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HISTORICAL SURVEY ON AQUATIC BIODIVERSITY STUDIES IN ROMANIA - DR. GRIGORE ANTIPA'S SCIENTIFIC HERITAGE

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Keywords: aquatic biodiversity, history of limnology, Grigore Antipa, Romania.

Abstract

The author of the paper pleads for reprinting and translating, where necessary, Dr. Gr. Antipa's scientific work, which is a treasure of Romanian and European thinking. Dr. Grigore Antipa (1864 - 1944) - member of the Romanian Academy and one of the great theorists of Romanian ecology, above all endowed with a particular gift for practical application of scientific knowledge in the daily economic life, studied the easily flooded plains of the Danube River, the Danube Delta and the Black Sea from an ecological, theoretical and practical point of view, laying the basis for the concept of bio-productivity and underlining the modern meaning of the notion of biocoenosis; even today his researches are not only a model/an example of practical application of ecological data but also the basis of modern fish culture management in Romania and other countries as well.

It has been over a century since Dr. Grigore Antipa set out on his great enterprise whose target was to improve the complex biological knowledge of the natural mechanisms of fish production in the macro-geo ecosystem of the Danube River, the Danube Delta and the Black Sea. The results of his researches were published in numerous papers ("Biologie des Donaudeltas und Uberschwemmungsgebiete"- 1908, "The easily flooded plains of the Danube River"- 1910, "Fisheries and fishing in Romania"- 1916, " The Danube River and its scientific, economic and political problems"- 1921, "The biological bases of the production of fisheries in the NW part of the Black Sea"-1931, "Life in the Black Sea "- 1933, "The Black Sea biosociology and bioeconomy"- 1933, "General organization of both collective life of organisms and production mechanism in the biosphere"- 1935, in the impressive monograph "The Black Sea"- 1941 etc.); the results were also presented at prestigious international scientific meetings (e.g., International Congress of Zoology in Budapest - 1927, Congress of Aquaculture and Fishing in Paris - 1931), or constituted administrative memoirs presented to the Government with the purpose of improving the state of fisheries in Romania.

The papers of the distinguished biologist Grigore Antipa form a unique fundamental work of everlasting value, which roused a great interest many decades back and are still reference papers of present interest due to the problems they tackle or analyze. Thinking far ahead, Dr. Grigore Antipa brought forward the issue which, nowadays, we call "management for the sustainable development".

The scientific work of the great patriot has become a national heritage which we will have to pass on to the future generations; it is an example of a life dedicated to real and everlasting values, a model fully accepted in the European world of that time.

Rereading the work of the illustrious predecessor, reprinting it in a linguistic garment accessible to a wide range of readers in our country (translating into Romanian papers published in a foreign language) and abroad (translating into English papers published in

Romanian in the original), that is a duty of honour and a humble homage of high gratitude paid to a scientist who is , even today, a vivid example of seriousness in one's life, of love of country and the world of waters and of a strong sense of duty.

What are the major coordinates of Dr. Grigore Antipa's instruction and completion?

Dr.Grigore Antipa evolved in a university atmosphere of seriousness, will and huge scientific interest in the knowledge of nature, in an environment of academic rivalry with eminent professors and students;

Dr.Grigore Antipa learned directly from masters representing true institutions or fields of science, vast cultural personalities, philosophers of science, true pioneers in biology;

Dr.Grigore Antipa had models that stimulated not only his deep interest in scientific knowledge but also in practical value, in economic and social development.

The brilliant student (PhD with "summa cum laudae") and assistant of the great scientist Ernst Haeckel in Jena – the creator of the concept of "ecology", Dr. Gr. Antipa remains one of the brightest creative figures of our nation. The grateful country bestowed on him the deserved honors during his tireless life and commemorated him after his great departure. Let us remember him for ever, since all of us, by accepting the call and challenge of water life magic, must sip from the well of wisdom bequeathed by Dr. Antipa to the future generations. Let us learn from Dr.Grigore Antipa's thinking and deeds that are still present after almost a century.

Finally, after submitting parts of Dr.Gr.Antipa's life and work, the author looks at some of the current tasks of the scientific community concerned with the knowledge of aquatic biodiversity, showing the perennial ideas of the great scientist:

Targets that scientific communities of hydro- biologists, including the Romanian one, should achieve:

- finding ways to stop the loss of biodiversity in the Danube and Black Sea aquatic systems and assessing the ecosystem state (complex dynamics, nonlinear responses and abrupt or irreversible shifts);
- understanding the drivers and evaluating the ecological, economic and social consequences of biodiversity change;
- improving knowledge of the complex interrelations between biodiversity, ecosystem functions, ecosystem services and their dynamics and the influence of the global change upon aquatic biodiversity;
- obtaining funds to improve the understanding of aquatic biodiversity and the mechanisms of recovering ecosystem biological productivity in the catchments;
- contributing to the conservation and sustainable use of aquatic biodiversity, and thus implementing the principles of the Convention on Biological Diversity.

According to the Recommendations of European Platform for Biodiversity (2005) special priorities for biodiversity on fisheries should be as follows:

- Develop the ecosystem-based approach to the management of fisheries and aquaculture supported by appropriate sociological and socio-economic research;
- Improve the understanding of the population structure of commercial species in order to optimize stock management, by making use of modern and traditional approaches;
- Improve understanding of the ecosystem effects of fishing activities and how they may be reduced, in particular through fishing gear developments including selectivity;
- Pursue further research into the ecological impacts of aquaculture to facilitate informed and sustainable development and management;
- Investigate new and alternative approaches to ensure the future economic and environmental sustainability of the aquaculture sector.

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NON-NATIVE FISHES IN THE MIDDLE EUROPE, A REVIEW

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Keywords: invasions, Danube, Aquaculture.

Abstract

There are many exotic fish species introduced to Europe, and many more have been translocated among European countries (Holčík 1991; Lehtonen 2002; Copp et al. 2005). At least 76 freshwater fish species from other continents have been introduced to European waters, with at least 50 species having established self-sustaining populations in one or more European countries (Lehtonen, 2002).

The aim of this study was to gather, as possible, existing information on alien fish in Middle Europe by using the published data, data from fish farms, fish research institutions, administrations and consultants.

In Germany, 14 out of 95 non-native fish species ever registered are established today, further four potentially established and three not. Of the remaining species, only the *Neogobius* species are actually spreading throughout the waterway network, whilst other stocks rather tend to decline or did not change. Most widespread was rainbow trout *O. mykiss*, which is at the same time the most important fish for German commercial inland fisheries.

Based on the comprehensive revision of the fish species introductions in Czech Republic, pond aquaculture and recreational fisheries were identified as major pathways responsible for 80% and respectively 40% of all introduced fish species. The contribution on use of non-native fishes and its over last decade trend strongly differs between aquaculture and recreational fisheries and group of target species (salmonid, non-salmonid).

At the present time, totally 76 fish species form a populations in Slovakia. There are 54 autochthonous and 22 allochthonous fish species, 8 of them are translocated and 14 are exotic fishes. The invasive characters in 13 allochthonous fish species were considered, the recent native/total fish ratio is 0.71.

The list of non-native fish species in the Poland territory has increased with time, and new species are presently being added. Before the 19th century there were probably only two fish species, in the beginning of the 21st century the list grow and consist of about 25 fish species. The dynamics of changes in number of non-native fish species shows a radical increase of new invasions (or sometimes just of new findings), especially during the last decade.

The number of non-native fishes in Bulgaria has dramatically increased throughout the past 70 years. At present, 26 exotic fish species have been registered. They represent 15 percent of Bulgarian's territory freshwater fish fauna and provide more than 60 percent of the aquaculture production. Only 12 fish species have been naturalized till the present. Two of these species (*Lepomis gibbosus* and *Perccottus glenii*) are considered invasive species. Along with these fish species introductions, parasites, bacterial and viral pathogens were also imported.

The Slovenian inland waters are inhabited by 86 species of fish of which 70 are indigenous and 16 have been introduced. Documentation of fish introductions to the area currently encompassing Slovenia began in 1891, when the occurrence of rainbow trout *Oncorhynchus mykiss* species was mentioned. All these introductions were performed mainly by fishermen who introduced non-native fish species either intentionally for their angling purposes and aquaculture, or accidentally with the restocking rivers occasions with native species.

Twenty six non-indigenous fish species have been introduced to the wild within the territory of Romania. *Carassius gibelio* and *Pseudorasbora parva* are the most widespread, and both continue to expand their ranges. Herbivorous Asian fishes (*Ctenopharyngodon idella*, *Hypophthalmichthys molitrix* and *Hypophthalmichthys nobilis*) increase its density too. A reduction in range has been observed in *Anguilla anguilla, Ameiurus nebulosus* (after appearing relative *Ameiurus .melas*), *Lepomis gibbosus* and *Gambusia affinis*. Most of these introductions occurred after 1950. The origin of introduced species was mainly China and the ex Soviet Union area.

There are 24 species of introduced fishes in the freshwater habitats of Serbia. The typical invasive species are *Ameiurus melas*, *Perccottus glenii*, and gobiid species. These Ponto - Caspian fish species have recently been reported often hundreds of kilometres upstream from their original distribution area. This range extension is only explainable by dispersal during the last decades. *Gasterosteus aculeatus* and *Syngnathus abaster* increase the density. A reduction in range and density has been observed in *Ameiurus nebulosus* and *Micropterus salmoides*.

The purpose of intentional introductions of the non-native fish species in Hungary was mainly farming (sixteen species in the present), seven species spread spontaneously from neighbouring countries and two species was introduced unintentionally. Altogether 28 non-native species was established in Hungary. Except five invasive gobiid species, *Ameiurus melas, Gasterosteus aculeatus* and *Perccottus glenii* increase the density.

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SILICA-SCALED CHRYSOPHYTESION (CHROMOPHYTA) IN THE CARPATHIAN BASIN

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Keywords: Synurophyceae, Chrysophyceae, distribution pattern, wetlands, nature reserves, Transylvanian Plateau, Depression of Braşov, Pannonian Plain.

Abstract

This account is based on the silica-scaled chrysophytes investigated by the present authors since 1965, occurring in various wetland habitat types (oxbow lakes, fishponds, shallow lakes, pools, bogs, peat bogs, roadside ditches etc.) located in the Romanian Western Carpathians, Transylvanian Plateau and in the Depression of Braşov, as well as in the Pannonian Plain (Romanian Western Plain, Little and Great Hungarian Plains).

The silica-scaled chrysophytes are distributed all over the investigated area, according to their preferences/tolerances towards environmental conditions and biogeographic pattern.

Their appearance is "meteoric", they occur sometimes for several subsequent years in the same sites, when the local conditions are appropriate, but may equally disappear for many years seemingly without any obvious particular reason. The silica-scaled chrysophytes occur more abundantly in early spring, when the water temperature is below 10^0C, being characteristic members of the algal communities after the melting of ice cover. The spring populations usually form endogenous siliceous stomatocysts when temperature increases above the critical value. With less abundance they may be present in the autumn communities too. Some of the silica-scaled chrysophytes are usual members of the summer phytoplankton communities developing sometimes high population densities.

Each habitat type exhibits its particular silica-scaled chrysophyte flora according to the physical, chemical and biological characteristics of the water (light, temperature, oxygen content, pH, mineral and organic loading, conductivity, grazing zooplankton and so on).

The authors recognized several wetland areas, with outstandingly diverse and interesting silica-scaled chrysophyte floras.

One of these interesting areas, from this study point of view is the "Mestecănişul de la Reci" Nature Reserve, situated in the Covasna County (Depression of Braşov), in the south-west of Transylvania, Romania. It is the central part of the wetland area, located in the extended aeolian sand dunes region which had been formed at the beginning of the Holocene, after the ancient quaternary lake of the depression was drained by the "Râu Negru" stream. The rising ground water generated hundreds of small pools and bogs in the depressions formed among the consolidated sand dunes. These are in various stages of silting, exhibiting high diversity of aquatic and paludal vegetation. There have been documented 26 *Mallomonas*, 8 *Synura,* 1 *Chrysosphaerella* and 1 *Paraphysomonas* taxa inhabiting the pools, bogs, peat bogs and oxbow lakes of this area. The most important ones are *Mallomonas transsylvanica*, *Mallomonas strictopteris*, *Synura splendida* and *Synura lapponica.*

Another interesting wetland area, similar with the above mentioned one, is the "Baláta-tó" Nature Reserve located between the Balaton and the Dráva river (Somogy County, in the south-west of Hungary). This area is covered by Pleistocene sands of diluvial origin. The wetland habitats are shallow, acidic bog-lakes formed in the depressions between dunes. The largest is the mesotrophic "Baláta-tó", sheltering many desmids, euglenoid flagellates and also 26 silica-scaled chrysophytes (1 *Chrysosphaerella,* 20 *Mallomonas* and 5 *Synura*). Outstanding is the presence of *Mallomonas pillula* and *Mallomonas scalaris* (first records for the Carpathian Basin). Also important is the presence of *Mallomonas alata* f. *hualvensis*, which was first time recorded in Europe.

The fishponds of the Pannonian Plain are inhabited by eutrophic phytoplankton communities in which several silica-scaled chrysophytes may develop relatively high population densities. The presence of *Mallomonas portae-ferreae* and *Mallomonas cyathellata*, species with subtropical/tropical distribution pattern is quite remarkable in the fishponds of Hortobágy.

CARPIOGARDA: A PROJECT FOR CONSERVATION OF THE ENDANGERED ENDEMIC SALMONID *SALMO CARPIO LINNAEUS, 1758* IN THE GARDA LAKE (ITALY)

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Keywords: *Salmo carpio*, endemic specie, IUCN red list, supportive breeding, genetic markers, morphometry, conservation.

Abstract

The carpione *Salmo carpio* is a species endemic to Lake Garda, and is included in the IUCN Red list as Critically Endangered.

The *Salmo carpio* has a peculiar biology compared to other Salmonids species: it lives in banks, feeding mostly on zooplankton, and spawns in the Garda Lake at depths ranging from 40 to 200 meters. *Salmo carpio* has two distinct reproductive periods per year (December-February and July-August).

Among the factors that negatively affect the survival of this taxon we can underline the competition and predation from allocthonous species, high fishing pressure and also water pollution.

At present *Salmo carpio* fishing is regulated by the provinces of Trento, Verona and Brescia through the establishment of "no-fishing"periods (from 15th of November to 31st of January and from 20th of June to 20th of August), and through regulation of the type of fishing net allowed to professional fishing.

There are no specific studies concerning the size of the *Salmo carpio* population. Fishing data supplied by fishermen, however, show a sharp decline in recent decades. The creation of a breeding stock for the production of eggs is necessary for the restocking.

A few recent projects provided a more in-depth analysis of some *Salmo carpio* features through the study of genetic variability and its phylogenetic relationship with the *Salmo trutta* species complex.

Genetic analysis of mitochondrial and nuclear data led different authors to propose a hybrid origin for *Salmo carpio*, by secondary contact in recent times of different evolutionary lineages. This hypothesis is consistent with the post-glacial origin of the Garda Lake.

The recent analysis of specimens of *Salmo carpio* and of the lacustrine form of the Garda Lake elucidated the genetic relationships between the two forms: while the local lacustris morpha has been almost completely replaced by individuals of Atlantic origin introduced in the recent past, *Salmo carpio* is characterised by the presence of both Marmoratus and Adriatic genetic features. Those results confirmed the hypothesis that this species originated from an introgression between the two lineages in Lake Garda.

The recent origin could explain the limited genetic differentiation with *Salmo trutta*. Moreover, the absence of Atlantic haplotypes, locally introduced since the last century, confirms the reproductive isolation of species. The *Salmo carpio* is a local adaptation, i. e. an isolated evolutionary lineage, and as such worthy of conservation.

Why are two reproductive periods present?

Are individuals that breed in summer and winter genetically and morphologically different?

What are the relations between *Salmo carpio* and other planktophagous fish in Lake Garda?

The aim of the project CARPIOGARDA is to characterize the population of carpione in Lake Garda based on ecological, genetical and phenotypical approaches.

Currently, about 50 individuals of *Salmo carpio* aged 3+, the result of the 2006 breeding program, raised at the Bardolino del Garda hatchery (Verona province), are maintained in a specific structure in the Basso Sarca river basin (town of Riva del Garda) and managed with the aims and the characteristics of a quarantine plant. These specimens constituted the first experimental captive spawner lot for the species. During the winter 2008/2009, a first artificial breeding experiment was carried out: around 25000 fries were produced in the hatchery.

Additional sampling efforts for the capturing of wild individuals will be organized during the year in order to increase the number of available breeders.

Identification of a rearing protocols for the species through performance tests under controlled and natural breeding conditions aims at improving the wealth of the species reared in intensive conditions as to keep the wildness for its restocking in Lake Garda.

Genetic characterization of the spawners will be used to limit imbreeding and to increase genetic variability. Five or more microsatellite loci will be carried out on the breeder cohorts. Microsatellite markers will be used also to clarify if there are genetical differences between the individuals that spawn during summer and during winter in Lake Garda: a piece of caudal fin for each individual will be taken and used for DNA extraction.

Morphometric analysis, starting from the photographic documentation, would complete and conferme the genetic results, and is useful to detect possible asymmetries and differences between individuals naturally present in Lake Garda, caught in summer and in winter.
This analysis will be carried out using TPS program.

For a better understanding of its biology, spawning areas will be censed and characterized: to do this we collaborate with some subacqueous, and we will try to get photo and movies.

Salmo carpio compete for food with other planktophagous fish species: C*oregonus lavaretus* and *Alosa fallax.*

In particular, C*oregonus lavaretus* is very valued for the quality of its meat, and, for this reason, largely introduced in the Lake.

The study of the stomach contents of *Salmo carpio* will also allow us to propose a different type of food from those available nowadays, to use in the reareing phase.

Finally, we will study the development of gonads: males reach sexual maturity at about 2 years, while female at 3 years: may the females that spawn during summer differ from those that spawn in winter?

CONTRIBUTION TO THE KNOWLEDGE OF DRAGONFLY FAUNA (INSECTA, ODONATA)

~ Sibiu/Romania/Euroean Union 2009 ~

FROM THE HATEG COUNTRY DINOSAURUS GEOPARK (TRANSYLVANIA, ROMANIA)

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Keywords: Odonata, Dragoflies, *Coenagrion ornatum*, *Nehalennia speciosa*, *Cordulegaster heros*, *Erythromma lindenii*, Hateg Country Dinosaurs Geopark, Wetland Biodiversity

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Abstract

From 2006 we have started to add on the map the records of dragonfly fauna from Hateg Country Dinosaurs Geopark. The Hateg Country Dinosaurs Geopark is situated entirely in Hunedoara County covering a surface of more than 100000 hecatars. The landscape is very diverse with a difference in level on vertical of almost 2000 m. On the area until today more than 30 stations were visited, some of them were visited several times. All these stations are in the Strei River Basin. In these stations we have tried to investigate the dragonfly fauna more from a qualitative point of view with the aim to create a more realistic list for the area. Different types of habitats between 300 and 1200 m altitude were targeted, every location being described. In all these stations mainly adults were collected or observed. This action resulted in a list of 41 species. For this paper also the dragonfly material (43 specimens) stored in Deva Museum of Natural Science was studied. From the 43 specimens, stored there, only 21 (pertaining to 3 species) were collected from the studied area. Only 10 species were known from the area (Czekelius 1896, Cârdei 1956, Cârdei & Bulima 1961, Plattner 1963 and Dijkstra 1994) previous to this paper. For each specie, a map will be created using 2x2 km UTM-squares. This paper mentions also the forth location known in the country for *Erythromma lindenii* (Selys, 1840) and third for *Cordulegaster heros* Theischinger, 1979. Of great importance is the presence of the following species: *Coenagrion ornatum* (Selys, 1850), *Nehalennia speciosa* (Charpentier, 1840) and *Cordulegaster heros* Theischinger, 1979 in the area. This importance is given by their presence in the Habitat Directive 92/43/EEC and for a future conservation of these species the designation of Special Areas of Conservation (SAC) is needed. This is very important especially for the *Nehalennia speciosa* (Charpentier, 1840) due to the fact that previously this was considered an extinct specie for Romania. Even if in the geopark a Special Areas of Conservation is designated these tree species are not covered with the exception of a record for *Coenagrion ornatum* (Selys, 1850). From a conservation point of view *Nehalennia speciosa* (Charpentier, 1840) is favorised beause the population is situated in a natural reserve. All the specimens collected are stored in a personal collection.

FISH DIVERSITY ASSESMENT ON LOWLAND RIVERS (SLOVAKIA)

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Keywords: lowland rivers, beach seining, biodiversity, fishes, Tisza basin.

Abstract

Lowland rivers as endangered riverine biotopes covers high species diversity, however their diversity is still not well documented due to the many problems with the sampling methods.

In this case, we aimed to test the suitability of small beach seine net (2x5m, mesh size 6 mm) on two lowland rivers in Slovakia.

Latorica and Tisza Rivers are the most important lowland rivers in the lowland area of Eastern Slovakia. Considering their natural character, few recent studies were focused on these large rivers. We aimed to investigate one swallow beach (riparian area) on each river in early summer (June-July) and late summer (August-September). Seine netting was undertaken during the 24 hour cycle every 2 hours.

Altogether, 4818 specimens of 20 species on Tisza River and 936 specimens of 26 species on Latorica River were recorded. Comparing the particular seasons on Tisza River, *Romanogobio albipinnatus*, *Chondrostoma nasus*, *Sabanejewia balcanica*, *Leuciscus leuciscus* and *Alburnus alburnus* were the most frequent in early summer (frequency>90%), while *Sander lucioperca*, *Chondrostoma nasus* and *Romanogobio albipinnatus* were the most frequent in late summer (frequency only up tu 62%). In the samples from Latorica River, *Gymnocephalus schraetser*, *Romanogobio albipinnatus* and *Sander lucioperca* were the most frequent species in early summer (frequency>90%, while only *Gymnocephalus schraetser* reached frequency more than 90% in late summer.

The number of species as well as the number of individuals varied during the 24 hour cycle reaching the highest values during dusk. The occurrence and the proportion of species varied over the diurnal cycle, however no significant differences (Kruskal-Wallis test, $p<0.05$) between particular samples within the diurnal cycle was detected.

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HUCHO HUCHO (LINNAEUS, 1758) SALMONIFORMES, SALMONIDAE MONITORING IN THE VIŞEU RIVER (MARAMUREŞ, ROMANIA)

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Keywords: Romanian Carpathians, Maramureş, lotic system, Danube salmon, monitoring, human impact, management, conservation.

Abstract

The *Hucho hucho* (Linnaeus, 1758), the largest, exclusively riverine and anadromous species, which can be found in Europe in Danube, Volga and Pechora basins. The *Hucho hucho* is the bigest salmonid in the Romanian waters, it can reach around 20 kg and over 1 m length, was the most poular salmonid species in its distribution area in the last centuries and attracted the Romanian ichtiologists attention beginning with XIX Century.

In spite of the protection of this species the constant human presure upon it make it to regress continuously, especially due to: overfishing, man-made lakes built in the upper reaches of rivers and pollution. As a result of these combined threats, this species is now common in only around 33% of its former range, rare in 28% and has disappeared completely from 39%.

Unfortunately in the last decades the regress was continued and in the present only about few such lotic systems exist data regarding this species. This accentuated regress was happened in the context of the increasing of the human impact also in the upper salmonids sectors of the Romanian Carpathian rivers with negative effects on the aquatic communities.

The aim of this study was to provide data regarding *Hucho hucho* monitoring in the Vişeu River basin. The first survey was started by the present comunication author in 1997 and the last one was in 2008, along this years the presence/absence of this species was monitorised.

The many cases of failure of spreading of this seriously endangered secies in Europe outside its natural range, and the decreasing of its spreading range in the last decades highlighted the necesity of a proper management activities where this species still exist.

The presence of some individuals over 60 cm and over 2 kg let us to belive that the reproductions of the Danube salmon in the Vişeu River Basin it can stil be happened.

The variation of this species presence/absence along this 11 years can be a result of the fishing technics limitations or a result of an existing variable environment which induce years when the species can be present and years when this species presence is not possible.

Active and real management activities in this basin area are highly needed for the protection and conservation of this species in this specific basin, one of the last where this species still exist on the Romanian territory!

Unfortunately, none of the measures have had long-term success, due to the complex sensitivityof this secies under the continuous complex human impact influence. It has therefore been advocate that total protection should be given to this species and its habitat. Exploratory ichtiological studies are still needed on the Vişeu River tributaries, to identify rivers where the Danube salmon can still be present.

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NATURAL, TEMPORARY DRY RIVER BANKS AND THEIR IMPORTANCE FOR A SPECIAL PART OF BIODIVERSITY

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Keywords: natural river banks, ephemeral species and communities, protosoil pioneers.

Abstract

Along the river banks the interacting hydrological and morphological dynamics give rise to a mosaic of habitats that emerge and alter constantly as a result of erosion, sedimentation and re-deposition processes. Different habitat structures occur along the upper and lower river reaches, depending on slope, flow velocity and the grain sizes of the substrate. They are settled by varying ephemeral, annual, biennial and perennial pioneer species, all of which requiring protosoil sites to develop.

Lowland rivers with water level fluctuations that temporarily lay bare broad parts of the river banks at low water levels provide fine-grained protosoil sites to very specific plant communities respectively biocoenoses which have adapted to these minor bed sites. They are settled by ephemeral species that complete their life cycle within the 2-3 months of low water levels. Given that low water periods do not occur annually these species respectively their communities may not be found each year either.

The loss of the morphological dynamics as a result of river training and bank construction measures led to a dramatic decrease in species that develop along the dynamic bank sites and are well adapted to respectively depend on these sites. It concerns all species that develop their succession or occur exclusively on dynamic sites, as well along the montane head waters as along the middle and lower reaches of the waters. On numerous European rivers, especially in the foothills of the Alps, embankment constructions led to a dramatic decrease in and a large-scale extinction of protosoil pioneers such as e.g. the Tamarisk *Myricaria germanica*. Furthermore, as a result of the loss of the morphological dynamics Black Poplar (*Populus nigra*) and White Willow (*Salix alba*) succession have become impossible along many rivers.

The Water Framework Directive considers the natural respectively near-natural morphological river bank structures. Appendix I of the Directive on the Conservation of natural abitats and of wild fauna and flora does also account for relevant river bank habitats with regard to the Natura 2000 network.

Using the example of the Danube River a general survey on the very specific habitat range of the minor bed as well as the protosoil sites will be given, pointing out their particular relevance within the river-floodplain ecosystem complex.

A fatal point as regards the existence of mainly the ephemeral species as well as all species that are bound to protosoil sites is that the training of the Lower Danube as navigable waterway (bank protection measures, rockfills, dams) will bring along the destruction of such habitats, both along the river banks and around the islands. As a result this very specific biodiversity element will disappear or few relicts will survive and occur in uncharacteristic compositions.

~ Sibiu/Romania/Euroean Union 2009 ~

CLIMBING UP THE CARPATHANS: THE EVIDENCE OF RIVER CAPTURE REVEALED BY FISH MOLECULAR DATA

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Keywords: Carpathians, Black Sea watershed, Baltic Sea watershed, stone loach, postglacial river connection.

Abstract

Northern part of the Western Carpathians represents the watershed between basins of the Black Sea and the Baltic Sea, and could potentially serve as a postglacial dispersal barrier for freshwater fauna. This theory is also supported by the presence of highly divergent genetic lineages of the stone loach (*Barbatula barbatula*) on each side of the mountains, reflecting different postglacial colonisation routes of this rheophilic loach from distinct glacial refugia. On the other hand, a postglacial river connection in this area was hypothesised based on the distribution pattern of the carpathian barbel (*Barbus carpathicus*). In general, populations of the stone loach have deeper genetic structure than more vagile barbel on the same geographic scale, which offers more precise localisation of the connection.

