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Distribution of Leech Faunal Diversity in Ecosystem of Dharni Region

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ABSTRACT

Biodiversity is one of the important cornerstones of sustainable development and represents the biological wealth of a given nation. A common misconception about leeches is that there is only one kind of leech. In fact, there are wide variety of species of leeches worldwide and they can be found in a variety of different habitats including marine, estuarine, moist and freshwater ecosystems. Within these habitats, leeches can be found attached to various substrates including fish and other marine creatures, underneath rocks or clinging to vegetation (moist terrestrial), or living on stones, and aquatic vegetation in ponds, streams, and rivers. Leeches (Hirudinea) constitute a relatively small monophyletic group of highly specialized annelids and play important roles as invertebrate predators in freshwater, while others are infamous for their ectoparasitic bloodsucking. They are globally distributed on all continents with one-half of all continental species, known for their local endemism.

Keywords: Leech, Faunal Diversity, Dharni

Introduction

Leeches are hermaphroditic annelids with totally reduced chetae and parapodia which are dominant in other classes of Phylum. Leeches has unpaired male and female genital pores in the region of clitellum which is glandular region in the body of leech. Sawyer [1] Leech has anterior and posterior sucker from which the anterior sucker is used for attachment and useful in blood sucking while the posterior sucker is only for the attachment to host body.

The body of leech is annulated in appearance, each annulus or somite is superficially divided into usually three to five sub annuli or segments sometimes these annuli may reach to ten in number. Most of the leeches are sanguivorous on vertebrates or invertebrates others are predatory mainly and very few are scavengers in their mode of feeding. leeches have four clades, Piscicolidae and Glossiiphoniidae species are having oribosis; Hirudiniformes species are having Jaws, Erpobdelliformes species are predaceous. The Hirudiniformes and Erpobdelliformes are sister groups and usually called as Arhynchobdellids due to lack of proboscis. Leeches from family Piscicolidae are mainly found in marine water and parasitic on fishes mainly**.** Glossophonidae family members are most diverse. The species from family Erpobdellidae are exclusively predatory and found either on land or in water [2]. A small number of sanguivorous species known as ''medicinal leeches'' have played an important role in traditional and modern medicine.

The medicinal leech species *Hirudo medicinalis* was used in human treatment and are very effective creature. Bloodletting is an ancient method which has been used extensively in treatment of various disorders since centauries in the natural medicine. The substance extractred from the saliva of leech is power anticoagulant. Major known enzymes in the saliva of the leech are anti-coagulant, anti-inflammatory, anti odimatous and analgesic in nature [3].

India is one among the 12 mega biodiversity countries of the world. A quick glance at the biological diversity reveals that Leech (Hirudinea) fauna of the world accounts to 680 species, of these 482 species are freshwater, 102 marine and remaining 92 species are terrestrial. Uptill now Leech fauna is represented by 64 species from Indian region (ZSI).

Very little is known about its exact distribution, specific habitat, and conservation status because of a dramatic decline in their natural populations, it is subject to considerable conservation effort. Despite all attention, there is confusion regarding the taxonomic status of different morphological forms.

Methodology

The leeches were collected in various seasons from Dharni region of Melghat. Different habitats like rivers streams, water bodies, and stagnant water pools isolated ponds were selected for sample collection.

Collection was done with the help of nylon net and cotton clothes. The success of the catch was found maximum in the shallow water of the habitat where the buffalo enter and sit in. They were found as a ectoparasites on buffalos, crusteceans, molluscs, fishes, these leeches were also collected. The preservation of leeches (Hirudinea) is much more difficult in comparison to those of Oligochaeta and Polychaeta. The difficulty arises from their great capacity for contraction and extension. The collected specimens were brought to laboratory and are placed in a petridish with small quantity of water and narcotized with the help of alcohol added gradually, in which leeches usually die extended. When they no longer respond to pinching of needles, the surplus mucous was removed by passing them rapidly between the fingers. The specimens are straightened and placed extended side by side in a flat dish, Then 2% formaldehyde is poured on the specimen. After they have been fully stiffened they were kept in 4% formaldehyde. The specimens were placed in glass bottles of sufficient length and diameter to avoid overcrowding and distortion. The proper and satisfactory study of leeches can be made with living or recently preserved specimens, because these alone exhibit the true colours, The details of annulation, surface sculpture can be studied satisfactorily on properly hardened specimens.

