



The genus *Cinysca* Kilburn, 1970 (Mollusca, Archaeogastropoda) in West Africa with the description of two new species

El género *Cinysca* Kilburn, 1970 (Mollusca, Archaeogastropoda) en África occidental con la description de dos especies nuevas

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ABSTRACT

Cinysca jullieni Adams and Knudsen, 1969, the only known species from West Africa coast was described after a juvenile; now, the species is redescribed and illustrated, from adult specimens collected in Ghana. Two new species belonging to this genus are described: *C. alvesi* and *C. arlequin*.

RESUMEN

La única especie conocida de la costa occidental de África, *Cinysca jullieni* Adam y Knudsen, 1969, fue descrita basándose en un juvenil. Ahora se describe y representa a partir de ejemplares adultos recolectados en Ghana. Se describen dos nuevas especies pertenecientes a dicho género: *C. alvesi* and *C. arlequin*.

KEY WORDS: Archaeogastropoda, Turbinidae, Liotiinae, *Cinysca*, *Cinysca jullieni*, West Africa.

PALABRAS CLAVE: Archaeogastropoda, Turbinidae, Liotiinae, *Cinysca*, *Cinysca jullieni*, África Occidental.

INTRODUCTION

The genus *Cinysca* Kilburn, 1970 is represented in the east Atlantic coast by a single species, *Cinysca jullieni*, described by ADAM AND KNUDSEN (1969) along with other small species of *Vitrinella*, *Tornus*, *Cochliolepis*, etc. The holotype of this species is a juvenile shell, a mere 2 mm long.

Believed to be the only species present in the West Africa coast, this taxon has been subsequently cited in several papers: in RUBIO AND ROLÁN (1990), showing shells from São Tomé, and in FERNANDES AND ROLÁN (1993), in the list of the species from São Tomé and Príncipe. BERNARD (1984) showed two

species of *Cinysca* for Gabon, as *C. sp 1* and *C. sp 2*. In a more recent work, ROLÁN AND RYALL (1999) mentioned for Angola two species of *Cinysca*: *C. jullieni* and *C. sp*. Therefore, it seems that more than one species belonging to this genus appear in West Africa. The first problem was to determine which adult specimens corresponded to the nominal taxon. This was the first purpose of the present work.

The other problem was due to the great difference in the morphological characters of the shells in the juvenile and adult stage, which made this assignment especially difficult.

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The study of the material collected from several countries of West African allowed us to make a study of the populations of this area, and three species of *Cynysca* were found. One of them corresponded to the previously known taxon and the other two were unnamed and are described herein as new species.

MATERIAL AND METHODS

The shells studied were primarily collected by skin diving. A few of the adult shells and most of the juveniles were obtained by dredging, on different expeditions, or by persons living in some African countries. Many shells were preserved in alcohol.

RESULTS

Family TURBINIDAE Rafinesque, 1815 Subfamily LIOTIINAE Adams and Adams, 1854

HICKMAN AND MCLEAN (1990) studying the family Turbinidae arrange the different subfamilies into several informal groups according to their common anatomical and conchological characters, making the suprageneric mark for a classification of this complex group. The subfamily Liotiinae is presently formed by 17 genera, whose species are present in all

Abbreviations:

AMNH American Museum of Natural History, New York
BMNH The Natural History Museum, Londres
LACM Los Angeles County Museum of Natural History
MNCN Museo Nacional of Ciencias Naturales, Madrid
MNHN Muséum National d'Histoire Naturelle, Paris
CER collection Emilio Rolán, Vigo
CFR collection Federico Rubio, Quart of Poblet
s shell
j juvenile
f fragment
sp/sps specimen (with soft parts)

the temperate seas of the world. More recent information is in MCLEAN (2001).

The West African species included in Liotiinae have prominent axial and spiral sculpture, internally thickened lip and a corneous operculum which is multispiral, externally covered by small spirally aligned calcium carbonate nodules.

Genus *Cynysca* Kilburn, 1970

Cynysca Kilburn, 1970, new name for *Cynisca* H. Adams and A. Adams, 1854, non Gray, 1844: 191.

