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## THE TRICHOPTERA (INSECTA) OF THE CSÖRGŐ BROOK IN THE MÁTRA MOUNTAINS (NORTH HUNGARY)

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**Abstract** - Larvae and imagines of Trichoptera were collected monthly at five sampling sites along the Narád and Csörgő brooks from early May to late September 2000. A description of the sampling sites is given together with the temperature, pH, conductivity, and oxygen content of the water. In total, 24 species of Trichoptera were collected and the numbers of individuals/m<sup>2</sup> for the sites are also given.

**KEY WORDS:** Trichoptera, Mátra Mts., Narád brook, Csörgő brook, Hungary

### **Izveček – MLADOLETNICE (TRICHOPTERA) POTOKA CSÖRGŐ V POGORJU MÁTRA (SEVERNA MADŽARSKA)**

Ličinke in odrasle primerke mladoletnic smo od zgodnjega maja do poznega septembra l. 2000 zbirali mesečno na petih vzorčevalnih mestih vzdolž potokov Narád in Csörgő. Opis vzorčevalnih mest vključuje temperaturo, pH, prevodnost in vsebnost kisika v vodi. Skupno smo našli 24 vrst mladoletnic, za posamezna mesta navajamo tudi število primerkov/m<sup>2</sup>.

**KLJUČNE BESEDE:** Trichoptera, pogorje Mátra, potok Narád, potok Csörgő, Madžarska

### **Introduction**

Although there are some data related to the occurrence of various species of Trichoptera in the Csörgő brook of the Mátra Mts. (Ujhelyi, 1974, Oláh, 1965, Kiss O., 1980, 1981), they are from sporadical samplings. The sources, rill sand brooks with andesite and andesite tuff as their base rock provide a habitat for the flora and

fauna with the Trichoptera as one of the benthos assemblages. So, a survey of the chemical status of water and the qualitative and quantitative study of larvae and imagines of Trichoptera seem to be important for the investigation of this area.

The larvae of Trichoptera inhabit the bottom of the brooks in a mosaic-like pattern, which is typical of the brooks of the mountains of medium height (Kiss, 1977, 1999).

### Material and methods

The Csörgő brook is situated in the Western Mátra Mts., NW of Mátraszentimre. It is formed by the confluence of three smaller brooks, which are called the Narád, Hutahelyi and Gedeon. It is of about 5.5 km in length and flows into the Kövecses brook near Mátrakeresztes. The study area is at 660-540 m a.s.l.; i.e. the difference between the heights of the first and last sampling sites is 120 m. Andesite and andesite tuff are typical of this area. The microclimate of the valley is cool and wet, typical of mountains of medium height.

The mean annual temperature is between 6°C and 8°C, the mean annual precipitation is 700-900 mm. At a farther distance from the brook beeches (*Fagus sylvatica* L.) can be found. The brook bed is lined with common alder (*Alnus glutinosa* L. Gartn.) and hornbeam (*Carpinus betulus* L.) with poor undergrowth and with fern (*Polypodium vulgare* L.) in places.

Larvae and imagines of Trichoptera were collected monthly at 5 sampling sites from early May to late September. For the quantitative study the methods of Kamler and Riedel (1960) and Macan (1958) were used (Schmera and Kiss, 2000). The temperature, pH, conductivity and oxygen content of the water, as well as the air temperature were measured when taking samples.

For the identification of larvae Hickin (1967) and Waringer and Graf (1997) were used, while the imagines were identified using Malicky (1983).

The data were evaluated using diagrams, the monthly occurrence of trichopteran species is given with reference to the larva-imaginate relationship and the mosaic-like assemblages of larvae in the brook bed. A NuCoSA cluster analysis (Fig. 1.) justifies the similarities and dissimilarities of the sampling sites.

