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Aquatic flora and fauna associated with the freshwater snail *Lymnaea acuminata* in Kham river at Aurangabad (M.S.)

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Abstract
The present study includes considerable variations in aquatic flora and fauna recorded in Kham River during the period of Jun. 2009 – Sept. 2009. *Lymnaea* work as vector for various trematode pathogens and it is common in the bitant of the Kham River.Hence the present investigation was undertaken to study other associate flora and fauna in the vicinity of the snail *Lymnaea acuminata* with their relationship. Density of the molluscan species carried out with the study.

Keywords: Aquatic Flora and Fauna, Snail, Density, Kham River

INTRODUCTION

Pond snails (Lymnaeaidae) are freshwater gastropods. Their preferred habitats are stagnant in slow streaming water with heavy vegetation.In Aurangabad city (19^0 53' 06.68" N and 75^0 19' 10.60"E) Kham River flows toward the south east and connected to Godavari River. Kham river which runs through the south west part of the city is now dried up and only flows in monsoon, rest of the part of the Kham river beyond Pan chakki is now appearing as dranage.

Much of work has centered on distributional studies of the flora and fauna on lake and spring water habitat [29] water plants [27] and rivers like Ganga, Godavari was carried out. The Kham River also studied for physico-chemical parameters [24]. The water bodies get studied for many purposes like to know biodiversity, physico–chemical nature of water, pollution and so on. The present work carried out for the investigation of flora and fauna. The study area is at Pan chakki near University. It ranges 1 km from Pan chakki to northern direction towards Bibika Maqbara area of the river. Here the river is shallow and having rocky substratum.

Freshwater snails plays an important role in freshwater ecosystem and some transmit serious diseases to human, animals and fish [23,34]. Due to disease transmission, snail population becomes an important point of study. The dreadful diseases spread get into new areas depends on the possible establishment of snail vectors [2, 14, 23, 33, 36, 32, 31, 35]. Hence, the present study was conducted to study the population density of snail species found at the collection site of the snail *Lymnaea* (Lamarck).

MATERIAL AND METHODS

During study period sampling was done in the morning from 9.00–12.00 am. Fort night collection was done in study area. Wearing hand glows, the mollusc were collected by hand picking method.For fishes and amphibian used fishing net. The algae collected with water sample in a beaker. Other flora collected by simple cutting its 5 cm.twig with scissor and kept a side in separate plastic bags. For the collection of rotifers and arthropods muddy water near the beds of algae was collected in a beaker, in plastic bag muddy soil and partly decomposing material also collected near the beds of algae for any larval form of insect group.

The distance between collection site and laboratory is not so far, hence after getting collection the samples brought to the laboratory within 20 – 30 minutes. The snails and amphibians brought alive to the laboratory and kept in separate trough.The frogs and toads were released alive at the bank of river, after identification. Water analyzed under light microscope for presence of rotifers and arthropod's larvae. Then preserved all the collected flora and fauna in preservatives like formalin. All the flora, snails and fishes were preserved in 10% formaline. Rest of all i.e. *Cylops, Daphnia,Brachionus* and chironomide were preseserved in 4% formaline.

Fig. showing collection sites

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RESULTS AND DISCUSSION

In the present study five flora and eleven fauna were found. In case of flora *Spirogyra,Limnobium laevigatum* (Frog bit*), Lysimachia nummularia* (Creeping Jenny),*Bacopa monniera* (Bramhi) *and* variegated Manna grass *Glyceria maxima* were found whereas in fauna mollusc comprising *Lymnaea acuminata, Indoplanorbis exustus, Gyraulus convexiusculus, Melanoides tuberculata*, in arthropoda, *Cyclops, Daphnia, Choronomidae*, in rotifers, *Branchionus*, in amphibian *Rana tigrina*and *Duttaphrynus melanostictus* frogs and finally a single fish species *Clarias batrachus* was found.

Lymnaeids are distributed all over the world[12]. This family has received much attention in literature because its members are vectors of Schistosome fluke's very damaging human parasites in tropical and subtropical countries[6]. Snails act as an intermediate host for the spread of the parasitic infection of the animals, birds, man and fishes. The involvement of snail for the transmission in Schistosomiasis, Fasciolasis and other trematode infection in buffalos and cattle is reported by Kandel [15]. In the study area found three molluscs which acts as a vectors other than *Lymnaeaacuminata* i.e. *Indoplanorbis exustus, Melanoides tuberculata* and *Gyraulus Convexiusculus* snail.

