

# CONTRIBUTION TO THE KNOWLEDGE OF THE CADDISFLY FAUNA (TRICHOPTERA) OF THE VÁH RIVER (THE DANUBE BASIN, SLOVAKIA)

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## ABSTRACT

Slovak caddisfly fauna is generally well-known. Nevertheless, there are still many gaps in our knowledge, especially regarding comprehensive faunistic records. For instance, a compact study investigating the longest Slovak river as a whole is missing, therefore in this study we provide results of a faunistic research focused on caddisfly adults of the Váh River. Caddisflies were swept from riparian vegetation at 29 sites along the Váh River from the Čierny Váh to the lowermost site not far from the confluence with the Danube River. Altogether, 56 caddisfly species were found including *Adicella syriaca* Ulmer, 1907 (Leptoceridae) (a new species recorded in Slovakia recently); *Hydroptila lotensis* Mosely, 1930 (Hydroptilidae); and *Agapetus laniger* (Pictet, 1843) (Glossosomatidae), a relatively rare species of Slovak caddisfly fauna. These and other records of caddisflies from the Váh River are presented and briefly discussed.

## KEYWORDS

faunistics, Danube tributary, Carpathians, Pannonian lowland

## INTRODUCTION

Slovak Trichoptera fauna was summarized in the checklist by CHVOJKA & NOVÁK (2001) with total number of 218 species. The list was extended by LUKÁŠ (2004), LUKÁŠ & CHVOJKA (2011), OLÁH et al. (2015), CHVOJKA et al. (2016), and NAVARA et al. (2020), thus currently 233 species are known from Slovakia. The aim of this paper is to provide additional information on the Trichoptera fauna of the Váh River. It is the longest Slovak river (403 km) with the catchment area of 19,696 km<sup>2</sup>. It emerges at the confluence of the Čierny Váh and the Biely Váh at Kráľova Lehota (northern Slovakia, 664 m a.s.l.) and it flows into the Danube River at Komárno (southern Slovakia, 106.5 m a.s.l.) (ŠKODA et al. 2005). According to the ecosystem classification (ILLIES 1967, 1978) the river passes through Carpathians in central Slovakia, and Pannonia (Hungarian lowlands) in western Slovakia. The first records about the benthic macroinvertebrates of the Váh River were provided by PAZSICZKY (1914) and later by FEKETE (1926), but these data originate only from the middle stretch of the river. Most of later studies were focused on benthic macroinvertebrates of the upper stretch (KRNO 1987, KRNO et al. 1993, KRNO 2000, NOVIKMEC et al. 2013). Macroinvertebrate assemblages of the Čierny Váh

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River were also studied regarding the effect of a pumped storage hydropower plant (KOKAVEC et al. 2017). BULÁNKOVÁ et al. (1996) examined macroinvertebrates of the river section above Žilina prior to construction of a dam. The benthic fauna of the Slovak part of the Danube River and its left tributaries including the Váh was studied by ELEXOVÁ (1998). Later, longitudinal distribution of caddisfly larvae (NAVARA 2017) and non-insect macroinvertebrates (KOKAVEC et al. 2018) was examined. Several sites of the Váh River were also involved in the Biological monitoring programme of the Slovak waters (MIŠÍKOVÁ ELEXOVÁ et al. 2010, MIŠÍKOVÁ ELEXOVÁ et al. 2015).

#### **MATERIAL AND METHODS**

Adults of caddisflies were collected by sweeping riparian vegetation at 29 sites along the longitudinal profile of the Váh River from its left branch the Čierny Váh River downstream to the lowermost site 30 km above the confluence with the Danube River (Fig. 1). Investigations were carried out since 2012, only for the site no. 18 (Trenčín) we used also older data (2002 – 2007) collected by J. Lukáš (see also BIMBOVÁ 2008). Collected specimens captured were preserved in 75% ethanol and identified according to MALICKY (2004).

