Contribution to the faunistic research of beetles (Insecta: Coleoptera) in Natural Monument Růžový kopec near Mikulov

David Kopr

The research of Natural Monument Růžový kopec took place at 2020. There were made six visits of the site during the vegetation season. During the survey, 183 species of beetles belonging to 26 families were found at the site, of which 5 species are protected pursuant to Section 56 Paragraphs 1 and 2 of Act No. 114/1992 Coll. and 38 species are included in the Red list of threatened species of the Czech Republic (Hejda et al. 2017). The most valuable species caught were *Agrilus roscidus* (Buprestidae), *Licinus cassideus* (Carabidae), *Zabrus spinipes* (Carabidae), *Liparus dirus* (Curculionidae), *Pseudocleonus cinereus* (Curculionidae), *Rhabdorrhynchus echii* (Curculionidae), *Cardiophorus vestigialis* (Elateridae), *Melanotus tenebrosus* (Elateridae) , *Coptocephala chalybaea* (Chrysomelidae), *Cheilotoma musciformis* (Chrysomelidae) and *Tituboea macropus* (Chrysomelidae).

Keywords: **beetles, faunistics, Coleoptera, entomology, Pálava**

Use of peas in fish nutrition

Filip Zezula, Jan Mares, Ondrej Maly, Michal Sorf, Lukas Pfeifer

The aim of the study was to evaluate the effect of peas as a component in feed mixture for common carp (*Cyprinus carpio*). During 70-day experiment, we especially targeted to production parameters (SGR, FCR, individual increment in %, total increment in %). Standard feed mixture commonly used in fisheries, KP1 containing 18% of nitrogenous substances (Stříbrné Hory) was used as a control diet. Six experimental treatments were as follows: control, 30% peas, 60% peas, 30% peas including citric acid and phytase and 60% peas including citric acid and phytase. The addition of citric acid was 3% and phytase 500 FTU. Fish were fed twice a day with a diet corresponding to 3% of average weight of fish stock. Weighting and adjustment of feed ration took place every 14 days. Fish were measured and weighted at the end of the experiment when samples were also taken. Besides production parameters, a length-weight parameters were also determined. Results were statistically evaluated using Kruskal-Wallis test. Common carp production measured as both the production and length-weight parameters revealed better performance in acidified diets. To conclude, peas addition in suitable ratio especially in combination with citric acid positively influenced common carp production and length-weight parameters.

Keywords: **pea, common carp, nutrition, production parameters, citric acid**

Importance of cereals for population dynamics of common voles (*Microtus arvalis*) – a case study from Moravia (Czech Republic)

Gabriela Skopalova, Jan Sipos, Josef Suchomel

The case study evaluates the importance of cereals for population dynamics and the occurrence of common voles. A time series data (2011–2020), obtained from the Phytosanitary Portal, was used, concerning repeated monitoring of the number of active burrows in different districts of the country. The data were then evaluated using a linear mixed-effects model. The results showed that the abundance of common vole in cereals was conclusively lower than in the other monitored crops and thus represents one of the least suitable habitats for common voles in agrocenoses, despite the considerable damage caused by voles in these crops. Across the Czech Republic, the numbers of active vole burrows in cereals were significantly lower than in perennial forage crops and winter rape. In Moravia, similar results were found in the South Moravian, Olomouc and Zlín regions.

Keywords: **vole, cereals, rape, perennial forage, population dynamics**

Rotifers and microcrustaceans communities in natural and restored peatlands

Lukas Pfeifer, Michal Sorf

Peatlands in the Czech Republic were significantly affected by anthropogenic pressure, drainage and the subsequent drying. The reason was mainly the peat extraction. Nowadays, there is the effort to restore peatlands to their natural character and to protect them. The aim of this study was to evaluate the current state of selected peatlands based on species composition of rotifers and microcrustaceans in both the natural and restored peatland localities in the Ore Mountains and the Bohemian Forest. A total of 39 rotifer and microcrustacean taxa were found.

Keywords: **peatland, restoration, rotifers, microcrustaceans, cladocerans, copepods**

Influence of different forage mixtures treated selenium and zinc on pollinators

Karolina Sodomova, Marian Hybl, Jan Sipos

Biodiversity and pollinator abundance are still declining. Due to many environmental influences, the health of pollinators is also endangered. This harms the environment and crop production, as pollinators are an irreplaceable component of our ecosystems. The constant deterioration of this situation is due to several factors. These are oxidative stress, pesticides, low resistance to diseases, habitat loss, and, last but not least, the quality and availability of their diet. In this study, we focused on two elements that are very important for the proper function of metabolism and contribute to the overall defence of the body, namely selenium and zinc. Both elements should increase the quality of pollen and nectar produced by the treated plants. Based on our results pollinators was not affected by the application of microelements, but rather by the botanical composition of flowering meadow mixtures. Thus, pollinators responded to differences in species composition and abundance of flowering plants rather than to treatment. The richness of pollinators was higher on meadow mixtures containing more flowering plants, which produce more pollen and nectar and have a higher nutritional value than others.

