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A NEW SPECIES OF *AMPHIDROMUS* ALBERS, 1850 (GASTROPODA: STYLOMMATOPHORA: CAMAENIDAE) FROM CHINA, WITH NOTES ON *AMPHIDROMUS* SPECIES

YUNG-CHING WANG[1]*, ZHE-YU CHEN[2]

[1]Shenyang, Liaoning Province, China (e-mail: melanostictus@foxmail.com);
https://orcid.org/0000-0003-4937-6116
[2]School of Life Sciences, Nanjing University, China (e-mail: chenzheyu1998@163.com);
https://orcid.org/0000-0002-4150-8906
*corresponding author

ABSTRACT: *Amphidromus zelosus* n. sp. from Guangxi Zhuang Autonomous Region, China, is described and illustrated. *A. wani* He et Zhou, 2017 is synonymised with *A. qiongensis* He et Zhou, 2017. Additional data on *A. sinensis sinensis* (Benson, 1851) are given.

KEY WORDS: taxonomy; systematics; new species; tree snails

INTRODUCTION

Amphidromus Albers, 1850 is a speciose genus of tropical arboreal camaenids that is widely distributed from South and Southeast Asia to northern Oceania (WANG 2021). The first report of this genus from China was *A. sinensis* by BENSON (1851); 130 years later, CHEN & GAO (1984a) reported another species from Hainan Island as *A. rhodostylus* Moellendorff, 1901. This identification was adopted by manifold subsequent studies (CHEN & GAO 1984b, 1987, QI et al. 1985, DU et. al. 2013). Nonetheless, in HE & ZHOU (2017), this species was recognised as two species new to science, namely *A. wani* and *A. qiongensis*; additionally, HE & ZHOU (2017) described from Yunnan Province a new subspecies, *A. sinensis qimingi* He et Zhou, 2017, and recorded *A. dautzenbergi* Fulton, 1899 (disproven senior synonym of *A. pervariabilis* Bavay et Dautzenberg, 1909 (WANG 2019)) from Guangxi Zhuang Autonomous Region simultaneously. Furthermore, SUTCHARIT & PANHA (2011) reported one specimen of *A. mundus* (Pfeiffer, 1853) labelled as "Borneo? China?". In the present study, *A. zelosus* n. sp., is described from Guangxi Zhuang Autonomous Region, and a rebuttal to the notion that the *A.* aff. *rhodostylus* population in Hainan Island comprises two species is proposed. Information concerning the type specimen and type locality of *A. sinensis sinensis*, which is practically known solely from its original description, is also presented.

MATERIAL AND METHODS

Specimens studied in this work were deposited in the Mollusc collection of the Museum of Hebei University (HBUMM, Baoding, Hebei Province, China) or Yung-Ching Wang's private collection (WYCC, Shenyang, Liaoning Province, China). Images of specimens in public repositories were also examined. Shells were measured with a mechanical vernier calliper by the first author to the nearest 0.05 mm. Photos were downloaded from the Internet or taken using a Canon® 5D Mark IV camera attached with Canon® 100 mm Macro lens, stacked with Zerene Stacker® 1.04. and modified in Adobe Photoshop® CS6. The terminology formulated by INKHAVILAY et. al. (2017) to describe shell colouration of *Amphidromus* was used.

SYSTEMATIC PART

Family Camaenidae Pilsbry, 1895

Genus *Amphidromus* Albers, 1850

Type species: *Helix perversus* L., 1758, subsequently designated by Martens in Albers (1860: 184)

Amphidromus zelosus n. sp.

Fig. 1

Amphidromus sp. He & Zhou 2017: 7, fig. 11.

Type material. Holotype, HBUMM 10049 (dry shell, shell height 30.25 mm, shell width 21.20 mm), Baise City (百色市), Guangxi Zhuang Autonomous Region (广西壮族自治区), China. Paratype: HBUMM 10050 (one dry shell, shell height 29.90 mm, shell width 21.30 mm), same data as the holotype.

Description. Shell conical, dextral, solid, consisting of approximately 6 moderately inflated whorls, exterior smooth, sutures slightly impressed, base angular. Umbilicus reduced to a slit. Aperture auriform. Peristome somewhat expanded but not bent or thickened. Colouration basically in white and includes two intersecting, brown bands: band 2 axial stripes, while band 3 a spiral stria located on shell's periphery. Both bands first appear around the 2.5 whorls and terminate before the last half whorl.

Etymology. The name of this new species is derived from the Latin word *zēlōsus*, meaning zealous, which embodies the first author's enthusiasm in malacology.

Remarks. Live samples of *A. zelosus* n. sp. were unavailable to the present study, but one specimen photographed by He & Zhou (2017) alive, which is a conchological sub-adult with thin peristome, is likely this species. Its head, tentacles, and foot are greyish brown, and its mantle has a green hue.

