

## AIR MASS TRANSPORT AND PRECIPITATION CHEMICAL COMPOSITION IN SOUTH-WEST BULGARIA

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### ABSTRACT

The purpose of the investigation is to determine the dependency between the precipitations' chemical composition and the origin and trajectory of the precipitating air masses. The local and adjective components of precipitation pollution are illustrated through four types of precipitation situations. The contribution of local pollution to the precipitation's composition is assessed through air quality analysis before and after the precipitation. The present work investigates the chemical composition of precipitations in Bulgaria under three types of general atmospheric circulation – WZ, SWA, and NZ according to the classification of Hess and Brezowsky and Mediterranean cyclones. A relationship between the precipitations' chemical composition and the path of the cloud systems was studied. The presence of the main anthropogenic ions in the air leading to precipitation acidity was investigated. The influence of trans-boundary factors is determined analysing the simultaneous precipitations from the same cloud systems in urban arias and the background regions. The pollution sources in South-West Bulgaria have not been investigated vis-à-vis precipitation chemical composition till now. Nor have there been comparisons between precipitations' chemical composition in urban areas and background stations. The contribution of trans-boundary transport on the precipitation composition has not been differentiated.

**Key words:** precipitation chemistry, trans-boundary transport of pollutants, atmospheric circulation

## BACTERIOLOGICAL WATER QUALITY OF SURFACE SPRINGS AROUND LAKE OHRID

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### ABSTRACT

The ancient Lake Ohrid is an oligotrophic, cold oligomictic, calcareous, graben, mark lake, mostly fed with spring water from the numerous sublacustrine and coastal sources. Besides tributaries, the main input comes from the numerous karstic springs around the lake. The bacteriological quality of spring waters around Lake Ohrid were evaluated. Samples were collected from 8 natural springs (St. Naum, St. Petka, St. Bogorodica, Korita, Elsani, Biljanini, Hydrobioloski and Kalista springs) and analysed for total coliforms, enterococcus bacteria, *Escherichia coli*, *Clostridium perfringens* and parameters of ecological aspect (heterotrophic, proteolytic, amilolytic, lipolytic and phosphorusmineralizing bacteria). Standard methods were used, with general and selective nutrient media and membrane filter method. Based on results, received from the bacteriological analyses of surface springs around the Lake, in general, from ecological aspect, we can conclude that all the investigated parameters have values characteristic for pure spring water. This state is a result of a low biodegradable organic matter concentrations. The total bacterial counts (heterotrophs) ranged from 18 to 612 bact.ml<sup>-1</sup>. The values obtained for bacteria which mineralize organic matter of protein, sugar or fat origin are small or insignificant. Also, phosphorusmineralising bacteria suggests a small concentrations of phosphorus. The coliform organisms, although in small amounts, were present almost in all springs. Enterococci and *E. coli* occur occasionally after rainy periods. Three springs were heavily contaminated. Based on criteria which used the ratio of faecal coliform to faecal streptococci, all springs studied may be contaminated with human and animal wastes. It is concluded that the spring waters studied are unsuitable for human consumption unless disinfected.

**Keywords:** surface springs, Lake Ohrid, water quality, bacteria,

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## A SURVEY OF BIOAVAILABLE FRACTION OF PERSISTANT ORGANIC POLLUTANTS IN THE POLLUTED AREAS ON LAKE SHKODRA

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### ABSTRACT

The Shkodra Lake is located on the border between Montenegro and Albania and is the largest lake in Balkan. During the last decades, the anthropogenic pollution is going to be significant in this area. The exposure of aquatic biota to certain HOPs is of immediate concern because of the ability of some of these compounds to bioaccumulate and induce either lethal or sub-lethal toxicity including mutagenic, carcinogenic, teratogenic and endocrine disrupting effects on species at all tropic levels and in doing so disrupt the normal functioning of the whole ecosystem. Consequently, the regulatory monitoring and risk assessment of hydrophobic contaminants in surface waters is generally hampered by the inability to measure reliably these low (and sometimes fluctuating) concentrations. In order to solve this problem and to monitor the bioavailable fraction of more hydrophobic organic micropollutants is used the laboratory extraction of water samples by using a polymeric material as a receiving phase as polydimethylsiloxane (PDMS) the most applied polymer. The concentrations of a number of PAHs in lake Shkodra water ranged from 0.01-5 ng/L.

