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COMPOSITIONANDDISTRIBUTIONOFMACROBENTHIC INVERTEBRATESOFSHAPOURRIVER, FARSSOUTH-WEST, IRAN

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ABSTRACT

Macrobenthic invertebrates' fauna of Shapour River at Kezerun, Fars south-west, Iran was conducted from October, 2014 to January, 2015. Benthic samples were collected from three different stations along the river.

Three phyla of macrobenthic invertebrates were encountered in the river. They were Arthropoda, represented by fortheen genera, Chironomus, Dixa,Culiseta (Diptera), Argia, Coenagrion,Epitheca (Odonata), Tricorythodes (Ephemeroptera), Notonecta (Hemiptera), Hydrobius,Ochthebius, Ancyronyx (Coleoptera), Hydropsyche (Trichoptera), Potamon, Caridina (Decapoda) Annelida represented by three genera, Erpobdella (Arhynchobdellida), Uncinais (Haplotaxida), Lumbriculus (Lumbriculida) and Mollusca represented by five genera of gastropods including Melanopsis, lymnaea, Radix, Gyraulus and Melanoides. Arthropoda dominated the macrobenthic invertebrates with a total relative abundance of 58.15% while Annelida were the least abundant, 5.62% by number. Also the abundant of Mollusca were 36.21% by number.

Keywords: Benthic Macroinvertebrates, Composition, Shapour River, Kazerun

INTRODUCTION

Benthic organisms are those organisms that live on or inside the deposit at the bottom of a water body [1]. These organisms play a vital role in the circulation and recirculation of nutrients in aquatic environments. They constitutethe link between the unavailable nutrients in detritus and useful protein materials in fish. Most benthic organisms feed for a wide range of fishes [2][3].Macro benthic invertebrates are also those organisms often retained by mesh sizes of 0.05m2 [4] although the earlystages of many macro benthic invertebrates species are smaller than this size. Several benthic species are relativelylong lived, with life spans ranging from weeks for some opportunistic worms to months or years for larger taxa [5].

Macrobenthic invertebrate are biological quality element require for the classification of biological status of thewater bodies [6]. Benthic in faunal community studies provide the 'golden standard' in terms of determining whetheror not alterations in benthic communities are occurring and together with sediment, toxicity and chemistry, whetheror not such changes are due to toxic contaminants in the sediments [7]. Over the last decades there has been aconsiderable effort to document the ecology, composition, spatial distribution and biodiversity of macrobenthic in vertebrate communities of Iranian rivers [8-13]. Researchers established a pattern of relationship between macrobenthic invertebrate fauna, depth, substrate type and organic contents of sediment. They reported that areas with high accumulation of sediment and high organic flux rates from river in e sources supported high macro infauna, abundance and biomass. Other studies using macrobenthic invertebrate as bio-indicator of anthropogenic impact onaquatic ecosystem have shown general decrease in macrobenthic invertebrate population and reduction in speciesdiversity and richness [13] and they possess higher ability to tolerate pollution-induced environmental stress thanplankton [14].

The Shapour River has been subjected to domestic, agricultural and Industrial activities. The river is the major source ofdrinking water to the inhabitants of these communities. This study provides a baseline data on the composition,distribution, abundance and diversity of macrobenthic invertebrates of the ShapourRiver.

MATERIALS AND METHODS

Description of Study area

The study was carried out in the ShapourRiver which is one of the major rivers

inKazrrun, Fars south-west, Iran .The ShapourRiver has a length of 220 kmoriginated from the highlands of Kazeroon. This is followed by the western region Kazeroon after a mountain path and connect multiple branches flows through theBushehrprovince and connects to theDalakiriverwhich flows into the Persian Gulf.

Sampling stations

Three sampling stations (1-3) were chosen along the river course. The co-ordinates of the sampling stations weretaken using Geographic Positioning System (GPS) and approximate distances of the stations were calculated, eachstation was 1000m apart from the other [15].

Sampling procedure

Benthic samples were collected monthly from the November, 2014 to January, 2015 at three different stations of thestudy area (Figure 1) using a van Veen grab, usually between 7:00am and 10:00am. For each sampling station, 3 or 4hauls were made by sending the grab down into the buttom. The sediment collected were poured into polythenebags, labeled and brought to the laboratory for analysis. The sediments were passed through 3 sieved of 2mm, 1mmand 0.5mm mesh sizes to collect the benthos. The benthos were poured into a white enamel tray, stained with RoseBenger Solution and sorted using forceps. They were sorted out into different groups and preserved in 4% formalin. They were then identified under a compound microscope using the key guide of Environmental Protection Agency [16] and counted.

