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ABUNDANCE OF COPEPOD FROM UMRA (SHAMSUDIN) RESERVOIR WASHIM DISTRACT MAHARASHTRA

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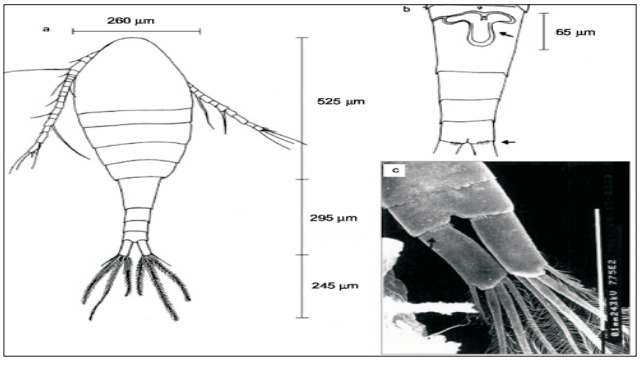
ABSTRACT :

Umra (Shamsudin) Reservoir is a man made reservoir located at Umra (Shamsudin) village, District –Washim. This project comes under watershed area of Pus project , which is in Godavari Valley on 20^0 - 05'-28'' and 77^0-16'-34''. This reservoir meets the need of drinking water, irrigation and aquaculture and it is the source of capture fishery in this region. The capacity of the Reservoir is 2.3164 million cubic meters and 413 Hq. land can be irrigated. Copepod diversity of Umra (Shamsudin) Reservoir Washim., was studied at four sampling stations during Jan. 2015 To Jun 2015. The water body sustains heavy Zooplanktonic biomass throughout the period of research except for the rainy season. The seasional abundance of the dominate Copepodes are described like Mesocyclops, Cyclops, Calanus, Macrocyclops, Diaptomus, Microcyclops, Tropocyclops, Orthocyclops, Eucyclop species of Copepods belonging to different groups were identified from the reservoir,.

KEY WORDS: *Copepod abundance, Pollution status, Umra (Shamsudin) Reservoir.*



INTRODUCTION:

During recent years there has been increasingly greater concern for inland fresh water resources, which are affected in different ways by all kinds of human activities. The man made lakes are but one such example of water resources, which form a part of a still larger system, the watersheds. Any human activity in the whole of the watershed is bound to influence the water in the reservoir and downstream. Deforestation, grazing and otherwise removal of vegetal in the watershed generally results in accelerated silting of the reservoir. The agricultural practices in the catchments area not only help increased silting but also responsible for addition of large quantities of nutrients, pesticides and organic matter, brought to the reservoir by the runoff through the stream. Not only the water quality in the reservoir is affected but its impact can also be left in the change in the biota, soil properties and physico-chemical status. In India, the water resources are under great stress from a plethora of human activities. Though the need for increased agricultural production, increased resource utilization, very little is known about the quality of water resources and impact of these activities thereupon. In the recent years environmental monitoring through regular assessment of water quality has become a crucial factor in the exploitation or conservation of aquatic resources Zooplankton is abundant in the shallow areas of water body. The zooplanktons unlike phytoplankton are particularly distributed horizontally and vertically in an ecosystem. The zooplanktons forms an important group as it occupies an intermediate position in the food web, many of them feeding on algae and bacteria and in turn being eaten up on by fishes. They also indicate the tropic status of a water body, their

abundance increase in eutrophic water. They are also sensitive to pollution and many species are recognized as indicators of pollution. Water from Umra (Shamsudin) reservoir is being used for drinking purpose and fishery activities. On the other hand, due to increasing human and animal activities in it, the water is becoming polluted. Hence, the basic information and data on the aquatic ecosystem thought to be worked out in order to evolve effective and appropriate strategies for the management of the reservoir. The study of the reservoir in respect to Zooplankton availability is not worked our earlier. Similarly, no studies are carried out on the water quality of the lake and therefore, it was thought to study zooplankton in different parts of the lake, so that it would help in future planning for the reclamation of such lake and its utilization for intensive fish culture.