#### **List of sites with collecting dates:**

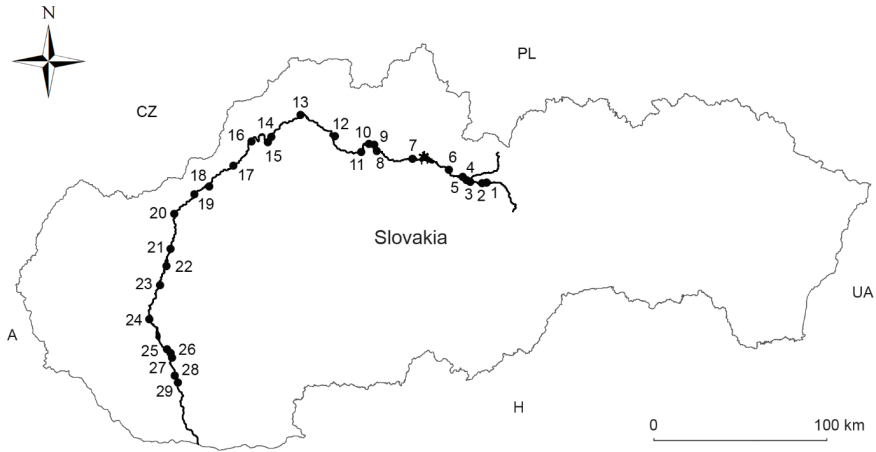
##### **Sites at the Čierny Váh River (tributary of the Váh River)**

- 1. The Čierny Váh** above the pumped storage hydropower plant, 49°0'54" N 19°56'27" E, 746 m a.s.l. (grid square of the Databank of the Slovak fauna - DFS 6985d), 1.viii.2012, 11.ix.2014
- 2. The Čierny Váh** below the pumped storage hydropower plant, 49°0'31" N 19°54'13" E, 730 m a.s.l. (DFS 6985c), 1.viii.2012, 11.ix.2014, 11.xi.2014
- 3. The Čierny Váh** at Kráľova Lehota, 49°0'54" N 19°48'41" E, 671 m a.s.l. (DFS 6984d), 2.x.2012, 12.x.2014, 12.xi.2014
- 4. The confluence of the Biely Váh and Čierny Váh Rivers**, 49°1'8" N 19°48'33" E, 668 m a.s.l. (DFS 6984d), 7.vi.2012

##### **Sites at the Váh River**

- 5. Červený Kút** 3 km below the confluence of Biely Váh and Čierny Váh, 49°2'4" N 19°46'50" E, 659 m a.s.l. (DFS 6984d), 1.viii.2012
- 6. Podtureň**, 49°3'24" N 19°41'27" E, 612 m a.s.l. (DFS 6984a), 19.ix.2015
- 7. Bešeňová**, 49°5'54" N 19°25'55" E, 510 m a.s.l. (DFS 6982b), 16.v.2016
- 8. Hubová**, 49°7'15" N 19°11'19" E, 448 m a.s.l. (DFS 6881c), 16.viii.2015, 16.v.2016
- 9. Stankovany**, 49°8'42" N 19°10'11" E, 437 m a.s.l. (DFS 6881c), 3.x.2012
- 10. Kralovany**, below the confluence with the Orava River, 49°9'1" N 19°8'16" E, 429 m a.s.l. (DFS 6880 b), 8.vi.2012, 26.viii.2015, 17.v.2016
- 11. Nolčovo**, 49°6'42" N 19°4'45" E, 410 m a.s.l. (DFS 6880c), 26.viii.2015
- 12. Domašinsky meander**, 49°10'27" N 18°53'46" E, 368 m a.s.l. (DFS 6879a), 8.vi.2012, 28.viii.2015, 17.v.2016, 17.vi.2019