Therefore we focused on the stone loach populations from both sides of the watershed in order to find out any connection between both lineages. To detect any sign of introgression, localise eventual contact zones and specify the direction of penetration, we sequenced mitochondrial as well as nuclear marker, and analysed five microsatellite loci. No mitochondrial introgression has been revealed.

However, nuclear markers indicate a recent gene flow from some tributaries of the Tisza River Basin to the streams of the Vistula R. Basin in two potential contact zones. Based on the results of all used markers we conclude, that the most plausible explanation for the observed pattern is the river captures event after the last Pleistocene glaciations rather than the ancestral polymorphism or human mediated dispersal.

The study was supported by the Slovak Grant Agency VEGA (No. 2/0037/08), APVV project (APVV-0154-07) and by the Grant Agency of the Academy of Sciences of the Czech Republic (Grant No. KJB600450601; Research plan AV0Z50450515).

DATA COLLECTION IN ANALYZING AND PREDICTING HYDROLOGICAL AND ECOLOGICAL CHARACTERISTICS OF RIVER BASINS: CASE STUDY NEAJLOV BASIN (ROMANIA)

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Keywords: ecological models, geo-statistics, dynamic hydro-systems, non linear systems, estimation methods.

Abstract

The management plans of hydrographic basins require short term predictions of the hydro and ecologic characteristics. The collection of hydrological data resulted from monitoring, research programs and other sources improve the mathematical models thus are facing theoretical (non continuous data series, non use of statistical methods) and practical (large systems, large number of parameters to be observed, limited resources, access restrains, focused researches) obstacles.

This paper presents some sequential methods of data collection based on non linear dynamic estimations applied in analyzing the spatial-temporal characteristics of hydrological systems. These types of systems are viewed from geo-statistics perspective, using a scale of tools available to represent and analyze scattered and historical data.

The starting point was an empiric model developed on a smaller scale hydrological basin that allows comparing two methods frequently used to collect data in this field (approximation of the dominant proper values and Monte Carlo simulation). The pilot model was filled with non linear historical data characteristic to the hydrographical Neajlov river basin.

Data collection allows integrating a numeric data model with a probabilistic approach. The paper proposes a general solution to this problem. In the case of a linear dependence the result is a Gaussian estimation, based on the classical methods of linear geo-statistics. The paper also presents another approach of this estimation based on Monte Carlo method better adapted to the cases of non linear dynamic dependence.

These two approaches are analyzed by comparison for an empirical ecologic model. It can be observe that in the non linear case is obtained an estimation much more closely to the real historical cases. Also the results of the dynamic non linear analysis of data collection can be connected to other problems of the non linear geo-statistics, like risk analysis and building probability maps of exceeding risk thresholds.

The data collection development by applying simulation methods in the Neajlov basin hydrodynamics resulted in a prediction of the ecological and hydro characteristics based on the evolution described by the currently available data series.

~ Sibiu/Romania/Euroean Union 2009 ~

FISH COENOLOGICAL AND HABITAT AFFINITIES IN THE MODEL FOOTHILL STREAM IN SLOVAKIA

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Keywords: species assemblages, habitat preferences, ichthyofauna, Tisza basin.

Abstract

Analyses on the fish interspecies associations and fish habitat use is presented here on the model area of the relatively undisrupted Udava Stream (Tisza basin) that is situated in the north-eastern part of the Slovak Republic. Udava stream is a 6th order stream with total length of 38.3 km. The tributary is covered by decidous forests and geologically is formed by flysh character. From the climatological viewpoint the Udava basin may be classified as a mildly warm province (majority of the river) and a warm province (the mouth of the river) with average annual temperature of approximately 7°C and average annual sum of rainfall of 800 mm.

Lampreys and fishes were sampled by electrofishing on four localities during the years 2006 – 2008. To analyse the coenological affinity cluster analysis of Ward's method in Past software was used. Habitat preferences were analysed using the Ilev's index of electivity modified by Jacobs and the Fisher's exact test for testing significance of the electivity indices.

Altogether one lamprey and 15 fish species occur in the Udava River. The dominant species in the investigated area were *Phoxinus phoxinus*, *Barbus carpathicus*, *Leuciscus cephalus*, *Alburnoides bipunctatus* and *Barbatula barbatula*. The presence of *Eudontomyzon danfordi* was also confirmed.

The cluster analysis showed several separated clusters. The first of three typical species assemblages consists of *B. barbatula*, *P. phoxinus* and *Salmo trutta*, the second of *B. carpathicus*, *A. bipunctatus*, *Sabanejewia balcanica*, *L. cephalus* and the third of *Gobio kesslerii* and *Gobio uranoscopus*. Following the results of electivity indices several preferences and avoidances were significant according to substratum type, refuges types distance from bank or water velocity.

The study was founded by the by the Slovak grant agency VEGA (projects no. 1/0352/08 and 2/0037/08) and Slovak Research and Development Agency (project no. APVV-0154-07).

~ AQUATIC BIODIVERSITY INTERNATIONAL CONFERENCE ~

ICHTHYOFAUNA AND FISHING POTENTIAL FROM GORGOVA - UZLINA COMPLEX OF LAKES, DANUBE DELTA (ROMANIA)

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Keywords: fish species, species richness, Danube delta, gibel carp, fish stock, fish natural productivity.

Abstract

Gorgova - Uzlina complex of lake cover a total surface of 5,845 ha including 26 lakes. Fish sampling was performed two times in June and September 2007 in Lakes: Isac (1098 ha), Uzlina (488 ha) and Cuibul cu Lebede (221 ha). Fish from open water was sampled with Nordic gillnets and from border lake line with electric fishing. To estimated fishing potential, the fish commercial catch was sampled at fishery landing point, Virtual Population Analysis method was used for gibel carp fish stock estimation, and Léger-Huet methods for natural productivity estimation.

The fish species richness was rather high including 31 species, from what 17 are for commercial fishing interest, the most being eurytopic and tolerant to habitat degradation. Bleak, perch, bitterling, roach and rudd are the most abundant species in June and bleak, roach, rudd, bitterling and perch in September, while in biomass, dominant species were perch and rudd for both months, followed by roach, bleak, tench and wels.

Reporting to all sampling catch, only 10% in individuals and 62% in biomass were commercial species and size in June, respectively 7% and 49% in September. The commercial catch is fare dominated by gibel carp, other valuable commercial species are under recorded in catch statistics, being sold on black market. The gibel carp from 2007 commercial catch has a mean TL of 31.3 cm and TW 631 g, with 30 cm the most frequent TL, corresponding of 4-7 years classes. The stock is under exploited due to large mesh size of gillnets used (fishing mortality was 0.1 and Y/R 146 g).

The fish productivity ranged from 150 kg/ha in Cuibul cu Lebede, 160 kg/ha in Uzlina to 170 kg/ha in Isac lake. Concluding, in 2007, Gorgova – Uzlina complex of lakes had a high fish species richness, a good fish natural productivity potential and catch, most based on exotic and opportunistic gibel carp species.

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INFLUENCE OF WATER ACTION ON AQUATIC'S PLANTS

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Keywords: phenotypic variation, clonal growth, biomass allocation, anchoring structures, water flow, wave action.

Abstract

Phenotypic reactions of 11 aquatic plant species from 5 rivers and 5 lakes in NW Poland were examined. Individuals of *Potamogeton pectinatus, P. perfoliatus, P. natans, Batrachium circinatum, Chara fragilis, Spirodela polyrhiza, Hydrocharis morsus-ranae* and *Salvinia natans* were collected from rivers with and without flow. *Chara delicatula, Nymphoides peltata* and *Juncus bulbosus* were taken out from the lake's littoral with strong wave action and without.

The hipothesis was that plastic responses of aquatic plants exposed to water flow pressure in river and wave action in lake are adaptations to maintain the occupied area.

In total, 1100 ramets of the afore-mentioned plant species were examined (800 individuals from the rivers and 400 from the lakes). Each individual (or ramet), after its height or lenght had been measured, was divided into above-ground and and underground structures, with were later dried to constant weight and weighed. Characteristic of the aquatic environment in lakes and rivers were described on the basis of water and sediment properties. Current and waves velocity were detremined on the basis of the three measurements performed on a one-off basis using a current meter (Nautilius C 2000 Sensor).

In the rivers, ramets grew in the water with current velocity from 0.15 to 0.65 m s^{-1}, while in ox bow without flow. In the lakes, plants grew in the shallow littoral with wave velocity from 0.04 to 0.15 m s^{-1} and without of influence of this factor. Ranges of water properties (pH, TP, $N_{Kiejd.}$) in the rivers and lakes were approximated.

Rhizophytes, which grew in the water with high current velocity, were biger and they allocated from 0.6% to 58.6% more biomass for anchoring in the substrate than in stagnant water. In both flow variants rhizophytes allocated a similar biomass fraction for generative reproduction. On the other hand, under the influence of water flow pleustophytes reduced the mass of an individual (*Spirodela* by 25%, *Hydrocharis* 67%, *Salvinia* 77%) and emergent structures ($p < 0.001$), and the number of sporangia ($p < 0.001$). In both flow variants the input of biomass to generative rproduction was the same (*Salvinia*), or it was greater in running water (*Hydrocharis*; an increase from 4.9 ± 1.3% to 15.1 ± 3.6%).

Under the conditions of strong wave action, in comparison with the lack of this environmental factor, *Chara delicatula* was several times shorter ($p < 0.001$). However, it was also stouter, and as a result it had similar mass. In the areas of wave action the plant allocated 88.8% of its mass for anchoring in the substrate, whereas when there were no waves, only 22.7%. *Nymphoides peltata* was also allocated more mass for anchoring system, but *Juncus bulbosus* and *Batrachium circinatum*'s mass wasn't changed.

EFFECTS OF TEMPERATURE AND SALINITY ON THE LARVAE OF TWO SUBTIDAL NASSARIID GASTROPODS (*NASSARIUS SIQUIJORENSIS* AND *NASSARIUS CREMATUS*, *GASTROPODA*, NASSARIIDAE)

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Keywords: Gastropoda; *Nassarius*; Salinity; Temperature; Tolerance; Oxygen consumption; Swimming velocity; Algae consumption.

Abstract

Owing to degradation of seabed communities by environmental stresses and human perturbations, species which have specialized diets in the local marine benthic community are gradually replaced by opportunistic species of which a number of them are scavengers. The most representative members of these generalists are gastropod species from the family Nassariidae.

Temperature and salinity of sea water are two primary factors that affect the behaviour, physiology, morphology and life history traits of marine organisms. This study investigated how two major environmental factors, temperature and salinity, affected the survival, behaviour and physiology of the larvae of two dominant scavenging gastropods.

Larval mortality of *Nassarius siquijorensis* and *Nassarius crematus* at six different temperatures (10, 15, 20, 25, 30 and 35ºC) and seven different salinities (0, 5, 10, 15, 20, 25 and 30‰) were observed after 24 hrs and 48 hrs respectively. Higher mortality was observed for both *N.S* and *N.C* when the salinity was < 10‰ and temperature < 15ºC.

Respiration rate, swimming velocity, and clearance rate of the larvae of *N. siquijorensis* and *N. crematus* were measured at combinations of three levels of temperature (20, 25, and 30 ºC) and three levels of salinity (20, 25, 30‰). Temperature, salinity and their interactions were significant in affecting larval metabolism, development and swimming behaviour of *N. siquijorensis* and *N. crematus*.

Significantly lower algal consumption rates and oxygen consumption rates were observed under lower salinities and temperatures, and the dispersal distance (VSL) were significant higher at lower salinities.

The results may provide insight into how the scavenging community in local waters is structured by natural stresses and human disturbance, and clues towards understanding similar communities in the subtropical region.

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FREE LIVING MARINE NEMATODA ON DIFFERENT SUBSTRATA AT THE ROMANIAN BLACK SEA COAST

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Keywords: free living nematoda, meiobenthos, bottom sediments, settlement density.

Abstract

Nematodes comprise a great number of parasite species, but also free living organisms adapted to live in soil and water benthic ecosystems. Marine free-living Nematoda present well developed populations in sediments, their size is small and are deposit feeder organisms.

Thirty quantitative samples were obtained drawing 100 cm^2 of sediment, or by scraping out the mussel epibiosis on the same surface, at different depth (1m, 3m, 5m, 15m, 20m and 23 m) in July 2002 in the Vama Veche zone and in May-July 2003 along the Romanian Black Sea coast between Sf. Gheorghe and Vama Veche. Two samples were obtained in June 2009 by scraping out the mussel epibiosis at 1 m depth, in Constanta harbor, equally on 100 cm^2. Four *Cystoseira* samples was collected in September-October 2008 in Mangalia zone, at 1 m depth, by scuba diver, using appropriate plastic bags to cover the entire alga. The samples were preserved directly on the field with formaldehyde solution. Samples were washed through 125µm and 250µm mesh sieves and examined at a Nikon SMZ-2T stereomicroscope and Nikon Eclipse 200 microscope. For drawings, a *camera lucida* device was used.

A number of 64 free-living Nematoda, belonging to five orders, was identified. The highest species diversity (32 species) is in meiobenthic communities in coarse sand, especially at a depth of 3 m (25 species), followed by the organism association developed in the interstitial space between mussels (27 species). In *Cystoseira* belts are present 24 species, between them *Anticoma acuminata* (Eberth, 1863), *Syringolaimus caspersi* Gerlach, 1951, *Chromadora cricophana* Filipjev, 1922 which are phytophylous species. Only six free-living Nematoda species are present in the interstitial space between mussels developed on Constanta harbor's piers, half of them bearing harbor unfavorable life conditions. Five cosmopolite species (most important: *Metaparoncholaimus campylocercoides* (de Man) de Conink & Schuurmans - Stekhoven, 1938, *Cyatholaimus gracilis* (Eberth, 1863) Bastian, 1865, *Halichoanolaimus clavicauda* Filipjev 1918) are present in almost all samples.

In the studied area, great density of free-living Nematoda was observed in the interstitial space between mussels (727 400 ind•m^{-2}), or in coarse sand (348 800 ind•m^{-2}). Important densities were determined also in deeper bottom meiobenthic associations (327 200 ind m^{-2} at 20 m in mussel reef, 10 560 ind•m^{-2} at 5 m in fine sand zone, 193 200 ind•m^{-2} at 3 m depth in coarse sand zone) (mean values).

In the Black Sea benthic communities, free-living Nematoda present remarkable species diversity and important values of density in zones with great amount of organic matter and in bottom associations where water dynamic is less pronounced.

MAYFLY AND STONEFLY DIVERSITY OF CARPATHIAN STREAM: WHAT ARE THE RELATED ENVIRONMENTAL VARIABLES?

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Keywords: diversity, Ephemeroptera, Plecoptera, Udava river.

Abstract

Mayflies (Ephemeroptera) and stonflies (Plecoptera) belong to the best known insect taxa groups in Slovak republic and in the Europe. The distribution and relationships between their diversity and taxa richness are generally relatively well known in the macro-scale, but not enough in the microhabitat-scale. Presented work is trying to identify the most influential environmental variables affecting both the mayflies and stoneflies assemblages (their taxa richness, diversity, micro-distribution) in an modeling Carpathian stream (Udava river, relatively undisrupted Eastern Carpathian stream in the Tisza basin).

Saesonal quantitative samples of macrobenthic assemblages were taken from various microhabitats at four sites of the Udava River during period 2006-2008. Each locality and each sample point were defined by a variety of charasteristics. Canoco and Past software were used to research the relationships between diversity and environmental conditions.

Udava stream represent near-pristine conditions with well-preserved mayfly and stonefly fauna. This fact is expressed in relatively high taxa-richness of mayflies and stoneflies. Altogether, 42 taxa (35 species) of mayflies and 24 taxa (20 species) of stoneflies were determined. Using the Canonical Correspondence Analysis (CCA), we performed the study of the mayfly and stonefly communities (their taxonomical composition and composition based on the feeding types, locomotion types, types of strategy, presence and type of gills, size of adult female) in relationships to selected environmental variables (water depth, water velocity, illumination, riverbed substratum, periphyton, distance from bank, Saprobic indexi, Froude number, Reynolds number, etc.). Both orders were mostly influenced by the substrate composition, periphyton, ilumination, Froude number and velocity. Less important, but in some cases significant ($p<0,05$), were distance from bank, depth, Reynolds number and some others environmental variables. However, there are visible differences in impact of specific variables on mayflies and stoneflies and differences between results of analyses of different taxa levels and ecological groups (guilds, strategies etc.).

To state the relationships between the environmental variables and the mayflies and stoneflies diversity in microhabitats, we defined the Generalized Linear Models (GLM) for significant ($p<0,05$) environmental factors (water depth, current velocity, distance from bank, etc.). Analogous to the results of CCA analysis, we detected specific variances in the correlations of environmental variables with diversity of mayflies and stoneflies in microhabitats.

The study was supported by the SLovak Grant Agency, project No. 1/4355/07 and APVV project No. 154-07.

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IMPACT OF THE EXOTIC MANGROVE *SONNERATIA CASEOLARIS* ON THE MACROBENTHIC INFAUNAL COMMUNITY

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Keywords: *Sonneratia caseolaris*, mangroves, macrobenthos, plant invasion, biodiversity, Futian Mangrove Nature Reserve.

Abstract

The exotic species *Sonneratia caseolaris* has been found in foreshore mudflat and mangrove areas in Deep Bay, Hong Kong since 2000. Owing to its fast growing properties, *Sonneratia* may become invasive and thus routine monitoring and frequent removal works have been conducted by government officials to prevent its spreading. The present study aims to examine the impact of this exotic mangrove on the macrobenthic community because the potential impact of *Sonneratia* on the ecology of local mangroves was not clear.

Futian Mangrove Nature Reserve, Shenzhen was chosen as the study site where *Sonneratia* had been introduced since 1993 for afforestation and a mature monospecific stand of *Sonneratia* was formed in addition to native mangrove species. Core sediment samples were collected seasonally in regions dominated by different mangrove species, namely *Kandelia obovata*, *Avicennia marina*, *Sonneratia caseolaris*, mixed forest and mudflat. The effect of tidal level within the *Sonneratia* stand and deforestation of *Sonneratia* on macrobenthic community were also studied. The sediments at each sampling point were collected to determinat the concentrations of polycyclic aromatic hydrocarbons (PAHs), heavy metals, total organic matter (TOM), total Kjeldhal nitrogen (TKN), total phosphorus (TP) and particle size in order to correlate the community structure.

A total of 41 macrobenthic species was found which was mainly composed of polychaetes, followed by gastropods. The Shannon-Weaver diversity (*H'*) was rather low among sampling points especially when *Limnodriloides* sp. and *Capitella capitata* heavily dominated the community. High levels of PAHs and heavy metals, probably due to municipal sewage discharge, were related to the dominance of these opportunistic species. Although the presence of *Sonneratia* seemed to enhance the biodiversity, *Neanthes glandicincta*, an important food source for waterfowls, became a rare species in this stand compared to mudflat area. After deforestation, *Neanthes glandicincta* could recolonize this area.

The macrobenthos biomass showed a seasonally variation that the highest biomass was found in February due to a large number of gastropods was found whereas the lowest in August.

Other factors including tidal level, salinity, temperature, tree density were also important to determine the distribution pattern of the macrobenthos. It was generally found that higher biodiversity was found in the lower intertidal zone.

Based on the results, the invasion of *Sonneratia* could be a friend or foe to the mangrove ecosystem as a whole. Therefore, regular monitoring works are essential as precautions to control its spreading.

FRESHWATER ALIEN INVERTEBRATES IN ROMANIA

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Keywords: alien invasive species, rivers, lakes, Romania, invertebrates.

Abstract

Invasive alien species (IAS) represent a major threat to biodiversity, have sometimes significant socio-economic impacts and can even affect human health. The rate of alien species introductions has continuously increased over the years.

Romania can be considered a high risk area regarding this issue. The opening of the Rhine-Main-Danube Canal and the large number of tributaries of the Danube (over 95% of the Romanian rivers) can ensure the intrusion of alien invasive species from other areas. A well known example is the arrival of the Asian clam *Corbicula fluminea.*

About 20 freshwater invertebrate IAS have already been reported from Romania, mainly represented by molluscs and fish parasites. The pathways of introduction are not known in all cases, but the main causes are aquaculture, inland water transport and pet trade.

Furthermore, species that have been reported from other European countries represent potentially invasive species for our freshwater ecosystems. Recently, a number of north-American species of crayfish, like *Procambarus clarcki, Pacifastacus leniusculus*, *Orconectes limosus*, that are very competitive in comparison with the native European species, were acclimatized in Europe. Following these introductions, some species established and became invasive in European freshwater basins (Belarus, Germany, Austria, Poland, etc.).

Another category of invasive species are the dynamic Ponto-Caspian elements that proved very successful in conquering new habitats and replacing existing native species. Species like *Limnomysis benedeni, Hemimysis anomala, Chaetogammarus ischnus* became widespread in European rivers. Unfortunately, the situation of such species in Romanian rivers and lakes is almost unknown for the last decades.

The large variety of species encountered in pet shops aquariums (gastropods, bivalves, freshwater shrimps) represent also a very important but poorly documented source of invasive species for freshwater bodies. Many of them are very tolerant to a wide temperature range and could develop self sustaining populations in natural habitats.

In order to prevent such problems, awareness should be raised regarding the harmful effects of IAS and measures of prevention and control implemented, especially in aquaculture and the unregulated pet trade. The recent Environment Ministry Order No. 979/2009 has no concrete measures for regulating alien species introductions, trade with potential IAS and prevention or control at the border.

BIOLOGICAL AND GENETIC-BIOCHEMICAL PARAMETERS OF CARASSIUS GIBELIO POPULATION IN THE KAMCHIYA RIVER (BLACK SEA TRIBUTARY)

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Keywords: *Carassius gibelio*, age and length composition, sexual ratio, growth rate, condition factor, electrophoresis, enzymes, general muscle proteins, genetic distance.

ABSTRACT

In Bulgaria, the species gibel carp *Carassius gibelio* (Bloch, 1782) was first reported in the 1940s as occurring only in the Danube River and the Black Sea coastal lakes. At present, it is common in all water bodies from the Aegean and the Black Sea basins and is one of the dominant fish species in the Bulgarian lakes and reservoirs. In the Kamchiya River (Black Sea tributary) the species was found in the late 1960s, and currently it is a common species there.

Totally 50 specimens were collected in the Kamchiya River in June 2009. Their standard length ranged from 95 to 220 mm, and weight from 25 to 290 g. They belonged to 5 age groups: 11 specimens at age 1+, 26 specimens at age 2+, 7 specimens at age 3+, 5 at age 4+ and one at age 5+. All individuals were sexually matured. The population consisted of females and males in a ratio 2:1. Growth rate and condition factor were studied and compared with other gibel carp populations in Bulgaria.

General muscle proteins and five enzyme systems of 34 individuals were analyzed by electrophoresis. All samples had three allelic polymorphism in the *PROT-3** locus, and the frequency of *PROT-3*a* allele in the Kamchiya population was the highest (0.75) in comparison with other Bulgarian rivers and reservoirs. On the electrophoregrams two zones with esterase activity were visualized. They probably were coded from two loci *(EST-1** and *EST-2**). Two allelic polymorphism with null allele in the first esterase polymorphic zone (*EST-1**) was found only in the Kamchiya River. *In EST-2** rare alleles were established in the populations from the reservoirs Drenovets and Poletkovtsi.

The polymorphism is under Hardy-Weinberg equilibrium which confirms that the population in the Kamchiya River consisted of individuals from both sexes.

All other enzyme systems (MDH, LDH, MEP and SOD) had common electrophoretical patterns. All MDH* loci were monomorphic in the compared sites, with exceptions of *sMDH*1* which was polymorphic in the Poletkovtsi Reservoir and Veleka River. In all rivers studied *mMDH* was monomorphic.

The gene frequencies of polymorphic loci (*PROT-3** and *EST-1**) could be used as genetic markers for distinguishing of *C. gibelio* population from the Kamchiya River.

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~ AQUATIC BIODIVERSITY INTERNATIONAL CONFERENCE ~

FREQUENCY OF MOLECULAR MARKERS USED IN PHYLOGENY AND PHYLOGEOGRAPHY STUDIES FOR REPRESENTANTS OF THE BIVALVIA CLASS

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Keywords: Molecular markers, Phylogeny, Phylogeography, Bivalvia.

Abstract

Molecular phylogeny is a relatively new field of interest which benefits from a wide range of modern molecular tools in order to reconstitute the phylogenetic and phylogeographic relations between organisms. Among these tools we can assume that the molecular markers are frequently used especially the mitochondrial and nuclear markers.

Molecular biology offers a great amount of study methods on evolution. These methods use the DNA sequences which have a high level of stability. Due to the fact that the modification of these sequences throughout evolution are so slow, they can supply information about their history and origin. The mitochondrial DNA is often used in these kind of studies although in its structure it contains areas with a high number of polymorphism in the nucleotide sequences. The nuclear markers are seldom used in these kind of studies.

The paper presents a statistic evaluation of the most frequently utilized molecular markers in phylogeny and phylogeography studies upon bivalves as well as the orders and families often studied from this point of view. A number of 52 articles, published between 1999 and 2009 have been taken into account. The following molecular markers were used in these studies: COI, 5S rDNA, 16S rDNA, 12S, 16S, 18S, 28S rRNA, ND1, microsatellites, ITS1, ITS2, H3, 5.8S.

Out of all the analyzed studies, the molecular marker mostly employed is the gene which encodes the subunit I of cytochrome oxidase (COI). This particular marker can be found in 33 studies out of the total analyzed, totaling a percentage of 63.46 %. The other markers with high percentage usage are: 16S rRNA with 26.92 % and 16S rDNA with 9.61 %. The least used molecular markers were the nuclear markers ITS1, ITS2, 18S rDNA and microsatellites.

According to the comparison of mitochondrial and nuclear markers, it is obvious that the mitochondrial markers are more often used and with more efficient results than the nuclear markers. The phylogeny and phylogeography studies were performed upon a relatively reduced number of species belonging to the *Veneroida* Order, with the *Veneridae*, *Tridacnidae*, *Dreissenidae*, *Mactridae*, *Lasaeidae*, *Cardiidae*, *Sphaeriidae* and *Corbiculidae* families and also the *Unionoida* Order with the *Unionidae*, *Hyriidae* and *Margaritiferidae* families. These orders already hold the highest percentage, respectively 34.61 % (*Veneroida*) and 25 % (*Unionoida*) out of the total studies.

~ Sibiu/Romania/Euroean Union 2009 ~

CHANGES OF SEDIMENT MICROBIAL COMMUNITY STRUCTURE AND POLYCYCLIC AROMATIC HYDROCARBON CONCENTRATION AFTER RELOCATION OF YIU LIAN FLOATING DOCK, (HONG KONG)

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Keywords: Sedimentary microbial ecology, PAHs, bioremediation, PLFA.

Abstract

Little is known about the interaction of microbial community structure and polycyclic aromatic hydrocarbon (PAH) concentration in field. A good study site was provided at Yiu Lian floating dock, which was once heavily polluted since late 1980s and was decommissioned in September 2007. Right after its relocation, microbial community structure, 16 US EPA priority PAHs and sediment physiochemical properties were examined for a year period to monitor the natural attenuation process *in situ*.

