

## A New Name for *Arestorides argus contrastriata* (PERRY, 1811) (Gastropoda: Cypraeidae)

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1 Map, 3 Figures, 3 Plates

### Abstract

The type figure of *contrastriata* in PERRY, 1811 is identified as a member of *Macrocypraea*. The name was used for the subspecies of *Arestorides argus* from the Indian Ocean, which is described as *A. argus contracasta*. It differs from the Pacific *A. argus argus* by reduced to absent labral blotches, larger, less numerous, unfilled dorsal rings and longer, less distinctly stained teeth.

### Zusammenfassung

Die Typusabbildung von *contrastriata* PERRY, 1811 wird als *Macrocypraea* identifiziert. Der Name wurde für die Unterart von *A. argus* aus dem Indischen Ozean benutzt. Diese wird als *A. argus contracasta* beschrieben. Sie unterscheidet sich von der pazifischen *A. argus* durch reduzierte bis fehlende Basalflecken auf der Labralseite, durch weniger zahlreiche, größere und ungefüllte Ringe und längere, weniger deutlich gefärbte Zähne.

### Abbreviations

CLSF	Chiapponi-Lorenz	Seashell
	Foundation, Lecco, Italy	
HNC	Haus der Natur, Cismar, Germany	
NHMUK	British Museum of Natural History, London, Great Britain	
MNHN	Museum National d'Histoire Naturelle, Paris, France	
SMNS	Staatliches Museum für Naturkunde, Stuttgart, Germany	
SMF	Senckenberg Museum, Frankfurt am Main, Germany	

### Introduction

At a meeting of the German Shell Club in Wiesbaden in 1982 I well recall cowry enthusiasts JOCHEN SALTIN and late JENS HEMMEN comparing a picture in an old book with specimens of *Arestorides argus*. They explained to me their doubts about the correct usage of the name *contrastriata* for the western

subspecies. Ten years later, Alex HUBERT and me were working on our "Guide to Worldwide Cowries". We half-heartedly agreed with the universally adopted interpretation that the illustration may or may not be a juvenile specimen of the Indian Ocean subspecies of *Arestorides argus* (LINNAEUS, 1758). Nearly thirty years have passed since that meeting in Wiesbaden, and once again, on admiring the plates of G. PERRY (1811) "Conchology", the original figure of *contrastriata* on pl. 20, fig. 3 comes back to my attention (Fig. 1).

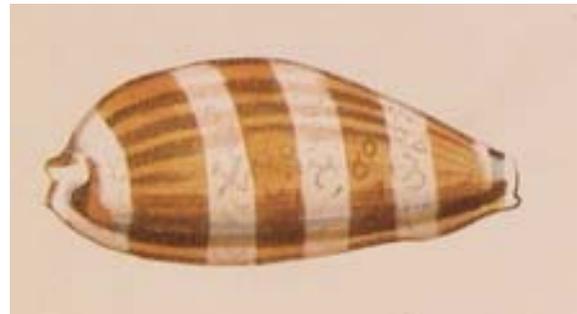


Fig. 1: Plate 20 fig. 3 in PERRY (1811). Type figure of *Cypraea contrastriata*.

The usage of the name *contrastriata* for a subspecies of *argus* goes back to SCHILDER & SCHILDER (1938), who installed it as a "provisional" name for the "Lemurian race". In my opinion, it requires too much fantasy to see a specimen of *A. argus* in the figure. This is probably why also the SCHILDERS called their interpretation "provisional"... However, inaccuracy is not a problem in other illustrations in PERRY, although they do have a peculiarity: The artists JOHN CLARKE (drawing) and WILLIAM MILLER (engraving) have created a "combined" view by summarizing features of different aspects of a shell. For example, the illustration of *alga* (pl. 23 fig. 1, a name associated with *Leporicypraea mappa* (LINNAEUS, 1758), Fig. 2 herein) suggests a view from an angle on the left side, with the spire pointing right, and the aperture showing. However, the dorsal line is also seen, although in that particular species-complex it is always situated on the right side or the centre of the

shell. The artists obviously tried to include as many as possible aspects of a shell into one single illustration, tolerating the result to be a mix of aspects. At the same time, each individual feature is reproduced with amazing accuracy. This needs to be kept in mind when reviewing the type figure of *contrastriata*. Although the direction of the banding is incorrect as a result of the combination of aspects, the general proportions, pattern and other details such as the width of the individual bands are moderately precise.



