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THE LECTOTYPE AND TYPE LOCALITY OF *CANDOIA CARINATA* (REPTILIA, SERPENTES)

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ABSTRACT: The lectotype of *Boa carinata* Schneider, 1801, has been rediscovered and is now ZMFK 35503, having been transferred in 1977 from the Göttingen Museum, its original location. Its type locality has not been reported previously, but is indicated as "Amboina" on a label with the lectotype. The specimen is redescribed and figured, and conforms with expectations for material from the vicinity of the type locality. A brief history of Schneider and of the syntypes of *Boa carinata*, now *Candoia carinata*, is reviewed.

Although the type locality of Schneider's *Boa carinata* (1801: 261-263) has been unknown (Stimson, 1969) ever since the species was described, no great problem was posed thereby until Stull (1956) ventured to describe and name a subspecies of it, *E. c. paulsoni*. Later, the review of the species by McDowell (1979) revealed considerable geographic variation suggestive of taxonomic differentiation, although the picture he obtained was considered inconclusive and no subspecies were recognized.

Our own studies of geographic variation indicate that the species as currently recognized does indeed constitute a complex of several taxa. Resolution of nomenclature for those taxa hinges upon fixation of the earliest name applied in the complex, Schneider's *Boa carinata*.

In the absence of type locality, application of Schneider's name would hinge solely on characteristics of the onomatophore (name bearer; Simpson, 1940). Schneider based his name on eight syntypes, without designation of any one as the onomatophore. As summarized by McDowell (1979), Schneider cited one specimen in the Ludwigian collection, two in the Lampian collection, five in the Museum of the Duke of Brunswick, and one in the Göttingen Museum. The latter was most fully described by Schneider, and was designated by McDowell as the lectotype, which he thought was "probably lost." Nevertheless, on the basis of the number of ventrals and caudals, and other data in the original description, McDowell concluded that the type locality probably was in the "South Moluccas."

Inasmuch as greater certainty of the geographic origin and identity of the name-bearer for *Candoia carinata*, as the species is now known, appears desirable (in view of the several taxa that now seem to be involved), a concerted effort to determine the fate of the lectotype revealed that the specimen does indeed exist, and is now No. 35503 in the Zoologisches Forschungsinstitut und Museum Alexander Koenig (ZFMK) in Bonn, Germany. We have made no attempt to locate the remainder of the former syntypes, now paralectotypes and no longer to be considered syntypes; they hence are without automatic replacement potential as onomatophore. A review of the history and associations of the lectotype, insofar as can now be determined, is of considerable importance.

The German naturalist Johann Gottlob Theaenus Schneider was born in 1750 near Oschatz, close to Leipzig, where he started in 1769 his university studies of natural history and philology, focussing the latter on classical Greek. He continued those studies in 1772 at Göttingen, and finished with a Ph.D. in 1774 at Strassburg (now Strasbourg, France). Two years later he became Professor of Philology at the University of Frankfurt (an der Oder), moving subsequently to Breslau (now Wroclaw, Poland) when the entire university was transferred there in 1811. He died in Breslau in 1822 (Adler, 1989: 13).

Although Schneider's literary work clearly outranked his zoological contributions, he nevertheless produced several major zoological works, most important among them "Historiae Amphibiorum" (2 vols., 1799 and 1801). That work dealt with the amphibians and reptiles of the world and included descriptions of numerous new genera and species. Adler's (1989: 13) biographical account for Schneider mentioned some of the best known examples, today known as *Crocodylus porosus*, *C. siamensis*, *Palaeosuchus trigonatus*, *Candoia carinata*, *Eryx conicus*, *Morelia amethistina* and *Python reticulatus*. Most of these descriptions referred to specimens Schneider examined in various German collections of that time, most of which are currently very hard to trace. Examples are "Museum Blochianum" (Berlin), "Museum Lampianum" (Hannover), "Museum Ducalis Brunovicensis" (Braunschweig), "Museum Meyerianum" (Stettin, now Szczecin, Poland), "Museum Goettingensis" and several others (see Schneider, 1799, 1801, 1821). The latter museum, in contrast with

