

SUMMARY OF THE RESULTS IN TISZA-RESEARCH OBTAINED DURING THE YEAR 1982

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The complex studying of the Environment Protection Area at Mártély-Körtvélyes had been accomplished by our study group in 1981. At the present time, after the first year of the 2×3 years research programme of the Alpár basin, we are in possession of data and hypotheses, which shall be reported on by our coworkers. The Tisza-research having its 30th jubilee this year continued its studies also in the current year joined to the 15-years perspective topic of the Hungarian Academy of Sciences entitled "Man and the protection of his natural environment", within the frame of the subject approved by the Hungarian Academy of Sciences: "Complex investigations of the Tisza river and its flood-plain, with regard to the river barrages and the nature conservancy areas". The year's areas where the studies were of the most important point extended to the Alpár basin, the region of Tóserdő and the range of the storage tank at Kisköre. The plan of research regarding Bodrozug was prepared at the end of 1982, which study was started in 1983 in accordance with the research contract made with the National Board of Environment- and Nature Conservancy.

The Tisza-research activity of the Ukrainian (CCCP) researchers has also been started. Fauna and flora investigations are being carried out at the Departments of Zoology and Botany of the State University in Uzhorod, under the leadership of Professors V. I. KOMENDAR, S. FODOR and I. I. TURJANYIR. In the Autumn of 1982, on the occasion of my Sub-Carpathian study-tour, the edition of a joint publication related to the nature conservation of the Tisza had been started together with Professor TURJANYIN.

The researchers from Novi Sad led by Professors M. MIKES and P. VLASZTA have also accomplished intensive studies in 1982.

In the fore-goings, a complex review is given on the investigations carried out at the Hungarian section of the Tisza river.

I. Studies in progress at the Alpár environs: Throughout the year, the oxygen-content of the water in the dead-Tisza at Lakitelek was above 6 mg/l) the oxygen-saturation was a minimum of 763. The low dissolved oxygen (3,9 mg/lr measured at the sampling site at the research house was accompanied by rather high amount of organic matter. It is interesting that the ratio of ondatra was the highest here (1 hectare — 12 ind.). The total salinity at the backwater was also rather,

constant (490—580 mg/l in the Spring — Autumn interval). The calcium ion was always of vertical and horizontal value, which could not be stated of magnesium. The backwater's phosphorus- and nitrate-contents were rather low. According to the COMECON classification, the water quality was "clear water, 1st class". By now, the backwater at Lakitelek is a holiday resort and angling water; attempts must be made to entirely preserve and realize, respectively, the quality of the water and also our environment protection objectives.

The bacteriological investigations at the Alpár backwater have demonstrated the seasonal fluctuation of the coliform and faecal coliform bacteria. The seasonal dynamic study of the algal communities has proved the relatedness of the algal communities here with the algal world of the sodic waters. *Euglena sanguinea* algal bloom appeared at Bokros. There were two maximums of zooplankton in May and September at the Alpár backwater (Protozoa, Rotatoria, Entomostraca).

The alphamesosaprobe organisms were dominant in Summer.

The studies on the Syrphidae and Culicidae species from the area of the storage tank to be established showed interesting results. Here, the Diptera fauna was found to be more variant. *Aedes caspius* PALL. larvae live in the seasonal waters of the stagnant pools becoming sofified, and *Culex modestus* FIC. larvae live in the backwaters. The larvae of *Aedes vexans* MEIG live in the seasonal, but not sodic waters. These three species cause the main mosquito-harm at the area. At the shrubby regions the *Anopheles maculipennis* MEIG is also observable.

The malacological investigations at the area in 1982 involved the snail communities: these belong to the continental Siberian-Asian fauna-society.