13. **Horný Hričov**, 49°15'32" N 18°39'28" E, 314 m a.s.l. (DFS 6777b), 26.viii.2015, 17.v.2016
14. **Považská Teplá**, 49°8'39" N 18°27'51" E, 284 m a.s.l. (DFS 6876d), 28.vii.2015, 17.v.2016
15. **Považská Bystrica**, 49°7'28" N 18°26'14" E, 281 m a.s.l. (DFS 6876d), 7.v.2012, 31.vii.2012
16. **Púchov**, 49°7'27" N 18°19'58" E, 263 m a.s.l. (DFS 6875d), 26.vi.2014, 6.vii.2014
17. **Pruské**, 49°0'12" N 18°13'16" E, 233 m a.s.l. (DFS 6975c), 7.v.2012, 17.v.2016
18. **Trenčín**, 48°54'05" N 18°04'16" E, 209 m a.s.l. (DFS 7074c), 19.ix.2002, 21.vii.2005, 11.viii.2005, 5.ix.2005, 14.ix.2005, 15.x.2005, 25.v.2007, 21.vii.2007, 9.viii.2019
19. **Opatovce**, 48°51'39" N 17°58'33" E, 197 m a.s.l. (DFS 7173b), 18.v.2016, 31.vii.2019
20. **Nové Mesto nad Váhom**, 48°46'13" N 17°51'15" E, 184 m a.s.l. (DFS 7273a), 31.vii.2012, 31.vii.2015, 14.viii.2015, 31.vii.2019, 11.viii.2019
21. **Piešťany**, 48°36'48" N 17°50'44" E, 163 m a.s.l. (DFS 7373c), 24.vii.2015, 5.viii.2015, 18.v.2016, 23.vii.2019, 24.vii.2019
22. **Sokolovce**, 48°31'51" N 17°49'50" E, 151 m a.s.l. (DFS 7472d), 2.x.2015, 18.v.2016
23. **Hlohovec**, 48°26'40" N 17°47'41" E, 141 m a.s.l. (DFS 7572d), 31.vii.2012, 23.vii.2015, 31.vii.2019
24. **Sereď**, 48°17'17" N 17°44'58" E, 128 m a.s.l. (DFS 7772a), 30.vii.2015, 2.x.2015, 18.v.2016
25. **Šaľa**, 48°9'37" N 17°52'43" E, 116 m a.s.l. (DFS 7873a), 8.v.2012, 30.vii.2015
26. **Trnovec nad Váhom**, 48°8'36" N 17°54'33" E, 114 m a.s.l. (DFS 7873c), 30.vii.2015, 14.ix.2015
27. **Hetmėň**, 48°7'35" N 17°55'8" E, 113 m a.s.l. (DFS 7873d), 9.v.2012
28. **Vlčany**, side arm, 48°2'15" N 17°57'25" E, 112 m a.s.l. (DFS 7973d), 30.vii.2015, 3.ix.2015
29. **Neded**, 48°0'55" N 17°58'31" E, 112 m a.s.l. (DFS 7973d), 30.vii.2015, 3.ix.2015



**Figure 1.** The map of the Váh River with the sampling sites 1 – 29.

## RESULTS

In total, out of 2,005 adults collected, 56 Trichoptera species were recorded at the Váh River and its left branch the Čierny Váh (Tab. 1). The most abundant (34.5%) was the species *Psychomyia pusilla* with 692 specimens. It was followed by *Polycentropus flavomaculatus*, *Agapetus laniger*, *Hydropsyche angustipennis*, *Ecnomus tenellus*, and *Mystacides nigra*, but they were several times less abundant.

Occurrence of the following species is interesting from the faunistic point of view:

*Agapetus laniger* (Pictet, 1834) (Glossosomatidae)

Piešťany, site no. 21, 23.-24.vii.2019, 22 ♂, 12 ♀; Hlohovec, site no. 23, 23.vii.2015, 1 ♀; Sereď, site no. 24, 30.vii.2015, 42 ♂, 23 ♀; all T. Navara leg. et coll., T. Navara et P. Chvojka det.