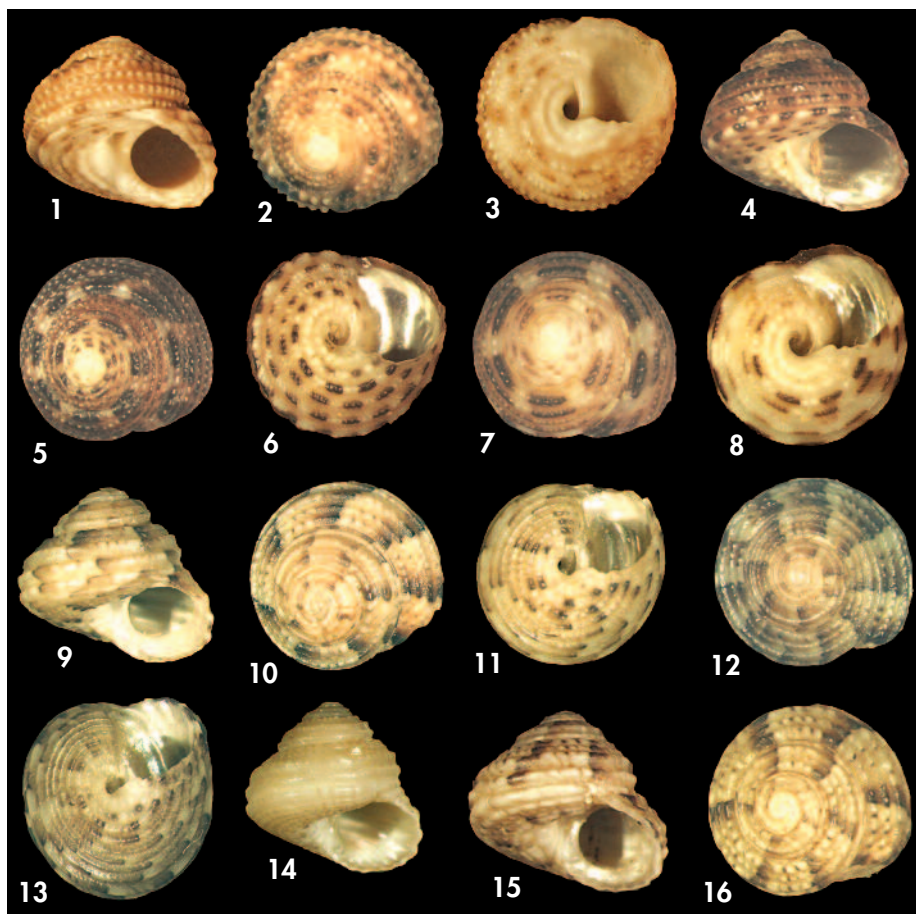
Type species by monotypy: *Delphinula granulosa* Krauss, 1848. South Africa.

The West African species studied showed a great difference between the conchological characters in the juvenile and adult periods. In the youngest individuals the sculpture is typical of the Lio-

tiinae, with strong spiral cords and axial lamellas but, when adult, fine spiral lines appear in the interspaces crossing the lamellas, giving the entire surface a reticulated aspect (Figs. 30-31, 33).

Cynysca jullieni Adam and Knudsen, 1969 (Figs. 1-3, 17-21)

Cynysca jullieni Adam and Knudsen, 1969. *Bull. Inst. r. Sci. nat. Belg.*, 44: 31-34, fig. 16. [Type locality: Garraway, Liberia].



Figures 1-3. *Cinysca jullieni*, 10.5 mm in diameter, from Miamia, Ghana. Figures 4-8. *Cinysca alvesi*. 4-6: holotype, 8.5 mm in diameter, Esprainha, São Tomé (MNCN); 7: paratype, 8.4 mm (MNHN); 8: paratype, 7.0 mm (AMNH). Figures 9-16. *Cinysca arlequin*. 9-11: holotype, 6.6 mm in diameter, Miamia, Ghana (MNCN); 12-13: paratype, 6.0 mm (MNHN); 14: shell with light pattern, 5.3 mm, Busua, Ghana (CER); 15-16: shell of 7.2 mm in diameter, from São Nicolau, Angola (CER).

Figuras 1-3. Cinysca jullieni, 10,5 mm de diámetro, de Miamia, Ghana. Figuras 4-8. Cinysca alvesi. 4-6: holotipo, 8,5 mm de diámetro, Esprainha, São Tomé (MNCN); 7: paratipo, 8,4 mm (MNHN); 8: paratipo, 7,0 mm (AMNH). Figuras 9-16. Cinysca arlequin. 9-11: holotipo, 6,6 mm de diámetro, Miamia, Ghana (MNCN); 12-13: paratipo, 6,0 mm (MNHN); 14: concha con patrón claro, 5,3 mm, Busua, Ghana (CER); 15-16: concha de 7,2 mm de diámetro, de São Nicolau, Angola (CER).

