

Description of Three New *Bistolida* Species (Gastropoda: Cypraeidae) from Mozambique and KwaZulu-Natal, South Africa

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ABSTRACT The *Bistolida* of southern Mozambique and KwaZulu-Natal South Africa is revised with two species having new combinations *B. uvongoensis* and *B. jangamoensis*, dealt here as full species. The study of the southern Mozambique and northern KwaZulu-Natal revealed one new species, described here as *B. kosibayensis* n. sp., whereas the study on the southern KwaZulu-Natal shells revealed two new species, *B. ronnieiwatti* n. sp. and *B. groenewaldi* n. sp.

KEYWORDS Cypraeidae, *Bistolida*, Mozambique, KwaZulu-Natal, South Africa

INTRODUCTION

The shells presented in the *Bistolida* genus is always a striking presentation in any book, described as short-cylindrical to elongate-oval shells, umbilicate spire, with rather strong but often numerous teeth which often extend across the base (Lorenz & Hubert 2000, Lorenz 2002, Lorenz 2017). Dorsum usually bluish tinted with a dark blotch or patches and fine spots (Lorenz & Hubert 2000, Lorenz 2002, Lorenz 2017). The *Bistolida* is usually grouped into several species with many subspecies (Burgess 1985, Lorenz & Hubert 2000, Lorenz 2017, Lorenz 2018), with each reference placing subspecies even under different species names which creates a lot of confusion. *Bistolida uvongoensis* Massier, 2004 is one of those that was firstly described as a subspecies of *B. stolida* (Massier, 2004), found in some private collections as *B. clavicola uvongoensis*, and more recently cited in Lorenz (2017, 2018) as *B. diauges uvongoensis*. *Bistolida uvongoensis* is different enough from the other species within the *Bistolida* genus to deserve full species status, thus will be dealt as such as a new combination.

Bistolida uvongoensis is closely related, but distinct from its closest congeners being *B. clavicola* Lorenz, 1998 (Plate 2 Q-T), *B. diauges* (Melvill, 1888) (Plate 2 I-L), and *B. jangamoensis* Aiken & Seccombe, 2022. *Bistolida jangamoensis* was originally described as a subspecies of *B. clavicola*, but are treated here as a full species in a new combination, as its shell morphological characteristics are sufficiently different from its closest congeners. It's already well established that *B. diauges* and *B. clavicola* and other species from northern Mozambique and northern East-African countries, and Madagascar are different from South African and southern Mozambique species: *B. uvongoensis* and *B. jangamoensis* (Massier 2004, Lorenz 2017, Lorenz 2018, Aiken & Seccombe 2022) (Figure 1). The study of the southern Mozambique and northern KwaZulu-Natal revealed one new species, described here as *B. kosibayensis* n. sp., whereas closer study on the southern KwaZulu-Natal shells revealed two new species, *B. ronnieiwatti* n. sp. and *B. groenewaldi* n. sp.

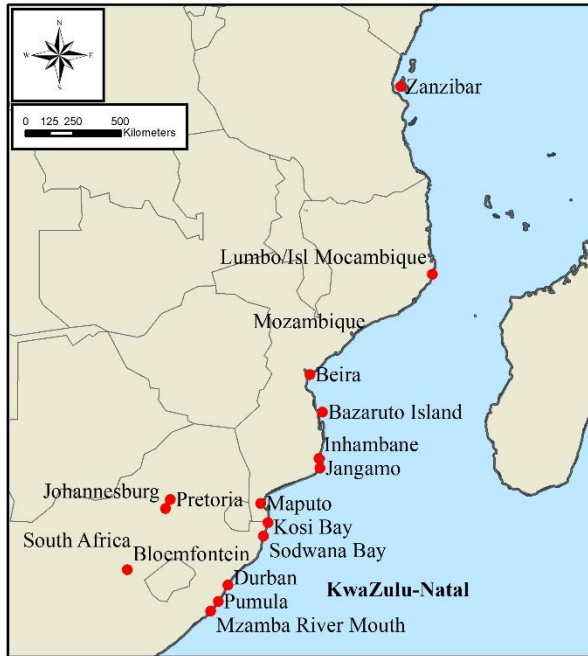


Figure 1. Main locality points where the South African and Mozambique *Bistolida* species occur (Map compiled by the author, 2022).

METHODOLOGY

The material studied comprises of 65 shells, beach collected, dived and trawled off the KwaZulu-Natal and Mozambique coast, from several private collections and the Natal Museum, South Africa (NMSA).

Main shell morphological features were used during this study to differentiate the new species from the closest congeners within the genus *Bistolida*. Detailed outline of the aperture side is compared along with aperture shape as the main differentiating factor between the species (Table 1 and 2, Figure 4). Measurements were taken of the maximum shell length, maximum diameter (width) and maximum height (Table 3).

The terminology used within this description:

The following measurements were taken for each specimen studied:

- SL – maximum shell length (mm)
- MD – maximum diameter / width (mm)
- H – maximum height (mm)

The formulas and analysis of Bridges & Lorenz (2013) were investigated and was found that the differences between the species are so small that it becomes insignificant to use as a differentiating factor.

The general shell morphological characters and terminology used in the description is illustrated in Figure 2.

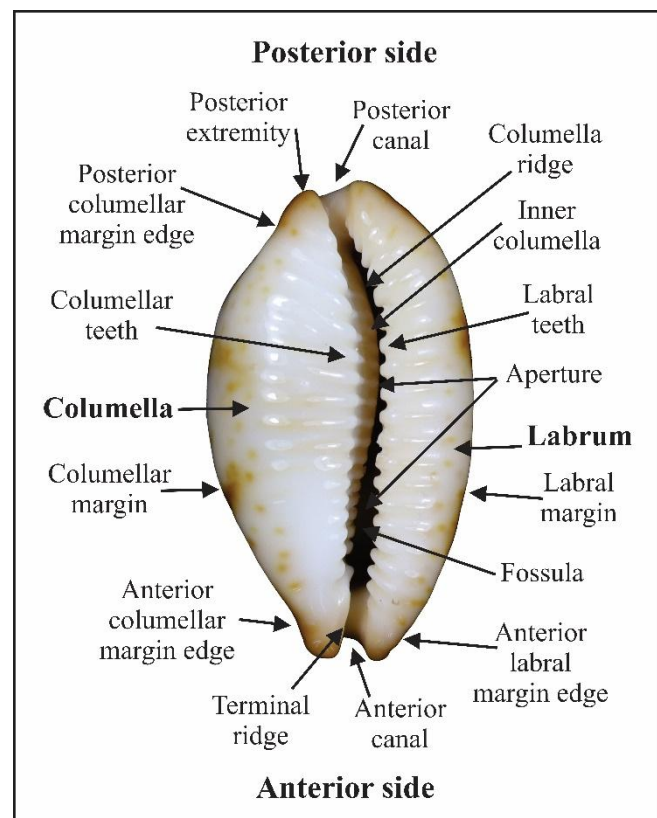


Figure 2. Shell morphological characters and terms.