### Results

Description of the sampling sites:

Narád brook, beyond the confluence of the three brooks, **N<sub>1</sub> sampling site**, 1600 m from the source, at 660 m a.s.l. The bottom of the brook is covered with large stones. The depth of water is between 3 cm and 5 cm. The brook flows in several branches of a width of 40-50 cm each. Water temperature is 17.9°C in August and 9.1°C in September. Conductivity ranges between 207 µS/cm and 250 µS/cm, the pH values can be considered constant; they vary from 7.5-7.8. The oxygen content, however, fluctuates to a relatively large extent; it ranges between 4.7 mg/l and 15.6 mg/l. The plant association along the banks is the hornbeam (*Carpinus betulus* L.).

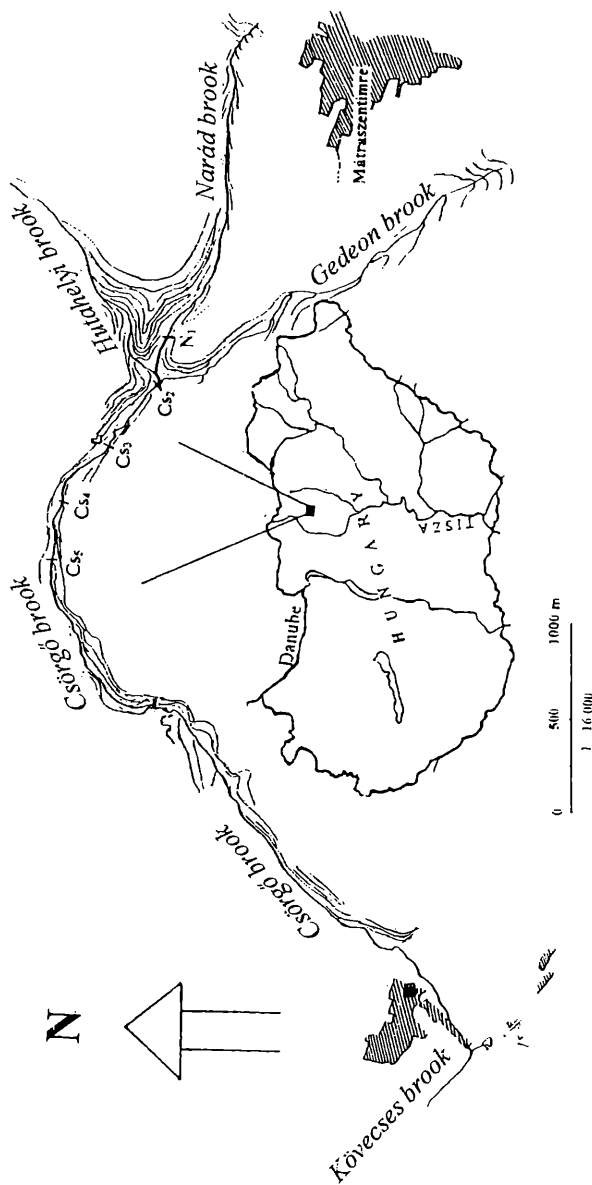


Fig. 1: Map of the study area

Csörgő brook, below the confluence of the three brooks, **Cs<sub>2</sub> sampling site**. It is 800 m away from N<sub>1</sub> sampling site, at 600 m a.s.l., where the water output is increased due to the inflow of the Hutahelyi brook from the NE and of the Gedeon brook from the SE. The maximum depth of water is 30 cm in the 'pot-holes', the width of the brook is 4-5 m. Water temperatures are similar to those at N<sub>1</sub> sampling site. The air temperature ranges between 9.1°C and 17.7°C with the lowest value in September, and the highest in August. Conductivity changes from 245-287 µS/cm. Its pH range is 7.7-7.9, which is different from that of N<sub>1</sub> sampling site. The oxygen content fluctuates between 6.35 mg/l and 12.9 mg/l. Its accompanying vegetation comprises the common alder (*Alnus glutinosa* L. Gartn.) and hornbeam (*Carpinus betulus* L.), and at a distance from the brook, the beech (*Fagus sylvatica* L.).

