Odonatological survey on the River Someş/Szamos[1] in Romania

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Introduction

Species richness of dragonfly fauna provide important information about the water quality of a wetland, since dragonfly nymphs can be considered as indicator organisms of natural waters sensitive to water pollution. In August 1996 an expedition was organised by the Tisza Klub of Szolnok and the Pro Europa Liga of Tărgu Mureş to get information about the ecological conditions of the Someş/Szamos. As a part of this expedition an odonatological survey was carried out in the river with the aim of revealing its dragonfly fauna and these results are summarised in this paper.

There were no literature found referring to the Odonata fauna of the Rumanian section of the river. In the Hungarian section of the Someş Ambrush et al. (1995, 1998) collected 7 species as nymphs and 7 species as adults altogether. In their papers the larval occurrence of 4 riverine dragonfly (*Gomphidae*) species is mentioned, in addition these 4 species occur together in some points of the river. Dévai et al. (1993) collected only 3 frequent species as imagoes near the Someş also in Hungary.

Keywords: Odonata, River Someş

Materials and methods

Both nymphs and adult dragonflies were collected in this expedition. Generally data come from the nymphs are very important because these prove undoubtedly which wetlands are used for reproducion. Exuvia were not found because the expedition took place in August by the time nymphs of almost all species moulted into adult.

A butterfly-net was used to catch adult dragonflies and a squared frame pond net for nymphs. The pond net could be used effectively in the lowland where the river formed fine silt and sand depositions. The animals were preserved in a 70% ethyl alcohol solution in little glass vials. Identification of species was made by using the keys and descriptions of Askew (1988), Benedek (1965), Carchini (1983), Dreyer and Franke (1987), Jödicke (1993), Laister (1991) and Steimann (1984).

The dragonfly nymphs were collected mainly from the Someş river itself and the adult insects from its surroundings. Besides nymphs and adults were also collected from a spring and from some still waters near the river and these results are also presented in this paper. The sampling stations were the following ones:

[1] The first name is Romanian, and the second Hungarian

1. Someşul Cald gorges (Ic Ponor) - 2. Someşul Cald, 2 km downstream Ic Ponor - 3. Lake Tarniţa - 4. Spring near Lake Tarniţa - 5. Someşul Rece (Blăjoaia) - 6. Someşul Rece, 10 km downstream Blăjoaia - 7. Someşul Mic (Cluj) - 8. Someşul Mic (Someşeni) - 9. Someşul Mic (Gherla) - 10. Someşul Mare (Şanţ) - 11. Lake near Someşul Mare (Şanţ) - 12. Someşul Mare (Sngeorz-Băi) - 13. Someşul Mare (Năsăud) - 14. Backwater of Someşul Mare (Salva) - 15. Someşul Mare (Piatra) - 16. Someşul Mare (Beclean) - 17. United Someş (Dej) - 18.. United Someş (Letca) - 19. United Someş (Someş-Odorhei) - 20. United Someş (Ţicău) - 21. United Someş (Sălsig) - 22. United Someş (Pomi) - 23. Channel near United Someş (Pomi) - 24. United Someş (Păuleşti) - 25. United Someş (Vetiş)

Although the expedition extended to the whole length of the river, the odonatological survey took place only in its Romanian section.

In the next chapter and in the tables I am going to refer to the sampling sites by numbers signed above.

Results and discussion

During this study 26 dragonfly species were recorded in the Romanian section of the river and in four nearby waters (4, 11, 14, 23), 16 of them as nymphs and 20 of them as imagoes.

Dragonfly nymphs were found in neither sampling site of the Someşul Cald (1-2). This is partly due to the fact that in such a fast flowing stream nymphal occurrence of at most few dragonfly species is expected. The larval growth of *Aeshna cyanea* and *Sympetrum meridionale*, which were collected as imagoes probably does not take place in the Someşul Cald but in little astatic and semistatic ponds, which were found near the river. Lake Tarniţa (3) is resulted from damming back of the Someşul Cald. The aquatic macrophytes and the marsh vegetation were very poor. The only dragonfly species collected was *Platycnemis pennipes*, besides *Aeshna cyanea* was observed. The larval growth of *Platycnemis* can take place in the lake, but *Aeshna cyanea* larvae were found in little springs with many detritus near the lake (4).