*Hydroptila lotensis* Mosely, 1930 (Hydroptilidae)

Trenčín, site no. 18, 15.x.2005, 3 ♂; J. Lukáš leg. et coll., P. Chvojka det.; Nové Mesto nad Váhom, site no. 20, 14.viii.2015, 1 ♂; T. Navara leg. et coll., T. Navara et P. Chvojka det.

*Hydropsyche exocellata* Dufour, 1841 (Hydropsychidae)

Trenčín, site no. 18, 21.vii.2005, 1 ♂, 11.viii.2005, 4 ♂, 5.ix.2005, 1 ♂, 15.x.2005, 2 ♂; all J. Lukáš leg. et coll., P. Chvojka det.; Považská Teplá, site no. 14, 28.vii.2015, 1 ♂; Považská Bystrica, site no. 15, 31.vii.2012, 2 ♂; Opatovce, site no. 19, 31.vii.2019, 3 ♂; Piešťany, site no. 21, 5.viii.2015, 2 ♂, 23.vii.2019, 31 ♂; Sokolovce, site no. 22, 26.viii.2015, 2 ♂; Hlohovec, site no. 23, 23.vii.2015, 2 ♂, 31.vii.2019, 1 ♂; all T. Navara leg. et coll., T. Navara et P. Chvojka det.

*Adicella syriaca* Ulmer, 1907 (Leptoceridae)

Nové Mesto nad Váhom, site no. 20, 14.viii.2015, 2 ♂, 1 ♀; Piešťany, site no. 21, 5.viii.2015, 2 ♀; Hlohovec, site no. 23, 23.vii.2015, 1 ♂, 2 ♀; all T. Navara leg. et coll., T. Navara et P. Chvojka det.; Nové Mesto nad Váhom, site no. 20, 11.viii.2019, 1 ♂; J. Cibik leg. et coll., T. Navara det.

**Table 1.** The list of Trichoptera species collected along the Váh River at sites 1 – 29 (see Material and methods) (with particular numbers of specimens in parentheses) and total numbers of specimens.

