

THE SYSTEMATIC POSITION OF THE NERITID PROSOBRANCH GASTROPOD *NERITA POLITA* AND RELATED SPECIES

Geerat J. Vermeij

Abstract.—*Nerita polita* Linnaeus, 1758, is the type of the new subgenus *Linnerita* of the genus *Nerita* Linnaeus, 1758. This species, like the three other members of the subgenus, is a common intertidal gastropod in the Indo-West-Pacific region.

Nerita polita Linnaeus, 1758, is an abundant intertidal gastropod which is widely distributed in the Indo-West-Pacific region from the mainland coast of East Africa to the Hawaiian Islands. It is the best known of a small group of distinctive Indo-West-Pacific species whose taxonomic unity has never been questioned but whose nomenclature and relationships to other members of the genus *Nerita* have remained unresolved. Baker (1923) exacerbated an already confusing situation when he synonymized several subgenerically distinct species under the single name *Nerita polita*. In this paper I review the relationships of *N. polita* and its relatives to superficially similar species of the genus, and I formally erect a taxon for this group.

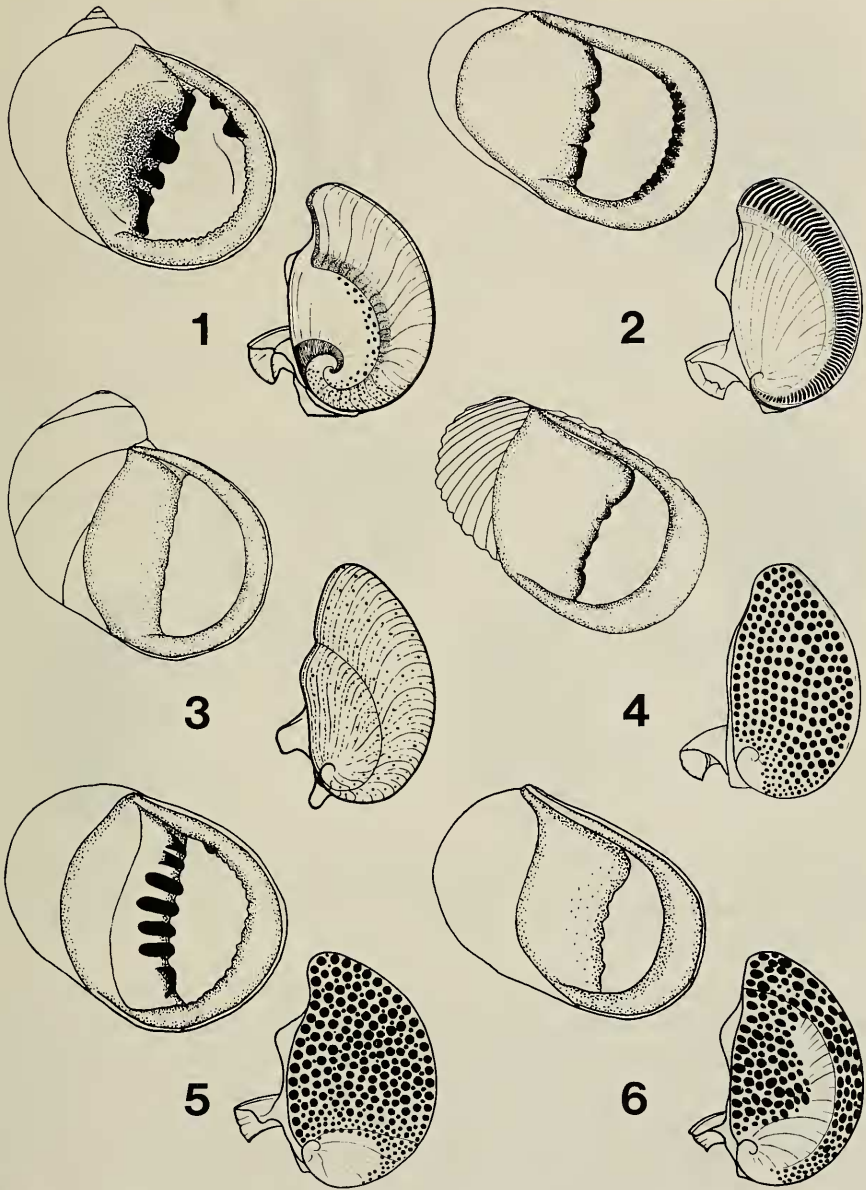
Nomenclatorial Background

