Bull. Fish. Res. Stn., Sri Lanka (Ceylon), Vol. 25, Nos. 1 and 2, 1974 pp. 183—188

RESULTS OF THE AUSTRIAN-CEYLONESE HYDROBIOLOGICAL MISSION 1970 OF THE 1ST ZOOLOGICAL INSTITUTE OF THE UNIVERSITY OF VIENNA (AUSTRIA) AND THE DEPARTMENT OF ZOOLOGY OF THE VIDYALANKARA UNIVERSITY OF CEYLON, KELANIYA

Part XVIII : Freshwater Mussels Bivalvia

by

Gerhard Hadl*

(With 1 plate—Plate XVII)

Introduction

Till now there have been only two families of Bivalves with four genera known from freshwaters in Ceylon (Mendis and Fernando 1962). The material used for this study consists of members of three genera.

This study deals mainly with the family Unionidae, the family Corbiculidae is only represented by one specimen.

Acknowledgements

The author is very much indebted to Professors H.H. Costa and F. Starmühlner and to the members of the Swedishi Lund University Expedition 1962 to Ceylon (Prof. Dr. P. Brinck, Dr. H. Andersson and Dr. L. Cederholm for the material they collected and to Mrs. M. Mizzarro for making the photographs.

Material and Method.

Bivalves were obtained from 6 stations. (Fig. 1). Exact data was received from two stations of the Austrian-Ceylonese Hydrobiological mission 1970 where only empty shells were collected. The data are as follows :—

FC 27 : 9.12.1970 : Kuda-Oya, near Buttala in the South-east of Ceylon, running through forest and very heavy shade (Fig 22).

Alt. : 150m

Br. : 10-15m.

D. : 20 cm.-1m.

Curr.: 30 cm./sec. (on small cascades : lm/ sec.)

Gr. : gravel, sand between some rocks

Te. : 25'5° C(11h)

Che. : pH : 7'7.
El_{20} : 295 μ Siemens
Tot.H.: 9'2°dH
Alk. : 3'55 mval.
CaO : 52mg./1
MgO : 28'9mg./1
SiO_2 : 28'8mg./1
Cl : 7'1mg./1
NO_3 : 0'108mg./1
NH_4 : 0'02mg./1
P_2O_5 : 0'11mg./1

(*Abbrevations :* Alt. : Altitude (in m.), Br. : Breadth (in cm. or m.), D. : Depth (in cm. or m.), Curr. : Current (in m/sec.) ; Gr. : Ground ; Te. : Termperature (in ° Celsius) ; Che. : Chemistry ; Tot. H. : Total Hardness (in ° dH=German Hardness degree, 1° dH=1'25° English Hardness degree= 1'79° French Hardness degree) ; Alk. : Alkalinity ; El_{20} μ : Conductivity (in μ Siemens, Temperature : 20° C) ; CaO : Calcium ; MgO : Magnesium ; SiO_2 : Silicate ; Cl : Chloride ; NO_3 : Nitrate ; NH_4: Ammonium ; P_2O_5 : Phosphate.).

(Data according to COSTA and STARMÜHLNER, 1972)

*1st Zoological Institute, University of Vienna, Austria.

FC 32 : 15.12.1970 : Small stream in a forest, crossing the road between Habarane and Dambulla in the west of Polonnaruwa, shady.

Br. : 1'5-3m
D. : 10-50cm.
Curr.: 30cm/sec
Gr. : sand, on the border of the stream are roots hanging and floating in the current
Te. : 25'5°C (18h)

Che. : pH : 7'25
El_{20} : 605μ Siemens
Tot.H.: 12'9–dH
Alk. : 1'6mval
CaO : 50'9 mg/1
MgO : 56mg./1
SiO_2 : 15mg./1
Cl. : 145'6mg/1
NO_3 : 0'081mg/1
NH_4 : 0'22mg/1
P_2O_5 : 0'18mg/1

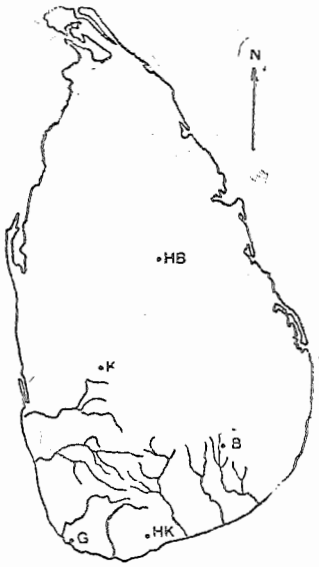


Fig. 1. Map of Ceylon showing collecting stations. B. Buttala, G. Galle, HB. Habarana, K. Kegalle (Modified from Costa and Starmühlner 1972)

Four species from 3 genera are recorded.