Data analysis

The statistical analyses were carried out with SPSS version 19.0 for windows.

RESULT

The examination of samples resulted in a total number of 21 families representing 4 classes and 13 orders of benthic macroinvertebrates (Table 1).All families found during the monthly sampling from October to Januaryat all stations(S1,S2 and S3)(Table 2).Overall, the benthic macroinvertebrate communities of the Shapour River were dominated by Melanopnis (15.33%). Frequency percentage of Macrobenthic invertebrate genus in three stations is shown in figure 2. Three phyla of macrobenthic invertebrates were encountered in the river. They were Arthropoda, represented by fortheen genera, Chironomus, Dixa, Culiseta (Diptera), Argia, Coenagrion, Epitheca (Odonata) ,Tricorythodes (Ephemeroptera), Notonecta (Hemiptera), Hydrobius, Ochthebius, Ancyronyx

(Coleoptera), Hydropsyche (Trichoptera), Potamon, Caridina (Decapoda) Annelida represented by three genera, Erpobdella (Arhynchobdellida), Uncinais (Haplotaxida), Lumbriculus (Lumbriculida) and Mollusca represented by five genera of gastropods including Melanopsis, lymnaea, Radix, Gyraulus and Melanoides (Table 1). Arthropoda dominated the macrobenthic invertebrates with a total relative abundance of 58.15% while Annelida were the least abundant, 5.62% by number. Also the abundant of Mollusca were 36.21% by number (Figure 1).

Table 1-Taxonomical list of benthic macroinvertebrates which were determined in theShapour River

number	Genus	Family	Order	Class	Phylum
1	Argia	Coenagrionidae	Odonata	Insecta	Arthropoda
2	Coenagrion	Coenagrionidae	Odonata	Insecta	Arthropoda
3	Epitheca	Corduliidae	Odonata	Insecta	Arthropoda
4	Tricorythodes	Leptohyphidae	Ephemeroptera	Insecta	Arthropoda
5	Notonecta	Notonectidae	Hemiptera	Insecta	Arthropoda
6	Hydrobius	Hydrophilidae	Coleoptera	Insecta	Arthropoda
7	Ochthebius	Hydraenidae	Coleoptera	Insecta	Arthropoda
8	Ancyronyx	Elmidae	Coleoptera	Insecta	Arthropoda
9	Hydropsyche	Hydropsychidae	Trichoptera	Insecta	Arthropoda
10	Dixa.	Dixidae	Diptera	Insecta	Arthropoda
11	Culiseta	Culicidae	Diptera	Insecta	Arthropoda
12	Chironomus	Chironomidae	Diptera	Insecta	Arthropoda
13	Potamon	Potamidae	Decapoda	Malacostraca	Arthropoda
14	Caridina	Atyidae	Decapoda	Malacostraca	Arthropoda
15	Melanopsis	Melanopsidae	Basommatophora	Gastropoda	Mollusca
16	lymnaea	Lymnaeidae	Basommatophora	Gastropoda	Mollusca
17	Farsithyra	Stenothyridae	Littorinimorpha	Gastropoda	Mollusca
18	Gyraulus	Planorbidae	Basommatophora	Gastropoda	Mollusca
19	Melanoides	Thiaridae	Neotaenioglossa	Gastropoda	Mollusca
20	Erpobdella	Erpobdellidae	Arhynchobdellida	Clitellata	Annelida
21	Uncinais	Naididae	Haplotaxida	Clitellata	Annelida
22	Lumbriculus	Lumbriculidae	Lumbriculida	Clitellata	Annelida

Table 2: Abundance of macroinvertebrates (indv/m2) in different stations in theShapour River

Macroinvertebrates	Number per Month				Numberper Genus
	October	November	December	January	
Argia	5	4	6	-	15
Coenagrion	6	5	1	2	14
Epitheca	1	4	3	-	8
Tricorythodes	23	6	8	12	49
Notonecta	2	3	6	-	11
Hydrobius	36	31	29	22	118
Ochthebius	24	29	17	15	85
Ancyronyx	4	1	2	-	7
Hydropsyche	43	47	33	32	155
Dixa	13	8	9	3	33
Culiseta	23	15	9	-	47
Chironomus	31	24	14	3	72
Potamon	9	8	3	36	56
Caridina	3	2	11	27	43

