CONSIDERATION ON THE BENTHIC INVERTEBRATE FAUNA FROM THE LOTRU RIVER

CONSIDERAŢII ASUPRA FAUNEI DE NEVERTEBRATE BENTONICE A RÂULUI LOTRU

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Abstract. *The paper presents data reffering to the comparative structure of the benthic invertebrate fauna of the Lotru River in five sampling site. On the basis of relative abundancy, the dominancy of the invertebrate groups is highlighted. In particular, is analyzed the community structure of the mayflies larvae being presented the list of the taxa, ecological spectrum, relative abundance, frequency and other ecological characteristics of the mayflies fauna.*
Key words: benthic invertebrate fauna, Lotru River, mayflies

Rezumat. *Lucrarea prezintă date referitoare la structura faunei de nevertebrate bentonice a Râului Lotru în cinci staţii de cercetare. Sunt evidenţiate grupele dominante pe baza abundenţei relative din macrozoobentos. În mod particular este analizată structura comunităţilor de efemeroptere, fiind prezentată lista taxonilor, spectrul ecologic, abundenţa relativă, frecvenţa şi alte caracteristici ecologice ale faunei de efemeroptere din Râul Lotru.*
Cuvinte cheie: nevertebrate bentonice, Râul Lotru, efemeroptere

INTRODUCTION

Situated in the Meridional Carpathians, in Vâlcea county, the Lotru river has its springs in the Parâng mountains, with a length of 80 km, and flows into the Olt river, near the Brezoi village. The Lotru basin sprawls on a 1024 square kilometers area, being narrower at the end and wider in its middle part. A right tributary of the Olt river, the Lotru is a typical mountain river due to its medium altitude of the basin (1374 m) and its morphodynamic characteristics. It has a slope of 327m/km, and that is why the water has a high speed, showing the potential of some high hydraulic amount of energy (Ujvary, 1972).

The average annual debit of the Lotru river at Voineasa is of 6.55 m^3/s and at the Vidra Lake is of 15.6 m^3/s. In spring, when the snow in the higher basin is melting, the debit is of 46 m^3/s, sometimes reaching 58.3 m^3/s.

The hydroenergetic Lotru system is the most complex of its kind in Romania and is situated on the upper and middle course of the river, being formed of a chain of storage basins and hydroelectric power stations, the most important of which are: Obârşia Lotrului, Vidra, Lotru, Malaia and Brădişor

Through the research undertaken and presented in the current work we wanted to make an inventory of the important benthic invertebrate taxa from the Lotru river and to emphasize the dominant groups based on their relative abundance; the

identification of the mayfly species from the Lotru river; the determination of the water quality of the Lotru river taking into account the distribution of the mayfly species.

MATERIAL AND METHOD

In the period August 2008 – May 2009, zoobenthic samples were taken periodically in August, November and May. Five stations were established to take samples, in the area Obârşia Lotrului – Bradişor dam, specifically: Obârşia Lotrului, Upstream Vidra Dam, Downstream Vidra Dam, upstream HC Lotru and Bradişor.

On each sampling site, the benthos samples were taken using a Surber–sampler, which covered a surface of 0.16 m^2 (mesh-size: 200 µm). The stones were washed in the stream and brushed. The samples were preserved on the field in 8% formalin solution. The retained material was separated into groups by a Zeiss stereomicroscope in the Hydrobiology lab of the University of Pitesti and removed in ethanol 70%. European identifications keys were used (Elliott et al., 1988, Bauernfeind et al., 2001, Godeanu et al., 2002, Pescador et al., 2000).

RESULTS AND DISCUSSIONS

As far as the benthic invertebrate fauna is concerned, in the research period representatives from eight taxa groups were identified (fig. 1). The analysis of the resulted data reveals that the mayflies are the best represented in all the sample stations, followed by stoneflies. In the upstream stations the chironomids are dominant, especially in the samples taken in November, while the caddisflies are relatively constant in number.

In August, extremely high values for the numerical density (1128 ind./m^2, 681 respectively) and abundance (59,87%; 25,27% respectively) at the first two stations were registered, and they decreased gradually, from upstream - downstream in an inverse ratio with the midges; for the stoneflies, the distribution on stations upstream - downstream is variable, with high values at Obârşia Lotrului (312 ind./m^2) and upstream CH Lotru (252 ind./m^2), but extremely low in the other cases (minimum at Brădişor 15 ind./m^2).

The analysis of the benthic zoocenosis structure in November shows the clear dominance of the mayflies, followed by stoneflies for each station, the other groups being lowly represented. For the mayflies, the maximum number of individuals/ m^2 (728 ind./m^2) as well as the relative abundance (67,22%) are registered at Obârşia Lotrului, with a slow increase at Brădişor, but the values remain high, over 200 ind./m^2; for the stoneflies the distribution upstream-downstream is equal for all the five stations , with very close values - an average of 150 ind./m^2.

