

Some views on Indo-Australian Phaedusinae and the establishment of a new subgenus

by

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The Clausiliidae of the Indo-Australian archipelago belong to six genera: *Hemiphaedusa*, *Phaedusa*, *Pseudonemia*, *Acrophaedusa*, *Euphaedusa* and *Paraphaedusa*. The first mentioned four genera occur on the Malay Peninsula and/or on one or more islands of the Sunda shelf, the last mentioned two genera live mainly on some of the islands between the Sunda and the Sahul shelf.

Let us first consider the four genera from the Sunda shelf. Doubtless they, or their ancestors invaded the area from Further India via Malaya.

Their recent distribution is:

Hemiphaedusa, known from Japan, China and Tonkin, is only represented by one species on Sumatra (*H. excurrens* Von Martens).

Phaedusa, known from Japan, China, India and Further India, is represented by four species on the Malay Peninsula (*Ph. pabangensis* Laidlaw, *Ph. lucens* Loosjes, *Ph. filicostata* Stoliczka, with the subspecies *filicostata* Stol., *tenuicosta* Nevill, *compressa* Loosjes, *kapayanensis* de Morgan and *musangensis* Loosjes and *Ph. kelantanensis* Sykes), one species (*Ph. corticina* L. Pfeiffer) on the Nicobar Islands (*Ph. c. nicobarica* Gude), Sumatra, Java and Madura (*Ph. c. corticina* Pfr.) and Batu islands (*Ph. c. batuensis* Loosjes) and three species on Borneo, one of which is a subspecies of a Malayan species (*Ph. borneensis* L. Pfeiffer, *Ph. dorsoplicata* Loosjes and *Ph. filicostata filialis* Von Martens).

Pseudonemia, known from India and Further India, is represented by two species on the Malay Peninsula (*Ps. penangensis penangensis* Stoliczka, *Ps. p. orites* Laidlaw, *Ps. johorensis* Tomlin), nine species on Sumatra and adjacent islands (*Ps. obesa obesa* Von Martens on Sumatra and Sebesi island, *Ps. aenigmatica* Sykes, *Ps. gracilentata* Loosjes, *Ps. sumatrana* Von Martens, *Ps. abbreviata* Von Martens, *Ps. loosjesi* Zilch and *Ps. brachyptycta* Loosjes on Sumatra, *Ps. mentawaiensis* Ehrmann on the Mentawai Islands and *Ps. jacobsoni* Loosjes on Simalur Island), three species on Java and adjacent islands (*Ps. javana* L. Pfeiffer on Java, Madura, Nusa Barung and Nusa Kambangan, *Ps. obesa salacana* O. Boettger and *Ps. fucosa* Loosjes both from Java only), one species on Borneo (*Ps. scalariformis* Loosjes) and one species on Sulu island (*Ps. suluana* Von Moellendorff). *Ps. schlüteri* O. Boettger probably occurs on one of the islands of the Sunda shelf.

Acrophaedusa is known from Burma (*A. arakana* Nevill, *A. monticola* Blanford) and from the islands on the Sunda shelf, one species known from