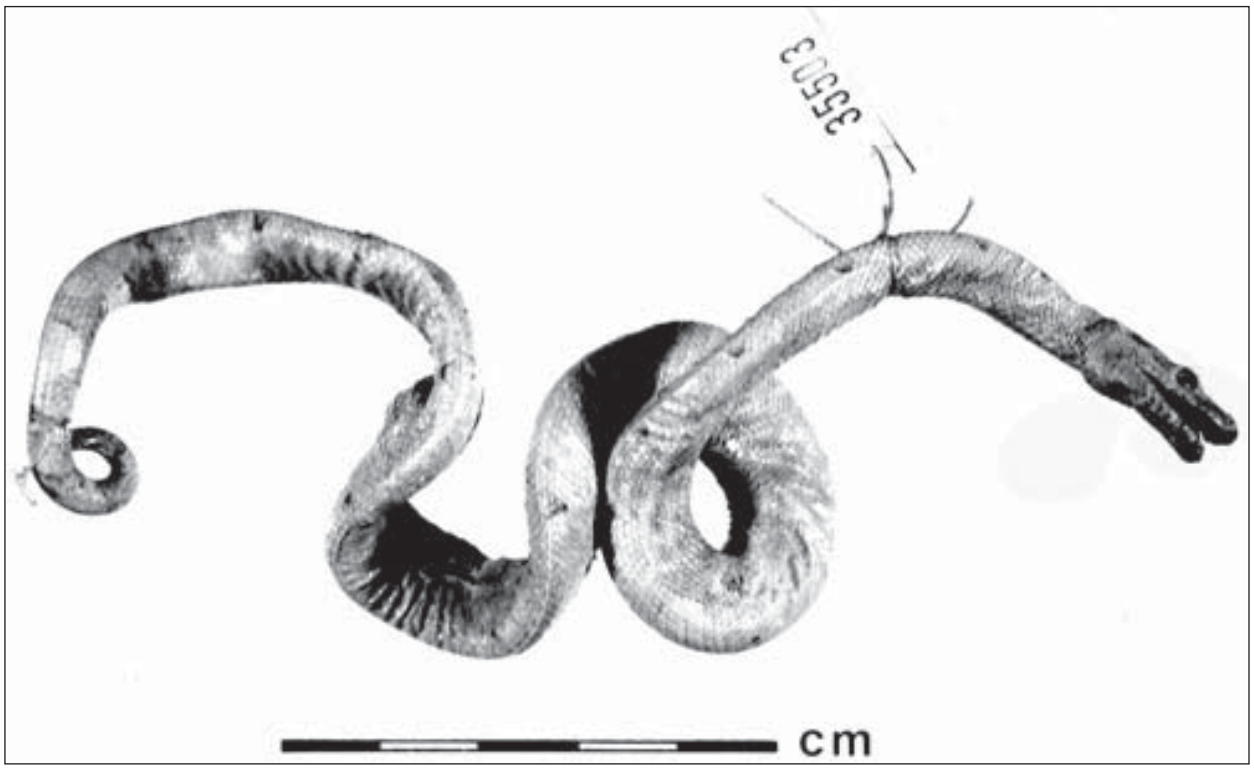

Figure 1. The lectotype of *Boa carinata* Schneider, ZMFK 35503. Total length 339 mm.

most of the others, already existed as a public institution not connected with the name of a private person, and it is there that the lectotype of *Boa carinata* was at one time housed.

The Zoological Museum of Göttingen existed from 1773 as a Department of the Royal Academic Museum ("Royal" referring to the Kingdom of Hannover), and received its own building in 1793. The first curator of the zoological (and thus herpetological) holdings was the famous anatomist Johann Friedrich Blumenbach (1752-1840). He was the academic mentor not only of Schneider but also of Prince Maximilian Wied zu Neuwied (1782-1862) and Arnold Adolph Berthold (1803-1861) among those of herpetological importance. Berthold followed Blumenbach as the second curator of the Museum in 1840, and was the first to establish a handwritten catalog, still extant, of its holdings. The catalog was started in 1840 or 1841, some 40 years after Schneider had worked in the collection. For this reason the specimens cited by Schneider had no catalog numbers at his time, and their jars bore no labels indicating that they were types (at that time the so-called "Originalexemplare"). Thus the types of several of Schneider's nominal species have come to be regarded as "lost," as was the case in *Boa carinata* (Stimson, 1969; McDowell, 1979).