**Fig. 2:** Plate 23 fig. 1 in PERRY (1811) showing *Cypraea alga*, a taxon associated to the *Leporicypraea mappa* complex. Although the shell is depicted from the left side, the artists incorporated the feature of the dorsal line, which is always situated on the opposite side of the shell.

Plate 1 compares the type figure with different species. In any *A. argus*, the dorsal profile is cylindrically flattened, not evenly rounded as in the figure, there is no darker depression flanking the posterior extremity, which is blunt and as pale as the surrounding in *A. argus*, and not pointed as in the figure of *contrastriata*. The transverse embryonal banding is not as conspicuous in *A. argus*, in which the two median bands are usually joining to one broad compact band. The markings on the type figure of *contrastriata* were interpreted as *argus*-rings by later authors including Alex HUBERT and myself, which lead to the continued misconception of the name. Even very young *A. argus* that have not yet formed pronounced extremities already have distinct rings which differ considerably from the blurry dots as shown in PERRY's illustration. Finally, one may assume that CLARKE and MILLER would have shown basal blotches, had there been any in that specimen they depict in fig. 3 (also the basal blotches are present already even in young shells of *A. argus*). The illustration of *A. argus* at the

bottom of the same plate is precise enough to determine the origin of the shell as Western Pacific based on the characteristic filled rings and four basal blotches (see discussion below).

The type-locality of *contrastriata* is "East Indies", which hints to the area inhabited by the three living species of the genus *Macrocypraea*: *M. cervus* (LINNAEUS, 1758) and *M. zebra* (LINNAEUS, 1758) from the Caribbean, and *M. cervinetta* (KIENER, 1843) from Pacific Panama. *M. cervus* is much more inflated and does not resemble the *contrastriata*-figure. The resemblance to *M. cervinetta* is more striking: that species is often barely spotted, with four darker transverse bands whose proportions match exactly those in the *contrastriata*-figure. The circular dots indicated weakly in the illustration are a variable characteristic of all species of *Macrocypraea*. In the Caribbean *M. zebra*, the dorsal banding is usually less distinctly separated, the median bands are mostly joined as in *A. argus*, but there are exceptions. PERRY's illustration shows a shell with a convex base and a slightly swollen flange towards the anterior, which is speaking in favour of *M. zebra*, less so for *M. cervinetta* in which the base tends to be more flattened. In any case, PERRY's illustration of *contrastriata* obviously illustrates an adult, but very eroded specimen of *Macrocypraea* in which the whitish spots are only visible as traces.

Two conclusions can be drawn from these observations:

- 1) the identity of *contrastriata* is doubtful but there is sufficient evidence to place it in the genus *Macrocypraea*, the name itself should be considered a *nomen dubium*.
- 2) the Indian Ocean subspecies of *A. argus* requires a new name, which is introduced in the following.

Incidentally, the description of *contrastriata* mentions "white teeth" which works neither for *Arestorides* nor *Macrocypraea*. The best explanation is that PERRY was referring to the whitish dental interstices that form a strong contrast against the darker staining of the teeth particularly in *Macrocypraea*.

***Arestorides argus contracasta* n. ssp.**

**Material:** Holotype: 83.9 mm. Fungu Mkadya, Tanzania; coll. MNHN 24943

Paratype 1: 81.7 mm. Fungu Mkadya, Tanzania; coll. SMF 334559

Paratype 2: 82.2 mm. Fungu Mkadya, Tanzania; coll. CLSF 14690

Paratype 3: 77.1 mm. Zanzibar Island, Tanzania; coll. HNC 79203

Paratype 4: 77.4 mm. Zanzibar Island, Tanzania; coll. SMNS-ZI 74130

Paratype 5: 74.3 mm. Zanzibar Island, Tanzania; coll. NHMUK 20110466

Paratype 6: 91.0 mm. SW corner of Cassini Is., NW Australia; coll. CLSF 14691

Paratype 7: 65.0 mm. Fungu Mkadya, Tanzania; coll. CLSF 14692

Paratype 8: 46.6 mm. Fungu Mkadya, Tanzania; coll. CLSF 14693

Paratype 9: 52.2 mm. Fungu Mkadya, Tanzania; coll. CLSF 14694

Paratype 10: 52.8 mm. Zanzibar Island, Tanzania; coll. Allen Bennett, Kerrville TX