Field sampling was performed at two sites near the dock and three sites distant along the coastline every six months. Total PAH concentration in the dock area was significantly higher than that in the distant control sites, with some hotspots detected up to 40□g g (dry weight) of sediment $^{-1}$. No significant decrease of total PAH concentration was observed over time, suggesting the slow process of intrinsic bioremediation in marine sediment.

Changes of sediment microbial community structure were characterized using phospholipid fatty acid (PLFA) profile. Principal component analysis (PCA) of microbial PLFA profiles showed three distinct clusters of sampling points according to sampling time. In each cluster, samples collected from the dock area separated from those from control sites. The variation in microbial communities along the time course was much larger than that along the PAH pollution gradient. In addition, the diversity and richness of microbial communities remarkably increased over time.

Redundancy analysis (RDA) was applied to interpretate the relationship between microbial community structure and various environmental factors. The results showed that 69.7% of the total variation in PLFA profiles could be explained by all the environmental factors, among which time and total PAH concentration were the two most significant factors, followed by total heterotrophic bacteria and total organic matter (p<0.05). Partial RDA using time as the covariate variable was then conducted to separate the effect of time, and the remaining variability was found mainly due to total PAH concentration. From the partial RDA triplot, higher concentrations of total PAHs were positively correlated with 18:1ω9c, cy19:0 and branched PLFAs, and negatively correlated with 18:1ω9t, 16:1ω9 and 18:2ω6c, 9c. Accordingly, the ratios of biomarker PLFAs showed the great dominance of gram positive bacteria over gram negative bacteria in the hotspot site and the stress indicator cis/trans PLFAs was the highest. The strong relationships observed between microbial PLFA biomarkers and PAH concentration suggested the potential for using microbial community analyses in the assessments of natural attenuation process in contaminated sediment.

INVASIVE FRESHWATER VERTEBRATE SPECIES - PRESENT AND FUTURE

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Keywords: invasive species, aquatic ecosystems, pet trade, aquaculture.

Biological invasion is one of the most acute phenomena of this beginning of century. It is responsible (alongside others) for losses of native biodiversity in most parts of the world. This is even more obvious when aquatic ecosystems are involved. Even though less invasive than invertebrate species, the vertebrate ones have been penetrating the Romanian aquatic ecosystems and the consequences of this penetration are difficult to anticipate.

The present paper endeavored to organize a picture of the phenomenon, as detailed as possible, starting from the data in specialized literature, to which the authors' own data (collected between September 2007 - August 2009) were added.

The field researches and the bibliographical data have evidenced the presence in Romania (in aquatic ecosystems or in their vicinity) of 29 fish species, one reptile species (Chelonia) and five mammal species.

Taking into account the unprecedented magnitude of importing fish species appropriate for aquaculture as a result of the growing demands on the internal market and of the financial gains generated by intensive aquaculture, we anticipate the possible penetration into Romanian aquatic ecosystems of 26 fish species. In all cases, the fish species are original from zones with similar climate and can adapt very well to the conditions that exist in our country. We considered in particular those species already signaled as alien or invasive in the aquatic ecosystems of neighboring countries or that have already proven their potential for invasion in remote geographical areas with a climate similar to that of South-Eastern Europe.

Also, we considered the increasing amplitude of aquaristics and terraristics in our country and the growing import of fish, amphibians and reptiles from zones with similar climate. In other cases, we refer to species original from warmer zones, but that have already proven their potential for adaptability and invasion in other temperate zones of the globe.

Considering these aspects, correlated to the presence in pet-shops of aquatic or amphibious species adaptable to various Romanian aquatic ecosystems, the result was a list containing four amphibian species (three Caudata and one Anura) and five reptile species (Chelonia). Another criterion that this list was based on was the willingness of pet-dealers to bring on request certain species that are very adaptable to the Romanian climate. In all cases, the species involved can be easily imported because they are not endangered and thus they are not the subject of national or international laws regarding the protection of wildlife.

~ Sibiu/Romania/Euroean Union 2009 ~

OCCURRENCE OF PLANKTONIC ROTIFERA IN THAR DESERT, SINDH (PAKISTAN)

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Keywords: Thar Desert (Pakistan), Nagarparkar, Zooplankton, Rotifer fauna.

Abstract

Thar Desert is in Suoth East corner of the province of Sindh. It is located between latitude 24°-26° N and longitude 69°- 71° E. The whole area comprises of sand dunes and sandy flate area. The Nagarparkar area is distinguished by the presence of Karoonjhar hills, about 1000 feet high area of granite rock. It is arid area where aquatic resources are meager. Average rainfall range in Thar is 5-15 inches. During rainy season water from hills flows down to the ravines and some quantity is retained in shallow depressions. Accross the hill streams of Karoonjhar few dams are constructed for the storage of water. Apart from these resources the people of Thar use subterranean water obtained from deep wells.

The rain water is retained for couple of months where aquatic vegetation and planktonic communities establish their populations. Planktonic rotifer community of Nagarparkar area was studied for the first time during October 2008. Plankton and water samples were collected from 16 different stations. Most of them were temporary and retain water for 3-6 months. The water bodies were included ponds, small dams and wells.

A total of 36 rotifer species have been identified. Major genera recorded were *Brachionus* (13 species), *Lecane* (5 species), *Keratella* (3 species) *Monostyla, Mytilina* and *Platyias* (2 species each). Among the above rotifer species, 11 are recorded for the first time from Pakistan, in which *Brachionus caudatus aculeatus* Hauer was most abundant. All the *Lecane* species occurring in Thar Desert are also recorded for the first time from Pakistan and hence are new record.

Water temperature ranged from 28.2° to 34.8°C while dissolved oxygen from 3.0 to 8.8 mg/l. Conductivity and salinity range was 141.1-40700µS/cm and 0.1-26.1 ppt, respectively. TDS and pH ranged in between 66-26048 mg/l and 7.4-8.6, respectively.

The distribution of rotifer species in relation to water quality showed that *Brachionus caudatus aculeatus* was most abundant and a common species of small ponds where salinity was very low. On the contrary *Lecane candida* occurred only in saline water bodies. The other *Lecane* species however, occurred in soft water bodies with low salinity.

The documentation of 11 newly recorded rotifer species is an addition to the rotifer fauna of Pakistan.

SOME BIOLOGICAL CHARACTERISTICS OF MESOPOTAMIAN SPINY EEL (MASTACEMBELUS MASTACEMBELUS BANKS AND SOLANDER, 1794) IN ATATÜRK DAM LAKE (EUPHRATES RIVER) (TURKEY)

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Keywords: *Mastacembelus mastacembelus*, Growth, Reproduction, Euphrates, Turkey.

Abstract

In this study, some biological characteristics such as age and sex composition, growth, spawning time, age of sexual maturity and fecundity of *Mastacembelus mastacembelus* from Atatürk Dam Lake were investigated between July 2005- July 2006. The population has 13 age classes with the sixth and seventh age-classes dominating. After IX years, all the samples were male.

The total lengths and weights of the samples ranged between 70 to 850 mm total length and 6 – 1100 g respectively. Estimations of length-weight relationships for 85 females, 135 males of Mesopotamian Spiny Eel resulted in the following equations; $W = 0{,}0228\ L^{2.43}$ ($R^2 = 0.92$) for males and $W = 0{,}0029\ L^{2.95}$ ($R^2 = 0.92$) for females. While total lenghts and weights of fish at age II-IV were close values for males and females, in all age groups males were longer and haevier than females. The difference between the sexes were not signifcant statistically in age groups except age VI. The von Bertalanffy growth equations for males and females were found as $L_t = 99{,}24\ [1\text{-}e^{-0.1061(t-0{,}12378)}]$ and $L_t = 63{,}92\ [1\text{-}e^{-0.2704(t-0{,}50206)}]$ respectively. Condition factor (*CF*) of *M. mastacembelus* fluctuated in a narrow range between 0.15-0.25. In females, *CF* value was higher than in males in summer months.

Males dominated especially in older age and sex ratio was 1:0.63 (M:F). The GSI varied from 0.46 to 12.35 for females and from 0.14 to 1.47 for males. The highest value for females was in June and for males was in May. Spawning period extended from May to July. The age of sexual maturity was determined at 4 for both sexes. Fecundity ranged from 2540 to 24000. The linear regression of the relation of fecundity with total length and weight were $F = 382.82\ L - 10811$ and $F = 21931W + 1347.3$.

~ Sibiu/Romania/Euroean Union 2009 ~

DATA REGARDING THE OCCURRENCE OF *DIPOLYDORA QUADRILOBATA* (JACOBI, 1883) (POLYCHAETA: SPIONIDAE) IN THE ROMANIAN SECTOR OF THE BLACK SEA

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Keywords: Polychaeta, Spionidae, *Dipolydora*, Black Sea, life history.

Abstract

The present study reports the presence of *Dipolydora quadrilobata*, an exotic polychaete species newly established in the Black Sea. The species was recorded for the first time at the Romanian coast of the Black Sea in August 2003 in samples taken at Tuzla and Eforie Nord from sandy substrate mixed with shell debris at 10 m depth. Subsequently (2007-2008), it was commonly reported from muddy sediments with *Modiolus phaseolinus* between 50 and 80 m depth.

Dipolydora quadrilobata is easily recognised from other polydorid species by its modified spines of the setiger 5, which are expanded distally into two nearly equal teeth and bear a bushy tuft of fine bristles between the teeth, and by four eyes arranged in a nearly straight transverse row. Another distinctive feature is the pygidium divided into four nearly equal lobes.

The worm lives in straight tubes built up from fine sand grains bound by silt and detrital particles, up to 40 mm long and 1.5 mm wide. The tubes stand erect in the substrate and extend 20-30 mm above the substratum. The upper part of the tube is smooth and greyish-brownish in colour, while the lower part, buried into sediment, is rough and rusty-coloured.

Dipolydora quadrilobata is a surface deposit-feeder, using the palps to sweep the organic film from the sediment surface. Food particles are then carried to the mouth along longitudinal ciliated groove.

The average density and biomass of *Dipolydora quadrilobata* in the *Modiolus phaseolinus* community were 974 ind. m^{-2} and 0.974 g wwt m^{-2}, respectively. The frequency of occurrence of this worm in samples taken from muddy seabed with *Modiolus* was 46.4%.

In sandy mud patches, occurred at 65 m depth, *Dipolydora quadrilobata* was the dominant species as number of individuals. On this type of sediment the species forms dense tube-mats, reaching densities as high as 23,000 ind. m^{-2}.

The species was most likely introduced into the Black Sea by ballast water of commercial ships. In the literature *Dipolydora quadrilobata* is regarded as an opportunistic species, because its population density increases rapidly in areas subjected to severe disturbance and organic enrichment. The episodic phenomena of mass-mortalities of the macrofauna in the north-western Black Sea, as a consequence of the summer hypoxia induced by eutrophication and organic pollution of the area, allowed this tube-dwelling polychaete to colonise available areas and to establish dense populations.

OCCURRENCE OF HALOPHILIC AND HALOTOLERANT MICROORGANISMS IN THE SALTY LAKES FROM OCNA SIBIULUI (ROMANIA)

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Keywords: hypersaline lakes, Ocna Sibiului, halophilic microorganisms, halotolerant fungi.

Abstract

A large number of natural hypersaline lakes are found in the Ocna Sibiului area in Romania. They are formed on abandoned salt mines or on excavations. The most important are the Brancoveanu Lake (the most salted lake in Ocna Sibiului, also protected area), Lake without Bottom (protected area and with powerful heliothermic effect), Lake of the Abandoned Salt Mine (the deeper antroposalted lake in Romania), Ocnita Lake, Flax Lake, Cats Lake and Mud Lake.

This research has as main goal the analysis of the occurrence of the groups of halophilic microorganisms which inhabit these natural lakes. A large number of microorganisms are isolated and characterised (cultural characteristics on solid and liquid substrates). The occurrence of halophilic microorganisms decreases in the order: Without Bottom > Mud > Brâncoveanu > Flax > Ocnita > Cats. Taking into account the large number of microorganisms which can inhabit these environments, it is very difficult to identify the microorganisms producers of pigments without genetic studies.

The physical and chemical characteristics of the analysed lakes (salts content and pH) influence the number and types of microorganisms isolated. Low ions concentrations and basic pH determines the decrease of number and types of strains isolated. Magnesium shows a high influence on the number and types of microorganisms present in these lakes.

Beside the bacterial strains, some halotolerant fungi were found. Three of the isolated fungi were identified as being the mycotoxins- producers *Aspergillus candidus*, *Aspergillus glaucus* and *Aspergillus parasiticus*. The analysis of the influence of the natural conditions (natrium chloride, temperature and pH) on the evolution of the fungal colonies showed that the environmental conditions in the Ocna Sibiului lakes are not optimal for the development of mycotoxins-producing fungi.

~ Sibiu/Romania/Euroean Union 2009 ~

TRANSFOMATION OF SELENITE TO ELEMENTAL SELENIUM BY *OCHROBACTRUM INTERMEDIUM STRAIN* S-5, A FIRST REPORT

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Keywords: Selenite, Selenate, *Ochrobactrum* sp., bioremediation

Abstract

Ochrobactrum intermedium (S-5), a gram negative, non spore forming, aerobic selenite transforming bacterial strain was isolated from the seleniferous agricultural soil. The strain was characterized using morphological, biochemical and molecular techniques. It transformed about 50% of the selenite SeO_3^{2-} (2 mM) to nontoxic red elemental selenium (Se^0) in 72 hours. There was no change in the growth characteristics of the strain even at 5 mM concentration of selenite. It is tolerant to high concentrations of selenite (250 mM). Accumulation of the transformed elemental selenium inside the cells was determined by electron microscopic studies and this accumulation increases the buoyant density of the cells. This strain not only transforms selenite but is also tolerant to other heavy metals like Cr^{2+}, Ni^{2+}, As^{+} and Hg^{2+} and resistant to number of antibiotics. This is the first report of selenite transformation by any member of the genus *Ochrobactrum*. This strain can be of potential use for bioremediation of selenium contaminated soils. Biosurfactants are secondary metabolites produced by a wide variety of microorganisms. Biosurfactants are diverse in their structure. They may be lipopeptides, glycolipids or proteins. Even a microorganism can be considered as a Biosurfactant as they have both hydrophobic and hydrophilic meoties. When dilute biosurfactant (25µg/ml) was added extrageneously to the growth mixture, the bioremediation was enhanced by about 35%. The biosurfactant was isolated from a culture of *Pseudomanas aeruginosa* grown on glucose. The biosurfactant was characterized as a rhamnolipid. The Biosurfactant was able to bring down the surface tension of the culture broth to 30 dynes/cm. The surface tension of water without the Biosurfactant is about 72 dynes/cm. The biosurfactant could therefore, successfully make the Se bioavailable for the aquatic bioremediation. It was proposed by us that the Biosurfactant forms a complex with the metal. This metal-Biosurfactant complex is treated to precipitate the biosurfactant with three volumes of chilled acetone or acid to pH values of 3-4 and the metal is left behind for recovery (Enhancement of metal bioremediation by use of microbial surfactants. BBRC 319(2): 291-297, 2004). Presently, studies are on to grow the strain along with other strains(consortia) that produce a Biosurfactant. This system along with the diverse microorganisms and Biosurfactant would be more effective in aquatic remediation.

INVESTIGATING THE LEARNING AND MEMORIZATION CAPACITIES IN *BUFO VIRIDIS* (AMPHIBIA, BUFONIDAE)

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Keywords: *Bufo viridis*; learning; memorization; hibernation.

Abstract

Data about animal memory are abundant in the literature. However, specific information regarding the memorization capacity of amphibians are poor. Memory is represented by the changes that occur in the brain, initiated by learning. These changes are the information aquired in a form used in later modifications of perception and behaviour. The memory dynamics represents a general characteristic of all animals.

The present study aims to investigate learning and memorization capacities for *Bufo viridis* (Amphibia, Bufonidae), before and after a hibernation period of 60 days, but also after a 60 days active period.

The individuals were offered a worm-like stimulus that resembled a *Tenebrio molitor* larva, placed at the end of a wire. Its movement were similar to the ones of a living larva. The reaction of the toads was filmed.

The rate of attacks towards the worm-like stimulus was high in the first experimental day, at the first test. At the second test however, toads were capable to recognize the worm-like stimulus and thus they attacked it fewer times.

The response of the toads towards the worm-like stimulus (the number of attacks) recorded a continuous decrease from the first testing day to the forth, but it remained almost unchanged afterwards (the average = 1,90 ± 0,53).

Our results showed that for the *Bufo viridis* adults the memory lasted at least 60 days: the individuals from the testing group recognized the worm-like stimulus after 60 days of hibernation and they reacted less compared to the control group.

Later, after two months of activity in conditions similar to the species natural environment, the memory of *Bufo viridis* was not fully preserved because the old information were partially replaced by new ones.

~ Sibiu/Romania/Euroean Union 2009 ~

RESEARCH REGARDING THE DISTRIBUTION OF THE INVASIVE SPECIES *PERCCOTTUS GLENII* DYBOWSKI 1877 (PISCES: OSTEICHTHYES) WITHIN THE UPPER AND MIDBASIN OF THE RIVER SIRET, ROMANIA

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Keywords: invasive species, chinese sleeper, fish associations, River Siret, Romania.

Abstract

Perccottus glenii Dybowski 1877 (chinese sleeper) is an element originated in Asia, and found in the Far East of Russia, in the North–Eastern China, and in the Northern Koreea. It was accidentally introduced in Europe through the Amur's upper basin.

In the Danube's basin, *Perccottus glenii* was first recorded in the basin of River Tisa in 1997 (Harka, 1998), in Ukrain at the Latorica river mouth (basin of River Tisa) in 1999 (Moshu, Guzun, 2002), in Slovacia near Bodrog (Kautman, 1999; Koščo *et al.*, 1999), in Romania in River Suceava, near Dorneşti in 2001 (Nalbant *et al.*, 2004), in Serbia in 2001 (Šipoš *et al.*, 2004) and in North-Weastern Bulgaria in 2005 (Jurajda P. *et al.*, 2006). The first signing of the species in the main course of the Danube was made in Serbia, at Vinci Marine (km 1,040), in February 2003 (Šipoš *et al.*, 2004) while the first signing in the Romanian sector of the Danube was made in 2005 (km 929) by Popa *et al.*, 2006.

The paper aimes at completion of the information regarding the presence and spreading of the invasive species *Perccottus glenii* within the upper and midbasin of the River Siret. The species was noticed for the first time in Romania in the year 2001 in the River Suceava, in the area of the road bridge to the locality Dornesti.

The further fishing in the upper and midbasin of the River Siret revealed a progressive increasing of the areal.

In the ichthyological material sampled in 2001 in the main course of the River Suceava (upstream from the bridge, locality Dorneşti), beside other 13 fish species, the species *Perccottus glenii* (chinese sleeper) was identified as 5 specimens, with a total biomass of 28.5 g.

Being an introduced species, considered a dangerous invader that afects the native amphibians and fish, a biological sampling in the main course of the River Siret and from some tributaries was run in the next years in order to watch the extension of this species areal.

In the year 2008, opposite to years 2005 and 2006, the species recorded an obvious extension in the basin investigated.

Our research brings an important contribution concerning the species' spreading within the upper and midbasin of the River Siret.

GRASSLAND WET FEATURES OF TARNAVE MARE: SIGNIFICANCE FOR BIODIVERSITY CONSERVATION (ROMANIA)

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Keywords: Romania, Transylvania, grassland, wetlands, vegetation, protection, conservation.

Abstract

The open landscapes of Transilvania are noted for their diverse dry grassland habitats.

Many grasslands, however, particularly in areas of landslip associated with slumping hills and on north-facing slopes, contain both temporary and permanent wet features, which provide habitats for a range of aquatic or semi-aquatic plants and animals.

Larger pools up to 20m in diameter with marginal macrophytic vegetation occur, also smaller pools both temporary and permanent.

Wet drainage channels are particularly associated with snowmelt and with spring-fed seepage. They have varying chemistry, including semi-saline, spring-fed alkaline and neutral-acidic.

These wet areas provide habitat most conspicuously for amphibians, including *Rana temporaria, Rana lessonae* and *Bombina* spp., and can have a dominant vegetation of brown mosses, *Juncus* spp., *Carex acuta* and other large riparian *Carex* spp., *Typha* spp. and *Phragmites australis*. Wet or damp meadows, especially those of northern aspect, have mesotrophic *Alopecurus pratensis* - *Sanguisorba officinalis* grassland, sometimes with semi-montane floristic elements.

The temporary pools, which may only fill in a wet year, may provide habitat for rare Coleoptera and Odonata and some rare annual plants of bare mud such as *Persicaria mitis*. Other wet habitats include gulleys and seepage areas on marl slopes that dry out in summer, dominated by *Phragmites australis*.

The work was supported by Orange Romania.

~ Sibiu/Romania/Euroean Union 2009 ~

STOCK ASSESSMENT OF *PAMPUS ARGENTEUS* (EUPHRASEN, 1788) IN THE NORTHWEST OF THE PERSIAN GULF

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Keywords: *Pampus argenteus*; ELEFAN; growth parameters; Persian Gulf; fisheries management.

Abstract

The silver pomfret, *Pampus argenteus*, locally known as 'zobaidy' is a member of the Stromateidae family and one of the most commercially important fish in the Northern Persian Gulf that its stock is shared by Iran, Iraq and Kuwait (Al-Hussaini, 2003). Monthly data of length composition for silver pomfret were landed from the Northwest of Persian Gulf (Khuzestan province), for a one year period (March 2004 to February 2005). Knowledge of growth parameters determinations, minimum legal size and other estimation that done in this study is important in fishery assessment and management of the *P.argenteus* population because they form the basis information required in determining whether an area is heavily fished or under-exploited to allow possible management measure to be taken. In total 6789 fish (both sexes combined) were collected and studied throughout the period of study. Growth was investigated by fitting the von Bertalanffy growth function (VBGF) to length frequency data (von Bertalanffy, 1938). ELEFAN in the software package FiSAT was used to analyse of their length frequency data. Maximum fork length and weight were 132 cm and 18.4 kg respectively. The parameter values of the von Bertalanffy growth function were: L_∞= 339 mm; k = 0.55 and t_0= -0.16 years. The raw data were restructured with ELEFAN, plotting the curves from the growth parameters. The catch curves showed that fisheries operate upon 5 cohorts of the population. The estimated value of the instantaneous rates of total mortalities, Z based on length converted catch curve was 2.07 $year^{-1}$. The instantaneous rates of natural mortality, M based on growth parameters and mean environmental temperature was 0.58 $year^{-1}$. The annual instantaneous fishing mortality rate, F was estimated to be 1.49. The mean lengths at first capture, Lc or L_{50}, was 101 mm and the lengths at capture at probabilities of 0.25 (L_{25}) and 0.75 (L_{75}) were 90 and 110 mm, respectively. Fish were fully recruited to the fishery at a 150 mm. Exploitation rate, E was 0.72 $year^{-1}$. Gulland (1969) suggested that in an optimally exploited stock, fishing mortality should be equal to natural mortality, resulting in an exploitation rate of 0.50 $year^{-1}$. Exploitation rate and the results derived from yield-per-recruit analysis indicated that the resource was heavily over-exploited, and that management of this species should have been implemented rapidly to remain sustainable. Therefore a management work should be started to design a net of an appropriate mesh size to collect optimum lengths and increase the size at first capture to bigger than the size at first maturity.

ICHTHYOFAUNA CHANGES IN EASTERN SLOVAKIA RIVERS 1960-2007

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Keywords: threatened species, invasive species, ichthyofauna, Tisza basin.

Natural conditions of Tisza basin enable occurrence of versatile spectrum of fish. We describe historical and actual knowledges about the threatened and invasive fish species.

The Hornád River (193 km) is the 5th longest river in Slovakia. It is a left-handed tributary of the Slaná. The spring is located at 1050 metres altitude under Kráľova hoľa in Low Tatras National Park. It flows east and near the Kysak village it turns south to the state border with Hungary. The mouth of the Hornád River is southeastern from the Miškolc city.

The most important tributary of the Hornád River is left-handed Torysa River with total length 129 km. It stems in Levočské vrchy, than it continues through Spišsko-šarišské medzihorie and Košická kotlina. Mentioned units consist of sediments of sea from the paleogen and neogen. It flows into the Hornád River in altitude 176 metres above the sea level.

The Ondava rises in Nízke Beskydy area in Ondavská vrchovina. Its drainage with total length 146 km is situated in the east part of Slovakia. The junction of the Ondava and the Latorica comes into being the Bodrog River. From the geomorphological point of view the Ondava River streams throgh the Ondavská vrchovina, Beskydské predhorie, Východoslovenská pahorkatina, Východoslovenská rovina.

Several autors were interested in ichthyofauna of the Hornád River. Altogether one lamprey and 15 fish species occured in this river in seventieth. The invasive fish species were not established. According to actualy investigations in the Hornád River live one lamprey and 19 fish species. All these species belong to The Red List of lampreys and fishes in the Slovak Republic. One fish species is endangered, one lamprey and 5 fish species are near threatened and the remaining 13 species are least concern. Three invasive species (*Pseudorasbora parva*, *Carassius gibelio*, *Ameiurus melas*) were confirmed only in tributary Olšava River.

The first credible reports of ichthyofauna of the Ondava River were published in the late fifties. Together one lamprey and 24 fish species were recorded. *Ameiurus nebulosus* was the only substantiated invasive species. Other validated results of ichthyological investigations were presented in the late seventies. Only 19 fish species appeared in the main stream. The presense of invasive species were not confirmed. The latest knowledges were from the beginning of the 21. century. Overall one lamprey and 30 fish species were registered. All these lampreys and fish species pertain to The Red List of lampreys and fishes in the Slovak Republic. One fish species is endangered, 3 species are vulnerable, one lamprey and 6 fish species are near threatened and the remaining 20 species are least concern. The only one invasive fish species (*Carassius gibelio*) was indicated.

Many autors were engaged in ichthyofauna of the Torysa River. Altogether 26 fish species were enregistered in the Torysa River in sixties. Other investigators verified 22 fish species in eighties. Just one invasive fish species (*Carassius gibelio*) were affirmed in half of the eighties. In the beginning of nineties were validated only 10 fish species. In compliance with current surveys live in the Torysa River 21 fish species. Besides *Oncorhynchus mykiss* all these species appertain to The Red List of lampreys and fishes in the Slovak Republic. One fish species is endangered, 1 species is vulnerable, 4 fish species are near threatened and the remaining 14 species are least concern.

The species diversity of the Hornád River, the Ondava River and the Torysa River is high, what is characteristic for the Slovak Tisza basin. This part of drainage of Slovak Republic is known by the richest occurrence of rared and protected fish species. Therefore it deserves adequate protection.

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ISOLATION AND IDENTIFICATION OF A POTENTIAL HALOPHILE FROM COASTAL WATER (INDIA)

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Keywords: Tuticorin, Halobacterium, Halophile.

Abstract

Water sample, collected from the coastal area of Tuticorin, Tamilnadu, India was investigated for halophilic bacteria for its potential applications in various fields including understanding of life in extreme environments.

The physicochemical characteristics of the water sample was analyzed at the Central Electrochemical Research Institute (CECRI) following the methods as outlined in the Handbook of methods in environmental studies, by Maiti, 2004. The nutrient rich agar medium containing 15% NaCl and the antibiotic penicillin was used as the selective medium to isolate halophiles. On isolation, growth under different concentrations of NaCl, different pH, and temperatures was carried out to identify the optimum growth conditions. Phenotypic characterization of the isolate was carried out using standard procedures of biochemical tests, with the addition of NaCl. Gram staining was performed according to Dussault, 1995. The Genomic DNA was isolated and PCR smplification of 16SrDNA was carried out using the haloarchaea specific primers 41F (ACUACGATTTAGCCATGCTAGT) and 338R (CAUCAGTGTAAAGGTTTCGCG) (Mormile et al.,2003). The PCR product was cleaned and sent to MWG-Biotech for sequencing.

