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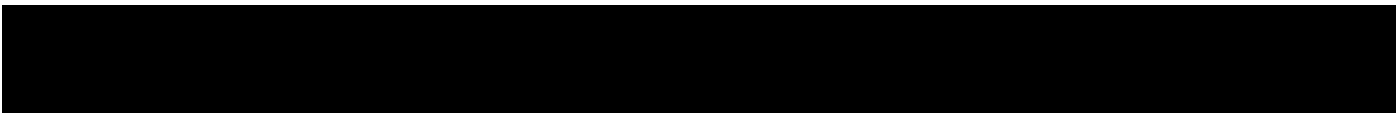
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**NOTES ON *NERITINA (DOSTIA) VIOLACEA* (GMELIN, 1791)
FROM THE CENTRAL PHILIPPINES (GASTROPODA: NERITIDAE)**

Daniel R. Goodwin

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Notes on *Neritina (Dostia) violacea* (Gmelin, 1791) from the Central Philippines (Gastropoda: Neritidae)

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ABSTRACT

The species *Neritina (Dostia) violacea* (Gmelin, 1791) from the central islands of the Philippines is reported in this paper. Notes on character sets are reported, along with photographic illustrations, variances in population, and their standard deviation. The species is compared with data collected from a similar species found in the Hawaiian Islands; *Theodoxus cariosa* (Wood, 1828).

KEYWORDS: Gastropoda, Neritidae, *Theodoxus*, *Dostia*, Diadromous, Brackish water, Philippines

I. INTRODUCTION

In this paper I discuss the character sets of size and possible water chemistry characteristics of the species: *Neritina (Dostia) violacea* (Gmelin, 1791) from central Philippines. The species is found sporadically across the Philippines (Springsteen and Leobrera, 1986); but is also found in Indonesia (Darma, 1988), Papua New Guinea (in Wilson, 1993), and Australia (Wilson, 1993). The species is Diadromous; the larvae is hatched in freshwater, migrating to saltwater where it grows to maturity, and migrates back to freshwater stream/rivers where it was first born. The Hawaiian species development is similar in characteristics and development (Goodwin, 1989, 1991, 1992, and 2006+). The water chemistry analysis of the Hawaiian Diadromous Mollusks have been reported in past and present literature (Goodwin, 1989, 1991, 1992 and 2006+). Shell morphology is similar to the Hawaiian species: *Theodoxus cariosus* (Wood, 1828) (E) (Goodwin, 1989), and may prefer

the same or equivalent water chemistry. The author has been involved with the research on Diadromous Mollusks of the Hawaiian Islands since 1988; and has written both published and unpublished research papers on this group of mollusks. The information that have been collected and reported in this paper will be used and integrated into my studies on Migrating Mollusks from the Hawaiian Islands, Pacific and Oceanic regions—known as “*Project Diadromous*” (PD) an ongoing research project that was first started in 1988.

ABBREVIATIONS:

CMS – Center for Molluscan Studies, IIRH,
Honolulu, Hawaii

E = Endemic Species

ICZN = International Commission on Zoological
Nomenclature

IIRH – Institute of Invertebrate Research Hawaii,
Honolulu, Hawaii

NaCl = Salinity

PD = “*Project Diadromous*”

ppt = parts per thousand

ppm = parts per million

σ^2 = Variance (or the use of S^2)

σ = Standard Deviation (or the use of S)

II. SUBJECTS, MATERIALS, AND METHODS

SYSTEMATICS

Family: Neritidae

Genus: *Neritina* Lamarck, 1816

Type species: (o.d.) *Nerita pulligera* Linnaeus,
1766 (ICZN Op. 119, 1931)

Subgenus: *Dostia* Gray, 1847

Type species: (o.d.): *Nerita crepidularia* Lamarck,
1822 [= *Neritina violacea* Gmelin, 1791]

***Neritina violacea* (Gmelin, 1791) = Common
name: Violet Nerite**

Locality: South Western Pacific, Philippine Islands,
Indonesia, India, and Australia

Remarks: Brackish water species

Synonymy:

Neritina violacea Abbott and Dance, 1986; Darma,
1988; Wilson, 1993.