Keywords: **biodiversity, abundance, pollinators, meadow mixture, selenium, zinc**

Toxicity tests on *Daphnia magna*

Petra Melezinkova, Eva Postulkova, Radovan Kopp

The aim of this study was to determine the toxic effect of chemicals on the tested organism *Daphnia magna*. The following substances were selected for testing: polyaluminium chloride (PAX 18), its aqueous solution (PAX 19) and potassium dichromate (K2Cr2O7) as a reference substance. The experimental concentrations for PAX 18 were in the intervals 1–100 mg/l, for PAX 19 10–300 mg/l and for K2Cr2O7 40–150 mg/l. Testing was performed in three replicates with ten specimens. Each test took 48 hours without changing the medium. The test organisms were not fed, and a tap water was used as a medium. The 24hEC50 values were as follows: 45.06 mg/l for PAX 18, 97.82 mg/l for PAX 19 and 1,57 mg/l for potassium dichromate. The 48hEC50 values were as follows: 22.62 mg/l for PAX 18, 37.20 mg/l for PAX 19 and 0.864 mg/l for K2Cr2O7. Changes in pH, dissolved oxygen content and number of inhibited individuals were regularly monitored. The pH values for PAX 18 were between 4.56–8.40, for PAX 19 within the range of 5.63–8.40 and for K2Cr2O7 did not drop below 7. Low pH values for PAX 18 and PAX 19 can be explained by very low pH value of the test substances, therefore the results can be considered as valid. The oxygen content was sufficient for all three test substances. The concentrations of chemical substances used in toxicity tests were more toxic for daphnids than the concentrations introduced into the aquatic environment.

Keywords: PAX 18, PAX 19, toxicity, *Daphnia magna*, ecotoxicology, inhibitions, biotests, acute tests

Is oral application of plastic particles able to provoke the oxidative stress and alter expression of an immunity related genes in rainbow trout?

Aneta Hollerova, Nikola Hodkovicova, Jana Blahova, Martin Faldyna, Denisa Medkova, Jan Mares, Zdenka Svobodova

In these days aquatic pollution by plastic materials is a worldwide environmental problem and may negatively affect the health of organisms exposed to oral intake of these contaminants. The main task of this study was the evaluation of polystyrene (PS) microparticles effects on selected health parameters of rainbow trout (*Oncorhynchus mykiss*) juveniles. Tested fish were divided into 4 groups – with 0.5%, 2% and 5% concentration of PS microparticles in diet and control group without the addition of microplastics. The experiment was divided into two samplings – after 4 weeks and 6 weeks of exposure. Significant differences were found in liver tissue and gills in the highest PS concentration related to control. In conclusion, PS microparticles can affect health indices of *O. mykiss* and the potential risk for aquatic environment and even human consumption should be considered.

Keywords: microplastics, aquatic environment, *Salmonidae*, qRT-PCR, oxidative stress, toxicology

Effects of pesticides on catfish (*Silurus glanis*) embryos

Denisa Medkova, Pavla Lakdawala, Veronika Doubkova, Jana Blahova, Aneta Hollerova, Zuzana Weiserova, Nikola Hodkovicova, Zdenka Svobodova, Jan Mares

Pesticides and many other types of contaminants have been constantly entering the aquatic environment. Pesticides, which are commonly used in agriculture, can have a negative impact on non-target species as well as human health. In the few past decades, water pollution caused by pesticides has become a commonly discussed issue. Residues of pesticides enter water environment, where they persist and have bioaccumulation potential. The aim of this research was to compare the effects of herbicide MCPA (4-chloro-2-methylphenoxyacetic acid), fungicide prochloraz and herbicide metazachlor on catfish (*Silurus glanis*) embryos in 96 hours long acute toxicity test with the five different tested concentrations. In the study, statistically significant changes were observed only at high concentrations that do not occur in nature. The results of the study show that the substances had a negative effect on fish development at some tested concentration. However, this screening study must be followed by studies of sub chronic and chronic toxicity with focus on lower tested concentrations in order to reveal a potential negative impact of long-term exposure to non-target species.

Keywords: **development, malformation, mortality, hatching**

Selected biochemical parameters of two common carp (*Cyprinus carpio*) breeds infected with koi herpesvirus

Radek Machat, Lenka Leva, Lubomir Pojezdal, Martin Faldyna

Koi herpesvirus (KHV) is infective agent causing one of the most serious diseases of common carp. Koi herpesvirus disease (KHVD) morbidity and mortality might reach 100%. Two common carp breeds with completely different susceptibility to KHV were chosen in this study. Koi carp, which is highly susceptible to KHV and amur wild carp. In this study, levels of chosen biochemical markers at 7 dpi (days post infection) were measured, namely: total protein, albumin, alanine aminotransferase, aspartate aminotransferase, glucose, triglycerids, cholesterol, calcium. Nevertheless, no differences in monitored blood factors were measured at this time point.

Keywords: **koi carp, amur wild carp, cyprinid herpesvirus 3, blood plasma, biochemic analysis**