

The occurrence of mayfly (*Ephemeroptera*) larvae along the River Someş/Szamos¹

Noémi Szállassy

Abstract

The distribution of mayfly (*Ephemeroptera*) larvae along the river Someş was studied from its spring to its mouth. We have found 18 species belonging to 4 different families. Knowing their density the collected mayfly species can be used as indicators of the water quality. The biodiversity (calculated with Shannon-Wiener formula) reached the maximum value ($H' = 1.502$) at the first sampling point of the Someşul Mare/Nagy Szamos (6 SM1). According to the lower biodiversity of mayfly larvae the river was very polluted downstream of big cities (Beclean, Năsăud, Dej, Satu Mare).

Keywords: *Ephemeroptera*, water quality classification.

Introduction

The present paper describes the mayfly fauna of the river Someş/Szamos. The mayfly larvae are important elements of water communities, therefore they can be used as indicator organisms.

The mayfly fauna of the river Someş/Szamos had been studied only once before our investigation (Găldean 1992a, 1992b). The present paper completes the study made by Găldean, with a special regards to water quality classification.

Materials and methods

The samples were collected in August 1996 in the Someş/Szamos expedition organised by Pro Europa Liga and Tisza Klub. We had one sample point at the Someşul Rece, one at the Ilva Creek, four at the Someşul Mare and six at the United Someş. The quantitative samples were collected with benthometer from a 0,1 m² surface of various substrates from both sides and from the middle of the river. The qualitative samples were taken by tweezers from the surface of stones.

The quantitative samples were preserved in 5 % formalin, the quantitative ones in 80 % alcohol. The larvae were identified under microscope, some species with the help of buccal preparations. I used the works compiled by Ujhelyi (1959), Macan (1970) and Studemann (1992).

¹ The first name is Romanian. and the second Hungarian

The diversity of the sampling points were characterised by the Shannon-Wiener formula.

Results and discussion

In 12 sampling points we have found 18 species of 4 families. Their occurrence at different sampling sites is represented in Table. The values of biodiversity are shown together with the number of individuals (Figure 1.).

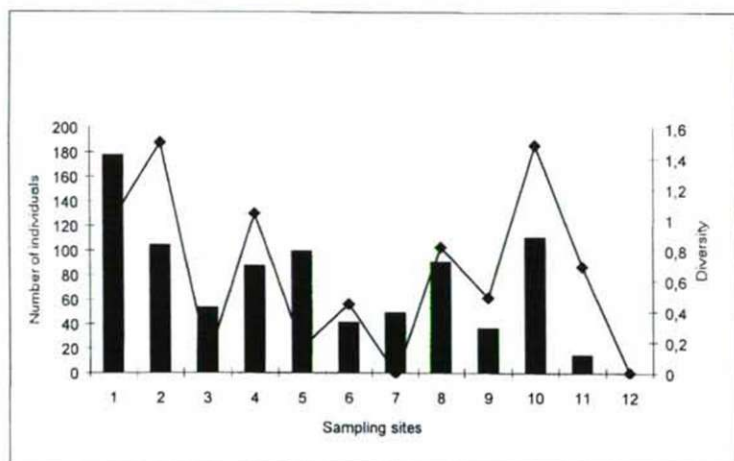


Figure 1. Values of biodiversity (line) and number of individuals (bars) of mayflies larvae along River Someş/Szamos

On the Someşul Rece (SR) we found rheophilic species characteristic to rithron that adapted themselves to the presence of materials arising from erosion (Găldean, 1992). The presence of *R. semicolorata* and *Ecdyonuridae* species refer to oligosaprobic water of first-class quality.

The greatest biodiversity ($HS = 1,502$) was found at the first sampling sites of the Someşul Mare (6 SM1) which indicates a natural state. Here the substrate consisted of different middle sized plate stones.

Near Năsăud (8 SM3) the water is polluted by organic matters coming from a textile factory. Here we observed *Baetis* larvae and caddisflies, these being better survivors in polluted area.

After Beclean (9 SM4) at the inflow of wastewater *Sphaerotilus natans* appears in great masses. Upstream the inflow where the stones are covered densely with algae we could find larvae of caddisflies, Chironomidae and leech, and we identified *B. rhodani* and *C. macrura* mayfly species. At this point the water is beta-mesosaprobic. After the inflow of wastewater the mayfly larvae disappeared completely from the river.

At the United Someş the stony and sandy sections are mosaic-like, thus a characteristic patch-like biocoenosis forms (Gáldean, 1992).

At Letca (10 SU2) at the bottom of the river showing a very strong pollution we found only *B. rhodani*.

At Someş Odorhei (11 SU3) as a result of natural purification processes the biodiversity grows to a certain extent (HS = 0,82). The stones were covered by biotecton and at the substrate there was a great density of *Trichoptera* and *Oligochaeta*.