Neritina (Dostia) violacea Springsteen and Leobrera,
1986.

Description: Average sizes are: 21.21-24.95mm in length; 15.09-18.08mm in width, and 10.84-12.99mm in height. The species is medium size, medium to heavy weight shell, protoconch is elevated, aperture semi-oval, parietal shield or columella completely covers the base from anterior end to posterior end, lip flaring with an edge, parietal shield or columella orange in coloration, two distinct grooves within the aperture which forms two distinct ridges, no

opercular teeth exposed on the posterior end of the aperture, dorsum with zic-zac markings or tenting, yellowish-white on the lower dorsum and markings dense; markings or tenting are more distinct on the mid dorsum to the protoconch area.

Note: Average sizes are based on the four specimens examined; average sizes may vary with increased population.

MATERIAL EXAMINED:

IIRH-06-N-01: 21.21mm in length; 15.21mm in width; and 10.84mm in height; Adult specimen;
IIRH-06-N-02: 21.60mm in length; 15.09mm in width; and 11.58mm in height; Adult specimen;
IIRH-06-N-03: 24.38mm in length; 16.76 mm in width; 12.53mm in height; Adult specimen; IIRH-06-N-04: 24.95mm in length; 18.08 mm in width; and 12.99mm in height; Adult specimen; all collected from the Central Islands of the Philippines.

LITERATURE EXAMINED:

Abbott, R. Tucker and S. Peter Dance, 1986, *Compendium of Seashells*, pg. 54.

Cowie, Robert H., Neal L. Evenhuis, and Carl C. Christensen, 1995, *Catalog of Native Land and Freshwater Molluscs of the Hawaiian Islands*, pgs. 13-15.

Darma, Bunjamin. 1988. *Siput dan Kerang Indonesia I (Indonesian Shells)*, pgs. 38 & 39, Plate 5, no. 20.

Goodwin, Daniel R. 1989, *The Discovery of Theodoxus cariosus Wood, 1828 from the Island Maui*.

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Springsteen, F. J. and F. M. Leobrera. 1986. *Shells of the Philippines*, pgs. 52 & 53, Plate 11, number 8.

Wilson, Barry. 1993. *Australian Marine Shell, Vol. 1*, pgs. 41, Plate 2, figs. 18 a & b, 19 a & b.

OTHER SOURCES EXAMINED: (Internet)

Hardy, Eddie. 2006, *Neritina violacea* (Gmelin, 1791).

Methods

Water chemistry analysis of pH, NH₃-N or Ammonia, NO₂-N or Nitrites, NO₃-N or Nitrates, O₂ or Oxygen and NaCl or Salinity are not known from the subject specimens locality mentioned in this paper; although, the measurements analyzed in previous literature (Goodwin, 1989, 1991, and 2006+) have been reported on a similar species (*Theodoxus cariosa*) from the Hawaiian Islands.

Statistical values are analyzed and their Standard Deviation and Variance are noted. I have used the following equation in my computations. The use of σ^2 represents the variance and σ represents the SD values. Other equations, variables and functions may apply in formulation for statistical purposes, but in this paper I use equation below and in the following paragraph.

Standard Deviation or SD:

$$\sigma^2 = \frac{\sum fi (Xi - \mu)^2}{N}$$

III. RESULTS AND OBSERVATIONS

The species *Neritina violacea* (Gmelin, 1791) may prefer brackish water chemistry similar to *Theodoxus cariosa* (Wood, 1828) from the Hawaiian Islands; base on the similar shell morphology. The species is reported with the following water chemistry analysis:

pH of 6.8-8.0, NH₃-N or Ammonia = 0.6 ppm (parts per million), Nitrites or NO₂-N = 0.6 ppm, Nitrates

or NO₃-N = 2.5 ppm, Oxygen or O₂ = 5 ppm and NaCl or salinity of 0-25 ppm.