Type material: not examined. Good drawings of the holotype accompany the original description (ADAM AND KNUDSEN, 1969, fig. 16).

Other material studied: Ghana: 5 sps, 7 s, 8 j, Miamia, 3-8 m, under rocks, Miamia; 48 j, Miamia, 38-40 m; 1 c, 3 j, Busua, 5 m; 1 sp (j), Busua, 1 m; 1 s, 2 j, Cape Three Points, 35-65 m.

Description: Shell (Figs. 1-3) with a relatively small size, solid, subglobose, pearly, with $5\frac{1}{4}$ whols separated by a

deep suture. Protoconch (Fig. 20) bulbous, with a little more than $\frac{1}{2}$ whorl, with a maximum diameter of 213 μ m,

smooth, except for 3 fine spiral lines. Teleoconch with 4 $1/2$ whorls; sculpture formed by spiral cords and axial striae which cross the whole surface. In the 2 first whorls there are 2-3 spiral cords (Fig. 19), the smallest one is nodulous and close to the suture, disappearing in the subsequent whorl. On the last whorl, 10 cords appear, 5 of them in the periphery, with strong granules, and 5 at the base, with small granules as close to the umbilicus; in the interspaces, fine spiral threads are crossed by the more prominent axial striae. Aperture rounded, oblique, peristome sharp, undulate and enlarged at the level of the basal cords. Outer lip with spiral lirae within. Columella curved, blunt denticles at base of columella; 4-5 smaller more, are aligned on the internal lip. Umbilicus narrow and deep, not crenulated.

Colour light brown. Under magnification on the light brown background there are some darker blotches near the suture and smaller light points on the spiral cords.

Dimensions, largest specimens up to 10.5 mm in diameter x 9.5 mm in height.

Operculum (Fig. 21) multispiral with a small central nucleus, forming a quitinous base on which the calcareous granules are disposed spirally.

Radula (Figs. 34-36) with the formula N.5.1.5.N. Central tooth of triangular profile, with ventral borders expanded and sloping externally; its central cusp is smooth and the secondary one has several blunt denticles. Lateral teeth with triangular cusps, strongly sloped outwardly and with the margins serrate. Marginal teeth elongate, narrow and laterally depressed; its size decreases gradually towards the exterior presenting a triangular extension from which the cusp strongly

sloped externally is originate, giving it a hooked aspect.

Distribution: Liberia and Ghana (Fig. 37).

Remarks: The material of *C. jullieni* from the original description was formed by small shells which were badly eroded. A juvenile shell was chosen as the holotype, due to its better condition.

RUBIO AND ROLÁN (1990) presented the shells found in São Tomé and Príncipe, which included juvenile shells very similar to the holotype of the species, under the name *C. jullieni*. Later, studying the complete material from West Africa, it was noticed that the species from the São Tomé archipelago was different from other two species found in Ghana. So, we had three species which were candidates to the taxon *C. jullieni*.

