

## RESULTS AND TASKS OF THE FIFTEEN YEARS OLD TISZA RESEARCH

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The organized Tisza research was set in action in 1957 by Academician DR. GÁBOR KOLOSVÁRY, Professor of General and Systematic Zoology at the Attila József University, Szeged. Academician Kolosváry was not only organizer and leader of these investigations but also their active research worker until his death in 1970.

In the first years, the members of the Tisza Research Association organized expeditions and investigated the whole Tisza region in Hungary. As a result of that work, a good survey has been achieved about the natural history of the Tisza and of its immediate environment.

It would be difficult to give a brief but complete survey of the results of the 15-year research work. We would like only to characterize, by means of a few examples, how complex and many-sided research work has been carried out by the members of the Tisza Research Association.

A map of the Middle and Lower Region of the Tisza was drawn by researchers dealing with water chemistry, Protophytes, and Protozoa floating in the water. The degree of water pollution and its influence on the unicellular organisms that determine the "self-purification" of a river were established. It is shown by these investigations that the micro-organisms of the Tisza are still able, at present, to „work up" the pollutions, that is to say, it is still a clear river. It was, anyhow, ascertained, as well, that in some places, intermittently, the pollution grows to dangerous proportions. We must take care, therefore, of the satisfactory waste-water purification, otherwise we cannot avoid the fate of the countries, where a great part of the rivers became a stinking sullage-pipe.

The increasing pollution of the environment, particularly that of air, was proved by the investigation of the distribution of lichens living in the inundation area of the Tisza. It can be established that approaching the great cities and industrial establishments we find fewer and fewer lichens as they are killed by the polluted air.

It is worth mentioning that much work has been devoted and money spent to clean the dams, built of stone, from lichens, although there wouldn't grow any lichens there if the stones were rubbed with tired oil.

In the course of the Tisza research, there was elaborated a grass-cover composition for serving the biological protection of dams. It was established what grass species were the most suitable for composing the grass cover of the dams of different soil and water-movement for making it the most resistant to the water-movement. The use of grass-covers was justified by the great inundation of the Tisza in 1970.

It is also important to record the soil-marking plants, indicating in the inunda-

tion area the stagnant waters left behind at the feet of dams that induce the danger of their thorough soaking.

The investigation of fish food and fish life is one of the most important topics of Tisza research, carried out in collaboration with the research workers of the Research Institute for Pisciculture at Szarvas. They elaborate the result of fishing, dealing with the causes of the decrease in the "fish population" of the Tisza. By means of marking the fish, they can follow the fish migration.

The researchers have dealt for years with preparing the introduction of fish into the water-basin formed out above the river barrage at Kisköre — at present, in process of construction — and they have dealt also with the prospective development of the quantity of natural fish food. The river-basin will play an important part, among other things, in increasing the stock of fish in the Tisza, as well.

The backwaters along the Tisza are very important places of fish-breeding in the Great Hungarian Plain. The Association is dealing, therefore, with exploring the causes of fish perdition occurring in the backwaters from time to time. They have elaborated a procedure for preventing the mass poisoning of fish as a result of the hydrogen sulphide production induced by the changes in the weather.

It is generally known that the application of plant-protecting agents means more and more a world-wide problem in respect of water pollution.

The importance of the so-called biological protection is emphasized, therefore, more and more. Opposite to the insect, mouse and other rodent parasites of the agricultural areas along the Tisza, the avifauna of the woods in the inundation areas along the whole Hungarian Plain has a considerable — although, unfortunately, more and more decreasing — part. That has got the Association of Tisza Research to deal also with the problem of the artificial bird-introduction and the practical implementation of that, as well.

The investigation of the bank swallows along the Tisza has led to results connected with public hygiene.

The nest-groups of this sociable bird species were studied along an about 600 km region. It was established that the more times 10,000 birds nesting in the steep river walls played a part in the promotion of the undisturbed holidays along the Tisza. A large part of the food of bank swallows consists namely of gnats.

In respect of flood-prevention, there is important also the investigation carried out in connection with the elimination of the damage induced by some small mammals — mouse, field-vole, rat, mole — deteriorating the dams. Examining systematically their way of life, their ducts, one tries to elaborate a process that decreases their number and, in that way, also the damages in dams.

One of the indispensable starting-points of the biological research is to know the climate of the area investigated. Therefore were established two meteorological stations by the Committee of Tisza Research, in the vicinity of the two intended water-basins at Kisköre. The data of these can be used not only for the present investigations but in the future, as well, representing, in this way, a considerable value as comparative material.

An important part of the task of the Tisza Reserch Association is the preservation of nature, endeavouring to preserve in an unchanged form the areas along the Tisza that are valuable in respect of the investigation or of holidays. Also this contributed to the fact that in the recent past the approximately 30 km Tisza region between Mártély and Sasér was declared a nature conservation area.

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In the autumn of 1971, the Committee of Tisza Research elaborated the long-range (15 years) research plan of the Association. On the basis of that, the Tisza research became more and more concentrated on two areas, taking into consideration the social demands, as well.

One of these areas is the Tisza region between Tiszafüred and Kisköre where river barrage "Tisza II" is in process of construction. The second one is the nature conservation area between Sasér and Mártély. The research work carried out in these areas will be completed during the 15-year plan with a third area, as well: the environment of Csongrád. According to that plan, namely, the river barrage "Tisza III" will be built there.

The Association of Tisza Research is striving for carrying on a complex research work with the participation of meteorologists, water-chemists, botanists and zoologists as well as of practical specialists. This complex research work is referred to by the title of the research topics, as well:

"Natural geographic, hydrobiological, zoo- and phyto-ecological investigations,

- (1) in the area of river barrage "Tisza II",
- (2) in the area of the nature conservation district Sasér—Mártély,
- (3) in the area of Csongrád."