Photos not specifically referenced were taken by the lead author: S.G. Veldsman.

SYSTEMATICS

Phylum Mollusca Linnaeus, 1758
 Class Gastropoda Cuvier, 1795
 Subclass Caenogastropoda Cox, 1960
 Order Littorinimorpha Golikov & Starobogatov, 1975
 Superfamily Cypraeoidea Rafinesque, 1815
 Family Cypraeidae Rafinesque, 1815
 Subfamily Erroneinae Schilder, 1927
 Tribe Bistolidini Meyer, 2003
 Genus *Bistolida* Cossmann, 1920

Bistolida uvongoensis Massier, 2004
 (Plates 1 A-D, 3 A-F)

Revised Description. Shell small (22-31 mm). Profile elongate-oval, small umbilicate spire. Dorsal profile slightly rounded to flat, the highest point is about one third from the posterior end. Labrum margin smooth to slightly irregular, curved on posterior side, small section straight at the center, curved from center to anterior side. Columella margin oval, posterior columellar margin edge angling in moderately, ending with a sharp curve at the posterior extremity, anterior columellar margin edge curving in moderately. Base flat with columella only slightly bulbous. Aperture, relatively straight at center, opening moderately narrow to narrow, posterior side curving slightly, opening moderately narrow to narrow, anterior side straight and moderately opening. Labral teeth moderately large and extending across labrum smoothing out towards the margin, 17-20 number of teeth. Columellar teeth small, posterior side teeth faint, extending across columella smoothing out towards margin, center teeth shortening, anterior side teeth only on aperture edge with columella being smooth. Small teeth present on columella ridge and fossula.

The base color is greenish-beige with a tint of orange, consisting of five broad bands, posterior, center and anterior bands dark, with the other two being lighter colored. One large slightly perforated brown blotch present on the center of the dorsum. Two dark brown blotches on the labrum and two on the columellar margin. Both margins are covered with very fine brown spots, with the fine spots extending sparsely over the dorsum (only visible in fresh specimens). Both extremities have darker brown coloration on both sides. The base is light cream to off-white, no staining visible on the teeth.

Type. The holotype of *Bistolida uvongoensis* Massier, 2004, 29.6 x 16.7 mm, Haus der Natur – Cismar, HNC 62712 (Plate 1 A-D).

Type locality. Uvongo/Shelly Beach, southern KwaZulu-Natal, South Africa.

Distribution. Specimens were recorded off localities such as Umkomaas, Scottburgh, Park Rynie, Pumula, Melville and Shelly Beach, southern KwaZulu-Natal, South Africa. Specimens studied were either beach collected or scuba to depths of 28 m.

Bistolida ronnieuwatti S.G. Veldsman &
 J.H. Veldsman, new species
 (Plates 1 E-H, 3 M-R)

Description. Shell small (22-31 mm). Profile elongate-cylindrical, small umbilicate spire. Dorsal profile slightly rounded to flat, the highest point is about one third from the posterior end. Labrum margin smooth to slightly irregular, curved on posterior side, largest portion of the center section straight, curving in sharply at anterior side. Columella margin slightly oval, posterior columellar margin edge curving in a rounded manner high on profile, angling in sharply at the posterior extremity, anterior columellar margin edge

curving in moderately. Base moderately flat, labrum slightly rounded, columella slightly bulbous. Aperture, slightly curved at center and opening wide, posterior side curving strongly, opening wide, anterior side straight and opening very wide. Labral teeth large and extending across labrum smoothing out towards the margin, 18-20 number of teeth. Columellar teeth small, posterior side and center teeth faint extending just over the columella ridge, anterior side teeth only on aperture edge with columella being smooth. Small teeth present on columella ridge and fossula.

The base color is greenish-beige with a tint of orange, consisting of five broad bands, posterior, center and anterior bands dark, with the other two being lighter colored. One large brown blotch, with a split mid-dorsum on the center of the dorsum, sometimes fingering out. Two dark brown blotches on the labrum and two on the columellar margin, slightly extending onto the dorsum. Both margins are covered with very sparse fine brown spots, with a few to no spots on the dorsum (only visible in fresh specimens). Both extremities have darker brown coloration on both sides. The base is light cream to off-white, no staining visible on the teeth.

Type locality. Mzamba, northern Eastern Cape / border of southern KwaZulu-Natal, South Africa.

Distribution. Specimens were recorded off localities such as Addington dredging's (Durban), Umkomaas, Sezela, Widenham, Umdloti, Aliwal Shoal, Margate, Mzamba, southern KwaZulu-Natal, South Africa. Specimens studied were beach collected, scuba to depths of 40 m.

Type material.

Holotype: 26.85 x 15.74 mm (Plate 1 E-H);
Beach collected, Mzamba,

northern Eastern Cape / border of southern KwaZulu-Natal; Coll. Natal Museum, Pietermaritzburg, South Africa: NMSA-Mol. P2312/T4595, donated by the Veldsmans.

Paratype 1: 30.97 x 16.49 mm (Plate 1 M-P);
Live taken, Margate, southern KwaZulu-Natal; Veldsman Collection.

Paratype 2: 28.49 x 16.13 mm (Plate 1 Q-R);
Beach collected, Mzamba, northern Eastern Cape / border of southern KwaZulu-Natal, southern KwaZulu-Natal; Veldsman Collection.

Paratype 3: 27.62 x 15.22 mm; Beach
collected – dredging material, Addington Beach, southern KwaZulu-Natal; Veldsman Collection.

Paratype 4: 24.51 x 14.34 mm; Beach
collected, Umdloti, southern KwaZulu-Natal; Veldsman Collection.

Paratype 5: 22.62 x 13.12 mm; Scuba 35-40
m, Aliwal Shoal, southern KwaZulu-Natal; Veldsman Collection.

Paratype 6: 22.44 x 13.27 mm; Beach
collected – dredging material, Addington Beach, southern KwaZulu-Natal; Veldsman Collection.

Paratype 7: 29.83 x 16.45 mm; Beach
collected, Sezela, southern KwaZulu-Natal; NMSA-Mol. 4812/T4590.

Paratype 8: 28.44 x 16.25 mm; Beach
collected, Umkomaas, southern KwaZulu-Natal; NMSA-Mol. 754/T4592.