Table showing the density of molluscs in study area

	Lymnaea	Melanoides	Indoplanorbis	Gyraulus
Jun-09	42	32	16	10
	35	33	20	12
Jul-09	40	38	18	4
	43	25	21	11
Aug-09	38	35	15	12
	46	28	14	12
Sep-09	44	23	17	16
	41	29	16	14

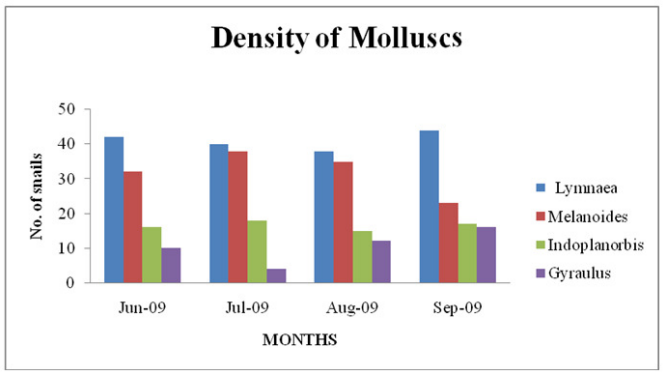

Fig. Showing graph of molluscan density in study area

As the algae abundant in monsoon, the density of mollusc was high in this season and the same situation observed at study area. Again, during every fort night random collection of the snails the numbers of *Lymnaea* was most drastic than other three mollusc. The reproductive biology of *L. acuminate* was done by Quazi [21]. According to her, the breeding season of *L. acuminata* was from July to September. According to the observation of density of the mollusc, the number of *Lymnaea* always leads may be due to the study period was the reproductive period of the snail. (The data collected for density of mollusc shown in the chart and graph)

Most authors recommended that the application of snails control measures should coincide with the time when the snails were abundant, when their populations built up and when conditions are optimal for their breeding and survival [14].Monsoon is the perfect season for snails population development regarding this area. The abundance of snails in this area is may be due to favorable conditions and vegetation in this season. As the density of population of mollusc was high, risk of spreading infection in this area also increases.

A relationship observed between the individuals found in this area as food chain. The vegetation present at the location, work as a producer on which primary, and secondary Consumers feed on. According to literature freshwater macrophytes are rarely eaten by snails [22] but they do provide shelter from predators and disturbances [5], egg-laying sites and substrates on which snails may crawl and they support growth of periphyton (algae and bacteria) which is an important food source [18]. The leaves and the stems of macro flora i.e. Frog bit, Creeping Jenny, Brahmi, Grass get used by the snail for egg laying sites and many egg clutches were observed on the leaves and stem of vegetation present there. Also it gets rid off from predators like fishes and birds. Snails act as primary consumer on which fishes grows and fishes *Clarias bactrachus* plays the role as final consumer. The reproduction of snails is reduced significantly when there are fewer aquatic plants as lacking of egg-laying sites and indirect effect on density because it increased chances of predation by fishes.

It is generally assumed that the aquatic vegetation offers a favorable habitat to the snails [10, 8, 16]. Abdel [1] andWatson [30] both concluded that snail can live and reproduce without aquatic vegetation. Although the soft parts of microphytes and the periphyton growing on them are the favorable food source [1][9], the snails are not strictly herbivorous [3]. In this respect the snails are not directly dependent on aquatic plants, but they may prefer a habitat with aquatic vegetation.

Investigations in Ghana have shown the omnivorous fish consumes considerably more snails, when the aquatic vegetation had been removed [20]. Leaves of floating plants protect snails from bright sun light and high temperature [9,13,17] at low water level, plants also protect them from drying out [4]. Aquatic vegetation may have a positive effect on the habitat of snails by supplying oxygen and absorbing toxic substances [1,13]. It is also assumed that macrophytes produce snail attracting chemicals [28].

Both, snails and tadpoles feed on periphytic algae and thus there should be a large potential for competitive interactions to occur between these two distantly related taxa. During experimental observation there was found competition among *L. acuminata, M.tuberculata, I. exustus, G. convexiculus* and tadpole larvae of R.tigrina and toad *D.melanostictus* for the common food source – algae. In exploitative competition interaction a resource is reduce by consumers, resulting in negative effect on consumers' growth and fecundity.

Osenberg [19] argued that the increased densities of snails found after an increase in resource level. This study argue that the increased density has an effect by increasing exploitative competition for food and addition of high quality food[26] or fertilization to increase algal production[19] increased the growth rate and especially fecundity.

