

## TISZA-RESEARCH CONFERENCE XX (1989)

Compiled by

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### I. Lecture on studies from the Tisza research in the Soviet Union

KOMENDÁR, L.:

On the scientific work carried out in 1989 by the Tisza Research Group in Uzgorod and its future trends

Complex botanical investigations of the Ukrainian stretch of the Tisza river have been carried out by the Department of Botany, University of Uzgorod.

In the syntaxonomic studies participated V. I. KOMENDÁR, V. V. KRICSFALUSI, from the Academy of Sciences in Lvov K. A. MALINOVSKI, from the University in Ufa B. M. MIRKIN and AJRAT IZSBRIDIN, I. FODOR. Research continued in the nature conservation area, in the first place on the monographic description of rare ephemeroïd plants: V. I. SZALUDOS defended his candidate thesis on *Leucojum aestivum* species and G. MEZŐ—KRICSFALUSI — on *Ornithogallum umbellatum*.

Successful work has been carried out by N. V. SUMCSKAJA (*Leucojum vernum* L.), K. S. PAVLINA (*Rosa canina* L.), S. P. LISCSUK (*Rumex alpinus* L.) in the preparation of their candidate dissertations. V. V. KRICSFALUSI and V. I. KOMENDÁR completed their book on rare plants (Carpathian flora), which is at present in press in Lvov.

BEATA MOLNÁR completed her diploma work on aquatic plants under the supervision of V. I. KOMENDÁR and E. SZALMA (Szeged).

Interesting joint research has been initiated on *Iris sibirica* species on the territory of the Soviet Union and Hungary (V. I. KOMENDÁR, S. GULYÁS (Szeged) and GY. CSIZMAZIA (Szeged)).

The phytocenological, phytogeographical, ecological and zoocenological aspects of this species have been investigated.

In the field of zoologic research further studies of vertebrate fauna are envisaged. A plan for joint research in the Sub-Carpathian Nature Conservation Area has been worked out in the field of dynamics of bird populations along different stretches of the Tisza.

Further results were obtained on the influence of micromammalia on the Tisza dam (endangering the flood protection).

The manuscript of a joint Ukrainian—Hungarian—Jugoslavian educational book on the Tisza river has been completed (KOMENDÁR—CSIZMAZIA—MIKES).

## II. Reports on the Hungarian Tisza reach

HEGEDŰS, MÁRIA and DOBLER, ENIKŐ:

### Comparative studies of the Dead-Tisza arms

In 1989 investigations have been carried out in six dead-arms in the southern stretch of the Tisza. Samples have been collected monthly during the vegetation periods, and one sample was taken every season as well.

Chemical parameters tested routinely in the practice of water-supply management have been measured; in the course of the biological studies quantitative analysis of chlorophyll forms, saprobiological evaluation, as well as algae-count and biomass determination in two dead-arms have been carried out.

The following results were obtained:

— Saprobiological evaluation carried out by ecological methods showed that the water in the dead-arms at Atka, Mártély and Serházzug was typically beta-mesosaprobic.

The water in the dead-arms at Körtvélyes, Gyála and Nagyfa differed significantly from that of the previous group and was of alpha-beta mesosaprobic quality.

— The level of trophicity estimated on the basis of a-chlorophyll content showed significant variations. The lowest (mesotrophic) level of trophicity was registered in the dead-arms at Mártély and Atka, and the highest — poli- or hypertrophic — in the dead-arm at Nagyfa. The rest of the dead-arms were characterized by alternate changes of eutrophic and eupolitrophic states.

— Algae-count and biomass determinations were carried out in the water samples collected in the dead-arms at Mártély and Atka. It was found that the annual biomass content differed significantly in the two dead-arms, which can be explained by the differences in their species compositions.

BANCSI, I.:

### Rotatoria fauna in the reed-grass and marsh vegetation of the Kisköre storage-lake

On the territory of the Kisköre storage-lake, along the dead-arms and mortlakes rich reed-grass vegetation developed. In the shallow waters and island-like emergences rich marsh vegetation can be found. A cross-stretch of the arm at Csapó and an old dead-arm of the Tisza with well-developed reed-grass were chosen for the present study. The following plant populations were investigated:

- *Scirpo-Phragmitetum-phragmitetosum*
- *Typhetum angustifoliae*
- *Nymphoidetum peltatae*
- *Tragetum natantis*
- *Nymphaeetum albo-luteae*.