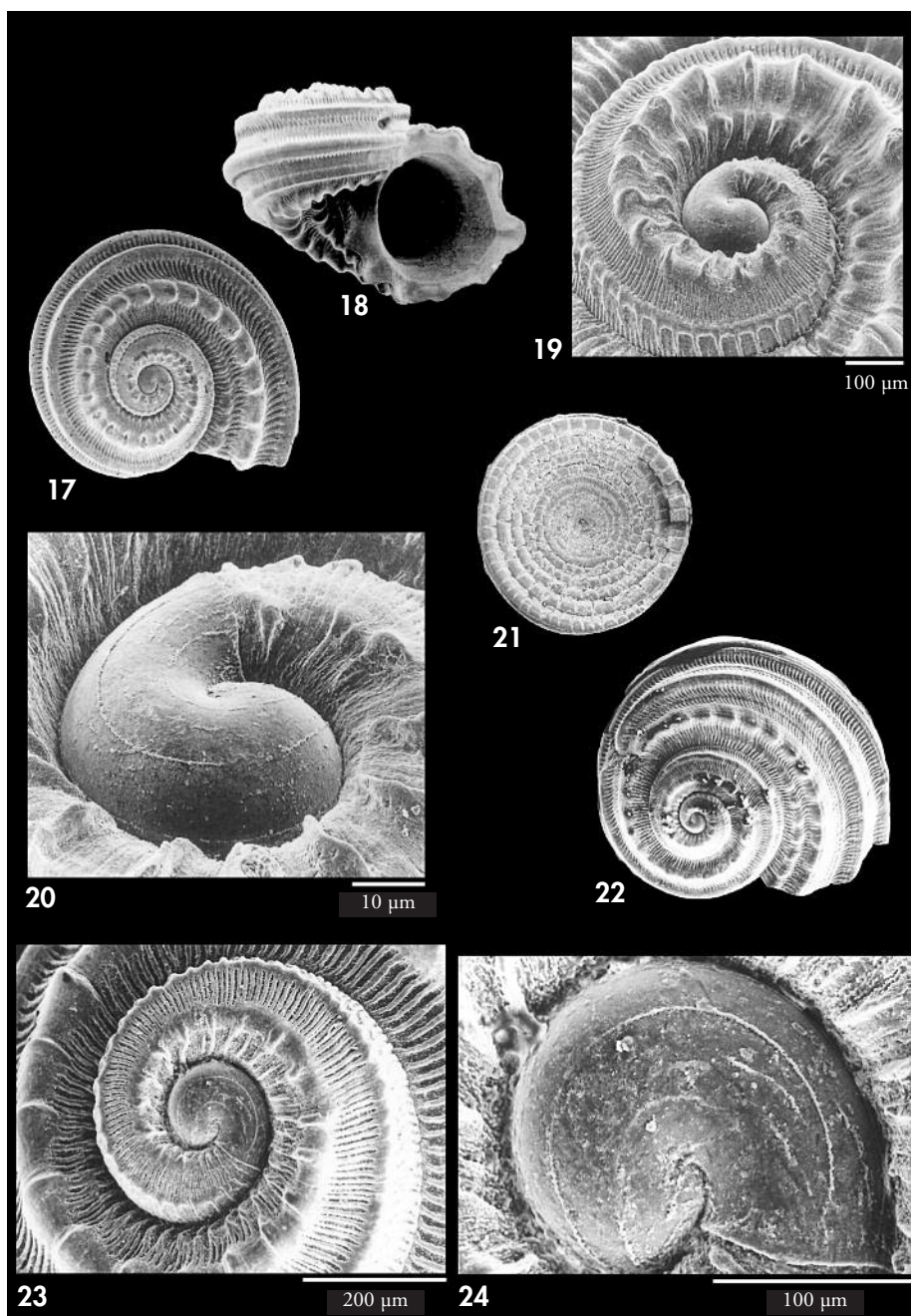
One of the species obviously could not be considered as *C. jullieni* because the shell did not have the prominent nodulous spiral cord on the dorsum. This species, collected in Ghana and Angola, is described below as *C. arlequin* spec. nov. So, we had only two candidates.

The juveniles of the other two species, had very similar shells and both were compatible with the type of *C. jullieni*. But the species found in São Tomé and Príncipe was never found out of this archipelago, and so, we consider that the holotype of *C. jullieni*, found in Liberia, can only correspond to the northern species, which was found in our material only in Ghana, and probably its range extends to the North. So, we present in Figures 1-3 adult shells of the species *C. jullieni*, in order to separate it from the other two African species herein described as new.

Cinysca alvesi spec. nov. (Figs. 4-8, 22-24)

Cinysca jullieni in Rubio and Rolán, 1990. *Iberus*, 9 (1-2): 213-214, figs. 20-25.

Type material: Holotype (Fig.) in the MNCN (n° 15.05/45908). Paratypes: AMNH (1) (Fig. 8), BMNH (1), LACM (1), MNHN (1) (Fig. 7), CER (69), CFR (10) CPR (2), all from type locality.



Figures 17-21. *Cinysca jullieni*. 17-18: juvenile shells of 1.6 and 2.3 mm, Miaamia; 19: detail of the first whorl; 20: protoconch; 21: operculum. Figures 22-24. *Cinysca alvesi*. 22: juvenile shell of 2.3 mm; 23: detail of the first whorl; 24: protoconch.

Figuras 17-21. Cinysca jullieni. 17-18: conchas juveniles de 1,6 y 2,3 mm, Miaamia; 19: detalle de la primera vuelta; 20: protoconcha; 21: opérculo. *Figuras 22-24. Cinysca alvesi*. 22: concha juvenil de 2,3 mm; 23: detalle de la primera vuelta; 24: protoconcha.