Paratype 9: 28.94 x 15.58 mm; Beach
collected, Umkomaas, southern

- KwaZulu-Natal; NMSA-Mol. 4807.
- Paratype 10: 27.16 x 15.93 mm; Beach collected, KwaZulu-Natal; NMSA-Mol. A4632/T4589.
- Paratype 11: 21.58 x 12.26 mm; Beach collected, Wydenham, southern KwaZulu-Natal; NMSA-Mol. B1916/T4591.
- Paratype 12: 26.64 x 15.64 mm; Beach collected, Mzamba, northern Eastern Cape / border of southern KwaZulu-Natal; H. Smit Collection.
- Paratype 13: 28.88 x 16.40 mm; Beach collected, southern KwaZulu-Natal; Veldsman Collection.
- Paratype 14: 26.03 x 14.77 mm; Beach collected, southern KwaZulu-Natal; Veldsman Collection.

Etymology. This species is named for Ronnie Watt, friend of the authors and the person who started the research on the *Bistolida* from South Africa that formed the background of this research.

Bistolida groenewaldi S.G. Veldsman & J.H. Veldsman, new species
(Plates 1 I-L, 3 G-L)

Description. Shell small (22-27 mm). Profile oval, small umbilicate spire. Dorsal profile rounded, slightly flattish on top, the highest point is about one third from the posterior end. Labrum margin smooth to slightly irregular, curved on posterior side, largest portion of the center section curved all the way to the anterior side. Columella margin oval, posterior columellar margin edge curving in a rounded manner high on profile, angling in sharply at the posterior extremity, anterior columellar margin edge almost stepped, curving in moderately at the end. Base moderately flat, labrum flat to

slightly rounded, columella bulbous. Aperture, slightly curved at center and narrow, curving strongly towards posterior side, staying narrow, center to anterior side opening very wide, curving strongly. Two small crenulations on posterior side of labrum, usually not visible and covered by callus. Labral teeth large and extending across labrum smoothing out towards the margin, 18-19 number of teeth. Columellar teeth small, posterior side and center teeth faint extending just over the columella ridge, smoothing out towards the center of the columella, anterior side teeth only on aperture edge with columella being smooth. Small teeth present on columella ridge and fossula.

The base color is greenish-beige with a tint of orange, consisting of five broad bands, posterior, center and anterior bands dark, with the other two being lighter colored. One large brown fragmented blotch, split mid-dorsum just off center of the dorsum, labrum side, fingering towards markings on margins. Two dark brown blotches on the labrum and two on the columellar margin, slightly extending onto the dorsum. Both margins are covered with very sparse fine brown spots, with a few to no spots on the dorsum (only visible in fresh specimens). Both extremities have darker brown coloration on both sides. The base is light cream to off-white, no staining visible on the teeth.

Type locality. Beach collected, Pumula, southern KwaZulu-Natal, South Africa.

Distribution. Specimens were recorded off localities such as Addington dredging's (Durban), Durban Harbor, Tongaat, Umdloti, Aliwal Shoal, Park Rynie, Pumula, Port Shepstone, southern KwaZulu-Natal, South Africa. Specimens studied beach collected, scuba to depths of 40 m or dredged.

Type material.

- Holotype: 27.72 x 15.73 mm (Plate 1 I-L); Beach collected, Pumula, southern KwaZulu-Natal; Coll. Natal Museum, Pietermaritzburg, South Africa: NMSA-Mol. P2311/T4594, donated by Anton Groenewald.
- Paratype 1: 24.35 x 14.64 mm (Plate 3 G-H); Scuba 25m, Park Rynie, southern KwaZulu-Natal; Veldsman Collection.
- Paratype 2: 24.05 x 13.94 mm; Scuba 25m, Park Rynie, southern KwaZulu-Natal; Veldsman Collection (ex. Paratype 2 of *B. uvongoensis*).
- Paratype 3: 25.33 x 15.06 mm; Scuba 35-40 m, Aliwal Shoal, southern KwaZulu-Natal; Veldsman Collection.
- Paratype 4: 25.35 x 15.14 mm; Beach collected, southern KwaZulu-Natal; R. Aiken Collection.
- Paratype 5: 24.94 x 14.93 mm; Dredged, Durban Harbour, KwaZulu-Natal; Veldsman Collection.
- Paratype 6: 25.27 x 14.50 mm; Beach collected – dredging material, Addington Beach, southern KwaZulu-Natal; Veldsman Collection.
- Paratype 7: 25.31 x 14.84 mm; Beach collected, Pumula, southern KwaZulu-Natal; L. Swart Collection.
- Paratype 8: 23.77 x 14.03 mm; Beach collected, southern KwaZulu-Natal; R. Aiken Collection.
- Paratype 9: 22.84 x 13.89 mm; Beach collected, Tongaat, southern KwaZulu-Natal; NMSA-Mol. 4808/T4581.
- Paratype 10: 28.32 x 16.27 mm (Plate 3 I-L); Beach collected, Umdloti, southern KwaZulu-Natal; NMSA-Mol. 4809/T4582.
- Paratype 11: 27.33 x 15.93 mm; Beach collected, Port Shepstone, southern KwaZulu-Natal; NMSA-Mol. 4815/T4583.
- Paratype 12: 28.53 x 16.85 mm; Beach collected, southern KwaZulu-Natal; R. Aiken Collection.
- Paratype 13: 25.79 x 15.96 mm; Beach collected, southern KwaZulu-Natal; R. Aiken Collection.
- Paratype 14: 27.46 x 17.56 mm (Figure x); Beach collected, southern KwaZulu-Natal; R. Aiken Collection.
- Paratype 15: 27.74 x 16.95 mm; Beach collected, Pumula, southern KwaZulu-Natal; H. Smit Collection.
- Paratype 16: 27.30 x 17.11 mm; Beach collected, southern KwaZulu-Natal; Veldsman Collection.
- Paratype 17: 25.91 x 15.45 mm; Beach collected, southern KwaZulu-Natal; A. Groenewald Collection, donated by the Veldsmans.

Etymology. This species is named for Anton Groenewald, friend of the authors and provided numerous specimens used in this study.