Owing to their similar size and colouration, some individuals of *A. pervariabilis* (especially of varieties *A. p. minor* and *A. p. goniostoma*) and *A. tanyai* Panha, 1996 may look akin to *A. zelosus* n. sp. Contrastingly, *A. zelosus* n. sp. exhibits dark axial streaks on the shell. Some juveniles of larger *Amphidromus* s. s., e.g. *A. atricallosus* (Gould, 1843), resemble *A. zelosus* n. sp.; nevertheless, they are easily separable in that juvenile *Amphidromus* do not possess an expanded peristome.

Distribution. Based on current information, this new species is confined to the type locality.

Amphidromus qiongensis He et Zhou, 2017

Figs 2–3

Amphidromus rhodostylus Chen & Gao 1984a: 130, fig. 143; Chen & Gao 1984b: 11, pl. 3, fig. 11; Qi et al. 1985: 81, text figure; Chen & Gao 1987: 112, fig. 144; Du et. al. 2013: 43, figs 1–3 (misidentification)

Amphidromus qiongensis He & Zhou 2017: 4–5, figs 6–7.

Amphidromus wani He & Zhou 2017: 3–4, figs 1–5; Thach 2020: 81, fig. 853 **(new synonym)**

Type locality. "Dongfang County, Hainan Province, China"

Material examined. WYCC/1, Jiangfengling, Ledong Li Autonomous County, Hainan Province, China; WYCC/2, Dongfang City, Hianan Province, China.

Remarks. In the population of this species, substantive transition in shell colour, the prime diagnostic trait indicated by He & Zhou (2017), has been observed (Sheng-Zhuo Huang, pers. comm.); it could, as a result, be suspected that differences in shell colour and texture, in the present case, reflect differences in individual growth stages or the collecting season, rather than in the genetics. A molecular phylogenetic analysis shows that *Amphidromus* samples morphologically identified as both species are monophyletic in comparison to other *Amphidromus* species (Chitse Lee, pers. comm.), which substantiates our allogeneic treatment. The first revisor's power is herein exercised to confer nomenclatural priority upon *A. qiongensis* He et Zhou, 2017.

He & Zhou (2017) expounded that the type morph of *A. rhodostylus* (*A. r. rhodostylus*) is different from *A. qiongensis*, which, judging from coloured photographs of the lectotype of *A. r. rhodostylus*, is correct. Though He & Zhou (2017) did not investigate the rest of the taxa assigned to *A. rhodostylus*, and that *A. qiongensis*, *A. r. nigrolineatus*, and *A. r. rhabdotus* sometimes appear alike, *A. qiongensis* remains distinguishable from *A. rhodostylus*, since they show a markedly different range of variation in shell colouration.

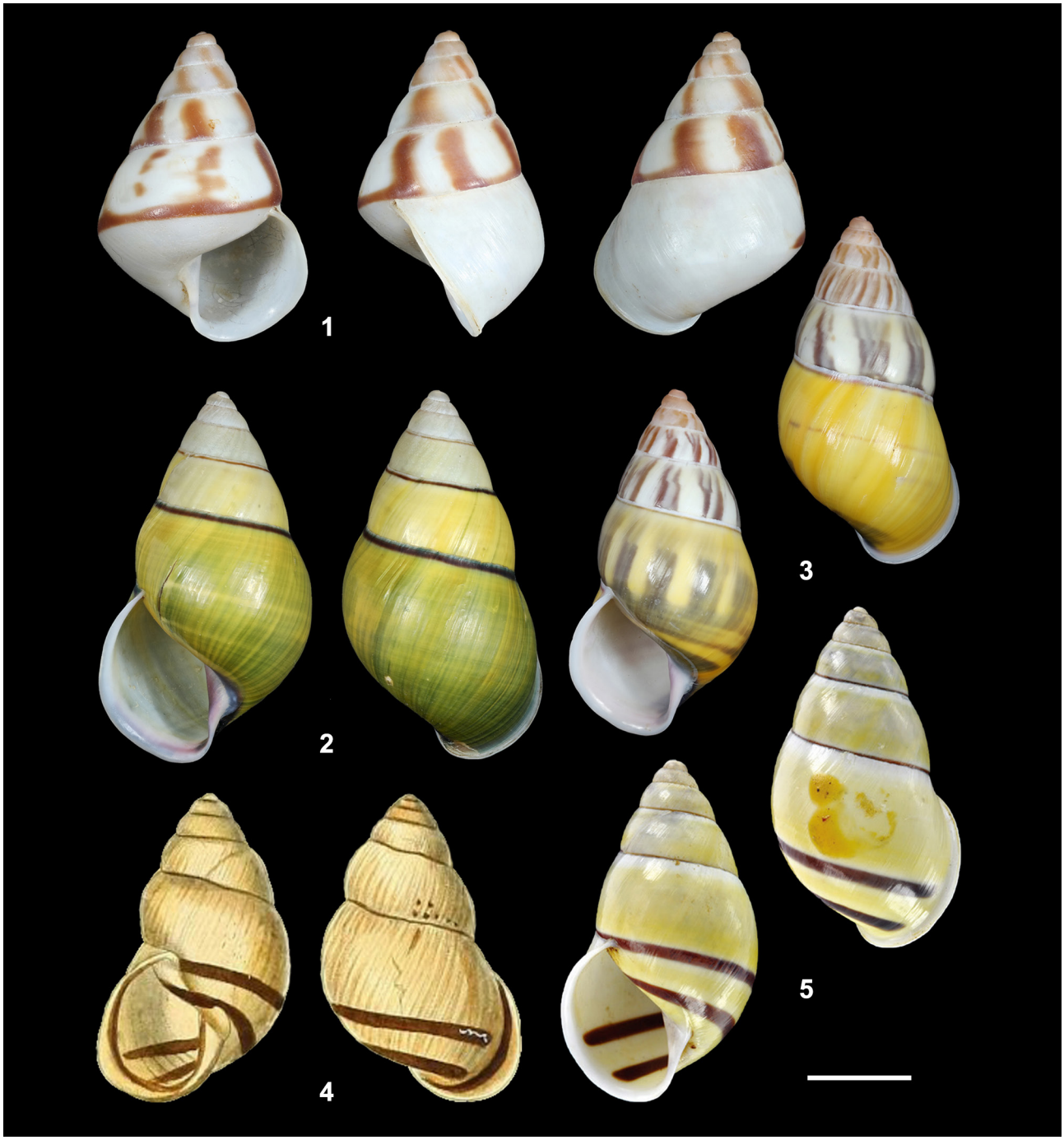
Amphidromus sinensis sinensis (Benson, 1851)

