

PROTECTION OF SPECIES DIVERSITY OF AQUATIC INSECTS IN THE SOUTHEASTERN PART OF BALTIC REGION

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Southeastern part of Baltic Region is characterized by comparatively good state of environment. Now, in this region called "Green Lungs of Europe", fauna of the aquatic insects is exposed to increasing anthropogenic influence. About 30% species of water insects are estimated to be threatened. Some rare and threatened species can recolonize disturbed ecosystems from neighboring regions. Various method of protection must be developing: national and landscape parks, umbrella species, key habitats. Creation of transboundary protected areas in southeastern Baltic Region will allow not only to keep an existing biological diversity, but also to organize monitoring processes of ecosystem's transformation.

Key words: aquatic insects, umbrella species, biodiversity, transboundary protected area

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Introduction

Southeastern part of the Baltic Region, including basins of the rivers Pasleka, Pregola, and Nieman, is divided into territory of four states: Poland, Belarus, Lithuania and Russia. Geologically this territory is young, and its animal population was generated only on the average Holocene, after reduction of a level of the Baltic Sea. The fauna representing a mixed complex of the European and relict postglacial elements.

Landscapes of the region are various and mosaic. A complicated history of civilization's development in the region to the present time has resulted in a relatively low population and weak degree of ecosystem's transformation. A degree of anthropogenic influence is reduced on many areas. It promotes development a secondary succession, restorations natural ecosystems and renaturalizations of fauna.

Northeastern Poland and Belarus is characterized by comparatively good state of environment, especially in comparison with countries of Western Europe. In northeastern Poland was created functional area "Green Lungs of Poland", and consistently there are suggested to create "Green Lungs of Europe" in

southeastern part of the Baltic region including areas from few countries. Geographical position and condition of environment are especially favorable for maintenance of boreal and boreal-mountains fauna. Now, in this region the fauna of aquatic insects is exposed to increasing anthropogenic influence.

Threat of insect's biodiversity

For a rating of anthropogenic transformations of a aquatic fauna it is necessary to have the information on its history and contemporary status. However degree of a fauna studying strongly varies. Aquatic insects are most full investigated in Poland, weaker in Belarus and Lithuania. For the Kaliningrad area of Russia the modern data practically are absent. It is necessary to note non-uniform study of various groups, *Trichoptera*, *Odonata*, *Heteroptera* and *Coleoptera* are recognized comparatively well, whereas *Diptera* are investigated very poor.

More than 3340 species of aquatic insects occur in Poland, the most numerous are dipterans, followed by coleopterans and trichopterans. But only for about 80%

of species the state of threat has not been recognized. Amongst the remaining 36 species are extinct, 53 are danger of extinction and 100 are rare. About 1000 species of water insects are estimated to be threatened (Czachorowski & Buczyński 2000). We think that number of treated species are more numerous, Invertebrates fauna of Belarus is recognized worse.

In both countries the most worst known are dipterans, although this insect order is the most numerous and very important for aquatic and wetlands communities. *Odonata*, *Heteroptera*, *Coleoptera*, *Trichoptera* and *Ephemeroptera* are the best recognized. Entomofauna of lowland running waters are known very poor.

Basic condition efficient protections of biodiversity is recognition of ecology each species. In Poland water entomofauna only just about 20 % species is recognized on so much well, that one can qualify approximate of melting their threats. Additionally, we have not good methodology for categorizing of threat at invertebrates.

Insects are threat by: changes in environment and insect habitat, and a little scale by catching by collectors and exploiting of insects populations during scientific investigations (Czachorowski & Buczyński 2000). So the most important way in insect protection is a protection of wetland landscapes with various water bodies. In Poland all kind of landscapes and types of water habitats occurs in national parks. But we don't know which threatened species are protected in national parks and landscapes parks.

Changes in environment's condition are dangerous for biodiversity in protected areas too. For example, in Poleski National Park (Eastern Poland) now occur 48 species of *Odonata*. Some of them are threatened, mainly species typical for peat-bogs (Buczynski 1997).

In 1996 22 National Parks, 103 Landscape parks and 1142 reserves were in Poland. Including protected landscapes total surface of protected area was 23 % of area of the country (Radziejowski 1996). Now is little more, 118 Landscape parks, 1201 reserves.

The existing river basin includes protected areas of a various rank: strict national reserves (the Białowieża Primeval Forest, Zuvintas), national parks (Białowieża National Park, Wigierski NP, Biebrzański NP, Brasławski NP), landscape parks (Suwałki, Knyszyńska Forest etc.). Logic continuation of development of system of protected areas is creation of their international network, where ecological corridors will connect the rather large protected territories. Species biodiversity of aquatic and

semiaquatic insects typical for bogs, fens, lakes and small rivers is kept the existing protected areas. However hydrobionts of large lowland rivers, such as Narew, Neman and Pregola, are investigated poorly and practically are not protected. Protection of invertebrate's biodiversity of these large rivers needs creation of transboundary protected territories.