Here at the field study area, though competition was observed but it does not affect the other population of competitor because the food source availability was abundant. Also there is no any drastic

effect of different snail population on each other during their coexistence.

Chironomous larvae have been used as pollution indicators by numbers of workers [11, 7]. The *chironomous* larvae abundantly found in this region suggesting that the water was polluted. As chironomous larvae fond in very much quantity the frogs which eat them also found. The frogs of various age groups found, suggesting there was a group who engage in increasing population size of their own community by reproduction. Rotifers also get consumed by fishes *Clarias batrachus* and amphibians i.e. frogs and complete one more side of food chain. Cyclops and Daphnia also consumed by fishes.

Some sheep and goats are also seen around the study area study area. Also domestic horses, buffalos found grazing on the grasses near the bank of river. The human living at the bank of the river uses its water for washing clothes and animals. Poultry birds frequently visit in this site as accumulation of Organic material found in abundant. The distribution and abundance of definitive hosts also influences the prevalence of trematode infection [25]. As the environment of this region supports molluscan population, the risk increases of spreading infection.The sewage water from neighboring houses also released in the riverine flow. As the regular dwelling of human and animals in this area, there can be chances of trematode infection attracts an attention at this site.

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REFERENCES

[1] Abdel Malek. E. 1958. Factors conditioning the Habitat of *Bilharziasis* intermediate host of the family Planorbidae, *Bull. W.H.O.*18:785-818.

[2] Atia M. M., El. Gindy M. S. Abou Senna H. O., Soud M.F.A.and Hassan M. M. 1984. Ecological studies on *Bulinus truncates* and *Biomphalaria alexandrina* in Zagazig, *J.Egypt,Soc. Parasitology*.14(1):245-250

[3] Baker F.C.1945. The molluscan family Planorbidae, *Univ.Illinois Press*, Urbana.

[4] Beadle L. C. 1974. The inland water of tropical Africa (An introduction to tropical Limnology) *Longman*, London.

[5] Bronmark C .1985. Freshwater snail diversity: effects of pond area, habitat heterogeneity and isolation. *Oecologia* 67:127-13

[6] Cheng, T. C. and F. O. Lee. 1971. Glucose levels in the mollusc *Biomphalaria glabrata* infected with *Schistosoma mansoni*. *Journal of Invertebrate Pathology* 18: 395-399.

[7] Curry, L. L. 1962. A survey of environmental requirements for the midge (Diptera,Tendipedidae). In: Biological Problems in Water Pollution. Transactions of 3rd seminar (Ed. Tarzwell), USDHEW, PHS, Robert, A. raft Sanitary Engineering Centre, Cincinnati.

[8] Dazoo ,B.C; N.G.Hairston and J. K.Dawood 1966. The Ecology of *Bulinustruncates* and *Biomphalaria alexandrina* and its Implification for the control of Bilharziasis in Egypt 49 Project Area. *Bull. W.H.O.*35:339-56.

[9] El Gindy, H. I. el 1960. On the ecology of snail intermediate Host of *Schistosoma* and *Fasciola.* Ph. D. Thesis, Faculty of Science, Cairo. University.

[10] El Gindy, H.I. el 1962. Ecology of Snail vectors of Bilharziasis Proc. Ith. Int. Symp. On Biharziasis pp. 305-18,Cairo Govt, Print.

[11] Gaufin, A.R. 1957. The use and value of aquatic insects as indicators of organic enrichment. Biological problems in water pollution. U.S. Public Health Service,Washington D.C. pp.139-14.

[12] Godan D. 1983. Pest slug and snails. *Springer-Verlag*, Berlin, Heidelberg, New York pp: 161+ 445.

[13] Heineman, D.W. 1973, Epidemalogie en bestijding van Schistosomiasis in Suriname. Ph. D. Thesis. University of Leiden.

[14] Kamel E.G.1984.Semi field studies on the bionomics of *Biomphalaria alexandrina* in *J.Egypt.Soc. Parasitology*.14 (2)483-493

[15] Kandel S.B., 1954. Flukes in Pakistan. Annals of Tropical Medicine and Parasitology, 48: 307-313.

[16] Mitchell, D.S. 1977. Water Weeds Problems in Irrigation System. Arid Land Irrigation in Developing Countries: Environmental Problems and Effects. *Oxford.* U. K; Pergaman Press 317-28.