Paratype 11: 64.3 mm. Nosy Be, N Madagascar; coll. CLSF 14695

Paratype 12: 75.7 mm. Chennai area, India; coll. CLSF 14696

Paratype 13: 81.5 mm. Weligama, Sri Lanka; coll. CLSF 14697

Paratype 14: 88.1 mm. Chennai, India; coll. CLSF 14698

Paratype 15: 62.3 mm. Fort Dauphin, Madagascar; coll. CLSF 4615

Paratype 16: 62.3 mm. Fort dauphin, SE Madagascar; coll. CLSF 4615

Paratype 17: 74.9 mm. Mombasa, Kenya; coll. CLSF 13954

Paratype 18: 71.3 mm. Phuket, Thailand; coll. CLSF 13955

Paratype 19: 71.9 mm. Le Palmar, Mauritius; coll. CLSF 14127

Paratype 20: 90.8 mm. La Reunion; coll. CLSF 14699

And 40 further paratypes in the author's possession, collected in the type locality Fungu Mkadya, Tanzania, at depths between 1–3 m, by Dr. HERBERT GANTER in the 1970ies, RENATE DÜNKEL in the 1980ies or by the author between 1987 and 1998: No. 21: 64.5 mm; 22: 78.9 mm; 23: 66.1 mm; 24: 79.1 mm; 25: 76.4 mm; 26: 82.3 mm; 27: 66.7 mm; 28: 75.0 mm; 29: 89.7 mm; 30: 77.4 mm; 31: 70.1 mm; 32: 69.1 mm; 33: 93.9 mm; 34: 74.8 mm; 35: 82.8 mm; 36: 67.7 mm; 37: 71.4 mm; 38: 67.8 mm; 39: 83.9 mm; 40: 76.3 mm; 41: 71.9 mm; 42: 88.3 mm; 43: 84.5 mm; 44: 67.3 mm; 45: 59.2 mm; 46: 54.8 mm; 47: 73.4 mm; 48: 73.2 mm; 49: 75.4 mm; 50: 82.1 mm; 51: 61.4 mm; 52: 67.3 mm; 53: 59.9 mm; 54: 60.9 mm; 55: 70.4 mm; 56: 77.1 mm; 57: 54.0 mm; 58: 62.1 mm; 59:

57.6 mm; 60: 71.7 mm. These paratypes 21 to 40 will be deposited in public and private collections.

## Description

Large and heavy, cylindrical, with a flattened, straight dorsal mid-portion running parallel to the base. Posterior extremity calloused and blunt. Anterior tips bordered with a sharp ridge. Spire partly exposed, flat, protoconch small, brown and exposed just above the callosity of the posterior extremity. Aperture straight, narrow, hardly widening anteriorly. Teeth on both sides numerous, somewhat finer posteriorly, where they border the left side of the canal. Labrally, the teeth extend evenly onto one third of the labrum. The columellar teeth reach 3–4 millimetres across the apertural edge towards the base. They extend far onto the columella, forming a slightly pronounced peristome which terminates in a small tubercle posteriorly and forms a concave but not projecting fossula along the anterior fourth of the shell.

Ground colour yellow-cream, with three indistinctly interrupted darker purple-brown embryonal bands which leave only two narrow, well defined paler transverse zones. The callosities and the teeth are slightly darker brown, the teeth are finely framed with dark brown, giving the impression that they are darker than the adjacent basal callosity. The dorsum is covered with distinct brown rings of two different types: the less numerous larger rings have a markedly thicker frame, but are not filled, the numerous small rings have a thinner frame of constant width and are also never filled. On the base there are two large dark brown to black blotches just above the extensions of the columellar teeth. Labrally there are two faint indications of darker blotches superimposing the extensions of the teeth.

The paratypes show considerable variation in shell size (from 45 – 93 mm) and the number and size of the dorsal rings. The larger rings are always circular, not star-shaped, and always have a pale centre. Other conchological aspects such as shape and dorsal banding are rather constant. On studying larger amounts of shells it is obvious that the darker basal blotches are always distinct on columellar side. They are usually dissolved on labral side, considerably smaller, with the posterior one less developed than the anterior one. In about half of the shells there is only a reminiscence of labral blotches in

the form of two somewhat darker areas just above the extensions of the teeth.

