PRELIMINARY STUDY ON OLIGOCHAETES (ANNELIDA, OLIGOCHAETA) AND WATER MITES (ACARI, HYDRACHNIDIA) FROM THE HYPORHEIC ZONES OF THE CRIŞUL REPEDE RIVER (ROMANIA)

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This paper is a preliminary study on oligochaetes and water mites from interstitial habitates of the Crişul Repede, one of the most important rivers in north-western Romania. Fourteen oligochaeta species and nine water mite species were collected from nine sampling sites located in the Crişul Repede catchment area. The highest number of both oligochaetes and water mites were found at Aleşd station where the samples were collected by the Karaman-Chappuis method. In the Crişul Repede catchment area the diversity of oligochaetes and water mites was higher than the one recorded on the Arieş River.

1. INTRODUCTION

Freshwater oligochaetes have long been recognized as common and permanent inhabitants of diverse aquatic habitats including lotic and lentic systems, surface waters, groundwater, and coarse as well as fine sediments (BRINKHURST and JAMIESON, 1971). In particular, oligochaetes are recognized as permanent and abundant taxa in hyporheic sediments where they constitute a relevant tool for ecological studies (GIERE, 1993).

Water mites represent the most important group of Acari which live in interstitial freshwaters (SCHWARZ *et al.*, 1998). There are about 500 species worldwide, representing 10% from the total number of water mites (DI SABATINO *et al.*, 2000).

Previous research regarding oligochaeta and water mite communities from interstitial zones located in the Crişul Repede catchment area were made many decades ago, as follows: SZALAY (1943, 1944, 1945), MOTAŞ and TANASACHI (1946), PLEŞA *et al.* (1964), BOTEA (1966, 1968), BOTEA and PLEŞA (1968).

The paper deals with oligochaeta and water mite communities and their distribution in the hyporheic zone from the Crişul Repede River and some of its tributaries.

2. MATERIAL AND METHODS

The samples were collected in the autumn of 2000 from the Crişul Repede catchment area. The study included nine sampling stations: Bologa, Negreni, Bulz,

Lorău, Şuncuiuş, Vadul Crişului, Auşeu, Aştileu and Aleşd (Fig. 1). Sampling were made using two different methods: Karaman-Chappuis and Bou-Rouch. The former was considered for the following sites: Lorău, Şuncuiuş, Vadul Crişului, Aleşd; while the latter for: Bologa, Negreni, Bulz, Şuncuiuş, Auşeu, Aştileu and Aleşd.

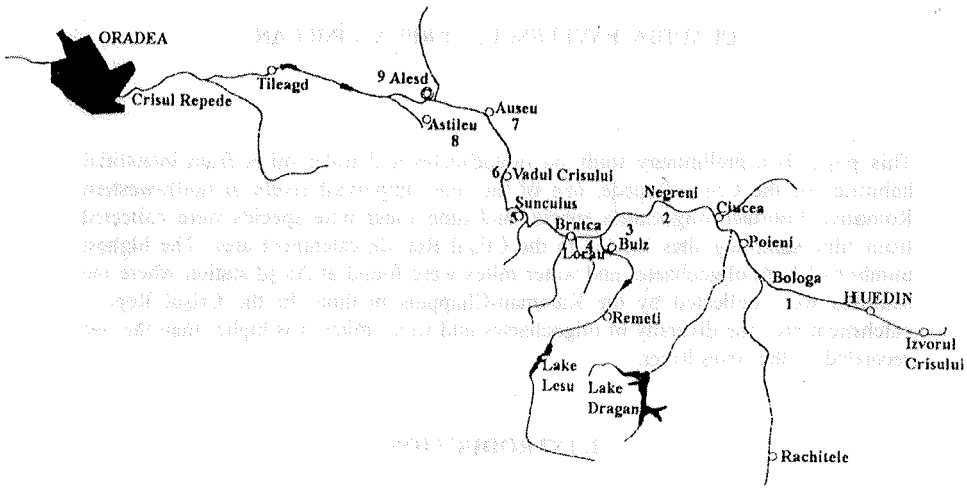

Fig. 1 – The Crişul Repede catchment area and the sampling sites: 1 – Bologa, 2 – Negreni, 3 – Bulz, 4 – Lorău, 5 – Şuncuiuş, 6 – Vadul Crişului, 7 – Auşeu, 8 – Aştileu, 9 – Aleşd.