Other material studied: São Tomé: more than 200 sps, São Tomé city, 2-3 m; 6 sps, Praia das Conchas; 20 sps, 10 s, 10 j, Esprainha, 2-3 m; 6 sps, Praia Mutamba. Príncipe: 41 sps, Santo Antonio, 5 m. Annobón: 1 s, 5 f, San Antonio de Palé, 15 m.

Type locality: Esprainha, São Tomé, 5-10 m, under rocks, República de São Tomé and Príncipe.

Etymology: The new species is named after the late Ilídio Félix-Alves, malacologist from Lisboa, Portugal, who sampled in São Tomé as well in other African places.

Description: Shell (Fig. 4-8) of small size, solid, subglobose, interior pearly, whorls $5\frac{1}{2}$, convex, separated by a grooved suture. Protoconch (Figs. 23, 24) white coloured, globular, with little more than $\frac{1}{2}$ whorl and a maximum diameter of 195 μm and smooth except for 2 fine spiral lines. Sculpture of the teleoconch formed by spiral cords and fine axial striae. In the two first whorls there are 2 spiral cords (Figs. 22, 23) plus other smaller ones near the suture and which disappear in the second whorl; on the last whorl there are 11 cords: 5 granulous ones on the periphery, and 6 at the base, which increase the size of their granules as they approach the umbilicus. Aperture rounded, oblique, inner and outer lip with a sharp border, without spiral folds at its inner part. Columella curved, with two small blunt denticles placed at base. Umbilicus narrow. Operculum multispiral, with a small central nucleus, externally concave, and with a chitinous base on which calcareous rectangular granules are disposed spirally.

Coloration. The ground color is cream-yellowish with radiating dark brown blotches. On the base, the coloration

is lighter, with 4-5 spiral cords with granules articulated of dark brown and cream, sometimes with cords without brown colour. Some specimens present an uniform brown reddish coloration on the dorsum, the base being lighter; there are very dark shells and also lighter juveniles.

Dimensions: Holotype 8.5 mm in diameter x 7.9 mm in height.

Radula with formula N.5.1.5.N, as the one mentioned for *C. jullieni*.

Distribution: The species appears to be restricted to the islands of São Tomé and Príncipe, and are probably endemic to the Gulf of Guinea islands (Fig. 37).

Remarks: *Cinysca alvesi* differs from *C. jullieni* because the latter species is larger, more globose, lighter in colour, the spiral cords have larger tubercles, the basal cords have larger and rounded but lesser coloured tubercles; the microsculpture is more prominent; also the denticles on the apertural lips are more numerous and more prominent; the umbilicus is somewhat more open than in the other African congeneric species.

For the differences with *C. arlequin* spec. nov. see below.

Cinysca arlequin spec. nov. (Figs. 9-16, 25-33)

Type material: Holotype (Fig. 9-11) in MNCN (n° 15.05/45909). Paratypes: AMNH (1), BMNH (1), LACM (1), MNHN (1), CER (5), CFR (1), CPR (8) all from type locality.

