

A new member of the *Amphidromus (Syndromus) contrarius* (Müller, 1774) group from Timor-Leste (East Timor)

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ABSTRACT This paper describes a new member of the *Amphidromus (Syndromus) contrarius* (Müller, 1774) group from Timor-Leste (East Timor). Although variable in shape, it is easily separated from the nominate subspecies and shares features with other members of the group, especially patterns. It differs in having its umbilicus closed or almost so, and has at least six colour forms, whereas other members of the group usually have only three colour forms.

KEY WORDS *Amphidromus*, *A. timorensis*, *A. contrarius*, Tutuala, Timor-Leste (East Timor)

INTRODUCTION

Earlier this year, John searched for a local living in Timor-Leste (East Timor) for the purposes of acquiring species of *Amphidromus* Albers, 1850. Having found such a person, John asked him to start looking in the forests west of Tutuala in May 2020. Weeks later, he sent John a photo of *Amphidromus* snails he had discovered. From that one photo it was clear these were not like any species we knew of from that part of the island. It is a new member of the *Amphidromus (Syndromus) contrarius* (Müller, 1774) group and described herein as a new species until preserved live specimens can be studied and proven otherwise.

Materials and Methods.

Shells were measured using digital Vernier callipers (0.01 mm resolution), sculpture examined under low magnification (10x) using a jeweller's loupe, and weighed using a pocket-sized electronic scale (capacity 300 g x 0.01 g). Whorl count includes the apex and counted precise to 0.125 (1/8 whorl). 'Paries' (adj.

parietal) refers to the 'inner apertural wall' and 'palatum' (adj. palatal) is the 'outer apertural wall'. Relative shell sizes for the subgenus *Syndromus* mentioned are as follows: small < 30 mm, medium 30-45 mm and large > 45 mm.

Five shells make up the type series, the holotype (NHMUK) and 4 paratypes (JA). Photography credits appear below each image and the plate. The species description and variation were determined from dry empty shells obtained for John Abbas by a local in East Timor. Comparative material comprised of shells from private collections, plus images of museum specimens and types.

Abbreviations used for museums and private collections:

NHMUK: Natural History Museum, London, England, UK

ZMB: specimen label code at Museum für Naturkunde, Berlin, Germany; previously known as Zoologisches Museum Berlin

JA: John Abbas collection

JP: Jeff Parsons collection

Abbreviations for shell morphometry, shell coiling and other:

D:	shell width (abbreviation for 'diameter' as per literature usage)
H:	shell height
H/D:	shell height/shell width ratio
N:	whorl count
W:	shell weight
JP	comments, data, images, observations or other by Jeff Parsons

Taxonomic Remarks.

The concept of the *A. (S.) contrarius* group used here is a modified version of that stated by Severns (2006) and is here split into 3 clades: 1) *A. (S.) contrarius*, 2) *A. (S.) laevus* (Müller, 1774) and 3) *A. (S.) reflexilabris* Schepman, 1892. Only members of the *contrarius*-clade are discussed herein as the new species is a new member of it and distinctly different to members of the other two clades.

In recent times, specimens of *A. (S.) contrarius* have been sold and displayed on the Internet under the name of *A. (S.) con. baaguia* Forcart, 1936 (see plate 2, figure 26). That is incorrect as that subspecies is known only to live in the Baagua Subdistrict (Baquia, Bagia, obsolete: Baagua) in SE Baucau District of Timor Leste, which is about 60 km WSW of Tutuala on the eastern tip of Timor Island.

We wish to correct three incorrect species associations: *Amphidromus berschaueri mingmini* Thach, 2018, *A. chrisabbasi roberti* Thach, 2017 and *A. bernardfamyi kefaensis* Thach, 2018. These snails show greater affinities to members of the *A. (S.) contrarius* clade and hereafter placed there. We accept one as a full species until confirmed otherwise, *A. (S.) mingmini*. For purposes of this paper *A. (S.) chrisabbasi roberti* is considered as a synonym of *A. (S.) con. albolabiatatus* Fulton, 1896 as per the decision of Páll-Gergely et al, 2020. After

studying multiple specimens of shells from Kefa, we believe *A. (S.) kefaensis* and *A. (S.) keppendhondtorum* Thach, 2018 are only shape and pattern variations of single species, since specimens identified as both occur with intergrades in the same colony, and henceforth *A. (S.) kefaensis* is regarded as a synonym of *A. (S.) keppendhondtorum*.