The salt concentration of the coastal water sample is 6.2% and the pH is 7.8. The optimum growth is observed in the NaCl concentration of 15%, pH 6.7-7.5 and the temperature of 30-35. The pure isolate was red pigmented, stained gram negative, pleomorphic rods in shape and are motile.The 16SrRNA sequence on BLAST analysis showed maximum identity to Halobacterum sp. and following analysis the sequence was submitted in Genbank (Accession No. EU713854).

From the ability to survive in high concentration of salt, resistance to penicillin, cell lysis in distilled water, growth and biochemical characteristics and 16SrRNA sequence analysis results, the isolate is confirmed as a Halobacterium species. From the study it is observed that halophiles can thrive in low salinity as evidenced from the physicochemical characteristics of the coastal sample and it supports the earlier reports on halophiles survival at low salt concentration. We aim to screen the isolate for potential enzymes, pigments etc for their applications in various industries. The major enzyme group of our current study is hydrolases, especially the different types of peptidases.

GENETIC DIVERSITY OF BACTERIAL COMMUNITY AT A CLAY TABLET SOLAR SALTERN

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Keyords: Bacterial Community, DGGE, Diversity, 16s rRNA, solar saltern.

Abstract

Hypersaline environmental conditions are among the extreme ecosystems on earth and halophilic microorganisms have been studied that screened for biocatalysts and biomaterials products using commercial applications. Solar saltern water was providing a wide set of ecological niches for halophilic microorganisms. But microorganisms in solar saltern were not sufficient for culture on traditional cultivation methods. Then, use of culture- independent method based on direct PCR of 16s rRNA was provided to be a powerful means of microbial identification and diversity.

Bacterial diversity in clay tablet solar saltern in Jeungdo Island, Jeonnam in Korea and bacterial communities with various salt concentration environments in labrotory were investigated by using 16s rRNA sequencing and DGGE. Strains were isolated from serially-diluted solar saltern samples on various media(nurteint agar, marine agar, skim mlik agar and R2A) and various salt concentration(0%-10% added NaCl). According to the results of 16s rRNA analysis, Bacillus sp.(35%) and *Halobacillus sp*.(35%) were predominant at 3% or lower NaCl containing medium. At higher NaCl concentration(5-10%), *Bacillus sp*.(25%), *Halobacillus sp*.(54%), and *Halomonas sp.*(11%) were predominant.

The effects of salt concentrations to bacterial diversity was investigated by 10 months incubaction of seawater and sediment samples in solar saltern added with various concentration of NaCl. Strains were isolated from colonies on various salt concentration. At 3% or lower NaCl concentration, *Bacillus sp*.(20%), *Microbulbifer sp.*(15%) and *Marinobacterium sp.*(15%) were predominant. *Bacillus sp*.(50%) was predominant at higher NaCl concentration(5-10%). Bacterial communities were analyzed by DGGE. It was conformed that high microbial diversity was maintained even at upto 25% NaCl. It was regarded as a results of high nutrient concentration in clay tablet and physiological characteristics of halophile bacteria which showed low growth rate in general.

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THE INHIBITING EFFECT OF HEAVY METALS ON THE PHOSPHOMONOESTERHYDROLISIS ACTIVITY

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Keywords: Lake Ohrid, phosphatase activity, organic mater, organotrophic bacteria, orthophosphate.

Abstract

River Cerava springs in the Republic of Albania, flowing through the fields of Ljubanista in the Republic of Macedonia and flows into Lake Ohrid eastwards of the St. Naum Monastery. The watershed of this river comprises certain coal and ferro-nickel excavations, and most probably a slag heap. It has been noticed that this river is the inflowing source of wastewater in Lake Ohrid in cases of downpour.

The quantity of biodegradable organic matter by the consumption of $KMnO_4$, the phosphatase activity index, the orthophosphates, as well as the number of the organotrophic bacteria have been investigated in the water of this river.

The obtained results display a low content of orthophosphates in the water of this river, a high phosphatase activity index, average content of biodegradable organic matter and slow growth of heterotrophic bacteria. Only 17% of the total average phosphorus have been evidenced (9,01 $\mu g \bullet l^{-1}$) occurring as $^{-}PO^{4}$; organic matter ranged between 2,7 $mg \bullet l^{-1}$ and 42,7 $mg \bullet l^{-1}$; whereas the phosphatase activity index varied from 0,11 $\mu mol/s/dm^3$ to 1,42 $\mu mol/s/dm^3$. The organotrophic bacteria were present in numbers from 26 $bac \bullet ml^{-1}$ to 764 $bac \bullet ml^{-1}$ water. There is an apparent incompatibility between the content of organic matter, the number of organotrophic bacteria, as well as the quantity of orthophosphates and total phosphorus.

This situation could be most likely explained by the inhibiting effect of certain heavy metals (Fe, Cd, Ni, Cu) which have been evidenced in the water of River Cerava on the phosphatase activity.

This paradox situation could be explained by the fact that this river flows through a mining area which conditions the presence of higher levels of heavy metals in the water. Considerably high concentrations of copper (7,96 $\mu g \bullet l^{-1}$), nickel (17,69 $\mu g \bullet l^{-1}$), iron (12,05 $\mu g \bullet l^{-1}$) were evidenced in the period 1997 and 1998, and there was also presence of cadmium, chrome and lead.

These metals could inhibit the phosphatase activity as a result of the substitute of the essential metal zinc ion of these metalloenzymes with one of the abovementioned metal ions.Alkaline phosphatases are closely linked to the surface of the cells which produce them. Due to this the enzymes are directly exposed to the activity of the free metal ions found in the water medium, and therefore can not avoid the toxic activity of the metals.

It is known that the increased activity of copper ions in the medium rapidly provokes inhibition of the alkaline phosphatase activity and this results in alterations of the phosphorus nutritive status in the environment and the organisms themselves.

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AMPHIPODA FAUNA OF GUILAN PROVINCE, A MORHOLOGICAL STUDY (IRAN)

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Keywords: Amphipods, Gammarus komareki, Gammarus syriacus, Alborz, Guilan.

Abstract

Amphipods are one of the great success stories in the Crustacea. Taxonomically, amphipods belong to the Order Amphipoda, of the Superorder Peracarida, of the Class Malacostraca, in the Subphylum Crustacea of the Phylum Arthropoda. The common type of amphipod is called "a Gammaridean amphipod" and belong to a grouping named after one of the more common freshwater amphipodan genera, Gammarus. They are widespread in aquatic ecosystems. They constitute a major group which are mainly marine but have also freshwater representatives. They have a central position in the food web and their role as bio indicator is significant. Most of the Iranian species belong to the artificial Gammarus pulex-group and the rest are grouped in the Gammarus locusta-, G.roeseli- and G.duebeni-species groups. In this study the specimens were collected from Alborz region in 3 rivers of Guilan province where 10 stations were sampled. Most of the specimens were collected from aquatiuc plants or beneath small stones, using a dip net with a mesh of 1×1 mm, then washed and cleaned of debris. Cleaned specimens were transferred to suitable jars, to which were added a few drops of ether to narcotize the specimens. Then 70% ethanol was added as a preservative. Specimens were studied morphologically under stereomicroscope and light microscope for identification in the laboratory. Large male and female specimens were selected for drawing. Partial dissection was facilitated using a pair of fine needle under stereomicroscope. Drawing, mostly based on male specimen, were made using a Camera Lucida on a light microscope. The results illustrated that there are 2 species of amphipods in this province, including *Gammarus komareki* and *Gammarus syriacus* that were recorded reviously in Iran. In addition, a new species: *Gammarus* sp.; somehow similar to *Gammarus komareki* but different in the characteristics of antenna 2 setose, epimeral plate shape, peduncle length of antenna 2 and in the size of uropod 3 was also identified. More in depth studies are required to determine the new unknown species more accurately.

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VIŞEU RIVER BASIN STONEFLY (INSECTA. PLECOPTERA) COMMUNITIES DIVERSITY ANALYSE (MARAMUREŞ, ROMANIA)

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Keywords: Romanian Carpathians, Vişeu River, Ţîşla River, Vaser River, Ruscova River, stoneflay larvae communities, human impact.

Abstract

This study assessed the Plecoptera communities diversity spatial variation in the north of Romania in the Vişeu River Basin (1606 km^2), in correlation with biotope characteristics (slope, water flow, bank stability, bank vegetation, substratum, and channel modification).

The data is based on quantitative samples of macro-invertebrates and qualitative samples of Plecoptera, sampled in 2007 (June - September), at 25 sampling stations, also biotope factors (slope, medium water flow, bank stability, bank vegetation type, percentage of water surface shaded by vegetation, channel modification, type of substratum) were evaluated.

Also the stonefly community's diversity - biotope relations modelling was done to describe the biodiversity dynamic in function of the biotope conditions variation and using in predicting the way lotic systems evolve. The assessed variables were the biotope factors ant Plecoptera communities' diversity, expressed through Margalef, Simpson and equitability indexes.

Achieving the correlation analysis it was found that significant statistical correlations exist between the Plecoptera diversity communities and biotope parameters: water flow, bank stability, bank vegetation, substratum, and channel modification.

In the studied area 18 species were identified belonging to 7 genera and six families. The stoneflay present the highest species diversity in the higher Ruscova basin were the aquatic habitats present an almost natural ecological state, the human impact being insignificant.

The studied plecopteran larvae communities reveal the fact that the aquatic habitats of the higher Ruscova basin, the upper Bistra and Frumuşeaua sectors, the extreme upper Vişeu Basin are in a good state and the anthropogenical impact is low in this sectors. The Ţâşla Basin is the most heavily impacted by the human activities. Lotic sectors slightly affected by the rural and forest exploitation impact are the lower Ruscova and Frumuşeaua sectors. The Vaser River suffering a higher impact of this type.

AQUATIC HEALTH ASSESSMENT: A METHODOLOGICAL PROPOSAL FOR MEXICAN AQUATIC ECOSYSTEMS

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Key words: Water quality index, trophic state index, multibiomarker response.

Abstract

The aquatic ecosystems are complex and dynamic, that consist of parts and biotic and abiotic processes. The environmental stress is an action, agent or condition that damage the structure or function of a biological system. Aquatic ecosystem health and environmental stress concepts are analyzed to discuss upon the advances that in freshwater topics have been carried out in the National School of Biological Sciences (NSBS) Mexico. We comment and discuss the main approaches used in the search of the diagnostic symptoms that researchers of the NSBS have investigated historically such as water quality, thropic status . Different indicators (end points) of abiotic (chemical and physical environment) and biotic conditions (biodiversity, exotic species, sentinel organisms, biomarkers and bioindicators) have been assessed to analyze the freshwater ecosystem health. The use of biomarkers has proven to be useful in establishing evidence of exposure to pollutant chemicals and health damage to sentinel organisms. In addition, biomarkers have helped to establish causal relationships. For our historical analysis, the diagnosis of the symptoms of the evaluation of the fresh water ecosystems has been divided in four groups: a) Abiotic indicators(include the measure of the physical and chemical variables in the aquatic ecosystem); b) Biological indicadors (specific richness, changes in the structure of the populations and changes in the trophic state of the water bodies, sentinel species with use of early warm biomarkers and bioindicators); c) Different spatial levels (from studies on precise water bodies and even, at regional level); and d) Level of organization (from organism or suborganism levels to population and community levels). Based on previous subjects, from 2004, an integrated protocol to freshwater ecosystem health assessment has been implemented, forming part of the new generation of quantitative assessment of freshwater ecosystem health. In this protocol the link among the environmental quality, the biological responses, and the socio-economic aspects are integrated by means of indices of water quality, trophic state and integrated biomarkers response, that give account of the state of ecosystem health in study. When conjugating the score or result of each of these indices gives the integral assessment of the freshwater ecosystem health. In our experience, the incorporation of different organization levels has allowed to have a holistic vision of the assessment of the freshwater ecosystem health. In Mexico, diverse research projects have been carried out under this scheme by our staff in lakes of the Mexican Central Palteau: Health assessment of Yuriria Lake, and in rivers of the tropical rainforest: aquatic health assessment of Champoton river, among others.

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HUMAN IMPACTS AND NUTRITIVE VALUE OF *NAJAS* SPP. IN WADI ALLAQI (LAKE NASSER, EGYPT)

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Key words: *Najas* spp., Lake Nasser, human impacts, Wadi Allaqi, nutritive value, fodder for sheep and goats.

Abstract

Development programmes in Lake Nasser, Egypt, give big attention to economic outcomes, including establishment of human settlements at the region along the shores of the lake (e.g. Shores agriculture and land reclamation), industrial development, tourism and recreation programmes, with little considerations to environmental implications. Wadi Allaqi as many areas in Lake Nasser exposed to anthropogenic stresses including: 1) Chemical fertilizers and pesticides moved to water from cultivated shores and 2) water pollution and mechanical damages of aquatic plants (macrophytes) from fishing using large motor boats. *Najas* spp. [*Najas horrida, Najas marina* subsp. *armata* and *Najas minor*] is one of essential aquatic fodder resource for nomadic groups [Bedouins] living in Allaqi particularly in the periods of low available grazing resources. Anthropogenic impacts [on water and hydrosoil qualities] have serious consequences on *Najas* spp. not restricted on its productivity, but extended to include the plant nutritive value. The aim of the study is to evaluate the effect of human activities on the nutritive value of *Najas* spp. Twenty two sites were selected, represented a various environmental conditions related [7 sites] and not related [15 sites] to human impacts. Three sampling periods [May, July and September 2008] were conducted represents maximum human impact and covers a wide range of environmental conditions. Water samples [measured parameters: pH, TDS, dissolved oxygen, light transparency, phosphate, nitrate, ammonium and sulphate], hydrosoil [measures parameters: phosphate, nitrate, ammonium and organic matter] and *Najas* plant [measured parameters: Crud carbohydrate, crud protein, crud fate and crud fiber for the three species of *Najas*] were collected from 22 sites and analyzed to relate the fodder value of *Najas* spp. to water and hydrosoil quality. Spatially marked difference in nutritive parameters of *Najas* spp. were observes, while the temporal variation was not clear. Dense canopy of *Najas* spp. supported by favourable conditions found to have high content of crud carbohydrate and fat. Although that CCA analysis indicated that crud protein in *Najas* spp. is correlated to nitrogen content in water, plant samples collected from the cultivated shores found to have low contents compare with other sides, this this was explained that some chemicals (as pesticides) contain heavy metals which compet on the ammonia absorption and restrict its utilization by plants. Fiber was the only content that independently varied from environmental conditions and its concentration depended only on the species of *Najas*.

QUALITATIVE AND QUANTITATIVE DATA REGARDING ZOOPLANKTON DIVERSITY FROM LACUL SĂRAT - BRĂILA (ROMANIA)

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Keywords: Lacul Sărat, Brăila, Romania, hiperhaline water, salt lake fauna, zooplankton, invertebrates, qualitative and quantitative analyse

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Abstract

Lacul Sărat is situated in the eastern part of Romania, in a stepic region where the climate is very dry in most part of the year. In conformity with Gâştescu's classification, it is considered as a *zonal salty lake*, together with other ones from Câmpia Română (Movila Miresii, Ianca and Batogu).

Known for it's therapeutically properties of mud and sludge since 1875 -1878 (the origin of the lake is in Quaternary and it was documentary attested in 1462, in a Vlad Ţepeş military campaign), the lake has become one of the most visited basins in the last decades.

In addition to salts contained in the constitution of a therapeutic mud an important role in its composition have water living organisms, either in plankton or in benthos. The decomposition of these bodies has a significant contribution to enriching the substance resulting curative mud.

This was just one of the reasons for starting this study pursued several aspects of the chemical composition of lake water and zooplankton component analysis.

Data based on some planktonic samples taken in several months of 2006 from hiperhalin water of Lacul Sărat, Brăila are presented in the paper.

8 sites situated either in the middle, either nearby the shore, from both compartments of the lake was investigated.

Some physico-chemical parameters as temperature, ph, conductivity, sulf compounds, Fe, variation of oxygen demand concentration, chlorides and ortho phosphate concentration are done.

It has recorded a reduce qualitative composition, constituted, mainly of 6 species, belonging to Rotatoria (*Brachionus plicatilis*), Crustacea Anostraca (*Artemia salina*), Crustacea Copepoda (the harpacticoid *Cletocamptus retrogressus* and the calanoid *Arctodiaptomus salinus*) and Insecta (adults of *Notonecta* and larvae of *Ephydra*), some of them considered as benthic ones.

Diagrams with qualitative structure (%) are analyzed for both compartment of the lake and a seasonal dynamic of zooplankton diversity are done.

A dynamic of average density of total zooplankton community and aspects of density variation for each identified group (Rotatoria, Crustacea, and Insecta) will be presented.

Some synecological indices will show the characteristic species for this particular type of ecosystem.

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STUDY OF GROWTH AND AGE OF CRUCIAN CARP, CARASSIUS AURATUS, IN GORGAN RIVER ESTUARINE (IRAN)

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Keywords: Growth, Age, Crucian carp, Gorgan river.

Abstract

Crucian carp is not a native species in Iran waters. It is frequently found in fish farms as well as producing common carp fry systems. This species has some drastic characteristics which enables it to out-compete the most stocks of the fish farms and occupy the ecosystems. For example its high tolerance to the severe conditions such as low food and oxygen, high reproduction ability, early maturation and gynogenesis. How ever, it is not an appropriate species for selling in Iran markets, its biological roles in ecosystems shouldn't be ignored.

With attention to its distribution in inland waters, we conduct a study on this species in Gorgan River estuarine. Sampling was done in autumn and three age classes detected 1+, 2+, and 3+. Average length of each age group was 75.48, 122.81 and 151 mm, and average weight was 8.48, 29.61 and 62.2, respectively. Only females were detected in samples, it reveals that this species is a gynogenes. Growth model was determined with W= aLb and it was positive allometric. With moment growth coefficient between 1+, 2+ and 2+,3+ equals .57 and .32 respectively. Gonadic examination show that samples were not adult, that is for sampling time in autumn and spawning month of this fish is April and May.

Previous study confirms that ssalinity has inverse correlation with growth rate of this fish that is the reason of weak growth of crucian carp in Gorgan River. So lower length and weight of current fishes is for high stress and salinity of estuary condition in spit of high amount of nutrient compound. RLG was measured for determination of feeding regime. Average RLG was 2.57 and it reflects that the given species is an herbivores, but in the same study in Dez river crucian carps had omnivores regime, that confirm abundance of herb tissue would affect selection of feeding regime in fishes.

Condition factor determines feeding conditions and with this factor we can compare feeding conditions among populations and different times. No distinct difference in growth was detected in this species between Gorgan River estuarine and Gharasoo Station.

It was prove that Maximum length and weight of this species is in January and minimum of that is in august. Our sampling was in fall so moderate condition factor was predictable.

CONTRIBUTION TO THE KNOWLEDGE OF *OREOCHROMIS MOSSAMBICUS* (PETERS, 1852) BIOLOGY IN NON-ORIGIN AREA (SLOVAKIA)

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Keywords: *Oreochromis mossambicus*, absolute fecundity, parasities, Nematoda, „Blue Kurper“.

Abstract

The fish fauna of the thermal waters Teplý potok near Bojnice Spa in October 2006 and May 2009 was monitored. Besides the population of *Poecilia reticulata* which has been present here for more than 25 years, the fish of the genus *Oreochromis* (Cichlidae) were recorded. The species of Tilapia namely *Oreochromis niloticus* are known in Slovakia from 1995, when fishes were imported from Sudan. The lethal temperature for this species is 15 ˚C; it survived only in the aquaculture a few years after duration of experiment and now it is extinct in Slovakia. According to the coloration and some distinguishing morphometric features, the species from Teplý potok as *Oreochromis mossambicus* was determined. This species survives in lower temperature (8 ˚C). The population probably originates from ZOO Bojnice where species has been maintained in 1990, or from aquarists. The fish were caught by hand net in 2006 (16 specimens) and by electrofishing in 2009 (9 specimens). Specimens caught in 2006 were bred in aquarium and fishes caught in 2009 were fixed in 4 % formaline. The present study is focused on the biology of this species: fecundity, diet and parasitological screening of the digestive tract. Totally, 9 fish were caught (4 females and 5 males. Average absolute fecundity of females was 224 eggs (ranged from 106 to 464 eggs). The standard length of females reached 93mm in average (64-131mm) and average weight was 17.25g (5g - 38g). Parasitological screening revealed only the presence of parasitic nematodes in the three fishes (33 % prevalence) with weak intensity of infection of (1-4), localized in the lumen of intestine or serosa. Because of a suboptimal environment in Teplý potok (size of recipient, food base) this species created here a slow-growing individuals. The content of intestine was formed by filamentous green algae and detritus. Since the population of Mozambique Tilapia has occurred in Teplý potok for several years, the species can be ranked as a part of Slovakian fish fauna, naturalized in the thermal waters of this recipient.

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DIVERSITY IN FEEDING SPECTRUM OF FISHES - A CASE STUDY OF CHILIKA LAKE (INDIA)

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Keywords: Chilika Lake, capture fishery, feeding spectrum, benthic food chain, pelagic food chain.

Abstract

Chilika Lake, the largest brackish water lagoon of Asia, is a highly productive wetland with rich biodiversity. The favourable habitat characteristics provide hospitable grounds to most economic species of finfish and shellfish that enhance its commercial significance as a multi-species capture fishery.

The diverse species of fish inhabiting the lake, with marine, brackish and freshwater origins, have evolved specific strategies to meet their nutritional requirements. Gut analysis exhibit great diversity in the types and amounts of food; even the diets of juveniles and adults, as observed in *Mugil cephalus, Lates calcarifer, Etroplus suratensis, Mystus gulio* and *Penaeus monodon,* exhibit ontogenic differences reflecting changes in food preferences with growth of fish.

Seasonal fluctuations occur in the amount of feed consumed, largely in herbivorous and carnivorous forms. In certain cases, the diet consists of 8-12 different food types. The major food items include detritus, phytoplankton, zooplankton, macrophytes, invertebrates and fishes. Basing on the food preferences of the species, five different feeding guilds - detritivores, planktivores, herbivores, carnivores and omnivores - are broadly recognized.

Existence of some flexibility in the feeding habits of certain fish, both in composition and in amount of each category of food, is observed in different sectors of the lake. Another significant feature in the feeding biology of the lake is the migration of juveniles of many marine species such as *Mugil cephalus, Liza macrolepis, L. subviridis, Valamugil speigleri, Lates calcarifer, Eleutheronema tetradactylum, Rhabdosargus sarba, Chanos chanos, Gerreomorpha setifer, Terapon puta, Penaeus monodon, P. indicus* and *Scylla serrata* into the lake to utilize this as the feeding ground. Some of the benthic and pelagic food chains operating in the lake, with predator fish as the top carnivores, have been presented and a generalized fish community food web has been prepared having components from detritus and plankton to fish-eating birds.

MICROORGANISMS WITH BIOTECHNOLOGICAL POTENTIAL PRESENT IN OIL RESIDUES POLLUTED AQUIFER AND GROUNDWATER

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Keywords: oil pollutants, hydrocarbon-oxidizing bacteria, biodegradation, bioremediation.

The presence in the environment of various pollutants influences directly the diversity of microorganisms, causing alteration of the structure of microbial communities. The microorganisms posses complex genetic mechanisms which allow them a quite rapid adaptation to various environmental conditions.

Samples collected from 2 types of aquatic sites contaminated with oil residues were taken under study, *i.e.* aquifer from Ovidiu Pod site, Constanta county, area crossed by an oil pipe for fuel transport, and groundwater from the Boldesti-Scaieni oil park, Prahova county, respectively, were semi paraffinc oil is extracted, processed and shipped. In the first location an accidental contamination of the environment with fuel oil occurred, while the second location involves a chronic pollution due to drilling, manipulation and storage of crude oil. The water samples were characterized physico-chemically and microbiologically, aiming to identify physiological groups of bacteria involved in the carbon, nitrogen, sulfur and iron circuits. Among these, more complex studies were performed on 15 isolates of hydrocarbon oxidizing bacteria, the most important of the microorganisms involved in the natural degradation of polluting hydrocarbons. The bacterial strains were characterized morphologically and physiologically, inclusively by quantifying their capacity to synthesize several degradative enzymes. The majority of the bacterial strains under study produce in the presence of hydrocarbons extra cellular tensioactive compounds that stimulate the metabolization of these hydrophobic pollutants. The degradation potential was assessed against saturated aliphatic hydrocarbons, cycloalcans and semi-paraffinc crude oil. The undertaken investigations, allowed the selection of 4 bacterial strains from the aquifer and 5 from the groundwater capable to both tolerate and degrade oil substrates at percents varying between 45.4-92.1%, and proving that these microorganisms adapted themselves to the presence in the environment of the given pollutants, which they use as carbon and energy sources.

The bacterial strains exhibiting superior degradative performances were analyzed by means of the "Biolog" system for identification of bacteria, establishing their presumptive taxonomic affiliation as to: *Pseudomonas*, *Vibrio*, *Micrococcus*, and *Brevumdimonas* genera.

These microorganisms, used possibly as a consortium, could be of potential interest for rehabilitation of aquatic and terrestrial environments polluted with oil residues by means of ecological bioremediation techniques.

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WETLAND BIODIVERSITY, TYPES, IMPROTANCE, AND MANAGEMENT (NIGERIA)

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Keywords: wetland, types, importance, Nigeria.

Abstract

Aquatic biodiversity can be defined as the variety of life and the ecosystems that make up the freshwater, tidal, and marine regions of the world and their interactions Aquatic biodiversity encompasses freshwater, including lakes, ponds, and reservoirs, rivers and streams, groundwater, and WETLANDS.now people have now understand the function of wetland, and the values humans obtain from them. Wetlands help regulate water levels within watersheds; improve water quality; reduce flood and storm damages; provide important fish and wildlife habitat; and support hunting, fishing and other recreational activities. Wetlands are important features in watershed management.

Some wetlands particularly those on flood plains and in coastal areas function in flood control by storing and decreasing the the velocity of excess water during heavy rainfall, as water flows into wetland, it naturally losses velocity as it collects and continuous to spread out. Wet land vegetation provide another natural barrier to fast moving water and therefore aids in floods speed reduction, the result of wetland activity during flood is often decreased damages to surrounding areas and control erosion, wetland buffer shore lands against erosion because they are often located between water bodies and high ground. The roots of wetland vegetation bind the soil, putting a hold on it, while the plants themselves absorb the impact of the wave.

In a healthy wetland, there are more life in one acre of healthily wetland, wetlands are virtual heaven for the endangered species in Africa, about 35% of all plant and animal lusted as threaten or endangered in most Africa, migratory bird, including ducks, merons, sand pipers and eagle visit wetland in the fall and spring to feed while enroute to their summer and winter destination, a large no of birds rest and winter in wetlands as well mostly in Europe. Economics in the united state according to (JEQ) hunting, fishing, hiking, boating, photograghing and bird watching opportunity are abundant in recreation wetland.

Water company and treatment: Wetlands fed by groundwater further transport the water to streams that may otherwise dry up during warm summers or times of drought. Furthermore, wetlands absorb water during the wet seasons and gradually release it during dry seasons, and can thereby refill aquifers and other drinking water supplies. Wetlands not only supply water, but they cleanse it. When water enters a wetland, the wetland becomes a giant kidney, filtering out impurities before allowing the water to leave. The wetland vegetation plays a large role in this filtering system as it uses its roots and stems to trap and gather sediments comprised of both chemicals and nutrients.