| Species  | Site (number of specimens)   | Total |
|--|--|-------|
| <b>Rhyacophilidae</b>                            |  |       |
| <i>Rhyacophila nubila</i> (Zetterstedt, 1840)    | 1.(1), 3.(3), 5.(3), 8.(2), 12.(3), 18.(3)   | 15    |
| <i>Rhyacophila obliterated</i> McLachlan, 1863   | 1.(3), 3.(1)   | 4     |
| <b>Glossosomatidae</b>                           |  |       |
| <i>Agapetus laniger</i> (Pictet, 1834)           | 21.(34), 23.(1), 24. (65)  | 100   |
| <i>Agapetus ochripes</i> Curtis, 1834            | 8.(1), 10(8), 12.(6)   | 15    |
| <i>Glossosoma boltoni</i> Curtis, 1834           | 10.(1)   | 1     |
| <i>Glossosoma conformis</i> Neboiss, 1963        | 5.(1)  | 1     |
| <b>Hydroptilidae</b>                             |  |       |
| <i>Hydroptila angulata</i> Mosely, 1922          | 11.(3), 18.(2), 21.(3)   | 8     |
| <i>Hydroptila forcipata</i> (Eaton, 1873)        | 10.(1), 12.(2), 18.(5), 20.(1), 23.(1)   | 10    |
| <i>Hydroptila lotensis</i> Mosely, 1930          | 18.(4), 20.(1)   | 5     |
| <i>Hydroptila sparsa</i> Curtis, 1834            | 18.(6), 20.(6), 21.(3), 22.(2)   | 17    |
| <i>Hydroptila sparsa</i> -group (females)        | 11.(2), 18.(19), 20.(8), 21.(19), 23.(1), 26.(1)                                     | 50    |
| <i>Hydroptila vectis</i> Curtis, 1834            | 18.(33)  | 33    |
| <i>Orthotrichia costalis</i> (Curtis, 1834)      | 16.(1), 18.(2), 28.(1)   | 4     |
| <b>Hydropsychidae</b>                            |  |       |
| <i>Cheumatopsyche lepida</i> (Pictet, 1834)      | 12.(1), 18.(2), 20.(13), 21.(3)  | 19    |
| <i>Hydropsyche angustipennis</i> (Curtis, 1834)  | 13.(12), 14.(6), 15.(8), 16.(15), 17.(1), 18.(18), 19.(2), 20.(1), 22.(34), 23.(1)   | 98    |
| <i>Hydropsyche bulbifera</i> McLachlan, 1878     | 11. (4), 14.(4), 15. (26), 17. (5), 18. (14), 21.(1)                                 | 54    |
| <i>Hydropsyche bulgaromanorum</i> Malicky, 1977  | 25.(2)   | 2     |
| <i>Hydropsyche contubernalis</i> McLachlan, 1865 | 18.(1), 19.(1), 20.(1), 21.(3), 23.(4)   | 10    |
| <i>Hydropsyche exocellata</i> Dufour, 1841       | 14.(1), 15.(2), 18.(8), 19.(3), 21.(33), 22.(2), 23.(3)                              | 52    |
| <i>Hydropsyche incognita</i> Pitsch, 1993        | 12.(4), 17.(1), 21.(1)   | 6     |
| <i>Hydropsyche</i> spp. (females)                | 2.(1), 5.(1), 8.(2), 10.(1), 11.(2), 14.(14), 15.(8), 17.(1), 18.(9), 23.(7), 24.(3) | 49    |
| <b>Polycentropodidae</b>                         |  |       |
| <i>Cyrnus trimaculatus</i> (Curtis, 1834)        | 12.(1), 16.(25), 18.(21), 20.(4), 21.(14)  | 65    |
| <i>Neureclipsis bimaculata</i> (Linnaeus, 1758)  | 16.(7), 18.(4), 20.(1), 21.(1), 22.(1), 23.(5), 29.(2)                               | 21    |