Simplified equation used:

Length:

$$\begin{aligned} \sigma^2 &= \frac{(23.04-21.21)^2 + (23.04-21.60)^2 + (23.04-24.38)^2 + (23.04-24.95)^2}{4} \\ &= \frac{3.35 + 2.07 + 1.80 + 3.61}{4} \\ \sigma^2 &= 10.83 \\ \sigma &= 3.29 \end{aligned}$$

Width:

$$\begin{aligned} \sigma^2 &= \frac{(16.29-15.21)^2 + (16.29-15.09)^2 + (16.29-16.76)^2 + (16.29-18.08)^2}{4} \\ &= \frac{1.17 + 1.44 + .22 + 3.20}{4} \\ \sigma^2 &= 6.03 \\ \sigma &= 2.46 \end{aligned}$$

Height:

$$\begin{aligned} \sigma^2 &= \frac{(11.99-10.84)^2 + (11.99-11.58)^2 + (11.99-12.53)^2 + (11.99-12.99)^2}{4} \\ &= \frac{1.32 + .17 + .29 + 1.00}{4} \\ \sigma^2 &= 2.78 \\ \sigma &= 1.67 \end{aligned}$$

Four specimens were examined with average sizes of: range of 21.21 to 24.95mm, average of 23.04mm in length, total variance of 10.87, and the Mean Standard Deviation or SD of 3.29; and the range of 15.09 to 18.08 in width, with an average of 16.29mm, total variance of 6.03, and SD of 2.46; and the range of 10.84 to 12.99mm in height, an average size of 11.99mm, total variance of 2.78, and SD of 1.67. Kurtosis and Skewness was not reported in this paper. Data on the operculum was not available. The species is medium size, medium to heavy weight, similar to *Theodoxus cariosa*; protoconch is elevated, versus the protoconch of *T. cariosa* which is slightly elevated; aperture semi-oval, similar to *T. cariosa*; parietal shield or colummella completely covers the base from anterior end to posterior end, differing from *T. cariosa*, which covers the aperture area only and extending to both ends of its wing like appendages; lip flaring with an edge, versus *T. cariosa* which has only slight flaring; parietal shield or colummella orange in coloration, versus *T. cariosa*, which is white or slight bluish in coloration.

IV. DISCUSSION

A study on the water chemistry on *Neritina violacea* will be conducted in a future report from the collection sites and compared with the water chemistry of *Theodoxus cariosa* (Wood, 1828) to get a conclusive understanding of their similarities in environment. The specimens that was reported in this paper was obtained from Shell Dealers in Hawaii and did not report where the actual specimens were collected or their habitat; except mentioning that they were collected from Cebu (Central) Philippine Islands. Future surveys are needed to evaluate the environmental habitat and water chemistry on this species. I will use this valuable information and combine it with other information gathered on Diadromous Mollusks from the Pacific, Oceanic regions, and the Hawaiian Islands. Future papers will be published on other Diadromous Mollusks in the near future.

V. REFERENCES

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American Malacologists, Inc., Madison Publishing Associates, Dai Nippon Printing Co., Ltd., Tokyo, page 54.

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Wilson, Barry. 1993. *Australian Marine Shell, Volume 1*, Odyssey Publishing, Western Australia, pages 41, Plate 2, figures 18 a & b, 19 a & b.