Similarly to Someşul Cald the Someşul Rece (5-6) is a fast flowing stream with bouldery substratum. Dragonfly nymphs were not found in the river itself. Indeed sampling site (6) was a little branch of the river with stagnant water and with rich aquatic vegetation (mainly with *Callitriche* spp.). Since the nymphs of adult dragonflies collected here normally grow in still waters, it is probable, that they all grow in this and in other similar branches. However the sample collected here contained the nymphs of only two *Aeshna* species.

The Someşul Cald and the Someşul Rece join in the Someşul Mic (7-9) upstream Gilău. Its flow is much slower but still with bouldery substratum. Dragonfly nymphs were not found either here but I collected 6 species as imagoes (see *Table 2.*). Reaching Cluj the river gets a large amount of communal and industrial sewage, so I could not find any dragonfly nymph downstream the town and only two frequent species were collected (*Platycnemis pennipes* and *Agrion splendens*) as imagoes but only in low number.

The upper reaches of the Someşul Mare (10) is fast flowing with bouldery substratum where dragonfly nymphs were not found. Nevertheless one of the most interesting result of the expedition was the occurrence of *Cordulegaster bidentatus* at Şanţ. Only one adult specimen was collected but I did not find its nymphs. Generally the nymphs of this species grow in such fast flowing streams, therefore its larval occurrence is expected there. The nymphs of *Aeshna cyanea* and *Agrion splendens* were collected from a little marshy branch of the river. Sampling site (11) was a little artificial pond near the Someşul Mare with silty bed and without macrovegetation where *Aeshna cyanea* larvae were very frequent. Reaching the lowland the river flows slower and slower and in some places its substratum is not bouldery but it forms fine silt depositions (at sampling site 12, 13, 15, 16). The riverine dragonfly nymphs (*Gomphidae*) could be collected very effectively in such places, but the nymphs of *Platycnemis pennipes* and *Agrion splendens* were present mainly in plant fragments hanging down into the water, especially in branches of trees. The first *Gomphid* species, namely *Onychogomphus forcipatus* appeared at Piatra in low number. Near Beclean the dragonfly nymphs were collected from a little branch of the river where after falling aquatic insects stayed behind in little ponds. In these ponds the nymphs of *Gomphus vulgatissimus*, *Agrion splendens* and *Platycnemis pennipes* were very frequent.. The river has an other branch at Beclean in the left bank, which is polluted with communal sewage flowing in it through a little channel. Dragonfly nymphs were not found in this branch but *Orthetrum cancellatum* and *O. albistylum* were collected there as imagoes.

The Someşul Mare and the Someşul Mic join in the United Someş at Dej. The United Someş (17-25, excepting 23) can be characterised by alternating occurrence of bouldery, sandy and gravely substratum. The river gets a large quantity of industrial pollution at Dej. Being sensitive to pollution the Gomphids disappeared downstream the town, although they were present at Piatra and at Beclean in the Someşul Mare. The next sampling site was Letca where *Gomphus vulgatissimus* appeared again but only in low number. It means that the water quality has improved between Dej and Letca but it was still polluted. This self-purification process probably continued between Letca and Someş-Odorhei because *Gomphus vulgatissimus* was quite frequent at the latter station and appeared other two *Gomphid* species (see *Table 1.*). 3 *Gomphid* species was found at 4 sampling sites altogether (17, 20, 22, 23) but all 4 species mentioned by Ambrush et al. (1995) was nowhere found together. *Gomphus flavipes* appeared first at Pomi and it was the most frequent *Gomphid* species at Vetiş. At Sălsig the river was relatively fast flowing with bouldery substratum where I could not find any *Gomphid* nymph. However they might also be present there because an ovipositing female *Onychogomphus forcipatus* was observed.

Beside the river some wetlands were also examined during the expedition. Sampling site (14) was a backwater of the Someşul Mare at Salva with dense macrovegetation (mainly with *Ceratophyllum demersum*). The dragonfly nymphs collected here are typical of still waters and they miss from the river (*Erythromma viridulum, Sympecma fusca, Lestes barbarus, Cordulia aenea, and Sympetrum sanguineum*). Sampling site (23) was a channel near Pomi where marsh vegetation was typical mainly with *Butomus*

umbellatus and *Iris pseudacorus*. Dragonfly species found there generally grow also in still waters (*Coenagrion puella, Lestes dryas, L. viren vestalis, Anaciaeshna isosceles, Somatochlora metallica, Libellula depressa*).