### (1) In the area of river barrage Tisza II

The artificial lake of a surface 200 sq. to be formed above the water barrage is a remaking of nature in such a degree that is a case without parallel in Hungary. As it is to be expected, it will influence in a considerable degree the natural geographic conditions of the adjacent areas — first of all the so-called local climate —, the plant associations and their organic matter production, too, as well as the animal kingdom. It will be an important task to profit of the opportunity provided by this enormous "field experiment" as well as possible for analysing the regularities of the connections between the living being and its environment and for promoting the solution of practical programmes (increase in fish output, formation of holiday centres, etc.).

As a result of the investigations started three years ago, the fact-finding investigation of the present state has already taken place, both in hydrobiologic and in botanical or zoological respects. These mean a comparative basis for comparing the changes to be as a result of remaking the nature. In two stations, also a continuous meteorological observation has begun.

In the course of investigations, in the future, we will start from the conception:

- (a) of character and degree of the effect exerted by the artificial lake as a water eco-system upon the local climatland other natural geographic conditions,
- (b) of character and degree of the effect exerted by it upon the adjacent terrestrial eco-systems, and
- (c) of the formation of the biological equilibrium of the water-basin as an artificial eco-system.

Corresponding to this triple programme, the following investigations are outlined by the Association of Tisza Research:

- (a) Continuous meteorological observations at minimum two states. Microclimatic investigations in the water and terrestrial biotops marked out for that purpose. (Minimum one water and three terrestrial biotops).

- (b) Synecological investigations in the natural plant associations of meadows and pasture lands (stand structure, production, etc.), at least in three biotops. Zoo-ecological and population-dynamic investigations touching every major taxonomic category, at least in three biotops.
- (c) Water-chemical investigations (water pollution, bacteriology), at least in one water biotop.

Investigation of phyto- and zooplankton and of benthos. Investigation of the food-chain from planktons till fish.

Apart from the results at the level of basic research, the investigations endeavour to give help connected with the following problems, as well:

Nature conservation,

Flood-prevention,

Biological protection,

Construction of holiday centres,

As good agricultural exploitation as possible of the adjacent areas,

Augmentation of fish production.

## **(2) In the area of the nature conservation district between Sasér and Mártély**

In the course of the formation of river barrages in the Tisza, the natural primary environment is more and more transformed. The transformation of these parts that are nice even as landscapes is meaning a heavy loss in nature conservation. It is therefore an important task to reconstruct the nature conservation area between Sasér and Mártély as prescribed by the order of the National Office of Nature Conservation. The Association of Tisza Research endeavours to promote also this nature conservation reconstruction with investigations scheduled for this area.

The research work between Mártély and Sasér, started in 1971, is justified also by that it is approaching Szeged, the centre of the Association of Tisza Research (where about 50 per cent of the investigators are working), making possible even continuous investigations by means of frequent visits to the scene.

The research work intended in this area is justified, in *tertio*, also by that here, in the early 1950s, a detailed plant geographic survey was carried out. That — as a basis for comparison — enables us to estimate the doubtless considerable anthropogenic effect exerted in the last two decades. From that it can be established, too, what the primary aim of human intervention is to be in the future, for carrying out the reconstruction of the region in as short a time as possible.

It follows from the programme outlined, as well, that the investigations in this area must be performed not only in the living Tisza but in the inundation areas, as well, and moreover in the backwaters of the Tisza that are aesthetically beautiful and for the people pleasant, too (e.g., the importance of establishing holiday centres in the vicinity of Szeged).

The research programme of the Association of Tisza Research in this area is the following:

- (1) Water-chemical, phyto-zooplankton and benthos investigations in the backwaters as natural biotops.  
Investigations of the food-chain for increasing fish production.  
Self-purification of the backwaters.

- (2) Syn-ecological investigation of the meadows, grass-lands and woods, as well as that of comparative production.
- (3) Zoo-economical and population-dynamical investigations with special regard to the reconstruction of the bird-populations.
- (4) Local and microclimatic investigations of the meadows, grass-lands and woods in the inundation areas. (Taking into consideration also the requirements connected with the allocation of recreation areas).
- (5) Comparative water-chemical and production-biological investigations in the living Tisza.

### (3) In the area of Csongrád

The aim of the investigations is:

- (a) A precise summing up investigation of the present natural geographic and biological state in the place of the intended river barrage at Csongrád.
- (b) Starting from the phytogeographic surveying in the 1950s, an analysis of the changes that took place since then.
- (c) Connected with the formation of the river barrage planned, calling the attention to the areas that mean a considerable value in respect of the protection of nature. These aims approximately agree with the investigations planned in the area of Kisköre, therefore, also the research tasks are similar to those outlined in item 1.

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The Conference of Tisza Research, arranged yearly, every spring, plays an important part in coordinating the activity of the Association of Tisza Research that consists of 35 to 40 research workers, lecturers, and practical specialists. In this Conference, the members of the Association are reporting on the results of their research work, elaborating the plans for the next year. This considerably promotes the research work to be a collective cooperation, even if it is not carried out by the participants at the same time.

The most important results achieved in the course of the Tisza research are published by the Committee of Tisza Research, in the scientific review "Tiscia" appearing yearly, subsidized by the Hungarian Academy of Sciences. There have appeared, so far, six volumes of the Tiscia that have excited a great interest, even in international relations. That is shown, for instance, by that the Committee of Tisza Research receives more than 100 scientific publications appearing abroad in exchange for this publication.

The papers published possibly in another scientific publication in connection with the Tisza research are epitomized by the Committee of Tisza Research in the series "Tisciale Hungarica", established in the recent past. In this way, an easy survey of the most important scientific publications relating to the Tisza research could be provided, independently of where they were published.

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