All bivalves were measured. The relationship of measurements and regression lines were calculated for two species.

Anatomical studies shall follow in a further contribution.

Recorded Species :

Unionidae

Lamellidens lamellatus (LEA) 1838
Lamellidens testudinarius (SPENGLER) 1793
Parreysia corrugata (MÜLLER) 1774

Corbiculidae

Polymesoda ceylonica (CHEMNITZ) 1782

Lamellidens lamellatus (LEA) 1838 (Fig. 2, plate XVII)

1838 *Unio lamellatus* LEA Terra typica Bengalen

1858 *Unio layardii* LEA, Terra typica Ceylon

Diagnosis : Shell irregular, egg-shaped, thin-shelled, ventricose, anteriorly it is narrow and rounded, the posterior dorsal margin is nearly straight. The area is wrinkled and its two ridges are weak. The shell surface is smooth of an olive to brown colour , sometimes with brighter yellow stripes. The umbo is weak and covered with small wrinkles. The cardinal teeth of the left valve are thin, incisive, partially fused together, seperated only by a poorly developed crease. Right valve with one cardinal tooth and, parallel to it an accessory tooth. Lateral teeth long, straight to slightly curved. Mother of pearl blue.

Localities

Kegalle, 21 specimens

Jungle brook near Habarane, west of Polonnaruwa (FC 32), 8 empty shells.

Kuda-Oya, near Buttala (FC 27), 1 empty shell.

Measurements are given for the three largest specimens recorded for each locality.

	Length mm.	*Height mm.*	*Breadth mm.*
Kegalle	53,3 ..	31,5 ..	15,0
	43,3 ..	25,4 ..	13,0
	41,3 ..	23,7 ..	12,6
Habarane	63,0 ..	31,3 ..	21,2
	52,4 ..	30,4 ..	17,0
	48,8 ..	28,0 ..	15,2
Kuda-Oya	71,8 ..	39,3 ..	22,3

Distribution : India, Ceylon .

Size-distribution of Population :

Because of the relatively large number of specimens from Kegalle (21), an analysis of their size-distribution has been ventured. The specimens were between 16.1 and 53,3 mm long. The maximum lies between 30 and 35mm. Smaller stages are missing, probably as a result of the collecting methods. Collections convering all seasons would be necessary in order to make an exact analysis of the structure of the population as well as to determine the time and length of reproduction.

Morphometry :

The height and breadth of each mussel is set in relation to its length and entered into a diagram. Circles indicate the animals from Kegalle, triangles those from Habarane. The latter values are not included in the calculations. They only serve to compare the two populations. The Habarane population compares well with that from Kegalle.

The points are situated very close to the regression line and show no significant deviation of measurement and their relations.

The regressions were calculated with a Hewlett Parker computer and were entered into the diagrams.

The coefficients of corelation (0,9700 and 0, 9752) show a high correlation of the values.