In the course of the studies water samples were collected from free-water and plant-covered areas and from the coating of leaves and stems of various plant species.

81 Rotatoria species were identified in the samples. The fauna of water-chestnut proved to be the richest. 30 Rotatoria taxa were found in water-chestnuts of both the Csapó and Nagy-Morotva-arms. In the live-coating of water-chestnut 23 taxa were identified.

The areas covered by *Nymphoidetum peltatae* and its live-coating were comparatively poor in Rotatoria.

Most of the Rotatoria taxa were found only in a few samples. From 81 taxa 29 were detected only once, 18 — twice and 10 — three times. The rest of them were found in 4—11 samples.

The characteristic Rotatoria species of the metaphyton were as follows: *Anuraeopsis fissa*, *Brachionus quadridentatus*, *Euchlanis dilatata*, *Lecane bulla*, *Mythilina ventralis* var. *macracantha*, *Synchaeta stylata*, *Testudinella patina*, *Trichocerca pusilla*. Among rarely found species *Colurella obtusa*, *Conochilus dossuarius*, *Eosphora najas*, *Lacinularia flosculosa*, *Lecane myriofilli* and *Trichocerca scipio* should be mentioned.



# Changes of water quality of the Tisza river between 1970 and 1987

A process of water purification is characteristic for the second biggest Hungarian river in the stretch between the mouth of the Sajó river and Szolnok. Because of the considerable water consumption of Szolnok for industrial purposes and drinkingwater supply, the water quality and its long-term changes are of outmost importance. The analysis is based on the evaluation of the results obtained in the studies of water samples collected weekly from the Tisza reach at Szolnok (335,4 river km) in the period 1970—1988. In order to obtain sufficiently detailed information on the water quality the most important 27 water quality parameters have been considered in the present study.

The changes observed in the annual maximal, minimal and mean values of several parameters in the period between 1970 and 1988 were presented. The changes in the water quality reflected by the mean values of the quality parameters were not considerable, altogether deterioration of water quality was observed. The direction and extent of the changes were determined for the periods 1970—1978 and 1979—1988 by means of regression analysis. It was found that a considerable deterioration of water quality took place in the 70s. Among the parameters studied 52% showed an improved or unchanged water quality, 22% indicated a slight and 22% — considerable deterioration between 1979 and 1988.

The quality of water in the Tisza met the I. class requirements when used for industrial and irrigation purposes during the whole period studied. From 1976 on it corresponded only to II. class in covering the needs of fishery or drinking-water supply, and in this field a further deterioration of water quality is to be expected.

SZITÓ, A.:

## Seasonal changes in mosquito (Culicidae) fauna in the Kisköre storage-lake

Several high water periods affected unfavourably the development of mosquito fauna, thus till the end of May the individual density was low and the number of bites/hour hardly reached 50—60. From mid-June the number of individuals increased drastically and e.g. at Tiszafüred 3888 bites/hour were measured, while at Kisköre only (!) 120.

This year anopheles species were of a secondary importance, however, *Aedes rossicus* and *Aedes nigritus* were observed in large numbers. The following species were detected in trace numbers: *Ae. cataphilla*, *Ae. sticticus*, *Ae. cinereus*. In comparison to the previous years a decrease was observed in the number of *Aedes vexans*. In July the number of bites was unbearable in all basins of the storage-lake.

The composition of mosquito fauna changed in summer and autumn, but the number of individuals, which belonged to the summer dominant species, was the highest in autumn as well.

SZITÓ, A. and SZABÓ, T.:

## The sediment-fauna of the Tisza river based on the longitudinal segment studies in 1989

The three longitudinal segments described in our previous studies have been investigated in a low-water period, after summer drought. The present study was carried out immediately after the withdrawal of the high water and the following observations were made:

— The upper Tisza-stretch, approximately till Tuzsér, is poor in Oligochaeta and Chironomida, regarding both the species and individual numbers, mollusks similarly to the previous results were absent, later, however, an increase in Oligochaeta and Chironomida species and individual numbers was observed. This was experienced not only in the shore region, but as well in the current.

Mollusks can be found in the Tisza-stretch above the mouth of Bodrog, in accordance with previous results their appearance can be detected from here on in varying number of individuals, mainly in the shore-band. Phryganea and water-flea occur in the places characterized by rapid-flow and stony, gravel riverbed.

