STUDIES ON THE DISTRIBUTION AND BIOMASS OF CHIRONOMIDS FROM IZVORU MUNTELUI-BICAZ RESERVOIR

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Abstract. The community structure, distribution and biomass of chironomids larvae has been examinated during the period 2006 – 2007 in Izvoru Muntelui – Bicaz rezervoir. From the total number of benthic macroinvertebrates identified in this period (28 species), 16 species were chironomids (larvae). Along with increasing of the depth, from upstream to downstream, we observed a decreasing of specific diversity as well as a decreasing of the biomass. The highest values of chironomids larvae biomass recorded for the entire period has been reached at Bistricioara site (4.9169 g.m⁻²), while the maximum number of individuals has been reached in Potoci bay (5161.29 individuals.m⁻²).

Keywords: Izvoru Muntelui – Bicaz reservoir, macrozoobenthos, Chironomidae larvae, density, biomass.

Introduction
Izvoru Muntelui – Bicaz reservoir (Fig. 1) is described as a large dimictic, oligotrophic to mesotrophic lake situated on Bistrita River, Carpathians Mountains, Romania. By time, the lake watershed area was intensely studied for a variety of limnological purposes. The analysis of the diversity of these organisms gave us an image on the evolution of this group and the effects of the alteration of the environmental conditions (especially the eutrophication). Being an important group in aquatic biocoenosis of the lentic ecosystems, these results are important to evaluate the functionality of lakes. Also, the taxonomic list is very useful in the biodiversity monitoring of Izvoru Muntelui Bicaz reservoir.

This paper aims to reveal the changes which occurred in chironomids’ communities of Izvoru Muntelui – Bicaz reservoir after more than 45 years of existence, completing the studies of Cure (1962, 1967), Miron (1983), Plavan (2005, 2007).

Material and Methods
- Period of sampling: May 2006 – June 2007
- Number of samples per site: 3 – 9
- Sampling instrument: benthic grab (modified Peterson type), with collecting area of 170.5 cm²
- Samples were processed using methods usual in this type of research
Gabriel Plăvan

- The results consisted of: taxonomical list, numerical abundance and biomass

![Sampling sites position (Google Earth).](image)

**Results and Discussion**

The species ecological analyses emphasized some relations between the presence and their abundance, and the ecological statute of the analyzed ecosystem. The information regarding the substrate preferences, the relation with the physical and chemical variables can be used to elaborate standardized systems for water quality evaluation.

The community structure, the distribution and biomass of chironomids larvae from Izvoru Muntelui – Bicaz reservoir have been examined during the period 2006 – 2007.

From the total number of benthic macroinvertebrates identified in this period (28 species), 16 species were chironomids (larvae):

- **Chironomus plumosus** (Linnaeus, 1758) (Fig. 2)  
  Collected from muddy substrate, below 20 m depth, from sampling sites: I, II, III, IV, V, VII, VIII and XII.

- **Cladotanytarsus mancus** (Walker, 1856)  
  Collected from sampling site XIII, at the entrance of Ceahlău River in the Bicaz Lake.

- **Cricotopus sylvestris** (Fabricius, 1794) (Fig. 3)  
  Species very spread in Romania. It is living in waters with a high transparency with a slow stream current. In Izvoru Muntelui – Bicaz reservoir it was collected from sampling sites: I, II and VII.
- **Cryptochironomus defectus** (Kieffer, 1913) (Fig. 4)
  Represents one of the species with a high tolerance to the low level of the oxygen in the water. Cosmopolite species, in Bicaz Lake was identified from sampling sites I, II, IV, V, VIII, IX and XI.

- **Diamesa thienemanni** (Kieffer, 1909) (Fig. 5)
  Lithorheophilous species, collected from sampling site VIII.

- **Dicrotendipes nervosus** (Staeger, 1839) (Fig. 6)
  Epiphytic and mud species collected from sampling sites: II, V and X.
- *Harnischia fuscimana* (Kieffer 1921) (Fig. 7)
  Collected from the soft sediments from sampling sites: II, IV, V, VII, VIII, IX, XII and XIII.
- *Microchironomus tener* (Kieffer 1918)
  Species spread on muddy and sandy bottom from sampling site V, with soft eutrophic conditions.
- *Micropsecta precox* (Meigen, 1818)
  Collected in cold season at sampling site XIII.