Detailed information on the geomorphological, hydrological, hydrochemical characteristics and the composition of interstitial communities were reported by MOLDOVAN *et al.* (2002). Oligochaetes and water mites were identified at the species level, using the protocol described in CÎMPEAN *et al.* (2003).

3. RESULTS AND DISCUSSION

The present study reveals that sampling using the Karaman-Chappuis method led to an increased number of collected oligochaetes and water mites as compared to the Bou-Rouch method.

In the case of oligochaeta community, only two sampling sites remained the same as compared to the research conducted in the 60's. BOTEA (1966, 1968) identified a greater number of oligochaetes at the two common sites. The following species: *Nais communis, Nais elinguis, Pristina foreli, Pristinella rosea* and *Trichodrilus* sp. are species found by Botea too.

Oligochaetes were identified only at seven sampling sites. At Bulz and Aştileu stations no oligochaetes were found. The highest oligochaeta number was observed at Aleşd, and the lowest number at Negreni (Fig. 2). Five families were described, including fourteen species (Table 1). The most numerous family was

Fam. Naididae; it included six species. These species are hyporheophilous species. The same situation was recorded for species belonging to Fam. Tubificidae. In the samplings during November 2000, only two tubificids were identified: *Isochaetides michaelseni* and *Rhyacodrilus coccineus.*

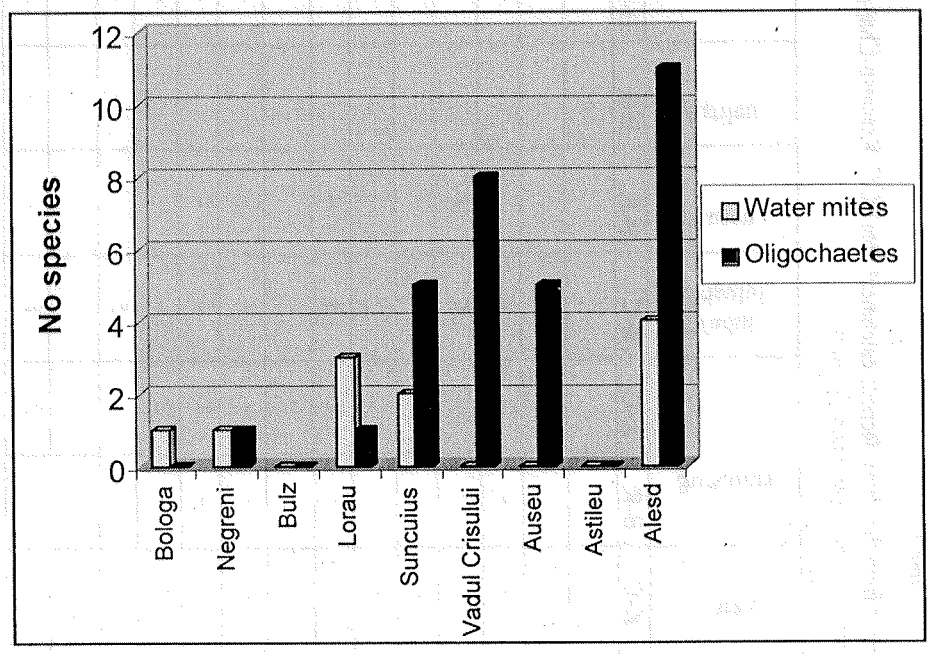

Fig. 2 – Oligochaetes and water mites species number at the sampling sites located on the Crişul Repede Catchment area.

An interesting fact was the presence of *Propappus volki*, recorded for the first time in the Crişul Repede catchment area. *Propappus volki* prefers clean waters, being considered by some authors as stygobite (LAFONT 1989, CELLOT and JUGET 1998). However, this species was also found in the benthic layer of rivers, thus showing a strong connection between ground and surface waters. *Propappus volki* was collected by means of both methods, and it was found at three sites: Şuncuiuş, Vadul Crişului and Aleşd, having a frequency of 33.33%.

Two species belonging to Fam. Lumbriculidae were identified. One of them, *Stylodrilus heringianus,* is epigean and the other, *Trichodrilus* sp., is considered stygobite. The latter had the highest frequency, 44.44%.

Enchytraeid species found in the study area are considered to be occasional hyporheophilous.