Melanopsis	**36**	**37**	**53**	**62**	**188**
Melanoides	**3**	**1**	**3**	**-**	**7**
Lymnaea	**11**	**12**	**15**	**20**	**58**
Gyraulus	**17**	**20**	**25**	**25**	**87**
Farsithyra	**26**	**25**	**27**	**26**	**104**
Erpobdella	**9**	**15**	**9**	**3**	**36**
Uncinais	**6**	**2**	**3**	**-**	**11**
Lumbriculus	**9**	**7**	**6**	**-**	**22**
Total	**340**	**306**	**292**	**288**	**1226**

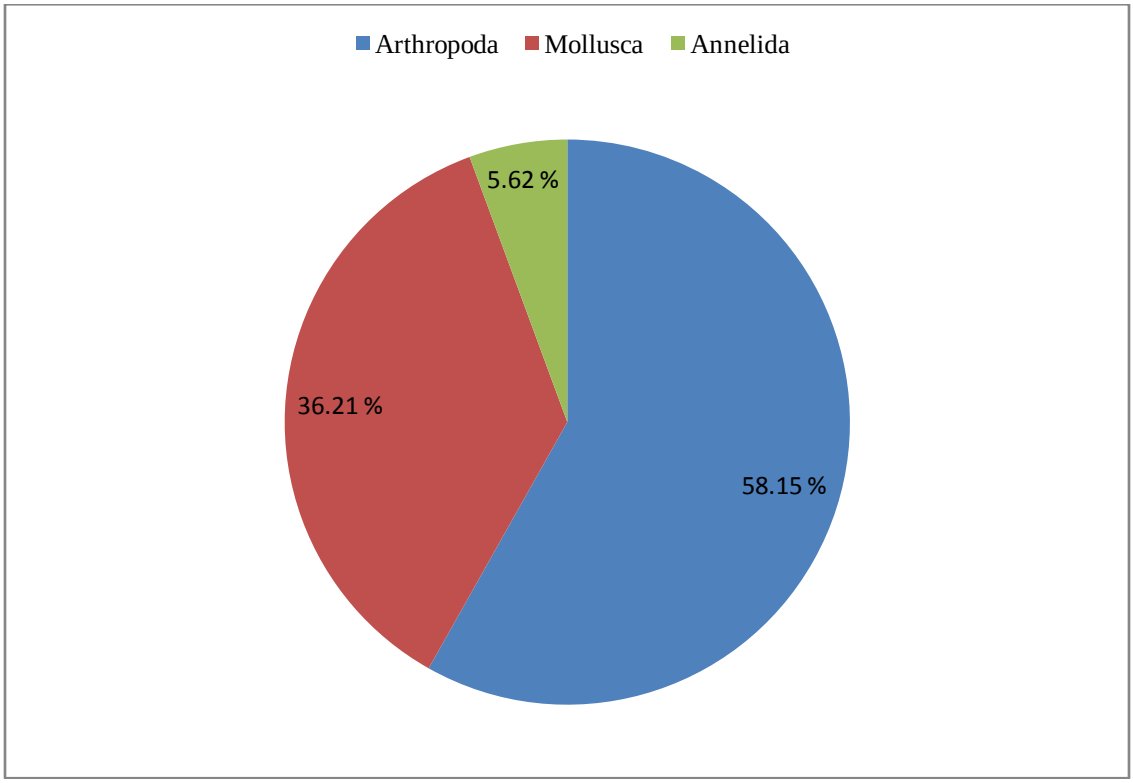

Figure1: Frequency percentage of Macrobenthic invertebrate phylum in three stations

