

WATER INVESTIGATIONS OF THE TRIPLE-KÖRÖS

MÁRIA M. HORVÁTH and KLÁRA F. KEMENES

Attila József University, Szeged

Water Administration of the Lower Tisza Region, Szeged

(Received 20 September 1978)

Abstract

We have investigated into the quality of water from samples taken at Magyartés and Kunszentmárton. It could be established that the water of the Triple-Körös at the sampling site in the neighbourhood of Magyartés is of first class from any points of view of utilization. The water samples taken at Kunszentmárton, however, showed that the water quality was influenced by the inflowing sewage-water. It is nonetheless obvious on the basis of the seven years long investigation that the Triple-Körös is our clearest river water, its pollution is of very small degree.

*

From the Bihar mountain dividing the Great Hungarian Plain from the Transylvanian Basin, four rivers begin flowing to the West: the fan-like converging Berettyó, the Rapid-, Black- and White Köröses. The water of the Köröses gets to the Tisza united in the Triple-Körös. This is the largest water system of the Middle Tisza region and one of the most interesting water systems of the Carpathian basin.

The watershed area of the Köröses may be considered as a square. It is limited by the lines drawn in the West in the direction of Tiszalök-Kunhegyes-Csongrád; in the North in that of Tiszalök- the Rumanian Nagykároly-Tasnád; in the East Tasnád-Rudabánya; in the South Világos-Orosháza-Csongrád.

The length of the river White-Körös is 236 km, of which 9 km flow on the territory of our country. In its mountain stretch it is nourished by several brooks. The Black-Körös is 168 km long, of which 4 km are at the frontier, 16 km flow on the territory of our country, taking in many right-side and left-side affluents, thus among others the Hortobágy, as well. The length of the Rapid-Körös is 209 km, of which 59 are on Hungarian territory. The Rapid-Körös takes in the Berettyó in the South of Szeghalom and then unites with the Double-Körös below Körösladány. One has also to reckon here, apart from the rivers, with the inland channels, as well.

The whole watershed area is about 22,715 square km. From this area 9,351 sq.km belong under the supervision of the Water Administration of the Lower Tisza Region. The largest water output of this part is 1,585 cubic m/sec, and the smallest one is 2 cubic m/sec. The water system is taken in by the Tisza at river-km 242.3.

The water examinations were performed out of samples taken at two sites. One of our sampling sites was in the Triple-Körös at Kunszentmárton, at river-km 19.8, the other one at Magyartés, at river-km 2.0. The sampling site at Magyartés is No.1 and that at Kunszentmárton is No. 2. In Fig. 1, the sampling sites are shown.

Similarly to the examination of the water of the Tisza (FÜGEDI 1978), in the earlier years, we have taken water samples in several places (bridge at Gyoma, Békés-szentandrás). The use of several sampling sites was not justified on the basis of analyses. Further on, therefore, the water samples were only taken at two sites (Fig. 1).

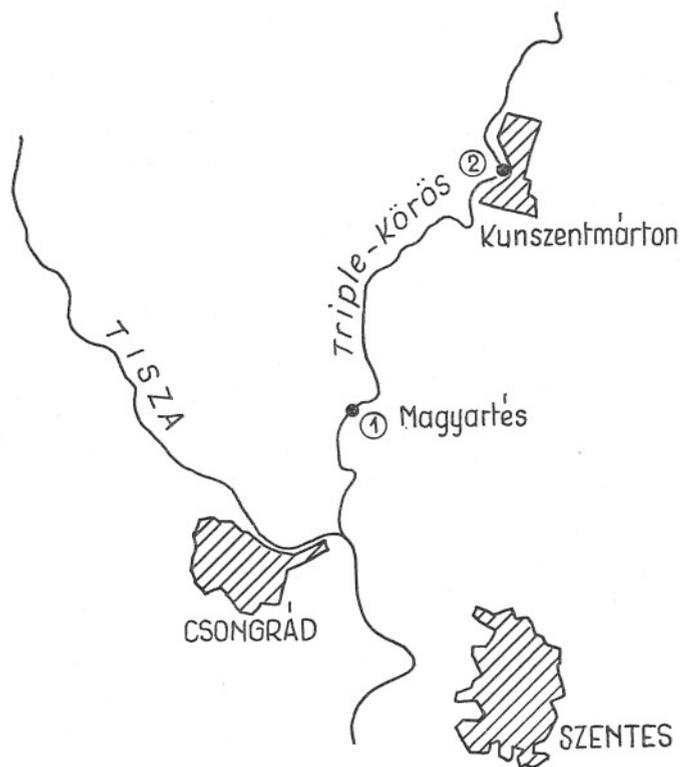


Fig. 1. Sampling sites in the Triple-Körös.

A survey and discussion of the results of investigations

The water of the Triple-Körös was systematically investigated on the basis of samples taken from the two sampling sites between 1970 and 1977. The evaluation of water according to use was carried out on the basis of the COMECON standard (FÜGEDI 1978).

