Investigation of caddisflies (Insecta, Trichoptera) fauna in the National Park Mavrovo (Republic of Macedonia)

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Introduction

The National park Mavrovo is the largest National Park in the Republic of Macedonia (Figs. 1-5). The protected area, that included 117km², was established in 1949, and since then the park was expended to 731 km². The National park is situated in north-west part of the Republic of Macedonia in mountain area (altitude 1200 – 2800 metres) and it includes 3 mountain systems, represented with 52 hilltops and peaks with higher of over 2000 metres. The mountain system Korab have the peak Golem Korab with 2746 metres of elevation which is the highest peak in the Macedonia. The river Radika (Fig. 5) flows through the middle of Mavrovo Nationa Park with lot of small stream and springs. Except rivers and mountain streams and springs in National park of Mavrovo is situated several lakes. Some of them are glacial. The biggest lake in National park is the Mavrovo Lake. This lake is artificial, situated in 1220 meters of elevation.

The Republic of Macedonia (official: Former Yugoslav Republic of Macedonia, Fig. 1) is located in the Western Balkans, and harbours due to its geology highly diverse hydrological biotopes (rivers, streams, springs, lakes) particularly in mountain areas (Figs. 2-5, 9c-d, 13, 15).

Figure 1. Republic of Macedonia (=Former Yugoslav Republic of Macedonia) and National Park Mavrovo.

Figure 2. The Mavrovo Lake.

Figure 3. Strem on the Lukovo polje, 1650 m asl.

Figure 4. Valley with strem, 1550 m asl., potencial location of new hidro-electric power station.

Figure 5. The Radika River, upper part, 1370 m asl.

Figure 6. Fieldtrip - UV–lamp.

Figure 7. Male genitalia *of Rhyacophila cf. obliterata.*

Figure 8. Male genitalia of *Glossosoma klotho*.

Figure 9 a-d. a – adults of *Drusus* sp. n., b – male genitalia of *Drusus* sp. n., c-d – *locus typicus* of *Drusus* sp. n., Korab Mt., 2080 m asl.

Material and Methods

Our systematic investigation of caddisflies in National park Mavrovo has started in 2008 and continues to this day. We have collected material (Fig. 6) from 15 different biotope localities: springs, streams, rivers, lakes (Figs. 2-5, 9c-d, 13, 15). The collected material is deposited in caddisflies collection on the Croatian Natural History Museum in Zagreb and in the Macedonian Museum of Natural History in Skopje (*Trichoptera collection Kučinić, Mihoci & Krpač*). Collected specimens were stored in containers with 80 and 96% EtOH, for morphological and molecular analysis, respectively.

Macrophotography was performed using a Leica Wild MZ8 stereomicroscope and Olympus SP-500 UZ digital camera, processed with computer programme Olympus Quick Photo Camera 2.2. For determination of collected specimens we used standard literature: Kumanski (1985, 1988) and Malicky (2004), Oláh & Kovács (2013, 2014), Oláh *et al.* (2013). Systematic presentation follows Morse (2015).

Figure 14. Female genitalia of *Annitella cf. triloba.*

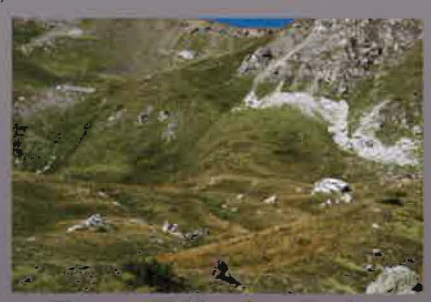

Figure 15. Fieldwork - collecting larvae on the little stream, Korab Mt 2170 m asl.

Table 1. Systematic presentation of caddisflies fauna from Mavrovo NP.

Family Rhyacophilidae
Rhyacophila armeniaca Guérin-Mene., 1834
Rhyacophila balcanica Radovanović, 1953
Rhayacophila laevis Pictet, 1834
Rhyacophila loxias Schmid, 1970
Rhyacophila mocsaryi Klapálek, 1898
Rhyacophila cf. obliterata McLachlan, 1863
Rhyacophila palmeni McLachlan, 1879
Rhyacophila tristis Pictet, 1834

Family Glossosomatidae
Glossosoma klotho Malicky, 2003
Glossosoma discophorum Klapálek, 1902
Synagapetus iridipennis McLachlan, 1879
Synagapetus slavorum Botosoneanu, 1960
Synapatepsu sp. (female)