Bistolida kosibayensis S.G. Veldsman & J.H. Veldsman, new species
(Plates 1 M-P, 2 A-H, Figure 3)

Description. Shell small (22-28 mm). Profile elongate-oval, small umbilicate spire. Dorsal profile slightly rounded to flat, the highest point is about one third from the posterior end. Labrum margin smooth to slightly irregular and strong marginal callus developed, curved on posterior side, largest portion of the center section slightly curved, curving in sharply at

anterior side. Columella margin slightly oval, posterior columellar margin edge curving in a rounded manner high on profile, angling in sharply at the posterior extremity, anterior columellar margin edge curving in moderately, angling in sharply at the extremity. Base moderately flat, labrum flat, columella flat to slightly bulbous. Aperture, narrow and straight at center, posterior side narrow and curving slightly, anterior side straight and narrow. Labral teeth large and extending across labrum smoothing out towards the margin, 19 number of teeth. Columellar teeth large on posterior side and center extending to the columella margin, smoothing out at margin. Columella smooth from center to anterior side. Small teeth present on columella ridge and fossula.

The base color is blue-grey, consisting of five broad bands, posterior, center and anterior bands dark, with the other two being lighter colored. One large orange-brown blotch, split mid-dorsum just off center of the dorsum, labrum side, sometimes fingering out to the margin markings. Two orange-brown blotches on the labrum and two on the columellar margin, extending onto the dorsum. Both margins are covered with very sparse fine orange-brown spots, with a few spots on the dorsum (only visible in fresh specimens). Both extremities have orange-brown coloration on both sides. The base is light cream, light orange-brown staining visible on the middle columella teeth on fresh specimens.

Type locality. Scuba live (Figure 3) 20-24 m Kosi Bay, northern KwaZulu-Natal, South Africa.

Distribution. Specimens were recorded off Kosi Bay and Sodwana, KwaZulu-Natal, South Africa, and Mocambique Island, Mozambique. Specimens studied were scuba to depths of 24 m.

Type material.

- Holotype: 27.69 x 15.23 mm (Plate 1 M-P, Figure 3); Scuba live 20-24 m Kosi Bay (off marker 17 north), southern KwaZulu-Natal; Coll. Natal Museum, Pietermaritzburg, South Africa: NMSA-Mol. S1748/T4587.
- Paratype 1: 26.98 x 15.20 mm (Plate 2 A-B); Scuba live Sodwana Bay, southern KwaZulu-Natal; Veldsman Collection.
- Paratype 2: 25.54 x 14.51 mm (Plate 2 C-D); Scuba live Mocambique Island, Mozambique; Veldsman Collection.
- Paratype 3: 22.68 x 12.53 mm (Plate 2 E-H); Scuba 5-9 m between Bhanga Neck and Kosi Bay (reef off marker 13 north), northern KwaZulu-Natal; NMSA-Mol. S1464/T4586.
- Paratype 4: 25.21 x 14.77 mm; Scuba 10-15m Sodwana Bay (Two Mile Reef), northern KwaZulu-Natal; NMSA-Mol. D1749/T4588.
- Paratype 5: 25.06 x 13.44 mm; Scuba 23-24 m Kosi Bay (Main Reef), northern KwaZulu-Natal; NMSA-Mol. S1787/T4585.
- Paratype 6: 23.44 x 13.36 mm; Scuba 18-20 m between Bhanga Neck and Kosi Bay (reef off point at marker 13), northern KwaZulu-Natal; NMSA-Mol. D9870/T4584.

Etymology. This species is named for the type locality, Kosi Bay, northern KwaZulu-Natal, South Africa.



Figure 3. Live take picture of *Bistolida kosibayensis* n. sp. holotype (courtesy of Dai Herbert, photo taken with a 35 mm slide film, 1990). Photo also illustrated on page 436 of Lorenz (2018).

Bistolida jangamoensis Aiken &
Secombe, 2022
(Plates 1 Q-T, 2 M-P)

Shell characteristics. Shell small (23-32 mm). Profile oval, small umbilicate spire. Dorsal profile slightly rounded to flat, the highest point is about one third from the posterior end. Labrum margin smooth to slightly irregular and strong marginal callus developed, curved sharply on posterior side, largest portion of the center section curved, straightening towards anterior side. Columella margin oval, posterior columellar margin edge curving strongly in a rounded manner high on profile, angling in moderately at the posterior extremity, anterior columellar margin edge curving in moderately, straightening towards anterior extremity. Base slightly rounded, labrum rounded, columella bulbous. Aperture, broad at center, posterior side broad and curving slightly, anterior side slightly curving towards labrum side. Two large crenulations on posterior side of labrum. Labral teeth thick and large, and extending across labrum smoothing out towards the margin, 18-19 number of teeth. Older specimens the callus cover the crenulations and one tooth. Columellar teeth large on posterior side and

center extending onto the columella, smoothing out at the center. Columella smooth from center to anterior side with small teeth present on columella ridge and fossula.

The base color is blue/green-grey, consisting of five broad bands, posterior, center and anterior bands dark, with the other two being lighter colored. One large orange-brown blotch, split mid-dorsum just off center of the dorsum, labrum side, sometimes fingering out to the margin markings. Two orange-brown blotches on the labrum and two on the columellar margin, extending onto the dorsum. Both margins are covered with very sparse fine orange-brown spots, with a few spots on the dorsum (only visible in fresh specimens). Both extremities have orange-brown coloration on both sides. The base is light cream, no staining visible on the teeth.

Type locality. Scuba Jangamo reef, Mozambique.

Distribution. Specimens were recorded off Jangamo and Inhambane, Mozambique, and Richards Bay, Port Dunford and Sodwana Bay, northern KwaZulu-Natal, South Africa. Specimens studied were beach collected, scuba to depths of 18 m, and *ex pisce*.

DISCUSSION

The three species from the southern KwaZulu-Natal include *B. uvongoensis*, *B. groenewaldi*, and *B. ronniawatti*, and occur sympatric across the range from Durban to Mzamba within the same habitat. The two other species *B. jangamoensis* and *B. kosibayensis* occur approximately 200 km north of Durban towards central Mozambique.

The more significant differences off *B. uvongoensis*, *B. groenewaldi*, *B. ronniawatti*, *B.*

jangamoensis, and *B. kosibayensis* are summarized in Table 1 and 2, and the morphometric parameters is presented in Table 3.

The aperture shape and opening of each of the species discussed here is significantly different from each other as summarized in Table 1 and 2, and illustrated in Figure 4.