Upstream Țicău (14 SU4) we identified two mayfly species. Here the riverbed is wide and the substrate is covered by black residua.

At Sălsig (12 SU5) the mayfly larvae appeared again in great masses. On a slow flowing section we found mayfly larvae belonging to *Heptageniidae* which are sensitive to pollution and *Bryozoa*. The majority of shells and snails found here were dead. It is caused by the waves being rich in organic and toxic materials.

Upstream Satu Mare (15 SU 8) the substrate is sandy and stony, with detritus agglomerations in some places. Here we did not find mayfly larvae at all.

As a conclusion we draw the followings: the Someş presents an interesting image because of its biotop diversity and because of changes of degraded and regenerated sections. In some places we found *Baetidae* and *Canidae* populations. Only one of the following species could be observed: *T. belgica*, *Habroleptoides carpatica*, *Habrophlebia fusca*. As the river is full of organic matters the sensitive *Heptageniidae* species (*Rhitrogena*, *Ecdyonuridae*) gradually disappear from the river. The *Heptagenia flava*, *H. fuscogrisea* and *H. coerulans* species appear again at the lower sections, although the water is full again of organic matters. This proves the beginning of a natural purification process on certain parts of the river.

Acknowledgement

I am grateful to dr. Endre Sárkány-Kiss, who made possible my participation in the expedition, to Kinga Kocsis for helping in the determination of larvae, to Zoltán D. Szabó for data processing and to dr. György Dévai, who made comments to the manuscript.

References

- GÁLDEAN N. (1992a): Biological division of the Someş river into zones according to mayflies fauna.-Trav. Mus. Hist. Nat. "Grigore Antipa" 34,: 435-454
- GÁLDEAN N. (1992b): Utilisation of mayflies (*Insecta, Ephemeroptera*) for dividing some Romanian running waters into zones.- Trav. Mus. Hist. Nat. "Grigore Antipa" 32,: 399-423
- MACAN T.T. (1970): A Key to the Nymphs of British Species of Ephemeroptera with notes on their ecology-. Freshwater Biological Association. Publ. no. 20. Second Edition

STUDEMANN, D. (1992): Ephemeroptera- Fauna Insecta Helvetica 9, Société Entomologique Suisse

UJHELYI S. (1959): Ephemeroptera - Kérészek- Fauna Hungariae. V. kötet, Akadémiai Kiadó. Budapest

Noémi Szállassy
Babeş-Bolyai University
5 - 7 Clinicilor St
3400 Cluj
Romania

	SR	6 SM1	7 SM2	11	8SM3	9SM4	10SU2	11SU3	14SU4	12SU5	13SU6	15SU8
<i>Baetis muticus</i>	-	-	-	-	1	2	-	-	-	-	-	-
<i>Baetis niger</i>	-	-	-	-	1	-	-	2	-	-	-	-
<i>Baetis rhodani</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Baetis scambus</i>	46	45	52	56	96	36	49	46	7	20	-	-
<i>Baetis sp.</i>	108	3	-	9	-	-	-	13	-	1	7	-
<i>Acentrella sinatica</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Acentrella sinatica</i>	-	28	-	16	1	-	-	15	-	24	-	-
<i>Cluon rufulum</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Rhyrogena loylei</i>	-	2	-	-	-	-	-	-	-	-	-	-
<i>Rhyrogena semicolorata</i>	4	2	-	-	-	-	-	-	-	-	-	-
<i>Ecdyonurus venosus</i>	-	2	-	-	-	-	-	-	-	-	-	-
<i>Ecdyonurus sp.</i>	2	-	-	-	-	-	-	-	-	1	-	-
<i>Heptagenia coarctata</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Heptagenia flava</i>	-	-	-	-	-	-	-	-	-	44	-	-
<i>Heptagenia fuscogrisea</i>	-	-	-	-	-	-	-	-	-	1	-	-
<i>Heptagenia sp.</i>	17	-	-	-	-	-	-	-	-	-	-	-
<i>Ephemerella ignita</i>	-	18	1	-	-	-	-	-	-	-	-	-
<i>Tortesia major (belgica)</i>	-	1	-	-	-	-	-	-	-	-	-	-
<i>Caenis macrura</i>	-	-	-	5	-	3	-	14	29	20	7	-
<i>Caenis sp.</i>	-	-	-	1	-	-	-	-	-	-	-	-
<i>Paraleptophlebia cinerea</i>	-	2	-	-	-	-	-	-	-	-	-	-
<i>Hydroptilodes carpatensis</i>	-	1	-	-	-	-	-	-	-	-	-	-
<i>Hydroptilodes fuscus</i>	-	-	-	-	-	-	-	-	-	1	-	-
<i>Nr. of individuals</i>	177	104	53	87	99	41	49	90	36	110	14	-

Table 1.: Occurrence of mayfly larvae at different sample points