

Notes on the systematics, morphology and biostratigraphy of fossil holoplanktonic Mollusca, 18¹. On the status of *Cuvierina (Cuvierina) ludbrooki* and *C. (C.) jagti* (Gastropoda, Euthecosomata)

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Rediscovery of the holotype of the Pliocene *Cuvierina ludbrooki* (Caprotti, 1962), originally described as a scaphopod, has enabled the conclusion that it is specifically distinct from the Late Miocene *C. jagti* Janssen, 1995, in altogether lacking longitudinal micro-ornament. The relationships of *C. astesana* (Rang, 1829), *C. ludbrooki* and *C. tubulata* Collins, 1934 are studied by means of height/width-ratios. It is concluded that *C. astesana* and *C. ludbrooki* are valid species, while *C. tubulata* is considered to fall within the range of variation of *C. astesana*.

Key words: Gastropoda, Euthecosomata, *Cuvierina*, systematics.

HISTORY

The confused history of the pteropod *Cuvierina ludbrooki*, introduced by Caprotti (1962) as a scaphopod, can now finally be resolved, as the type specimen has recently been traced. In summary, this is what happened:

Janssen (1995: 41, pl. 4 fig. 2a-c) compared slender cuvierinid material from the Late Miocene (Tortonian) of Tetti Borelli (northern Italy) with *C. tubulata* Collins, 1934 from the 'Middle Miocene' (but most probably Pliocene) of Santa Rosa, Mexico. It was concluded that these two occurrences were specifically different, especially because of the presence of clear longitudinal micro-ornament on the Italian specimens. *C. tubulata*, although also being quite slender, was considered most probably to fall within the range of variation of the Mediterranean Pliocene (Zanclean-Piacenzian) *C. astesana* (Rang, 1829), because of the absence of micro-ornament. Consequently, the taxon *Cuvierina jagti* Janssen, 1995, was introduced for the Miocene Italian specimens.

Shortly afterwards however, my attention was drawn to another very slender cuvierinid, introduced as a scaphopod, from the Pliocene (Piacenzian) of Castell'Arquato (northern Italy), viz. *Dentalium (Gadilina) ludbrooki* Caprotti, 1962. That species, according to Caprotti's (1962: 96, pl. 16 figs 4-6) description and illustration, resembled *C. jagti* from Tetti Borelli closely in its slender shape and triangular aperture, which made me decide to relegate (Janssen, 1999b: 109) *C. jagti* into the synonymy of *C. ludbrooki* (Caprotti). The holotype, and sole specimen known, of the latter species, however, could not be traced in 1996 and 2005 by Dr G. Teruzzi of the Museo Civico di Storia Naturale (Milano), where Caprotti (1962) stated to have deposited it.

Closely similar specimens, and therefore also identified as *C. ludbrooki*, then became available during a study of Pliocene (Piacenzian) material from the Estepona area, Spain (Janssen, 2004: 113, pl. 2 fig. 8a-c), but these differed from the Tetti Borelli specimens in the complete lack of micro-ornament. In that same paper, it was concluded that this dif-

¹) For no. 17 in this series see *Basteria* 70: 71-83 (2006).

ference between *C. jagti* and *C. ludbrookii* might indicate that these are distinct species after all. Yet, the presence or absence of micro-ornament in typical *C. ludbrookii* could not be established, because the holotype (and only specimen) was not available.

THE STATUS OF *CUVIERINA LUDBROOKII*

This very unsatisfactory situation made me try to contact Dr Caprotti again. Fortunately, thanks to the never-abating assistance and mediation of Dr Marco Taviani (Institute of Marine Sciences-CNR, Bologna), the holotype finally turned up in Dr Caprotti's private collection. It was made available to me in December 2005, together with three more specimens collected by Dr Caprotti, after the 1962 paper had been published. It immediately became clear that the holotype was absolutely devoid of micro-ornament, indicating that *C. jagti* is a different species indeed, and that this name is still valid for the Miocene specimens with micro-ornament. One of the additional specimens, although incomplete, could also be identified as *C. ludbrookii*, on account of its triangular aperture. It is from the same locality of Castell'Arquato, but is labelled 'Astiano', so most probably came from the yellow sandy deposit on top of the Piacenzian clays. Two further specimens are too incompletely preserved to be identified with certainty.