Evaluation of the water of the Triple-Körös according to utilization

	Sampling site 1 Magyartés	Sampling site 2 Kunszentmárton
Communal water supply	I	II
Industrial water supply	I	I
Agricultural water supply		
(a) Irrigation	I	I
(b) Fish husbandry	I	II

In the following, the data of sampling site 1 (Magyartés), the formation of the indices investigated are shown in Fig. 2 and the data of sampling site 2 (Kunszentmárton).

Figure are showing the oxygen household in the water of the Triple-Körös. The solute oxygen content developed similarly to that in the Tisza water, under like conditions (K. FÜGEDI, H. MÉSZÁROS 1978). A considerable difference could, anyway, be observed above the river barrage at Békésszentandrás when the saturation value

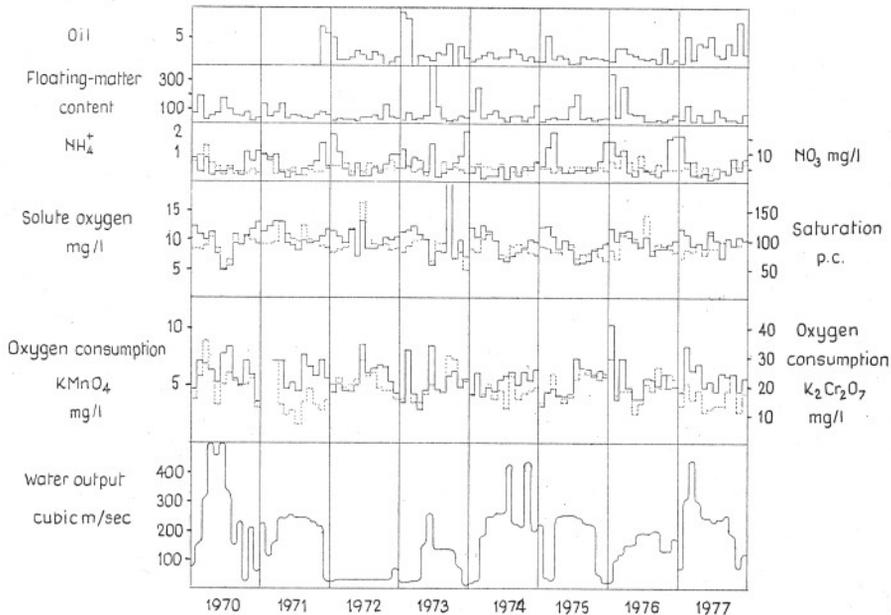


Fig. 2. Investigation data of sampling site 1 (Magyartés).

reached even 189 percent. This high value may have been brought about by the biological overproduction. The river reaches are here of standing water character. It is shown by the data both of the sampling place at Magyartés and that of Kunszentmárton that there is still enough solute oxygen in the river.

We could observe at our sampling place 2 (Kunszentmárton) that the samples taken from the streamline of the river differed from those taken from places close to the riverside. In the parts close to the riverside the sewage-water of the large village inflows — and by this the quantity of the solute oxygen was reduced, and the pollution became larger, as well.

For establishing water pollution, it is most wide-spread to measure oxygen consumption with potassium permanganate and potassium dichromate (FÜGEDI 1978). If there are only easily oxidizable matters in water, then the oxygen-consumption values of the two kinds of measuring agree with each other. At the presence of difficultly oxidizable matters, however, the value of the potassium dichromatic oxygen consumption is higher. The value of oxygen consumption measured with potassium permanganate did not exceed, at any sampling site, the value 10 mg/l. The lowest value measured was 2.8 mg/l.

The organic-matter pollution of the Triple-Körös has not increased in proportion as it was observed in case of the Tisza (K. FÜGEDI, H. MÉSZÁROS 1978). The quantity of organic matter increases very slowly, the water quality is, therefore, first class.

This river water is, according to cation water type, Ca-Mg, rarely Ca, but there occurs type Ca-Na, as well. From among anions, HCO_3 is dominant but there occurs CO_3 , too. The halobity of water means the totality of inorganic compounds that are important from biological point of view. Halobity is determined by the geochemical properties of the river bed and the watershed area. The living beings can hardly make any change in this well-determining factor. They generally accomodate themselves to the salts in different concentrations (FELFÖLDY 1974). The salt content of the Triple-Körös is lower than that of the Tisza, its value being about 250 mg/l. In the course of our investigations there were measured 400 mg/l maximum and 140 mg/l minimum salt quantities.

Floating matter is in this water: very fin sand and silt. The amount of the latter is, however, not considerable. The annual deposit transport of the Köröses is also small. There gets, therefore, into the Triple-Körös, too, a minimum deposit. The Triple-Körös flows, in general, at an identical level. This has also in a certain sense influence on that the sediment transport is very low. In the upper reaches of the Köröses — where there are great level-differences in their flowing — the alluvial deposit is fine grained and in the lower reaches there is no rolled grain at all to be found. Compared with other water courses of similar size, the deposit transfer of the Köröses is the smallest. The water output and floating-matter content show a close connection. Outstanding values can be seen for 2 to 3 days after floods.

