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ON THE IDENTITY OF '*COLUMBELLA RUSTICA*' FROM WEST AFRICA AND THE MACARONESIAN ISLANDS

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SUMMARY

Difference in protoconch structure is the reason to consider *Columbella rustica* (Linné, 1758) and *Columbella adansoni* Menke, 1853 as distinct species. *C. adansoni* is the East Atlantic species with a planktotrophic larval development, restricted to the Macaronesian islands. *Columbella rustica* is the Mediterranean and West African species with direct development.

INTRODUCTION

One of the best known Mediterranean gastropods is *Columbella rustica* (Linné, 1758), a species that occurs abundantly in shallow water throughout the Mediterranean Sea and in the adjacent Atlantic Ocean from southern Portugal and Morocco south to Senegal (fig. 20).

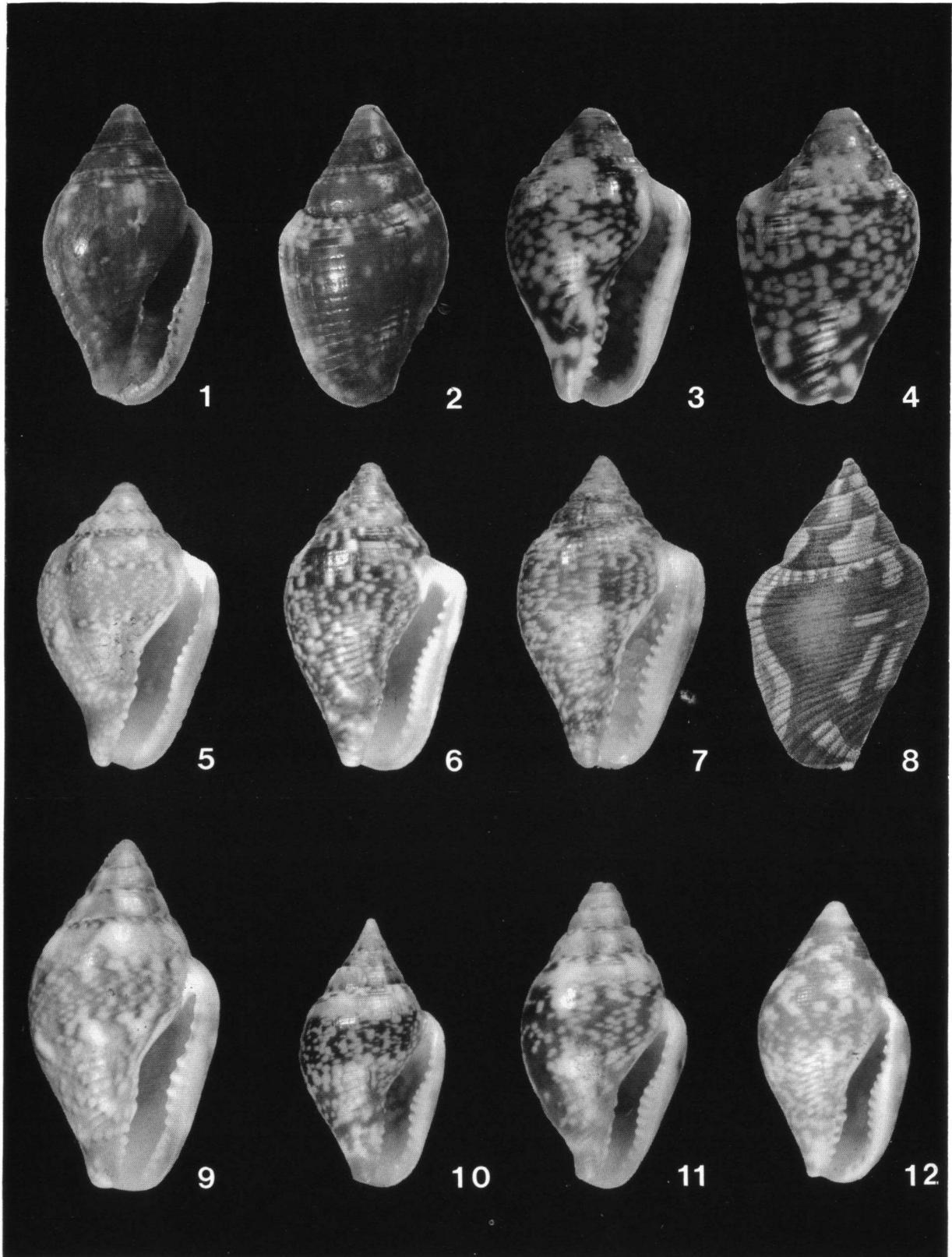
Like, e.g., the largely sympatric *Conus mediterraneus* Hwass, 1792, this species is extremely variable in shape and colour pattern, which resulted in the subdivision and description of many new taxa (Pace, 1902; Settepassi, 1972). Most modern authors are convinced that this polymorphism and polychromatism is infraspecific; most of these names, including all based on recent Mediterranean material, are regarded as junior synonyms.