**Key words:** PDMS, PAH, HOP

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## CYANOBACTERIA FROM SHKODRA LAKE AND HISTOLOGY OF LARVAE HYPOPHthalmichthys MOLITRIX (Valenciennes 1844)

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### ABSTRACT

The aim of this study was to find out how crude extract of cyanobacteria can influence larval development of hypophthalmichthys on the basis of embryo-larval toxicity test and histological changes of liver of larvae hypophthalmichthys exposed 30 days to the crude extract of cyanobacteria with the cumulative concentration  $9.0 \mu\text{g l}^{-1}$  (medium concentration of the extract) and  $0.9 \mu\text{g l}^{-1}$  (low concentration of the extract) of microcystins LR, RR and YR. The experiments were finished after 30 days. Evaluation of the tests was based on the OECD guideline for testing chemicals, direction 210 from 1992. Liver sections were stained with haematoxylin-eosin and using light microscopy. The extract with medium concentration caused an increase in malformed and dead larvae. The extract with low concentration caused an increase in dead larvae. Vacuolisation of hepatocytes accompanied by damage of nuclei (pyknosis,) were found in the group exposed to the low concentration of the extract. Necroses of hepatocytes with vacuolization and nuclei damage (pyknosis, karyolysis,) were found in the group exposed to the medium concentration of the extract. The degree of damage depended on the concentration of the extract.

**Keyword:** cyanobacteria, malformations, fish, histology

**SOME ENDANGERED COLEOPTERASPECIESOF NORTHERN ALBANIA****Ariana STRINIQUI LAÇEJ<sup>1\*</sup>, Kastriot MISJA<sup>2</sup>, Neira MEDJA<sup>1</sup>,***Department of Biology, University of Shkodra,  
University of Tirana, Faculty of Natural Sciences**\*e-mail: a.striniqui@yahoo.com***ABSTRACT**

In this study we are going to present some Northern Albanian Coleoptera species, endangered in their habitats, which have also their perilous categories at the national level based on the Red List of IUCN (International Union for the Protection of Nature). There are exactly 12 Coleoptera species with their risked categories: VU (6 species), EN (2 species), LR (2 species), CR (2 species). These data are derivative of a several-year monitoring, based on expeditions carried out in different areas of the country. We think that there are lots of causes of their peril, but the most important to be highlighted are the destruction of their habitats, the collection before egg emplacement, chemical –organic contamination of waters (for water insects) etc. To prevent these risks we should take measures for the protection and preservation of the habitats, to elude commercial collections. Meanwhile, we should investigate thoroughly on ecological research and should monitor endangered species and their habitats, especially those from EN category (*Calosoma sycophanta*, *Gymnopleurus mopsus*) and CR category (*Osomderma eremite*, *Rosalia alpina*).

**Key words** Coleoptera, Chrysomelidae family, Albania, Malësia e Madhe Region.

## THE PARTICULARITIES OF CHEMICAL POLLUTANTS ACCUMULATION IN DIFFERENT COMPONENTS OF FOREST ECOSYSTEMS IN MOLDOVA

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### ABSTRACT

The study performed in 34 forest ecosystems in the Republic of Moldova indicates that there are certain particularities concerning differential accumulation of heavy metals in abiotic and biotic ecosystem components and possible sources of pollution. The results of the chemical analysis of the six studied chemical elements (Cu, Zn, Cd, Pb, Cr and Ni) show that none exceeded maximum permissible concentration in the *soils* of our forests. It has been evaluated that *trees* tend to accumulate Zn, Cu, Pb, Cd and Ni which is confirmed by high concentration of these elements in the litter of representative species. *Mosses* intensely accumulate Pb, Cd, Cr, whereas *lichens* proved to be the best accumulators of Cu, Pb and Cr. In particular, the litter layer and mosses accumulate better Cd than lichens do, which indicate the possibility of their use in monitoring of environment pollution with Cd. In all cases mosses and lichens accumulated more Cr than the litter does, which probably involves a cross-border penetration of the pollutant by air. Ni is accumulated better by trees, because the element content in the litter prevails over that in lichens and mosses. Its origin can be both ground and air. Taking into consideration investigated bio accumulator's cumulative properties and distribution uniformity, the following species are recommended to be applied in the monitoring of ecosystems pollution with heavy metals within the Republic of Moldova: oak - *Quercus robur*, mosses - *Hypnum cupressiforme*, lichens - *Parmelia sulcata* and mollusks - *Helix pomatia*.