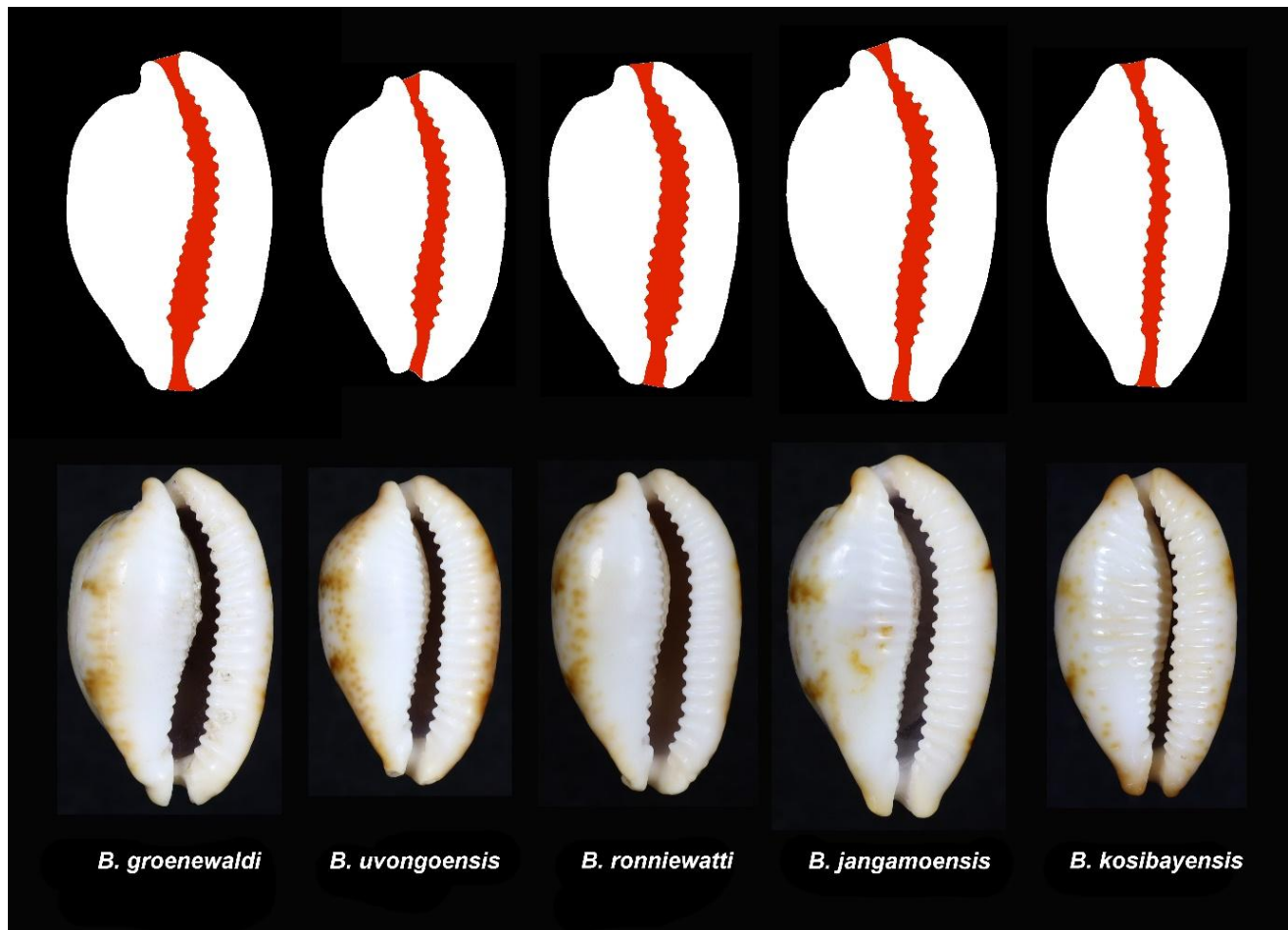


Figure 4. Aperture comparison between the five species studied.

	<i>B. uvongoensis</i>	<i>B. groenewaldi</i>	<i>B. ronniewatti</i>
Shell profile	Dorsal profile elongate-oval and slightly rounded to flat on top.	Dorsal profile oval and rounded, slightly flattish on top.	Dorsal profile elongate-cylindrical, slightly rounded to flat on top.
Labrum	Labrum curved on posterior side, small section straight at the center, curved from center to anterior side. Labrum base flat.	Labrum curved on posterior side, largest portion of the center section curved all the way to the anterior side. Labrum base flat to slightly rounded.	Labrum curved on posterior side, largest portion of the center section straight, curving in sharply at anterior side. Labrum base slightly rounded.

Columella	Columella margin oval, posterior columellar margin edge angling in moderately, ending with a sharp curve at the posterior extremity, anterior columellar margin edge curving in moderately. Base slightly bulbous.	Columella margin oval, posterior columellar margin edge curving in a rounded manner high on profile, angling in sharply at the posterior extremity, anterior columellar margin edge almost stepped, curving in moderately at the end. Base bulbous.	Columella margin slightly oval, posterior columellar margin edge curving in a rounded manner high on profile, angling in sharply at the posterior extremity, anterior columellar margin edge curving in moderately. Base slightly bulbous.
Labrum teeth	Labral teeth moderately large and extending across labrum smoothing out towards the margin.	Labral teeth large and extending across labrum smoothing out towards the margin.	Labral teeth large and extending across labrum smoothing out towards the margin.
Columella teeth	Columellar teeth small, posterior side teeth faint extending across columella smoothing out towards margin, center teeth shortening, anterior side teeth only on aperture edge with columella being smooth.	Columellar teeth small, posterior side and center teeth faint extending just over the columella ridge, smoothing out towards the center of the columella, columella being smooth, anterior side teeth only on aperture edge with columella being smooth.	Columellar teeth small, posterior side and center teeth faint extending just over the columella ridge, columella being smooth, anterior side teeth only on aperture edge with columella being smooth.
Aperture (Figure 4)	Aperture, relatively straight at center, opening moderately narrow to narrow, posterior side curving slightly, opening moderately narrow to narrow, anterior side straight and moderately opening.	Aperture, slightly curved at center and narrow, curving strongly towards posterior side, staying narrow, center to anterior side opening very wide, curving strongly.	Aperture, slightly curved at center and opening wide, posterior side curving strongly, opening wide, anterior side straight and opening very wide.
Shell coloration	One large slightly perforated brown blotch present on the center of the dorsum. Two dark brown blotches on the labrum and two on the columellar margin. Both margins are covered with very fine brown spots, with the fine spots extending sparsely over the dorsum.	One large brown fragmented blotch, split mid-dorsum just off center of the dorsum, labrum side, fingering towards markings on margins. Two dark brown blotches on the labrum and two on the columellar margin, slightly extending onto the dorsum. Both margins are covered with very sparse fine brown spots, with a few to no spots on the dorsum.	One large brown blotch, with a split mid-dorsum on the center of the dorsum, sometimes fingering out or being split mid-dorsum. Two dark brown blotches on the labrum and two on the columellar margin, slightly extending onto the dorsum. Both margins are covered with very sparse fine brown spots, with a few to no spots on the dorsum.