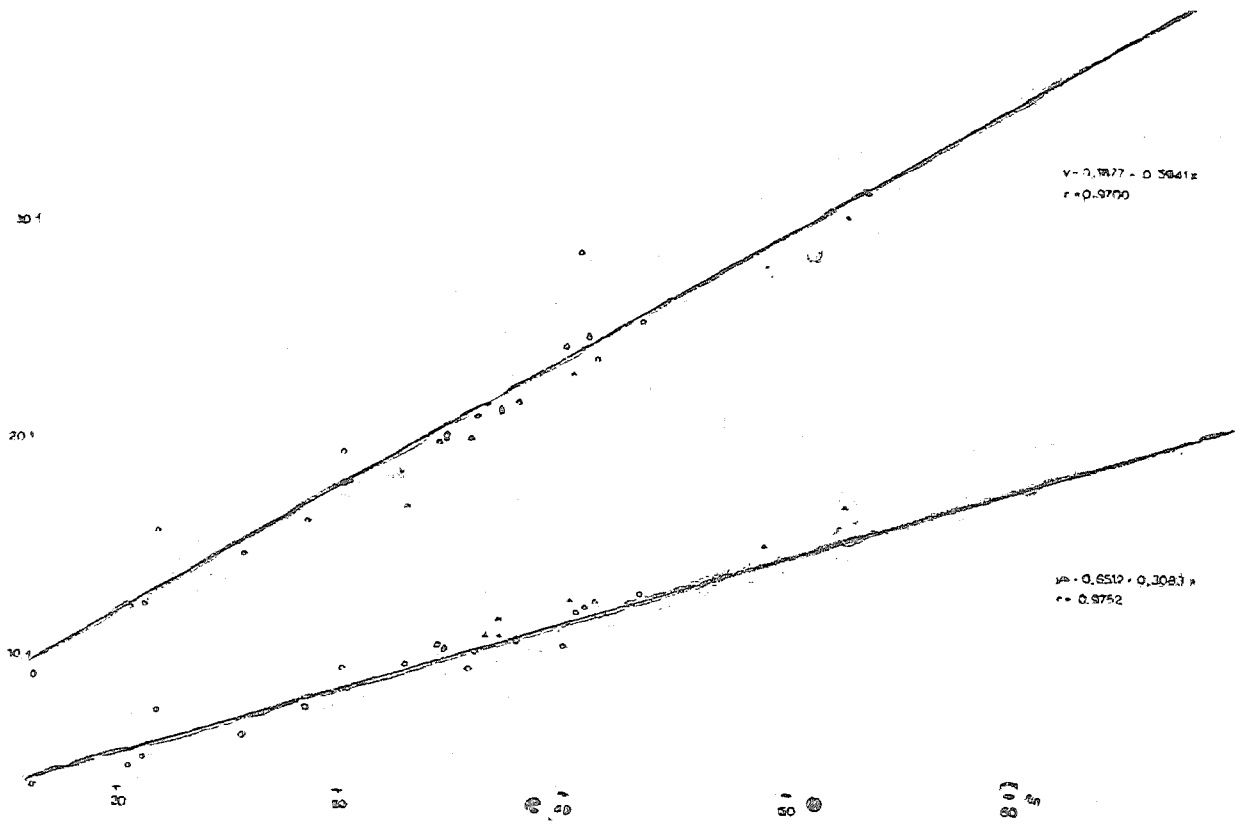


Fig. 3. Relation between length (x-axis) and height (upper line) and breadth (lower line) by *Lamellidens lamellatus*. Circles indicate animals for Kegalle, Triangles indicate animals from Habarana.

Lamellidens testudinarius (SPENGLER) 1793 (Fig. 4, Plate XVII)

1793 *Unio testudinarius* SPENGLER

1793 *Unio truncatus* SPENGLER

1819 *Unio marginalis* LAMARCK

1859 *Unio thwaitesii* LEA

1860 *Unio consobrinus* LEA

1892 *Unio corbei* DESCHAMPS

Diagnosis. Shell irregular, egg-shaped, relatively strong, ventricose, rounded anteriorly, posterior dorsal margin slightly rounded, area with two area ridges, posterior end with a rostrum. Surface of the shell smoth of a brownish colour with numerous raised growth rings. Umbo weak, strongly corroded, rough, the posterior one smooth. Right valve with one cardinal tooth and, parallel to it, an accesory tooth. Lateral teeth long, straight, mother of pearl bluish, salmon-pink in the umbo-fold.

	L	*H*	*B*
	mm.	*mm.*	*mm.*
Hakmana, 2 specimens ..	56,2 ..	30,7 ..	19,1
	55,4 ..	30,6 ..	20,0

Distribution. Ceylon, India, Burma.