Von Martens (1887-89) believed that *N. polita* was the type of the genus *Nerita* Linnaeus, 1758, and therefore saw no need to coin a name for the group containing this and related species. Abbott (1958), however, confirmed the suspicion of other workers that the distinctive West Indian *N. peloronta* Linnaeus, 1758, was the type of the genus. In his classification based on radular characters, Baker (1923) considered *N. polita* to be a senior synonym of *N. umlaasiana* Krauss, 1848, which von Martens (1887-89) established as the type of his subgenus *Amphinerita*. *Nerita umlaasiana* and its relatives are morphologically and ecologically distinct from *N. polita* and its relatives, so that the name *Amphinerita* cannot be applied to the latter group. The only other name which has been proposed for the *N. polita* group is *Odontostoma* Mörch, 1852, but this name is preoccupied by *Odontostoma* Turton, 1829 (see Baker 1923). Accordingly, no valid name exists for the *N. polita* group, even though most students of *Nerita* have recognized the distinctiveness of this group.

Linnerita, new subgenus

Type-species.—*Nerita polita* Linnaeus, 1758.

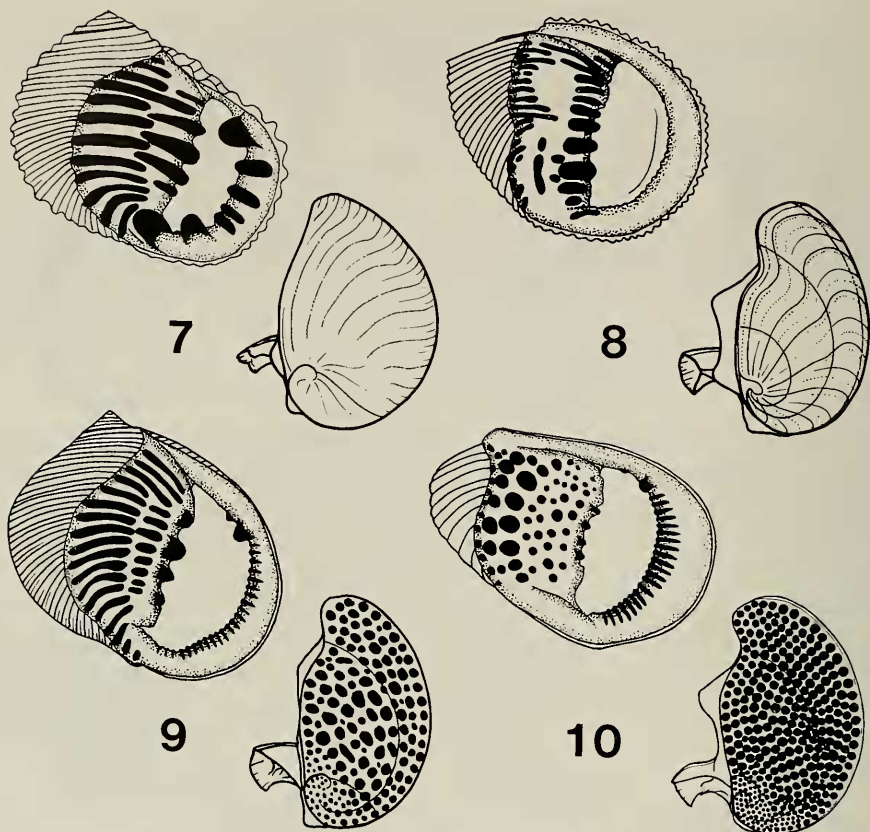
Diagnosis.—Shell neritiform; spiral sculpture very weakly developed or absent; collabral sculpture consists of closely spaced wrinkles slightly reflected away from outer lip; apex hardly protruding above rest of shell; outer lip with numerous weakly developed denticles; columellar edge with 3 to 5 teeth; parietal callus