Fig. 5 presents some oligochaeta species. The first picture shows a general view of an enchytraeid. The second one points out the dorsal hair chaetae and the pectinate chaetae. The last two photos represent the most frequent naidids from the interstitial zones: *Pristina foreli* and *Pristinella rosea.*

Table 1

Oligochaetes and water mites identified in stream interstitial habitates from the Crişul Repede catchment area (K-C, Karaman-Chappuis method; B-R, Bou-Rough method) (for water mites ♂/♀/ny)

Sampling sites / Species	Bologa	Negreni	Bulz	Lorău	Şuncuiuş		Vadul Crişului	Auşeu	Aştileu	Aleşd	
	B-R	B-R	B-R	K-C	B-R	K-C	K-C	B-R	B-R	B-R	K-C
OLIGOCHAETA											
Fam. Lumbriculidae											
Stylodrilus heringianus	-	-	-	-	-	-	-	-	-	-	14
Trichodrilus sp.	-	2	-	-	-	-	8	1	-	-	3
Other	-	-	-	-	-	-	-	-	-	-	13
Fam. Propappidae											
Propappus volki	-	-	-	-	-	2	3	4	-	-	-
Fam. Enchytaeidae											
Cernosvitoviella sp.	-	-	-	-	-	-	-	-	-	-	8
Cognettia glandulosa	-	-	-	-	-	1	-	-	-	-	-
Cognettia sphagnetorum	-	-	-	-	-	2	-	-	-	-	-
Other	-	-	-	4	-	-	5	-	-	-	34
Fam. Naididae											
Nais communis	-	-	-	-	-	2	1	-	-	-	1

Table 1 (continued)

Sampling sites / Species	Bologa	Negreni	Bulz	Lorău	Şuncuiuş		Vadul Crişului	Auşeu	Aştileu	Aleşd	
	B-R	B-R	B-R	K-C	B-R	K-C	K-C	B-R	B-r	B-R	K-C
Nais elinguis	-	-	-	-	-	-	1	-	-	-	-
Nais sp.	-	-	-	-	-	-	17	-	-	-	1
Pristina foreli	-	-	-	-	-	4	10	-	-	-	4
Pristinella rosea	-	-	-	-	-	-	-	2	-	-	86
Vejdovskyella comata	-	-	-	-	-	-	-	1	-	-	1
Fam. Tubificidae											
Isochaetides michaelseni	-	-	-	-	-	-	-	1	-	-	-
Rhyacodrilus coccineus	-	-	-	1	-	-	1	-	-	-	32
HYDRACHNIDIA											
Fam. Lebertiidae											
Lebertia cf. *pussila*	-	-	-	-	1/0/0	-	-	-	-	-	-
Fam. Torrenticolidae											
Torrenticola amplexa	-	-	-	1/1/0	-	-	-	-	-	-	-
Torrenticola cf. *anomala*	-	-	-	0/0/1	-	-	-	-	-	-	-
Torrenticola sp.	-	1/0/0	-	-	-	-	-	-	-	-	7/15/0

Table 1 (continued)

Sampling sites / Species	Bologa	Negreni	Bulz	Lorău	Şuncuiuş		Vadul Crişului	Auşeu	Aştileu	Aleşd	
	B-R	B-R	B-R	K-C	B-R	K-C	K-C	B-R	B-R	B-R	K-C
Fam. Limnesiidae											
Kawamuracarus chappuisi	0/0/1	-	-	-	-	-	-	-	-	1/0/0	-
Fam. Feltriidae											
Feltria cornuta paucipora	-	-	-	-	-	-	-	-	-	-	1/1/0
Fam. Aturidae											
Frontipodopsis reticulatifrons	-	-	-	0/0/1	-	-	-	-	-	-	-
Aturus paucisetus	-	-	-	-	-	1/0/1	-	-	-	-	-
Fam. Momoniidae											
Stygomomonia latipes	-	-	-	-	-	-	-	-	-	-	1/0/1
larvae	-	-	-	-	-	1	-	-	-	-	-

Nine water mite species (Acari, Hydrachnidia) were identified in the samples collected from the interstitial zones located along the Crişul Repede River. They belong to six families and seven genera (Table 1). All water mite species found here have a broad distribution throughout Romania, except for *Kawamuracarus chappuisi*. This species was only identified on a tributary of the Bistriţa River and on the Crişul Repede (KONNERTH–IONESCU, 1979). Moreover, it was considered endemic for Romania.