Shells from both West Africa and the Macaronesian Islands have often been identified as *Columbella rustica* var. *striata* Duclos, 1835 (Dautzenberg, 1890; Nicklès, 1950; Nordsieck & Talavera, 1979). Menke

(1853) described *C. adansoni* and *C. rufa* from the Cape Verde Islands and Drouët (1858) described *C. rustica azorica* from the Azores. Tryon (1883), who published the last monograph of the family Columbellidae considered these three names as junior synonyms of *C. rustica*.

During our recent investigations of the molluscan faunas of the Macaronesian Islands, it appeared that the common littoral *Columbella* species on all these islands possesses a multispiral protoconch (figs 15-17), indicating planktotrophic development, whereas the "Mediterranean" *C. rustica* shows a paucispiral protoconch (Bandel, 1975), indicating direct development (figs 13-14), the juvenile is benthic directly after hatching.

Material from the west coast of the African continent (Morocco, Mauritania, Senegal) has the paucispiral protoconch. This type of protoconch has never been found in any of the Macaronesian shells. A phenomenon that can be explained by assuming that direct larval development does not allow conti-



Figs 1-7. *Columbella adansoni* Menke, 1853. 1-2. lectotype, length 11.0 mm. 3-4. lectotype *C. rufa* Menke, 1853, length 12.8 mm, all Cape Verde Islands, "St. Vincent". 5. Azores, San Miguel, length 15.4 mm. 6. Gran Canaria, length 16.6 mm. 7. Madeira, Funchal Lido, length 17.0 mm.

Figs 8-12. *Columbella rustica* (Linné, 1758). 8. Figure of lectotype of *C. striata* Duclos, 1846 (after Chenu, 1846), length 12.1 mm. 9. Spain, Algeciras, length 19.0 mm. 10. Greece, Skopelos, length 14.4 mm. 11. Morocco, El Jadida, length 16.7 mm. 12. Senegal, Goré, length 15.1 mm.

mental specimens to cross the barriers formed by the deep, open waters of the Atlantic Ocean, and, on the other hand, sea currents (generally directing to the southwest, away from the African coast) may prevent the planktonic larvae from the oceanic islands reaching the continent. If they succeed, interspecific competition probably prevents definite settlement.

According to Bernard (1984) *C. rustica* has also been recorded south of Senegal, e.g. Gabon; we have not been able to study shells from that region. Based on the difference in larval development between Mediterranean/northwest continental African and oceanic Macaronesian populations (probably already noticed in 1950 by Thorson, who interpreted it as evidence for poecilogony), we conclude that our material represents two different species. Proposing a new name for the oceanic species with multispiral protoconch is not permitted since both Menke (1853), and Drouët (1858) provided valid descriptions.

After comparison of colour, colour pattern, teleoconch sculpture, and preliminary biometrical analyses of several other shell characters only a few additional differences were revealed between both species. We consider *Columbella adansoni* Menke, 1853 the oldest available name for the Macaronesian species, with planktotrophic larval development.