Figure 6. *Dicrotendipes nervosus* (Stæger, 1839): the mentum.

Figure 7. *Harnischia fuscimana* (Kieffer, 1921): the mentum.

Figure 8. *Monodiamesa bathyphila* (Kieffer, 1918): the mentum.

Figure 9. *Polypedilum nubeculosum* (Meigen, 1804): head capsule (ventral view).
- **Micropsectra lobatifrons** (Kieffer, 1909)
  Species collected from sampling site VII, in high transparency conditions and a soft enrichment in organic pollutants.

- **Monodiamesa bathyphila** (Kieffer, 1909) (Fig. 8)
  Prefers oligotrophic waters. Collected from sandy bottom, from upstream sampling sites: VII and XIII.

- **Paratendipes albimanus** (Meigen, 1818)
  Psamophilous species, was collected from sampling site XIII.

- **Polypedilum nubeculosum** (Meigen, 1804) (Fig. 9)
  Collected from muddy, eutrophic waters. In Izvoru Muntelui – Bicaz reservoir has been identified from sampling sites: II, III, IV, VII, IX, XII and XIII.

- **Polypedilum sp.** (Meigen, 1804)
  The larvae are living in sediments or in vegetation. In Bicaz lake was collected from sampling sites: II, III, IV, V, VII, VIII, X and XI.

- **Procladius choreus** (Meigen, 1804) (Fig. 10)
  Euritopic species, collected from muddy bottom. Resists to different environmental conditions, to a low oxygen level at water/sediment interface. Collected in all sampling sites (I – XIII).

- **Prodiamesa olivacea** (Meigen, 1818) (Fig. 11)
  Collected from upstream sampling sites: VII, XII and XIII.

- **Prodiamesa rufovittata** (Goetghebuer, 1932)
  Psamorheophilous species; identified only from sampling site XIII.

- **Tanytarsus sp.** (Linnaeus, 1758)
  Euritopic genus, with larvae living in all aquatic conditions. In Izvoru Muntelui – Bicaz reservoir it was identified at sampling site VIII.

Along with the increase of the depth, from upstream to downstream, we observed a decrease of the specific diversity as well as a decrease of the biomass.
Figure 12. Biomass comparative analysis according to site in Chironomidae larvae populations from Izvoru Muntelui – Bicaz lake.

*Procladius choreus* (Meigen, 1804) was the species with the highest abundance (1,569.89 individuals m\(^{-2}\)) while Secu bay and Potoci bay were the sites with the highest number of individuals.

The highest biomass values of chironomids larvae reported to the entire period has been reached in Bistricioara site (4.9169 g m\(^{-2}\)) (Fig. 12), while the maximum number of individuals has been reached in Potoci bay (5161.29 individuals m\(^{-2}\)).

The actual situation of the spatial distribution and structure of chironomids fauna in Izvoru Muntelui – Bicaz reservoir is not very different from the situation observed in first 5 – 6 years after the impoundment. The changes in the specific composition are not relevant because both, the species that were not recorded anymore and the newly found, presented low densities and frequencies, without an important ecological significance.

**Conclusions**

The chironomidae larvae populated the entire dam lake biotope. We observed a decrease of the specific diversity as well as a decrease of the biomass along with the increase of the depth, from upstream to downstream.

From the whole number of chironomids species (16) recorded in Izvoru Muntelui – Bicaz reservoir in the 2006 – 2007 period, only two species: *Procladius choreus* (Meigen, 1804) and *Chironomus plumosus* (Linnaeus,1758) reached a high abundance, spreading on almost all lake’s area.

The other 14 species indicated in the qualitative list are secondary forms, with an insular distribution, without signification in the benthic zoocoenosis economy.

The changes in the specific composition are not relevant because both, species that were not recorded anymore and the newly found, presented low densities and frequencies, without an important ecological significance.

**References**