Table 1. Summarized shell morphological differences between *Bistolida uvongoensis*, *B. groenewaldi* n. sp. and *B. ronniawatti*.

	<i>B. jangamoensis</i>	<i>B. kosibayensis</i>
Shell profile	Dorsal profile oval and slightly rounded to flat on top.	Dorsal profile elongate-oval and slightly rounded to flat on top.
Labrum	Labrum curved sharply on posterior side, largest portion of the center section curved, straightening towards anterior side. Labrum base rounded.	Labrum curved on posterior side, largest portion of the center section slightly curved, curving in sharply at anterior side. Labrum base flat.
Columella	Columella margin oval, posterior columellar margin edge curving strongly in a rounded manner high on profile, angling in moderately at the posterior extremity, anterior columellar margin edge curving in moderately, straightening towards anterior extremity. Base bulbous.	Columella margin slightly oval, posterior columellar margin edge curving in a rounded manner high on profile, angling in sharply at the posterior extremity, anterior columellar margin edge curving in moderately, angling in sharply at the extremity, Base flat to slightly bulbous.
Labrum teeth	Labral teeth thick and large, and extending across labrum smoothing out towards the margin.	Labral teeth large and extending across labrum smoothing out towards the margin.
Columella teeth	Columellar teeth large on posterior side and center extending onto the columella, smoothing out at the center. Columella smooth from center to anterior side.	Columellar teeth large on posterior side and center extending to the columella margin, smoothing out at margin. Columella smooth from center to anterior side.
Aperture (Figure 4)	Aperture, broad at center, posterior side broad and curving slightly, anterior side slightly curving towards labrum side.	Aperture, narrow and straight at center, posterior side narrow and curving slightly, anterior side straight and narrow.
Shell coloration	One large orange-brown blotch, split mid-dorsum just off center of the dorsum, labrum side, sometimes fingering out to the margin markings. Two orange-brown blotches on the labrum and two on the columellar margin, extending onto the dorsum. Both margins are covered with very sparse fine orange-brown spots, with a few spots on the dorsum (only visible in fresh specimens). No coloration on base.	One large orange-brown blotch, split mid-dorsum just off center of the dorsum, labrum side, sometimes fingering out to the margin markings. Two orange-brown blotches on the labrum and two on the columellar margin, extending onto the dorsum. Both margins are covered with very sparse fine orange-brown spots, with a few spots on the dorsum (only visible in fresh specimens). Light orange-brown staining visible on the middle columella teeth on fresh specimens.

Table 2. Summarized shell morphological differences between *Bistolida jangamoensis* and *B. kosibayensis*.

	Length (L) - mm	Width (W) - mm	Height (H) - mm	Labral teeth - amount
<i>Bistolida uvongoensis</i> (20 specimens studied)				
Range	22.8 – 31.11	12.70 – 17.81	10.00 – 14.41	17 - 20
Mean	26.53	15.35	13.94	18
<i>Bistolida groenewaldi</i> n. sp. (18 specimens studied)				
Range	23.77 – 28.53	13.89 – 17.56	10.25 – 14.01	18 - 19
Mean	25.96	15.48	12.24	19
<i>Bistolida ronniawatti</i> n. sp. (15 specimens studied)				
Range	21.58 – 30.97	12.26 – 16.49	9.43 – 13.55	18 - 20
Mean	26.73	15.17	12.04	19
<i>Bistolida jangamoensis</i> (5 specimens studied)				
Range	23.21 – 30.11	13.33 – 17.14	10.72 – 13.49	18 - 19
Mean	26.23	15.49	12.35	19
<i>Bistolida kosibayensis</i> n. sp. (7 specimens studied)				
Range	22.68 – 27.69	12.53 – 15.23	10.09 – 11.94	19
Mean	25.23	14.15	11.13	19

Table 3. Morphometric parameters of *B. uvongoensis*, *B. groenewaldi*, *B. ronniawatti*, *B. jangamoensis*, and *B. kosibayensis*.

CONCLUSION

The three southern KwaZulu-Natal *Bistolida* species occur sympatric, occurring within the same geographic area and habitat, and are separated by the Tugela Bank (approximately 200 km) from the two *Bistolida* species that occur in the northern KwaZulu-Natal (north of Cape Vidal/St. Lucia). *Bistolida ronniawatti* is an elongate-cylindrical species, with *B.*

uvongoensis being slightly more oval, still elongated, whereas *B. groenewaldi* is a very oval shaped species. *Bistolida jangamoensis* is very different from the other species discussed here, being oval and very robust, where *B. kosibayensis* is a very narrow elongated-oval species. The labrums of the five species discussed here, are significantly different as discussed above and illustrated in Figure 4. One can further clearly see the differences between

the five species discussed here and *B. diauges* and *B. clavicola* as illustrated in Plate 2.