VI. OTHER REFERENCES

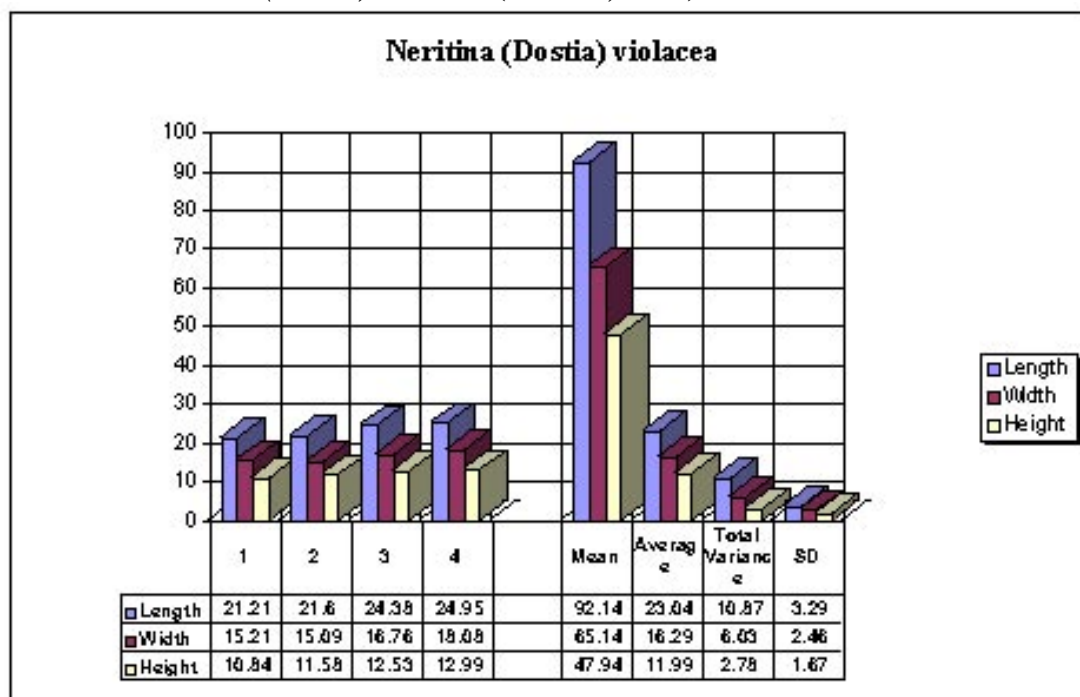
Hardy, Eddie. 2006. Gastropods.com (Internet Site); (*Neritina violacea* (Gmelin, 1791)).

LIST OF TABLES:Table – 1 *Neritina (Dostia) violacea* (Gmelin, 1791) (Central Philippines)**LIST OF CHARTS, GRAPHS, OR DRAWINGS:**Chart – 1 *Neritina (Dostia) violacea*Drawing – 1 Linear illustration/drawing of the possible habitat of *Neritina (Dostia) violacea* (Gmelin, 1791)**Table - 1 *Neritina violacea* (Gmelin, 1791) (Central Philippines) Linear measurements in metric mm.**

Specimen	Length	Width	Height	Remarks
IIRH-06-N-01	21.21	15.21	10.84	Adult
IIRH-06-N-02	21.60	15.09	11.58	Adult
IIRH-06-N-03	24.38	16.76	12.53	Adult
IIRH-06-N-04	24.95	18.08	12.99	Adult
Range	21.21-24.95	15.09-18.08	10.84-12.99	
Mean	23.04	16.29	11.99	
Average	23.04	16.29	11.99	
SD	3.29	2.46	1.67	

