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A Report on Bryozoan Fauna of Jayakwadi Bird Sanctuary, Maharashtra, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The study attempts to understand the freshwater Bryozoan fauna of the Jayakwadi Bird Sanctuary, Maharashtra, India. The samples were collected and were identified based on colony morphology and floatoblast morphometry. Seven species belonging to the genus *Lophopodella*, *Plumatella*, *Rumarcanella*, *and Hislopia* were recorded. The study added valuable information on faunal resources in the Jayakwadi Bird Sanctuary.

Keywords: Freshwater Bryozoa; Jayakwadi Bird Sanctuary; Lophopodella; Plumatella; Rumarcanella; Hislopia.

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1. INTRODUCTION

Bryozoa (also known as Ectoprocta, Polyzoa, Sea mats. Moss animals) are aquatic, sessile animals found attached to some submerged substratum in water viz wood, rock, plastic, rubber tires, painted metal, glass, macrophytes and other all possible substratum as colonies of genetically identical zooids [1]. Freshwater Bryozoans are represented by Class Phylactolaemata and Class Gymnolaemata. Bryozoan taxonomy is complicated and depends largely on colony morphology and statoblast (asexual reproductive bodies) morphology [2]. Colony morphology can often determine the genera. Nevertheless, the surface features of statoblasts studied by Scanning electron microscopy (SEM) provide useful data for species identification [3]. According to Wood [4], there are at least 24 species of Phylactolaemate species reported from India by resolving all the synonymies. Jayakwadi Bird Sanctuary or Nathsagar is the largest dam in Maharashtra (19°29'8.7"N. 75°22'12"E) on the Godavari River. It was declared a Jayakwadi Bird Sanctuary in 1986 by the Government of Maharashtra. This is the first attempt to explore the Bryozoan fauna of the Jayakwadi Bird Sanctuary.

2. MATERIALS AND METHODS

Bryozoa samples were collected in the form of colonies and statoblasts using a random sampling technique. Intact colonies were collected from the substrates as described by [3], brought to the lab in separate polythene bags and observed under a Stereozoom Dissecting Microscope.

Free-floating statoblasts were collected using Bolten silk (No.25) 40µm plankton net and preserved in 70% Ethanol for Scanning Electron Microscopy (SEM). A few statoblasts were kept in water for germination. The debris was removed by vigorously shaking the statoblasts with 0.1N Sodium Hexametaphosphate as suggested by [5], dried and examined with Scanning Electron Microscopy (SEM). The identification process relied on the keys and explanations provided by Annandale [6], Lacourt [7], Rao [8], as well as Wood et al. [9,10].

3. RESULTS AND DISCUSSION

In the current study, seven species of freshwater Bryozoa were recorded from Jayakwadi Bird Sanctuary. Among the seven species, five species namely Lophopodella carteri (Carter, 1859), Plumatella casmiana (Oka, 1907), Plumatella emarginata (Allman, 1844), Rumarcanella vorstmani (Toriumi, 1952) and Plumatella javanica (Kraepelin, 1906) belong to the class Phylactolaemata and two species Hislopia malayensis (Annandale,1916) and Hislopia lacustris (Carter, 1858) belong to class Gymnolaemata were recorded from Jayakwadi Bird Sanctuary.

Species-(I) Lophopodella carteri (Carter, 1859): The colony was gelatinous but firm with soft and transparent walls. The statoblasts exhibited a generally oval shape, with flattened points on each side, and they displayed a graduated arrangement of spines with barbs or hooks on both ends (Fig.1 A). Among these spines, those positioned in the middle were the longest, while the ones at the ends of the sequence were the shortest. This feature is distinct for the genus Lophopodella [11].

Species-(II) *Plumatella casmiana* (Oka, 1907): The colony was neat with tubules short, richly branched, and lying flat along the substratum. Statoblasts were 364 µm long and 205 µm wide with an inner capsule with long and lightly tuberculated fenestrae. The annulus of both valves was slightly wider at the poles than along the sides (Fig.1 B).

Species-(III) *Plumatella emarginata* (Allman, 1844): The colonies were compact with heavily branched tubes. Floatoblasts were broadly oval or elliptical about 559 μ m long and 318 μ m wide. Fenestra with tubercles distinct from the ventral valve. The annulus was three times wider at the poles than laterally (Fig.1 C).

Species-(IV) *Rumarcanella vorstmani* (Toriumi,1952): The colony was found to grow flatly along the substratum viz. rock. Zooids were present in linear series oriented parallel to the main branch axes. The floatoblasts were laterally symmetrical, with irregular outlines about 265 μ m long and 196 μ m wide (Fig.1 D). The dorsal valve of the fenestrae had well-defined capped tubercles, the ventral fenestra bearing a distinct central protuberance.

Species-(V) *Plumatella javanica* (Kraepelin, 1906): The colony is light grey to transparent in colour and encrusted. The colonies are sprawling and diffused, with tubules attached to the substratum throughout their length. The zooids are diffused and recumbent. The ends of the

branches often rise from the substratum. The colony morphology is as described by Smith [12] and Hirose [13]. The examined floatoblasts are large in size and elliptical. The floatoblast is 310 um long and has 214 um widths at the centre with a length-width ratio of 1.45. The ventral fenestrae of the floatoblast have 222 um length and 164 um widths with a length-width ratio of 1.35 (Fig.1 E). The ventral fenestra of floatoblast is comparatively larger than the dorsal fenestra and the surface of the fenestra is entirely covered by minute and rounded tubercles.

Species-(VI) *Hislopia malayensis* (Annandale, 1916): The colony was flat with nearly flat zooids radiating in all directions from a central point. It was found on a piece of glass. The old zooids

appeared brown while the newly formed ones were transparent. The distal expansion that develops later as a daughter zooid and the absence of spines around the orifice of the zooids is the diagnostic character of the species (Fig.1 F) [14,9].

Species-(VII) *Hislopia lacustris* (Carter, 1858): The colonies were abundantly found on glass, rocks, rubber, cloths and bottles. The chitinous outer covering of the zooecium displayed an approximately oval shape and was transparent, allowing for clear visibility of the soft internal body parts. The colonies take on an encrusting growth pattern on the underlying surface, with individual organisms maintaining their distinct positions without overlapping or growing over each other (Fig.1 G).



Fig. 1. Floatoblast of A) Lophopodella carteri B) Plumatella casmiana C) Plumatella emarginata D) Rumarcanella vorstmani E) Plumatella javanica F) Colony of Hislopia malayensis and G) Colony of Hislopia lacustris

The present study has revealed a diverse bryozoan community within the Javakwadi Bird ecosystem, encompassing Sanctuarv the identification of seven distinct species. This finding not only contributes to the growing knowledge of bryozoan diversity but also sheds light on the unique ecological dynamics of this aquatic habitat. Comparisons with prior research highlight the significance of these findings, as many of these species were previously not recorded in this region. The coexistence of multiple species highlights potential niche differentiation, suggesting varying ecological roles within the dam ecosystem [15].

4. CONCLUSION

These findings not only deepen our understanding of local biodiversity but also have far-reaching implications for conservation efforts and the broader ecological health of the Jayakwadi Bird Sanctuary.

COMPETING INTERESTS

The authors have declared that no competing interests exist.

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