[17] Odei ,M. A.1973. Observations On some Weeds of malacological Importance in the Volta Lake. *Bull.* De l'institute Fondamentals d'Afrique Noire, 35, 1:57-66.

[18] Okland J 1990. Lakes and snails. Universal Book Services, Dr W Backhuys, *Oegstgeest.* 516 pp.

[19] Osenberg C.W. 1989 Resource limitation, competition and the influence of life history in a freshwater snail community. *Oecologia* 79:512-519

[20] Paperna 1969, Studies of the Transmission of Scistosomiasis in Ghana III. Notes on the Ecology and Distribution of *Bulinus truncates* and *Biomphalariapfeiffri* in Lower Volta Benis; *Ghana Med*; 7:139-45.

[21] Quazi Ajmatunnisa 1974: Biological studies in India pulmonate snail *Lymnaea* Sp. Ph.d. Thesis Submitted to Marathwada University, Aurangabad, India.

[22] Reavell. P.E. 1980. A study of the diets of some British freshwater gastropods. I Conchol 30:253-271

[23] Salem Al., Osman M.M., El-Daly S.and Farahat A. 1993.Studies on *Lymnaea* snails and their trematode parasites Abis II Village, Alexandria,*J. Egypt.Soc.Parasitology*.23(2):477-483

[24] Shinde.S.S.,Kamtikar V.N.,Muley S.P.and Nimbalkar R.K.2011.Studies on physico- chemical parameters of water and Zooplaktons Diversity in Kham River in Aurangabad District(MS) India.*Bioscience Discovery,*02(2):207-213

[25] Smith, N.F. 2001 Spatial heterogeneity in recruitment of larval trematodes to snail intermediate hosts. *Oecologia* 127, 115-122.

[26] Spinach 1966: Eisenberg R.M. 1970 The role of food in the regulation of the pond snail, *Lymnaea elodes*. *Ecology* 51:680-684

[27] Stainty, G. R.and Jacob S.W.L.2003 Water plants in Australia Expanded 4th Edition, Stainty 7 Associate Darlinghurst.

[28] Sterry ,P.R.;J. D.Thomas and R. I.Patience 1983.Behavorial Responses of *Biomphalaria glabrata* (Say) to chemical factors from aquatic Macrophytes including decaying *Lemma paucicostata* (Hegelm.ex Engelm) 13(5):465-76

[29] Vincent,W.F.,Forsyth D.J.,1987. Geothermally influenced water. In :Inland waters of New Zealand,ed, Viner, A.B. *DSIR Bulletin 241;Wellington*. New Zealand, pp. 349-377

[30] Watson, J.M. 1958. Ecology and Distribution of *Bulinus truncatus* in the Middle East; *Bull. W.H.O.* 18:833-94.

[31] Yousif F., El- Emam M., Abd Kader, shraf El- Din A, El-Hommossany Kand Shift C 1998c. Schistosomiasis in newly reclaimed areas in Egypt, 1. Distribution and population seasonal fluctuation of intermediate host snails. *J. Egypt Soc.Parasitilogy*.28 (3):483-493

[32] Yousif F., Ibrahim A., Abd El- Kader A. and El – Bardicy S. 1998b Invasion of the Nile Valley in Egypt by a hybrid of *Biomphalatria glabrata* and *Biomphalaria alexandrina* snail vectors of *Schistosoma mansoni*. *J. Egypt. Soc. Parasitology*. 28(2): 569-582

[33] Yousif F, Kamel G, El-Emam M and Mohamed S.1993b Population Dynamics and Schistosamal infection of *Biomphalaria alexandrina* in four irrigation canals in Egypt. *J. Egypt. Soc. Parasitology*. 23(3):621- 630

[34] Yousif F., Kamel G., El-Emam M. and Mohamed S. 1993a ecology of *Biomphalaria alexandrina* the snail vector of *Schistosoma mansoni* in Egypt. *J. Egypt.Soc. Parasitilogy* 22(1):29-42

[35] Yousif F.,El- Emam M, Abd Kader A.,Shraf El- DinA.El-Hommossany K. and Shiff C1999. Schistosomiasis in newly reclaimed areas in Egypt,2. Patterns of transmission.*J.Egypt.Soc. Parasitology*.29.(2):635-648

[36] Yuosif F, El- Emam M 7 El- Sayed K.1998a Effect of sex on non-target snail on *Schistosoma mansoni* miracidial host finding and infection of *Biomphalaria alexandrina* under laboratory conditions. *J. Egypt.Soc. Parasitology* 28 (2):559-568