The ornithological investigations of the Nagy Lake and Meadow at Tiszaalpár registered 47 nesting, 14 locally feeding and 45 over-flying species. 126 pairs of different heron types hatched eggs at the thick reedy, marsh-willow heron colonies (night heron, small heron, squacco heron, red heron, common heron, big heron). 86 pairs of wild terns nested in the waterlily-stratiotes marsh, together with mire-crows. It is an important conclusion that the avifauna recalls the picture of the marsh-world of the centuries old Tisza overflows — all this at the boundary of the Tőserdő Reserve of the Kiskunság National Park — rare nesting and over-flying species live here — therefore, it seems expedient to attach these parts also to the protected area and to leave these out from the works on the river barrage.

The faunistic survey of the small mammals was accomplished at the Alpár meadow in the agricultural civilization and the *Salicetum albae-fragilis* grove. The occurrence of five species was proved in 1982. The studies aim at the interrelationships of the intra- and interspecific competition, and bring light to the predational aliment-chain relations in the ecosystem.

II. study area: Tőserdő. The 1982 research results of the competition topic entitled "The comparative complex hydrobiological, biocenological and synecological seasonal dynamics of the nature conservancy area and environment of the Kiskunság National Park at Tőserdő" could be sketched in brief as follows.

As basic study, the dynamics of the salt-household were determined in the waters belonging here. 286 algal taxa were demonstrated from the aquatic microorganisms, the seasonal fluctuation showed a maximum in the Euglenophyton and Chrysophyta groups.

The water producing macrophytocenoses at the marshland were formed in 80% by the mosaic-complexes of the contiguous *Nymphaeaetum*, *Trapaetum*, *Hydrochari-Stratiotetum* (patchy *Hottonia* stand).

The bacteriological studies served the purpose of the environment protection of

the Töserdő holiday resort. *Salmonella* was not demonstrable in the backwater. Both in qualitative and quantitative respect, the Rotatoria components dominated in 60% in the zooplankton of the Töserdő backwater. These were followed by the Protozoa in 25%, and then by the Entomostraca in 15%. The first group revealed correlation partially with the culmination points of the thallus-bodied bacteria number and algal production, respectively. The most frequent taxa were the *Arcella stellata*, *Centropyxis aculeata*, *Brachionus* sp. and *Keratella* species.

The temperature rise of the backwater at the beginning of Summer is also accompanied by the increase in the amount of zooplankton, which shows correlation with the mass appearance of the schools of young fish.

From these vertebrates the 1982 data manifest 34% decrease in species according to the malacological studies, compared to the results of earlier investigations.

Among the consumers of the backwater the praedational relations of the ichthiofauna were studied. The largest was the Cyprinidae family with 12 species. Here the carnivorous fish species are low in number — compared to other Tisza backwaters — with the exception of the numerous *Amiurus nebulosus*. Data collection related to mammology extended to the populations of the bats (*Nyctalus noctula*) living in the hollows of poplar and the ondatra populations at the backwater (*Ondatra zibethica*). The bird fauna in the ligament-forest near the Töserdő backwater is rather rich. The nesting of the black woodpecker and the grey laughing-bird is the great ornithological value of this area. It could be determined that — unfortunately — the life activities of the birds nesting in forests — only rarely detectable in the lowlands — are greatly disturbed by the many tourists in Summer and at week-ends. Nature conservancy would have further tasks in this regard.

The III. stressed study area was the storage tank at Kisköre. The water quality of the storage tank in 1982 showed a more favourable picture compared to the previous years. On the basis of the dissolved oxygen-content values, the chemical oxygen demand, as well as the dissolved mineral substances, it proved to be of COMECON Ist class. On the contrary, the values of the suspended matter measured during the course of floods and the total amount of iron made the water of IIIrd class in certain cases. Among the plant nutrient solutions important from the viewpoint of eutrophization, abundant amounts of phosphorus and nitrogen were registered. The inundation with Tisza water of the Sarudi basin (rinsing canal No. V.) was favourably ensured by the velocity relations. This and the fluctuations caused by wind significantly pressed back the process of benthic eutrophization. The considerable repression of the dense macrovegetation characteristic of the past years was also firstly a consequence of the changed conditions of the water course. The results of the studies all the more allow the conclusion that although the Tisza water flows continuously into the storage tank, there is a possibility for us to determine: the quality of the water wished to be stored; the time the possibly “decomposed” water is wished to be changed; and the type of water with which to fill up the storage tank again. However, the storage of “bad” water, the surplus drainage of “good quality” water and even the unnecessary derangement of the “settled” water quality state in the storage tank are also possible, if merely on the basis of technical reasons we specify various modes of function and carry out inadequately prepared technical interventions, or changes in water level.