Figs. 1-6. Views of ventral shell surface and outer opercular surface of the type-species of Recent subgenera of *Nerita*: 1, *N. (Nerita) peloronta* Linnaeus, 1758; 2, *N. (Linnerita) polita* Linnaeus, 1758; 3, *N. (Heminerita) japonica* Dunker, 1859; 4, *N. (Lepidonerita) insculpta* Recluz, 1841; 5, *N. (Melanerita) atramentosa* Reeve, 1855; 6, *N. (Amphinerita) umlaasiana* Krauss, 1848. Drawings by E. J. Petuch; plate preparation by M. G. Harasewych.

smooth or transversely wrinkled. Operculum mostly smooth on outer face, flat to convex outward, with granulated raised rim.

Etymology.—This taxon is named in honor of Carolus Linnaeus, who in 1758 described its type-species, *N. polita*.



Figs. 7-10. Views of ventral shell surface and outer opercular surface of the type-species of Recent subgenera of *Nerita*: 7, *N. (Ritena) plicata* Linnaeus, 1758; 8, *N. (Ilynerita) planospira* Anton, 1839; 9, *N. (Cymostyla) undata* Linnaeus, 1758; 10, *N. (Theliostyla) albicilla* Linnaeus, 1758. Drawings by E. J. Petuch; plate preparation by M. G. Harasewych.

Remarks.—*Linnerita* contains at least four species: *N. polita* Linnaeus, 1758, *N. antiquata* Recluz, 1853, *N. doreyana* Quoy and Gaimard, 1834, and *N. orbignyana* Recluz, 1841. All these species are from the Indo-West-Pacific region. Ecologically, the group is diverse. *Nerita polita* and *N. orbignyana* (the latter being a species or subspecies from the Red Sea) bury themselves in shallow sand by day and come out on middle to high intertidal rocks at night (Taylor 1968, Safriell 1969). *Nerita doreyana* from the Indian and Western Pacific Oceans is found on rocks in the middle and upper intertidal zones and does not burrow in sand (Vermeij 1973). No published information exists on the habits of *N. antiquata*, a species which is apparently limited to the Philippines.

In sculpture, species of *Linnerita* are superficially similar to members of the subgenera *Amphinerita* von Martens, 1887 (type-species: *N. umlaasiana* Krauss, 1848) and *Melanerita* von Martens, 1887 (type-species: *N. nigra* "Gray" von Martens, 1889 = *N. atramentosa* Reeve, 1855). The collabral wrinkles of *Linnerita*, which are best developed in *N. antiquata*, do not appear in the other two subgenera.

Table 1.—Distribution of characters in the subgenera of *Nerita*.

Character	A	C	H	I	L	M	N	R	T
Operculum									
Outer surface granulate throughout	+	+	-	-	-	+	-	+	+
Granulate on rim	-	-	-	-	+	-	-	-	-
Outer surface smooth throughout	-	-	+	+	-	-	-	-	-
Shell sculpture									
Spiral cords present	+	+	+	+	-	+	+	+	+
Axial wrinkles present	-	-	-	-	+	-	-	-	-
Sculpture lacking	+	-	-	-	-	+	-	-	-
Callus									
Granulate or pustulose	-	-	-	+	-	+	±	-	+
Transversely wrinkled	-	+	-	-	+	-	-	+	-
Smooth	+	-	+	-	+	-	-	-	-
Teeth on outer lip									
Strong, fewer than 15 in number	-	-	-	-	-	-	-	+	-
Numerous and weak	+	+	+	+	+	+	+	-	+
Apex									
Raised on tall spire	-	+	+	-	-	+	+	+	-
Barely raised above rest of shell	+	-	-	+	+	-	-	-	+

+ Present, at least in some species.

