COMPOSITION, DISTRIBUTION AND ECOLOGY OF EPHEMEROPTERA (INSECTA) IN BULGARIA

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Summary

The present work is a comprehensive study on the Ephemeroptera order in Bulgaria. A complete list of known species in systematic order is given, as well as the authors of the country's first report of the larval (la) and/or imaginal stage (i). Distribution in Bulgaria with reference to known localities is given and is illustrated with UTM-maps covered by the river network.

Ephemeroptera order is represented by 116 species belonging to 15 families, 32 genera and 21 subgenera – 56 species are known as larvae and adults, 57 - just as larvae and 3 - as imago. Seven mayflies are newly reported as imagoes (*Siphlonurus* (*S.*) *aestivalis*, *S.* (*S.*) *armatus*, *Ecdyonurus* (*E.*) *insignis*, *E.* (*H.*) *subalpinus*, *Electrogena mazedonica*, *Rhithrogena loyolaea*, *Habroleptoides confusa*), 5 species – as larva (*Ecdyonurus* (*H.*) *zelleri*, *Rhithrogena diaphana*, *Rh. iridina*, *Thraulus thraker* and *Serratella ikonomovi*), 1 species – both as larva and adult (*Ecdyonurus* (*E.*) *starmachi*).

One genus - *Serratella* Edmunds, 1959, and 3 species - *Ecdyonurus* (*E.*) *starmachi* Sowa, 1971, *Ecdyonurus* (*H.*) *zelleri* (Eaton, 1885) (Heptageniidae) and *Serratella ikonomovi* (Puthz, 1971) (Ephemerellidae) are firstly reported for the Bulgarian fauna.

The list of conservation significant mayflies is updated. The total number of endemic species is 11 (9.48% of all known), as they are divided into three categories: Balkan endemics- 6 species; regional – 3 species; local – 2 species. The relative part of rare (stenotopic) mayflies amounts to 21.55% (25 species).

An overall zoogeographical classification of the ephemeropteran fauna in Bulgaria is made. The known species are referred to 18 zoogeographical categories and 7 complexes, as Siberian and Mediterranean are widely presented, followed by Montanomediterranean and Pontic complexes. Due to the low level of endemism, the local nature of ephemeropteran fauna is less pronounced.

The distribution of mayflies in the main catchment areas of Bulgaria is analyzed. The results of the structural analysis divide the rivers in 3 groups: having rich and diverse species composition, with moderate - and low species diversity. Comparison of the species composition of the studied rivers and river valleys draws higher values of the coefficient of similarity (QS) between rivers with similar average annual discharges; with similar hydrological and hydro-morphological characteristics and/or between larger tributary systems.

The altitudinal distribution of Ephemeroptera is also analyzed. Species richness of the order increased downstream, as significantly higher it is in the areas of meta- and hyporhithral and epi- and metapotamal. Less inhabited areas are epirhithral, hypopotamal and littoral zones. Delimitation of specific ephemeropteran communities (taxocoenoses) of the particular river zones and the formation of so-called "transitional zone" between rhithral and potamal,

characterized by greater species diversity, support the concept of consecutive longitudinal communities' changes.

The correlation between the values of selected aquatic environment parameters, on one hand, and species richness (S) and the abundance (N) of mayflies, on the other, is discussed. Rare cases of statistically reliable correlations between number of individuals and environmental parameters are relevant to the microhabitat distribution. The frequency of occurrence of the species is considered to be dependent on the environment. The maximum, minimum and median values in the range of parameters for each species are also studied.

The main factors influencing the mayflies' distribution on a large scale are the altitude gradient and the related temperature regime, the oxygen content and degree of saprobity. Their distribution in the different rivers or river sections (local scale) is determined by the preferences of individual species to different types of substrate, pH, mineral and salt content of the water. Compared to the range of values of the studied parameters, mayflies are set in groups of species with wide, respectively narrow limits. Thus, the eurybionts are distinguished by stenobiont species.

Through the statistical processing of mayflies' abundance data and their occurrence in limnosaprobic zones, the complete indicator characteristics (saprobic valences, indicator weight and saprobic index) is given for 22 species, including 4 new bioindicators and 14 species - with revised saprobic valences and/or changed indicator feature towards known from the literature. The valences for the rest 4 species are confirmed. In conclusion - the mayflies with saprobic valences and indicator weights can be used in precise saprobic methods of Zelinka & Marvan' and Pantle & Buck'. The indicator species can be also successfully used in categorizing of surface water through normalized indexes (Adapted Biotic Index (BI), EPT, RETI/PETI).