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## STUDIES ON THE PHYSICO-CHEMICAL AND BIOLOGICAL PROPERTIES OF TWO MAN MADE LAKES OF CALCUTTA

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### INTRODUCTION

Lakes, both natural as well as man made, constitute an important component of fresh water resources, because of their diverse uses. The aquatic environment of such lakes support a variety of flora and fauna which include the biotic community of phytoplankton, macrophytes, zooplankton, benthos, nection etc. Together with the prevailing physico-chemical condition of water and soil, these biotic communities form an interdependent and balanced ecological system. Generally, lakes situated in urban areas are mainly used for recreational purposes like swimming, bathing and other water sports. However, many a times, these water bodies are subjected to undesirable uses such as discharge of industrial and domestic effluents or excessive use by surrounding dense human population for a variety of purposes and thereby degrading the water quality considerably.

In Calcutta metropolitan, there are two medium sized man made lakes viz. Rabindra Sarovar and Subhas Sarovar. Subhas Sarovar, situated in north eastern part of city covers an area of 39.5 acre. Rabindra Sarovar situated in Southern part of city is larger than Subhas Sarovar and covers an area of nearly 72 acres. No organised fishing activity is being carried out in these lakes, except sport angling in Subhas Sarovar. Recently these two lakes have been included in National Lake conservation plan by Ministry of Environment and Forests and Rabindra Sarovar has been declared as National Lake.

Several earlier studies on the urban recreational ponds of the country (Michael, 1962, Sreenivasan, 1964, 1965, 1976; George, 1966; Ganapati and Sreenivasan, 1970; Jana, 1979; Zutsi and Vaas, 1982; Zafar, 1966 Kulshrestha, 1988,) also pointed out their altered ecological condition due to excessive undesirable uses. In spite of their importance in Calcutta Metropolitan, these lakes have yet not been properly investigated. Excepting few earlier studies of specific nature on primary productivity and zooplankton by Khan (1979, 1981, 1985) in Rabindra Sarovar practically no information is available on general limnological condition of these two lakes. Therefore, the present studies were undertaken for two consecutive annual cycles, 1996-97 and 1997-98. with a view point to work out the physico-chemical characteristics of water, phytoplankton, rate of primary production and diversity and abundance of zooplankton of the two lakes.

**NOTES ON THE GENUS *PREPARCHUS* BURR (INSECTA :  
DERMAPTERA) WITH THE DESCRIPTION OF A NEW SPECIES  
FROM INDIA**

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**INTRODUCTION**

This genus was erected by Burr (1911) for the reception of *Opisthocosmia minuscula* Bormans (1984) described on a female from Sumatra and figured the ultimate tergites and forceps of male, besides head and pronotum, antennae and tarsus. The locality record is mentioned as Sumatra and Borneo and the said male should be from latter area.

*Pareparchus* can be separated from other genera of Opisthocosmiinae by comparatively shorter and thicker antennal segments, semicircular transverse pronotum and transverse ultimate tergite.

At present, besides type species, *P. pelvimeter* Hebard (1923) from India is included under the genus. The described species differs from both the known species in general colouration and the forceps, in males, having branches regularly incurved, cylindrical and with a triangular inwardly direct tooth near base.

***Pareparchus* Burr**

*Pareparchus* Burr, 1911, *Genera Insect.*, 122 : 92 (Type species : *Opisthocosmia minuscula* Bormans, 1884); Townes, 1945, *Ann. ent. Soc. Am.*, 38 : 353; Popham & Brindle, *Entomologist*, 98 : 135; Kapoor, 1967, *Agra Univ. J. Res. (Sci.)*, 16(1) : 34; Popham, 1968, *Entomologist*, 101 : 277; Sakai, 1970, *Dermapterorum Cat. Prael.*, 7 : 49; Sakai, 1982, *Bull. Daito Bunka Univ.*, 20 : 46; Sakai, 1994, *Dermapterorum Cat.*, 26 : 5483, Srivastava, 1976, *Rec. zool. Surv. India, Occ. pap.*, 2 : 69; Steinmann, 1989, *World Catalogue of Dermaptera* : 719; Steinmann, 1993, *Das Tierreich*, 108 : 267.