The 1982 studies on the phytoplankton communities of the storage tank also proved the good functioning of the rinsing canal established between the Tisza and the storage tank, which hinders the development of high algal number. The large

openwater areas of the banked up Tisza and the storage tank were suitable for recreational purposes in the year.

The studies on the mineral substance quantities regarding reed-grass vegetation and litoral vegetation significantly indicate the extremely high iron-, manganese-, aluminium- and zinc-contents in the water of the storage tank.

The bacteriological studies are interesting; we have been successful in cultivating enteral pathogenic bacteria (*Salmonella derby*, *Salmonella brandenburg*) from the segment of Kisköre, but not from the segment of Tiszafüred. The bacteriological investigations at the Eger brook showed gradually increasing bacteriological pollution in the segment at Almár. More and more week-end houses are being built at the area, the hygienic problems of which are unsolved. The *Salmonella infantis*, *Salmonella give*, *Salmonella meleagridis*, *Salmonella bovis-morbificany*, and *Salmonella panama* have been cultivated from the Eger brook.

Important determinations have been made concerning the development of the fish stock at the Kisköre storage tank. As the consequence of the silting up of the channel, the species roeing at the bottom all the more lose their spawning ground, therefore the individuals reaching sexual maturity migrate from this river section (*Acipenser ruthenus*, *Barbus barbus*). With the decrease in the amount of rolled alluvium, those species which mainly select their nutriment from this are able to obtain it less easily, therefore their stock becomes suppressed (*Aspro zingel*, *Aspro streber*). The barrage keeps back regularly the Spring overflows, and the easily warming-up shallow water creates favourable conditions for the multiplication of the emerging limnophyl species, ensuring in such a way the adequate supply of the brood. However, a significant proportion of the progeny becomes victim to the lowering of the water in Autumn, because due to the unorganized state of the area, they are perforced outside on the navy pits and the shallow-watered plains. The loss should be reduced by the building of newer drain-canals. It could be determined of the fish stock at the Kisköre region that while the carp belonged to the upper region of the state-tract before the damming up of the water, today it belongs to the lower region.

The analysis of the nesting bird communities at the storage tank had started in 1982, the preparation of the bird map is in progress and shall be finished in two years time.

Finally, after reviewing the previous three well-circumscribed areas where the research activities are being carried out more or less complexely, let us survey the punctiform researches going on "dispersedly" at other sections of the Tisza river.

Further data were collected on the biological water quality of the Tisza between Tokaj and Tiszafüred, with emphasise on the investigations of the oxygen circulation at the Sajó. The bacteriological studies of the district waters at the Middle Tisza-Section were carried out in two areas: Körösér and the dead-Tisza at Tizsakécske. It has been proved that the majority of the allochton organic matter contaminations is becoming mineralized through biological process with the help of bacteria, therefore their role is important in the process of natural purification.

The seasonal studies as well as the disclosure of the environmental-biological background of the algal vegetation at the Eastern Main Canal and nearby Tisza section were further continued.

The *Daphnia* testing of the Tisza section at Szolnok county and its district waters, as well as of the drinking water of Szolnok city shows encouraging results. The results of each *Daphnia* test of the Tisza longitudinal segment study were negative. From this, the unrefined water before the Szolnok Water Works should be emphasized,

where 5.1% of the samples was positive, as should also be the drinking water obtained from the surface Water Works — supplying the drinking water for the city and its environs — where 24.3% of the samples also showed positivity. Compared to the results of the recent years, this is an extremely favourable ratio, both in the case of unrefined and drinking water. The explanation to this is seen in the fact that on one part, the water quality of the Tisza has improved, on the other part, the processing techniques of the surface waters have also considerably improved.