The checklist of the dragonfly nymphs and adults collected at the sampling sites is presented in Table 1. and 2.

During this short survey the nymphs of 8 dragonfly species were found in the river itself. Being a very important result of the expedition all 4 *Gomphid* species mentioned by Ambrush et al. (1995) was found in the lowland reaches of the river. Likewise the occurrence of *Cordulegaster bidentatus* at the upper Someşul Mare is a remarkable result. Ambrush et al. (1995) also mention the nymphal occurrence of *Sympetrum sanguineum* but normally this species is typical of semistatic standing waters and at most sporadically grow in rivers. The nymphs of this species were not found in the Romanian section of the river. They also caught *Gomphus flavipes*, *Anax imperator* and *Lestes dryas* as imagoes but the latter two species occur generally near still waters. On the other hand they do not mention the larval occurrence of *Orthetrum albistylum* and *Ischnura elegans* in the Hungarian section of the river. The dragonflies typical of Someş are the *Gomphids*, *Platycnemis pennipes* and *Agrion splendens* whose nymphs are frequent in some reaches of the river. In general *Orthetrum albistylum* grow in still waters and its larval occurrence can be expected in reaches where the flow speed of the water decrease almost to zero, therefore silt depositions are formed. *Ischnura elegans* normally can also be found in still waters but this species links to water-plants or plant fragments.

The results of this expedition support that the dragonfly nymphs are sensitive to water pollution, since at sampling sites the river gets a stronger pollution (Dej, Cluj) dragonfly nymphs disappeared entirely or almost entirely and at reaches downstream when water quality improved due to the self-purification of the river they gradually spread again. This is true considering both number of individuals and number of species. Therefore in the lowland reaches of the river the improvement of water quality could be very important.

The checklist of species presented in this paper cannot be considered to be complete for the river and for its surroundings. Because of phenological differences probably other species of dragonflies remain to be found both as larvae and as imagoes.

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Species	Sampling stations																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Platycnemis pennipes*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0	1	0
Coenagrion puella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Ischnura elegans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Sympecma fusca	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Agrion splendens*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0	1
Aeshna cyanea	0	0	0	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aeshna juncea	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anaciaeshna isosceles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Gomphus vulgatissimus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	0	1	1
Gomphus flavipes*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Onychogomphus forcipatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0
Ophiogomphus cecilia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Cordulia aenea	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Somatochlora metallica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Libellula depressa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Orthetrum albistylum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Total	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**2**	**1**	**4**	**0**	**1**	**5**	**2**	**2**	**5**	**4**	**4**	**4**

Table 1: Dragonfly larvae collected from the river Someş and nearby still waters

0 = absent 1 = present

Species asterisked (*) are mentioned also in literature

Species	Sampling sites																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Platycnemis pennipes*	0	0	1	0	0	0	1	1	1	0	1	1	1	1	0	1	0	1	0	0	0	0	0	0	0
Coenagrion puella	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erythromma viridulum	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Ischnura elegans*	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0
Ischnura pumilio	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Lestes dryas*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Lestes barbarus	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Lestes virens vestalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Agrion splendens*	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0
Aeshna cyanea	1	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aeshna juncea	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onychogomphus forcipatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Cordulegaster bidentatus	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Somatochlora flavomaculata	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Somatochlora metallica	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Libellula depressa	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orthetrum albistylum*	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
Orthetrum cancellatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Sympetrum sanguineum	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	0	1	0	0
Sympetrum meridionale	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Összesen	**1**	**1**	**2**	**0**	**0**	**6**	**6**	**2**	**3**	**1**	**2**	**2**	**2**	**7**	**0**	**6**	**0**	**2**	**1**	**0**	**1**	**3**	**3**	**0**	**0**

Table 2.: Adult dragonflies collected or observed near the river Someş and nearby still waters

0 = absent 1 = present

Species asterisked (*) are mentioned also in literature