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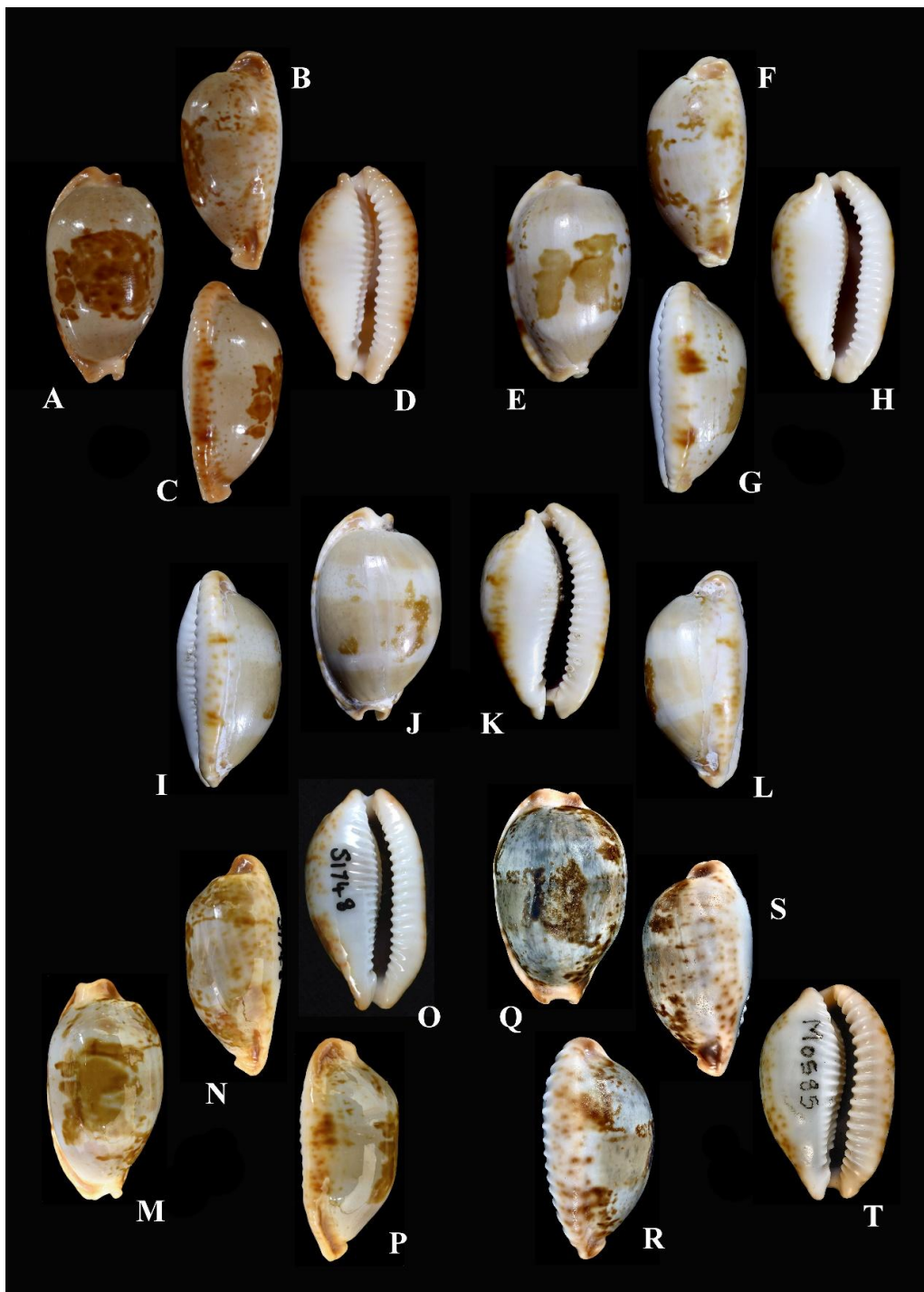


Plate 1. A-D= *Bistolida uvongoensis* Holotype: 29.60 x 16.70 mm; Uvongo/Shelly Beach, southern KwaZulu-Natal; HNC 62712, photo courtesy of Dr. Vollrath Wiese, Haus der Natur - Cismar. **E-H=** *Bistolida ronnieiwatti* Holotype: 26.85 x 15.74 mm; beach collected, Mzamba, northern Eastern Cape / border of southern KwaZulu-Natal; NMSA-Mol. P2312/T4595. **I-L=** *Bistolida groenewaldi* Holotype: 27.72 x 15.73 mm; beach collected, Pumula, southern KwaZulu-Natal; NMSA-Mol. P2311/T4594. **M-P=** *Bistolida kosibayensis* Holotype: 27.69 x 15.23 mm; scuba live 20-24 m, Kosi Bay (off marker 17 north), northern KwaZulu-Natal; NMSA-Mol. S1748/T4587. **Q-T=** *Bistolida jangamoensis* Holotype: 23.21 x 14.71 mm; scuba, Jangamo reef, Mozambique, photo courtesy of Nelisiwe Mary Manukuza, NMSA.