Contrary to the previous observations some representatives of the sedimental fauna groups could be found in all tributaries. 1 km above the mouth of the Maros a high individual density of Oligochaeta, characteristic for waste-waters was detected in the sandy sediment of the left-hand shore (5000—8000 ind./m<sup>2</sup>).

# Studies of Oligochaeta in the Hungarian stretch of the Tisza

Aquatic annelids (Oligochaeta) are important participants in matter and energy turnover in dead- and fresh water ecosystems. They play an important role in the degradation of organic matter in the sediment, contribute to water selfpurification and are valuable fish nutriment.

Oligochaeta are dominant fauna elements in the macrozoobenthos of freshwaters, in the first place in the shore regions (FERENCZ 1979), thus their quantitative and qualitative investigations provide information on the quality of aquatic environment as well.

In the presentation the author reports on the newest results obtained in 1989. The results accumulated in the course of the Tisza research carried out systematically for several years enable the analysis of recent changes.

BÁBA, K.:

## Seasonal malacocenological studies in the region of Tisza-alpár

A study of snail populations of *Fraxino-Alnetum*, *Molinetum coeruleae*, *Alopecuretum pratensis* plant associations based on 204 live and 384 dead individuals belonging to 13 species was carried out in 1988—89.

The collected data were analysed by means of mathematical methods.

Seasonally spring and summer-autumn aspects can be distinguished in *Fraxino-Alnetum* and *Molinetum*. In dry *Alopecuretum* spring, summer and autumn aspects can be distinguished. The aspect-formation is influenced by changes in the characterspecies populations. In different biotops the propagation of identical species occur in different months. In biotops differing in humidity the variability of ecological species groups decreases with drying. The herbivor and saprophage elements are complementary, and with drying the latter types become dominant. From zoogeographical point of view drying leads to prevalence of holoarctic elements having a broad range of endurance.

GYOVAL, F.:

## Dynamics (density, reproduction, mortality) of moor frog (*RANA ARVALIS* WOLTERSTORFFI) population in the Tisza flood-plain forest-biocenosis

A 70% decrease in the population density and biomass of *R. arvalis* population in Tiszaalpár has been observed in 1989 in comparison to the previous year. Here, in alder forest the autumn biomass was 9,2 kg/ha. In the same period in the Tisza Körtvélyes—Barci rét flood-plain the biomass measured in the plant associations was as follows: *Caricetum gracilis*: 1,7 kg/ha, dry cutting area 4,2 kg/ha, wet cutting area 7,6 kg/ha, *Ulmo-Fraxinetum Populus canescens facies*: 13,2 kg/ha.

In Tiszaalpár the average number of eggs found in March for two-year old small size females was 489 and for three-year old bigger size females — 1104. In spring an enormous number of eggs started to develop in 14—45 cm deep oligotrophic marshes. However, the larval development has been hampered by later drainages.

The above data and unfavourable developments observed clearly show that drainages caused the most heavy damages. It is by all means justified to preserve the fringing forests and marshes in a close to natural state.

KOVÁCS, P.:

## Ichthyofaunistic evaluation of catches of fishers and anglers in the Kisköre storage-lake (1975—1988)

General environmental and ichthyobiological conditions before the building of the storage- lake. Characteristics of the new living-space, its influence on fish population.

Evaluation of species composition on the basis of earlier literary data.

Fish species occurrence judged by catching results: (barbel, tench, bullhead pout, amur, silver carp, bighead carp, pike, pike-perch, bream, silur, eel, sturgeon, carp, crucian, carp-bream, new species in the storache-lake).

General statements, conclusions:

- composition of fish population,
- influence of artificial fish introduction
- migration,



- fish nutriment supply,
- fish protection,
- recapture
- ecological and water-management aspects of fishery and angling.

FARKAS, Á.:

Age determination, distribution and frequency of occurrence of carp-bream (*Acipenser ruthenus* L.) in the lower stretch of the Tisza river

Carp-bream is the most valuable representative of the indigenous ichthyofauna in the Tisza. It occurs frequently in the lower Tisza between 202 and 214 river km. Such stretches are found in the Maros—Tisza influx and in the vicinity of the Algyó bridge. If marl, steep shore is combined with deep water and hard-set river bed, the occurrence of carp-bream is to be expected with high probability.

Age determination was carried out on the basis of pectoralray sections.