**Key words:** ecobioindication, heavy metals, pollution, forest ecosystems, mosses, lichens, mollusks.

## ADSORPTION AND RECOVERY OF SRG EXTRA FROM ACTIVATED CARBON USED IN WATER SYSTEM STUDIES

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### ABSTRACT

The purpose of this paper relates to determining the adsorption and recovery degree from activated carbon bags of Sulphorhodamine G Extra (SRG) which can be used as fluorescent tracer in studies of aquatic environments. The effect of the activated carbon is that traces of the used dye are strongly fixed at the surface of the carbon grains. This attribute is used in different water systems studies with fluorescent tracer experiments. Carbon bags are used for the first time in our country in karst system study of Mali me Gropa and in the studies of Ohrid-Prespa system (2002, 2007). The adsorbed dye can be extracted from carbon bags using appropriate mixture solutions. Based on measurements of SRG Extra fluorescence intensity in standard solutions and extracts we can calculate its adsorption and recovery degree from active carbon bags. The obtained results prove that extreme low traces of SRG Extra, which cannot be detected directly in the water sample, can be determined in carbon extracts.

**Keywords:** Artificial tracer, Fluorescence Intensity ( $I_F$ ), Synchronous scan, SRG Extra, Activated carbon.

## AIR POLLUTION IN SHKODRA REGION

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### ABSTRACT

In this paper we have presented detailed results of air pollution over Shkodra region. We have obtained measurement results on number and mass concentration of particulate matter. Measurement campaigns were carried out in several areas; urban centre of Shkodra city, rural areas around this city, places near the perimeter of Shkodra Lake, seashore places of Velipoja (Adriatic Sea), and nearest mountain areas. The principal goal of this study is evaluation of air pollution situation in Shkodra region, and the determination of principal sources of particulate matter in this region. Monitoring results indicate the fact that principal sources in the Shkodra region are; traffic from the nearest roads, combustion activities from Shkodra city and surrounding residential rural centers, combustion activities from residential and commercial activities around the Shkodra Lake and Velipoja beach, biomass burning in rural areas, sea salt from the Adriatic Sea, and residential and touristic activities in mountain areas. Higher concentrations of particulate matter were obtained in urban centre of Shkodra city, whilst lower values were obtained in mountain areas.

**Keywords:** Air pollution, particulate matter, Shkodra region

## THE DETERMINATION OF PHYTOREMEDIATION LEVELS OF ORNAMENTAL PLANTS USED IN LANDSCAPE

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### ABSTRACT

Nowadays, environmental pollution related in industrial development is one of the most important problems. The researches in this field are generally conducted using hyper accumulator plants. The phytoremediation properties of some ornamental plants used in landscape have been also investigated. The objective of this study was to determine accumulation of heavy metals in leaves of some ornamental plants used in the landscape of Yüzüncü Yıl University campus area near Lake Van. Leaf samples of the plant species belong to leafy, coniferous and shrub were taken from the refuge of main road in the campus area affected heavy metal pollution due to intensive motorized traffic, and from the coastal areas far away from the intensive traffic. Nickel, lead, cadmium, iron, zinc and copper concentrations were determined in leaf samples. There were significant differences among the plant species ( $P<0.01$ ) according to Fe, Zn, Cu, Ni, Pb and Cd contents of leaves. There were also significant differences among the locations ( $P<0.01$ ) for Fe, Zn, and Cd contents of leaves. Interactions between locations and plant species were significant ( $P<0.01$ ) for the heavy metals, except Pb. The highest Fe, Zn, Cu, and Cd concentrations were obtained in species of *Cedrus libani* A.Rich (618 ppm), *Betula alba* Linn. (106.30 ppm), *Salix alba* L. (24.54 ppm) and *Eleagnus angustifolia* L. (0.28 ppm), respectively. The highest Ni (6.36 ppm) and Pb (3.76 ppm) contents were determined in *Pyracantha coccinea* M. Roem.

**Key words:** Accumulation heavy metals, ornamental plant, phytoremediation