Now another question arises. In the Middle Pliocene (Piacenzian) of northern Italy and Spain, *Cuvierina ludbrookii* co-occurs with another, less slender cuvierinid species, equally devoid of micro-ornament, namely *C. astesana*. This species is locally quite common in the Mediterranean realm and occurs during both the Zanclean and the Piacenzian. Janssen (1995: 34) observed a considerable variability of this species, especially in H/W ratios, in populations from the Pliocene of Zinola and Rio Torsero (both northern Italy). Could it be that *C. ludbrookii* is nothing else than an extreme variety of this *C. astesana*? And also for the Mexican *C. tubulata* it was assumed (Janssen, 1995: 43) that this might fall within the range of variation of *C. astesana*.

In order to obtain a good idea of the mutual relationships, measurements of H/W-ratio (= shell height/shell width x 100) were put in a stacked bar graph. Pliocene specimens of *C. astesana* from Estepona (Spain) and Rio Torsero (Italy) were used, as well as *C. ludbrookii* from Estepona and the holotype from Castell'Arquato (Italy), and the holotype of *C. tubulata* (fig. 1).

From this graph it is clear that on the basis of the available material the distinction between *C. astesana* and *C. ludbrookii* can be maintained. As a rule, specimens with a H/W-ratio of approximately 465 or more belong to *C. ludbrookii*, specimens with a lower value belong to *C. astesana*. Admittedly, the number of measurable specimens, especially for *C. ludbrookii*, is too limited for final conclusions to be drawn. In the Pliocene of northern Italy that species seems to be extremely rare and one might argue that the holotype is nothing more than an extreme of *C. astesana*. But in the Estepona assemblage (Janssen, 2004) no fewer than 21 specimens of *C. ludbrookii* have been identified (only 12 of which could be measured), and 57 of *C. astesana*, which makes the existence of a separate species far more plausible. The holotype of *C. ludbrookii* and a typical specimen of *C. astesana* are illustrated in figs 2-3.

For the few specimens that on the basis of H/W-ratio cannot clearly be identified as one of the two species, apertural shape is helpful: rather triangular in *C. ludbrookii*, and more reniform in *C. astesana*.

As suggested earlier (Janssen, 1995), the single Mexican specimen of *C. tubulata* in

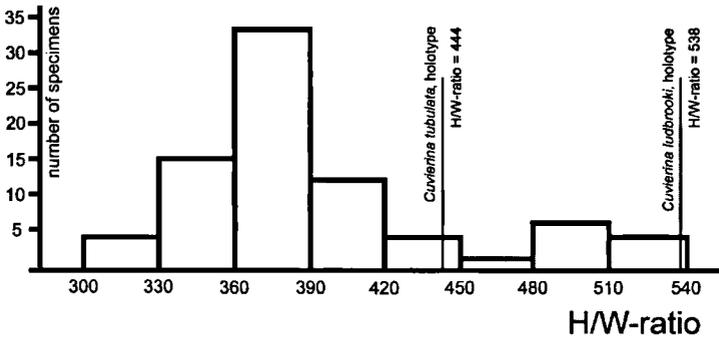
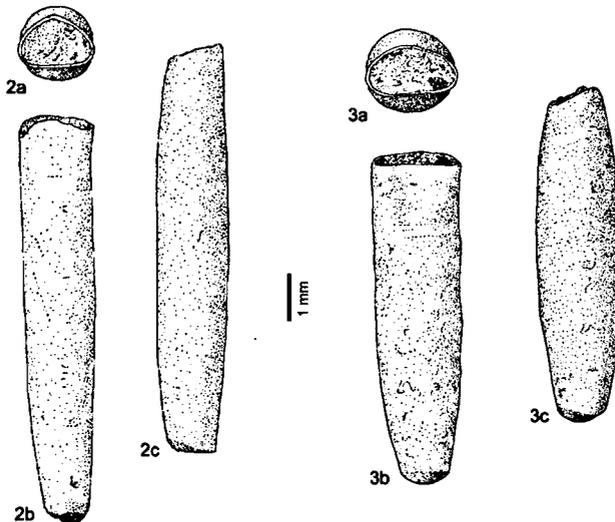