Csörgő brook near the ruins of the watermill, **Cs<sub>3</sub> sampling site**, 500 m from Cs<sub>2</sub> sampling site at 580 m a.s.l. Here, the brook has a main branch of 4 m in width with an average of 20 cm in depth and two branches of about 30-40 cm in width and 5-10 cm in depth each. The bottom is covered with rocks of medium size. In some higher places alder trees are found near the brook. Water temperature ranges between 9.8 and 17.8°C with minimum and maximum values in September and August, resp. The conductivity is lower, 223-268 µS/cm, its pH is 7.6 or 7.7, the oxygen content ranges between 6.6 mg/l and 12.73 mg/l. Here, the accompanying vegetation also comprises the common alder (*Alnus glutinosa* L. Gartn.) and the hornbeam (*Carpinus betulus* L.).

**Tab. 1:** The Trichoptera of the Csörgő brook, Mátra Mts. Hungary  
(A= total number of individuals, B= larva, C= cocoon, D= imagine, E= empty case)

| Species  | A  | B  | C  | D  | E |
|--|----|----|----|----|---|
| <b>RHYACOPHILIDAE</b>                          |    |    |    |    |   |
| 1 <i>Rhyacophila fasciata</i> (H., 1859.)      | 6  | 5  | 1  |    |   |
| 2 <i>Rhyacophila oblitterata</i> (McL., 1863.) | 7  | 4  | 3  |    |   |
| 3 <i>Rhyacophila tristis</i> (P., 1834.)       | 10 | 6  | 2  | 2  |   |
| <b>GLOSSOSOMATIDAE</b>                         |    |    |    |    |   |
| 4 <i>Agapetus</i> sp. (indet.)                 | 14 | 14 |    |    |   |
| 5 <i>Synagapetus</i> sp. (indet.)              | 2  |    |    |    | 2 |
| <b>PHILOPOTAMIDAE</b>                          |    |    |    |    |   |
| 6 <i>Philopotamus montanus</i> (D., 1813.)     | 51 | 31 | 10 | 10 |   |
| <b>HYDROPSYCHIDAE</b>                          |    |    |    |    |   |
| 7 <i>Hydropsyche angustipennis</i> (C., 1834.) | 17 |    |    |    |   |
| 8 <i>Hydropsyche exocellata</i> (D., 1841.)    | 8  | 8  |    |    |   |
| 9 <i>Hydropsyche fulvipes</i> (C., 1834.)      | 9  | 9  |    |    |   |
| 10 <i>Hydropsyche instabilis</i> (C., 1834.)   | 28 | 26 |    | 1  | 1 |
| 11 <i>Hydropsyche pellucidula</i> (C., 1834.)  | 1  | 1  |    |    |   |
| 12 <i>Hydropsyche</i> sp. (indet.)             | 23 | 18 | 4  |    | 1 |
| <b>POLYCENTROPODIDAE</b>                       |    |    |    |    |   |
| 13 <i>Plectrocnemia conspersa</i> (C., 1834.)  | 25 | 22 | 3  |    |   |