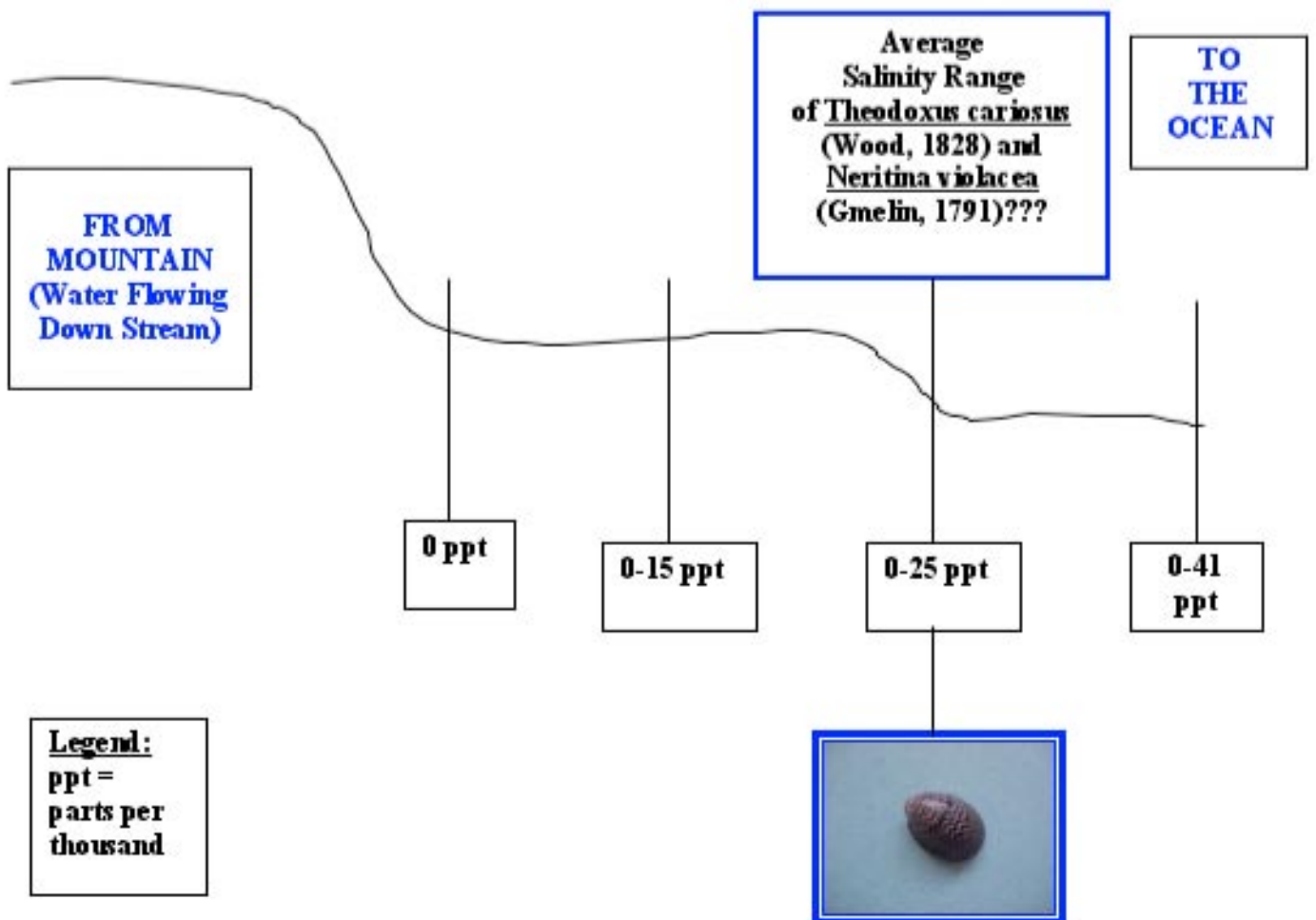
Legend:

Specimens obtained without operculums; no data available

Chart – 1 *Neritina (Dostia) violacea* (Gmelin, 1791)

NaCl (Salinity) Ranges

Text
Figure - 1



SPECIAL NOTE:

Theodoxus cariosa (Wood, 1828) = *Theodoxus cariosus* (Wood, 1828)