METAL AVAILABILITY ASSESSMENT

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Keywords: sediment, metals, availability, sequential extraction procedure.

Abstract

It is now widely accepted that the role of aquatic sediments as a sink for metal pollutants cannot be fully assessed by measuring the total metal concentration. In addition, determination of total element does not give accurate estimate of the likely environmental impact. Hence, contaminant speciation and its effects on bioavailability are critical to understanding ecotoxicity. The use of the total concentration of a trace metal in sediment as a measure of its toxicity and its ability to bioaccumulate is problematic because different sediments exhibit different degrees of bioavailability for the same total metal content. Metal speciation occurring in the sediments is in turn expected to influence metal bioavailability, and thereby metal content in biota, in particular in the soft tissues of fish and mussels. Since availability critically depends upon the chemical form in which a metal is present in the sediment, considerable interest exists in element speciation.

In the present study sequential extraction scheme has been applied to evaluate the properties of metals bound to different phases of sediment matrix. This procedure allows us to obtain the distribution of metals in the following fractions: loosely adsorbed to the surface of sediment particles, exchangeable and bound to carbonates; bound to iron and manganese oxides/hydroxides; bound to organic matter and suplhides and incorporated into clay mineral lattices. Metal fraction adsorbed and bound to carbonates is considered to be the most bioavailable. The potential mobility and toxicity of metal ions could be related to the ratio of simultaneously extracted metals (SEM) and acid volatile sulphide (AVS) for the sediment. To evaluate the potential effects of metals on benthic species, the ratio [SEM]/[AVS] was detected for five metals: cadmium, copper, nickel, lead and zinc. When the ratio [SEM]/[AVS] < 1, metals are immobilized in the solid sulphide phase and acute toxicity due to heavy metals is not probable.

According to the results, Zn, Ni and Pb are more associated with mobilisable fraction (exchangeable and carbonate bound). In other words, these metals are more available to aquatic life. This was confirmed with the results of SEM and AVS analysis since for the Pb and Zn the ratio [SEM]/[AVS] > 1. That indicates the presence of Zn, Ni and Pb in pore water and possible acute toxicity. Cu and Cd were found mainly in residual fraction with lowest environmental impact.

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DISSOLVED NUCLEIC ACIDS IN THE ENVIRONMENT OF SOUTHERN JORDAN

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KeywordsS: Dissolved nucleic acids, environmet, Microbial loop and Jordan.

Abstracts

Dissolved Nucleic acids (DNC) are ubiquitous components of the dissolved organic matter (DOM) pool of all oceanic, neritic, estuarine, and freshwater habitats studied to date, and may be also an important component of the DOM for microbial growth, because of its enrichment in nitrogen and phosphorous, and also as a source of nucleic acid precursors. Additionally, DNC could be genetically important, encoding for gene sequences with the potential to transform microbial populations. Transformation has been demonstrated for a variety of terrestrial bacteria and genetic exchange via transformation has been observed in soil. Under appropriate reaction conditions, dissolved DNA (D-DNA) and dissolved RNA (D-RNA) are efficiently removed from samples. The purpose of the present study, was to investigate DNA and RNA dynamics in soil of the southern of Jordan in order to provide quantitative estimates of DNC distribution and accumulation in soils.

In order to understand the dynamics of DNA and RNA in soils, sampling was carried out on the five different locations in south of Jordan, which is one of the most dry places in the world . For nucleic acid determination, we sampled the top 1-cm slices of two cores, which were subsequently homogenized and deep frozen for later analyses in the laboratory, at five different locations and analyzed for nucleic acid content (DNA and RNA). Nucleic acid extraction and measurement were done by the procedures of Zachleder (1984) as applied by Danovaro(1993), with a few modifications to enhance DNA extraction from the soil.

The results reveal two important facts. First; Both DNA and RNA concentrations were extremely high and characterized by a significant difference between the different sites of southern Jordan. A similar trend has been noticed with RNA. The results confirming the view of large variability among different environments.

Secondly; our results are in agreement with the hypothesis which indicates that the microbial loop play an important role in NA dynamics. This fact suggests the presence of enzymatic activities decomposing organic materials and releasing DNA. Our results confirmed the hypothesis that DNA released from dry matter in decomposition in soil is rapidly degraded or adsorbed onto soil particles as well as the adsorption of DNA onto soil components retards DNA degradation and constitutes a major mechanism of DNA molecule persistence in soil.

DNA concentrations reported in this study were high when compared to literature data indicating that organic matter accumulation has higher rate in the continental environments. Also, RNA concentrations in the study areas were extremely high and comparable to those found in highly productive systems.

PRELIMINARY DATA ON THE GENETIC DIVERSITY OF *DREISSENA BUGENSIS* IN THE LOWER DANUBE BASIN

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Keywords: genetic diversity, *Dreissena bugensis*, microsatelite, Lower Danube.

Abstract

The introduction of the species *Dreissena bugensis* in Europe was facilitated by the construction of navigable canals and irrigation systems. The first record of the species was reported in the Romanian sector of the Danube River (Cernavoda locality area) in 2004. Later, it was found also in the Romanian-Serbian sector (Drobeta Turnu-Severin locality area) and in the Bulgarian-Romanian part.

The first records of *Dreissena bugensis* in Western Europe were reported in the Hollands Diep, part of the main distributary in the Rhine Delta in 2006 and in the Main River in 2007.

The species was also recorded in the inland waters of the Bulgarian territory in 2005-2006 period, which was the first record of *Dreissena bugensis* in un-navigable water of Europe.

We report here preliminary data on the genetic diversity of thee populations of *Dreissena bugensis* in the Lower Danube basin: Ogosta Reservoir in Bulgaria (43°22'31.0"N, 23°10'56.0"E), Danube at Drobeta Turnu-Severin (44°37'12.0"N, 22°38'51.5"E) and Danube at Galați (45°24'46.8"N, 28°02'42.5"E). The genetic diversity was assessed at four nuclear microsatellite loci. The analysis revealed a high level of genetic diversity, the observed heterozigosity values reported here being larger than the values reported by two other authors. These values of Ho are comparable with those of the native species *Dreissena polymorpha*. The differentiation between populations proved to be low (maxFST<0.027) and the founder effect was not detected.

This situation was probably generated by a combination of two factors: a large number of individuals in the newly established populations of *Dreissena bugensis*, which preserved a significant proportion of the original genetic diversity and multiple colonisation events and the consequent accumulation of large genetic diversity.

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REPLACEMENT OF STREAM PROCESSING SUGARCANE PITH (KHOTAN) WITH BARELY GRAIN IN COMMON CARP FEED

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Keywords: common carp, pith of sugarcane, replacement, barely, growth.

Abstract

One of the major expenses in any fish culture operation is the cost of feeds for the fish, and the profitability of many operations is frequently tied to the cost of feed. In Iran, common carp are widespread in the rivers and its attributes as well as in the pools. This is due to the fact that common carp are easily growing fish species since they eat a variety of foods, resist to diseases and grow well in poor quality water with low dissolved oxygen. Of these species, is an important food fish and it is considered as the best species for culture because of its high tolerance to adverse environmental conditions, its relatively fast growth and it could be easily bred.

Common carp intensive culture requires the formulation of efficient food with optimum
potency to meet the protein requirements in fish culture and the selection of genetically improved tilapia strain. A semi-moist basal diet was prepared from purified ingredients and was used to formulate. Fish were fed frequently at a rate of 3% of live body weight. The fingerlings of mixed sex were distributed randomly. Common carp used were 2-8 g in the body weight and the length of 2-5 cm.

The use of fiber materials is cheap price in feed warmwater fishes and also less use of cereal grain especially barely grain, will become along increase economic benefit in aquaculture breeding. For was accomplishment this research with no.1 treatment only use of groats rate 5% of body weight, no.2 treatment 5% sugarcane pith will processing with steam pressure(Khotan) and no.3 treatment for 10% khotan. One time fifteen was accomplishment sampling of fishes. With end of breeding period fishing fifty number of release coincidence for pond and repose assessment growth process and body long. In this research fishes live weight changes from statistical viewpoint by increases of khotan rate diet weight of fishes are not find significant increases ($p<0.05$). FCR in 1th treatment(control group) 3/74 , 2th treatment(5%khotan) 8/55 and 3th treatment 9/12 and also finished cost meat production per kilogram get calculated 10472, 8122/5 and 8664 rials, respectively. Also became observation which this research by level khotan increase, aquatic is able to continue itself growth. This research have results similar of other researchers, based upon ability of fiber consumption in carp fishes feed maximum 30% and reports based upon feeds consumption comprise high fiber in this fishes nutrition. Although growth in comparison with control group have not makes difference but will have many less final reations cost of khotan.

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STUDY ON PRESENT STATUS OF AVIFAUNA IN THE PONDS OF BILASPUR 'A DEVELOPING CITY OF CHHATISGARH STATE (INDIA)

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Keywords: Avifauna, Water Birds, Biodiversity, India

Abstract

Birds are biological indicator and a measure of ecological health of the region as man and birds share common resources to sustain their life. Small ponds of India perhaps show this inseparable relationship at the most. However low land areas of the city also act as a natural rain water storage area and provide seasonal shelter for water birds. These water bodies along with marshy areas develop as self sustained ecosystems with variety of aquatic and marshy vegetation surrounded by grasses, shrubs and trees. These areas act as home for good number of water birds.

Reclamation of low land areas and water bodies for human habitation and other activities limits these birds in small discrete pockets within city limits.

In the present study survey of ponds and marshy area of Bilaspur a small city of Chhattisgarh India was conducted to find out biodiversity of birds within city boundary and to find out ecological health of the city. Study was conducted between April 2008 to March 2009. Five sites were sampled quarterly to document the birds. Point count method was adopted to note abundance and diversity of birds. Book of Indian Birds By salim Ali and A Field Guide to Birds of India By Krays Kazmierczac was referred for identification.

There was considerable difference between the sites as far as biodiversity of birds is considered. One site did not support water birds probably due to the pollution caused by sewage water poured onto it from near by slum.

In total forty two Bird species were recorded from five study sites. Out of which nineteen were water birds and Twenty three Species inhabited surrounding areas of pond and marsh.

Pond heron (*Ardeola bacchus*), little Egret(*Egretta gularis*) Cattle egret (*Bubulcus ibis*), white Breasted Kingfisher(*Halcyon smyrnensis*) were common birds seen near water bodies. Bronze winged Jacana (*Metropidius indicus*), Moor Hen (*Gallinulla chloropus*), White Breasted Water Hen (*Amaurornis phoenicurcus*) were commonly seen around marshy area. White Wag Tail and Sand piper were winter visitors. Purple Moor Hen was also recorded from a study site.
It was found that abundance and diversity of birds varies with season, climatic condition and vegetation in pond.

HEALTH CONDITION ASSESSMENT IN XOCHIMILCO LAKE, MÉXICO

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Keywords: Water quality index, trophic state index, multibiomarker response.

Abstract

Xochimilco Lake, located in Mexico City, has a long historical and cultural heap that includes its high biodiversity, and the floating gardens or "Chinampas". In 1987 was declared as Patrimony of the Humanity by UNESCO and in 2004 was included in the international list of wetlands Convention RAMSAR. Since 1900, this lake was one of the main water supplies for Mexico City. Nowadays the wastewater inputs from a treatment facility have brought to the depletion in the water quality. This study assess the health of the Xochimilco Lake, using early warning biomarkers in organisms of three trophic levels (primary producers: *Ankistrodesmus falcatus*; first order consumers: *Hyallela azteca*, and third order consumers: *Ambystoma mexicanum*); the trophic state was analyzed, a water quality index (WQI) was assessed and histological damaged were analyzed in *A. mexicanum*. Three monitoring periods were carried out (rainy, cold and drought season), in three study sites: urban (UZ), touristic (TZ) and agricultural or chinampera (CZ) zones. Environmental factors were recorded *in situ* and water and sediments samples were taken for their analysis and for exposure assays. The trophic state fluctuates from eutrophyc to hypereutrophic, according to transparency, chlorophyll *a* and P total. Contents of P_T and N_T increased drastically in the drought and the trophic condition evolves to hypereutrophyc. Spatial differences were also detected. WQI fluctuates from 47.7 in UZ to 61.8 in CZ. There is remarkable the higher values of the total and faecal coliforms and DBO_5 values in UZ. Sublethal exposure assays provoked oxidative stress in all organisms studied. Lipidperoxidation level reflects that the UZ was the site that exerted major oxidative damage, followed by the CZ. Furthermore, CZ also exerted inhibition in the acetilcholinesterase activity, suggesting neurotoxic damage in *A.mexicanum*. The exposure of *A. mexicanum* to elutriates of the three study sites make evident histological damages in liver and gills. The UZ and the CZ provoked increase in the pigment cells, vasocongestion and epithelial thinning in gills. The UZ also exerted damages in the liver with a gradual increase in vacuolization of the hepatic cells, vasodilatation of the sinusoids and in the capillaries and erythrocytes increases in them. Prevailing conditions in Xochimilco Lake, in particular in UZ put in risk the health of aquatic biota of the three trophic levels and put in danger the survival of the neotenic amphibian, *A. mexicanum*, an endemic species of Xochimilco, that are considered as critically in danger by the IUCN criteria.

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THE EFFECT OF PROBIOTIC (BACILLUS SPP) ON GROWTH, SURVIVAL AND GUT MICROBIAL LOAD OF RAINBOW TROUT

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Keywords: Bacillus, micro flora, nutrition.

Abstract

A commercial Bacillus spp. probiotic was tested on rainbow trout fry, during the two months of first feeding. Probiotic was introduced in diets at five different levels, (T_1:4.8×10^8, T_2:1.2×10^9, T_3:2.01×10^9, T_4:3.8×10^9, T_5:6.1×10^9 CFU g-1) and their effects compared with those of control diet, containing no probiotic. Survival in treatments were significantly ($P<0.05$) higher than control and a slight increasing mortality rate was observed during the first week of experiment. The counts of bacteria associated with trout intestine in all treatments were significantly ($P<0.05$) higher than controls and Bacillus spp. was not detected in controls. Total bacteria counts were significantly different among treatments and controls; it may suggest that the colonization rate of digestive tracts of rainbow trout fry with bacteria was affected by dietary bacteria level. Specific growth rate, condition factor, protein efficiency ratio were slightly, but significantly ($P<0.05$) higher and feed conversion ratio was lower in groups received probiotic via diets than controls. It may show that probiotic stimulates digestive development and enzymatic activity in fish. Growth performance in treatment received 3.8×10^9CFU g-1 showed the best results. Therefore, it does not appear that higher levels of probiotics improved results and suitable doze of probiotic should be assessed before application in large scale to prevent any undesired effects. The supplementation of trout starter diet with Bacillus spp. is probably effective for improving rearing conditions. Because growth rate throughout the experiment was improved in T4, not in T5, it can be certainly suggested that the more probiotic cells in diets and host intestine necessarily does not result in the more improved growth and survival. Better growth, as observed in T4, may establish better health conditions in rainbow trout fry and therefore, decrease mortality. Bacillus spp. produces several peptide antibiotics, including subtilin and bacitracin produced by B.subtilis and B. leicheniformis, respectively, which was present in the probiotic we used. Moreover, there are a number of other substances with biocontrol activities isolated from species of Bacillus.We found that supplementation of trout starter diet with the proper density of commercial Bacillus probiotic could be beneficial for growth and survival of rainbow trout fry, especially in fast growing conditions, where it would be essential to stimulate the precocious maturation of digestive system . No clear effect of probiotic on diversity of rainbow trout fry intestine flora detected, but high rate of probiotic bacteria colonization was observed. Since the results might be affected by the rearing conditions, so we suggest the effects of Bacillus probiotic to be tested in other locations.

PRESSURE ON MARINE NATURAL RESOURCES AND THE MARINE STRATEGY FRAMEWORK DIRECTIVE (DIRECTIVE 2008/56/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 17 JUNE 2008 ESTABLISHING A FRAMEWORK FOR COMMUNITY ACTION IN THE FIELD OF MARINE ENVIRONMENTAL POLICY)

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Keywords: water and aquatic ecosystem protection, sustainable water management, maximization of social profit, qualitative and quantitative water protection, marine policies, initial assessment, measure proposals.

The main reason that led to Directive 2008/56/EC is the observation that pressure on marine natural resources is often too strong: a reason for which the community should reduce impact on marine waters.

Marine waters under the sovereignty and jurisdiction of the Member States of the European Union include the waters in the Mediterranean Sea, the Baltic Sea, the Black Sea and the North-east Atlantic Ocean, including the waters surrounding the Azores, Madeira and the Canary Island (paragraph 1 of the Directive 2008/56/EC Protocol). The pressure exercised by man consists of multiple forms of water pollution: thermal pollution, chemical pollution, biological pollution etc.

Thermal pollution, deepened by the development of electronuclear programmes – since sea and continental waters are used as a coolant for nuclear and conventional power plants – has harmful effects on both abiotic factors and biotic factors.

Besides mineral and organic chemical pollution (with pesticides, sewage, Mercury Hg, Lead Pb), the pollution of continental and ocean water with hydrocarbons represents – despite all commitments at both international and regional levels by different treaties – a factor of serious concern through the diversity and magnitude of harmful effects.

Biological water pollution consists of bacteria contamination of waters, which explains, among others, the present spreading of choleric pandemia, polluted waters accelerating pathogenic diseases such as: typhoid fever, dysentery, enteric viruses etc.

In order to face these present threats, both internal and community norms try to maintain or to improve the biological quality and productivity of waters, for the purpose of avoiding negative effects on the environment, human health and material goods.

Directive 2008/56/EC establishes a framework within which the Member States adopt the necessary measures for attaining or maintaining a proper ecological marine environment.

Just like internal norms, Directive 2008/56/EC has positive elements as well as serious limits or omissions.

SOONWOOA BUANENSIS GEN. NOV. SP. NOV. IN THE FAMILY FLAVOBACTERIACEAE

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Keywords: Flavobacteriaceae, 16S rRNA gene, gen. nov.

Abstract

The family *Flavobacteriaceae* currently comprising more than 85 genera is a recently expanding lineage in the phylum *Bacteroidetes*(www.bacterio.cict.fr/). Most new members of the family have been continuously isolated mainly from diverse marine environments including the deep, sediment, Antarctic waters and marine plants or animals.

A Gram-negative, non-motile, non-gliding, strictly aerobic, yellow colony-forming, rod-shaped bacterial strain, named HM0024^T, was isolated from costal seawater of the Yellow Sea and taxonomically investigated.

The 16S rRNA gene sequence similarities were calculated based on the sequence alignments in the ARB package and also confirmed by EzTaxon server, the strain was most closely related to *Chryseobacterium balustinum* (94.4 %), *Chryseobacterium scophthalmum* (94.4 %) and *Elizabethkingia meningoseptica* (94.0 %), and shared less than 92 % sequence similarity with other genera in the family *Flavobacteriaceae*.

To clarify the phylogenetic position of the novel strain, 1178 nucleotide positions that could be unambiguously aligned were used to generate phylogenetic trees using the maximum-likelihood, maximum-parsimony and neighbour-joining algorithms in PAUP*4.0beta 10.Phylogenetic analyses clearly showed that the strain formed an independent phyletic lineage within the family *Flavobacteriaceae*.

The DNA G+C content of the strain was 29.6 mol% and the major cellular fatty acids were iso-$C_{15:0}$, iso-$C_{17:0}$ 3-OH, iso-$C_{17:0}$ ω7c and $C_{16:1}$ ω6c/$C_{16:1}$ ω7c. The lower DNA G+C content, larger proportions of $C_{16:1}$ ω6c/$C_{16:1}$ ω7c, anteiso-$C_{15:0}$ and iso-$C_{16:0}$ 3-OH.

The results show the differential phenotypic characteristics between strain HM0024^T and the 5 closest members of the genera *Chryseobacterium* and *Elizabethkingia*. A number of phenotypic characteristics, including especially the carbon source oxidation pattern, enzyme activities and growth properties, differentiated strain HM0024^T from the related.

On the basis of phenotypic and phylogenetic data, therefore, it is suggested that strain HM0024^T (=KCTC 22689^T =CECT 7503^T =DSM 22323 ^{T}) be classified in a novel genus and species, named *Soonwooa buanensis* gen. nov., sp. nov.

~ Sibiu/Romania/Euroean Union 2009 ~

SOCIO ECONOMIC THREATS AND WATER RESOURCES IN BALOCHISTAN (PAKISTAN)

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Keywords: Sibiu County, algal community, qualitative structure, ecological aspects.

Abstract

The water resources are decreasing day by day and the entire world is feeling it impact. But the situation is worst in the developing countries like Pakistan, where there is big difference between supply and demand. There are multiple facts of this difference like population pressure, changing of socio-cultural and agricultural practices, climatic variability and mismanagement of resources. Also, if an effort is made to improve the water resources that could not be effective due to lack of planning and coordination among the stakeholders.

To find out the reality that at what level the lack of planning affect the socio-economic condition of the area, the author conducted study in Makran Division, Balochistan Pakistan between the periods of 2006-2007, where an effort was made to establish the water storage system (Dam) to improve the water resource of the area. But on the upper side, the sheet/torrential flow was not channelized, resultantly, the existing water resources (Kareze), which were the sole source of irrigation, were abandoned due to inundation. These water resources were irrigating almost 4000 hectares of area and left adverse impact on the socio-economic condition of the upper riparian of the Dam area. The area was very rich in the growing of date trees and other cash crops.

The data was collected through the primary and secondary sources to make the study more meaning full. The collected data was entered, processed and analyzed. The primarily analysis of the study shows that there is an adverse impact on the agricultural productivity, i.e., 24 percent of crop yield is decreasing, 10 percent of the date trees get abandoned, livestock rearing is decreased to 12 percent, and eight (8) percent decrease in revenue of the area. Surprisingly, 13% of the people shifted to other location due to their miseable socio-economic condition.

Keeping in view the findings of the study, it is recommended that considerable time must be given at the planning stage of the project, even the local community must be consulted at this stage of the project. Similarly, the mechanism must be developed to control the sheet /torrential flow which cause the damages of the existing water resources (Kareze), especially in the water scarcity area; otherwise the efforts to improve the water resources remain fruitless. There is also message for the donor to release the funds with the condition of proper feasibility study before the initiation of such projects.

MULTIDISCIPLINARY EVALUATION OF THE FUNCTION AND IMPORTANCE OF THE SMALL WATER RESERVOIRS: THE BIODIVERSITY ASPECT

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Keywords: water reservoirs, Carpathians, biodiversity, phytobentos, macrohpytes, benthic and pelagic invertebrates, molluscs, fishes, birds.

Abstract

Small water reservoirs are the very important landscape elements for effective water management. Although these man-made artificial biotopes change the proportion of lotic and lenitic habitats and thus influence the species community structure, secondarily offer a broader scale of microhabitats and, in general, can significantly influence the fauna sustainable development. The evaluation of the function and importance of small water reservoirs in the biodiveristy development on all levels is still unappreciated. In this case, preliminary results of the study on 6 small water reservoirs in West Slovakia are presented.

The research has covered the major species groups (phytobentos, macrohpytes, benthic and pelagic invertebrates, molluscs, fishes and birds). As the first step, we are focusing on the description of the biodiversity patterns within the particular water reservoirs followed by the analyses of species links to the environmental variables using the multidimensional methods (neural networks, ordination methods and generalised linear methods) as the second step. The third step covers the compilation of obtained results and evaluation of the function and importance of the small water reservoirs.

The major benefits of this study are as follows: (I) significant improvement of the knowledge on the biodiversity of aquatic ecosystems influenced by small water reservoirs, (ii) implementation of the innovative methods of the multidisciplinary ecological research, (iii) support for sustainable development of the biodiversity in artificial biotopes, development of the multidisciplinary network of researchers and experts from the applied sphere, (iv) effective application of outputs in the ecological management oriented to the sustainable development of the artificial aquatic ecosystems in combination with their primary use and implementation of the results gained at the international scale.

The study was supported by the project SAV-FM-EHP-2008-03-04.

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COMPARATIVE ANALYSIS OF THE FOOD SPECTRA OF THE FISH POPULATIONS FROM THE RIVER OITUZ (ROMANIA)

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Keywords: River Oituz, macroinvertebrates, fish, food spectrum.

Abstract

The study aimed at analyzing the diversity of the macroinvertebrates present in the food of the fish populations living in the River Oituz and its tributaries: Halos and Lesuntu Mare, and also Lesuntu Mic and Slatina - tributaries of the Lesuntu Mare.

Fish were sampled in the years 1998, 1999 2004 and 2008.

Fish species sampled were: brown trout (*Salmo fario*), European chub (*Squalius cephalus*), Eurasian minnow (*Phoxinus phoxinus*), bleak (*Alburnus alburnus*), chub (*Alburnoides bipunctatus*), gudgeon (*Gobio obtusirostris*), stone moroko (*Pseudorasbora parva*), mediterranean barbel (*Barbus petenyi*), stone loach (*Orthrias barbatulus*), golden spined loach (*Sabanejewia aurata balcanica*) and bullhead (*Cottus gobio*).

Their food was investigated based on the stomach and gut content analysis. A stereomicroscope was used and different categories of food were quantified.

A ratio between different food types (aquatic and terrestrial) was calculated for each fish species and overlapping of their food niche was estimated.

Qualitative analysis was run till the lowest taxa possible and results were statistically processed using a range of ecological indices (Shanon Wiener, Pielou, Levins', Hurlbert) in order to characterize fish food spectra were calculated.

Environmental food offer was established based upon the analyses of the stomach content of all specimens captured.

The main component consisted of macroinvertebrates and insects were in majority. 34 species or groups of macroinvertebrates were identified in the stomach containt of the fish captured.

The most diverse food spectra characterized the species *Salmo trutta fario* and *Phoxinus phoxinus* with 32 and 19 macroinvertebrate species/groups, respectively.

The most majority of macroinvertebrate specimens found in the fish belonged to the Class Insecta (90-100%), and among them to the mayflies: Family Baetidae (59% from all).

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GENETICAL STUDY OF IRANIAN GIANT FRESHWATER PRAWN *(MACROBRACHIUM ROSENBERGII)* POPULATION

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Keywords: Macrobrachium rosenbergii, Inbreeding coefficient, Ne.

Abstract

Near of 25 kinds of those species live in USA and also more 40 species they are very important to importation to another countries, also like as an economic profit.

Development of this kind of species is very positive special concerning to gene.

Cultivation of those species that live like a family was developed very fast.

Concerning about cultivation and production of genes (fish of Persia-gulf) that was being one of the productivity's on this region was a positive step, and an important factor to economic growth Iranian industries fisheries.

The animals that lived on sea, or sweet water, and have the same group of blood, may be have a strongly influence on future production of this specimens, special for humans-food, around the world, that people eaten those products.

In order to primary research on population genetic and determination of probable polymorphism in Giant Freshwater prawn of IRAN samples of muscle texture of this prawn in order to determination of the whole protein separated and transferred to biotechnology laboratory of Khuzestan research center this laboratory by the method of electrophoresis samples (Laemmli-SDS/Polyacrylamide Gel Electrophoresis) went under analysis stage.It is necessary to said that in these experiments utilized from acrylamid gel by 12% and of the average samples were 10% of population of each center . As electrophoresis comparison shows population this prawn in IRAN is uniform and needs to imposing a similar genetic management through the country. According to calculated covariance table and also path way method of determining inbreeding coefficient(88.8%), inbreeding level (in the 10^{th} generation) in which is as strange reason in alleviation of efficiency of this prawn in IRAN and danger sign for this society of prawns and with do attention reproduction of 10 generation research center in Iran and adaptation with climatic and ecological circumstances in the country, should said *Iranian Giant Freshwater Prawn*.We have to call this society as Giant Freshwater prawn and by imposing exhabitate genetic reaction measures at is possible after for controlled generation and evaluation of results and also by calculation and controlling amount of inbreeding in the level of 3% discover the most hybrid of this naturalized species with foreign improved species and by culturing relationship of superior generation prevent from causing inbreeding problems during next year.