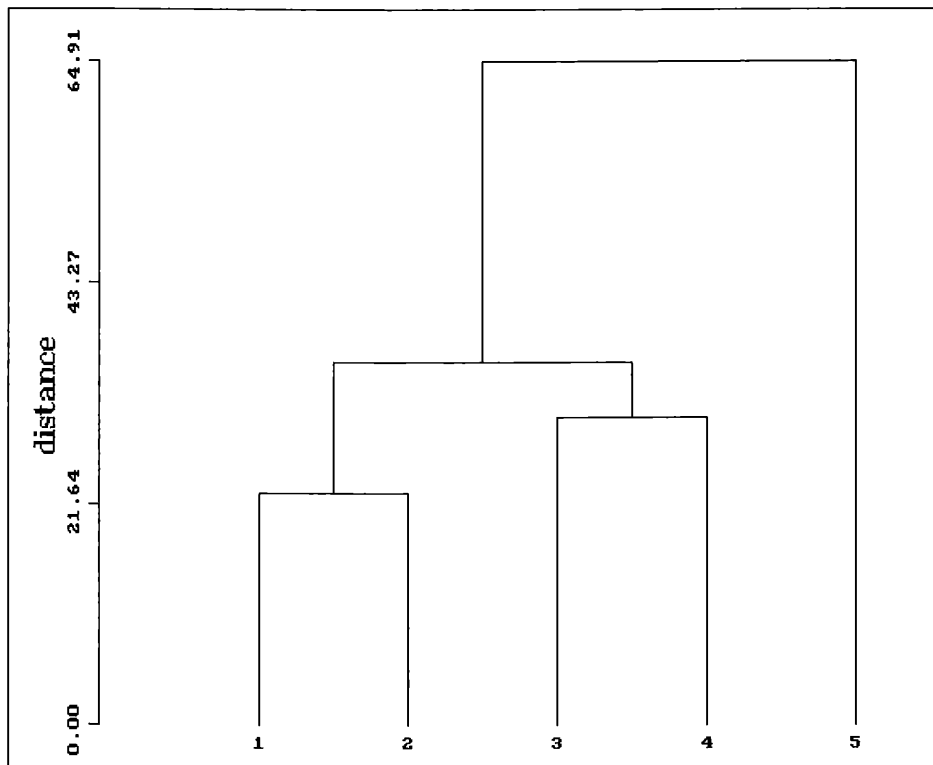
|               |   |     |     |    |       |
|---------------|---|-----|-----|----|-------|
| 14            | <i>Polycentropus flavomaculatus</i> (F., 1834.) | 1   | 1   |    |       |
|               | <b>PSYCHOMYIDAE</b>                             |     |     |    |       |
| 15            | <i>Tinodes rostocki</i> (McL., 1878.)           | 4   | 3   |    | 1     |
|               | <b>LIMNEPHILIDAE</b>                            |     |     |    |       |
| 16            | <i>Ecclisopteryx madida</i> (McL., 1867.)       | 41  | 24  |    | 1 16  |
| 17            | <i>Grammotaulius nigropunctatus</i> (R., 1783.) | 1   |     |    | 1     |
| 18            | <i>Halesus digitatus</i> (S., 1781.)            | 78  | 78  |    |       |
| 19            | <i>Limnephilus</i> sp. (indet.)                 | 2   | 2   |    |       |
| 20            | <i>Potamophylax latipennis</i> (C., 1834.)      | 24  | 21  |    | 3     |
| 21            | <i>Stenophylax permistus</i> (McL., 1895.)      | 2   |     |    | 2     |
|               | <b>SERICOSTOMATIDAE</b>                         |     |     |    |       |
| 22            | <i>Notidobia ciliaris</i> (L., 1761.)           | 2   | 1   |    | 1     |
| 23            | <i>Sericostoma personatum</i> (K. et S., 1826)  | 22  | 13  |    | 9     |
|               | <b>ODONTOCERIDAE</b>                            |     |     |    |       |
| 24            | <i>Odontocerum albicorne</i> (S., 1763.)        |     | 7   | 2  | 7     |
| <b>TOTAL:</b> |   | 377 | 294 | 30 | 16 37 |

Csörgő brook, 300 m downstream from the previous sampling site, **Cs<sub>4</sub> sampling site**, at 560 m a.s.l. Here, the brook has a main branch of 4 m in width with an average of 25 cm in depth and one branch of 1.5 m in width and 15-20 cm in depth. The bottom is covered with small stones. Water current speed is lower because of the less steep slope. Water temperature ranges between 9.3 °C and 17.8 °C. The conductivity varies between 222 µS/cm and 267 µS/cm, which are almost identical with the values for the previous sampling site. The water pH is 7.7 or 7.8, the oxygen content varies between 6.2 mg/l and 12.41 mg/l. Its plant association comprises the common alder (*Alnus glutinosa* L. Gartn.) and the hornbeam (*Carpinus betulus* L.).