Size small to medium; slender. Antennae multi-segmented, basal segment shorter than the distance between antennal bases; 3rd and 4th sub-equal, former slender and latter stouter, 5th onward segments gradually increasing in length, not slender. Eyes shorter than post-ocular area.

Pronotum transverse and semicircular. Elytra and wings well developed, former not keeled along the costal margin. Legs slender, hind tarsi with 1st segment equal to 3rd; 2nd briefly lobed, claw without an arolium. Ultimate tergite transverse, sloping backwards. Forceps, in males, stout, elongated.

*Type species* : *Opisthocosmia minuscula* Bormans 1884.

*Distribution* : Oriental Region.

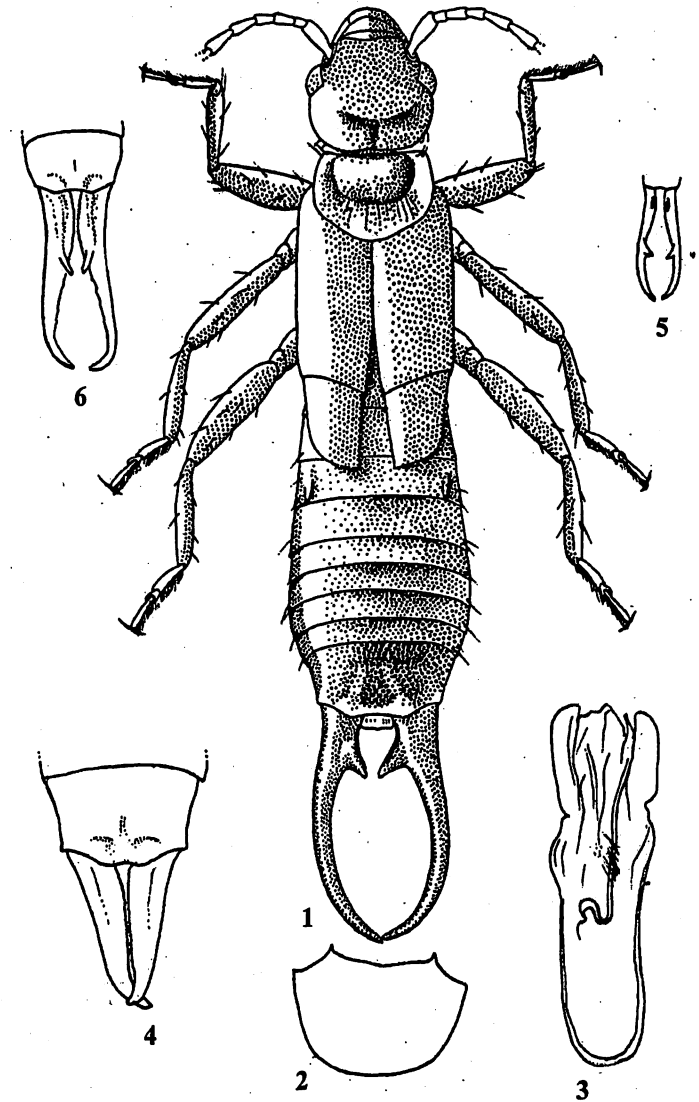
*Key to species (basal on males only)*

- 1(4). Size smaller (7.0 to 7.4 mm, including forceps)  
 2(3). Abdominal tergites strongly punctate; forceps regularly incurved from base to apex, at base close to inner dorsal border with a sharp, triangular, inwardly and posteriorly directed tooth (figs. 1-4). ..... *P. pillai* sp. n.  
 3(2). Abdominal tergites weakly punctate; forceps with branches sub-contiguous in basal 1/4, afterwards incurved enclosing oblong space, at base above with a short vertical crest and in apical 1/3 a triangular tooth directed inwards (fig. 5) ..... *P. minusculus* (Bormans)  
 4(1). Size larger (11.1-13.5 mm, including forceps) (fig. 6) ..... *P. pelvimeter* Hebard

*Pareparchus pillai* sp.n.