STUDY OF THE TROPHIC RESOURCES FOR PREDATORY FISH IN THE INFERIOR COURSE OF THE DANUBE

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Keywords: Inferior course of the Danube, trophic resources, predatory fish, favorite/available food, quality/quantity of food resources.

Abstract

The analysis of the consumers trophic regime, regardless of their level in the trophic pyramid, represents a necessary stage for the study of various ecosystems; thus, the quantity and quality of food resources for the predatory species can be a very useful indicator for the state of the analyzed ecosystem. The objective of this study was the analysis of the trophic basis for certain predatory species in the inferior course of the Danube, the observation of seasonal variations that may occur in what regards the available food sources and the comparative analysis of the food regime for the same species in Lake Golovita.

A constant analysis of the stomach content was observed in the case of the following species: *Esox lucius* (L. 1758; Esocidae, Common-pike), *Aspius aspius* (L. 1758; Cyprinidae, Asp), *Silurus glanis* (L. 1758; Siluridae, Wels-catfish), *Perca fluviatilis* (L.1758; Percidae, Perch), *Stizostedion lucioperca* (L. 1758; Percidae, Pike-perch); in addition to these species, the stomach content was analyzed in the case of omnivorous-carnivorous species that occurred occasionally in captures and in the case of two small individuals (30-38 cm, captured accidentally) of *Acipenser ruthenus* (L. 1758, Acipenseridae, Sterlet).

Invertebrates (especially Amphipoda crustaceans and insect larvae) form the trophic basis for most omnivorous-carnivorous fish species, while small fish species such as *Gobio* (Gudgeon) and *Alburnus* (Bleak) genera, as well as Decapoda crustaceans form the trophic basis for predatory fish.

The study on the food consumed according to the size of the predatory fish has emphasized that the small individuals often feed on invertebrates (for example, the pike-perch and the common-perch feed on *Dreyssena*, asp feeds on amphipods and wels-catfish on decapods, astacidae and even Oligocheta worms); as the fish size increases, the stomach content includes only fish that could be identified (gudgeon and bleak), as well as matter in an advanced state of digestion. The analysis of the Ivlev index, calculated seasonally for each species, has recorded significant variations according to size and season; the food ingested in the digestive tube was in an advanced state of digestion in autumn (the percentage value reported to the total biomass of the digestive tract was between 18-27%), compared to May (when the percentage is between 38-52%).

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BIOLOGICAL CONTROL OF AQUATIC PLANT BY FISH

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Keywords: Grass Carp - Common carp - Biological control.

Abstract

The ability of aquatic as controller factor of aquatic plants it is probably, create more motivarion for expanding aquatic related to it ́s suitable for raising that in special the panel of cypriniddfish is right. In recently euthorphication reise of chemical and calorific pollution in great rate about problems raise of aquatic organic in number ousness aquatic ecosystem have in creased. Arriving has foreign plant have also been foul situation concludes a lot of competence such as: Hy drill verticillata. Many of investigators was studied harmful effects with abundance aquatic organic plant over drainers, transship, watery reaction and … and now the good of study in special of harmful effects from growth these plants lead to prevention of wave motion and over t

In numerousness of places, carp system is fantastic factor for controlling aquatic plants in comparison with elinibate mechanical, chemical arrange, bringing change in water rate or other biological factors. But in this research was used grass carp plus to common carp for campaign biological because we inspire from how feed these two fishes that the first is feed from thinly grass and these feed near the surface if water and common carp was use of deeper parts of water and feed material in bottom of sea and as a matter of fact they use of the belong part of plants cussing of aquatic in biologic campaign against growth unsuitable and harm aquatic organic plants was the first time and this system(grass & common carp) report for first time for campaign biological in world. The control of aquatic plants by two fishes was above – mentioned always was cheap and considerably it ́s more stable other ways. Herbicide poisons was rapidly loosed aquatic plants but all of feed material for growth latter plant was return to water and surely it conclude unspecial poison effects or long term. Ioosing aquatic organic plants by grass carp system plus common carp not only it prevents to arrive feed material but also they convert to digestible protein(for aquatic) more rate. The interesting point in using of grass carp in this research is other fishes have less resistance against grass carp that they are controllers of biological of aquatic organic plants.Using of grass carp plus common carp is probably only way practice of control aquatic plant of watery ecosystems that it is for obtaining drinking and agriculture water and using of herbicide poison is impossible or harmful.

Grass carp begin feeding from organic plants in the length of 2 cm. (1/5 - 2 gr.). Plant feeds prefer for carp fishes at the beginning that it the concluding kind of very tiny such as moss string seaweed, Charles, Nitella, Fontialis, Chara, Lemna, Spirodella, Potamogto, Elodea, Callotroche, Paspalum, Najas, Ant hophytans. Further more of these hottina typha, Juncus & silk plant such as glyceria fluitans, minor, lactuca sativa and also strinf and thallophyta seaweed as spiroogoyra, Oedogonium also were selected and consumpted.

~ Sibiu/Romania/Euroean Union 2009 ~

CHARACTERISTICS OF *DREISSENA BUGENSIS* POPULATION IN THE LOWER DANUBE

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Keywords: *Dreissena bugensis*, abundance, biomass, shell morphometry, Lower Danube

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Abstract

In the Lower Danube, the quagga mussel *Dreissena bugensis* was first recorded in 2004 - in the Romanian sector (in the Cernavoda area, 300 r. km), and one year later - in the Romanian-Serbian sector (at Drobeta Turno Severin, 929 r. km). First records from the Bulgarian-Romanian part of the river were in the section between the villages Koshava (km 811) and Sandrovo (km 477) in 2005-2006. In the same period, the species was also found in two reservoirs in Bulgaria: the Ogosta Reservoir, which is located about 50 km far from the Danube and Shishmanov Val Reservoir about 15 km far.

D. bugensis populations in the Lower Danube were characterized based on morphometry and quantitative parameters. Specimens from three localities were collected in November 2009: Ogosta Reservoir, Danube River at Ruse (496 river km) and Danube at Drobeta Turnu-Severin. Quantitative samples were collected with Petersen bottom sampler in the reservoir and with Surber sampler frame in the Danube. In the Ogosta Reservoir the specimens were found on the bottom and attached to sunk tree branches; in Ruse, on the bottom and attached to a pontoon; while in Drobeta only attached to a pontoon. At all sites, *D. bugensis* specimens were mixed with *D. polymorpha*.

The highest abundance and biomass of *D. bugensis* were recorded in the Ogosta Reservoir: from 1225 to 11096 ind./m^2 and from 361 to 1376 g/m^2, respectfully. In Ruse, an abundance of 1281 ind./m^2 and biomass of 400 g/m^2 were recorded. In Drobeta Turnu-Severin, the lowest quantitative parameters were recorded: 63 ind./m^2 and 69 g/m^2. *D. bugensis* dominated in number at all sites. Its abundance was 4 fold higher than *D. polymorpha* in the reservoir and 2-3 fold higher in the Danube. Compared to our previous results in the last 4 years, the relative share of *D. bugensis* in the Ogosta Reservoir considerably increased and it became dominant over zebra mussel.

The results on shell morphometry showed that the specimens in Ruse were characterized with the highest height (ratio SH/SL of 0.68 compared to 0.59 in Ogosta and Drobeta); while specimens in Ogosta had the lowest width (ratios SW/SL 0.45 and SW/SH 0.77 compared to SW/SL 0.55 and SW/SH 0.82 in Ruse, and SW/SL 0.53 and SW/SH 0.9 in Drobeta Turnu Severin).

The study was funded by the Austrian Federal Ministry of Science and Research within the Project 4-08-2008 of ASO Ljubljana and Sofia – ZSI, and by the National Science Fund of Bulgaria, Project DO 02-283/08.

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SEM STUDY OF ADHESIVE ORGANS REVEALS MECHANISM IN FIVE FISHES TO SUSTAIN LIFE IN RIVERS/STREAMS OF WESTERN HIMALAYAS

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Keywords: Himalayan Rivers/Streams, SEM Adhesive Organ, Carps and Loaches, threats.

Abstract

Fishes enjoy the life in torrent water of the Himalayan rivers and streams water have developed specific morphological adaptations to sustain life (Figure 1). Many workers so far has done work to understand these adaptations and have given there views based on morphology but the present analysis is based on scanning electron microscopic study. Sections of adhesive organs cut were fixed in 2.5% glutaraldehyde in 0.1 M Sodium Cacodylate buffer at pH 7.2-7.4 for 24 hours. After washings in the rinsing buffer 0.1M sodium cacodylate buffer, dehydration was carried out in various grades of acetone. Then specimens were transferred into Emylacetate solution. After that specimen were dried in a Polaram Critical Point Dryer (CPP) and mounted on metal stubs and coated with $100A^0$ thick layer of Gold/Palladium in JEOL sputter ion coater. The specimens were examined with JEOL TSM 6100 SEM at 20KV and the images were observed on the screen.

Five fishes which contribute to major fisheries in the western Himalayan streams / rivers have been selected for present study (Plate 1). Three are carps and two are loaches. Among carps are *Shcizothorax richaradsonii, Garra gotyla gotyla and Crossocheilus latius latius and among loaches are Acanthocobitis botia* (Ham.) and *Schistura nilgiriensis* (Menon) present from an elevation 400m, msl to 1800m,msl. Among carps study reveals presence of adhesive pads with spines on lower jaws or suckers enabling them to hold on substratum in fast water current. Among loaches *Acanthocobitis botia* (Ham.) *has cylindrical body and p*refer shallow water habitat and found amongst pebbles, cobbles and gravels. *Schistura nilgiriensis* (Menon) found attached on rocky bottom as well as shllow water zone which consists dorso-ventrally compressed head and inferior mouth.

Thus, SEM study of adhesive apparatus of *these five fishes* revealed that adhesive function is based on the suction principle and helping them to stay in the torrent water of Hilayan rivers and streams. There it is inferred from the morphological adaptation that any change in the surrounding habitat due to anthropological activity could let decrease in biodiversity or even extinction of these fishes from Himalayan rivers. Earlier damming was done on major rivers only. At present stage the major threats are due to harvest maximum power mini, micro and medium size (1MW, 5MW or 25MW) hydropower plant which has resulted in shrinkage of free flowing regimes in the Himlayas. Hence, there is need to address the specific issue for restoration and protection of the aquatic biodiversity.

~ Sibiu/Romania/Euroean Union 2009 ~

DETERMINATION OF SEX AND GONADIC STAGE OF BELUGA (*HUSO HUSO*) WITH NEW METHOD OF BLOOD AND MORPHOLOGICAL INDICATORS

IRAN

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Keywords: Sex determine, Blood index, Huso huso, Beluga, Morphometric parameter.

Abstract

Successful management of sturgeon population requires knowledge of stock composition with regard to sex and gonadic stage. Measurement of sex steroid concentration has proven to be a reliable and less invasive method in compare of convention method. In this study we have examined the possible role of plasma testosterone (T), estradiol (E2), progesterone (P), cortisol (C) and morphometric parameters as indicator of sex and stage of gonadal development in immature (4-5 years old) Beluga cultured in brackish water. Experiment were carried out in one year (summer 2005 – spring 2006). The fish were 4-5 years old. For field study we used 8 circle cement pond that supplement with air/water supply system (salinity was 12-17 ppt, pH was 7-8.5). fishes (74 specimen) were fed with four commercial formulate diet with constant protein 40% and four energy content (400, 425 and 475 kcal/100g) in Salt Water Fishery Reaserch Istation BAFGH, fishes fed three time in day (7am - 12am - 5pm). every three month we biometry fishes, Blood sampling was performed in caudal vein and plasma was frozen until future analyses, Glucose was measured with Authoanalyser, calcium and magnesium with spectrophotometer and sodium and potassium with film photometer, Hormone levels measured by Radio Immunoassay (RIA). Histological preparation was stained with Hematoxylin & Eosin. Histological study show that in males 6% were in stage I, 11% in stage I-II, 61% stage II, 3% stage II-III, 11% III, 8% in stage IV. In females 3% were unknown stage, 3% in stage I, 11% in stage I-II, 60% in stage II, 14% II-III, 3% III, 3% III-IV and 3% in stage IV. Stastitical result show that there were significant correlation between weight and length with gonadic stage in males but there were no significant correlation in females. In sex determination, result show that total length (L) and weight (W) hadn't significant elevation in different sexes and can not use this factor for sex determination. Among hormones just T had significant elevation, so could state that with measured T in immature Beluga could recognize sexually. About determination of gonadic stage result show that total L and W just in male had significant correlation with gonadal stage and among hormones just T in male and C in female had significant correlation. So could state in male and female respectively with measured T & C could recognize gonadic stage in immature Grate sturgeon.

NITRA - HYDROBIOLOGY OF NEW ARTIFICIAL RIVER BED (SLOVAKIA)

AQUATIC HABITATS - BIODIVERSITY INTERRELATIONS

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Keywords: Slovakia, coal mining, artificial river bed, rivers, fish, parasites, index.

Abstract

The Upper Nitra River lies in the coal mining area. With respect to the mining activities, on May 2009 - 1800m of Nitra River and 500m of its tributary Handlovka rivulet were reassembled.

We investigated the new river bed one month after, by using the point sampling method. Fish diversity and their parasites were examined, comparing results obtained from new and old river beds. The number of fish species and number of specimens was lower in new river bed than in old one. These parameters were marked in the middle part of artificial bed with the four times lower number of specimens than in natural river, and more than three times lower number of species. Faunistic identity index of fish assemblages between old and new river beds was 46% - so investigated ichthyocenoses show no similarity.

The new shorter river bed with higher velocity is more suitable for reophilous species. In total, 176 fish of the 11 fish species from the both – old (81) and new (95) part of the river bed were examined for helminth parasites.

Only the adult acanthocephalans localised in the intestine, with overall prevalence 25% in old and 8% in new river bed were found. Gudgeon (*Gobio gobio*) - the most frequent species in new river bed show disparity of 21% prevalence in old and 3.8% in new artificial bed. In chub (*Leuciscus cephalus*), the most abundant fish species in old river part and frequent *Alburnoides bipunctatus*, negligible differences in parasite prevalence in old (17-22 %) and new (19 %) part of river was observed. *Barbatula barbatula* was free of parasites.

The intensity of infection ranged between 1-7 worms per fish.

The work was supported by APVV - 0154-07 and VEGA no. 1/0352/08.

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NAJAS SPP. GROWTH IN RELATION TO ENVIRONMENTAL FACTORS IN WADI ALLAQI - LAKE NASSER (EGYPT)

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Keywords: *Najas* spp., Lake Nasser, human impacts, Wadi Allaqi, Canonical correspondence analysis (CCA), fodder resources.

Abstract

The study aims to evaluate the pattern of *Najas* spp. [Aquatic plant] distribution along the shores of Allaqi, Lake Nasser, to identify the effect of physico-chemical variables on the growth and on the expansion of the plant. *Najas* spp. is vital for nomadic groups [Bedouins] living in the area, they harvest the plant out of lake to utilize it as fodder resource for their sheep and goats. Drought conditions that extended more than ten years increase the demands on plant to compensate the reduction of available grazing areas and the lack of grazing terrestrial plants. It was noticed that *Najas* growth declined in many areas in Allaqi due to anthropogenic and natural factors. *Najas* exposed to negative conditions caused as a reflect to human activities including shores agriculture and fishing. The dense flocks of large migratory birds and the expansion of aquatic plants (other species of macrophytes and epiphytes) are additional factors that threat in many ways the *Najas* spp. presence. Environmental pattern were assessed over 17 abiotic parameters related to water [Depth, temperature, pH, TDS, conductivity, dissolved oxygen, light transparency, phosphate, nitrate, nitrite, ammonium and sulphate] and hydrosoil [phosphate, nitrate, nitrite, ammonium and organic matter]. Three field sampling were performed [May, July and September 2008] in the period which *Najas* [mainly *Najas horrida* which is dominant] start and complete its life cycle, also this period represents maximum human impact (harvesting time of *Najas* by Bedouins and period of shores cultivation) covering a wide range of natural and unnatural conditions variations. The temporal and spatial variation of *Najas* spp. growth was so obvious in Allaqi due to conditions related to: 1) Variation in water and hydrosoil qualities returned mainly to human impacts, 2) Variation in the nature and physical features of the shores, 3) Machanical damage of migratory birds and 4) Competitoin of epiphytes and other macrophytes species for available light, nutrients oxygen and space. CCA statistical technique was extremely useful to understand the response of different *Najas* species growing in Allaqi [*Najas horrida, Najas marina* subsp. *armata* and *Najas minor*] to various conditions. It indicated that depth, TDS, water ammonium and hydrosoil phosphate are the key factors that controlled *Najas* growth in Allaqi, and this agreed with field observation that *Najas* thrived and dominated in shallow sheltered areas with low nutrient contents. Remarkable reduction in *Najas* growth at cultivated shores was recorded due to chemical fertilizers moved to water, causing high ammonium contents. *Myriophyllum spicatum* known to be a sever competitor, able to grow in wide range of environmental conditions, and here in our study *Myriophyllum* was more adapted to reverse factors than *Najas* suggesting the invasion possibility of this species in the future.

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STRUCTURE AND DISTRIBUTION OF MAYFLY (INSECTA. EPHEMEROPTERA) COMMUNITIES IN THE UPPER COURSE OF THE RIVER OLT AND ITS TRIBUTARIES (TRANSYLVANIA, ROMANIA)

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Keywords: River Olt, Ephemeroptera, diversity, abundance, similarity.

Abstract

The composition, diversity and abundance of mayflies (Ephemeroptera) were investigated on 14 sampling sites of the upper course of the River Olt and its tributaries between spring 2007 and summer 2009. Quantitative macroinvertebrate samples were taken with Surber-sampler twice a year, in spring and autumn from Covasna creek, upstream Covasna, Ozunca creek, upstream Bățanii Mari, Cormoş creek, upstream Filia, Aita creek, upstream Aita Medie, all of them reference sites, Mărcuşa creek before it joins the River Râul Negru, Caşin creek near Ruseni and Talomir creek in Bodoc, while the River Olt near Micfalău, Ilieni and Araci, the River Râul Negru near Catalina and Chichiş, Târlung creek before it joins the River Olt, and Covasna creek, downstream Boroşneu Mare were surveyed three times a year, in spring, summer and autumn.

34 mayfly species of 7 families were identified. Their abundance varied between 7 specimens/m^2 in the River Olt, near Ilieni and 1769 specimens/m^2 in the River Râul Negru, near Catalina. Highest diversity, 2.26 was recorded in autumn 2008 in Târlung creek, while in the samples taken in spring 2008 from the River Olt, near Ilieni, autumn 2008 from Mărcuşa creek and spring 2009 from the River Râul Negru, near Chichiş only one mayfly species was found.

During the study a total of 25 taxons were recorded from Ozunca creek. Mărcuşa creek is in the last place with only 4 taxons identified during the survey.

As a consequence of seasonal shifts in species composition, the comparison of abundance, taxon number and diversity data of the succeeding sampling periods revealed significant differences only on three occasions.

According to their similarity, hierarchical cluster analysis grouped sampling sites into two main clusters. Highest similarity was recorded between Aita and Ozunca creeks (80%) while Cormoş and Mărcuşa creeks shared only 17,39% of their species. The only eudominant species was *Baetis rhodani* representing more than 10% of the identified specimens.

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THE EFFECT OF SYNTHETIC GROWTH PROMOTOR ON FISH AND URINE COMPOSITION

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Keywords: urine collection, Catheterization, Roxarsone, *Cyprinus carpio*.

Abstract

In metabolic studies, urine collection in fish is designed to measure the excretion of various biochemical compounds. Such studies are made to estimate the concentration of excretory products resulted from digestion of food or metabolic conversion of reservoir materials. Because of anatomical differences in urinary system of marine and fresh water species and the anatomical diversity of teleost, cannulation is a difficult and complex process.

The organoarsenic compounds synthesized as animal feed additives include arsanilic acid, Roxarsone, Carbarsone (P-uriedobenzen arsonic acid), and Nitarsone (4-nitrophenyle arsonic acid). Arsanilic acid and roxarsone are used for increased weight gain and improved feed efficiency in chickens and swine and for the control of swine dysentery while other are used as antihistamine in turkeys.

New research could be done to determine the concentration and type of arsenic species in fish tissue, but aren't many studies on roxarsone effect on fish tissue and its excretion.

In this study, the effect of a growth promotor was investigated while passing the intestinal tract and urinary system. Urinary bladder internal catheterization technique is used to recognize excretion route of roxarsone in *Cyprinus carpio*.

Catheterization accomplished by LATEX FOLEY CATHETER – Silicon Coated. In order to fit the catheter into urinar bladder and possibility of urine collection for a long period, it was modified desirably. A successful cannulation technique depends upon a thorough knowledge of the anatomy of the excretory system of the species in question and matching catheter diameter to the size of ducts of the fish renal system.

Roxarsone was given to the fish in solution form. Urine samples were collected at specific time and kept in 5ºC temperature, to be analyzed by HPLC to detect roxarsone. Histological studies were made to consider effect of roxarsone on liver and kidney tissues.

The advantage of present technique is durability of cannula for longer time, possibility of urine collection for many times particularly when urine quality is considered for drugs, food components and environmental effects. This technique also isn't any problem for fish free swimming in the water. Collected urine was perfectly clean and no infection observed.

Roxarsone was found unchange in urine. It was noticed that roxarsone, partly absorbed by blood and filtered by kidney gradually. Damaged kidney and liver tissues in common carp was signs of roxarsone effect by passing through liver and kidney. The observed histological changes in kidney are direct response to the effect of roxarsone and attention to roxarsone existence in urine; it absolutely passed through the kidney.

This study was a primary step to identify the effects to roxarsone on fish by analyzing urine collected during a known period of time.

A STUDY ON *ARTEMIA SALINA* FROM LACUL SĂRAT - BRĂILA AQUATIC HABITATS - BIODIVERSITY INTERRELATIONS

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Keywords: Lacul Sărat, Brăila, Romania, hiperhaline waters, Crustacea, *Artemia salina*, synecological analyse

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Abstract

Artemia salina – the brine shrimp – branchiopods from Anostraca order is one of the most encountered species of Crustacea in the inland saltwater lakes. Known as one of the oldest, entomostraceans, the species was much studied all over the world, for different reasons, scientifically or commercial ones. It was used even for space missions, both for soviets and Americans to observe its etology and resistance with different degree of radiations.

In Romania the brine shrimp lives in many hiperhaline water lakes, from the littoral ones (Techirghiol Lake) and Câmpia Română to the mountain basins (lakes from Ocna Sibiului, Slănic Prahova etc). The *Artemia* importance is linked with therapeutically properties of the mud in mentioned saline waters, being known that the dead bodies enrich its composition, in proteins, lipids and other organic (unsaturated fatty acids) and inorganic components.

Researches made from May to November 2006, in Local Sărat from Brăila, Romania, show a strong population of *Artemia salina*, known as characteristic species for these types of basins and very resistant at different levels of salinity. Due to its specific type of feeding by filtration of unicellular algae (mainly green) and to its particular parthenogenetic life cycle, populations of this crustacean reaches great abundances. Microscopic analyze of the samples revealed that this brine shrimp is founded mostly in one compartment of the lake, where the salt concentration is bigger than in the other.

Data regarded seasonal variation of total density of *Artemia salina* population are presented and an analyze of average density on different type of females (total, ovigerous and non-ovigerous) of the population is done. Density variation of cyst-like eggs and immature development stages, in each month of the study is represented.

A discussion on variation of average biomass, in the entire basin and a seasonal biomass dynamic of each sex representatives is done.

The main synecological indices - related to density of individuals or to their biomasses (Ddavg, Ddeco, DD%, FD%, WD; Dbavg, Dbeco, DB%, FB%, WB) of *Artemia salina* population are presented and comment.

Some biometry data will be also analyse on 100 individuals (from more than 1000 measured).

Due to the fact that in the last two years the level of the lake decreased on almost 90% of its surface, the present data could represent significant results for future comparison, if the conditions of the ecosystem will suffer important changes.

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ENVIRONMENTAL POLLUTION OF WASTE GENERATED BY COMMERCIAL VESSELS

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Keywords: Environmental waste - ship waste - black/grey water - bilge/sludge oil - waste management.

Abstract

Every day, vessels ranging from large cruise ships to small recreational boats discharge wastes into coastal waters. The waste streams from recreational vessels primarily contain sewage, while cruise ships discharge both sewage and toxic substances, so Commercial and recreational vessels can be the source of many pollutants in the marine environment including waste discharges, air pollution, and chemical and oil spills. In this context various ship waste categories are identified (oily wastes, Black water, Grey water, Ballast water, Garbage, Air emission), their variation between different vessel types is pinpointed and the legal framework and guidelines for their management and handling are drafted adequately. Ship waste shall be refer to any harmful substance (for both the marine environment and the public health), which is generated during the usual day-to-day ship operation. Past experience has proven that these wastes accumulate significant quantities and therefore potential for marine pollution. Thus, only after recent significant environment damage (e.g. in Alaska, the Caribbean Sea etc) has occurred, did the international maritime community turn its attention on the matter. Only Through an international marine forum marine pollution from ships can be satisfactorily tackles. That forum is the International Maritime Organization (IMO) whose twin objectives are maritime safety and the prevention of marine pollution caused by ships. Vessels can release oil into the marine environment in a variety of ways, including accidental spills of oil and fuel, release of oil during normal engine operations, and intentional discharges. Oil can poison fish and other marine organisms; its byproducts, if ingested, can harm fish, wildlife, and humans. Complications for marine animals include, but are not limited to, skin and eye lesions, liver toxicity, blood disorders, fin erosion, cellular changes, nervous system disturbances, and lung congestion It consists of drainage from dishwashers, showers, laundry, baths, galleys, and washbasins. It might contain pollutants such as fecal coli form, food waste, oil and grease, detergents, shampoos, cleaners, pesticides, and heavy metals. Grey water represents by far the largest quantity of liquid waste generated by cruise ships. If wastes are unavoidable and cannot be destroyed or sufficiently treated so that overboard discharges are not environmentally significant, they must be retained on board for offload ashore. Considerable research, development, testing, and evaluation for processing shipboard wastes still need to be accomplished. Shipboard pollution-control systems must be integrated into ships during the concept-formulation stage in order to allocate adequate space and location and optimize the total design package.

SPREADING AND ECOLOGY OF *MANAYUNKIA CASPICA* ANNENKOVA, 1929 (POLYCHAETA) IN SERBIAN DANUBE STRETCH

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Keywords: Polychaeta, *Manayunkia caspica*, Ponto-Caspian relict, spreading, ecology, meio- and macrozoobenthic communities, the Danube, Serbia.

Abstract

Systematic limnological investigations of the Danube were performed from April 2002 till the June 2009 at eight standard locations in 261 km long sector of the Danube (from 1112 r-km to 851 r-km): Smederevo - 1112 r-km in flow-through reservoir part of the Danube; Ram -1072 r-km, Veliko Gradiste - 1059 r-km, Donji Milanovac - 991 r-km and Tekija - 956 r-km, all four in Djerdap I reservoir; Kladovo - 934 r-km and Kusjak - 864 r-km both in Djerdap II reservoir; and Radujevac - 851 r-km in the riverine part of the Danube.

