QUANTITATIVE AND QUALITATIVE STUDY OF CHIRONOMIDA LARVAE ON THE SECTION OF THE TISZA BETWEEN TISZAFÜRED AND KISKÖRE

A. SZITÓ

Institute of Pisciculture, Szarvas

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Abstract

With the construction of the second series of locks on the Tisza, a lake will develop on a section of the river about 45 km long above the dam. The changes arising in this section compared to the previous state will influence the organisms living here.

In order to record the initial state and the changes, the author began in 1970 a quantitative and qualitative study of the mud-inhabiting Chironomida species in the section of the river Tisza between Tiszafüred and Kisköre, and in the dead-arm of the Tisza beside the strand at Tiszafüred.

20 samples each were taken from the Tisza at Kisköre and at Tiszaörvény, and 10 samples each from the Kistisza and from the dead-arm at Tiszafüred.

The processing of the material revealed that of the total of 60 samples only 22 contained larvae. In all, 46 larvae individuals were found in the samples, these belonging to 11 species. The bottom fauna of the dead-arm is very poor. The single dominant species in the Tisza is *Polypedilum nubeculosum* MEIG., which provided 30% of all the larvae. In spite of the fact that for the whole of 1971 the river was in its bed, the species characteristic of standing water comprised 67% of the total larva population in the section of the river examined.

Introduction

In order to be able to follow the changes in the life of the water-basin forming in this section of the river after the construction of the dam at Kisköre, it is necessary to obtain the present faunistic and floristic picture. Within the Tisza Research Working Group, several specialist groups have been formed to study this area.

The author undertook to discover the situation relating to the Chironomidae by quantitative and qualitative surveys of the zoobenthos. Such a study of the Chironomidae is considered of importance in this section of the Tisza, not only because changes will take place there within a few years and there will be not possibility later for the investigations, but also because, in contrast with the Danube, studies of the Chironomida population of the Tisza have not yet been carried out in Hungary. The study of the Chironomida fauna of the Tisza was begun in 1970, and the accomplishment of this is the main aim up to the commencement of the dam.

The data reported are thus the first data from work already begun, but planned to last for several years.

Material and method

Mud samples were taken on both the right and left banks of the Tisza, about 300 m north of the 405 river km mark, in the vicinity of Kisköre, and from the Kistisza along the right bank at lock-keeper's house no. 404. Further samples were taken from the Tisza, about 200 m north of the 428 river km, mark, on both banks at the Tiszaörvény ferry and also from the dead-arm at Tiszafüred. Sampling was performed on 18—19 June 1971. The samples were taken 4—5 m from the edge of the water-covered bed. 10 samples were collected from each sampling site, at 10 m intervals from one another. This means that data were obtained for 100 m stretches, on the basis of the principle of chance.

The reason why samples were taken 4—6 m in towards the middle of the river or dead-arm from the edge of the water-covered bed, was that in this way the sampling sites would not be such that they had not been covered by water weeks or months before and thus not inhabited by fauna.

On the day prior to the first sampling the Tisza began to flood, and the water level rose 40 cm.

The mud samples were taken with a semi-automatic mud-scoop. In form this was a regular cylinder; its diameter was 84 mm and its height 425 mm. The cross-sectional area was thus 55.4 cm^2.

The sampling yielded the following numbers of samples: from the Tisza at Kisköre: 20; from the Tisza at Tiszaörvény: 20 (i.e. a total of 40 samples from the Tisza); from the Kistisza: 10; and from the dead-arm at Tiszafüred: 10. Thus, a total of 60 samples were collected on the two days. After the completion of each day's collecting, these were washed through a sieve-series. The animals thereby collected were preserved in 10% formalin. The separation of the individual taxonomic groups was performed in Attila József University, Szeged.

The Chironomida species collected and determined from this area are listed in Table 1, together with the numbers of individuals.

Results and conclusions

It is striking that there were no Chironomida larvae in a significant proportion of the samples. For purposes of clarity the empty samples too have been given in the Table.

It is also clear that in comparison with the number of samples the total number of larvae is also very small: only 46. These are distributed among 11 species. Some species are found to be represented by only a single larva.

The single dominant species in the Tisza was *Polypedilum nubeculosum* MEIG. This gave 30% of the total larva population, although in the Kistisza a *Trissocladius* sp. attained 36.5%.

Because of their immaturity, they can be determined only according to genus.

The samples indicate that the larva population in the dead-arm is poorer than those in the Tisza and Kistisza. One cause of this is undoubtedly the deep mud in the dead-arm, for the oxidation processes take place only on the surface of this. The surface to a depth of 2—3 cm is brown, but at greater depths it is the steel-blue characteristic of the formation of hydrogen sulphide. It is well-known (BERCZIK 1962) that the larvae flee from the hydrogen sulphide into the higher, hydrogen sulphide-free layers; if this is impossible, they die.

There are two common species in the Tisza and the Kistisza: *Trichocladius distylus* K. and *Polypedilum nubeculosum* MEIG. Although these are species typically characteristic of standing waters, nevertheless their larvae were not found in the dead-arm. The dead-arm is characterized (though by only a single specimen) by *Chironomus halophilus* K. The same can not be said either for the species found in the Tisza, or for the majority of those found in the Kistisza. Of these latter species, in effect only three are exclusively standing-water ones:

the *Thienemanniola* species have so far been found only in springs, brooks and rivers;

some species of the *Trissocladius* genus are also known from standing waters.

The species found here, however, will without doubt be some running-water species.

The *Pseudochironomus* species live in slow-running waters and are predatory.

According to both the foreign (THIENEMANN 1944, 1945, ALBU 1966) and the Hungarian (BERCZIK 1966) literature, the other species are characteristic of standing water.

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