Sample preparation for Scanning Electron Microscopy (SEM)

SEM preparations generally involves immediate fixation of samples to avoid autolysis, putrefaction and drying effects, which may destroy the ultrastructural integrity of tissues. Small pieces of tissues were taken and fixed in glutaraldehyde. SEM analysis was performed at Visvesvaraya National Institute of Technology, South Ambazari Road, Nagpur. On the day of SEM dehydration of samples were carried out in a graded series of alcohol. After

that samples were dried and handed over to technician for further process.

Results and Discussion

In present study the area around Melghat region are explored for the collection of leeches. The survey was conducted during 2018-2020 from the area of melghat region particularly Dharni, The samples were collected from the month of July to January 2018 to 2020 on random basis.

Collection was done with the help of nylon net and cotton clothes. Searching under the stones in water. Searching scars on the body of host animals. The success of the catch was found maximum in the shallow water of the habitat where the buffalo enter and sit in. They were found as a ectoparasites on buffalos, crusteceans, molluscs, fishes, these leeches were also collected.

The samples were brought in the laboratory for observation and photography. The species were identified with the help of reference material.
It has been seen that due to vegetation and temperature, number of wetland leech species and population density of them varies.

In the present study 06 species of leeches belonging to 5 genera from 03 families were recorded.

***1. Herpobdelloidea lateroculata* (Chandra 1983)**
Diagnostic characters: The size of leeches are smaller and slender. The body is of nearly similar breadth posterior to the genital region, from which it tapers gradually towards the anterior end. The dorsal surface is more or less rough having minute papillae which present no regularity in arrangement. The size is about I4 mm long by 3 mm. broad at the middle of the body. Counting the first oculiferous ring as the first ring there are in all 109 rings, which appear to be grouped somewhat as follows,- somites i, ii, iii and xxvii are uniannulate; xxv and xxvi biannulate; iv Head small, lipless, prolonged and narrow. Clitellum well developed. The male genital orifice is placed on the middle ring of somite xi, the female orifice lies two rings behind the male,that is between somites xi and xii. The anus is situated dorsally between somites xxiv and xxv.

2. ***Hirudo* (*Asiaticobdella) Birmanica* (Blanchard 1894)** Anderson, [7] Sawyer, [8]
Diagnostic characters: body slender and small headed. Length is about 8 cm to 12 cm long, colour olive or olive brown with seven brown dorsal stipes, the outer (supra –marginal) of which includes darker quadrate spots on b6 and b1 of every complete annulus; a broad, clear yellow marginal and dusky sub marginal stripe.

The living specimens have a dark brown dorsal side with a black segmentally arranged pattern, the ventral side is a little bit lighter with black stripes and a dark greyish intermediate field. The body is dorsoventrally slightly compressed and cylindrical. Cephalic sucker small and caudal sucker of medium size. Jaws short and high bearing 43-59 conical teeth. Eyes small. The first three pairs of eyes on contiguous annuli, the fourth separated by one annuli and the fifth by two. Complete somite from IX to XXI I and quinquannulate. *Asiaticobdella birmanica* (Blanchard, 1894) is commonly named as 'Buffalo leech' (Sawyer, 1984; Chavan *et al.*2010) because the leech mostly prefer to be attached to Indian domestic Buffalo (*Bubals bubalus*) body for blood sucking as temporary ecto-parasite.

