

A report on the extended distribution of a rare Indian freshwater mussel species (Mollusca: Bivalvia: Unionidae)

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ABSTRACT

Freshwater mussels are well known as 'Ecosystem Engineers' for the ecosystem services they provide. Therefore knowledge of their distribution and conservation will help in sustaining natural ecosystems. This study reports on the extended distribution of a rare Indian freshwater bivalve, *Lamellidens daccaensis* (Preston, 1912) from River Krishna, Nagarjuna Sagar, Telangana, India. This note is a first record of the species from South India. The re-description and taxonomic history of *Lamellidens daccaensis* and related species are provided in this article.

Keywords: Distribution; Freshwater Bivalves; India; *Lamellidens daccaensis*; Unionidae.

INTRODUCTION

Freshwater mussels (Unionidae) are renowned as 'Ecosystem Engineers', for their valuable ecosystem services. These include filter-feeding on organic matter, phytoplankton, zooplankton, bacteria, algae etc., suspended in the water and excrete fine particulate matter, thereby improving the water quality[1]. The freshwater mussels of India are poorly known compared to that of the other countries. Therefore the study on distribution of freshwater mussels and their conservation, in India, will aid in sustaining natural ecosystems. The present note reports a new record of a rare mussel from India, *Lamellidens jenkinsianus daccaensis* (Preston, 1912) from River Krishna, Nagarjuna Sagar, Telangana.

MATERIALS AND METHODS

Our collection of *Lamellidens jenkinsianus daccaensis* (Preston, 1912) from River Krishna, Nagarjuna Sagar, Telangana [FBRC/ZSI/INV/1138 (four specimens)], registered at Freshwater Biology Regional Centre (FBRC), ZSI, Hyderabad was re-described and compared with the holotype M 6105/1, Zoological Survey of India, Kolkata. In addition, the specimens are identified by matching with the descriptions and figures given by Subba Rao[2].

RESULTS AND DISCUSSION

The systematic account of the species is given below:

Lamellidens jenkinsianus daccaensis (Preston, 1912)

Parreysia daccaensis Preston, 1912, *Records of the Indian Museum* 7: 300. Type locality: Dacca, [Bangladesh], Simpson 1914:231; Preston 1915:165 text fig 16[3]; Haas 1969:121[4].

Lamellidens jenkinsianus daccaensis: Prashad, 1920, *Records Indian Museum* 19: 173, pl.ix, figs.5-8; Subba Rao, 1989:167, figs. 394-397; Ramakrishna & Dey, 2007:286, fig. 289A-B.

The measurements of the holotype (ZSI-M 6105/1) and the four collected specimens (FBRC/ZSI/INV/1138) in millimeters:

	Holotype	I	II	III	IV
Length	81.1	68.5	65.7	74.2	72.3
Height	47.0	43.3	38.5	42.4	40.5
Depth	30.2	23.7	25.8	28.0	25.0

Shell elliptical, broad with external shine; periostracum light to dark brown in color; nacre pinkish; anterior end rounded and compressed; posterior end swollen; posterior ridge slightly convex; shell maximum inflated from middle to the posterior ridge; sculpture with rays of sharp lines radiating from umbo towards the ventral margin, sculpture prominent in the anterior region and faded out gradually towards the posterior region; escutcheon and lunule present; hinge teeth well formed; dentacle present; pseudocardinals two in each valve, pseudocardinal towards the dorsal margin in the left valve feeble and more prominent in adults; two laterals in the left valve and one in the right; striations vertical in pseudocardinals and oblique in laterals; elevator muscle scars clearly seen, anterior adductor muscle scar ovate, anterior retractor muscle scar lies along the upper two-thirds of the posterior margin of the anterior adductor muscle scar, posterior adductor muscle scar oval, posterior retractor muscle scar triangular and continuous with the posterior adductor muscle scar on the dorsal margin, pedal protractor muscle scar elliptical and well separated from anterior adductor muscle scar; pallial sinus absent.

Distribution: This species has been reported from Bangladesh and from east India- Bihar and Assam. Neesemann's team has reported the species as endemic to the Gangetic delta[5]. The recent paper on the fauna of Andhra Pradesh[6] and an older study on freshwater mollusca in Guntur district of Andhra Pradesh did not report the occurrence of this species[7]. Probably they have missed to collect this particular species. The first author collected four specimens from left bank, near Hill colony, River Krishna, Nagarjuna Sagar, Telangana, India on 27 June, 2014(Figure.1).



Figure 1: A. Nagarjuna Sagar specimen (68.5 x 43.3 x 23.7) B. Holotype (81.1 x 47 x 30.2)

This note is the first record of the species from South India, faraway from its original discovery. More collections are needed in between these intervening locations. Until such time, it is difficult to comment on the disjunct distribution of this species. The extended distribution of *Lamellidens daccaensis* (Preston, 1912) in Nagarjuna Sagar,

Telangana, India is shown in the Map in Figure 2. The available information on distribution of the former and its allied species is taken from MUSSELPDatabase[8].

