accumulation of yolk in oocytes in females.

Three generations of egg cells of trophoplasmic growth are clearly traced, which is a characteristic of portion-spawning fish with asynchronous development of oocytes. The youngest cells making up the third generation of oocytes are in the phases of vacuolization "D₁" and "D₂".

The greatest number of normally developing oocytes of the phase "E", which make up the first portion of the caviar, are in the gonads of the Myndyckiy carp. Their size composition in the phase of completed vitellogenesis is somewhat higher than Kuboltskiy females'. It was noted that with the increase of the gonadosomatic index, a decrease in size of ovules in the phase "E" appears, which is confirmed by other authors (Statova et al., 1982). The female with the greatest weight had the largest size of oocytes - 6.35 kg (Duvarova, 1980).

The gonads of all the investigated females of the Kuboltskiy carp in the autumn contain yolk oocytes at different stages of resorption. In the Myndyckiy carp, this was found in only one of the producers.

Before wintering the generative tissue of males' gonads contains ampoules filled with spermatozoa. In flowing producers, the contents of the ampoules merge, forming sperm streams, which is an indicator of males being in a state of sexual maturity. In the Myndyckiy carp, the size of the testicle ampulla is somewhat smaller than that of Kuboltskiy, which is explained by the higher fertility of the latter.

Thus, carp females pass to winter maintenance with gonads at the IV stage of maturity, and males with mature sexual products.

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The applications of DNA barcoding in the assignment of commercially valuable salmonids and acipenserids from Romania

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Key words: DNA barcoding, salmonids, acipenserids, fish market, wild fauna.

The issue of mislabelling fish or fish-derived products is a serious one, as there are laws that mandate correct product identification, regardless of its provenience. However, studies show that up to 30% of fish products are mislabelled in fish markets and restaurants with the problem being particularly acute in the latter. The DNA barcoding technique has been used to unmask attempts of frauds in fish markets where more desirable and expensive fish are sometimes substituted with lower valued species. In Romania, both sturgeons and salmonids have high socio-ecological importance, therefore a correct species labelling ensures not only compliance with the laws, but also a significant increase in customers' trust in the desired products.

Our study aims to test the utility of the COI barcoding gene in the correct identification of several economically and ecologically valuable fish species, and interspecies hybrids, from Romanian wild fauna, aquaculture and fish markets.

By combining the 122 COI sequences generated in this study, by using Sanger sequencing, with additional barcodes downloaded from GenBank and BOLD, we screened several members of Acipenseriformes and Salmoniformes. We followed the classic protocol of sequence identification, beginning with database query and ending with cluster analysis of the phylogenetic trees.

While COI could correctly classify the majority of Salmoniformes, the identification process for Acipenseriformes proved more difficult, especially in the case of hybrids.

Although the results show that DNA barcodes present a low degree of interspecies variation making classification possible only at the genus level, this technique is still relatively cheap, fast, and useful in the identification of incorrectly labelled market products. Furthermore, the food tracing and species identification programs are developing more and more each year, both in terms of technology and biological samples used for analysis.

Formation of the brood stock of European Catfish *Silurus glanis* (L.) in the condition of pond aquaculture

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Key words: catfish, population, generation, body weight.

According to the results of fishing for scientific purposes, as well as industrial fishing for a number of years, the share of the European catfish *Silurus glanis* (L.) in the fishery is about 2-3%.

The aim of the work is to create a pond population of European catfish adapted to reproduction and cultivation under controlled conditions to expand the range of aquaculture products and restore natural populations.

The original brood stock was formed from individuals of three generations at the age of yearlings, two-year-olds and three-year-olds, received from the producers caught earlier in the sleeve of the Dniester-Turunchuk River.

In joint cultivation of carp and herbivorous fish in pond conditions, the body weight of the European catfish increased: two-year-olds – by 9.2 times, three-year-olds – 1.38 and four-year-olds – 1.58 times. The growth of body weight in the second year of cultivation averaged 558.0 g, the third - 271.0 g. The decrease in the rate of growth is associated with both the age factor and the nature of the formation of the pond food base. The average body weight of two-year-old catfish in the fall was 626.5 gr with a variability of 29.2%. The index of physical development was at the level of 16.0 g / cm. Two-year-old and three-year-old European catfish were characterized by good exteriors.

The grown two-year-olds and three-year-olds had a high fatness rate of 0.97 and 0.89 with a physical development index of 15.6 and 20.5 g / cm respectively.

Four-year-olds of the European catfish reached an average weight of 3878 g.

Different-aged groups of European catfish grown at sparse planting densities (recommended planting density for yearlings - 60-120 pieces / ha, two-year-olds - 45-60 pieces / ha, three-year-olds - 20-30 pieces / ha), had a high growth rate. The total fish productivity from 1 hectare was 18.2; 42.7 and 73.7 kg.

Estimation of the exterior of three age groups showed that the conditions of a food ration formation and the availability of consumed live food are of major importance to obtain additional products.

The brood stocks of the European catfish *Silurus glanis* (L.) of the pond population were formed, the 1st, 2nd and the 3rd generations of selection were obtained and its reproduction was started.