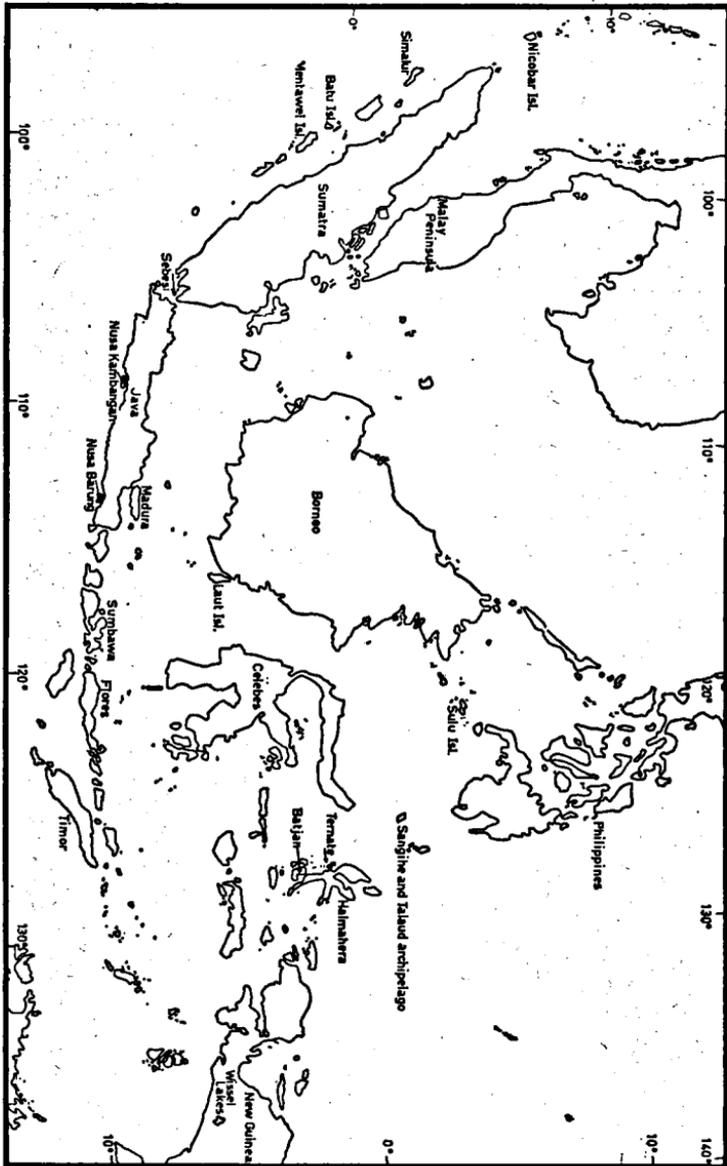


Fig. 1. Sketch-map of the Indo-Australian region.

the Nicobar islands (*A. wuellerstorfi* Zelebor), four species on Sumatra (*A. ibrausta* Loosjes, *A. jungbubni* Philippi, *A. alticola* Von Martens and *A. fornicata* Loosjes); six from Java and adjacent islands (*A. cornea* Philippi, on Java, Madura and Nusa Barung, *A. orientalis* L. Pfeiffer, *A. jungbubni* Phil., *A. schepmani* Von Moellendorff, *A. frubstorferi* Von Moellendorff and *A. nubigena* Von Moellendorff, all from Java only).

If we consider the conchological data of these four genera, the resemblance between *Pseudonemia* and *Acrophaedusa* is very striking (lamellae, plicae, closing apparatus, vide LOOSJES, 1953). Only the concavity of the lateral outlines, the colour of the shell and the shape of the aperture and of the peristome are usually real differences, all phenomena that are under the direct influence of the environment! The Nicobar species *A. wuellerstorfi* Zel. occupies an intermediate position between the two genera. On this account and having regard to the characterizations of the Tribi Megalophaeduseae and Phaeduseae (WENZ/ZILCH, 1959/60) we regard *Acrophaedusa* as belonging to the Phaeduseae and not to the Megalophaeduseae. The anatomical characters, as far as known at the moment do not conflict with this.

Within the Tribus Phaeduseae, *Acrophaedusa* should be placed directly following *Pseudonemia*. In this light and with a view to the distribution of the genera it seems not unreasonable to state that *Acrophaedusa* arose from *Pseudonemia* after species of the latter genus had spread to the islands of the Indo-Australian archipelago, especially to Java. There, perhaps because of the less moist conditions (more pronounced on the eastern part of Java) and perhaps influenced by areas deforested by volcanic activity (the species live on the slopes of the volcanos!) acrophaedusoid light coloured species may have come into being. From Java they spread to Sumatra and possibly also to the Nicobars. The number of *Pseudonemia* species from Java (3) is small compared with that from Sumatra (7), on the other hand *Acrophaedusa* is represented better on Java (6) than on Sumatra (4), this may support my supposition that *Acrophaedusa* had its origin on the smaller island (Java). In my opinion it is more likely that the Nicobar species and both Indian species, which are of somewhat different type, arose independently of *A. cornea* and its allies.

During the origin and spread of the acrophaedusoid forms representatives of the genus *Phaedusa* arrived on the scene. The time elapsed since their arrival has not been long enough to allow the development of different species of the latter genus on Sumatra, Java and adjacent islands. One gets the impression that the presence of four *Phaedusa* species on the Malay Peninsula and three on Borneo implies an earlier appearance of representatives of the genus there.

The theory that *Pseudonemia* reached the islands Sumatra and Java much earlier than *Phaedusa*, is not only based on the many spe-

cies of the first genus, compared with the one species of the second in that area, but also on the fact that a *Pseudonemia* lives on Simalur, an island of which the fauna shows by its aberrant type that it had been isolated longer from the main island than most of the other islands along the west coast of Sumatra. The same holds true for the Mentawai islands, on which also a *Pseudonemia* species lives, but to a less degree. The Batu islands, on which a *Phaedusa* subspecies occurs, were on the contrary connected with Sumatra up to a more recent time than any other island of the chain (DE ROOY, 1922). From that we may conclude that *Pseudonemia* was already present before Simalur or the Mentawai islands became isolated, whereas *Phaedusa* arrived only in time to reach the Batu islands.

The two genera in the eastern part of the archipelago, *Euphaedusa* and *Paraphaedusa*, or their ancestors, reached this area from China via the Philippines (LOOSJES, 1953).

The genus *Paraphaedusa* is endemic on the island of Celebes. Only one species is known from western New Guinea (*P. minahassae* Sarasin from the neighbourhood of the Wissel lakes) and one is found on eastern Borneo and on the island of Laut (*P. schwaneri* Von Martens). The specimens of New Guinea are identical with the type specimens of the species from Celebes and so it is likely that this species reached New Guinea in the not very distant past by chance, possibly transported by birds, or may it be, by man in the course of his inter-island traffic. This is the more probable as Mr. MCMICHAEL of Sydney (Australia) kindly informed me that he had found no Clausiliidae on his collecting expedition in Western New Guinea. For *P. schwaneri* Von Martens of eastern Borneo and Laut island I would also suggest transport by birds but longer ago, because here a separate species was formed.