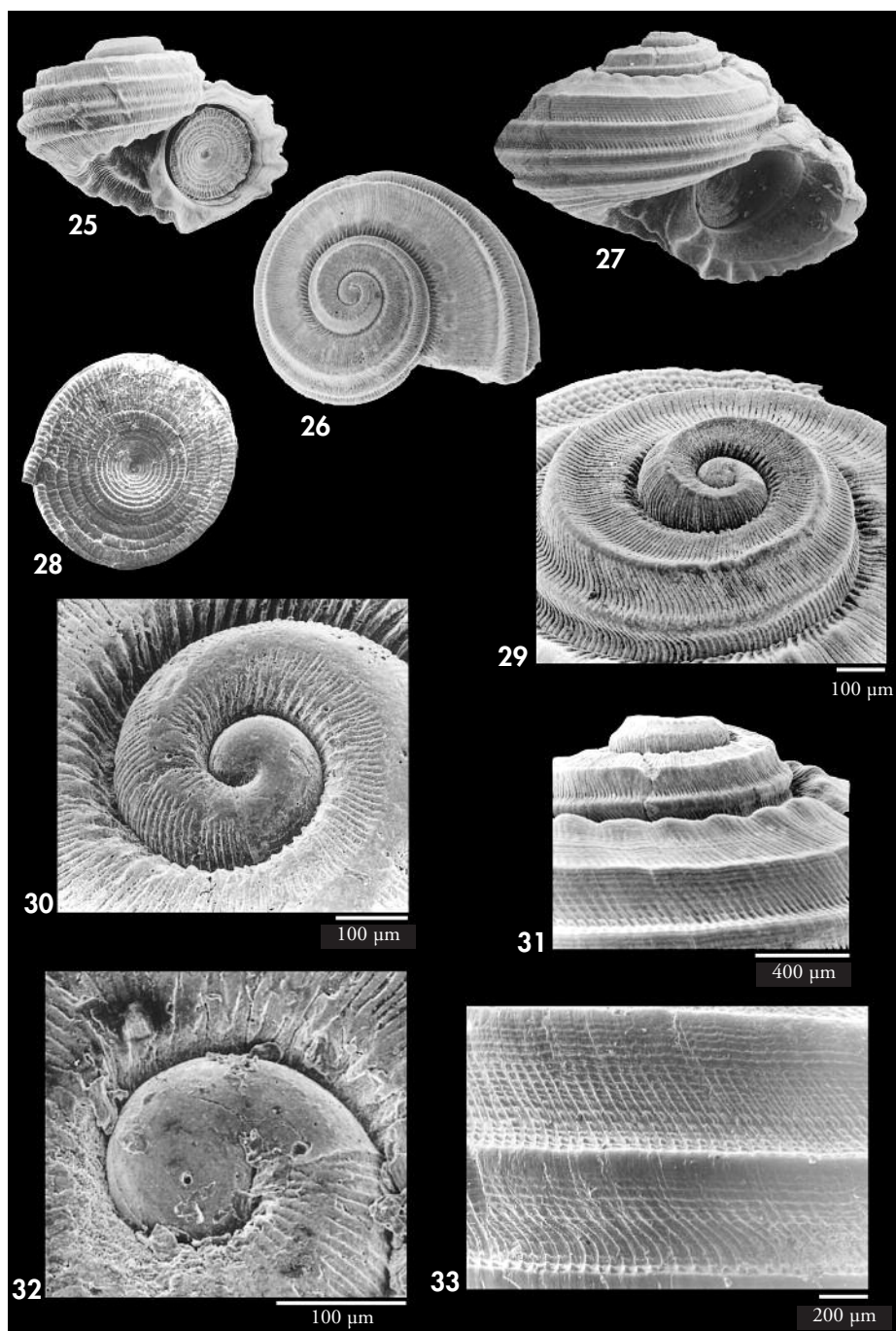
Other material studied: Ghana: 7 sps, 12 s, 10 j, Takoradi, 1-3 m; 63 sps, 15 j, Busua, 10-15 m; 12 sp, small island of Abokwa, Busua, 2-5 m; 55 sps, 17 s, Mudrachmi point, 10-20 m; 6 s, 15 j, Miamia, 8-25 m; 8 sps, 2 s, 95 j, Miamia, 30-40 m; 6 j, Miamia, 45-65 m; 10 j, Cape Three Points, 35-65 m. Angola: 1 sp, Mutuco, Luanda, 120 m; 20 sp, Palmerinhas, Luanda, 15-20 m; 1 s, 1 j, Sacomar, Namibe, 1-2 m (CPR); 5 sps, São Nicolau, low tide; 8 sps, Bentiaba, 1 m; 1 sp, Bentiaba, 1-2 m (CPR).

Type locality: Miamia, Ghana, 10-15 m, under rocks.

Etymology: The name refers to the typical colour pattern of the shell.