SYSTEMATICS

Columbella adansoni Menke, 1853

(Figs 1-7, 15-17, 19)

Columbella Adansoni Menke, 1853: 74-75

Columbella rufa Menke, 1853: 75.

Columbella rustica Linné, 1758 var. *azorica* Drouët, 1858: 169.

Columbella rustica Linné, 1758 var. *striata* Duclos. Dautzenberg, 1890: 153

Columbella rustica Linné, 1758 var. *striata* Duclos. Dautzenberg, 1891: 23

Columbella rustica Linné, 1758 var. *striata* Duclos. Dautzenberg, 1910: 58-59

Columbella striata Duclos, 1846. Dautzenberg, 1900: 183

Columbella striata Duclos, 1846 var. *minor* Dautzenberg, 1900: 183

Columbella rustica Linné, 1758 var. *striata* Duclos. Nord-sieck & Talavera, 1979: 134-135, pl. 31 fig. 1.

Columbella rustica Linné, 1758 form *striata* Duclos. Nord-sieck, 1982: 207, pl. 68 fig. 73.70a

Type material

The syntypes (16 specimens) of *C. adansoni* and *C. rufa* were once mixed up in one sample (R. Janssen

in litt., 1990). However, by reading the original description, we were able to split part of the material in "typical" *C. adansoni* and "typical" *C. rufa*. Out of these syntypes we designate a lectotype of *C. adansoni* Menke, 1853 (figs. 1-2) with measurements length 11.0 mm, width 6.1 mm. They were collected in 1852 by Dr. Johann Anton Schmidt, donated to the Heidelberg Museum, and recently transferred to the Senckenberg Museum.

Type locality

Cape Verde Islands, beach "St. Vincent"

Remarks

We regard *C. rufa* as a junior synonym. From the mixed lot mentioned above, we also designate a lectotype of *C. rufa*, with measurements length 12.8 mm, width 8.1 mm (figs 3-4). It falls well within the range of colour variability of *C. adansoni*.

The whereabouts of the Drouët (1858) material is unknown (Bouchet in litt, 1987, Kuiper in litt, 1991). Shells from the Cape Verde Islands are generally smaller than those of other Macaronesian Islands; however large specimens do occur on these islands in small numbers.

Columbella rustica (Linné, 1758)

(Figs 8-14, 18)

Voluta rustica Linné, 1758: 731

Columbella striata Duclos in Chenu, 1846, pl. 6, fig. 5 (non Menke, 1829)

Voluta rustica Linné, 1758, Dodge, 1955: 94-96.