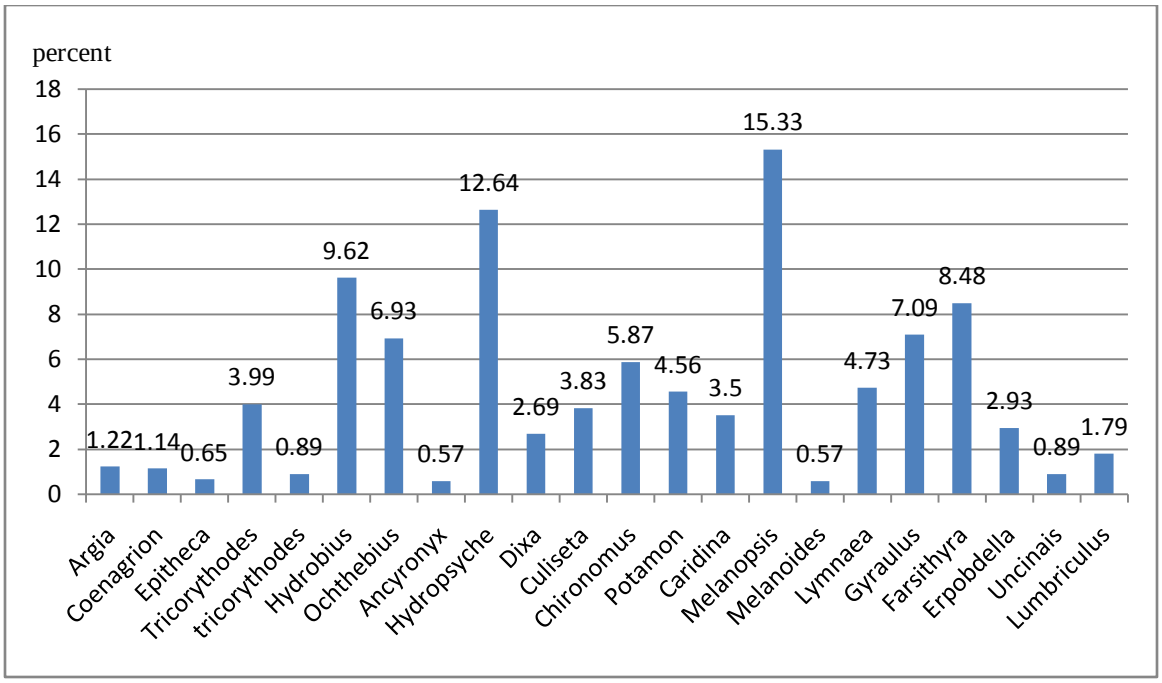

Figure 2: Frequency percentage of Macrobenthic invertebrate genus in three stations

DISCUSSION

The number of recorded benthic macroinvertebrate's population was generally low because of some ecologicalimbalance arising from alterations of some important factors governing the abundance and distribution of thebenthic communities. Such factors include water quality, immediate substrates for occupation and food availability[17]. According to [18] cited by [19], the bigger the size of a lotic water body the poorer the macroinvertebraterichness. In addition, high human activity around the sampling stations which released wastes into the river couldalso be a possible explanation. [20] reported that high biodiversity is expected in ecosystems devoid of significantanthropogenic impacts.

Changes made in the composition of Macrobenthic population are often in response to environmental factors and stressful conditions in the river to maintain ecological balance [21]. Researchers showed that the groups which are sensitive to pollution (Ephemeroptera, Plecoptera, Trichoptera) in contaminated areas are reduced and vice versa, the resistant groups Diptera (Chironomidae and Simullidae) are increased [22].Results from the another study showed that the most abundant macrobenthic invertebrate fauna throughout thestudy period was Chironomuslarvae; could be attributed to the fact that this insect is known to thrive in

pollutedenvironment properly due to possession of haemogloblin a pigment that transport and store dissolved oxygen,also the present of Tubifexlarvae and some gastropods recorded during this study attribute to the fact that they weretransported by water current and were tolerant of the prevalent water condition. However, the presence of theseindicator species suggests organic pollution from anthropogenic source[23]However, such a case was found in Shapour river that seems to be due to the proximity of the stations to the source of the river and lake of the water pollution.

Humans may have the ability to manipulate the environment to suit their needs, but this requires a responsible approach. Our present generation must therefore stand up and be accountable for our actions focusing our knowledge and intuition toward a better future that includes the availability of clean, freshwater for all the nations of the world.

CONCLUSION

I.Arthropoda was the most abundant taxonomic group in terms of numerical abundance.

II.The benthic macro invertebrate communities of the Shapour River were dominated by Melanopnis.

III. It could be concluded that Shapour River water is not under stress due to organic pollutants from anthropogenic sources such as the surrounding industries and water front dwellers releasing raw human excreta, detergents, wastewater and cleaning agents from the industries but may when the path goes and close to the sea the river be polluted that further research is needed.

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