Investigating into the nitrogen household in Figures, we can establish that the ion content of ammonia does not depend upon the water-level. Instead of the outstanding values measured in the large river systems on certain occasions, here we generally measured lower values (1.4–0.5 mg/l). The increase in the use of artificial fertilizers is connected with the development of agriculture both in this country and abroad. The utilization of artificial fertilizers increases in the watershed area of the Tisza-Körös-Maros, as well. The most important fertilizers are nitrate and phosphorus. — In the water samples, the nitrate content shows a little rise. There are some outstanding data — with the presence of a major quantity of nitrate — when a frozen ground was strewn with the artificial fertilizer which got into the river by erosion.

The phosphorus loading of the water of the Triple-Körös was only investigated for two years. This is, at any rate, a short time to draw essential conclusions and give generalizations. Nevertheless, it may be established that the nitrate content of water was augmented by the increasing use of fertilizers. This however is not dangerous, as yet, either for the use of water or from ecological point of view.

Of late years, we have met newer water-polluting materials: mineral oil and its derivatives. The damaging effect of these is in that they spread in a thin layer on the surface of water and prevent oxygen uptake. The thickness of such an oil layer is one or more microns. — Oil is particularly dangerous to fishes because it covers gills and impedes breathing. If oil is absorbed in the alimentary canal of fishes, this deteriorates the taste of flesh. Apart from this, oil damages the riverside, too, impedes recreation and water sports.

The water of the Köröses is not polluted so much with oil, as yet, as the Danube and the Tisza. But we are reminded by the values of the analysis of that, if only in a small degree, oil pollution is continuous.

References

- FELFÖLDI, L. (1974): A biológiai vízminősítés (The biological water-qualification). — VIZDOK 3.
K. FÜGEDI, KLÁRA (1978): A természetes és mesterségesen kialakított környezet a Kurca folyó szakaszán Szentes város térségében (The natural and artificially formed environment in the reaches of the river Kurca in the area of the town Szentes). — Doctoral thesis. Szeged, pp. 90.
K. FÜGEDI, KLÁRA—H. MÉSZÁROS, MÁRIA (1978): Investigation into the water quality of the Tisza from Csongrád till Tiszasziget. — Tiscia (Szeged) (In print).

Vízvizsgálatok a Hármas-Körösön

H. MÉSZÁROS MÁRIA és K. FÜGEDI KLÁRA

József Attila Tudományegyetem Biofizikai Tanszék, Ökológiai Laboratórium
Alsó-tiszavidéki Vízügyi Igazgatóság Laboratóriuma, Szeged

Kivonat

A Hármas-Körös vízének minőségét vizsgáltuk Magyar- és Kunszentmárton mellett vett mintákból. Megállapíthattuk azt, hogy a Hármas-Körös vize Magyar- és Kunszentmárton mellett vett hasznosítási szempontból első osztályú. Kunszentmártonnál vett vízminták azt mutatták, hogy a beömlő szennyvíz befolyásolta a víz minőségét. A héteves vizsgálat alapján látható, hogy a Hármas-Körös a legtisztább folyóvizünk, szennyeződése igen kismértékű.

Istraživanja na rekama Hármas-Körös

H. MÉSZÁROS MÁRIA i K. FÜGEDI KLÁRA

Ekološka laboratorija Katedre za biofiziku Univerziteta JATE; Laboratorija uprave za vodoprivredu
županije Csongrád, Szeged

Abstract

Istraživanja kvaliteta voda na rekama Hármas-Körös vršena su iz proba uzetih pored Magyar- és Kunszentmárton. Utvrđeno je da je voda Hármas-Körös kod Magyar- és Kunszentmártona pogodna za svaku upotrebu. Probe sa područja Kunszentmárton pokazale su da otpadne vode utiču na kvalitet vode. Na osnovu sedmogodišnjeg ispitivanja vidljivo je da je Hármas-Körös najčistija tekuća voda NR Madjarske, njeno zagađivanje je neznatno.

Анализ воды реки Хармаш-Кереш

М. Месарош—К. Фюгеди

Университет им. А. Йожефа, кафедра биофизици, генетическая лаборатория; Водное Управление
нижнего побережья Тисы, Сегед

Нами был проведен анализ качества воды реки Хармаш-Кереш по пробам, взятым в районе Мадярътиш и Кунсентмартон. Установлено, что вода реки Хармаш-Кереш в районе взятия пробы у Мадярътиш является первоклассной со всех точек зрения использования. Пробы воды, взятые у Кунсентмартона, показывают, что притекающая сюда грязная вода оказывает влияние на качество воды. Как показывают результаты проведенных нами в течение семи лет анализов, Хармаш-Кереш является самой чистой рекой Венгрии, загрязненность воды здесь очень незначительна.