Phylogenetic analysis of one brown trout (*Salmo trutta fario*) population from Romania based on a mitochondrial marker

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Key words: brown trout, mitochondrial markers, sequencing, Danubian.

Salmo trutta fario, a member of the *Salmonidae* family, is a fish species well represented in Romanian fauna, with an economic and ecological importance. *Salmo trutta* species are characterized by a phenotype adapted to the diversity of geographical areas. Thus, subspecies specialized for the way of living in rivers, lakes or seas were identified. The aim of this study was to determine the phylogenetic lineage and the genetic variability of one brown trout population by using mitochondrial markers.

We used fin clips as biological samples and we isolated the DNA by using a phenol/chloroform protocol. As mitochondrial marker we analyzed a fragment of the non-coding mitochondrial region D-loop by Sanger sequencing, the *dye terminator* version, following the specific steps. In terms of data analysis, we used *BioEdit* for DNA sequences edit, followed by *MEGA* and *FigTree* software in order to construct and visualize a phylogenetic tree. Besides the analyzed sequences, the phylogenetic tree also contains sequences retrieved from *GenBank* characteristic to the Danubian (DA), Atlantic (AT), Adriatic (AD) and Mediterranean (ME) phylogenetic lines and an outgroup sequence. In addition, we used *DNAsp* to determine the genetic variability.

After the alignment of the analyzed sequences a number of mutations could be observed in the form of nucleotide substitutions. The analyzed sequences are organized in a single cluster belonging to the DA phylogenetic line, considered native to our country. Two singleton variable sites and five parsimony informative sites were identified. Furthermore, the number of haplotypes is 4, with an average number of nucleotide differences 1.289, a haplotype diversity 0.320 ± 0.121 and nucleotide diversity (Pi) 0.00271 ± 0.00113 .

Additional studies of other molecular markers and populations are required to be able to characterize the population status of the brown trout in Romania.

Colonial waterbird genetic diversity assessment. Case study: experimental design for a genetic study in the Danube Delta Biosphere Reserve (Romania)

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Key words: waterbirds, Danube Delta Biosphere Reserve, experimental design, genetic diversity, COX1.

The extensive wetland complex of the Danube Delta provides internationally important stopover sites and breeding sites for millions of migratory birds. Worldwide, natural wetlands are facing an accelerated decline due to the increased urbanization and conversion of open spaces to agriculture. The Danube Delta is no exception, being subject to anthropogenic factors that affect this wildlife hotspot, in spite of considerable conservation efforts. Despite numerous studies focused on the Danube Delta waterbird particularities, knowledge on them is limited and highly fragmented. To provide a framework for assessing colonial waterbird populations from the Danube Delta, we developed a comprehensive experimental design to answer existing questions regarding genetic diversity, genetic discontinuities and the degree of genetic differentiation. This paper describes a study which overlaps landscape genetics principles and a small genetic survey in order to provide a feasible framework for studying colonial waterbirds from the Danube Delta Biosphere Reserve. To the best of our knowledge, this is the first experimental design of landscape genetics for colonial waterbirds from the Danube Delta. The design outline provides a paradigm framework for studying bird landscape genetics, being the first one of its kind in Romania. In addition, this work highlights the importance of study design and a proper sampling model. The design's feasibility was confirmed by the results of the pilot study, suggesting outcomes with high applicability.

The work for this paper was funded by Project PN 16 28 01 01 in the Nucleus Programme of ANCSI / Romanian Ministry of Education and Research (2016).

The presence of different elements in Herons eggshells used as bioindicators of wetland health in Moldova region, Romania: preliminary study

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Key words: herons, eggshells, trace elements, biomonitors, pollution, Eastern Romania.

Hérons are birds of prey within aquatic ecosystems and their food varies from aquatic invertebrates to fish, amphibians and reptiles to micromammals and even small birds. Different elements such as toxic metals accumulate in the top end of the trophic chain and are stored in different bird organs such as liver, kidneys, muscles or excreted through eggs or feathers. Thus, birds of prey can be used as biomonitors of ecosystem health that they occupy and implicitly as indicators of heavy metal pollution.

In the present study the concentration of seven trace metals (Fe, Zn, Cd, As, Pb, Cr and Ni) and four structural elements (Na, K, Mg, Ca) were analyzed in the eggshells of grey herons (*Ardea cinerea*) and black-crowned night herons (*Nycticorax nycticorax*). Samples (n=26) were collected from three colonies in the region of Moldova (Eastern Romania), colonies located within or nearby special protection avifaunistic sites (SPAs).

The presence of toxic metals was identified in the samples collected from a newly formed colony of grey heron in the vicinity of a European road and the Siret River, in Miclăușeni, Iași County. The pattern of element concentration in these samples followed the order: Fe>Zn>Cu>Ni>As>Pb>Cd. Although concentrations are much lower than those reported by other authors, the sequence of concentrations Cu>Pb>Cd is the same.

Also, important differences in the concentration of some elements within the same species in different areas were found. The mean value of Zn concentration in Grey heron eggshells from Fălticeni colony was 3.3 times higher than those from Miclăușeni colony. Fe and Mg was more than double, but there are significant differences between the two analyzed species, too. The mean value of Zn concentration in Black-crowned night heron eggshells was 3.6 times higher than in Grey heron eggshells and Fe and Mg was more than double.