3. *Poecilobdella manillensis* (Lesson, 1842)
Diagnostic characters: Body larger and robust broad headed, circular in buccal region, broadly elliptical elsewhere with sides broadly rounded. Dark olive green, varying to bright olive green, or to olive brown, yellowish brown and brown on the dorsum, marked by a continuous or broken median dorsal line of black, dark brown or green much darker than ground colour irregular, wavy, and narrow black lines on each side more or less broken or distinct and black, dark green supramarginal spots on every second (b2) and fourth (b5) annulus of each somites. The body consistence is firm with a very rough surface due to the presence of numerous large papillae. Lip very broad and rounded. Jaws all alike with prominent papillae of two sizes. Teeth very numerous, about 150, about half of them very small and the series tapering to the vanishing point. Gonopores separated by five annuli like

granulose. The male genital pore is situated in the furrow XI b5/b6, the female in. XII b5/b6. Nephropores in line with or a little lateral of ventral intermediate sensillae. The largest specimen has a total length of 70 mm and is 15 mm wide.

***4. Poecilobdella granulosa* (Savigny 1820)**

Diagnostic characters: Size large and form robust than other species of the genus *Poecilobdella.* Colour of dorsum varied shades of olive-green, often divided by one or two pairs of yellowish longitudinal stripes, and marked by a black pattern consisting of a median constricted or broken line; four pairs of narrow wavy lines bordering the yellow stripes. Typically the outline is greatly elongated ovate, with maximum width at the beginning of the caudal third, but individuals with the stomach completely empty have the maximum width farther forward near the middle Head very broad, the lip short and rounded ,lip constituted of somites I to IV, which are wrinkled and more or less divided into quadrate areas obscuring the annulation. Gonopore at XI *b*5 /*b*6 and XII *b5/b6*. Caudal sucker not exceeding two -third of body width in normal extension. Sensillae prominent, elliptical, and oblique. Gonopores in typical position at XI and XII b5/b6. Male orifice a minute circular pore in the centre of an elliptical or lozenge shaped area extending half way across the bounding annuli; female pore a larger transverse slit with rugous margins. Annuli sharply defined and of equal length throughout the middle body region.

Table 1.Leech Species Collected from study Area

Study place	*Herpobdelloidea lateroculata*	*Hirudo (Asiaticobdella) Birmanica*	*Poecilobdella manillensis*	*Poecilobdella granulosa*	*Poecilobdella viridis*	Paraclepsis praedatrix
Dharni	02	13	15	17	19	03