SYSTEMATICS

Family: Camaenidae Pilsbry, 1895
 Subfamily: Camaeninae Pilsbry, 1895
 Genus: *Amphidromus* (m.) Albers, 1850
 Subgenus: *Syndromus* (m.) Pilsbry, 1900
 Type species: *Helix contraria* (f.) Müller, 1774

Amphidromus (Syndromus) timorensis
 Parsons and Abbas new species
 (Figure A and Plate 1)

Description. (Holotype) Shell medium-sized, sinistral, ovate-conic, moderately thick, translucent and solid. Spire long and summit rounded. Surface shiny and protoconch smooth; teleoconch with obsolete spiral microstriae crossed by growth threads, slightly coarser on last whorl. Whorls 6¼, regularly coiled and gradually expanding, upper surface subconvex. Last whorl not descending in front, its periphery and base rounded. Suture impressed apically and appressed below periphery on teleoconch; white-margined and bordered below by a rose subsutural band from third whorl onward. Periostracum removed.

Protoconch 1½ whorls, pale flesh and rotund. Apex rounded, exsert and black, continued as an infrasutural fillet (apical swirl) that narrows and fades-away on second whorl. Teleoconch flesh-tinted apically, next ones white and ultimate pale cream. Two series of pale brown blotches emerge on second whorl, darken and then tinted purple and partially faded on antepenult, split on

penult and fuse as brown spiral lines on last whorl, crossed by dilution streaks. Yellow supermedial band on third and fourth whorls is evanescent on penult. Base has two brown lines between two purplish-brown bands, upper one partially interrupted by a few spirally-elongated cream blotches.

Circumbilical band rose, thin, obsolescent and does not exit the aperture, bordered above by a narrow brown band. All bands and lines fall short of outer lip. Stripes marking growth stoppages (morae) absent.

Aperture suboblique, narrowly ovate. Palatum cream, whitened near lip and external pattern shows through. Parietal callus very thin and colourless. Parietal tubercles absent. Outer lip gleamy white, thin but thickened inwardly, strongly reflected and very narrowly expanded; edge not rimmed, flat; lateral profile rather straight. Lip terminus non-ascending, slightly curved forward and weakly grooved. Columella gleamy white, narrow, suberect and slightly twisted, curved dorsally. Columellar margin thickened, subulate, convexly dilated above and revolute, closing the umbilicus.

Type Material. 5 adult shells, all from the type locality. Holotype (NHMUK 20200247, figure A and plate 1, figure 2) H 40.8 mm, D 18.66 mm, H/D 2.19 and N 6.25. Paratypes (JA, plate 1, figures 5, 7, 11 and 18) not measured.

Other Material. 15 adult shells from the type locality (JA, plate 1, figures 1, 3-4, 6, 8-10, and 12-17) not measured.

Type Locality. Easternmost tip of Timor Island at Tutuala Subdistrict, Lautém District, Timor-Leste (East Timor).

Distribution. Currently known only from the type locality.

Ecology/Habitat. Found on tree trunks in vine thicket and lowland limestone forest, collected by a local for John Abbas.

External Features of Animal. Unknown.

Soft Parts. Not available for study.

Etymology. Named after the island of Timor.



Figure A. Holotype of *A. (S.) timorensis* n. sp. NHMUK 20200247 [Photos by JA]

Shell Variation. (Plate 1) Upper teleoconch usually albous (dull white), sometimes same colour as protoconch post-apically. Lower whorls albous (Figure 6), creamy (Figure 7), pale yellow (figure 4), brown [pinkish- (Figures 11-15) or vinaceous-tinted (figure 19), hazel or chestnut], olive-green or pale pink. Sometimes most of shell is orange-brown (rufous, Figure 13) or very rarely patternless and yellow. Protoconch whitish (Figure 1), orange-brown (Figure 4), brown (Figure 8), pale flesh (Figure 6) or creamy (Figure 19). Apex usually black, sometimes not coloured (Figures 3, 4, 11 and 13) or continued as a black suprasutural band. Periostracum plain, pale ochraceous buff (figure 16). The palatal and external coloration is usually the same due to translucency of the palatum: white, creamy, pale yellow or brown inside and outside. During shell maturity the palatum is whitened as it is thickened and reducing the external colour shining through, as seen in the three brown morphs. However, rarely white shells have a yellow palatum.