SZALMA, E.:

Vegetation mapping of reed-grass population of the Kisköre storage-lake

The water-basins found on the territory of Kisköre storage-lake can not be considered homogenous. At least four different area can be distinguished in the storage lake. This finding is based not only on the results of chemical analysis but as well on the results of plant, faunistic and cenological investigations.

The gradual filling up of the area facilitates fast and continuous spreading of the plant associations found in the storage-lake. In several exposed locations of the storage-lake a process of marsh formation and parallel to this an increased eutrophization were observed.

### III. Reports on research in the Yugoslavian stretch of the river Tisza

GAJIN, S., PETROVIĆ, O., MATAVULJ, M., GANTAR, M. and RADNOVIĆ, D.:

Presence of naphtha and phenol oxidizing bacteria in the water of the Yugoslavian stretch of the river Tisza

Lately the pollution of surface waters by naphtha and phenol imposes ever growing problems. Since the metabolic activity of the microorganisms determines the water selfpurification from organic matter, the authors followed the presence of microbial groups in the water of the Yugoslavian stretch of the Tisza, which are capable to purify it from naphtha and phenol.

In the tow-year period studied naphtha and phenol degrading bacteria were temporarily or permanently present in the water of the Tisza in all locations.

The proportion of both bacterial groups, but in the first place that of the naphtha-oxidizing ones in the heterotrophic populations was very high (naphtha-oxidizing — 38—128%, phenol-oxidizing — 0,8—5,6%). The presence of these bacteria in the Tisza points at a temporary or permanent pollution by naphtha and phenol, but at the same time indicates that the metabolic activity of the autochthon microorganisms contribute to the selfpurification (autopurification) of the Tisza water.

BUDAKOV, LJILJANA:

Growth of *Rutilus rutilus* L. 1758) in the Tisza and its tributaries

On the basis of material collected in the lower course of the Tisza, in the Dead-Tisza and within the Ó-Bega park region in 1987, the author reconstructed the longitudinal and mass growth, longitudinal and mass growth rate, and studied with the help of theoretical calculations the growth rate and growth constant. It was found that the longitudinal and mass growth showed an increase with species age, while the growth rate was the highest in the first and second year of life. The mass growth rate showed an increasing tendency and was the highest in 4<sup>+</sup>-developmental group. The highest longitudinal and mass growth was observed in the population found in the Tisza, and the lowest — in Ó-Bega. The differences in the growth rate can be related to environmental factors. As far as the growth rate and growth constant are concerned, two periods can be distinguished — before and after the third year of life.

TÓTH, MÁRTA and PUJIN, VLASTA:

#### Combined effect of the Bega and Tisza on zooplankton composition

The lecture deals with the results of chemical and physical analysis carried out in 1988—89, as well as with the composition of the zooplankton of the lower Tisza and its left-hand tributary — Bega. The determination of physical and chemical characteristics showed that both rivers had a slightly alkaline pH, corresponding to average values 0,82 in the Tisza and 0,98 mg O<sub>2</sub>/l in the Bega. The mean concentration of ammonium ion was 4,83 in the Tisza and 3,85 mg/l in the Bega.

In the two rivers altogether 36 zooplankton taxons were identified — 32 in the Tisza and 34 in the Bega, i.e. 3 Protozoa in both rivers, 27 Rotatoria — 24 in the Tisza and 25 in the Bega, 4 Cladocera in both rivers and 2 Copepoda — 1 in the Tisza and 2 in the Bega. The number of species varied significantly in different years and seasons. In the Tisza the lowest number of species was observed in the spring of 1988 and the highest — in the summer of 1989. In the Bega the lowest number of species was registered in the spring of 1989 and the highest one — in the summer of 1988.

The results of the studies prove that there is a marked combined effect of the Tisza and the Bega on the composition of zooplankton, since 78 samples, representing more than 50%, had identical species composition.

RATAJAC, RUŽICA:

#### Composition and dynamics of Cladocera in the Tisza

Between 1981 and 1988 samples have been collected seasonally, at times even more frequently at five locations along the Tisza. Altogether 22 Cladocera species have been identified. Quantitative composition and number of species differed from year to year and from season to season. As far as the seasonal variations are concerned, it can be started that in winter the number of species is the lowest, it increases in spring and summer and reaches the maximum in autumn. Only in 1982 and 1988 the number of species was the highest in summer. In every season *Alona quadrangularis*, *Bosmina longirostris* and *Chydorus sphaericus* were present. Other species occurred more rarely. *Diaphanosoma brachyurum* was more frequently observed in the warm periods of the year.