Schneider's type specimens in the Bloch collection ("Museum Blochianum"), Berlin, as well as all of the rest of that collection and that of the Preussisch-Königliche Kunstkammer (Royal Prussian Art Chamber), were ultimately incorporated in the Zoological Museum of Berlin, founded in 1810. For example, the onomatophores of Schneider's *Eryx conicus*, *Morelia amethistina* and *Crocodylus porosus* still exist in the Berlin Museum, carefully labelled as "original specimens" by the former curator Wilhelm Peters (Wermuth, 1954; Stimson, 1969; Bauer et al., 1995).

In contrast, Schneider's types in the Göttingen Museum were never so labelled. Berthold marked some of them with the symbol "A.S." (for "Alte Sammlung," i.e., the "old collection"), referring to the material on hand when he started his curatorship and catalog in 1840/41. Thus, because the characters described by Schneider (1799) for *Crocodylus porosus* were rather irrelevant, Wermuth (1954) failed to identify the Göttingen syntypes of this species although they are most likely still in existence (Böhme, in prep.). On the contrary, Schneider (1801) gave scale counts by which the syntype of *Candoia carinata* in the Göttingen collection could be unequivocally identified. Such a specimen is indeed present, cataloged in Berthold's handwriting as "*Enygrus carinatus* (entry 18a)" with the locality "Amboina." It is listed by him in a published catalog (Berthold, 1846: 18) as "*Boa (Enygrus) carinata* Schneid. Amboina."

As published by Böhme and Bischoff (1984, see also Myers and Böhme, 1996), the entire collection of the Zoological Museum of Göttingen was transferred to the Zoologisches Forschungsinstitut und Museum Alexander Koenig (ZFMK), Bonn, in 1977. The specimen included by Schneider (1801) in his syntype series of *Boa carinata* and designated as lectotype by McDowell (1979) is from "Amboina" (=Ambon) and is now cataloged as ZFMK 35503 (Figures 1, 2).

The type locality of an onomatophore of a widely distributed species, such as *Candoia carinata*, is of critical importance when, as in the present case, geographic subdivision may be involved. The uncertainty of precise, local application of that name due to the absence of a known type locality has been only partly mitigated by McDowell's (1979) surmise, based on morphology, that the lectotype came from the "South Moluccas." Discovery

Figure 2. Right side of head and neck of the ZMFK 35503. Horizontal diameter of eye 2 mm.

of the catalog entry of "Amboina" for the lectotype leaves no doubt whatsoever that McDowell's surmise was correct, and provides an even more precise fixation.

No evidence exists that more than one taxon of the *C. carinata* complex occurs on Ambon Island or anywhere else in the South Moluccas or Irian Jaya. Nevertheless, it is also important that the morphological features of the lectotype conform with those of other material known to have originated in that area, thus substantiating the purported source of the lectotype from the stated locality.

The pertinent morphology of the lectotype may be summarized as follows (Figures 1-3). Male, with conspicuous spurs; SVL 286 mm, TL 53 mm (incomplete, see Figure 2); scale rows 28-34-22, keels present on all rows except the 1st, although weak and limited on the 2nd scale row to 2-3 head lengths behind the head; ventrals 169 (vs 168 given by Schneider), including a distinctive (of the genus) antepreanal; caudals 45 (vs 46 given by Schneider), but tail incomplete (see Figure 2); supralabials 13-13, 6-7 entering orbit; 2nd and 3rd supralabials not divided, 4th divided; infralabials 13-13; 11-12 scales encircling orbit, excluding supralabials and including a subpreocular and a preocular twice as large as the subpreocular; minimum number of scales in a row between preoculars, excluding any of the circumorbitals, 9; postrostrals 3; scales contacting posterior end of nasal between lateral postrostral and 2nd supralabial, 3-3; number of internasals in a row connecting the posterior ends of the lateral postrostrals, 7; number of scales between internasals and postrostrals, 2; number of prefrontals in a row posterior to internasals, 7; minimum number of scales in a row between orbits, 9; number of enlarged supraoculars on each side, 3-3; number of enlarged supraoculars forming a part of the circumorbital series, 0-0; horizontal diameter of eye, 2 mm; vertical diameter of eye, 1.8 mm; eye-lip distance, 1 mm; eye snout-tip distance, 6 mm; eye-rictus oris distance, 4 mm; a white postanal spot covering all or parts of 5 subcaudals; pattern faded except for vestiges of a zigzag middorsal line at intervals of 10-20 scale lengths (Figures 1, 2).