Mites represented 4.72% of the total fauna collected from the interstitial samples (MOLDOVAN *et al.*, 2002). Only 1.46% was water mites. This percentage is similar to those reported by DI SABATINO *et al.* (1996) from the hyporheic habitat of a small apenninian stream. The low abundance is related to the trophic role of these organisms (carnivore and top predators). Water mites were identified at five stations from a total of nine sampling sites. At Aleşd and Lorău stations the highest number of water mites species was found, namely: four and three species, respectively (Fig. 3). The number of mates, females, deutonymphs and larvae are presented in Table 1.

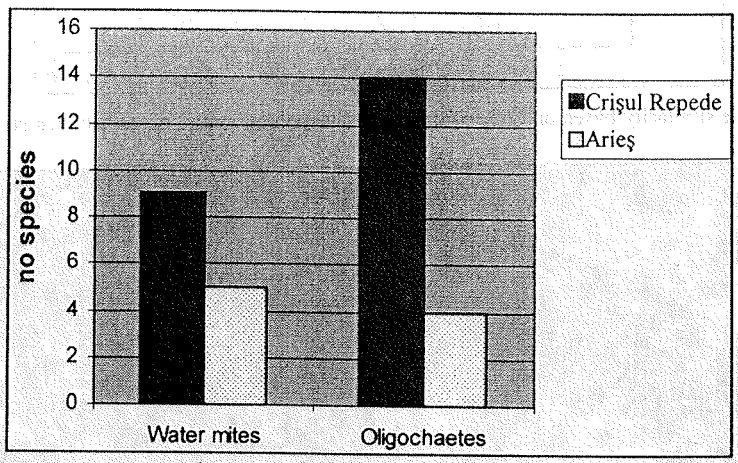

Fig. 3 – Oligochaetes and water mites speciesnumber from the Crişul Repede and Arieş Rivers.

Stygomomonia latipes and *Frontipodopsis reticulatifrons* are considered stygobite species (PETROVA, 1983). *Kawamuracarus chappuisi* and *Feltria cornuta paucipora* are interstitial species (Fig. 6).

Recent studies about interstitial oligochaetes and water mites fauna on the Arieş River (CÎMPEAN *et al.*, 2003) pointed out differences in number species (Fig. 4) and communities composition compared with Crişul Repede catchment area. The lower number of species on the Arieş River is probably caused by the increased water and sediment pollution (IEPURE, 2000/2001).

Pristinella rosea (Oligochaeta) and *Frontipodopsis reticulatifrons* (Hydrachnidia) are the only species found both in the Arieş and the Crişul Repede Rivers.

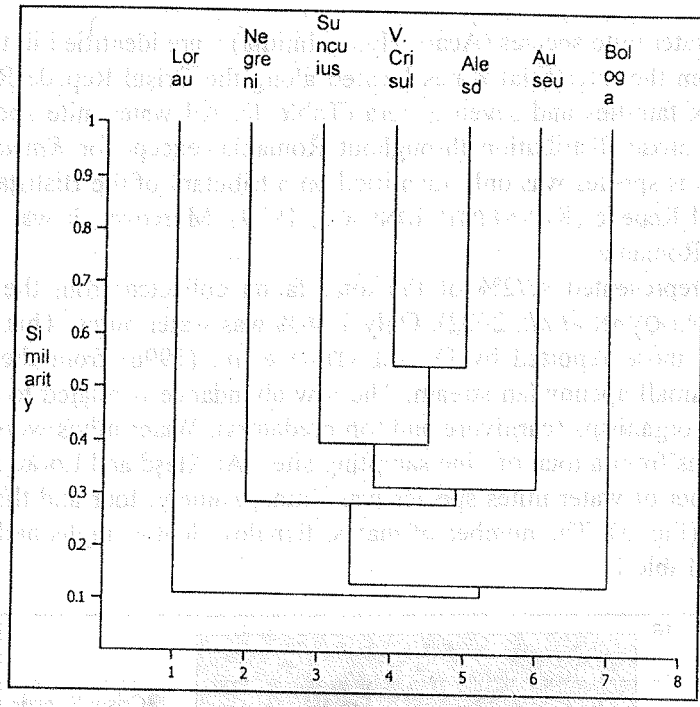

Fig. 4 – The similarity based on oligochaetes and water mites communities between studied sites.