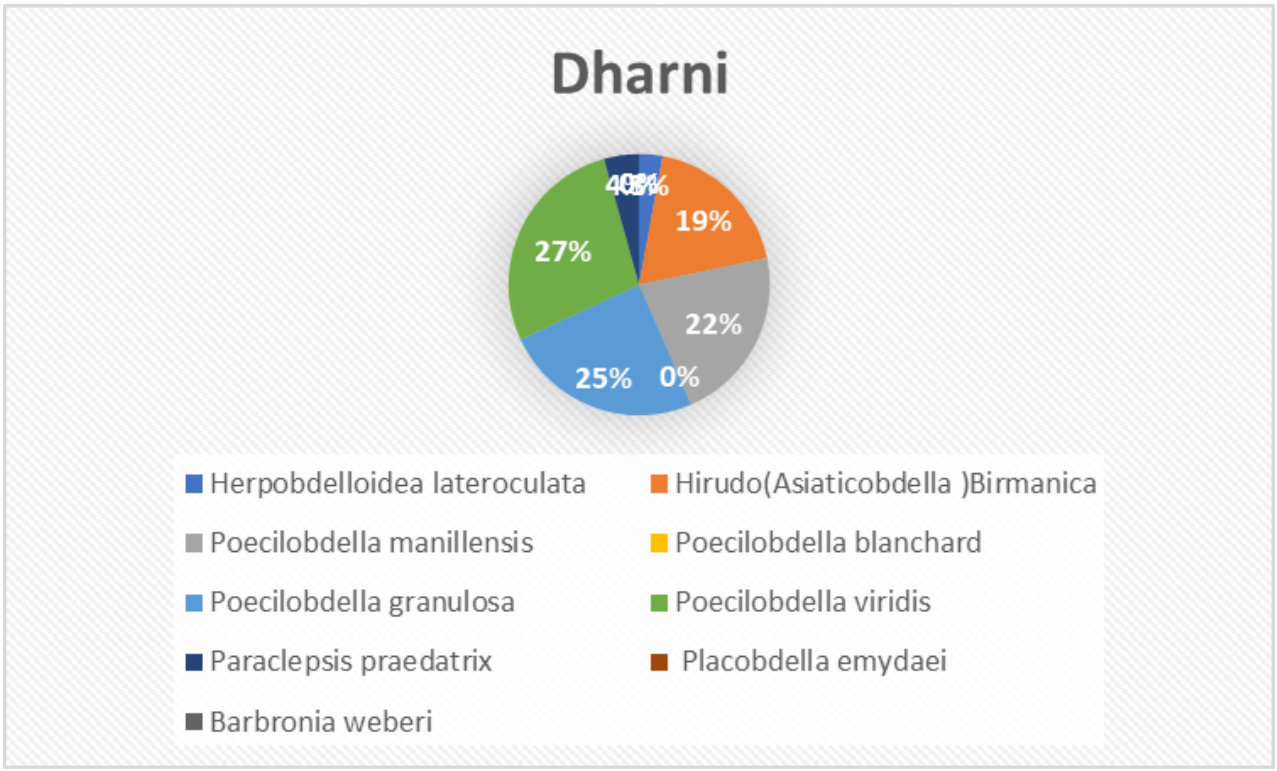

Figure 1: Species Collected from Dharni Region

***5. Poecilobdella viridis* (Moore 1927)**

***Diagnostic Characters*:** The general form of this species is similar to that of *P. granulosa,* colour is more

greener and pattern disintegrated more completely earlier in life. The black pattern is chiefly limited to transverse rows of midmetameric spots. Dorsum is bright olive-green and venter in greyish-green, sharply separated by bright marginal orange stripes. Head a little broader. Jaw prominent, bearing on each side about sixty outstanding rounded papillae 0.05 to 0.095 mm.in diameter; the median jaw somewhat larger, with 100-105 teeth, the paired with 90-92 teeth. The lip marked on the venter by a median furrow. Sensillae disposed as in H. granulosa but, though appearing conspicuously on the dark background, they are smaller and less elongated, generally white spots on a clear elliptical area; dorsal intermediate largest.

***6. Paraclepsis praedatrix* (Harding 1924)**

Diagnostic characters: These are freshwater leeches with ovate, flattened body. Body length is about 14.5mm, breadth 4.4mm. Breadth of anterior sucker7mm.-1.5mm. Breadth of posterior sucker-1.2mm.-3.6mm. Anterior sucker ventral and fused with the body. Posterior sucker cupuliform, distinct from the body, with more or less ventral aspect.

Stripe-Three dorsal lines and one mid ventral line. On the anterior and posterior thirds of the body pigment cells formed a broad and somewhat irregular longitudinal band, interrupted along the middle by a colorless line; a transverse colorless line ran across the body just behind the 'head' which was profusely covered with green pigment –cells. The posterior sucker centrally attached and rather less in diameter than the greatest width of the body.it bears a series of submarginal papillae it bore faint, radiating green lines.

In the present survey the leeches belonging to Order – Rhynchobdellida and Order- Arhynchobdella were observed. The order – Rhynchobdellida having Family – Glossiphonidae, two species of one genera were recorded (*Paraclepsis praedatrix)*, while the leeches belonging to Order – Arhynchobdellida 02 families were recorded ,Family- *Erpobdellidae,:* one species belonging to genus Herpobdelloidea ware observed (*Herpobdelloidea lateroculata,*. Family – *Hirudidae* having 04 species belonging to 02 genera were recorded (*Hirudo birmanica, Poecilobdella manillensis, Poecilobdella granulosa, Poecilobdella viridis).* Scanning electron micrographs (SEM) of jaws of Family *Hirudidae* were carried out. In these species triradiate mouth were observed with many teeth.

Conflicts of interest: The authors stated that no conflicts of interest.

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