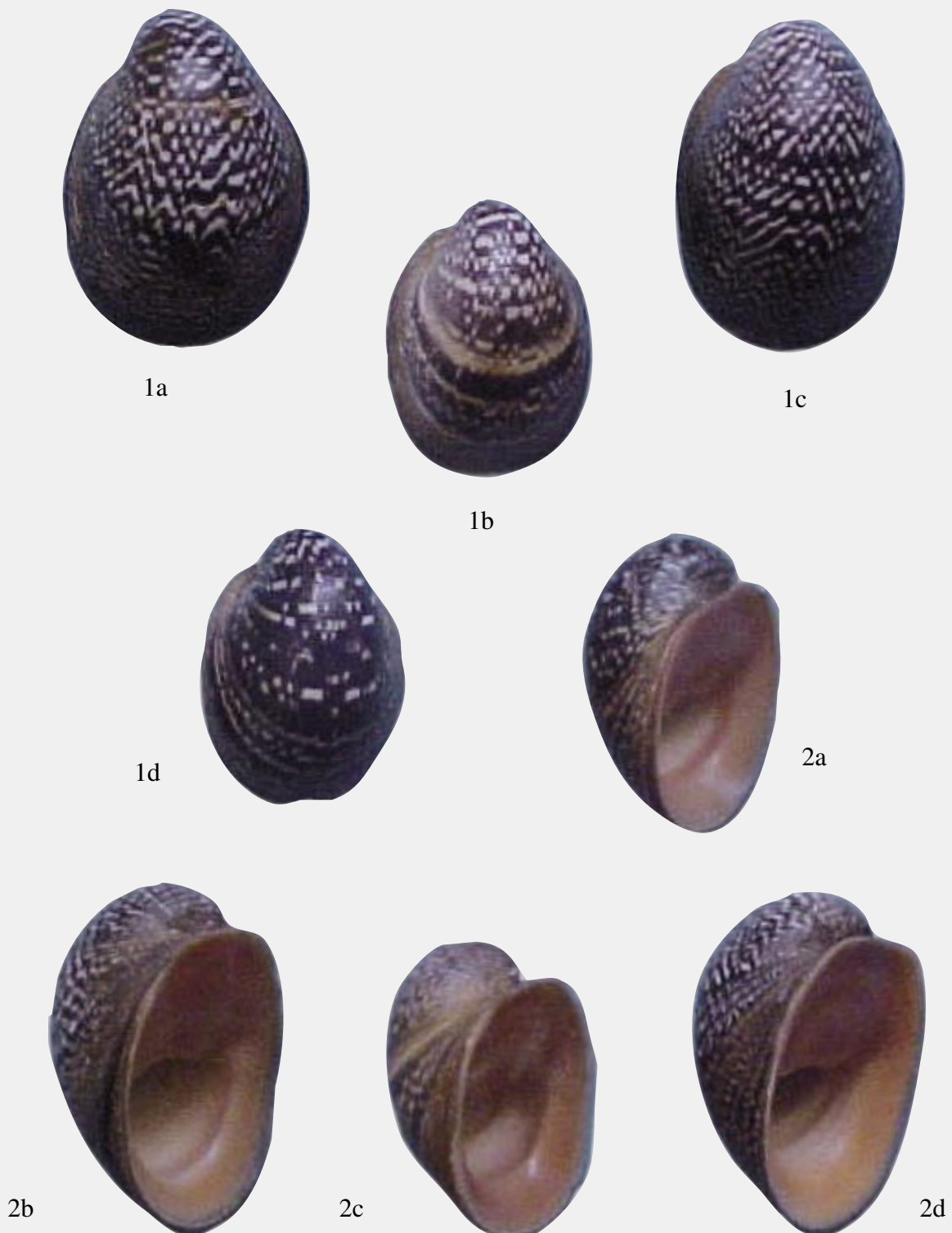


Figure – 1: Illustration of the four specimens illustrated and reported in this paper (Dorsal view).

Figure – 2: Illustration of the four specimens illustrated and reported in this paper (Apertural view).