Fig. 1. Height/width ratio of *Cuvierina astesana*, *C. ludbrooki*, and *C. tubulata*.

existence, may be considered to be a relatively slender specimen of *C. astesana*. It remains the sole record from the New World, with the exception of some specimens from the Late Miocene of the Dominican Republic (Janssen, 1999a: 19, pl. 3 fig. 10), slightly differing from typical *C. astesana* (mean value of H/W-ratio = 286, for 7 specimens), and most probably representing an ancestral form of *C. astesana*.

The holotype of *C. ludbrooki* is now housed (with Dr Caprotti's consent) in the collections of the Museo Civico di Storia Naturale (Milano), under registration number MSNMi26743. The three additional specimens are kept in the Malacological Laboratory of the Museo di Zoologia (Bologna, Italy) under registration numbers MZB 44060 [*C. (C.) ludbrooki*, 1 damaged specimen, no paratype] and MZB 44061 [*Cuvierina (Cuvierina)* sp., 2 frag-



Figs 2-3. *Cuvierina (Cuvierina)* species. 2, *C. (C.) ludbrooki* (Caprotti, 1962), holotype, Castell'Arquato (Italy), Pliocene (Piacenzian), coll. Museo Civico di Storia Naturale, Milano, reg. nr. MSNMi26743 (leg./don. E. Caprotti); 3, *C. (C.) astesana* (Rang, 1829), Velerin Antena, Estepona (Spain), Pliocene (Piacenzian), coll. RGM 458.948 (leg./don. R. Marquet). a, apertural; b, ventral; c, left lateral views.

ments), all kindly donated by Dr E. Caprotti. Dr Taviani informed me that three further specimens, all *C. astesana*, were donated to the same institute in Bologna by Dr Caprotti.

CONCLUSIONS

1. *Cuvierina (Cuvierina) jagti* Janssen, 2005 is not synonymous with *C. (C.) ludbrookii* and remains the valid name for slender Late Miocene (Tortonian) specimens with a longitudinal micro-ornament and a triangular, rather than reniform, aperture.
2. *Cuvierina (Cuvierina) ludbrookii* (Caprotti, 1962) is a slender species (H/W-ratio > c. 465), devoid of micro-ornament and with a triangular rather than reniform aperture, of Middle Pliocene (Piacenzian) age.
3. *Cuvierina (Cuvierina) astesana* (Rang, 1829) is a less slender (H/W-ratio < c. 465), Pliocene (Zanclean-Piacenzian) species with a reniform rather than triangular aperture, co-occurring with *C. (C.) ludbrookii* during the Piacenzian.
4. *Cuvierina tubulata* Collins, 1934 is a junior subjective synonym of *C. (C.) astesana*.

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Dr Marco Taviani (Institute of Marine Sciences-CNR and Malacological Laboratory of the Museo di Zoologia di Bologna, Bologna, Italy) succeeded in tracing the holotype of *Dentalium ludbrookii* and critically read the manuscript. Dr Erminio Caprotti (Guanzate, Como, Italy) was kind enough to make specimens available and agreed to donate them to the Milano and Bologna museums. Dr Giorgio Teruzzi (Museo Civico di Storia Naturale, Milano, Italy) informed me about collections in his care and helped in locating Dr Caprotti. Mr Frank P. Wesselingh (Nationaal Natuurhistorisch Museum Naturalis, Leiden, The Netherlands) critically read the manuscript. Dr John W.M. Jagt (Venlo, The Netherlands), as always, improved the English.

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