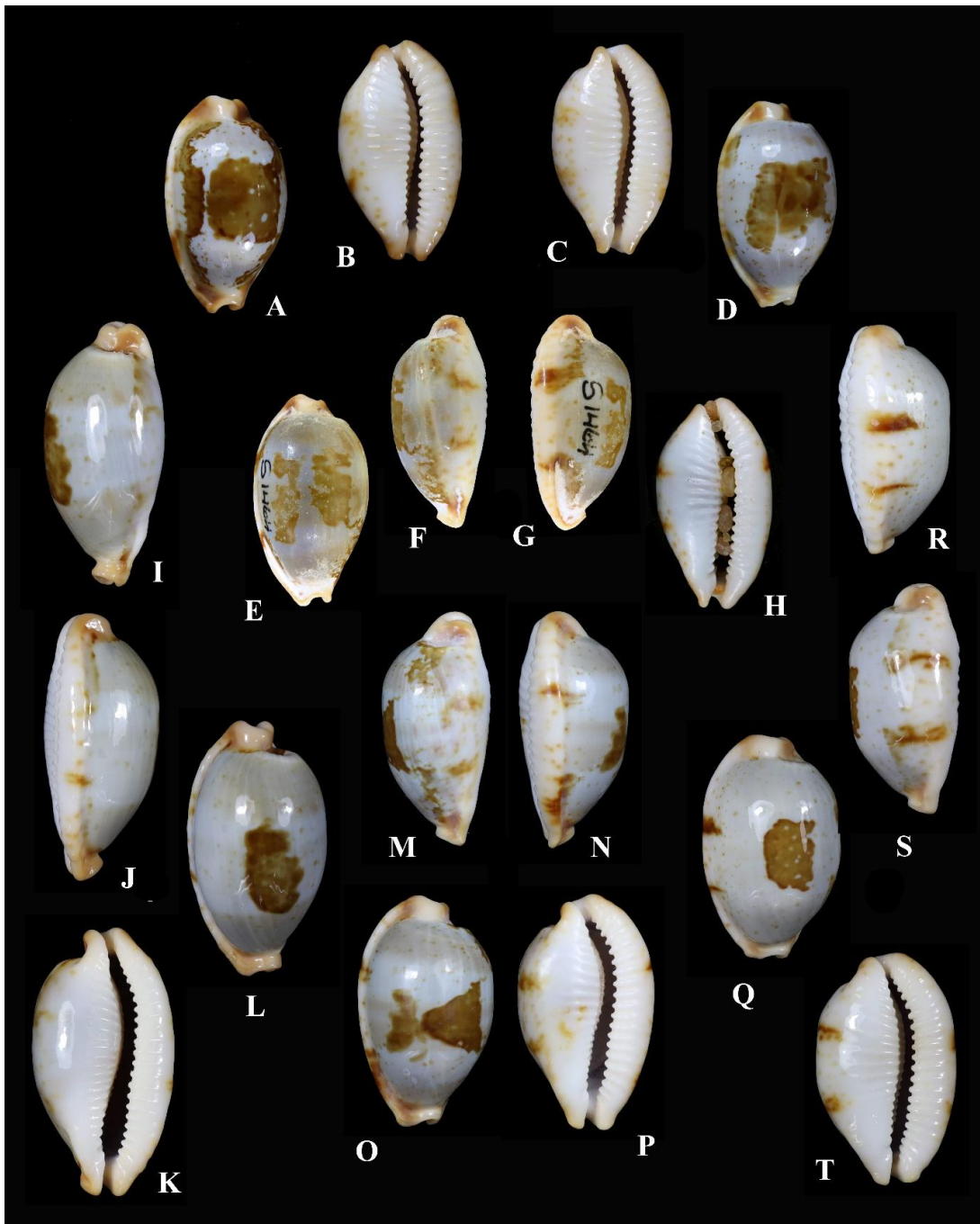


Plate 2. A-B= *Bistolida kosibayensis* Paratype 1: 26.98 x 15.20 mm; scuba live, Sodwana Bay, northern KwaZulu-Natal; Veldsman Collection. C-D= *Bistolida kosibayensis* Paratype 2: 25.54 x 14.51 mm; scuba live, Mocambique Island, Mozambique; Veldsman Collection. E-H= *Bistolida kosibayensis* Paratype 3: 22.68 x 12.53 mm; scuba 5-9 m, between Bhanga Neck and Kosi Bay (reef off marker 13 north), northern KwaZulu-Natal; NMSA-Mol. S1464/T4586; photo courtesy of Nelisiwe Mary Manukuza, NMSA. I-L= *Bistolida diauges*: 33.68 x 17.73 mm; scuba live 2-3 m, Fundo Island, Tanzania, Veldsman Collection. M-P= *Bistolida jangamoensis*: 29.62 x 17.14 mm; southern Mozambique, Veldsman Collection. Q-T= *Bistolida clavicola*: 29.17 x 17.79 mm; scuba live 1.5 m, Fungu Mkadya Reef, Dar es Salaam, Tanzania, Veldsman Collection.

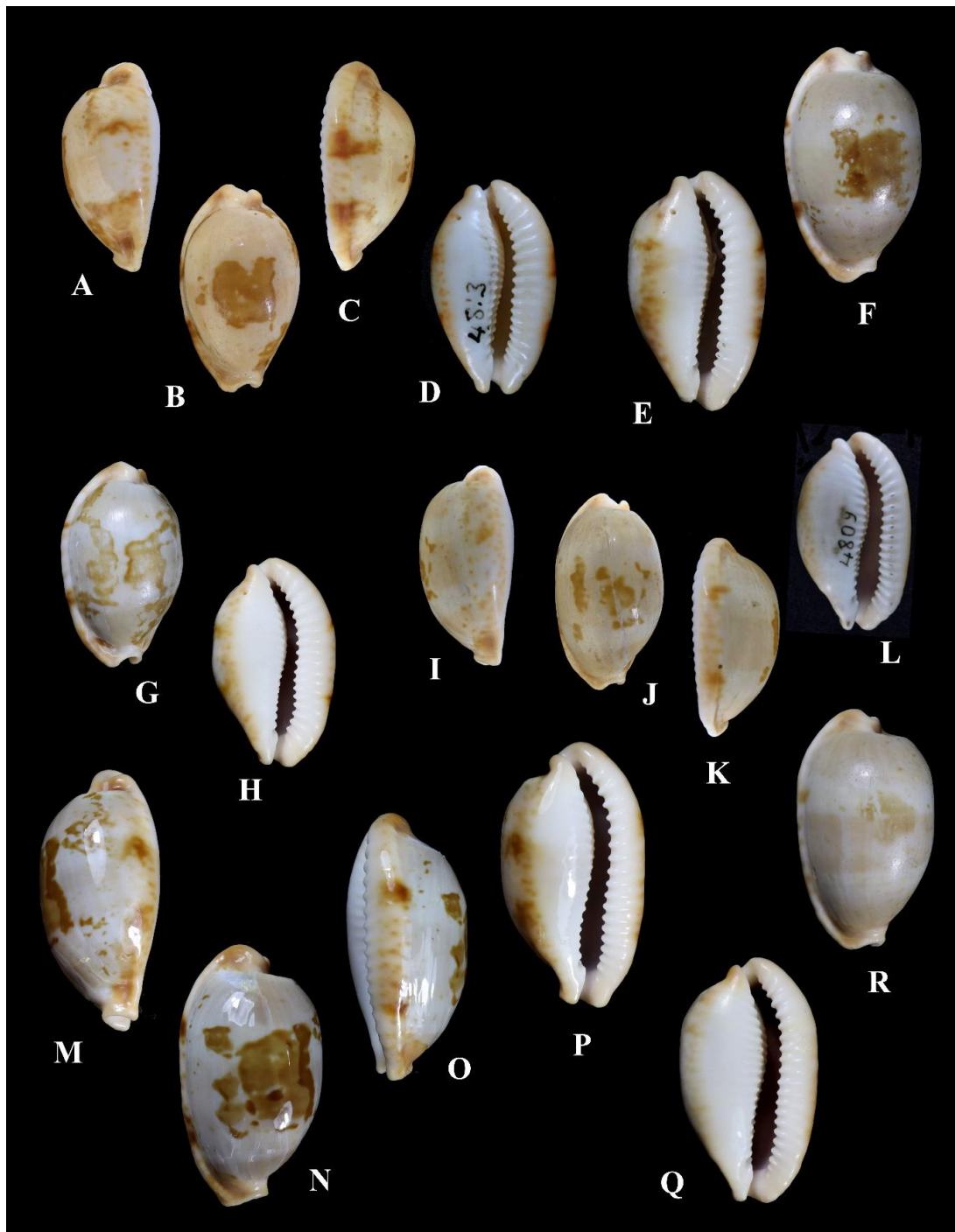


Plate 3. A-D= *Bistolida uvongoensis*: 25.73 x 14.50 mm; scuba, Melville, southern KwaZulu-Natal; NMSA-Mol. 4813; photo courtesy of Nelisiwe Mary Manukuza, NMSA. E-F= *Bistolida uvongoensis*: 27.62 x 16.24 mm; Beach collected, Pumula, southern KwaZulu-Natal, A. Groenewald collection. G-H= *Bistolida groenewaldi* Paratype 1: 24.35 x 14.64 mm; scuba 25m, Park Rynie, southern KwaZulu-Natal; Veldsman Collection. I-L= *Bistolida groenewaldi* Paratype 10: 28.32 x 16.27 mm; beach collected, Umdloti, southern KwaZulu-Natal; NMSA-Mol. 4809/T4582, photo courtesy of Nelisiwe Mary Manukuza, NMSA. M-P= *Bistolida ronnieiwatti* Paratype 1: 30.97 x 16.49 mm; live taken, Margate, southern KwaZulu-Natal; Veldsman Collection. Q-R= *Bistolida ronnieiwatti* Paratype 2: 28.49 x 16.13 mm; beach collected, Mzamba, northern Eastern Cape / border of southern KwaZulu-Natal; Veldsman Collection.