Shells from the eastern limit of the range of *A. argus contracasta* – Sri Lanka, Thailand and the Western Australian coast – tend to show more produced labral blotches while retaining the typical features of the dorsal rings.

### Type locality and distribution

The type locality is a small area between Fungu Mkadya and Fungu Yasin, offshore reefs approx. 25 km north of Dar-es-Salaam, Tanzania (6°38'S 39°13'E). *A. argus contracasta* ranges throughout the Indian Ocean; along the East African coast from Aden to southern Mozambique, from Madagascar, the Mascarene Islands, the Maldives, Sri Lanka, India to the Indian Ocean coast of Thailand and the north of Western Australia (map 1).

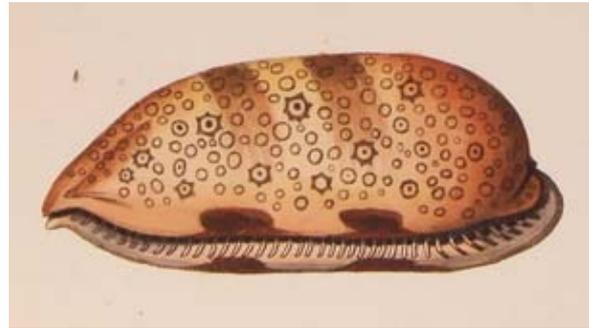
### Habitat

In East Africa, *A. argus contracasta* is found from just below the intertidal zone to fairly deep water. Large shells occupied by hermit crabs are occasionally found in fish traps set at approximately 90 m on the Leven Bank in the north of Zanzibar. Numerous specimens were observed crawling on open reef during the night on the northern drop-off at Fungu Yasin, at depths of 20–30 m. In shallower water it is found in areas with strong wave action and current, in crevices of rocks and under large coral slabs. In the type locality, peculiar dwarf and slender specimens, usually not exceeding 60 mm (e.g. paratypes 8, 9) are found inbetween the columns of large, dome-shaped colonies of *Pavona clavus* DANA, 1846. Larger shells are found in close vicinity, on more exposed outer reefs and *Porites*–coral slabs (see also LORENZ 1998). In the type locality and other places in Tanzania, *A. a. contracasta* is a seasonal species which appears in fair numbers over several months and then becomes extremely rare for several years (personal observation, supported by the local collectors M. FAENZILBER, H. GANTER and R. DÜNKEL). In other places of the western Indian Ocean, it has been collected at 35 m on drop offs e.g. at Réunion Island, in surge channels at 25 m along the outer reef of eastern Mauritius, under coral slabs at 3–6 m in the south of Madagascar.

### Etymology

The name indicates that there is a contrast ("contra"= lat. opposite) in the blotching on

either side of the aperture; "casta" lat. unblotched, refers to the weak or absent blotching of the labrum.



**Fig. 3:** Plate 20 fig. 7 in PERRY (1811) depicting *Cypraea argus*. The characteristics of the nominate subspecies are all clearly shown: four equally strong basal blotches, larger rings filled, with a star-shaped outline, smaller rings crowded. Median bands separated.

### Discussion

The systematic placement of the striking *argus* within the family Cypraeidae has been subject to changes. IREDALE proposed the generic name *Arestorides* (1930). SCHILDER & SCHILDER placed it in *Talparia*, subgenus *Arestorides* (1952) and later in *Lyncina* (1971). This was adopted by LORENZ & HUBERT (1993). According to MEYER (2003), the genus *Arestorides* forms a distinct clade in the proximity of *Lyncina*, based on mtDNA analysis.

Among the synonyms of *A. argus*, no name is available to replace *contrastriata*. DAUTZENBERG'S *A. argus concatenata* (1903) is conchologically inseparable from typical western Pacific *A. argus argus*. SULLIOTTI'S *bynei* (1924) refers to an aberrant form assigned to *A. argus*, but no locality data or any further information is given to make use of that name in any sensible way. A varietal name commonly read in combination with sparsely ringed Indian Ocean shells is "*rariocellata* RAYBAUDI, 1977". In *The Connoisseur of Seashells* No. 5 p. 9 (1985) RAYBAUDI uses the name twice, for a variety of *contrastriata* as well as *ventricosa*, but gives no clue to differentiation or any further characterization. A formal description of "*rariocellata*" was never published and it is therefore unavailable for the western subspecies described herein, or any other subspecies of *A. argus*.