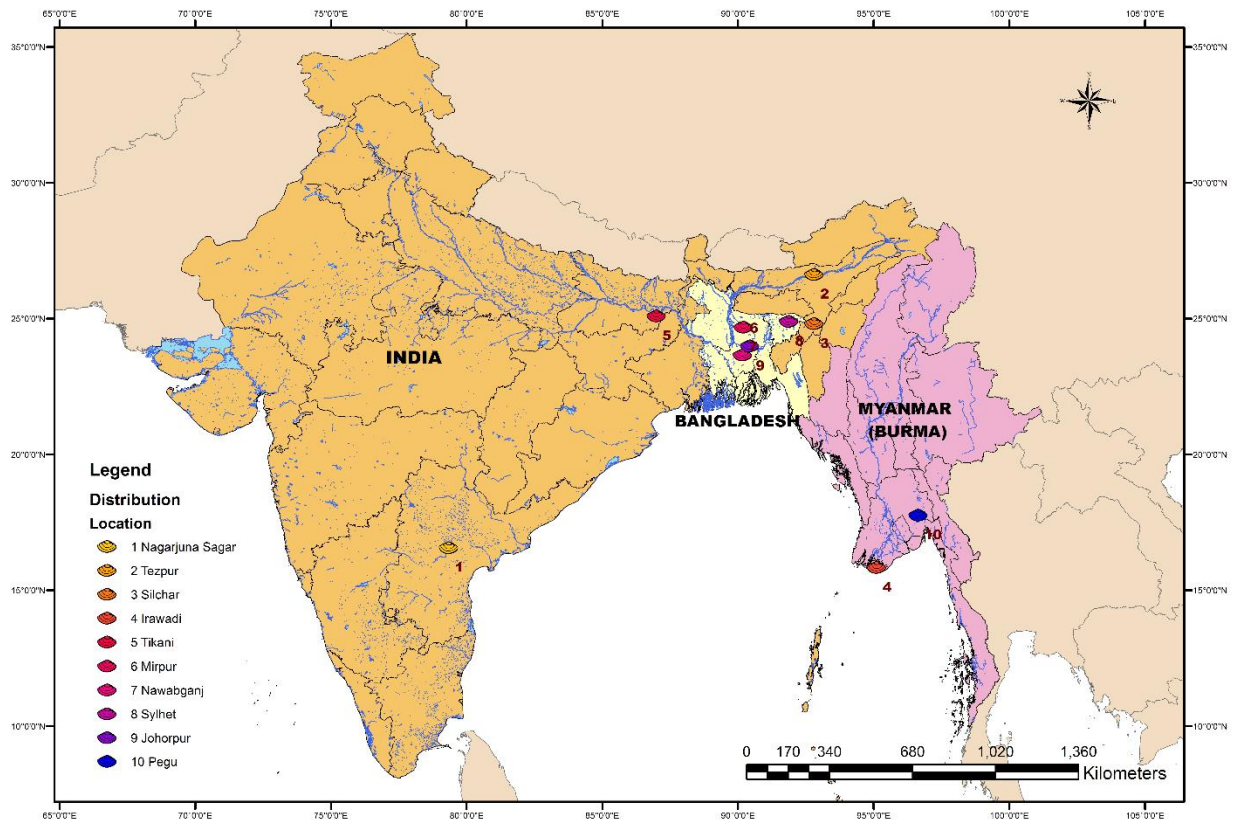


Figure 2: Extended distribution of *Lamellidens daccaensis* (Preston, 1912) – Nagarjuna Sagar

Habitat: The site of collection is the left bank region. It is approximately 10 km from Nagarjuna Sagar dam and 8 km from the origin of left canal of the dam Reservoir. Algae was observed on gravel and stones. Specimens were found in sand and fine gravel mixed with mud and silt at a depth of 1 meter. The other bivalves found in the area were *Parreysia favidens* (Benson, 1862), *Lamellidens marginalis* (Lamarck, 1819) and *Radiatula cf. lima* (Simpson, 1900).

Taxonomic history of *Lamellidens jenkinsianus* and its subspecies: *Unio jenkinsianus* was described by Benson in 1862. It was later placed in *Lamellidens* by Simpson [9]. Preston described a new species named *Parreysia daccaensis*, while studying the collection in the Indian museum[10]. In 1920, Prashad gave an account of this species stating that it was mistakenly placed by Preston in the genus *Parreysia* Conrad. Observing Preston's *Parreysia daccaensis* and his personal collection of similar specimens from the type locality, Dacca district, Prashad considered it to be only a form of *Lamellidens jenkinsianus*. In this regard, Preston's name *daccaensis* was retained to treat this peculiar subspecies as *Lamellidens jenkinsianus daccaensis* (Preston, 1912).

Prashad also commented that Benson's *Unio jenkinsianus* was only a form of Hanley & Theobald's *Unio marginalis* var. *obesa*. Based on the anatomy and shell characters, he considered *Parreysia daccaensis* (Preston, 1914) and *Unio marginalis* var. *obesa* (Hanley & Theobald, 1877) as subspecies of *Lamellidens jenkinsianus* (Benson, 1862)[11]. The same was followed by Subba Rao[2] and Ramakrishna & Dey [12]. However, recent studies by Graf & Cummings have treated *Lamellidens daccaensis* (Preston, 1912) and *Lamellidens jenkinsianus obesa* (Hanley & Theobald, 1877) as junior synonyms of *Lamellidens jenkinsianus* (Benson, 1862)[6].

CONCLUSION

Lamellidens jenkinsianus daccaensis differs from *Lamellidens jenkinsianus* (s.s) and *Lamellidens jenkinsianus obesa* in being shorter, more convex, broader, heavier, broad posterior end and by having an extra feebly developed pseudocardinal positioned towards the dorsal margin in the left valve[2], [9], [11], [12]. These descriptions from the literature and our observations inferred from personal collection and National Zoological collections suggest that *Lamellidens daccaensis* Preston, 1912 is a distinct species and differ from the other two taxa as mentioned above. Further analysis at molecular level is vital either to confirm the same or to support the current data.

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