Columbella rustica (Linné, 1758), Bandel, 1975: 100-101, pl. 5, figs 1-4

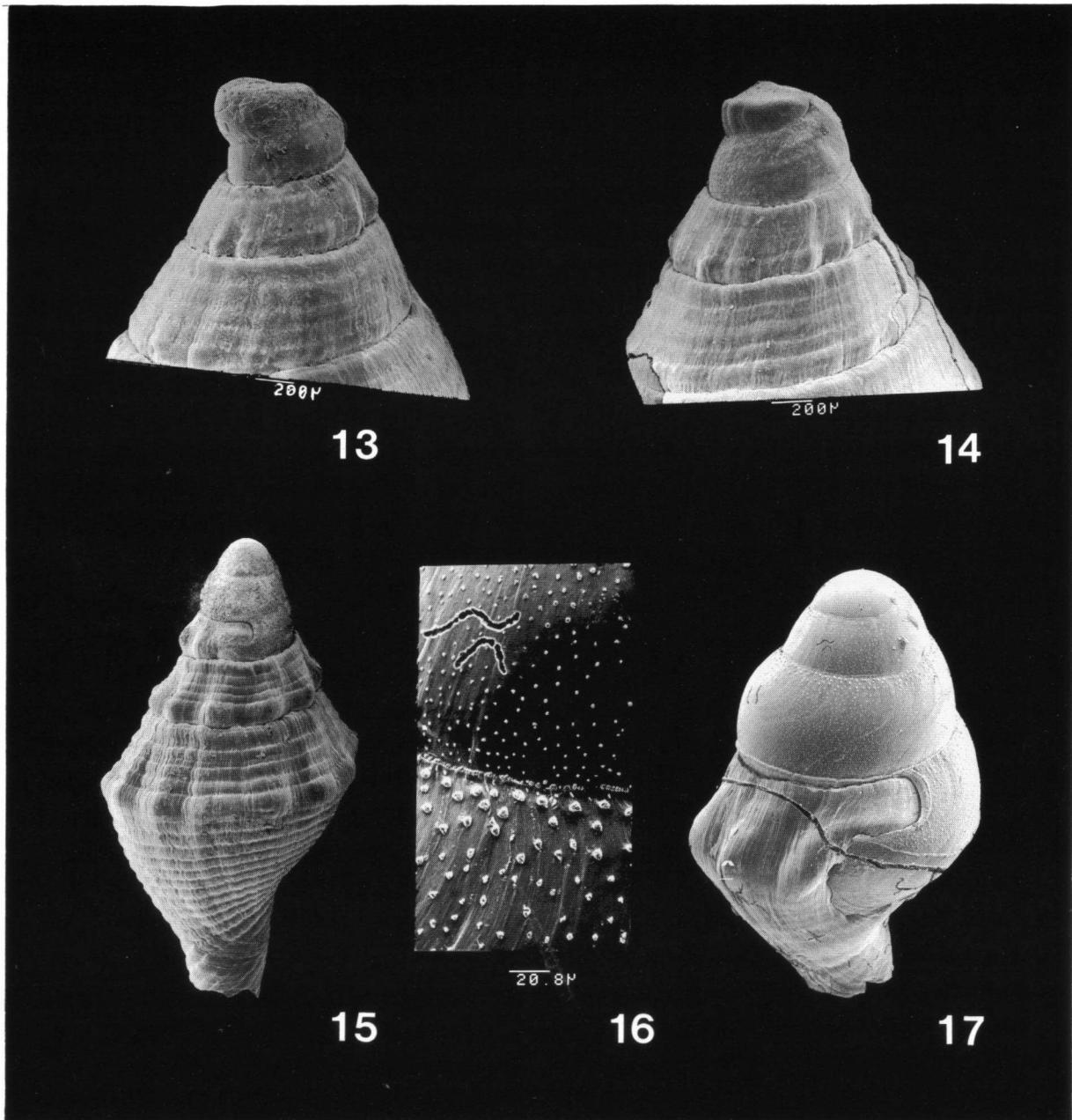
Columbella rustica (Linné, 1758), Bandel, 1977: pl 2, figs 7-8

Type locality

"In M. Mediterraneo".

Remarks

We refrain from enumerating the extensive synonymy of *Voluta rustica* Linné, 1758. For this we refer to Dodge (1955), Bucquoy, Dautzenberg & Dollfus (1882), Pace (1902), and Settepassi (1972). Only some relevant recent articles concerning the taxonomy of this species are mentioned above. Because of its abundance and circum-Mediterranean distribution,



Figs. 13-14. Variation in direct development protoconchs of *C. rustica*, Spain, Menorca.
 Figs. 15-17. Protoconchs and microsculpture *C. adansoni*, Porto Santo.

C. rustica has been a working tool in/for several scientific disciplines (e.g. biochemistry, ethology, physiology). This resulted in many non-taxonomic publications. Fortunately, in most of these the name *C. rustica* (Linné) is used. We feel that it is beyond the scope of this paper to summarize all these papers.

DISCUSSION

Except for their different modes of development, there are some additional, minor differences be-

tween Macaronesian *C. adansoni* and Mediterranean/West African *C. rustica*, supporting the idea that both represent distinct species. *C. adansoni* generally has a smoother body whorl. We also detected a minor difference in the lateral teeth of both taxa: the central cusp of *C. adansoni* is slightly serrated (fig. 19) whereas that of *C. rustica* is perfectly smooth (fig. 18, see also Bandel, 1977).