- Absent in all species.

A *Amphinerita*.C *Cymostyla*.H *Heminerita*.I *Ilynerita*.L *Linnerita*.M *Melanerita*.N *Nerita* s.s.R *Ritena*.T *Theliostyla*.

One feature which distinguishes *Linnerita* from all other members of the genus *Nerita* is the operculum, whose smooth outer surface is bordered by a raised granulated rim. The operculum of *Amphinerita*, *Melanerita*, and *Theliostyla* Mörch, 1852 (type-species: *N. albicilla* Linnaeus, 1758) has the convex or flat outer face granulated throughout (Fig. 1). The operculum of *Ilynerita* von Martens, 1887 (type-and only species: *N. planospira* Anton, 1839) is entirely smooth on its outer face. Mienis (1970) described the operculum of *N. olivaria* Le Guillou, 1841 as having two granulated regions separated by a longitudinal line on the outer surface. This species, whose shell is very much like that of *N. umlaasiana*, may belong to *Amphinerita*. Species of *Cymostyla* von Martens, 1887 (type-species: *N. undata* Linnaeus, 1758), *Ritena* Gray, 1858 (type-species: *N. plicata* Linnaeus, 1758), and *Heminerita* von Martens, 1887 (type-species: *N. pica* Gould, 1850 = *N. japonica* Dunker, 1859), and *Nerita* s.s. (type- and only species: *N. peloronta* Linnaeus, 1758) have opercula whose outer face is flat to concave and granulated throughout or in the central area (see Fig. 1). *Nerita insculpta* Recluz, 1841 is a distinctive species with a fully granulated operculum. The nerites with a smooth or nearly smooth operculum are very different in shell characters from *Linnerita*.

Ilynerita has a strongly pustulose rather than a smooth or transversely wrinkled parietal callus, and strong spiral cords on the outer surface of the shell. *Heminerita*, some of whose species have a nearly smooth flat operculum (example: *N. guamensis* Quoy and Gaimard, 1834), has a spirally corded shell with a high spire. *Nerita plicata*, the type-species of *Ritena*, has a nearly smooth operculum, but the operculum is strongly concave outward and the shell has strong spiral cords and a strongly toothed aperture.

Relationships in *Nerita*

A summary of the distribution of shell and opercular characters of the subgenera of *Nerita* is outlined in Table 1. This compilation suggests that *Linnerita* is closely allied with *Amphinerita* and furthest removed from *Ritena*. It is possible that the clade containing *Linnerita* and *Amphinerita* is of relatively recent origin, because these subgenera are confined in the modern fauna to the Indo-West-Pacific, and have no known fossil species outside that region. *Cymostyla*, *Ritena*, and *Theliostyla*, on the other hand, have Tethyan distributions, which may imply a more ancient origin for these usually strongly sculptured nerites. *Melanerita* shares many features in common with *Theliostyla*, and may represent a group of cool-water species of *Theliostyla* in which the external sculpture, callus sculpture, and lip dentition have become reduced. *Heminerita* is a group of small species which resemble *Cymostyla* save for the smooth callus and greatly reduced lip dentition. Members of *Heminerita* may be progenetic derivatives of the *Cymostyla* stock which are now found chiefly on islands in the Indo-West-Pacific region. *Ilynerita* and *Nerita* are monospecific taxa confined respectively to the Indo-West-Pacific and Caribbean regions. Their origins and relationships with other members of the genus *Nerita* remain unclear.

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Department of Zoology, University of Maryland, College Park, Maryland 20742.