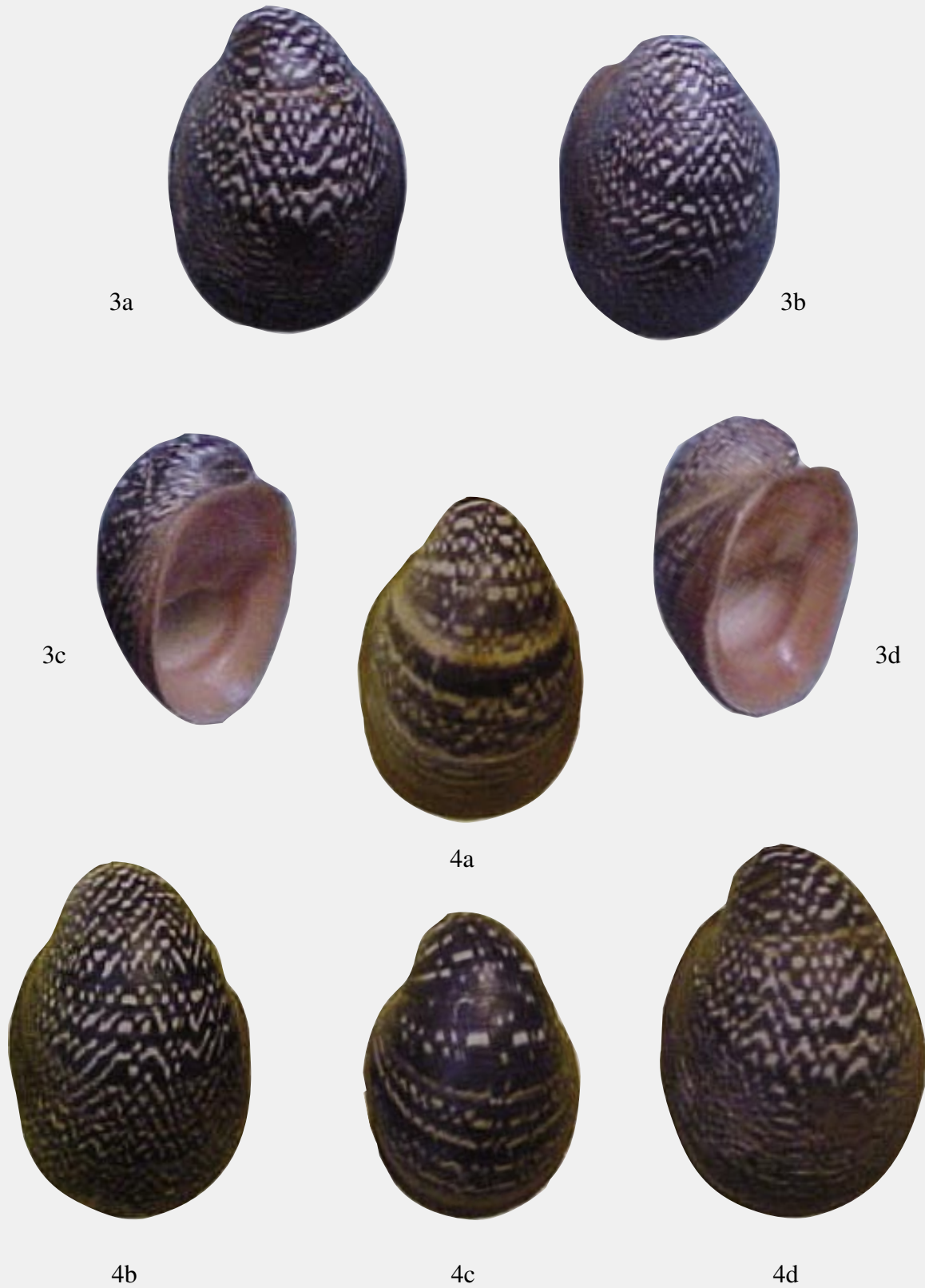


Figure – 3: *Illustration of the four specimens illustrated and reported in this paper.*
Figure – 4: *Illustration of the four specimens illustrated and reported in this paper.*