Methods of Protection

Current laws on nature protection in Poland are grounded on experiences with protection of vertebrates and plants. This law is not useful in insect protection. Activities outside protected areas using so-called "cover species" (umbrella species) were proposed by Czachorowski et al. (2000). But we need successful protection in European scale.

Some anthropogenous water bodies can be good tools for species protection, especially outside of the protected areas. For example, post-exploitation reservoirs, gravel and clay pits are important habitats for some aquatic insects. Many threatened species live in these secondary habitats (Buczynski & Pakulnicka 2000).

Base of aquatic insect protection should be large area, embracing especially characteristic for each regions kinds of water environments. Should this be large scenery complexes, embracing wide adjacent areas minimizing results of external influences. In Poland circumstances such realize national and landscape parks. Polish net of reservations is comparatively thick, but in most of objects are little, about very limited ecological autonomy.

Moroz et al. (2000) suggested, that some little water bodies, such springs, play an important role in keeping of biodiversity. It is necessary to introduce the term "key habitat".

On Belarus, the system of protected areas is only created. Dominates idea, which for base of preservation of nature accepts areas about large surface. Precious success rolling of discussion is elaboration of system for protection of springs simultaneously environments very strongly threatened (Moroz et al. 2000).

Important element efficient protections water insects is recognition and documentary evidence of occurrence of threatened species. Such areas should obtain special status in international scale, and state of population these species should be regularly monitored. An example such area can be the peat bog Zehlau

(Kaliningrad District, Russia), where very numerous are *Dytiscus lapponicus* Gyllenhal, 1808 (in Europe greatest population, supplied documentary evidence for many years thirtieth XX), *Laccophilus variegatus* (Germar et Kaufuss, 1817), *Notonecta reuteri* Hungerford, 1928 (color variety - single place in Europe regular and very numerous occurrences), *Notonecta lutea* O.F.Müller, 1776 and other (Skwarra 1929, Biesiadka & Moroz 1996), some carabid beetles: *Chlaenius quadrisulcatus* (Paykull, 1790), *Carabus menetriesi* Hummel, 1827 live on the "Dzikoje" peat bog, near the Białowieża Primeval Forest (Aleksandrovich 1995 b), very rare in whole Europe representative from family *Cononotidae* (Coleoptera) - *Agnathus decoratus* (Germar, 1818) collected at the beach of Augustowski Channel (Aleksandrovich 1995a). Such area should determine specific element of strategy of protection water fauna. In Eastern Europe is surely many of such places. It is strong needed to recognize these areas and include to protection European systems of water.

In Janowskie Forests Landscape Park (eastern Poland) caddisfly fauna of springs and peat-bogs was poor and transformed. In Trichoptera of all water bodies (running waters, ponds, springs, peat-bogs, fens) an impoverishment is visible as result of antropogenic transformations of water habitats: ponds were created in second half of XIX age, deranges in years 60-th, drops of sewage. Gradual recolonization and renaturalization in caddisfly fauna flows probably. (Czachorowski, Buczy ski & Stryjecki 2000). The recolonization makes quickly in more dispersal invertebrates for example dragonflies. Some rare and threatened species (typical for wetlands) may recolonize from neighboring regions and ecosystems. But these refuge must occur in the region.

Fischer's (1996) biocenosis naturalness index, in modification of Czachorowski (Czachorowski & Buczyński 1999), is proposed for biomonitoring of peat-bogs. The biocenosis naturalness indexes are good tool for planning the animal protection: to chose different objects for protection of other species in a national or/and a landscape park or other protected areas in a country.

Conclusions

Certain areas protected and merited on protection are some transboundary areas. At north-east part of Poland such character have: the Romincka Forest, the Augustowska Forest and the Białowieża Forest.

From initiatives of some scientists from Belarus, Poland and Lithuania comes into being international program focused to creation of the Augustowska Forest transboundary protected area. The Augustowska Primeval Forest is located in territory of Poland, Belarus and Lithuania. Except for Middle course of the Neman River, the inclusion of average and small rivers, bogs, fens, astatic forest pools are supposed.

The Braslaw Lakeland (Latgalia) is the next possibility to create the transboundary protected area. This area included territory of Belarus, Lithuania and Latvia.

The creation of a network of protected territories in southeastern Baltic Region will allow not only to keep an existing biological diversity, but also to organize monitoring processes of ecosystem's transformation.

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