Samples were collected seasonally (April, June, September and November). In November 2005 for the first time a Ponto-Caspian element, *Manayunkia caspica* Annenkova, 1929 was found in Serbian Danube stretch. The species was found exclusively and from that moment repeatedly at the town Kladovo (44° 37' 02.7'' N 022° 36' 34.8'' E; 934 km of the watercourse; depth of 5-11 m).

In the paper are given five years results of investigations of physical sediment characteristics as well as results of chemical analysis of water. Data concerning qualitative and quantitative analyses of benthic invertebrate communities at the Kladovo site as well as those of *M. caspica* biomass produced were also presented.

Appearance of *M. caspica* is constant in every season from November 2005 till June 2009 only at Kladovo site, and the species is evidenced in total 15 times in the Serbian Danube stretch being the most upstream registered.

Findings of *M. caspica* in Serbian part of the Danube are evidence that this Ponto-Caspian relict as invasive species move the limit of distribution upstream in the Danube River which is the one of the main corridor for its spreading from East (Bulgaria, Romania) to Central Europe.

The most abundant populations of *M. caspica* were registered in November 2007 (7,696 individuals per square meter) and was found on habitat with gravel substrate in navigable zone.

Generally, at the sampling location Kladovo, *M. caspica* prefers habitat with a hard substrate that mainly contains gravel and coarse sand with occasionally traces of fine settled suspended particles and detritus.

Water quality based on benthic communities' saprobic analysis was to be generally in the class II range with some gradation to class III.

~ Sibiu/Romania/Euroean Union 2009 ~

TERRESTRIAL SNAIL COMMUNITIES IN SOUTHERN TRANSYLVANIA ALLUVIAL FOREST (ROMANIA)

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Keywords: terrestrial gastropods, communities, alluvial forest.

Abstract

Habitat's features as humidity, temperature and the vegetation type seem to be the most important in defining the presence and relative importance of terrestrial snail species in snail assemblages, and this is also the case of hygrophilous and mesohygrophilous habitats as alluvial forests. These types of habitats are ones of the most riches concerning the malacofauna.

The paper analyzes the land snail's communities in six sampling points from Sibiu and Fagăraş Depressions - Seviş, Tocile, Avrig, Ucea, Sâmbăta, Dridif. The characteristic vegetation is represented by the following associations *Salicetum albae-fragilis, Salicetum triandrae, Aegopodio-Alnetum glutinosae*, with *Rubus caesius* and *Urtica dioica*. There were also observed intermediary aspects between alluvial forest and anthropophylous weeds, alluvial forest and deciduous forest, alluvial forest and orchard. Land snail diversity quantification was made considering mean densities for each species used for diversity indices – Margalef and Menhinik, heterogeneity indices - Simpson and Shanon-Wiener, and equitability index calculation. Community's quantitative structure was expressed using the following ecological indices: relative abundance, frequency, and Dzuba ecological significance index. Quantification of association degree was made using mean contingency coefficient, *Cole's coefficient* of *interspecific association* and Fager affinity index.

A number of 51 species from 19 families were identified. The highest statistical density was 259 ind. / m^2 - Ucea, and the lowest 40 ind. / m^2 -Tocile. Concerning the biomass, their values were between 35,53 g/m^2, -Avrig, and 16,2 g/m^2 - Seviş. Differences in statistical densities of different station are due to high relative abundances of small gastropods from Carychiidae, Cochlicopidae, Valoniidae, Gastrodontidae, Oxychilidae, families. In all the stations except Tocile dominant species are *Vallonia costata* and *Cochlicopa lubrica*. In different station are also presents in large numbers *Zonitoides nitidus, Perpolita hammonis, Carychium tridentatum, Succinea oblonga.* The terrestrial snail community in Tocile station has a different composition, due to the nearby deciduous forest; here are present species from both types of habitats, dominated by *Macrogastra latestriata*, *Cochlodina laminata* but also *Fruticicola fruticum* and *Euomphalia strigella.*

The more significant association between gastropod species was found between *Fruticicola fruticum* and *Perpolita hammonis*, *Perforatella bidentata* and *Perpolita hammonis*, *Perforatella bidentata*, and *Valonia costata*, *Cochlicopa lubrica* and *Vitraea crystalina*, *Cochlicopa lubrica* and *Vallonia costata*, *Succinea oblonga* and *Vallonia costata*, *Perforatella bidentata* and *Vitrina pellucida*.

ASSESSMENT OF WATER MICROBIOLOGIC POLLUTION IN DURRES'S MARINE HARBOUR BASIN (ALBANIA)

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Keywords: Microbiolologic assessment, water microbiologic pollution, heterotrophic bacteria, total coliforms, Durres' Marine Harbour basin, Apollonia Beach area., pollution in coastal areas.

Abstract

The object of this study is in four sampling areas of Durres's harbour basin.

The period of sample-taking was July-October 2008. In order to compare the level of water microbiologic pollution in areas of Durres's harbour basin is also studied a beach area near the harbour.

The sampling areas were: Ferry Terminal (FT), Fishery Harbor (FH), East Zone (EZ), Fuel Quay (FQ) and Apollonia Beach (AB). Durres's marine harbour is located in the southern part of Adriatic Sea, in the south of Durres, in the northern part of Durres Bay.

It is known that marine harbours bring pollution in coastal areas because of the services that are performed there. The aim is to assess water microbiologic pollution and to compare it with European standards.

The strategy used for this purpose consisted in water insemination with coverage method by means of Petri's plates according to respective dilutions in culture media PCA (Plate Count Agar) for heterotrophs and MacConkey for total coliforms.

The number of colonies that are formed determines the number of cells at the moment of water insemination, respectively the number of heterotrophs in culture media PCA.

The number of pink and red colonies that were formed determines the number of cells at the moment of water insemination, respectively the number of total coliforms in culture media MacConkey.

The measure of heterotrophic bacteria and total coliforms used is CFU/100 ml water.

The comparison of heterotrophs and total coliforms level in sampling areas has been the essence of this research.

Few conclusions were drawned from the sampling areas

Apollonia Beach is within European standards.

The richest area with heterotrophs is Fishery Harbor, which confirms the fact that it is the most polluted microbiologic area in the harbour basin of Durres.

The richest area with total coliforms is Ferry Terminal, which reflects spills of organic substance, such as fecal pollution.

The poorest area with heterotrophs and total coliforms is Fuel Quay. This shows the inhibition of heterotrophs and total coliform bacteria growth in this area. The inhibition itself may come as a result of petroleum or chemical wastes such as heavy metals. However, this remains to be confirmed.

~ Sibiu/Romania/Euroean Union 2009 ~

BIODIVERSITY AND ECOSYSTEM FUNCTIONS OF A TROPICAL ESTUARINE SYSTEM (INDIA)

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Keywords: ecosystem serices, participatory conservation, biodiversity losses.

Abstract

The Vembanad wetlands (Cochin Backwaters) foster high bio-diversity which substantially supports rural livelihoods. The environmental condition of this lake is steadily declining due to various human activities. It has also caused a crisis in the livelihoods of dependent communities.

The biodiversity in Cochin Backwaters is composed with diverse ecosystem services. These services and resources are subject to various biophysical processes, an examination of these features is pre requisite for an understanding of its biodiversity. The process of commercialization of estuarine space has drawn limits to their capabilities and degraded the biodiversity of this eco- zone. The biodiversity degradation is also related to the weak political and social mobilizations of backwater communities to tackle their problems. Apart from a variety of hydro-bio-physical processes, biodiversity is degraded due to various social and economic processes internal to the system and external interventions found to accelerate the process of degradation.

The recent studies indicated that the ecosystem is retaining its average health expressed through the existence of a diverse floral and faunal composition. There were 150 fish and shellfish species available during early eighties, 74 migrant species and 17 vagrant species. About 43 (species were available for 12 months, 42 species for a period of six to 10 months, 25 species for three to six months and the remaining were available for one or two months. Biodiversity loss in Cochin backwaters had reduced the quantity of fish landed. Prior to the commissioning of the Thaneermukkom bund, an average daily catch of 5 tones of shrimp was available during the summer months. Production has been decreasing during the past 3 decades. The productivity of backwater had reduced from 1131 kg/ha in 1950's to the range of 300-400 kg/ha during the eighties. A survey of fish in the Backwaters in 2009 had shown that several fish species that believed to have left the tourist hotspots have returned to the backwaters, whose biodiversity is under threat for various reasons.

Fishermen, scientists and environmentalists who came together for a participatory conservation exercise identified 10 more fish species than those found in the 1990s. The participants had surveyed the habitat as well as its physical and chemical aspects and made a record of the resources including plants and weeds

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PRELIMINARY INVESTIGATIONS OF FLORAL AND FAUNAL BIODIVERSITY OF BELCISTA WETLAND (SINI VIROJ) (MACEDONIA)

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Keywords: flora, fauna, biodiversity, Belcista Wetland, Sini Viroj, Debarca.

Abstract

Debarca area is situated in the south-western part of Macedonia. By the tectonic movements in Pliocene the land terrain of Debarca was divided into three parts: Upper, Middle and Lower Debarca. Because of altitude differences between these parts only in Middle and Lower Debarca are preserved the remains of ancient lake which now existed like wetlands.

In this paper are presented the results of the preliminary investigations of floral and faunal diversity of Belcista Wetland - Sini Viroj (situated in the western part of Lower Debarca).

In this ecosystem according to our investigations were evidenced total of 55 different plant species: *Acer campestre* L., *Alisma plantago aquatica* L., *Berula erecta* (Huds.) Coville, *Calaminntha nepeta* (L.) Savi, *Caprinus orientalis* Mill., *Cardamine amara* L., *Carex echinata* Murr., *Carex riparia* Curt., *Clematis vitalba* L., *Cornus mas* L., *Corylus avelllana* L., *Crategus monogyna* Jacq., *Crategus oxyacantha* L., *Crocus biflorus* Mill., *Equisetum arvense* L., *Equisetum palustre* L., *Eupatorium cannabinum* L., *Fontinalis antipyretica* Hedw., *Gallium verum* L., *Helleborus odorus* Waldst. & Kit., *Holcus mollis* L., *Hypericum perforatum* L., *Iris pseudocorus* L., *Juncus conglomeratus* L., *Lemna minor* L., *Lemna trisulca* L., *Lonicera alpigena* L., *Lonicera xylosteum* L., *Mentha longifolia* (L.) Nath., *Nasturtium officinale* R.Br., *Petasites hybridus* (L.) G.M.Sch., *Phragmites australis* (Cav.) Trin. ex Steud., *Poa palustris* L., *Polygonum hydropiper* L., *Prunus spinosa* L., *Quercus cerris* L., *Quercus frainetto* Ten., *Quercus robur* L., *Ranunculus trichophyllus* Chaix., *Rosa canina* L., *Rubus fruticosus* L., *Rumex hydrolaphatum* Huds., *Salix alba* L., *Salix cinerea* L., *Salix purpurea* L., *Scirpus silvaticus* L., *Scutelaria galericulata* L., *Sium angustifolium* L., *Sium latifolium* L., *Sparganium ramosum* Huds., *Typha latifolia* L., *Ulmus minor* Mill., *Urtica dioica* L., *Verbascum phlomoides* and *Viburnum opulus* L.

In this wetland from Pisces were evidenced: *Anguilla anguilla* (Linnaeus, 1758), *Salmo letnica* Karaman, 1924, *Cobitis ohridana* Karaman, 1928, *Cyprinus carpio* Linnaeus, 1758, *Scardinius knezevici* (Bianco & Kottelat, 2005), *Squalius cephalus* (Linnaeus, 1758), *Chondrostoma ohridanus* Karaman, 1924. Also, according to our investigations and literature data in Belcista Wetland were evidenced 9 representatives of Aves, 9 representatives of Mammalia, 9 representatives from Amphibia and Reptilia, and 14 representatives from Invertebratae.

~ Sibiu/Romania/Euroean Union 2009 ~

PARASITES OF THE FRESH-WATER FISH FROM THE SMALL BASINS LOCATED WITHN THE OLTENIA PLAIN

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Keywords: The Preajba Valley, eutrophic, parasites, crustaceous parasitoses, nematodiasis.

Abstract

The present paper deals with two parasite diseases, crustaceous parasitoses and nematodiasis, met at the fish communities from a special category of ecosystems (small basins located along the Preajba Valley); we have described the etiology and pathology of the disease, as well as the prophylaxis and treatment measures known in the literature in the field. The thirteen studied basins formed along the valleys of the Preajba River and the Bătrâna Stream.

Geographically located within a plain area, the basins resulted from damming a small tributary of the Jiu River, the hydrographical basin of which includes more than 50 springs and represents the main supplying source of the Preajba Valley River. Thus, within an area no larger than 30 sq km, there is grouped a large diversity of aquatic ecosystems: springs, streams, rivers, lakes and swamps, each of them imposing their own features to biocoenoses and plant and animal populations. In order to establish a correlation between the structure of fish populations and water chemism as an indicator for the quality of the basins, we took water samples from the most representative basin (basin VI), as well as from the streams' area. The samples were then analysed at the laboratory of Dolj EPA. The obtained data allowed us to draw certain preliminary conclusions regarding fish populations and their relation with water quality. The analysis of the main physical-chemical indicators emphasized that water is characteristic to eutrophic ecosystems. In 2009, samples have been taken rarely in order to obtain the ichthyologic material necessary for studying parasitoses.

Of the 10 fish species of the basins, we have discovered parasites at two of them – *Perca fluviatilis* L, 1758 and *Cyprinus carpio* L. 1758. The etiologic agents of these parasitoses are the crustaceous *Argulus foliaceus* L, 1758 in the case of carp (identified both in zooplankton and at the carp body surface; the injuries provoked by the oral apparatus appear as small necrosed ulcerations and we also noticed the destruction of the mucus stratum from the skin surface) and the nematode *Eustrongylides excisus* Jägerskiöld, 1909 met at the perch (both as encysted larvae surrounded by a thick capsule of conjunctive tissue and free in the abdominal muscles), the perch being considered a secondary intermediary host. This nematodiasis is more and more rarely met and it does not lead to obvious pathologic state, but it can affect the commercial aspect and meat quality. In order to control these parasitoses, there were proposed prophylaxis and treatment measures, such as installing some wood panels in the basins for the parasite to lay its eggs. As a control measure, the literature in the field recommend the treatment with Trichlorfon in a dose of 1g/6m^3 of water, in the case of the parasitoses with crustaceous and the fishing of sick fish, destruction of the parasites' eggs and lavas by means of lime chloride at a concentration of 1: 25000 for nematodiasis.

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CONSERVATION STATUS OF THE HAWKSBILL TURTLE (*ERETMOCHELYS IMBRICATA*) IN SOME ISLANDS OF PERSIAN GULF

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KEY WORDS: hawksbill turtle, Persian Gulf, nesting season, *Eretmochelys imbricata*, conservation.

Abstract

Globally marine turtles are experiencing serious threats to their survival and are considered internationally as species of conservation concern. Due to this status, they are listed in the World Conservation Union "Red List of Threatened Animals"; listed in the Appendix 1 of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Over-hunting for their shells and meat and the collection of eggs from turtle nests are some factors attributing to the endangered status of turtles. They are also threatened by coastal development, pollution and pathogens, global warming and fisheries impacts. Fisheries impacts are thought to be one of the leading causes for sea turtle death and injury worldwide and can occur when turtles bite baited hooks, become entangled in fishing lines, are crushed by dredges, or otherwise held underwater by a variety of fishing methods.

In Persian Gulf islands, turtle declines are worsened by the breakdown of traditional conservation practices, the use of powered boats in turtle hunting, commercial sale, large scale harvesting of eggs in the rookeries and habitat destruction. In these Islands, The most common species is the hawksbill turtle (*Eretmochelys imbricata*). Nesting season of this species occurs from March to May. In this study, we have investigated nesting activity of hawksbill turtle in Shidvar, Lavan, Qeshm, Hormuz, Farour and Hendurabi Islands. In addition, we monitored all human activites in nesting beaches and neighbour areas (such as coastal development, artificial light, pollutants and beach destruction) and recorded natural predators of eggs, hatchlings and nesting females.

Our results show some serious threats to hawksbills survival especially in Shidvar Island (due to high egg harvesting and in some cases killing adult females), Hendurabi Island (hunting for their meat) and Qeshm and Kish Islands due to coastal development, habitat destruction and artificial lights. Our study shows that unfortunately available conservative programs aren't sufficient to can prevent local peoples from egg harvesting. In concern to conservative importance of hawksbill turtles and by using this information, we can prevent to increaser depletion of these stocks in these areas and protect nesting habitats. In addition, continious monitoring of nesting beaches, their conditions and nesting activity of sea turtles can help us in designing better conservative programs.

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AQUATIC BIODIVERSITY / WETLAND BIODIVERSITY IN WATER DEFICIT NATION (NIGERIA)

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Keywords: Wetlands, conservation, biodiversity, water deficit.

Abstract

A scientifically defensible methodology for identifying areas of high bidoiversity in acquatic environments is presented. Areas of high biodiversity or Acquatic Biodiversity Investment Areas are identified using a technique referred to as Habitat Supply Analysis

This technique uses the microhabitat features of an ecosystem in conjunction with information on the microhabitat preferences of fish to calculate the suitability of an area to fish. The method is structured so that the suitability of habitat to life stages of fish, species of fish, groups of fish and fish assemblages can be evaluated. The methodology recognizes that to some degree all areas within an aquatic system contribute to the maintenance of biodiversity. As such, a classification scheme is proposed to evaluate the potential versus the actual contribution of an area to the maintenance of biodiversity in an ecosystem.

This classification scheme is designed to help priorities habitat restoration and preservation efforts. Prototype evaluations of the methodology for identifying and classifying Aquatic Biodiversity Investment Areas are presented.

An Expert Consultation on Biosafety and Environmental Impact of Genetic Enhancement and Introduction of Improved Tilapia strains/ Alien species in Africa, to discuss and develop guidelines that will foster the development of aquaculture while maintaining biodiversity .Aquaculture in Africa.

Wetlands are areas where plants and animals have become adapted to temporary or permanent flooding by saline, brackish or freshwater. All wetlands are characterized by impeded drainage, but vary in detail depending on the period of flooding and depth of water, incase of a water deficit nation flooding is low and depth of water is low. Distinctive plants and animals are low in number like “sitatunga”, shoe bill, crowned crane etc.

Some flooding is low due to the deficit in water, there is a low water table leading to less water for the existence of wetland biodiversity.

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RIVER FRAGMENTATION AND CONNECTIVITY PROBLEMS IN RIVER GANGA OF UPPER HIMALYAS: THE EFFECT ON THE FISH COMMUNITIES

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Keywords: River Ganga, Upper Himalaya, migratory fish, river Nayyar, Human Impact.

Abstract

The Upstream river of River Ganga especially the River Bhagirathi was evaluated for the impact of human interference especially due to hydropower porjects on richness of Migratory fish especially for Mahseer (*Tor putira* L.). The Mahseer is an important game and food fish distributed along the Himalaya in India, Pakistan, Bhutan and Bangladesh. The Mahseer is a migratory fish and attains a maximum weight up to 25kg. An 18kg (152cm length) and is a column feeder and omnivorous (adult) planktivorous (juvenile). The ecological status of these species of Mahseer has been assigned as endangered by Singh and Sharma (1998), Anon (2001) and Sharma (2003).

Considerable works have been done on the impact of dam works on aquatic ecosystems and fish life in America and Europe and fish pass has been to facilitate fish movement upstream and downstream. However, sincere effort has been made so far on the protection of fish influenced by the expanding dam network in India. Therefore, it was felt desirable to asses the impact of series of dam networks on important migratory fish and its ecology in the area Garhwal Himalaya, India.

The longitudinal connectivity of a river play an important factor in contributing to the long-term survival of all riverine fish. Upstream of Ganga River, especially on River Bhagirathi, a total of 10 barriers in the form of dam along its total length of the river have been in the process of constriction or in the process of completion (Fig-2) . The impoundments after damming the rivers adversely impact both fish biodiversity and local fishing communities. Ecosystem change especially the riparian flora that provides feeding as well as breeding grounds gets affected resulting in loss specific habitat.

The diversity of species along the longitudinal connectivity was assessed in the selected sites with reference to the riparian flora to asses the impact of series of dam on fish.

~ Sibiu/Romania/Euroean Union 2009 ~

STUDIES ON THE DISTRIBUTION AND BIOMASS OF CHIRONOMIDS FROM IZVORU MUNTELUI - BICAZ RESERVOIR (ROMANIA)

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Keywords: Izvoru Muntelui - Bicaz reservoir, dam lake, macrozoobenthos, Chironomidae larvae, density, biomass.

Abstract

The community structure, the distribution and biomass of chironomids larvae from Izvoru Muntelui – Bicaz reservoir have been examined during the period 2006 – 2007.

From the total number of benthonic macroinvertebrates identified in this period (28 species), 16 species were chironomids (larvae): *Chironomus plumosus* (Linnaeus,1758), *Procladius choreus* (Meigen, 1804), *Polypedilum nubeculosum* (Meigen, 1804), *Polypedilum* sp. (Kieffer, 1913), *Harnischia fuscimana* (Kieffer, 1921), *Dicrotendipes nervosus* (Staeger, 1839), *Prodiamesa olivaceea* (Meigen, 1818), *Prodiamesa rufovittata* (Goetghebuer, 1932), *Monodiamesa bathyphila* (Kieffer, 1918), *Paratendipes albimanus* (Meigen, 1818), *Cladotanytarsus mancus* (Walker, 1856), *Cryptochironomus defectus* (Kieffer, 1913), *Cricotopus sylvestris* (Fabricius, 1794), *Tanytarsus* sp. (Van Der Wulp, 1874), *Diamesa thienemanni* (Kieffer, 1909) and *Microchironomus tener* (Kieffer, 1909).

According to these species distribution in different zones of the lake, some differences in the specific structure and biomass values were found.

Along with the increase of the depth, from upstream to downstream, we observed a decrease of the specific diversity as well as a decrease of the biomass.

The highest biomass values of chironomids larvae reported to the entire period has been reached in Bistricioara site (4.9169 g m^{-2}), while the maximum number of individuals has been reached in Potoci bay (5,161.29 individuals m^{-2}).

Procladius choreus (Meigen, 1804) was the species with the highest abundance (1,569.89 individuals m^{-2}) while Secu bay and Potoci bay were the sites with the highest number of individuals.

From the whole number of chironomids species (16) recorded in Izvoru Muntelui – Bicaz reservoir in 2006 – 2007 period, only two species – *Procladius choreus* (Meigen, 1804) and *Chironomus plumosus* (Linnaeus,1758) reached to a high abundance, spreading on almost all lake's area. The other 14 species indicated in the qualitative list are secondary forms, with an insular distribution, without signification in the benthic zoocoenosis economy.

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EXAMINATION OF POLLUTION EFFECTS ON AQUATIC ANIMALS IN ANZALI WETLAND (IRAN)

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Keywords: Anzali wetland - Phytoplankton - Zooplankton - Hydrobiological parameter - Eutrification.

Abstract

Anzali wetland is in north of Iran and in south east of Caspian sea. Because of enterance of high amount of different compound of pollutant, this wetland is in red list of Ramsar convention. In this study we collect data of pollution effect in Anzali wetland for knowledge of present ecotoxicological situation. This parameters are accumulation of organic matter in sediment, bloom of phytoplanktons, species of peryphyton, and population of benthic microphones. Our data collection shown high amount of organic matter with average of 137.32 + 28.60 mg/g that means Anzali is reach wetland in word and is negative factor and show progress of pollution in wetland. Result of phytoplankton bloom during one year in Abkenar & Hendkhale stations shown 67 species belong to 5 phyla. Bloom of phytoplankton in Abkenar was 2 time in year (spring & fall). Cyanobacters were main species. 176 phyto and 17 zeo species were indicating. Balanus from Crustacean was most species. Except 4 stations, phyto species were domain. Tubifex and shyronomid were domain species in benthic. Odonata and lumacea were less in benthic.The water connection between Anzali wetland and Caspian Sea caused some changes on wetland ecosystem. One of these changes is increasing the sea water level, which makes a barrier against affluent of river. Monthly Organic matters changes showed that water, nutrient and living organisms established several reactions in water ecosystem, one of them is nutrient exchanging from sediments to water and vice versa. the results from investigating the organic matter accumulations ascertain that rising Caspian sea water level and consequently Anzali wetland water level had positive effect on wetland biological activities and accelerated exchange rate of organic matters from sediments to water column. Furthermore, total concentration of organisms in west part was more than the other part of wetland. Indeed this part preserved its ecological identity and probably was less exposure to pollutant than the rest part of wetland.the benthic organisms such as chironomid, tubifex and gammarus which live in Anzali wetland, were bigger than their mate in Caspian sea. Whats more, mollusks such as gastropoda in wetland were fresh water dwellings. Nevertheless, shell of sea species was present in some part of wetland. The occurrence of nereis and raising the water level can lead in an idea of penetrating of this benthic organism. Dominancy of tubifex in Anzali wetland, which is an indicator of pollution, is a sign of high pollution in wetland. It is recommended that many more attempts should be done to prevent Eutrification process in Anzali wetland.

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PROTECTIVE ROLES OF FORESTS IN CAMBODIA

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Keywords: Cambodia, forests, climate, coastal protection.

Abstract

Cambodia have a total areaof 181 035 km^2, a tropical monsoonic climate, two seasons: dry season (November to April) and rainy season (May to October). The average annual rainfall: central lowlands: 1 200 to 1 400 mm; highland region: 2 000mm; coastal area: up to 3 000 mm; temperature: around 27 C°; forest Area: 181 606 70 ha; types of Forests: 8 types.

Int'l conservation significance: one of the highest proportions of land as natural habitat (forest and wetlands) in the world; one of the least disturbed coastlines in continental Asia; over 45 habitat types have been characterised and mapped (PAD, 2003:22) with seven biodiversity management regions (Ashwell, 1997, 2004); Cardomon Mountain has thelargest tract of virgin rainforest in mainland South East Asia; together with two other wildlife reserves largest uninterrupted region of protected areas in Cambodia; largest protected region in mainland South East Asia; home to significant numbers of rare animals due to its relatively minimal disturbance, remoteness and vast size.

Coastal protection. The 435 Km Cambodia coastline is comprised of beach and 60 000 ha of some 30 species of mangroves which*:* serve as fish breeding and nursery grounds; serve as habitats for waterbirds and mammals; prevent the coastal area from erosion and reduce natural hazards from storm and waves; maintain the balance of the natural environment of the coastal area.

Due to the protective roles of the mangrove forests, fish catch has remained economically good for the local coastal communities.

Influence on climate. Forests affect climate by: eflecting less heat back into the atmosphere than other types of land use that have more bare soil and less green cover; providing shade and absorbing heat energy, in both cities and rural areas in Cambodia; producing a cooling effect. During the cold season, they obstruct, filter and deflect wind, reducing wind chill; reducing evaporative losses from small water bodies.

These functions of reducing wind velocity, moderating soil temperature and increasing relative humidity are also beneficial in agroforestry systems (Vergara and Briones, 1987).

IMPACT OF LOW HEAD DAM/BARRAGE ON FISHERIES - A CASE STUDY OF RIVER GIRI, MAJOR TRIBUTARY OF RIVER YAMUNA (INDIA)

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Keywords: Endemic species, Barrage, river Giri of Yamuna basin, India.