Fig. 4

Bulimus sinensis Benson 1851: 264; Küster & Pfeiffer 1845–1855: 67–68, pl. 20, figs 1–2.

Amphidromus sinensis: Fulton 1896: 80; Pilsbry 1900: 190–191, pl. 62, figs 64–65; Gude 1914: 182–183; Laidlaw & Solem 1961: 660.

Remarks. In the original description of *A. sinensis sinensis* Benson (1851) provided the measurements of only one shell and used the singular form of the noun "specimen", which signifies a holotype designated by monotypy. The specimen depicted in Küster & Pfeiffer (1845–1855), which is the "type shell" (in other words, the holotype) according to Fulton (1896), has a "lilac-coloured" peristome and one black streak immediately behind it, which



Figs 1–5. Shells of *Amphidromus* spp: 1 – *A. zelosus* n. sp. (holotype, HBUMM 10049); 2–3 – *A. qiongensis* (WYCC); 4 – *A. sinensis sinensis* (holotype, hand-drawn); 5 – *A. s. vicarius* (erroneously presumed syntype of *A. s. sinensis*, University Museum of Zoology Cambridge, Cambridge, UK). Scale bar 10 mm

resembles that of *A. koonpoi* Thach et Huber, 2018 (a probable synonym of *A. roseobiatus* Fulton, 1896). These traits are highly unique; beside a "broader" shell, they are the chief characters that separate *A. s. sinensis* from *A. s. vicarius* Fulton, 1896 (Fulton 1896, Pilsbry 1900). *A. s. vicarius* (e.g. Mitra et al. 2005, Natural History Museum (UK) 2014, Naturalis Biodiversity Center 2020) constitute the vast majority of *A. sinensis* collections, and except for the holotype of *A. s. sinensis*, the specimen reported by Tripathy et. al. (2018) is the only specimen on which we identified a "lilac-coloured" peristome and one black streak immediately behind it, although the streak is far from pronounced and is only visible between band 4 and band 5 from inside the aperture. The holotype of *A. s. sinensis* was surmised to be missing (Pilsbry 1900, Laidlaw & Solem 1961). It has not been located in the collections of the Oxford

Museum of Natural History, the Museum of Zoology of University of Cambridge, or the Natural History Museum in London. SUTCHARIT et al. (2015) discovered three specimens in Benson's collection (Fig. 5), and assumed them to be possible syntypes of *A. s. sinensis*. Their supposition is incorrect because the type material of this subspecies is the holotype instead, as explained above; moreover, morphologically, those three specimens are *A. s. vicarius* Fulton, 1896 rather than *A. s. sinensis*. PILSBRY (1900) suspected that the holotype of *A. s. sinensis* may have been transferred to the collection of Dohrn, but no specimen claimed to be Benson's type material was found in Dohrn's surviving collection in Warsaw, Poland (TOM WHITE, pers. comm.).

BENSON (1851) only vaguely stated the type locality of *A. sinensis sinensis* as southern China, whereas LAIDLAW & SOLEM (1961) cited the locality data documented in BENSON (1851) as Canton [Guangzhou, Guangdong Province], South China, which we believe was a misreading of the name of Dr. Cantor, who was mentioned in the text of BENSON (1851) almost immediately after the locality data for *A. sinensis*. Unaware of LAIDLAW & SOLEM's (1961) error, HE & ZHOU (2017) reproduced it. Actually, however, the precise origin of *A. s. sinensis* is still in suspense.

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