Pattern elements variable on a single shell as per holotype, pattern faded (Figure 12) or lost (Figure 19) on lower whorls, or the same pattern type continues onto the last whorl (Figure 20). Patterns include banded (Figure 3), striped (Figure 6), chequered (Figure 5) or a mixture (Figure 1). Subsutural band is rarely absent (Figure 3), sometimes obsolescent (Figure 7) and usually pink-rose, but also red or purple tinted. Circumumbilical band rose with or without a narrow brown band bordering above, often obsolescent and does not exit the aperture or sometimes absent. Some shells have a growth stoppage on the spire, marked an opaque greyish resting line representing the former lip of a resting stage and usually preceded by a coloured stripe (mora). A mora is brown, blackish-brown, yellow-brown (Figures 7 and 14) or pale yellow, and may also appear behind the lip (Figures 11 and 13). Three basic shell

shapes: as per holotype, longer attenuated spire (Figure 3) and short spire with an inflated last whorl (Figure 10).

DISCUSSION

A. (S.) timorensis n. sp. differs from the nominate subspecies in lacking parietal tubercles and having the lip terminus fused to the body whorl, an indentation is present there but not a groove or channel. It differs from all other members of the group in having a revolute columellar margin that covers the umbilicus, either occluding it (closed) or leaving a very thin gap (finely rimate) only visible with a hand lens and a greater number of colour forms. Similar to some other taxa in sometimes being weakly compressed subsuturally when lower whorls develop below the periphery of preceding whorls, which causes a usually impressed suture to become appressed.

The following taxa **differ in developing parietal tubercles and lip terminus not fused to body whorl with a narrow sinus beside it forming a gap** (see Plate 2):

A. (S.) contrarius (Figure 21), its colour variant *A. (S.) con. var. subconcolor* (von Martens, 1867) (Figure 25) and subspecies *A. (S.) con. suspectus* (von Martens, 1864) (Figures 23-24) all differ in having parietal tubercles. A mature anterior or parieto-columellar (P-C) tubercle is a falcate or straightened ledge, and the posterior or parieto-labral (P-L) tubercle is a subtriangular lump separated from the lip terminus by a narrow sinus (gap present) continued as a channel along the suture inside. At full maturity both tubercles may be connected by a thickened parietal margin (Figure 21). All three are similar to *A. (S.) timorensis* n. sp. in having a dark apex or first whorl, thin white lip and growth stoppages marked by a grey resting line with a yellow or

white mora, sometimes absent, except *A. (S.) con. suspectus* usually has a blackish mora. All differ in commonly have the last whorl more expanded than spire whorls.

A. (S.) contrarius has similar yellow or whitish submedial and supermedial bands, except the wider lower one is often bordered by the two dark basal bands and dark bands commonly border the upper one, solid or broken. It is similar in having rose subsutural and circumumbilical bands; a white, brownish or pink protoconch; pale yellow, albus or pale flesh lower whorls; and rarely with the upper surface banded on lower whorls. Differs in having flammules that typically stop at the upper basal band and sometimes with a purplish or greenish suffusion between pattern elements on the last whorl.

A. (S.) con. suspectus is similar to some *A. (S.) timorensis* n. sp. with pale yellow or albus lower whorls in having a white or rarely pink protoconch; rose circumumbilical band and rarely having chequered early whorls that form spiral bands on lower whorls (Figure 24). Differs in typically being buff-whitish with two dark basal bands and thinner yellow submedial and supermedial bands; a blackish stripe behind a violaceous-brown lip and paler columellar margin, columella whitish internally; and lacks a rose subsutural band. It sometimes has white-lipped forms (Figure 23).

The following taxa are **similar in having the lip terminus fused to the body whorl and a thin white lip, and differ in occasionally developing parietal tubercles:**

A. (S.) rottiensis Chan & Tan, 2010 (Plate 2, Figures 33-36) sometimes form white parietal tubercles in mature snails like those of *A. (S.) contrarius* (Figure 36), however the P-L tubercle is “fused” to the lip terminus. It is

similar to *A. (S.) timorensis* n. sp. in having white, yellow or pink (Figure 35) lower whorls and a flammulate or chequered pattern. Differs in having a more stable shape and two-banded morph with white or yellow lower whorls that has a yellow subsutural band and lacks a coloured circumumbilical band (Figure 33).