Csörgő brook, 300 m downstream from the previous sampling site, **Cs<sub>5</sub> sampling site**, at 540 m a.s.l. The brook flows in a narrow valley and has only one branch of 5 m in width and 20-30 cm in depth. The bottom is covered with small stones and gravel. Water temperature is slightly higher than at the previous site; it ranges between 9.7°C and 18.2°C as minimum and maximum, resp. The water pH is 7.8, the oxygen content of water varies from 6.1-12.4 mg/l. On the banks the hornbeam (*Carpinus betulus* L.) is found, but the common alder (*Alnus glutinosa* L. Gartn.) is not present.

In general, the presence of large amounts of disintegrating material of plant origin, i.e. detritus is typical of the sampling sites. The water temperature measured monthly at the sampling sites is almost constant. The warmest month is August (23.8 °C) the coolest one is September (13 °C). Conductivity is lower at N<sub>1</sub> sampling site than at the others as it is beyond the confluence of the three brooks (Narád, Hutahelyi, and Gedeon). The water pH slightly varies (7.6-7.9), the water is slightly alkaline. The oxygen content in May is 136 %, in June and July it is 50 % and in September there is an increase in it, it is 85%.

The oxygen content of the water shows wide ranges but also identical values at the different sampling sites, and largely depends on the quantity and time of precip-



**Fig. 2:** Cluster analysis of the sampling sites along the Csörgő brook (NuCoSA 1.05)

itation prior to the measurement, on the water current speed and also on the smaller rapids and water falls. Sunlight only reaches the brook in small spots because of the shade by the deciduous trees along the brook.

### Discussion

The total number of trichopteran species collected from the Narád and Csörgő brooks is 24 (Table 1.).

N<sub>1</sub> sampling site: 14 species of Trichoptera were collected and the following species occurred in large numbers: *Halesus digitatus* (9 inds/m<sup>2</sup>), *Ecclisopteryx madida* (7 inds/m<sup>2</sup>), and *Hydropsyche instabilis* (5 inds/m<sup>2</sup>). The number of individuals/m<sup>2</sup> for the net-spinning *Hydropsyche fulvipes*, *Hydropsyche sp.* and *Plectrocnemia conspersa* varied from 1-5 inds/m<sup>2</sup>. Small numbers of individuals of *Sericostoma personatum* (2 inds/m<sup>2</sup>) were collected.

Cs<sub>2</sub> sampling site: A total of 17 species was collected here. The larvae of *Agapetus sp.*, *Halesus digitatus* and *Ecclisopteryx madida* were collected in large numbers (8, 8, and 5 inds/m<sup>2</sup>, resp.). *Sericostoma personatum*, *Halesus digitatus* and *Plectrocnemia conspersa* occurred in all four months. *Notidobia ciliaris* and *Tinodes rostocki* are to be considered rare species.

Cs<sub>3</sub> sampling site: 13 species were collected, with *Philopotamus montanus* as the most abundant species (11 inds/m<sup>2</sup>). *Halesus digitatus* and *Hydropsyche exocellata* also occurred in large numbers (7 inds/m<sup>2</sup> and 5 inds/m<sup>2</sup>, resp.). *Plectrocnemia conspersa* was collected each month. *Rhyacophila tristis* is a subalpine species.

Cs<sub>4</sub> sampling site: 14 species were collected. *Halesus digitatus*, *Philopotamus montanus* and *Potamophylax latipennis* were found in large numbers (9, 7, and 5 inds/m<sup>2</sup> resp.). *Halesus digitatus* was collected in all four months. *Hydropsyche angustipennis*, *H. exocellata*, *H. fulvipes*, *H. instabilis*, and *Hydropsyche sp.* occurred in small numbers (1 ind/m<sup>2</sup>).

Cs<sub>5</sub> sampling site: Also 14 species were collected. *Halesus digitatus* and *Potamophylax latipennis* were collected in large numbers (23 and 5 inds/m<sup>2</sup>, resp.), the latter one was found each month. From among the net-spinning species the number of individuals for *Hydropsyche fulvipes*, *H. instabilis*, *H. sp.*, *Philopotamus montanus* and *Plectrocnemia conspersa* varied between 1 ind/m<sup>2</sup> and 3 inds/m<sup>2</sup>.

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