The structure of the benthic zoocenosis in May 2009 shows the general decreasing tendency of individuals/ m^2 from upstream downstream for the two groups – mayflies and stoneflies – with a slight improvement of the values at Downstream Vidra Dam, close to those at Obârşia Lotrului; we observed a surprising increase in the number of mayflies at the Brădişor station.

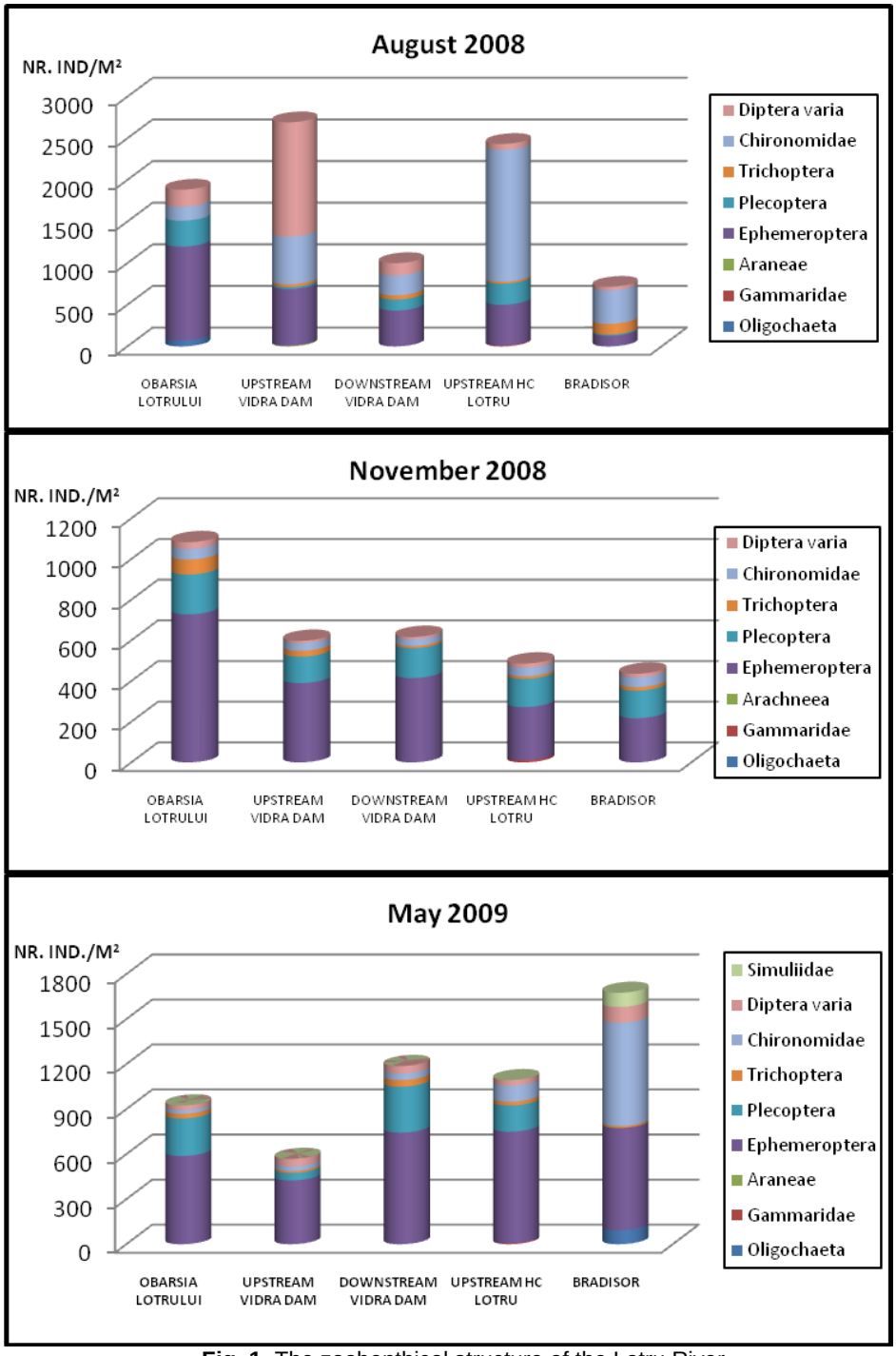

Fig. 1. The zoobenthical structure of the Lotru River

In the case of mayflies, in the samples taken we identified fourteen species from seven genera belonging to six families from all the three suborders. The monthly distribution of the mayfly species (fig. 2), reveals the following aspects:

In August 2008, eighteen species were identified, their number per station increasing progressively from Obârşia Lotrului (five species) to Upstream CH (ten species), and decreasing to six species at the Brădişor Station; the *Baëtis* genus is present at all the stations, with very high levels of density.