Considering only the type shell, *A. (S.) con. albolabiatus* (Plate 2, Figure 28) differs in having a weak P-C tubercle, which is a very thin, white smudge of callus and no P-L tubercle. It is similar to some *A. (S.) timorensis* n. sp. in having an indentation beside the fused lip terminus, faint or obsolescent pinkish subsutural band, pinkish circumumbilical band and a non-black apex. Differs in having a sub-turreted lower spire due to more convex lower whorls that are narrowly compressed subsuturally with an appressed suture, whitish palatum and two brown basal bands on a creamy back ground.

Taxa without parietal tubercles.

The following taxa **differ in having the lip terminus not fused to the body whorl with a narrow sinus beside it:**

A. (S.) con. rolfei Thach, 2018 (Plate 2, figure 22) similar to *A. (S.) contrarius* in pattern, shape, etc. but smaller. Differs from *A. (S.) timorensis* n. sp. in having a reddish-brown subsutural band, chocolate last whorl and protoconch, pale greyish-pink lip and circumumbilical band absent.

A. (S.) keppensdhondtorum (Plate 3, Figures 45-48 and synonym “*kefaensis*” Figures 41-44) and *A. (S.) con. nikiensis* Rensch, 1931 (Plate 3, Figures 49-51) both have similar patterns to *A. (S.) timorensis* n. sp., especially chequered or axially aligned dashes forming stripes. Comparing shells with white or yellow lower whorls, both are similar in having a faded

pattern on the last whorl; whitish or brownish protoconch; subsutural band is rose or absent; and may have yellow submedial and supermedial bands with the lower one wider; and two dark basal bands. Both differ in having a distinctly appressed suture on mid to lower whorls and shells with elongated or inflated whorls tend to have subsutural compression and a turreted spire; circumumbilical band that exits the aperture and is rose, brown or absent; and commonly lacking a pattern on lower whorls or most of the shell. Their palatum is either white or brownish-yellow internally, often whitened near the lip, regardless of external colour; it is faint in *A. (S.) keppendhondtorum* and pale to dark in *A. (S.) con. nikiensis* even in brown morphs.

A. (S.) keppendhondtorum is similar in occasionally forming a two-banded morph with residual markings on early whorls (Figure 48). It differs in having the apex dark on patterned shells and an uncoloured on the two-banded morph.

A. (S.) con. nikiensis is similar in having pinkish- or purplish-brown lower whorls (Figure 50), a black suprasutural band or flammulate pattern; and the apex is dark-coloured or not. It differs in producing banded shells like those of the *A. (S.) laevus* (Müller, 1774) subspecies (Figure 52) and sometimes has a brown subsutural band.

The following taxa are **similar in having the lip terminus fused to body whorl and differ in lacking an indentation beside it or a groove below it:**

A. (S.) con. baaguiae (Plate 2, Figure 26) known only from the types. Its whitish submedial and supermedial bands are narrower and bordered by thin dark bands, solid on lower one and broken on upper one, which is similar to some *A.*

(S.) timorensis n. sp. in fading-away on the spire. Similar in having a whitish protoconch, black apex and flammules almost reaching the umbilicus. Differs in having more convex whorls; distinctly ascending lip terminus; somewhat flared lip; solid brown flammules that change to purple on last whorl and sometimes forked; paler periostracum; and lacks subsutural and circumumbilical bands.