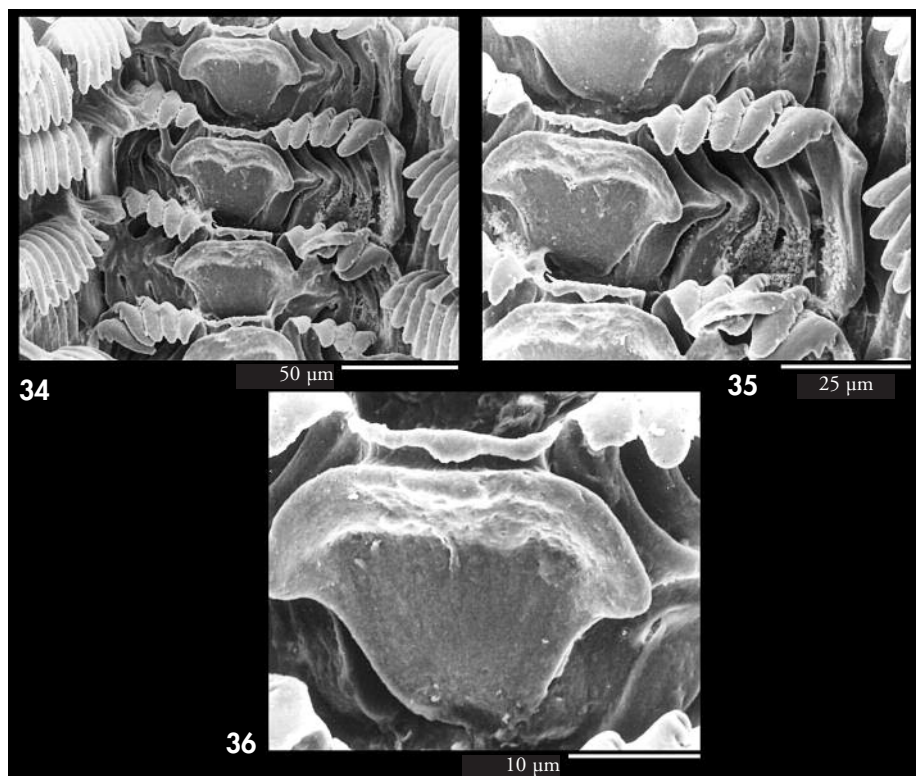
Description: Shell (Figs. 9-16) of small size, solid, subglobose, pearly, with about 5 whorls separated by a grooved suture. Protoconch (Fig. 32) with $\frac{1}{2}$

whorl, bulbous, with a maximum diameter 200 μm and smooth except for 1-2 spiral lines. Teleoconch with only a peripheral cord at the beginning of the



Figures 25-33. *Cinysca arlequin*. 25-26: juvenile shells of 2.0 and 2.0 mm; 27: shell of 4.2 mm. 28: operculum; 29-31: detail of the apex and protoconch; 32: protoconch; 33: microsculpture.

Figuras 25-33. Cinysca arlequin. 25-26: conchas juveniles de 2,0 and 2,0 mm; 27: concha de 4,2 mm. 28: opérculo; 29-31: detalle del ápice y la protoconcha; 32: protoconcha; 33: microescultura.



Figures 34-36. Radula of *Cinyrsa jullieni*.
Figuras 34-36. Rádula of *Cinyrsa jullieni*.

first whorl (Figs. 29-31), and two on the subsequent one; sculpture formed by spiral cords and axial striae on the first two whorls, fine small cords appearing in the interspaces from the 2nd whorl (Fig. 33). Last whorl with 11-12 cords, 4-5 from the suture to the periphery, which are strong, the 2-3 first ones are clearly granulous and the others smooth; the 7 cords from the periphery to the base, are narrower and present granules of small size. Aperture rounded, oblique; columella curved, with two blunt denticles on its base, on the internal lip; there are spiral folds on the inner part of the external and internal lip, the border of which is sharp. Umbilicus narrow and deep, not crenulated.

Coloration highly variable, with a background of dirty white, cream or brown-greenish, with radiant blotches

of dark brown or reddish-brown, usually smaller than the interspaces. Some other small brown spots are distributed on the spiral cords. There are shells more uniformly brownish but never very dark.

Dimensions: The largest specimen (from Ghana) is 7.0 mm in diameter x 6.9 mm in height, with a ratio of $H/D = 0.98$. The largest specimen from Angola is 8.0 mm in diameter x 8.0 mm in height, with a ratio of $H/D = 1$. The holotype is 6.6 mm x 6.2 mm.