*A. argus argus* varies considerably throughout its wide range in the Pacific. Western Pacific

specimens from the Philippines, Vietnam, Malaysia and Indonesia usually have very small and dense dorsal rings combined with larger, star-shaped filled rings or blotches. The illustration of *Cypraea argus* in PERRY shows all these features perfectly well (fig. 3). In Melanesia, Micronesia and western Polynesia, the shells of *A. argus argus* are more inflated and the rings larger, often unfilled and less numerous than in western Pacific *A. argus argus*. This eastern variation or subspecies was called *ventricosa* (GRAY, 1824), e.g. by SCHILDER & SCHILDER (1952). However, the original description of *ventricosa* lists completely different localities (e.g. India, Indonesia and even Africa) and does not reveal any substantial information such as a recognizable illustration that would support the usage of that name in the way suggested by the SCHILDERS. Nonetheless, there is evidence of a yet un-named subspecies of *A. argus* in the Pacific. The great variability within the Pacific populations is confusing, and genetic analysis should be applied to ascertain their status.

The Indian Ocean *A. argus contracasta* differs from the nominate *A. argus argus* from the Pacific by the weaker development of blotches on the labrum. This is the most consistent feature. In the majority of specimens from all populations of *A. argus argus*, the basal blotches show an equally strong development on either side of the aperture. However, specimens of *A. argus argus* in which one blotch is reduced or absent (usually the posterior labral one) are not rare.

The less numerous, larger and unfilled dorsal rings in *A. a. contracasta* are safely separating Indian Ocean shells from typical *A. argus argus* in which the rings are either very small and crowded, or large, more or less filled with darker, with a more irregular outline. Even though the above mentioned eastern Melanesian and Micronesian *A. argus* may have larger, less numerous, unfilled rings resembling shells from the Indian Ocean on dorsal view, their basal blotches are usually well produced on either side.

The teeth of *A. argus argus* are somewhat shorter and more distinctly framed with darker than those of *A. a. contracasta*. The base in *A. argus argus* is convex, in *A. argus contracasta* it tends to be flattened and more angular and calloused labrally. In *A. argus argus*, the two median bands are usually separated and still

visible on the left side of the shell whereas in *A. a. contracasta* they tend to be indistinct or absent on the left side.

The considerable individual variability of the Pacific *A. argus argus* may make a separation difficult when based on a single feature. The characteristics of basal blotches, dorsal rings and length of teeth taken together ensure identification of shells from the Indian Ocean against those from the Pacific. The taxonomic distinction between these two groups at least on subspecific level is strongly supported by mtDNA (MEYER, 2004).

### Acknowledgements

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### Literature

- IREDALE, T. (1930): Queensland molluscan notes No. 2. – *Memoirs of the Queensland Museum*, **10** (1): 87.
- LORENZ, F. (1998): Kauris von Ostafrika. Taxonomisch-morphologische und ökologische Untersuchungen an Cypraeidae von Ostafrika. – *Schriften zur Malakozoologie (Cismar)*, **11**: 55–58, pl. 26.
- LORENZ, F. & HUBERT, A. (1993): A Guide to Worldwide Cowries. – CHRISTA HEMMEN Verlag, Wiesbaden: 571 pages
- MEYER, C. (2003): Molecular systematics of cowries (Gastropoda: Cypraeidae) and diversification patterns in the tropics. – *Biological Journal of the Linnean Society*, **79**: 401–459.
- MEYER, C. (2004): Toward comprehensive: increased molecular sampling in Cypraeidae and its phylogenetic implications. – *Malacologia* **46** (1): 127–156.
- PERRY, G. (1811): *Conchology, or the natural history of shells: containing a new arrangement of the genera and species.* – WILLIAM MILLER, London: 1-4, pls. 1-61.
- RAYBAUDI, L. (1985): *Lyncina argus.* – *The Connoisseur of Seashells*, **5**: 9.

SCHILDER, F. A. & SCHILDER, M. (1938):  
Prodrome of a monograph on living Cypræidae. –  
Proceedings of the Malacological Society London,  
**23**: 119–231.

SCHILDER, F. A. & SCHILDER, M. (1952): PH.  
DAUTZENBERG'S collection of Cypræidæ. – Mémoires

Institut Royal des Sciences Naturelles de Belgique,  
(2) **45**: 1–243, pls. 1–4.