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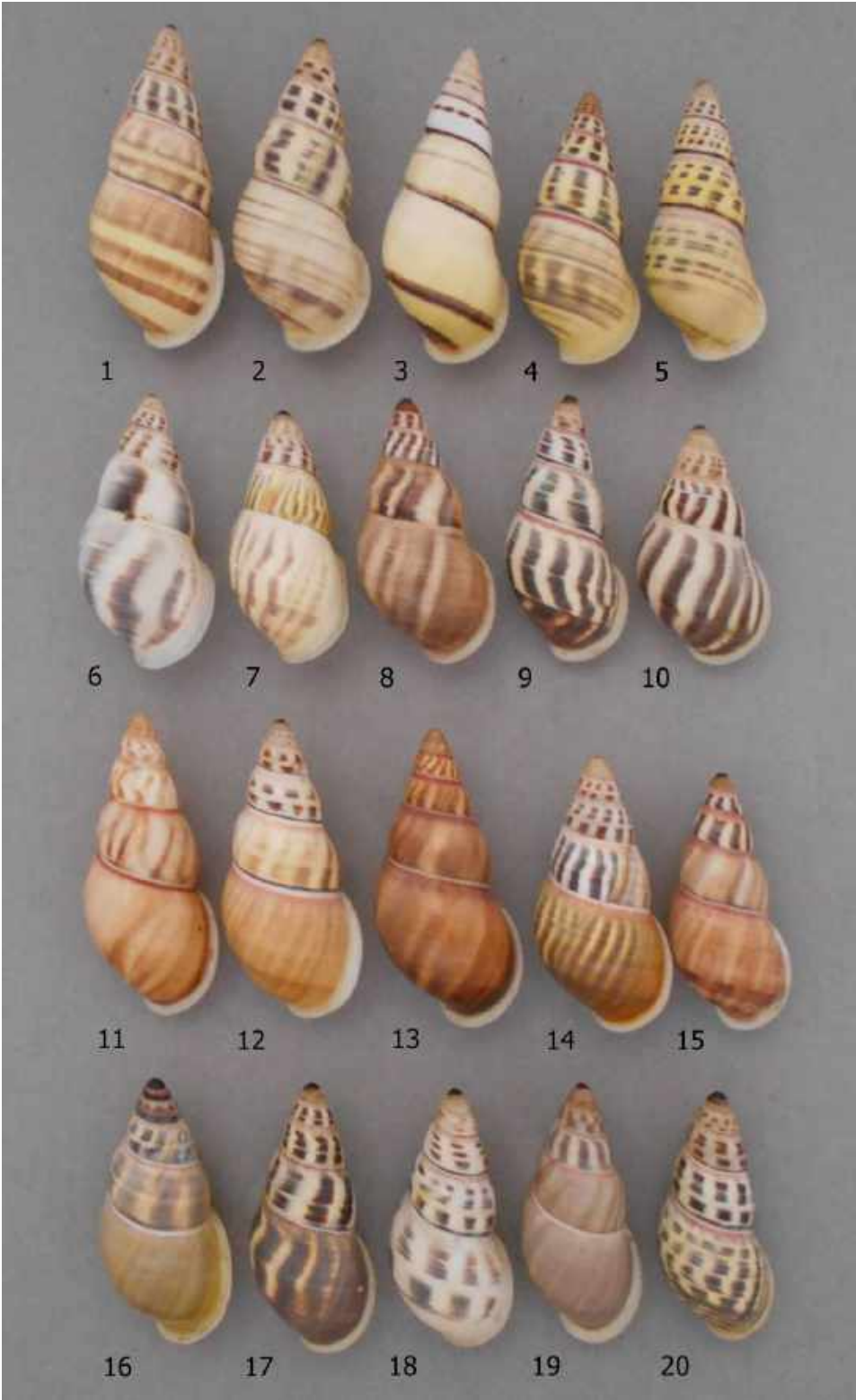


Plate 1. Variation of *A. (S.) timorensis* n. sp.: 2 holotype, 5 paratype 1, 7 paratype 2, 11 paratype 3 and 18 paratype 4; others are specimen shells (3 JP; rest JA) [Photo by JA]