Activity patterns of *Nyctalus noctula* in response to climatic variations during winter: a case study based on a rehabilitated colony

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Key words: noctule, hibernation, activity, microclimate, rehabilitation.

A total of 456 *Nyctalus noctula* individuals were rescued from a flat during December 2016 by specialists and volunteers from the Wilderness Research and Conservation Association and Visul Luanei Foundation. In order to reduce the relocation stress, the animals were temporarily cared for at the L'ARC animal rescue centre in Bucharest, within a hibernation chamber, which maintained optimal microclimatic conditions until the beginning of spring. The animals were periodically aroused, hydrated and fed with *Tenebrio molitor* larvae. Each animal was banded in order to keep track of its evolution during the rehabilitation procedure. In March, the animals were released in the Comana Natural Park, using specially designed bat houses. The release point was located 40 km south (2 home ranges distance) of the capture point. We have selected the natural habitat of the species within the area: an old oak forest with a high abundance of tree hollows. During hibernation, the animals were placed in a holding cage (2 m length, 1 m width, 1,4 m height). Within the cage, three bat houses were mounted, in which bats could form hibernating colonies. Temperature and relative air humidity fluctuations were recorded using hygrocron iButton data loggers placed in the hibernation cage, in a bat house (in direct contact with the bats), and the last exposed to the exterior climatic conditions. A motion sensor was also placed in direct contact with the cage walls, which recorded bat activity outside the bat houses. Results have shown that bats were active when the exterior temperatures exceeded 0°C and the interior temperatures exceeded 7°C. As temperatures were rising, the bats formed clusters outside the hibernation boxes. Mortality reached almost 10%, with high values at the end of the season, when exterior temperatures peaked at 14°C and abruptly dropped in 48 hours to -8°C.

Hunted mammals in Early Iron Age: archaeozoological data on Dobrudja sites

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Key words: archaeozoology, hunting, wild mammals, Dobrudja, Early Iron Age.

Early Iron Age sites (1200-500 BC) from Dobrudja like Babadag (2 samples), Niculițel and Rasova show important amount of wild mammal remains, but still have a large variety of remains from other species (e.g. domestic mammals, fishes), which indicates that different subsistence strategies were utilised at these places.

This paper will correlate results of the archaeozoological analyses from four assemblages (Babadag 1, Babadag 2, Niculițel, Rasova) discovered in the mentioned sites.

The proportion of wild mammal remains (of the total identified mammal remains) is 7.44% for Babadag 1, 10.27% for Babadag 2, 12% for Niculițel, and 13.3% for Rasova.

The list of wild mammal species identified in the three settlements includes *Cervus elaphus* (Red deer), *Sus scrofa* (Wild boar), *Capreolus capreolus* (Roe deer), *Bos primigenius* (Aurochs), *Canis lupus* (Wolf), *Vulpes vulpes* (Fox), *Lepus europaeus* (Hare) and *Meles meles* (Badger). Three species of wild mammals were identified in Niculițel sample, 4 species at Rasova and 8 species at Babadag. The common species in all assemblages are Red deer and Wild boar.

From the ecological standpoint, the list of hunted species suggests, foremost, an exploitation of forest (*Sus scrofa*, *Cervus elaphus*) as well as forest edge fauna (*Bos primigenius*, *Capreolus capreolus*).

This paper was supported by a grant of Ministry of Research and Innovation, CNCS – UEFISCDI, project number PN-III-P4-ID-PCE-2016-0852, within PNCDI III.

PHOTO EXHIBITION

**Contest exhibition:
Bats seen through children's eyes
within the International Bat Night,
organised in Krosno on 29th September 2017**

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Key words: bats, educational event, children, International Bat Night, exhibition.

The aim of the contest was to draw attention of the participants to the beauty of nature and its unusual details basing on the example of bats. The main purpose of the competition was to develop the skills of nature observation, documentation, interpretation and description among children and young people, as well as the participants' environmental awareness.

Bats are the only flying mammals that live during the night. They feed mainly on mosquitos, thus we often call them our friends. They are a dying species under a strict protection. The educational events called Bat Nights aim to bring children, young people and adults closer to life of bats and the need to protect them. The people who protect these animals are awarded with the "Bats Friend" crystal medal. There are 25 species of bats living in Poland and about 1200 species of this mammals living in the world that spend their winter in different hiding places while being hibernated. We wish them a happy and peaceful survival through the winter season, and also we hope the visitors will have a wonderful artistic experience.

There were 252 works in the contest, prepared by pupils of primary and lower secondary schools located in the Podkarpackie Province. The works were evaluated by a committee consisting of three people with qualifications and knowledge of different animal species and plastic arts. The presented works aim to raise the awareness about the importance of the protection of endangered species among young people and adults. Although the exhibition presents only 25 awarded and honoured works, all the submitted works were wonderful.

We sincerely congratulate to all the participants of the contest.

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ISSN: 2457-9777
ISSN-L: 2457-9769