The cenological data and the studies on the grassy areas of the water plant vegetation at the river section in the environs of the water storage tank (till Tiszaranyos) have been supplemented. It has been determined that the most important task of the future is the maintenance of the richness in species of the natural grass-plots. From the viewpoint of forage, the abundance in species of the biotic grass-plots found at the Tisza flood-plain areas has such balanced and favourable mineral substance-content, which cannot be experienced in the case of the vegetation at the flood-plain areas of other rivers in Hungary. The decrease in mineral substance-content in the case of the artificial grass — which are well known to be poor in species — mostly results the catastrophic deterioration in quality of the pasture.

The studies on the honey-bee population were carried out in the region of Tiszasziget as well as Vásárosnamény and Tarpa.

In 1982 the hatching stock of sand martins at the Middle Tisza Nature Conservancy Area was about 1910 pairs between the 397 and 288 riv. km section. The large scale decrease in the number of sand martins (*Riparia riparia*) compared to the previous years was caused by the water conservancy bank-safeguarding works carried out in the area of Tizsakécske. As the consequence of this, the nest colonies of the sand martins may probably have increased at the areas falling North from Szolnok.

The studies came to an end in 1982 regrading the topic of the aliment and energy demand of the ... at Tiszavölgy. According to the determinations, one hatching pair of the nesting in the ... Sasér and Mártély Nature Conservancy Area, as well as its progeny counted averagely for two individuals, consume 288 kg fish in the interval between March and October. The study is destined for serving with concrete data to the realistic judgement of the damage caused by the birds experienced in the nearby fish-hatchery at Szege-Fehértó.

Finally, I should like to mention that according to my opinion it would not be without interest to review — if only briefly — the research areas of the year 1982, since this is when we could jointly evidence the enormous and far-reaching activities being carried out by our co-workers. This work, from water chemistry throughout botanic relations to the vertebrates, is unique not only in the relation of the Hungarian, but also in that of the foreign researches on rivers. The attempt regarding the complex coordination of the research subjects on the Tisza river has been achieved in the volume on Körtvélyes of the Tiscia. We hope that this effort will prevail more increasingly with the concluding of the next plan period related to Alpár and Tőserdő.

Following the beginning “illusory” monographic objectives, the Tisza-research has found the resultful, and — according to the possibilities — one of the best means of concentrating the intellectual scientific products.

Finally, I should like to call our attention to another important task. The relationship between the Tisza and environment protection is two-faced. On one side is the protection of the condition, living world, and water quality of the surface waters (aquatic environment protection); on the other side is the role of the river in the formation of the environmentalbiological fundamentals of our surroundings. Many negative examples could be listed from both fields. The “regulation” of living waters;

the straightening of water-course channels; their lining with concrete together with their living world; the stoning of river banks; the dredging of the bottom sediment together with the living world there; the eradication of forests at flood-areas; the colonization of herbivorous fish into backwaters; the artificial alteration of the depth and drift of the water; the entering of sewage — can all not be done with impunity, without the knowledge on, and without taking into account the ecological demands of the living creatures.

Today the environs of the Tisza is formed rfrom teh complicated network of the artificial and natural factors, and in general, the proportion of these two changes according to the purposes of man. And where the value of the Tisza environs is determined by natural formations — according to the human standards — the demands of these natural formations should be studied before each intervention, which — it could be said — are biloogical demands in every case. Therefore, besides the whatever high scientific levelled publications and lectures on Tisza-research — intended for everybody, yet not addressed to anyboky — our co-workers must also find the concrete nature conservancy questions from their own special fields of research, and elaborating these — in the interest of environment protection — attempts should also be made regarding effectuation from the profile of their familiarizing, acceptance and scientific popularization.

It should be an important promoter of our efficiency to also succeed in getting thr nature- and environment protection questions regarding the Tisza into the value judgement of the designing smaller teams and our society — as an integral part.