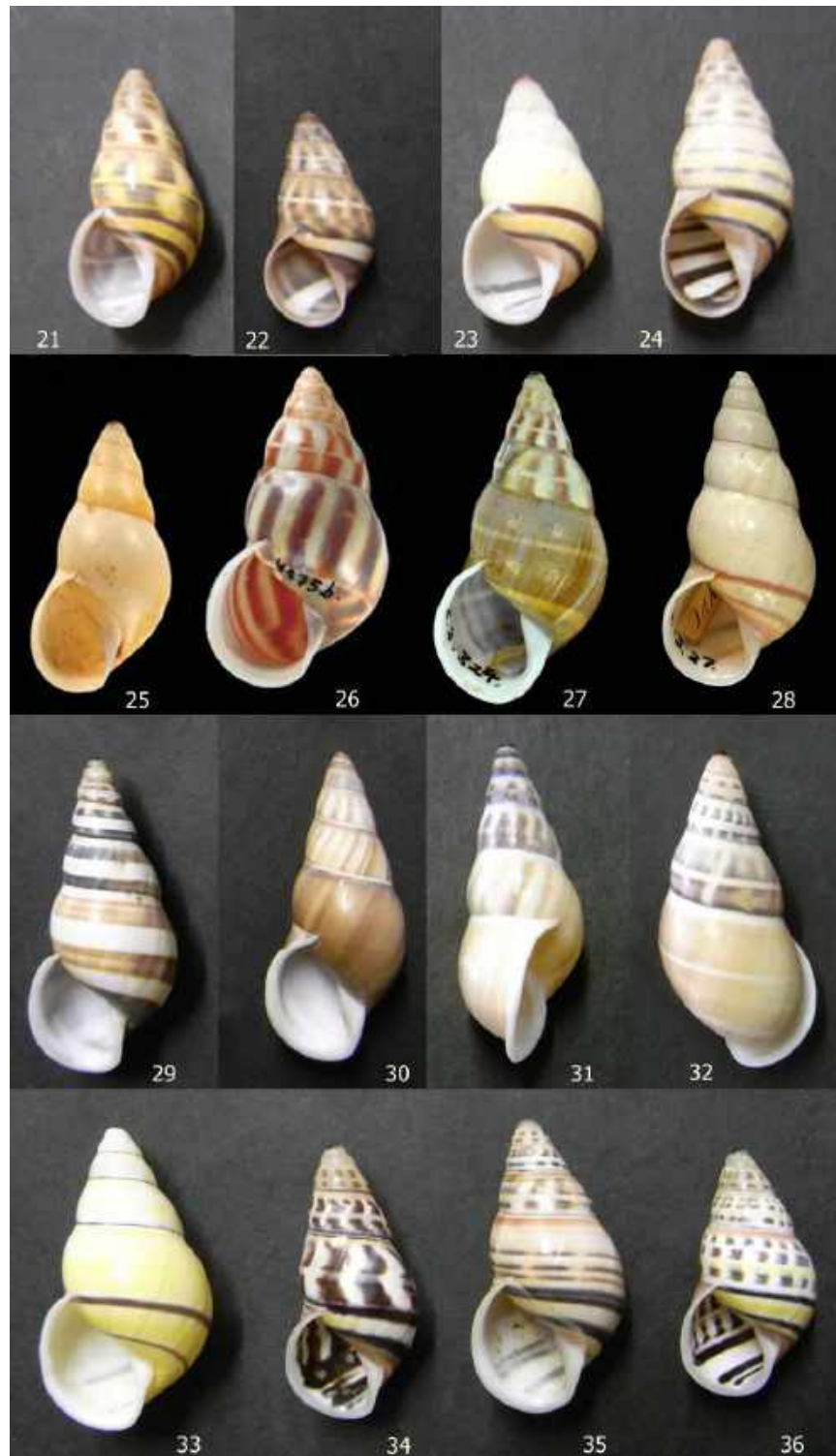


Plate 2. Members of the *A. (S.) contrarius* group from West Timor, including the nominate subspecies (Shells shown to same scale within each row but not across rows). **First row, figure 21** *A. (S.) contrarius*, **figure 22** *A. (S.) con. rolfei*, and **figures 23-24** *A. (S.) con. suspectus*; **Second row, figure 25** Syntype *A. (S.) con. var. subconcolor* ZMB 5638, **figure 26** Syntype *A. (S.) con. baaguiae* ZMB 87424, **figure 27** Paralectotype *A. (S.) con. crassus* NHMUK 1898.12.3.323 and **figure 28** Lectotype *A. (S.) con. albolabiatus* NHMUK 1896.6.13.27; **Third row, figures 29-30** *A. (S.) mingmini* and **figures 31-32** *A. (S.) reuselaarsi*; **Fourth row, figures 33-36** *A. (S.) rottiensis*. [Image credits: **Figures 21-24 & 29-36** JP; **25** Frank Köhler, 2012a; **26** Frank Köhler, 2012b; **27** Natural History Museum, 2017; **28** Natural History Museum, 2018]



Plate 3. Other members of the *A. (S.) contrarius* group from West Timor (Shells shown to same scale within each row but not across rows). **First row, figures 37-40** *A. (S.) con. hanieli*; **Second row 41-44** *A. (S.) kefaensis* synonym of *A. (S.) keppensdhondtorum*; **Third row 45-48** *A. (S.) keppensdhondtorum*; **Fourth row 49-51** *A. (S.) con. nikiensis*; 52 *A. (S.) laevus*. [Photos by JP]