General morphology of Copepods: Copepods are a group of lower crustaceans passing consecutively through a series of nauplius and copepodid stages, each transition being achieved by means of a molt. The anterior part of the body is broad and bears jointed appendages whereas the posterior part ends in a fork or furca (caudal rami) copepods vary in size from 0.3 mm to 18-0 mm almost all marine copepods have an entirely or largely vitreous body while alive preserved copepods rapidly lose their hyaline consisteny and become cloudy and dark the terminology used varies with different authors the common terms used are as follows.1) Head thorax and abdomen 2) Prosome, metasome and urosome 3) Cephalosome, thorax and abdomen. The terms used here are according to Huys and boxshall (1991) In many species the head is not distinct from the thorax but is fused with one or more thoracic somites to form a cephalothorax or cephalosome. The body comprises of an anterior cephalosome of 6 somites and a post cephaic trank of 9 somites plus the anal somite termed as urosome and the caudal furca, which represets the telson. Th cephalosome consists of 5 cephalic somits and first thoracic somite fully incorpotated into the cephalosome. The post cephalic trunk comprises the second to sixth thoracic somites each of which bears a pair of biramous swimming legs, the genital (7th thoracic) somite which bears the genital opening or openings in both sexes and 4 post genital abdominal somites. THe abdominal somites are all limbless although the anal somite bears a pair of setiferous caudal rami. In many species the trunk somites are fused to each other or to the cephalosome.

Habitat : Copepods have successfully colonized all salinity regimes from freshwater, marine and hyper saline inland water and all three regimes from subzero polar waters to springs and also in all majority are marine some are commensals and parasites.

Life cycle: The basic life cycle of copepods comprises two phases, naupliar and copepodid. The egg typically hatches into a nauplius larva defined by its small, un-segmented body and the possession of only three pairs of functional appendages, antennules, antennae and mandibles. There is a maximum of six naupliar stages and all six are retained in most free living copepods and in some parasites. Naupli may be planktonic, feeding on other planktonic organisms or lecithotrophic, relaying on yolk stores for nutrients. In free living copepods there is a maximum of five copepodid stages and one body so mites is added at each molts' through this phase. In both sexes the fifth copepodid stage molts' into the adults. Mating takes place soon after the female becomes sexually receptive and adult males may engage in precopulatory mate guarding, holding pre-adult female until molt (Box shall1990). The sequence of mating behaviors consists of mate detection, mate recognition and mate capture, culminating in copulation during which sperm contianing spermatophore are transferred to the female. The full life cycle comprising six naupliar stages and five copepodid stages preceding the adult is retained in many families of parasitic copepods, especially those utilizing invertebrates

COPEPODS IMPORTANCE:

(1) Copepods occupy a significant intermediate position in aquatic food chains, are usually omnivorous in habit, and when possible tend to be food selective. (2) A wide variety of food have been found in the copepod guts including algae, pollen, detritus, bacteria and rotifers. It was originally thought that all fresh water copepods were herbivorous filter feeders.(3) Increasingly the copepods or zooplanktons production has resulted in increased fish production.(4) Copepods have been used for the bioassay of toxins in water .(5) The importance of small planktonic copepods and their roles in the pelagic marine food webs.(6) There is a increasing evidence that some small

copepods feed primarily as predators upon the heterotrophic protest rather than as grazers of phytoplankton.

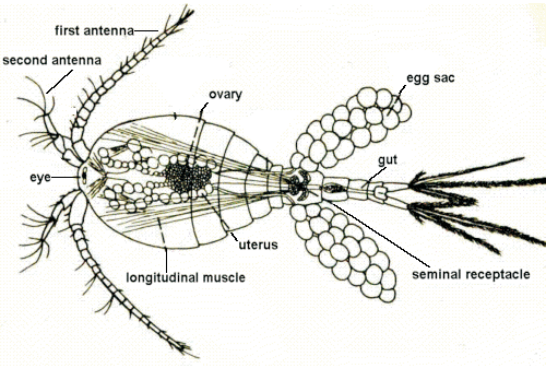


Fig : General Morphology of Copepods.

MATERIAL AND METHODS:

Site description: Umra (Shamsudin) Reservoir is a man made reservoir located at Umra (Shamsudin) village, District –Washim. This project comes under watershed area of Pus project, which is in Godavari Valley on 20^0 -05'-28'' and 77^0-16'-34''.