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| Species  | Site (number of specimens)   | Total |
|--|--|-------|
| <i>Polycentropus flavomaculatus</i> (Pictet, 1834) | 2.(1), 5.(1), 10.(1), 11.(2), 12.(14), 14.(2), 15.(15),<br>18.(55), 20.(2), 21.(10), 22.(1)  | 104   |
| <b>Psychomiidae</b>                                |  |       |
| <i>Lype phaeopa</i> (Stephens, 1836)               | 18.(3), 20.(1), 29.(8)   | 12    |
| <i>Psychomyia pusilla</i> (Fabricius, 1781)        | 2.(12), 8.(1), 10.(16), 11.(83), 12.(83), 13.(12),<br>14.(7), 15.(22), 16.(5), 17.(2), 18.(49), 19.(30),<br>20.(24), 21.(87), 22.(4), 23.(126), 24.(145) | 692   |
| <i>Tinodes waeneri</i> (Linnaeus, 1758)            | 16.(52), 18.(2), 21.(1)  | 55    |
| <b>Ecnomidae</b>                                   |  |       |
| <i>Ecnomus tenellus</i> (Rambur, 1842)             | 16.(59), 18.(1), 20.(3), 21.(8), 23.(2), 25.(12), 26.(4)   | 89    |
| <b>Brachycentridae</b>                             |  |       |
| <i>Brachycentrus maculatus</i> (Fourcroy, 1785)    | 12.(1)   | 1     |
| <i>Brachycentrus subnubilus</i> Curtis, 1834       | 7.(27), 8.(6), 10.(1)  | 34    |
| <i>Micrasema minimum</i> McLachlan, 1876           | 4.(3), 12.(1)  | 4     |
| <i>Micrasema setiferum</i> (Pictet, 1834)          | 8.(3), 10.(16), 12.(1)   | 20    |
| <b>Linnephilidae</b>                               |  |       |
| <i>Allogamus auricollis</i> (Pictet, 1834)         | 2.(13), 3.(6), 5.(4), 6.(1)  | 24    |
| <i>Allogamus uncatus</i> (Brauer, 1857)            | 2.(1)  | 1     |
| <i>Anabolia furcata</i> Brauer, 1857               | 2.(5), 15.(2), 18.(2)  | 9     |
| <i>Annitella thuringica</i> (Ulmer, 1909)          | 2.(6), 3.(4)   | 10    |
| <i>Chaetopteryx fusca</i> Brauer, 1857             | 2.(15), 18.(5)   | 20    |
| <i>Halesus radiatus</i> (Curtis, 1834)             | 9.(1)  | 1     |
| <b>Goeridae</b>                                    |  |       |
| <i>Goera pilosa</i> (Fabricius, 1775)              | 12.(1), 13.(1), 18.(2), 19.(7), 20.(4), 21.(1), 25.(12),<br>27.(2)   | 30    |
| <i>Silo pallipes</i> (Fabricius, 1781)             | 1.(1)  | 1     |
| <i>Silo piceus</i> (Brauer, 1857)                  | 12.(2)   | 2     |
| <b>Lepidostomatidae</b>                            |  |       |
| <i>Lepidostoma basale</i> (Kolenati, 1848)         | 12.(1)   | 1     |
| <b>Leptoceridae</b>                                |  |       |
| <i>Adicella syriaca</i> Ulmer, 1907                | 20.(4), 21.(2), 23.(3)   | 9     |
| <i>Athripsodes albifrons</i> (Linnaeus, 1758)      | 8.(2), 10.(3)  | 5     |
| <i>Athripsodes aterrimus</i> (Stephens, 1836)      | 16.(2)   | 2     |
| <i>Athripsodes bilineatus</i> (Linnaeus, 1758)     | 18.(2)   | 2     |
| <i>Athripsodes cinereus</i> (Curtis, 1834)         | 12.(1), 16.(7), 18.(10), 20.(4), 25.(4)  | 26    |

| Species  | Site (number of specimens)   | Total |
|--|--|-------|
| <i>Ceraclea annulicornis</i> (Stephens, 1836)  | 18.(1), 21.(6)   | 7     |
| <i>Ceraclea dissimilis</i> (Stephens, 1836)    | 16.(1), 18.(27), 21.(5), 23.(2), 25.(3), 26.(1)                              | 39    |
| <i>Mystacides azurea</i> (Linnaeus, 1761)      | 11.(1), 12.(2), 16.(19), 18.(7), 23.(1)                                      | 30    |
| <i>Mystacides longicornis</i> (Linnaeus, 1758) | 16.(19)  | 19    |
| <i>Mystacides nigra</i> (Linnaeus, 1758)       | 14.(1), 16.(2), 18.(24), 19.(1), 20.(1), 21.(6), 23.(1),<br>25.(21), 26.(22) | 79    |
| <i>Oecetis lacustris</i> (Pictet, 1834)        | 16.(1)   | 1     |
| <i>Oecetis notata</i> (Rambur, 1848)           | 18.(14), 20.(9), 21.(2), 23.(6)  | 31    |
| <i>Oecetis ochracea</i> (Curtis, 1825)         | 18.(2)   | 2     |
| <i>Oecetis tripunctata</i> (Fabricius, 1793)   | 18.(1), 23.(1)   | 2     |
| Sericostomatidae                               |  |       |
| <i>Oecismus monedula</i> (Hagen, 1859)         | 12.(1)   | 1     |
| Odontoceridae                                  |  |       |
| <i>Odontocerum albicorne</i> (Scopoli, 1763)   | 5.(1)  | 1     |

## DISCUSSION

During our examination we collected and identified 56 Trichoptera species from the Váh River, but comparing these results with larval data (NAVARA 2017), the number of species rises up to 80. The number is relatively high, since the river is heavily impacted by human activities (hydromorphological degradation due to channelization and dam construction; industrial and urban pollution) and by presence of invasive species such as the genus *Dikerogammarus* (KOKAVEC et al. 2018), which can have a negative effect on biocoenoses (MACNEIL et al. 2013). Remarks to faunistically notable species are provided below.