Animal of light cream colour; the head has cephalic tentacles elongated and ciliated, black eyes on short stalks and an elongated postocular right tentacle. Epipodium with 4 tentacles on each side, similar to the cephalic ones, and disposed two around the operculum and two anteriorly. The foot has dark

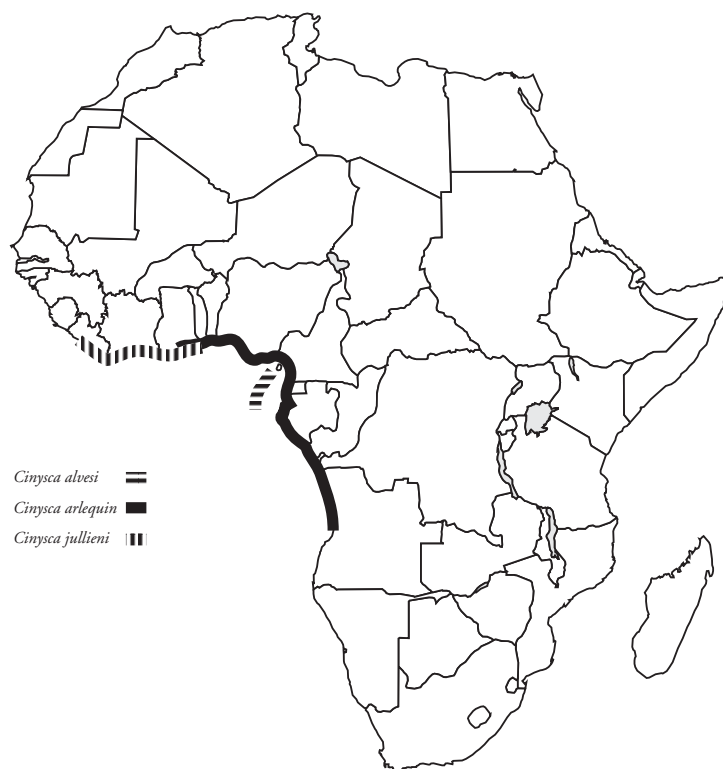


Figure 37. Distribution range in the African coast of the species of *Cinysca*.

Figure 37. Área de distribución en la costa africana de las especies de *Cinysca*.

brown blotches at both sides and the sole is very rough and has the anterior extremes expanded.

Radula similar to the one described for *Cinysca jullieni*.

Operculum (Fig. 28) multispiral with a central nucleus, externally concave, with a quitinous base on which the rectangular spiral calcareous granules are disposed in greater numbers than in *C. alvesi* and *C. jullieni*.

Distribution: Only known from Ghana and Angola (Fig. 37), and probably in the intermediate areas of the Guinea Gulf.

Remarks: *C. arlequin* can be separated from *C. jullieni* and *C. alvesi* because its shell is smaller than those of both congeneric species; the beginning of the teleoconch of *C. arlequin* shows two smooth cords, and the single nodulous

cord appears near of the second whorl and is, in the next whorl, very close to the suture. The other two species have several nodulous cords, and the larger cord is more separate from the suture. The colour *C. arlequin* is brown-greenish while *C. jullieni* is light brown and *C. alvesi* is darker brown with the base lighter with articulated cords. The spiral cords on the base are more numerous and narrower in *C. arlequin*, which has fewer denticles on the internal lip, and the operculum is more calcareous and with smaller nodules.

Final comment: The three species found in the West African coast are studied and presented. Probably there is another species in deeper water of Angola but the material collected is scant and in very bad condition, and it did not allow us to present its characteristics.

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BIBLIOGRAPHY

- ADAM, W. AND KNUDSEN, J., 1969. Quelques genres de mollusques prosobranches marins inconnus ou peu connus de l'Afrique Occidentale. *Bulletin Institut royal des Sciences naturelles de Belgique*, 44 (27):1-69
- FERNANDES, F. AND ROLÁN, E., 1993. Moluscos marinos de São Tomé y Príncipe: actualización bibliográfica y nuevas aportaciones. *Iberus*, 11 (1): 31-47.
- HICKMAN, C.S. AND MCLEAN, J. H., 1990. Systematic revision and suprageneric classification of trochacean gastropods. *Natural History Museum of Los Angeles, Science Series*, 35. 169 pp.
- MCLEAN, J. H., 2001. Progress on revision of Lioitiinae (Vetigastropoda: Turbinidae) of the world. In Salvini-Plawen, L., Voltzow, J., Sattmann, H. and Steiner, G. (Eds.): *Abstracts, World Congress of Malacology, 2001, Vienna, Austria*, p. 418.
- ROLÁN, E. AND RYALL, P., 1999. Checklist of the Angolan marine molluscs. *Reseñas Malacológicas*, 10: 5-132.
- RUBIO, F. AND ROLAN, E., 1990. Aportaciones a los conocimientos sobre micromoluscos de Africa Occidental. 2. Archaeogastropoda de Sao Tome y Principe. *Iberus*, 9 (1-2): 209-219.