Parreysia corrugata (MÜLLER) 1774 (Fig. 5, Plate XVII)

1774 *Mya corrugata* MÜLLER

Diagnosis. Shell thick-set, irregularly egg-shaped, relatively compact, anterior margin runs to a point in its lower third part, posterior brim regularly rounded, merging into the lower brim, area with one area ridge and 2 parallel dark lines, shell with smooth surface, except for low rough ridges on the brims due to folds of the periostracum. Umbo prominent, its peak mostly corroded, young animals have distinct zig-zag pattern, ligament prominent, cardinal teeth of left valve strong, small, parallely curved, clear imprints of shell adductors, frontal adductor inserting into a groove.

Localities

Kegalle, 71 specimens

Batalagoda, 1 specimen

	L mm.	*H* mm.	*B* mm.
Kegalle	48.9 ..	34.1 ..	21.5
	43.7 ..	30.3 ..	19.2
	41.1 ..	30.0 ..	19.1
Batalagoda	32.3 ..	21.5 ..	18.5

Distribution. Bengal, Deccan, Ceylon.

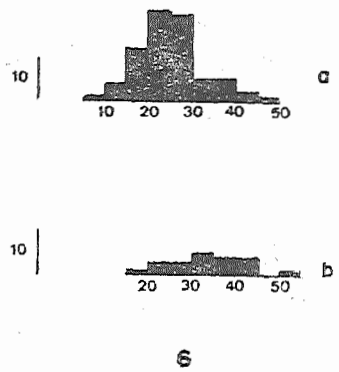
Size distribution of population :

71 specimens of *Parreysia corrugata* were found in Kegalle. The smallest individual is 9. 6mm. the largest 48. 9mm in length. The population's maximum lies between 20 and 25 mm in length. The number of representatives of the different size-classes approaches normality in its distribution.

Morphometry

As with *Lamellidens lamellatus* the height and breadth of the mussels are set into relation to its length and the results are presented graphically.

The relationship of the measurements agrees well with their correlation coefficient of 0. 9954 and 0.9900. During their growth *Lamellidens lamellatus* and both *Parreysia corrugata* show a constancy of their proportions. Early youth stages are missing, but probably do not influence the result . The proportions can be concluded from the rise of the regression line. Ventricose and compact species show a steeper rise in comparison to the slimmer species.



6

Fig. 6. Size frequency diagram for the animals of Kegalle. a. *Parreysia corrugata*, mean length $\times$ =25.9 mm. No. of Specimens 71. b. *Lamellidens lamellatus*, means length $\times$ =33.3 mm. No. of specimens 21.

The study of different populations of one species as well as comparison of populations of related species could be a valuable contribution to the taxonomy of these in part little known species.