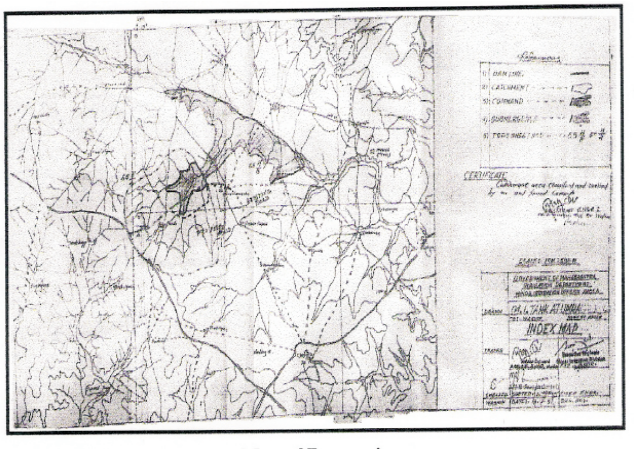


Fig. Map of the Reservoir

COLLECTION OF SAMPLES: For the study of various biotic parameters, water samples were collected from the selected four sampling stations The water samples were collected, about 5 meter away from the shore and one-meter depth from the surface by using sieve net no. 25. Water was collected in a wide mouth polythene bottle for biological analysis. Plankton net (mesh size 64 µm) was used to filter 5 hundred liters of surface water to obtain the net plankton concentration. The sample is collected by GPA or OECD (2005), method. It was fixed with 4% formalin Zooplankton studies: Sampler and hydrobios standard water was used for the qualitative and quantitative estimation of zooplankton. Identification of zooplankton was done by using key and monographs of Sehgal, (1983); Adoni, (1985); APHA (1985).

RESULTS AND DISCUSSION:

Copepods observed from Umra (Shamsudin) reservoir were represented by different species *Cyclops, Mesocyclops (M. oithonoides, M dybowskii, M. tenuis*), etc. dominated the reservoir. Station wise abundance of copepods showed major population at stations III, IV. Station IV represented the highest population of copepods followed by station III and then station II, I Though the abundance of us Calanus, Macrocyclops, Diaptomus, Microcyclops, Tropocyclops, Orthocyclops, Eucyclop was comparatively low. Copepods were represented by different species and among them Cyclops dominating the reservoir. Copepods exhibited two peaks i.e. one in summer and other in winter. This is in confirmation with the findings of George (1969); Chapman (1972) and

Govind (1978). The summer peak may be due to the abundance of diatoms and blue green algae (Goswami and Selvakumar, 1977). Winter peak may be attributed to the abundance of phytoplankton in the present investigation. A decrease in rainy season may be because of predation of planktonivorous shrimps, prawns and fishes. This is well in agreement with Brandorff and De Andrade (1973). it can be concluded that the biotic components of the water of the reservoir investigated were, thus found to be dependent on large number of abiotic parameters in different combinations and these combinations, their abundance was also found to be dependent on food habits and macrophytes found in the water of reservoir and also in the catchments area. However, the results of the present study indicate the Oligotrophic nature of the reservoir. Environmental variables like water temperature, alkalinity, pH, chloride, dissolved oxygen, and the nutrients like sulphates, nitrates, phosphates etc. were also found to be most important of all with respect to the productivity of the reservoir. The pollution indicator species were predominately found at certain regions of the reservoir where human activities were more, confirming that, in future, the water of reservoir may unsafe for drinking, human welfare and also for intensive fish culture. Hence, it is concluded that, the present water body of this reservoir may becomes polluted. Looking towards the human welfare, phytoplanktons, zooplanktons, Ichthyofauna & large number of visiting migratory birds, proper measures are essential to avoid the pollution of water of the reservoir so that still more migratory birds may visit in the coming years and similarly, this may lead to an increase in the fishery activities and proper use of water of the Umra (Shamsudin) reservoir of Washim district for the welfare of the society.