SCHILDER, M. & SCHILDER, F.A. (1971): A  
catalogue of living and fossil cowries. – Mémoires  
Institut Royal des Sciences Naturelles de Belgique,  
**85**:1–246.

## Plate 1 (opposite page 93)

1. Type figure of *contrastriata* from PERRY (1811) Pl. 20 fig. 3. On right, the image is flipped horizontally to facilitate a comparison of the left side aspects.

Right and left side views of

2. *Macrocypraea cervinetta*. Pacific coast of Panama (72 mm). Slightly subadult specimen without white secondary spots, showing the characteristic dorsal banding.

3. *Macrocypraea zebra*. Aruba (104 mm). Slightly subadult specimen without white secondary spots, showing the characteristic dorsal banding.

4. *Macrocypraea zebra*. Brazil (82 mm). Adult specimen with indistinct white secondary spots, showing the characteristic dorsal banding, resembling the type figure of *contrastriata* the most.

5. *Arestorides argus contracasta* (formerly *contrastriata*). Typical, slightly young shell. There is no resemblance to the type figure of *contrastriata*.

## Plate 2 (page after next page 94)

*Arestorides argus contracasta*

1. Holotype, Fungu Mkadya, Tanzania (84 mm)

2. Paratype 3, Zanzibar Island, Tanzania (77 mm)

3. Paratype 7, Fungu Mkadya, Tanzania (65 mm)

4. Paratype 9, Fungu Mkadya, Tanzania (52 mm). Dwarf form, found among *Pavona* colonies

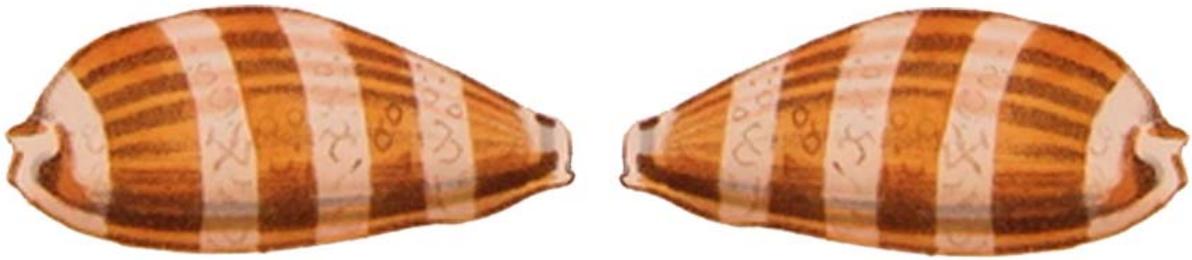
5. Paratype 20, La Reunion (91 mm). Sparsely ringed form