Family Hydroptilidae
Hydroptila tineoides Dalman, 1819

Family Philopotamidae
Phylopotamus montanus (Donovan, 1813)
Wormaldia occipitalis (Pictet, 1834)

Family Polycentropodidae
Cyrnus trimaculatus (Curtis, 1834)
Plectrocnemia brevis Botosaneanu, 1960
Plectrocnemia conspersa (Curtsis, 1834)
Plectrocnemia geniculata McLachlan, 1871

Family Psychomyiidae
Psychomyia pusilla (Fabricius, 1781)
Tinodes sp. (female)

Familiy Hydropsychidae
Diplectrona atra McLachlan, 1878
Hydropsyche instabilis (Curtis, 1834)
Hydropsyche sp. (female)

Family Uenoidae
Thremma anomalum McLachlan, 1876

Family Goeridae
Silo pallipes (Fabricius, 1781)

Family Limnephilidae
Drusus biguttatus Pictet, 1834
Drusus sp. n. Kučinić, Graf & Vitecek, 2015
***Drusus botosaneanui* Kumanski, 1968**
***Drusus discolor* (Raambur, 1842)**
***Drusus plicatus* Radovanović, 1942**
***Drusus tenellus* (Klapálek, 1898)**
***Limnephilus auriculo* (Curtis, 1834)**
***Limnephilus rhombicus* (Linnaeus, 1758)**
***Limnephilus sparsus* Curtis, 1834**
Limnephilus sp. (female)
Radioclepus alp. maccdonicus Bo.&Ri., 1965
Annitella cf. triloba Marin.-Gos., 1957
Chaetopteryx stankovici Marin.-Gos.., 1966
Micropterna sequax Mclachlan, 1875
Potamophylax latipennis (Curtis, 1834)
Potamophylax lemezes Oláh & Graf, 2013
Potamophylax luctuosus Piller & Mitt., 1783
Potamophylax cf. kesken Oláh, 2012
Potamophylax pallidus (Klapálek, 1900)
Allogamus uncatus (Brauer, 1857)
Halesus digitatus (Schrank, 1781)

Family Lepidostomatidae
Lasiocephala basalis (Kolenati, 1848)

Family Leptoceridae
Mysalcides azurea (Linnaeus, 1761)

Figure 10 a-b. *Drusus plicatus*, adults (a) and male genitalia (b).

Figure 11. Male genitalia *of Potamophylax cf. kesken.*

Results and Discussion

This is the first check list of caddisflies fauna in the Mavrovo National Park which includes 48 identified species (Tab. 1, Figs. 7-12, 14). During the last 7 years we discovered in the Mavrovo National Park some new species for Macedonian fauna: *e.g. Rhyacophila laevis*, *R. palmeni*, *Glososssoma klotho* (endemic species of Grecee) (Fig. 8), *Synagapetus iridipennis*, *Synagapetus slavorum*, *Plectrocnemia geniculata*, *Drusus* sp. n. (Figs. 9a-b), *Annitella cf. triloba* (Fig. 14), *Potamophylax cf. kesken* (endemic species of Albania) (Fig. 11), *P. latinpennis*, *Lasiocephala basalis*.

The most interesting species which we collected during our investigation belong to the family Limnephilidae, genus *Drusus*, in which we found a new species from the Korab Mountain. This micro-endemic species belong to a new group of filtering carnivorous caddisflies (Figs,. From genus *Drusus* in the **National** Park Mavrovo we found six species: *Drusus* sp. n. (Figs. 9a-b), *D. biguttatus*, *D. botosaneanui*, *D. discolor*, *D. plicatus* (Fig. 10a-b) and *D. tenellus* and this presents the highest diveristy of this genus. Furthermore, a new species from the genus *Potamophylax*, *P. lemezes* (Fig. 12) was described from specimens collected in the National Park Mavrovo (Oláh *et al.* 2013). This species was found on only one locality (*locus typicus*), in the spring of the Galičnik River (Fig. 13). Also, during our investigation, a new stonefly species, ***Siphonoperla korab*** was found and described from the Korab Mt. (Graf *et al.* 2011).

According to hydrological features we estimate that 65 to 75 percent of potential Mavrovo fauna of caddisflies is established in this work. In the future we will focus on collecting caddisflies in the National Park Mavrovo in some new locations, situated especailly on large rivers (*e.g.* the Radika River).

Figure 12. Male genitalia of *Potamophylax lemezes*, endemic species in Macedonia.

13. Spring of the Galičnik River, type localities of *Potamophylax lemezes*.

Literature

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