Other data from our biometric research are as yet inconclusive, due to lack of enough fresh specimens from several localities (especially West African shells



Fig. 18. radula *C. rustica*.

Fig. 19. radula *C. adansoni*.

are, in our opinion, not well enough represented in our material).

The name *C. striata* Duclos, 1846 is often used for the Macaronesian *Columbella*-species (Nordsieck & Talavera, 1979). Only Nicklès (1950) considered this name for the Mediterranean/West African specimens of *C. rustica*.

The syntypes of *Columbella striata* Duclos, are in the Museum National d'histoire Naturelle in Paris. Amongst them, we found the figured specimen (Duclos in Chenu, pl. 6, fig. 5), which we herewith designate as lectotype (fig. 8). The measurements are

length 12.1 mm, width 7.6 mm. All syntypes of *C. striata* are beach worn and lack the protoconch, which makes identification difficult. On the original label from Duclos is mentioned "Senegal". We regard this as the type locality. As we only know the occurrence of *C. rustica* (L.) in Senegal, we provisionally listed *C. striata* as a junior synonym of the latter. But more (biometric) research may indicate otherwise. Shells from Mauritania and Senegal usually have a higher number of columellar teeth (6-10) in contrast with shells from the Mediterranean having 3-6 columellar teeth.

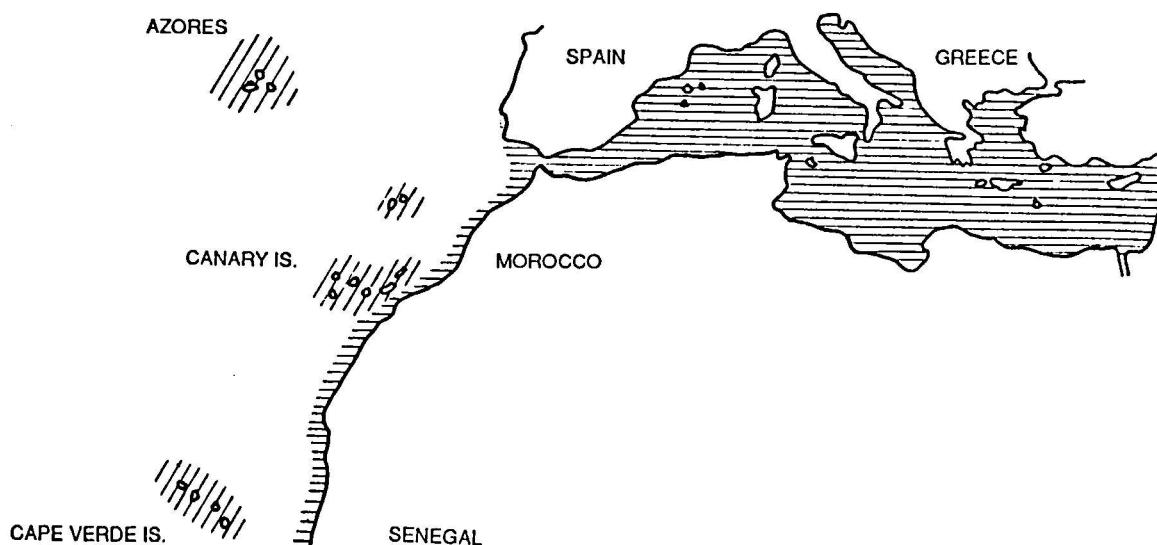


Fig. 20. Distribution of *Columbella rustica* (horizontal striping) and *C. adansoni* (diagonal striping).

The name *C. striata* has already been used by Menke (1829), which makes *C. striata* Duclos an junior homonym.

Shells of *C. rustica* from the north coast of Africa, in particular Tunisia, generally have a higher spire. Several of such formae have been named in the past.

As mentioned before, we think they represent infra-specific morphs, for "normal" *C. rustica*, and intermediate forms do occur there as well.

We do not consider the relatively small size of most of the shells of *C. adansoni* in the Cape Verde Islands as of any (sub)specific importance.

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