*Male* : General colour chocolate brown with shades of black; pronotum on sides and posteriorly, legs and basal two antennal segments yellow; elytra with a yellow oblong patch near shoulder, wings yellow with a faint stripe of brown in middle.

Head about as long as broad, smooth, hind margin scarcely emarginate in middle, frons convex, sutures faint. Antennae 12-segmented, stout, basal segment stout, gently expanded apically, shorter than the distance between antennal bases; 2nd about as long as broad; 3rd long, slender; 4th a trifle shorter than preceding, stouter, expanded apically; 5th stouter, longer than 3rd; remaining gradually increasing in length. Eyes distinctly shorter than post-ocular area. Pronotum transverse, smooth, sides along with hind margin semicircular, median sulcus distinct, prozona tumid; metazona depressed. Elytra and wings well developed and smooth. Legs typical of the genus, hind tarsi with 1st segment compressed, equal to 3rd; 2nd briefly lobed, clad on underside with pubescence. Abdomen long, gently enlarged in middle, tergites convex, blackish brown, along the hind margin yellowish brown, shining, punctate. Penultimate sternite transverse, shallowly punctate, hind margin rounded. Ultimate tergite transverse, weakly convex, gently narrowed and sloping backwards,



Figs. 1-6. *Pareparchus pillai* sp.n., Holotype Male, 1. Dorsal view; 2. Penultimate sternite; 3. Genitalia; Paratype Female, 4. Ultimate tergite and forceps; *Pareparchus minusculus* (Bormans), Male, 5. Ultimate tergite and forceps; *Pareparchus pelvimeter* Hebard, Male, 6. Ultimate tergite and forceps.

(Fig. 5 after Burr, 1911)

punctures deeper than on the other abdominal tergites, posteriorly in middle faintly depressed, hind margin incassate, straight in middle, laterally oblique above bases of forceps. Pygidium vertical, transverse, posterior margin in the middle with a small triangular point. Forceps cylindrical, tapering apically, regularly incurved, with tip gently hooked, internal margin unarmed, at base a sharp, triangular tooth directed inward and posteriorly close to inner dorsal border present. Genitalia with parameres flat, longer than broad, virga thin and tubular.

*Female* : Agrees with male in most characters except that pronotum is complete yellow; elytra unicolourous with a shade of yellow in middle; abdominal tergites obscurely punctulated; ultimate tergite more narrowed posteriorly, punctation heavier than on the other abdominal tergites but weaker than in Male; forceps simple and straight.

*Measurements* : (in mm).

	Holotype	Paratypes	
	Male	2 Male	1 Female
Length of body	- 5.5	5.3-5.4	7.0
Length of forceps	- 1.5	1.6-1.7	1.7

*Material examined* : Holotype Male, India : Kerala, Kayapara Forest, 1160 m, 24.xii.1980; 1 nymph, with same data; Paratypes : 1 Male, 1 Female, 2 nymphs, Silent valley and Kayapara Dam site, 9.xii.1980 (*R.S.Pillai* coll.); 1 Male (genitalia mounted between two coverslips and attached to the pin of specimen), Nilgiri Hills, Devala, 3200 ft.,...x.1980 (*P.S. Nathan* coll.).

*Remarks* : Some variations are noted in the colour. In the paratype Male from Nilgiri Hills, Devala the elytra and wings are almost unicolourous brown. Posterior margin of tergites is however lighter in colour.

This species is close to *Pareparchus pelvimeter* Hebard, but differs by its smaller size, i.e., 7.0-7.1 in Males (vs 11.0-13.0 mm in *Pareparchus pelvimeter* Hebard); heavier punctation on abdominal tergites (vs obscurely punctulated) and forceps cylindrical, regularly incurved from base to apex, internal margin armed with a triangular tooth, directed posteriorly and inwards, situated near base (vs branches depressed and contiguous in basal 1/3, afterward compressed, incurved, enclosing broadly oblong space, internal margin serrated, a vertical, triangular tooth directed posteriorly inwards situated at basal 1/3).

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