Baëtis alpinus reaches its maximum density at Obârşia Lotrului and Upstream Vidra Dam (767 ind./m^2, 235 ind./m^2 respectively) and it decreases gradually to values of 21 ind./ m^2 at the Upstream CH Lotru and disappears at Brădişor; *Baëtis rhodani* appears at Upstream Vidra station (146 ind./m^2) and its density increases gradually downstream up to 183 ind./m^2 at Brădişor; *Rhithrogena semicolorata* presents the highest values at the first upstream stations (354 ind./m^2, 155 ind./m^2 respectively), but it lacks at Brădişor; *Ephemerella ignita* is present at all the stations downstream of Vidra Dam, in low numerical density; the other species appear sporadically in reduced numbers.

In November 2008, it is observed that all the fourteen species are present. *Baëtis alpinus* is present at all the first three upstream stations, the highest numerical density being registered at Obârşia Lotrului (324 ind./m^2); the values decrease suddenly at Upstream Vidra Dam, Downstream Vidra Dam (24 ind./m^2). *Baëtis rhodani* appears at the Upstream Vidra station (63 ind./m^2) and the density increases progressively downstream up to 101 ind./m^2 at CH Lotru and then suddenly decreases to 24 ind./m^2 la Brădişor. For the *Rhithrogena* genus, there is a decreasing tendency from upstream downstream, the maximum numerical density being registered at Obârşia Lotrului (242 ind./m^2), the values decreasing gradually to 17 ind./m^2 at Brădişor; the *Ephemerella*, *Ephemera* and *Caenis* genera lack at the Obârşia Lotrului station, the maximum density being reached at Downstream Vidra Dam. The *Epeorus* and *Ecdyonurus* genera were identified at CH Lotru and Brădişor stations.

In May 2009, all the fourteen species were identified, their number / station increasing progressively, the maximum number of species (eight) being registered at Upstream CH; *Baëtis alpinus* has the highest density at Obârşia Lotrului and Upstream Vidra Dam (328, 235 ind./m^2, respectively), and then decreases gradually to 17 ind./ m^2 at the Brădişor station. *Baëtis rhodani* appears at the Upstream Vidra station (157 ind./m^2) and the density increases progressively downstream up to 324 ind./m^2 at Brădişor. *Rhithrogena semicolorata* registers the highest values at the Downstream Vidra Dam and CH Lotru. *Ephemerella ignita* is present at all the Upstream CH Lotru and Brădişor, in low numerical densities.

Taking into account the ecological spectrum (fig. 3) one can observe that at the upstream stations, the *Ecdyonuriidae* family is the best represented, with 57% at Obârşia Lotrului, a percentage that decreases progressively to 11% at Brădişor. The *Bäetidae* family is best represented at Brădişor, where they are dominant (45%). The other families represent less than 15% at all the stations.