S.no	Phylum	Class	Family	Genus	Species
1.	Arthropoda	Crustacean	cyclopidae	*Mesocyclops*	*M.leukarti*
2.	Arthropoda	Crustacean	Cyclopidae	*cyclops*	--
3.	Arthropoda	Crustacean	Cyclopidae	*calanus*	--
4.	Arthropoda	maxillopoda	Macrocyclops	*Macrocyclops*	*M. albidus*
5.	Arthropoda	maxillopoda	Diaptomidae	*Diaptomus*	--
6.	Arthropoda	maxillopoda	Cyclopidae	*Microcyclops*	*M.varicans*
7.	Arthropoda	Crustacean	Cyclopidae	*Tropocyclops*	*T.prassinus Mexicans*
8.	Arthropoda	maxillopoda	Cyclopidae	*Orthcyclops*	*O.modestus*
9	Arthropoda	maxillopoda	Cyclopidae	*Eucyclops*	*E.prionophorus*

Table : Record of Copepods in Umra (Shamsudin) reservoir of Washim district

IDENTIFICATION:

1) MESOCYCLOPS LEUCKARTI

Classifiction:

Phylum - Arthropoda
Class - Crustacean
Order - Copepoda
Family - Cyclopidae
Genus - Mesocyclops
Species - *M.leukarti*

2) CYCLOPES

Clasification:

Phylum - Arthopoda
Subphylum - Crustacea
Class - Maxillopoda
Subclass - Copepode
Order - Cyclopoida

Family - Cyclopidae
Genus - Cyclopes

3)CALANUS COPEPODE

Classification:

Phylum - Arthopoda
Subphylum - Crustacea
Class - Maxillopoda
Subclass - Copepode
Order - Cyclopoidae
Family - Cyclopidae
Genus - Calanus

4) MACROCYCLOPS

Classification

Phylum - Arthropoda
Sub phylum - Crustacea
Class - Maxillopoda
Sub class - Copepod
Order - Cxyclopidae
Family - Macrocyclops
Species - M. albidus

5) DIAPTOMUS

Classification

Phylum - Arhtopoda
Sub phylum - Crustacea
Class - Maxillopoda
Sub class - Copepoda
Order - Calanoidae
Family - Diaptomidae
Genus - Diaptomus

6) MICROCYCLOPS VARICA

Classification:

Phylum - Arthropoda
Class - Maxillopoda
Order - Cyclopoida
Family - Cyclopidae
Genus - Microcyclops
Species - M. varicans

7) TROPOCYCLOPS PRASSINUS MEXICANUS

Classification:-

Phylum - Arthropoda
Class - Maxillopoda
Order - Cyclopoida
Family - Cyclopidae
Genus - Tropocyclops
Species - Prassinus Mexicanus

8) TROPOCYCLOPS SPE.

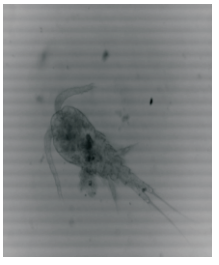
Classification

Phylum - Arthropoda
Class - Crustacea
Order - Cyclopoida
Family - Cyclopidae
Genus - Tropocyclops (Klefer, 1927)

9) ORTHOCYCLOPS MODESTUS

Classification:

Phylum - Arthropoda
Class - Maxillopoda
Order - Cyclopoida
Family - Cyclopidea
Genus - Orthocyclops
Species - Modestus.



10) EUCYCLOPS PRIONOPHORUS

Classification:

Phylum - Arthropoda
Class - Maxillopoda
Order - Cyclopoida
Family - Cyclopidae
Genus - Eucyclops
Species - Prionophorus

TABLE NUMERICAL ABUNDANCE OF COPEPODA (ORG. / L) AT DIFFERENT STATIONS OF UMRA(SHAMSUDIN) RESERVOIR DURING

Sr. No.	Zooplankton	At Stations				Total
		I	II	III	IV	
3	Copepods	18000	22000	35000	43000	118000

TABLE- VARIATION IN THE ABUNDANCE OF COPEPODS AT DIFFERENT STATIONS OF UMRA (SHAMSUDIN) RESERVOIR DURING

Sr. No.	Zooplankton	At Stations			
		I	II	III	IV
1.	*Cyclops* *	++++	++++++	++++++	++++++++++
2.	*Diaptomus* *	-	++++	++++++	++++
3.	*Ectocyclops**	-	-	++++	++++
4.	*Mesocyclops*	++++	++++	++++++	+++++++
5.	*Macrocyclops*	++++	+++	++++	++++
6.	*Calanoids*	++	++	+++++	++++++
7.	*Microcyclops*	++++	-	++++	-
8.	*Tropocyclop*	-	++	-	++++++++
9.	*Orthocyclops*	-	-	+	-
10.	*Eucyclops*	-	+	-	-

(+) Denotes 1000 Org/1 (-) Denotes Absent (*) Pollution Indicator Species

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