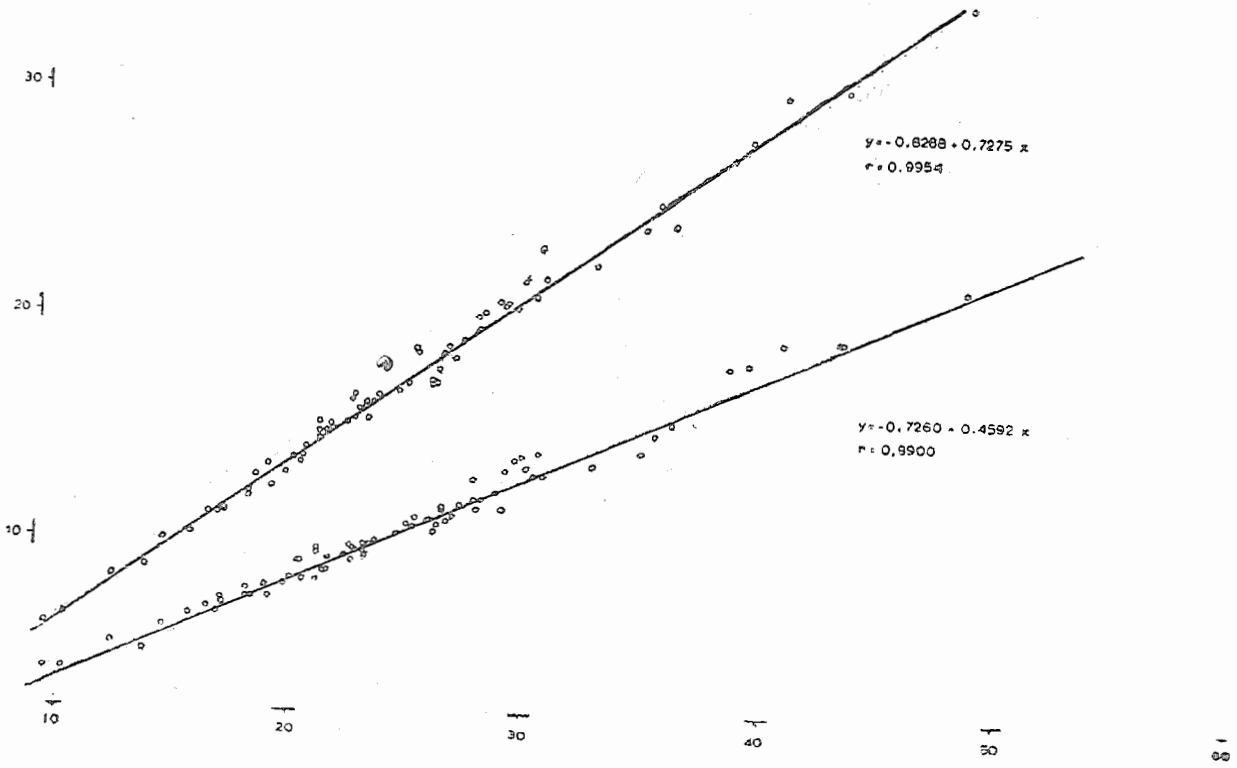


Fig. 7. Relation between length and height (upper line) and breadth (lower line) in *Parreysia corrugata* from Kegalle (71 specimens).

Polymesoda ceylonica (CHEMNITZ) 1782 (Fig. 8, Plate XVII)

1782 *Venus ceylonica* CHEMNITZ

1086 *Cyclas zeylanica* LAMARCK

1818 *Cyrena zeylanica* LAMARCK

Diagnosis. Shell rounded, thick, height and length equal ; surface brown, smooth between folds of periostracum umboes projecting from the nearly circular form, strongly corroded, hinge teeth normally developed.

	L	*H*	*B*
	mm.	*mm.*	*mm.*
Galle, one empty shell ..	81.5 ..	75.0 ..	40.5

Distribution : Ceylon. Other Indo-Pacific species of *Polymesoda* possibly fall into the breadth of variation of *Polymesoda ceylonica*. Larger numbers of specimens would be necessary to classify the relationship of these species.

References

COSTA, H. H. and F. STARMÜHLNER, 1972. Results of the Austrian-Ceylanese Hydrological Mission 1970 of the 1st Zoological Institute of the University of Vienna (Austria) and the Department of Zoology of the Vidyalankara University of Ceylon, Kelaniya. PART I.—Preliminary Report :—Introduction and Description of the Stations.—Bull. Fish. Res. Stn., Sri Lanka (Ceylon) 23 : 43–76.

HAAS, F., 1969. Superfamilia Uniconacea. n : Das Tierreich, Lief. 88., Berlin 663 pp.

HANLEY, S. and W. THEOBALD, 1876. Conchologia Indica : Illustrations of the Land and Freshwater shells of British India. London 65 p., 160 pl.

MENDIS, A. S. and C. H. FERNANDO, 1962. A Guide to the Freshwater Fauna of Ceylon. Fisheries Research Station, Department of Fisheries, Ceylon. Bulletin No. 12, 160 pp.

PRESTON, H. B., 1915. The Fauna of British India, including Ceylon and Burma. Mollusca (Freshwater Gastropoda and Pelecypoda). London 244 pp.

PLATE XVII—HADL—FRESHWATER MUSSELS, pp. 183–188

Fig. 2 : *Lamellidens lamellatus* (LEA), a. Outside ; b. Inner side of left valve

Fig. 4 : *Lamellidens testudinarius* (SPENGLER) a. Outside ; b. Inner side of left valve

Fig. 5 : *Parreysia corrugata* (MÜLLER) ; a. Outside of left valve ; b. Inner side of both valves

Fig. 8 : *Polymesoda ceylonica* (CHEMNITZ) ; a. Outside of left valve ; b. Hinge of both valves

HADL—FRESHWATER MUSSELS—pp. 183–188