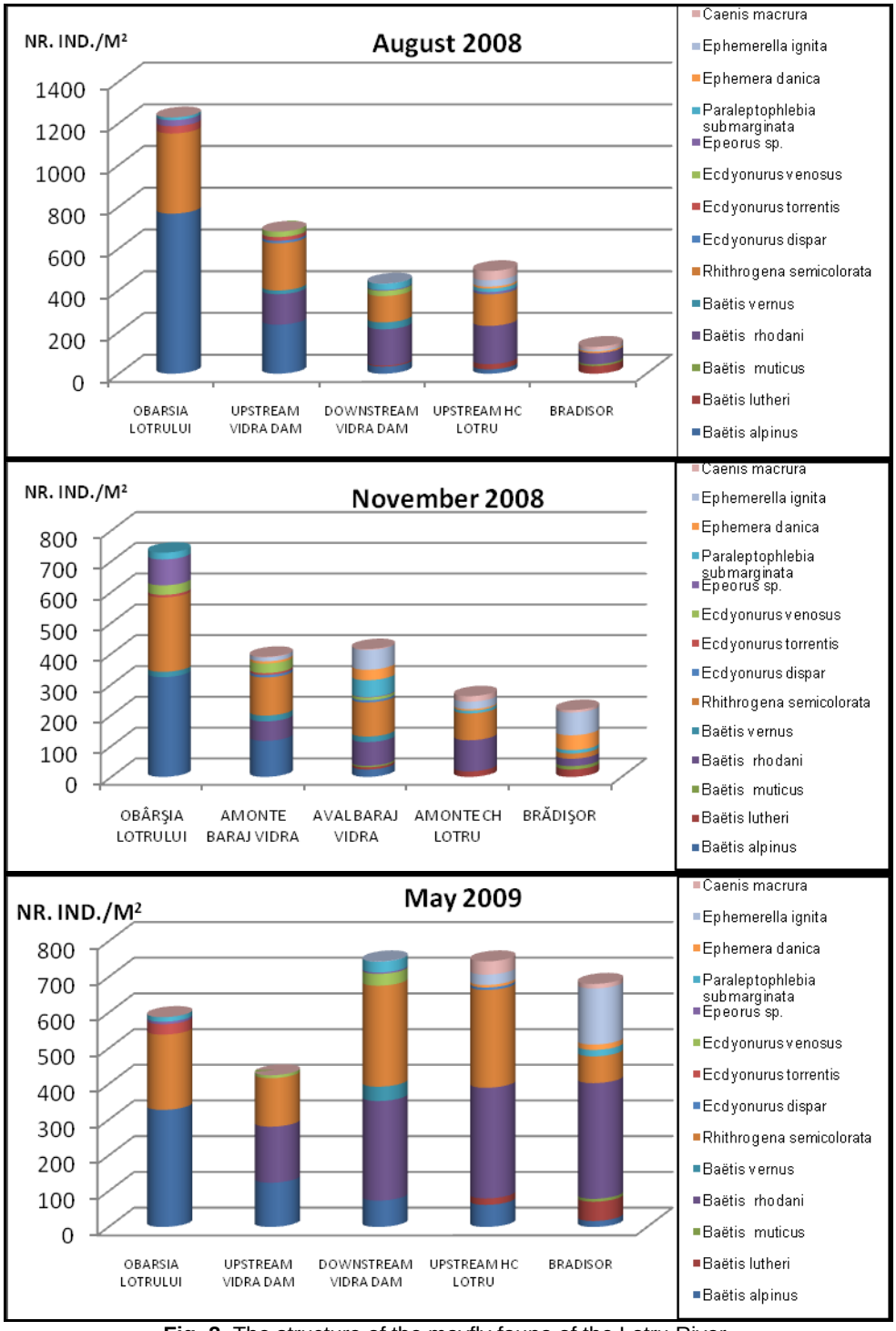

Fig. 2. The structure of the mayfly fauna of the Lotru River

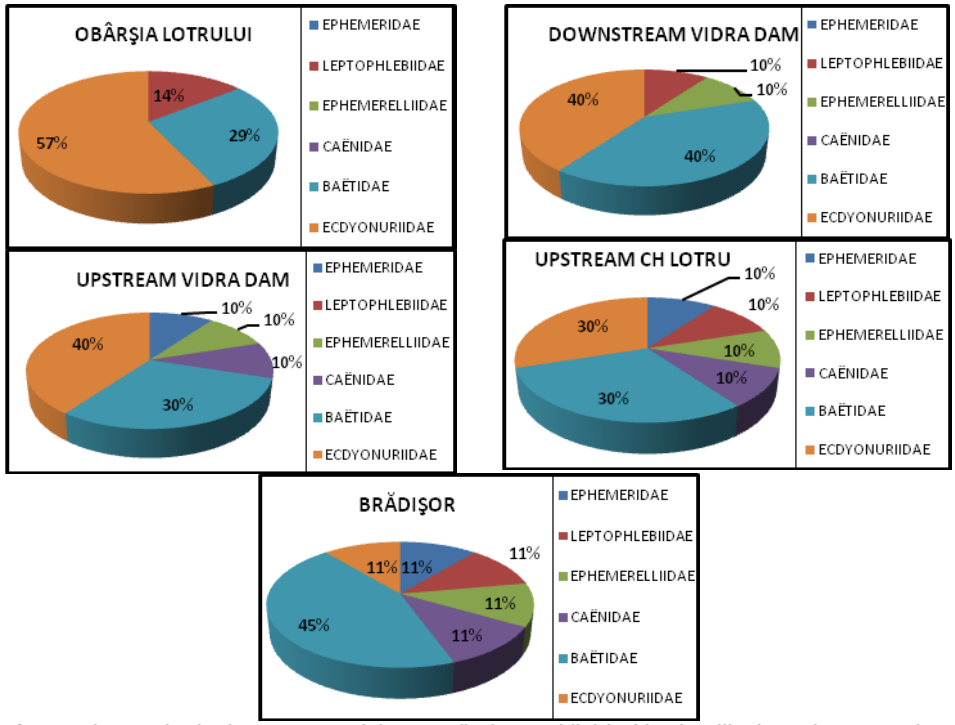

Fig. 3. The ecological spectrum of the mayfly fauna (divided by families) on the Lotru river

CONCLUSIONS

1. From the ecological zonation point of view, the presence of the identified species points at the idea that the river where the research was undertaken is part of the area where the erosion phenomenon is predominant, alternating with small areas of sedimentation;

2. From the quality of the water, the identified species are indicators of the waters from the oligosaprobe and β – mezosaprobe categories;

3. The hydrotechnical lay out did not significantly modify the structure of the benthic zoocenosis; it has been re-formed over the years.

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