*Agapetus laniger* is a rheophilous stenotopic species (USSEGLIO-POLATERA & BOURNAUD 1989), typical for hyporhithral and epipotamal, widely distributed in southern, western, and central Europe and Asia Minor (GRAF et al. 2008, NEU et al. 2018). Its findings are rather rare in Slovakia. It was found in the Rimava River in Sobôtka during the biological monitoring of the Slovak surface waters (MIŠÍKOVÁ ELEXOVÁ et al. 2010). A larger population is known from the Danube floodplain (KRNO et al. 2018; NAVARA et al. 2019). Besides the recent finding of large populations at Sereď and Piešťany towns (2015 and 2019, respectively), another similarly large population was found at the lower course of the Hron River (Psiare village and sites downstream to Turá village) recently. In both rivers, the species was recorded for the first time (NAVARA et al. 2019). Comprehensive information about the distribution of this species in Slovakia was provided by NAVARA et al. (2019).

*Hydroptila lotensis* is widely distributed in Europe and is also known from Turkey and Iran (NEU et al. 2018). However, its distribution in Slovakia is insufficiently

known so far, it was reported from the Orava and Turiec Rivers two decades ago (CHVOJKA & NOVÁK 2001). It occurs also along the Slovak-Hungarian part of the Danube River (UHERKOVICH & NÓGRÁDI 2001). Our records from the Váh River come from Trenčín town in 2005 (BIMBOVÁ 2008).

*Hydropsyche exocellata* was recorded in Slovakia from several rivers and streams, including the Váh River at Koplotovce village relatively recently (LUKÁŠ 2004). This species originally with western European distribution was recorded along the Slovak-Hungarian section of the Danube River at the turn of the 20<sup>th</sup> and 21<sup>st</sup> century (CHVOJKA & NOVÁK 2001, NÓGRÁDI 2001) and it spread into all its tributaries in Slovakia subsequently (LUKÁŠ 2004). According to our results, the species occurs in the Váh River from Hlohovec to Považská Teplá, which is the uppermost site of its occurrence in the Váh River. This can be supported by larval findings, although the lowermost site for larvae was in Sered; *H. exocellata* (and also *H. incognita*) larvae were amongst the most abundant species in the Váh River (NAVARA 2017), adults were collected rather rarely on riparian vegetation along the river. The species is resistant to pollution (USSEGLIO-POLATERA & BOURNAUD 1989), although it avoids extremely polluted sites (GALLARDO-MAYENCO & RUÍZ 2007).

During our research the species *Adicella syriaca* was recorded from the Slovakia for the first time. The species probably came from southern areas, and this distribution shift and its possible reasons were discussed in detail by NAVARA et al. (2020).

The performed research based on sampling of adults allowed us not only to detect the first record of *Adicella syriaca*, but also to prove the occurrence of species with insufficiently known larval stages (see WARINGER & GRAF 2011) such as *Rhyacophila nubila*, *Annitella thuringica*, *Oecetis tripunctata*, and hydroptilid species, and thus contribute to the better knowledge of the species diversity. The importance of such research is supported by the fact, that the river ecosystems are heavily impacted, and human activities are responsible for reduction of biodiversity in rivers (BOTOSANEANU 1981, MEYBECK 2003).

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#### LITERATURE

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CONTRIBUTION TO THE KNOWLEDGE OF THE CADDISFLY FAUNA (TRICHOPTERA)  
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