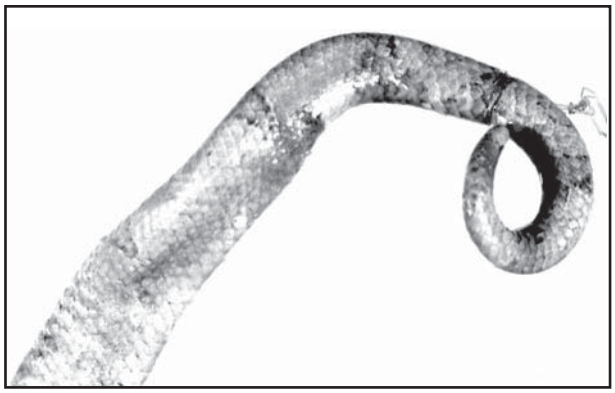

Figure 3. Left side of tail and posterior part of body of ZMFK 35503. Tail length 53 mm (incomplete).

Over 300 specimens have been examined for comparison from all parts of the range of the species, enabling us to compare the features of the lectotype with those of populations in all parts of the range of the species. Especially critical is the presence of a conspicuous white postanal spot, immediately following the anus; the spot is invariably present in the morphologically uniform populations of the South Moluccas, Irian Jaya, northern Papua New Guinea, New Britain and New Ireland, all regarded as typical *C. carinata*. There is, indeed, no way to limit the origin of the lectotype morphologically to any one of those regions. A white, immediately postanal spot occurs elsewhere in the *C. carinata* complex only in the Palau population, which, however, has fewer than 9 intersupraoculars (4-7, N=29), usually fewer anterior scale rows (25-27, 28 occurring in only two of 29), and several other average differences.

A second generally distinctive feature of South Moluccan populations is the relatively long tail, as noted by McDowell (1979), who struggled with an analysis of its possible taxonomic significance. The lectotype number of 45 subcaudals, even though incomplete, occurs within the range of 45-53 that occurs in South Moluccan *C. carinata* (N=21), and is matched elsewhere only in Misima Island specimens (49-50, N=3). None is as high as 45 in material from Bougainville and Halmahera (N=52), in only 3% in material from central and southern Papua New Guinea (N=29), although in 25% of specimens from the Solomons (N= 56) and 45% in Palau material (N=20). Concomitantly, the TL/TTL ratio is consistently higher in typical *C. carinata*, including the holotype with a ratio of .16; 81% of South Moluccan specimens have a ratio of .16 or higher, whereas 0% occurs in material from Halmahera and central and southern Papua New Guinea (N=55), 4% in Bougainville (N=23), 5% in the Solomon Islands (N=55), 15% in Palau (N=20), and 33% in Misima (N=3).

A third, apparently completely distinctive feature of typical *C. carinata* is the presence of at least weak keels on some part of the 2nd scale row, as in the lectotype. Keels do not occur on the 2nd scale row in any material from elsewhere.

Thus all distinctive features of the lectotype of *Boa carinata* conform with those of other material from the stated type locality of Ambon, which we conclude cannot be contested.

Fixation of application of the name *C. carinata*, through discovery of the lectotype, clarification of type locality, and analysis of the characteristics of the lectotype, removes all uncertainty in application of other names, such as *Enygrus superciliosus* Günther (1863) and *E. c. paulsoni* Stull (1956) to the complex, as junior synonyms or for separately valid taxa.

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