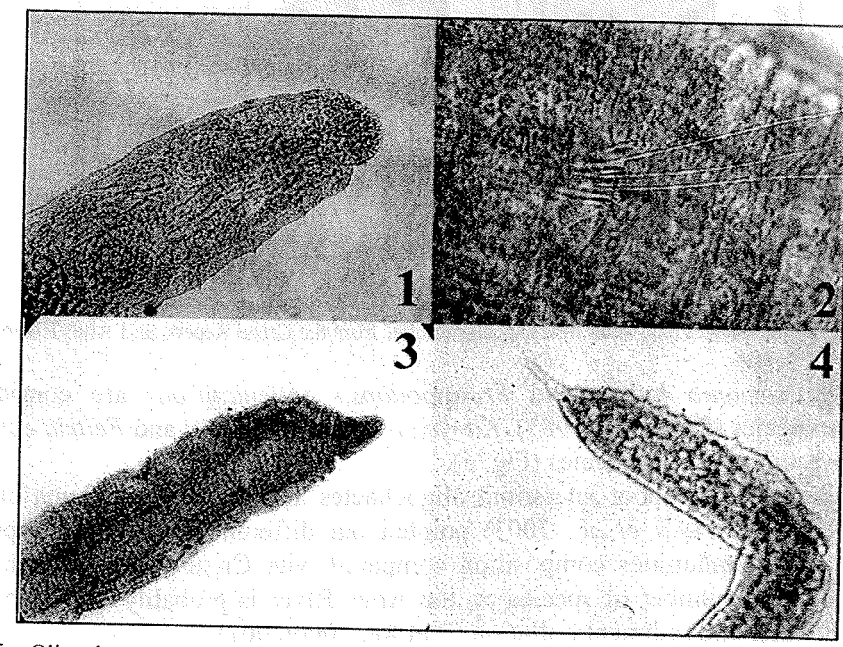

Fig. 5 – Oligochaetes: 1 – Enchytraeid, 2 – *Rhyacodrilus coccineus* – dorsal chaetes, 3 – *Pristinella rosea*, 4 – *Pristina foreli*.

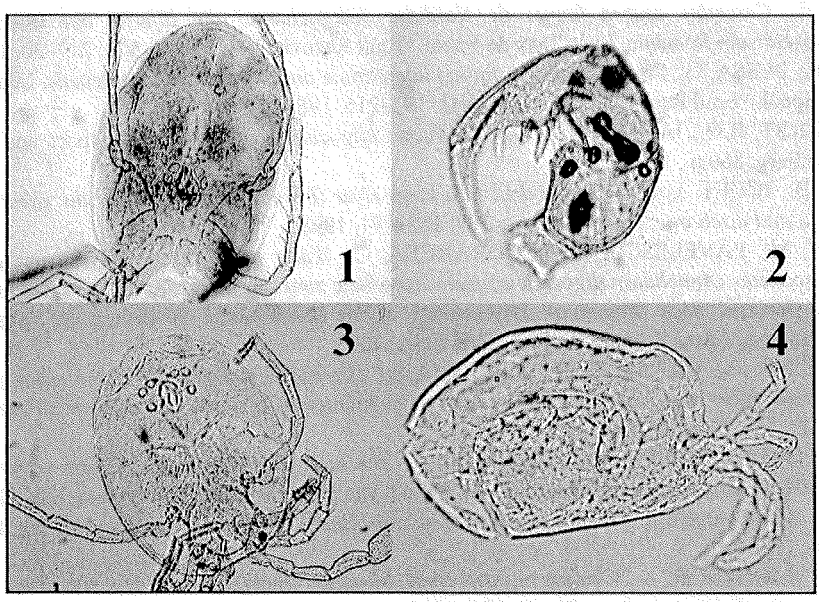

Fig. 6 – Water mites: 1 – Kawamuracarus chappuisi (♂, ventral), 2 – Kawamuracarus chappuisi (palp), 3 – Stygomomonia latipes (♂, ventral), 4 – Frontipodopsis reticulatifrons (lateral).

The Morisita index was calculated in order to depict the similarity between oligochaeta and water mites communities at the sampling sites situated on the Crişul Repede. The most similar sites were Vadul Crişului and Aleşd. In the same group were included Şuncuiuş and Auşeu sites. These four stations are located in the middle river course.

4. CONCLUSIONS

A higher number of oligochaetes and water mites were collected by means of the Karaman-Chappuis method compared to the Bou-Rouch method.

Preliminary data included in this paper revealed the presence of 14 oligochaeta species belonging to 5 families. *Propappus volki* was mentioned for the first time in the Crişul Repede catchment area.

Nine species of water mites (Acari, Hydrachnidia) were identified at five sampling sites from a total of nine considered stations.

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