6. Paratype 11, Nosy Be, N Madagascar (64 mm)

7. Paratype 12, Chennai area, India (76 mm)

8. Paratype 6, Cassini Is., W Australia (91 mm)

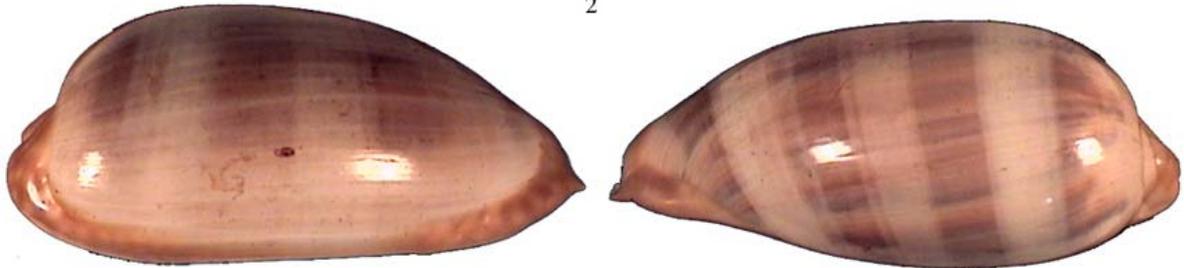
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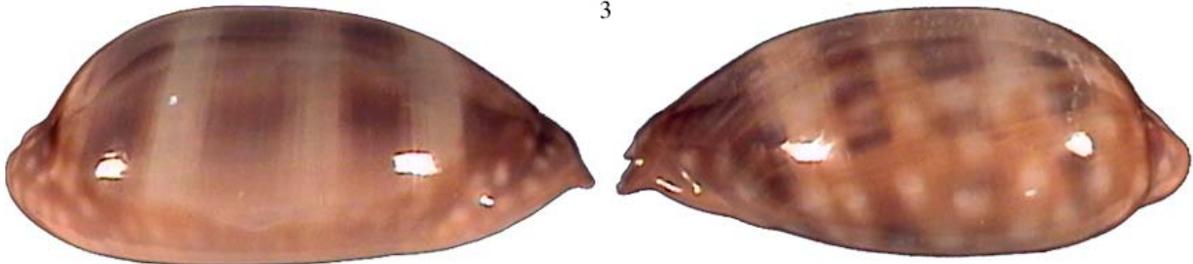
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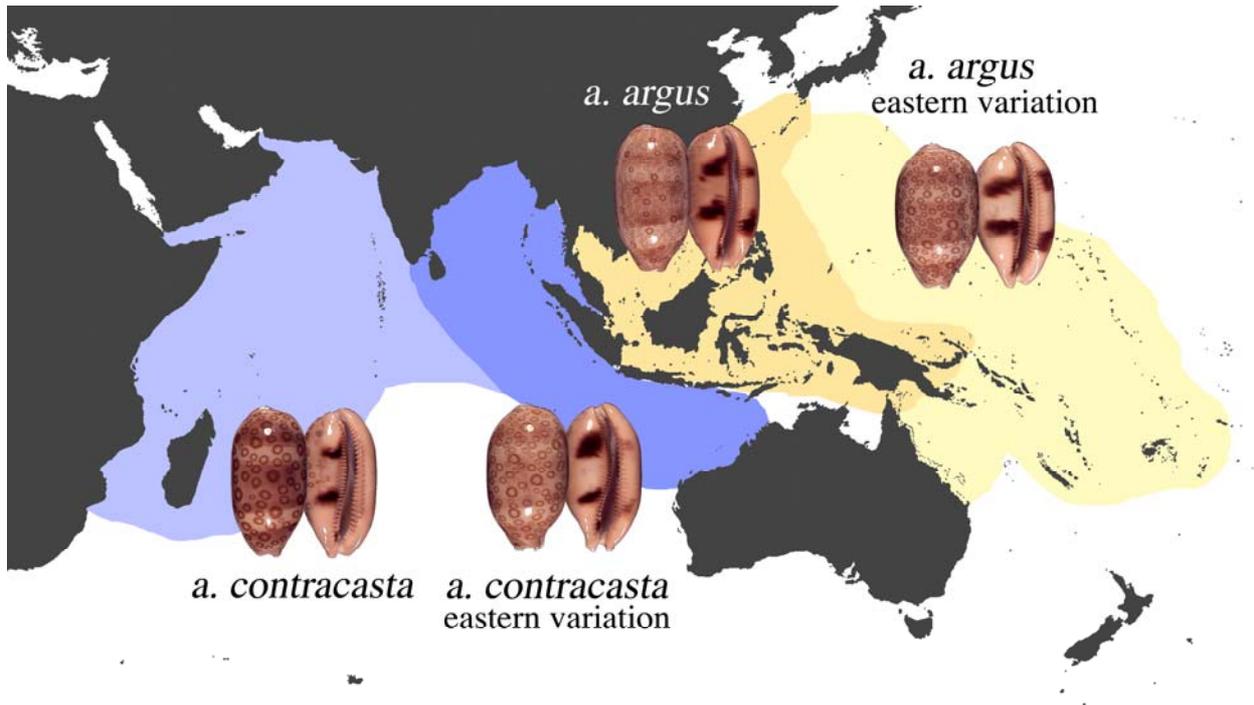
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**Plate 2**



Plate 3





**Map 1:** Approximate ranges of *A. argus argus* (yellow) and *A. a. contracasta* (blue)

### Plate 3 (previous page 95)

#### *Arestorides argus argus*

1. Nha Trang, Vietnam. Exceptionally sparse rings, giant local form (97 mm)
2. Laminusa Is., Sulu Sea, Philippines (81 mm). Typical western Pacific form
3. Eastern Samar, Philippines (52 mm). Typical western Pacific form
4. Kavieng, New Ireland, Papua New Guinea. Slightly subadult (89 mm)
5. Kwajalein Atoll, Micronesia (77 mm). Eastern variation
6. Savaii Is., Western Samoa (67 mm). Eastern variation

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