As the *Paraphaedusae* have developed into eight different species on the island of Celebes and the *Euphaedusae* (moreover known from Japan, China and Korea) have only managed to form some subspecies, even on islands as remote as the Philippines (*Eu. cumingiana cumingiana* L. Pfeiffer), Celebes (*Eu. c. moluccensis* Von Martens and *Eu. c. similima* Smith), Sangihe and Talaud archipelago (*Eu. c. moluccensis* Marts.), northern Moluccas (Halmahera, Ternate, Batjan) (*Eu. c. moluccensis* Marts.) and the lesser Sunda islands (Sumbawa, Flores, Timor) (*Eu. c. recondita* Sykes), one can only conclude that either the development of the latter species group proceeds much more slowly, possibly on account of their less variable habitat (they are usually found in low land, whereas the *Paraphaedusae* are mountain dwellers), or the ancestors of the *Paraphaedusae* reached Celebes long before the *Euphaedusae* of the *cumingiana* group arrived. I sup-

port the latter view (LOOSJES, 1953, p. 213). Nevertheless it is not excluded that the *Paraphaedusae* arose from euphaedusoid ancestors.

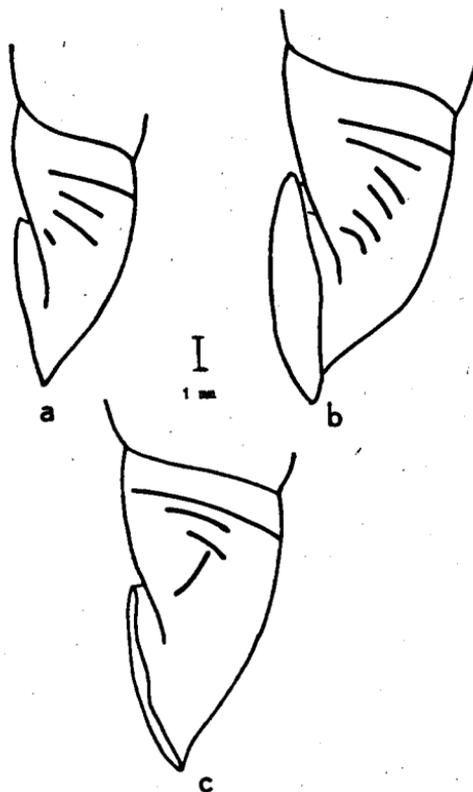


Fig. 2. a. *Pseudonenia javana* (Pfeiffer); b. *Pseudonenia obesa* (Von Martens); c. *Pseudonenia fucosa* Loosjes. The right side of the last whorl of the three species is figured to show the plicae palatales.

To the genus *Pseudonenia* belong the subgenera *Oospira* Blanford (type *Ps. (O.) philippiana* (L. Pfeiffer) (conf. ZILCH, 1954, WENZ/ZILCH, 1959/60) and *Pseudonenia* s.s. The latter subgenus includes two distinct groups of species. In the first group, to which the genotype *Ps. (Ps.) javana* (Pfr.) belongs, the plicae palatales all run more or less parallel and correspond with two very similar schemes (fig. 1a and 1b). In the other group, the upper palatal plicae are more or less parallel with the plica palatalis principalis but below them is a rather long plica, situated vertically to the upper ones (fig. 1c).

This arrangement of the plicae is found in *Ps. fucosa* Loosjes and in *Ps. schlüteri* O. Boettger. I separate them from the subgenus *Pseudonemia* in a distinct subgenus **Juttingia** (type *Ps. (Juttingia) fucosa* Loosjes) in honour of Mrs. W. S. S. VAN DER FEEN-VAN BENTHEM JUTTING who has contributed more than any one else to the knowledge of the Mollusca from the Indo-Australian region.

The Tribus Phaeduseae (WENZ/ZILCH, 1959/60) should read, according to this conception:

- Genus *Stereophaedusa* O. Boettger, 1877
 type: *S. valida* (Pfr.)
Phaedusa H. & A. Adams, 1855
 type: *Ph. corvicina* (Pfr.)
Pseudonemia O. Boettger, 1877
 type: *Ps. javana* (Pfr.)
Pseudonemia s.s.
Oospira Blanford, 1872
 type: *Ps. (O.) philippiana* (Pfr.)
Juttingia nov. subg.
 type: *Ps. (J.) fucosa* Loosjes
Acrophaedusa O. Boettger, 1877
 type: *A. cornea* (Philippi)
Euphaedusa O. Boettger, 1877
 type: *Eu. shanghaiensis* (Pfr.)
Paraphaedusa O. Boettger, 1899
 type: *P. subpolita* (E. A. Smith)
Reinia Kobelt, 1876
 type: *R. variegata* (A. Adams)
Proreimia Thiele, 1931
 type: *R. (P.) eastlakeana* (Mldff)
Reinia s.s.

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