Abstract

The studied area lies between Latitude 30°33'5"N to 30°38'277"N, Longitude 77° 23'48"E to 77° 30'E and Elevations from 600m -820m mean sea level. Shannon's diversity index H'= pi $\log_2$ pi was calculated for 16 fish species. The index was resolved into its components, species richness (n), diversity index (H') and relative abundance (J'). During monsoon season Hmax'varies between 0.48-0.85 and during postmonsoon season from 0.6-1.15 at 10 study sites(I-X) made on river Giri of Yamuna river basin in the western-central Himalayan region. The fish species belong to 11 genera, 6 families and four orders. Of these, cyprinids found most dominant group was represented by 10 species of 7 genera. Of the order Cypriniformes *Barchydanio rerio* was recorded from site IV. Of the three *Barilius* spp., *B. bendelisis* (Ham.) is the most common at all sites. *B. barila* (Ham.) and *B. vagra* have not been regularly recorded. *Tor putitora* (Ham.) was present at all sites. Species of *Puntus* i.e *P. ticto ticto* (Ham.) and *P. sarana sarana* (Ham.) were observed at site IV. Schizothorax richardsoinii (Gray) is again typical hillstream forms with reduced scales and occur in II, V, VII, VIII & X sites. *Schistura* spp. recorded from site II. *Glyptothorax* spp. is a true hillstream fish with well developed thorax adhesive organs. *Mastembelus* arm*a*tus (Lacepede) (Synbranchiformes) reported from all sites except site II and *Channa punctatus* (Bloch) (Perciformes) though are not true hill stream fishes but also harbour among hillstream fishes. Biotic profile shows that phytoplankton, zooplankton and benthos were consist of 33, 28 and 43 species respectively.

The physic-chemical variation of water are clearly showing the difference between the running water in the river and impounded water at barrage site. The temperature is higher in the impounded water along with higher concentration of migrate, phosphate, other cations and anions, BOD, COD and Ca and Mg hardness indicates accumulation of nutrients. There all variable were found in low concentration at all sites upstream.

Change in diversity are showing correlation with species richness(r), habitat heterogeneity, and hydrological regimes in longitudinal stretch of 35 km along river Giri a major tributaries of Yamuna river system, in Western Himalayas. The abundance differs with change in habitat structures, habitat preference of fishes and water regimes. The decrease in diversity in lower stretch of about 3-4 km upstream of barrage found associated with habitat fragmentation and as well as d/s with loss of biotic integrity of aquatic ecosystem due to water scarcity. The species richness was found maximum at upper V& middle reaches (650-800m, msl) of river whereas it was low in lower reaches. The change in water chemistry is also noticed at Jatan barrage-low head dam due to impoundment of river water.

Because of relatively great floral and faunal biodiversity of Belcista Wetland (Sini Viroj) it shall precede initiative to proclaimed this wetland ecosystem like strictly protected zone under special regime of monitoring.

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AFFECT OF ALIEN FISH SPECIES TO AUTOCHTHONOUS ICHTHYOFAUNA OF LAKE PRESPA IN MACEDONIA

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Keywords: alien fish species, autochthonous ichthyofauna, Lake Prespa, Macedonia.

Abstract

Lake Prespa is transboundary lake between R.Macedonia, R.Greece and R.Albania. The Lake is contained of Macro and Micro Prespa. It is the second largest lake in Macedonia and is settled in the south-western part of the Republic of Macedonia.

In Lake Prespa are recognized 11 native fish species: *Alburnoides prespensis* Karaman, 1924 (Spirlin), *Alburnus belvica* Karaman, 1924 (Prespa bleak), *Anguilla anguilla* (Linnaeus, 1758) (eel), *Barbus prespensis* Karaman, 1924 (Prespa barbel), *Chondrostoma prespense* Karaman, 1924 (Prespa nase), *Cobitis meridionalis* Karaman, 1924 (Prespa loach), *Cyprinis carpio* Linnaeus, 1758 (Carp), *Pelasgus prespensis* Karaman, 1924 (Prespa minnow), *Rutilus prespensis* Karaman, 1924 (Prespa roach), *Salmo peristericus* Karaman, 1938 (Prespa trout) and *Squalius prespensis* Fowler, 1977 (Prespa chub).

Unfortunelly in the past period in Lake Prespa are introduced great number of fish species. They are: *Salmo letnica* Karaman (Ohrid trout - introduced 1950s),, 1924, *Carassius gibelio* Bloch, 1782 (Goldfish - introduced 1970s), *Ctenopharyngodon idella* Valenciennes 1844 (Grass carp - introduced 1980s), *Gambusia holbrooki* Girard, 1859 (Mosquito fish - introduced 1995-1996), *Hypophthalmichthys molitrix* Valenciennes 1844 (Silver carp - introduced 1980s), *Lepomis gibbosus* Linnaeus, 1758 (Pumpkinseed - introduced 1995-1996), *Oncorhynchus mykiss* (Rainbow trout - introduced 1970s), *Parabramis pekinensis* (Amur carp - introduced 1970s, *Pseudorasbora parva* Temmini &Schlegel, 1846 (False Harlequin - introduced 1970s), *Silurus glanis* Linnaeus, 1758 (Wels catfish - introduced 1986), *Rhodeus amarus* Bloch, 1782 (Bitterling - introduced 1990s) and *Tinca tinca* Linnaeus, 1758 (Tench - introduced 1980s).

Populations of the *Alburnus belvica* and *Rutilus prespensis* are very stability. Unfortunelly the populations of the autochthones endemic fish species: *Barbus prespensis*, *Chondrostoma prespense*, *Squalius prespensis* and *Cyprinis carpio* are decreasing every year. Populations of the *Alburnoides prespensis, Cobitis meridionalis*, *Pelasgus prespensis* and *Salmo peristericus* are very rarely. *Anguilla anguilla* are strongly declining in the whole Europe for many reasons, not all well understood.

Fortunelly the populations of the *Ctenopharyngodon idella*, *Hypophthalmichthys molitrix*, *Oncorhynchus mykiss, Parabramis pekinensis* and *Salmo letnica* are not reproduced in Prespa lakes and today their number is very small. Also, the populations of *Pseudorasbora parva*, *Rhodeus amarus*, *Silurus glanis* and *Tinca tinca* are not very abundant in the moment**.** But the populations of *Carassius gibelio* and *Lepomis gibbosus* every year are increasing and they have great percentage participation in the total commercial catches.

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ENVIRONMENTAL EFFECT AND THREAT OF BALLAST WATER

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Keywords: Environmental Risk, Aquatic species, Ship, Nuisance, Management.

Abstract

In recent years, many people have become increasingly aware that the globalization of trade, the increased speed of travel, the massive volume of cargo shipments, and rising tourism has combined to increase the chance of accidental introductions of foreign species through Ballast Water into the native habitats.

Aquatic species arrive through a variety of mechanisms - unintentionally when attached to vessel hulls or carried in vessel ballast water and intentionally when imported for aquaria display, as live seafood for human consumption, or as a transplant to increase sport fishing opportunities.

Ballast water is an important way of transferring aquatic nuisance species (ANS) all over the world. ANS include algae, shellfish, developing larvae, eggs and other microorganisms. Due to the lack of natural predators in the new environment, they are often able to thrive and outgrow the native species. This domination can cause massive ecological, economic, and public health problems such as degradation of habitat, alteration of water quality, blockage of flow in drainage and irrigation canals, or even transition of diseases to humans. The economic, social, recreational, and ecological losses/costs attributable to aquatic invasive species are difficult to quantify.

The International Maritime Organization (IMO) regards the introduction of harmful aquatic organisms and pathogens to new environments via ballast water, as one of the four greatest threats to the world's oceans. At least one foreign marine species is introduced into a new environment every nine weeks. In response to this, the International Marine Organization (IMO), a specialized agency of the United Nations with 166 member states, established the Ballast Water Management Convention (BWM) in 2004. Ballast water management (BWM) for vessels includes all measures that aim to prevent unwanted aquatic nuisance species from being transported between ports in the ballast. In this paper the ballast water management methods is explained under three categories, the exchange, the treatment and the isolation of the ballast water. The advantages and disadvantages of these methods are also discussed.

Ballast water has been identified as one of the four greatest threats to the world's oceans. It transfers aquatic species and aquatic invasive species are perhaps the biggest environmental challenge facing the global shipping industry this century.

STUDIES ON ANIMAL DIVERSITY WITH SPECIAL REFERENCE TO PISCEAN DIVERSITY OF KRISHNA-ARJUNI POND OF RATANPUR, DISTRICT- BILASPUR (CHHATTISGARH, INDIA)

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Keywords: Animal diversity, Piscean diversity, Krishna-Arjuni pond, nets.

Abstract

Biologically diversity is a term used to describe the number, variety and variability of organisms. This diversity can be studied at many levels. Mostly it is used as an indication of numbers of species in a particular habitat or ecosystem. There are varying and often conflicting estimates floating around nationally and internationally the number of animal species. India is known for its Mega-biodiversity of biological wealth, harbouring are 12% of the shell and fin fishes known. India is very rich in terms of biological diversity due to its unique biogeographic locations, diversified climatic conditions and enormous ecodiversity and geodiversity (Chakraborthy,1997).

During the decades investigation on Indian reservoir and fish fauna has been conducted by a number of workers. In India total recorded fishes are 2500 species , out of which 930 are fresh water and 1570 are marine. The Indian Fish populations represent 11.72% of families and 80% of orders of global fishes (Jayaraman, 1999). But the biodiversity studies of fishes are still in alpha taxonomic level and very little information is available on the fish varieties of Chhattisgarh state. With this view keep in mind the present work has been carried out in the year 2007-2008 in the pond Krishna- Arjuni, a perennial pond situated at Ratanpur district Bilaspur, C. G. Bilaspur district is situated in eastern part of Chhattisgarh state and fall within the latitude 21'47" to 23'8" and longitude 81'14" to 83'15".Before this study Jogi,Shailja (2003) had a survey on fish diversity in Dulhara pond of Ratanpur and reported 35 species of 25 genera,these fishes are belonging to 6orders and 11 families.

At the time of study the specimens were collected with the help of different kinds of nets and other fish catching appliances and devices. The specimens were fixed in 4% formaldehyde solution and kept in containers with proper labeling and tail pointing upwards to avoid damage to the caudal fin. Identification of fishes have been done as per procedure described by F.Day(1878), Hora,S.L. and Mukerji, D.D. (1938),Jayaraman,K.C. (1999) and Gopalji Shrivastava (1982).

24 species of 16 genera had been identified which are belonging to 11 families of 6 orders namely Clupieformes, Cypriniformes, Beloniformes, Opheocephaliformes, Perciformes and Mestacembeliformes. Out of 24 species 15 species are belonging to order Cypriniformes (06 species of family Cyprinidae,02 of Siluridae, 04 of Bagridae and 01 each of Cobitidae,Sisoridae and family Claridae).02 species are belonging to order Clupeiformes, 01 species to order Beloniformes, 03 species to order Ophiocephaliformes,01 to order Perciformes and 02 species were belonging to order Mastacembeliformes.

AQUATIC AND SEMIAQUATIC HETEROPTERA FROM ARIEŞ RIVER BASIN (TRANSYLVANIA, ROMANIA) - METHODS IN ESTIMATING BIODIVERSITY

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Keywords: upper basin, lower basin, α-biodiversity, β-biodiversity, γ-biodiversity, numeric equivalent.

Abstract

This paper is part of a study made in order to establish the quality of water resources from the Arieş River Basin.

The aim was to inventory the habitats of aquatic and semiaquatic Heteroptera (inventory that will regard the number and quality of those habitats, and also the human intervention in the area), and to establish the biodiversity degree, using two different methods that estimate both α-, β- and γ-biodiversity.

In order to reach that, we took samples from 16 sampling stations along the hydrographic basin, the results showing the presence of at least 17 species, most of them eurivalent ones, but also with exceptions like *Gerris gibbifer* Schummel 1832 B, *Hebrus pusillus* (Fallén, 1807) or *Hesperocorixa sahlbergi* Fieber 1848, species with rare sightings in Romanian fauna.

The α-biodiversity analysis reveals low values, counterbalanced by higher β-biodiversity values for most of the hydrographic basin, the gradient used in this case being altitude.

Both methods used for diversity estimation show more or less similar results.

~ Sibiu/Romania/Euroean Union 2009 ~

DEMOGRAPHIC STUDIES ON THE NILE CROCODILE (*CROCODYLUS NILOTICUS*), LAKE NASSER (EGYPT) A CASE STUDY: PRELIMINARY ASSESSMENT OF POPULATION DYNAMICS

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Keywords: Nile Crocodiles, Demography, Population Dynamics, Lake Nasser, Double-Observer Counts, Size class frequency distributions.

Abstract

Nine locations surveyed in between July 2008 to May 2008 in order to estimate a preliminary count of *Crocodylus niloticus* in Lake Nasser. The study aim to quantitative survey and determine the crocodile population size in Lake Nasser, and to analyze the dynamics of the Nile crocodile population in Lake Nasser (South Egypt), through demographic survey. This study is important for the populations of Nile crocodiles that continuously subjected to different kinds of threats, hunting and illegal skin trade. Furthermore, the local fishing communities around Lake Nasser had been suggested that the crocodile population is currently large enough to be a threat to their livelihoods, through destruction of nets and a depletion of the fish stock. Spotlight nocturnal surveys were conducted based on Boat- counts were used to establish the number of Nile crocodiles in the Lake Nasser. Double-observer counts technique used to estimate detection probability of animals along the survey route. In total of 1065 km were surveyed at Lake Nasser during the nine location (Khor El Ramla, Dahmit East and Dahmit West, Khor Korosko, Khor Abuo Handel, El Sibu, Khor Al-Allaqi, Amada- tomas, El Derr, and Kalabasha) 394 crocodiles were observed, the encounter rate or the total abundance= 0.37 crocodiles/km, and the corrected abundance =0.27 crocodiles/km. Of these, 159 (40.4%) were classified as EO(reflective eyes), and 235 (59.6%) were approached closely enough to estimate size; these included 90 (22.8%) juvenile, 77(19.5 %) sub adults and 53(13.5%) adults on the other hand the hatchling represented about 14 (3.6%) of the total count of crocodiles. In accordence with our survey the nine location exhibt an inverse- J- shaped or positively skewed size class frequency distributions which may represent rapidly-growing population with high reproductive capacity. Such distribution may also indicate a high juvenile mortality. In these populations, the younger individuals are preponderant than older ones, which is an indication of strength and success of the species, it is mostly due to victorious reproductive and survival of individuals. Using DOBSERV program (Hines 2000) the average detection probability in between different observers was ≈ 0.96. On the other hand A chi-square goodness of fit test indicated that crocodiles were not randomly distributed in between habitats (χ^2= 409.9, *df* =8; P<0.001).

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EFFECTS OF ANIONIC DETERGENT ON BLOOD FACTORS AND LIVER STRUCTURE IN CYPRINUS CARPIO

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Keywords: Anionic detergent, *Cyprinus carpio*, Blood factors, Liver tissue.

Abstract

The fate of many industrial, agricultural and urban pollutants is aquatic ecosystems. Aquatic ecosystems have different capacities of pollution absorption in different conditions. As long as quantity of pollution is overcapacity of ecosystem, self purification of ecosystem maybe changed or stopped or even has short & long term effect on aquatic animals. Nektons, planktons, benthos as well as water quality are affected by water poisons. Detergents petroleum are two important pollutants. Exhausting of these matter lead to some ecological impacts and water pollution. Among Different pollutant, because of much consumption, detergents are more important and have harmful effect on aquatic animals. Petroleum matter together with anionic detergent will decrease dissolved oxygen and water hardness and increase free CO2, alkalinity and phosphate.

In this investigation, we studied the effects of anionic detergent on blood factors and liver morphology of *Cyprinus carpio*. In this study, 40 fish (10-12 Cm and 35-40gr) were put in one control group and four treatment groups in 150-litr aquariums. The treatment groups contained 2, 4, 6 and 8 mg/l of anionic detergent respectively. After specimens were exposed to the detergent, blood was taken from the anal fin ventral area on days 1, 2, 3, 5 and 7. Part of the provided blood was stained by Gimsa and studied blood cells. To determine the blood glucose concentration, the enzymatic test of glucoseoxidase and spectrophotometer were applied. To determine the liver glycogen, the liver tissue was hydrolyzed, so that glycogen would shift into glucose. Then, the amount of the glucose and the glycogen of the liver were subsequently measured using the above enzymatic test. Part of the tissues in each treatments were the immediately fixed in Bouin solution. Then, to study the samples, 5µ sections were made and stained by Hematoxylin-Eosin general staining method. In the study of blood cells, some variation in the number and form of the cells were observed. So that as the amount of the detergent increased, the number of blood cells increase compared to the control group. Contrary to the control group most of RBC would deform from the natural shape in treatment groups. A relationship was found to be between an increase in the detergent and a decrease of glycogen and also an increase in the blood glucose using ANOVA method ($P<0.05$). In histological study of the liver, hypertrophy was clearly obvious in treatment specimens, so that hypertrophy would increase along with the dose increase of the detergent and in the highest dose, most of the liver cells had been damaged.

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THE RECONSTRUCTION OF THE DANUBE'S FLOODPLAIN AND OF ITS BIODIVERSITY (ROMANIA)

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Keywords: the Danube, floodplain, biodiversity.

Abstract

The Danube's floodplain represented the largest wet area along a river in Europe and one of the largest in the world. The construction of the 1,157 kilometers of dams, in Romania, led to the disappearance of lakes, pools, marshes, brooks, channels, and specific dry areas, all these covering a surface of more than 417,617 hectares. This area was characterized by a great biodiversity.The characteristic flora and fauna is made up of woody, aquatic herbaceous, and paludous plants, plants growing on sands and salt-flats, more than 25 large groups of aquatic and terrestrial invertebrates, fish populations, numerous species of amphibians, reptiles, birds, and mammals.

Due to its particular ecosystem structure and its natural resources, the flooding area displayed many used being considered the richest in Romania. The first place was occupied by the fish production. Naturally, 14 million kilograms per year were fished in the permanent and temporary lakes.Within the rarely flooded fields the cereal production was similar the higher productions obtained in the plain (4,000 - 5,000 Kilograms per hectares of wheat) without chemical fertilizers and irrigations. An important resource was represented by hayfields and animal breeding, as well as by forests. A general conclusion detached from its features is that the flooding area displayed four main functions among many other functions. The first function - the hydrological one. It acted as a regulator for the hydrological regime of the Danube. The second function - the climatologic one. The flooding area, through the vast surface covered by the aquatic ecosystems rich in paludous and terrestrial vegetation ensured the moderation of an excessively continental climate characterized by extremely hot and dry summers specific in the South of Romania and especially within the Danube's Plain. The third function - the ecological one was extremely important due to the diversity of ecosystems and the richness of plants and animals' populations; thousands of species enriched the flora and fauna of Romania and Europe. The fourth function, the economic one, a resultant of the three previously mentioned functions, is also important because of the great fish production, agricultural products, wood, hayfields and animal breeding.

The replacement of the floodplain with the terrestrial agricultural ecosystem brought to the disappearance of the flora and fauna specific to wet areas. The damming of the area and the destruction of the floodplain proved to be inefficient economically and ecologically. Under these circumstances, a present issue under debate in Romania is that of the reconstruction of the floodplain. By the implementation of this project there are established the premises for the reconstruction of the specific ecosystems and for the development of all the economic activities characteristic to floodplains.

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DYNAMIC OF ZOOPLANKTON IN THE FLOOD AREA OF CHKO LATORICA IN RELATION TO ECOLOGICAL CONDITIONS

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Keywords: Cladocera, Copepoda, Rotatoria, dead arm, flood, the inside embankment area, the outside embankment area.

Abstract

The research was perfomed in five localities in the area of CHKO Latorica in southeastern part of the East Slovakia Lowland. Four localities (named Balaton, Cesta, Pri hlavnom toku a Kubík) are situated in the area inside the embankment, whereby they join together during the overflow of the river Latorica. One locality (named Mimohrádzový priestor) is isolated and situated behind the embankment, the outside of the embankment area. The localities Mimohrádzový priestor, Balaton, Cesta and Pri hlavnom toku have the character of dead arms. The locality Kubík represents artificially created material pit, where the material for building the embankment was taken from.

During the two years we have altogether detected 118 taxons of zooplankton, from that 76 taxons of Rotatoria, 32 taxons of Cladocera and 10 taxons of Copepoda. A part of the research was to watch the physical-chemical and hydrological indicators and to determine monthly P/B coefficient for the dominant species *Bosmina longiristris.* A limiting factor of zooplankton development was the influence of floods, which are accompanied by turbidity. The floods had inhibitory effect on the abundance of zooplankton. The abundance of zooplankton during the floods was extremely low, 24,5 ex./l in average. After the floods, there was in isolated localities a qualitative and quantitative development of zooplankton. This was manifested in the interflood periods in the months April, May, June, July and August 2007, May, June and July 2008 and September and October 2008. The abundance in these periods reached 178,4 ex./l in average.

The highest secondary production of *B. longorostris* species was determined in the interflood period in the months May, June, July and August 2007. The average monthly P/B coefficient during these four months in the inside embankment area with an average water temperature 21,83°C was 14,23. During other months with less favourable ecological conditions (mainly thermal), with an average water temperature 12,39 °C, P/B coefficient reached the value 5,5. During the periods of floods the abundance of individuals wasn't sufficient for estimation of the secondary production. The monthly P/B coefficient was higher in the areas with lower water depth. The average value of biomass of *B. longorostris* was 108,46 μg/l.

Species diversity was higher in the localities with lower water depth, therefore with larger area of ecologically active surface per unit of water volume. Species diversity in the locality in the outside embankment area was lower (63 taxons) compared to the localities in the inside embankment area (110 taxons).

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SEDIMENT DREDGING AND REMEDIATION VERSUS AQUATIC BIODIVERSITY

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Keywords: sediment, metals, dredging, remediation, biodiversity.

Abstract

Water-sediment systems, with their inherent biodiversity, are among the most endangered ecosystems worldwide. Pollutants from various sources (industrial, mining, municipal sewage, agricultural and other activities) have entered water ways over time. The sediments then become a sink and source of toxic components due to their resuspension and can, thus be one of the largest potential sources of risk to water quality. Declines in aquatic biodiversity, because of heavy metal pollution could be great and remediation and restoration is increasingly important.

However, the data about aquatic biodiversity status before and after dredging or sediment remediation are still insufficient. Anthropogenic impacts such as dredging and remediation disrupt natural disturbance regimes, truncate environmental gradients, and sever interactive pathways. Within sediment monitoring and specially when a decision about dredging or remediation needs to be taken we should have in mind among other things - biodiversity. Single approach and simple usage of sediment quality guidelines to asses sediment quality may be insufficient. Components of continual environmental monitoring of sediments should check both the chemistry of the sediments and the biodiversity on both the mobile and physically stable parts of the sediments. Along with ecological risk assessment, habitat valuation provides science usefull informations regarding remedial decision-making. Sometimes this valuation may show that the no-action alternative provides greater habitat value than remediation. The environmental monitoring should be continued after the dredging have ceased to confirm that the predicted biodiversity recovery has occurred.

A systematic approach to the problem of sediment quality in Serbia is just beginning. Serbia has neither an established system of continual monitoring of sediment quality nor regulations concerning quality standards. Some watercourses in Serbia needs dredging and remediation. Still, there is no remediation activities in Serbia nor monitoring biodiversity status within sediment quality assessment. Only physical-chemical aspects are monitored while ecological outcomes are not evaluated. More ecologically orientated planning of remediation and dredging activities should be in future schemes.

THE INCIDENCE OF ZOOPLANKTON SPEED AND SAMPLING DEPTH ON THE SAMPLING EFFICIENCY / PRELIMINARY COMPARATIVE DATA

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Keywords: zooplankton sampling methodology, swimming speed, Limnos tube, Green tube, digital video recording.

Abstract

The efficiency of the tubes, traps and nets is varying according to the type of the studied lake and the type of applied methodology. Thus, from one study to another, the obtained data can vary within certain limits for the same water body and season.

The inherent variability led to some correlation studies between used methodologies in order to corroborate the results and render them comparable.

The present study is a comparative analysis of the efficiency of the tubes used for the sampling the superficial layers in the lotic or slow running limnic biotopes. The Limnos and Green tubes have been compared to sampling tubes of different diameters. The water speed at the entrance in the tube during the sampling manoeuvre is calculated on digital video record of 30 frames/sec and compared with the swimming speed of cladocerans (*Simocephalus vetulus,* juveniles and adult individuals) and copepods (*Cyclops* sp. juveniles and adult individuals), measured in an experimental tank with black walls and numbered 1cm^2 white markers with the aid of the same video recorder.

It is demonstrated that the diameter of the tube used for sampling influences the sampling efficiency especially for the zooplankton species that are actively swimming in the water body (cladocerans, copepods).

The tubes used in other European studies, the Limnos tube was properly used by the Karjalainen and colab., 1996, in terms of depth and inner diameter of the tube, while the Green tube had apparently a too large inner diameter for the shallow depth in which it was used (17,2 cm in diameter for 30 cm deep sampled layer) to be considered adequate in terms of zooplankton diversity and quantity.

The present study sets the basis for a larger methodology study integrating statistical analysis and hydrodynamics in order to establish a unified methodology for limnologists worldwide.

DIVERSITY AND DENSITY OF ZOOPLANKTONS OF POND KRISHNA ARJUNI OF RATANPUR, DISTRICT BILASPUR (C.G.) INDIA

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Keywords: Diversity, density, zooplankton, pond.

Abstract

Biological diversity is a term used to describe the number, variety and variability of organisms. This diversity can be studied at many levels. Mostly it is used as an indication of numbers of species, in a particular habitat or ecosystem. Discussion on bio diversity rarely mention microorganism. Although their number and roles are crucial to the maintenance of more visible plants and animal communities.

The role of zooplanktons in the functioning of the ecosystems is of paramount importance to man. Food pyramids of more complex organisms rest on wide zooplankton bases. They form an important source of fish food; hence the knowledge of abundance and variation is an essential parameter for pond ecosystem study. Zooplankton is an important factor in the energy transfer on the secondary level and shows variation in the species, composition and abundance according to the change in several environmental factors.

Present study was taken up at Krishna Arjuni pond of Ratanpur. Samples were collected at four sampling stations of the pond and their plankton density was estimated. Collection of sample - the water was filtered with the help of standard planktonic net made up of bottling silk no. 14 (120 m) and 25(65 m). The filtrate was transferred in marked glass stopper bottles. The sample was preserved with 5% formaldehyde and ethanol iodine solution. The samples were further concentrated to 5 ml. by centrifugation at 2500 rpm. After sedimentation the supernatant liquid was siphoned off and sediment was preserved in 5% formaldehyde. The planktons were systematically identified up to group level by using compound microscope. The prominent groups identified during this study wereProtozoa, rotifera, cladocera, copepod and ostracoda. The list of planktons observed is Protozoa - Paramecium, Amoeba, Volvox, Actinophrys, Centrophyxis,Vorticella, Arcella. Rotifera - Branchionus, Lepedella, Lecave, Keratella, Notholca, Platyias; Cladocerca - Daphnia, Sida, Moina, Bosmin, Camtocercus, Eucerus, Chydorus, Pleurox Copepoda - Cyclops, Diatomus, Helicyclops, Canthocamptus, Eucyclops, EubranchypusOstracoda - Mysis, Onis.

The dominant group observed is protozoa while ostracoda is the group present in lowest count. The density observed was highest in the month of June and lowest in October. Nearly thirty genera were identified. It was observed that among zooplanktons the maximum average density was of Protozoa (120.9 org/l) and observed in the month of October.minimum of Ostracoda (29.0 org/l).

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