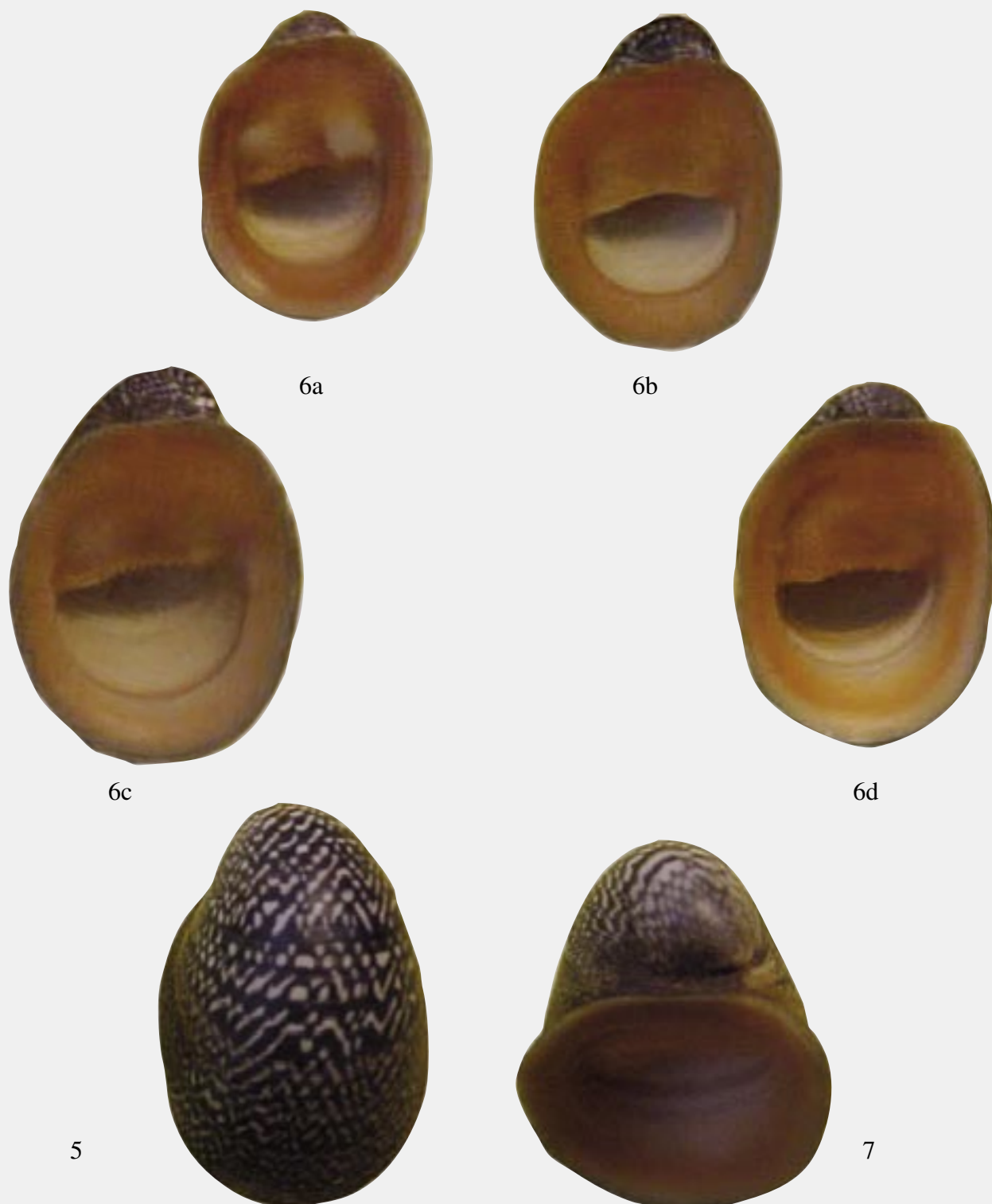


Figure – 5: Dorsal View of one of the specimens.

Figure – 6: Illustration of the four specimens illustrated and reported in this paper (Apertural view).

Figure – 7: Protoconch view of one of the specimens.



Figure – 8: *Illustration of the four specimens illustrated and reported in this paper (Mix view).*

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