

M. G. ANANTHA PADMANABHA SETTY

RAJIV NIGAM

*National Institute of Oceanography*

*Dona Paula, N.I.O. Post, Goa-403 004, India*

## EXCENTRICITY AND TWINNING IN VIRGULINELLA PERTUSA (REUSS)

In *Virgulinella pertusa*, one instance of bizarre growth of the last three chambers, another case of sudden spurt of development in the last three chambers and one case of abnormality in the chamber size and inflation were found. Moreover, a case of twinning was also observed and these have been reported giving illustrations.

Se ha observado, en *Virgulinella pertusa*, un caso de crecimiento caprichoso de las últimas tres cámaras, otro de brote imprevisto de las mismas, y otro de anomalía de tamaño e inflación de las cámaras. También se observó un caso de desdoblamiento. Se dan ilustraciones de tales casos.

*Virgulinella* was erected as a subgenus from *Virgulina* s.s. to accommodate two species *V. gunteri* (Cushman) and *V. pertusa* (Reuss) as these were characterised by very prominent arched sutural bridges alternating with the arched sutural openings at the base of the chamber walls (Todd and Brönnimann 1957). Further, these are mostly transparent and exceedingly fragile. Fig. 1 is a megalospheric form of *V. pertusa* in its normal growth and development.

*Virgulinella pertusa* is known from the Miocene of Europe (Germany, The Netherlands, and Italy); Africa (Algeria and Egypt); and Pliocene of Belgium and California (Loeblich and Tappan 1964). But *V. pertusa* is found to be present in the shelf sediments off Ratna-

giri (from stations at 24-37 m depth), Arabian Sea. A very small percentage of living specimens were also encountered at these stations. Some of the specimens were fresh, fragile and transparent, while some were filled with glauconite and stains of iron oxide, but a few were robust, opaque (porcellaneous) and thick walled. The faunal abundance was approximately 4 %.

Within this population, three cases of excentric growth and development were observed:

1. In one case, there was a sudden spurt of chamber development resulting in multiplication and bizarre growth of the last few chambers. These chambers terminated the

normal biserial character. The last three chambers being the largest, bubbled up as it were, and overflowed so as to overhang heavily on one side (Fig. 2).

2. In the second case, the taxon showed a normal biserial, twisted or sigmoid shape with chambers, the sizes and inflation of which gradually increased somewhat abnormally. But suddenly, the last three chambers enlarged disproportionately and became nearly 3-4 times larger in length than breadth. The aperture was normal but large and proportionate to the size of the last chamber. The oblique, loop shaped opening in the aperture was clearly visible through the opening of the broken chamber in the middle part of the specimen (see Fig. 3). The causative factor for this unnatural development in the increased size of the chambers is not very clear.

3. In a third case, another abnormality was observed wherein the large megalospheric proloculum was added by two chambers on either side nearly double its size and further four more unusually large-sized chambers were formed giving it a sigmoid appearance (Fig. 4).

All these specimens showed bridges and niches at the walls of lower chambers characterising the *V. pertusa* species.

Two large-sized megalospheric proloculii of *V. pertusa* during their embryonic stage somehow got fused and subsequently, each grew independently of the other in opposite directions approximately at an angle of 45°. This fusion resulted in the formation of a single specimen of two individuals giving rise to the phenomenon of 'Twining' (Fig. 5).

Aberrant features observed in foraminifera have frequently been reported earlier. A case of double apertures being present in *Uvigerina*; a case of twining in another *Uvigerina* sp.; the presence of two end chambers instead of one in *Siphonoperta* sp.; have been described earlier from the shelf sediments of Bay of Bengal (Setty and Almeida 1972). A case of *Uvigerina* sp. having double apertures in the

sediments of lower Eocene of Belgium was also reported (Willems 1974). A case of plastogamy in *Patellina corrugata* and cases of twining in *Planorbulina mediterranneansis*, *Siphogenerinoides plummarae* (in Glaessner 1948) and 'Trigonal' *Discocyclina* (Setty 1968) were also noted earlier.

The present authors therefore, consider that twining may be due to an accidental coalescence of two gametes just at the time of secreting their tests followed by normal growth leading to the formation of individuals which remained independent of each others. Presumably, excentricity is due to adaptation in the littoral habitat where rapid changes were occurring in the environmental conditions, the process of growth leading to a sudden spurt in the chamber development took place. However, it is difficult to isolate any one factor inducing such a formation.

#### ACKNOWLEDGEMENT

The authors are thankful to Drr. S. Z. Qasim, Director National Institute of Oceanography for going through the manuscript and to Shri V. M. Daté for his assistance in the preparation of figures.

#### REFERENCES

- GLAESSNER M. F.  
1948 *Life history and structure of the Foraminifera*, chapter 4 in *Principles of Micropaleontology*, Melbourne Univ. Press, pp. 55-62.
- LOEBLICH A. R., TAPPAN H.  
1964 *Family caucasinidae in Treatise on Invertebrate Paleontology, Part 2, Protista 2, Vol. 2*, pp. C 731-C 734.
- SETTY M. G. ANANTHA P.  
1968 "Trigonal" *Discocyclina* sp. from the Pondichery formation Pondichery, South India. *Geol. Soc. India Memoir No. 2*, pp. 130-135.
- SETTY M. G. ANANTHA P., ALMEIDA F.  
1972 *Some aberrant foraminifera from the shelf sediments of central east coast of India*. *Proc. II Indian Coll. Micropaleo. & Stratigr.*, pp. 103-106.

TODD R., BRÖNNIMANN P.

1957 *Recent foraminifera and the thecamoebina from the east Gulf of Paria*. Cushman Found. Foram. Res. Spl. Publ. 3. 43 pp.

WILLEMS W.

1974 *An aberrant Uvigerina from the lower Eocene of Belgium*. Micropaleontology, Vol. 20, No. 4, pp. 478-479.

*Manuscrito recibido el 13-IX-1979*



- 1: A typical specimen of *Virgulinitella pertusa* showing normal growth (X 160).
- 2: Bizarre growth of last few chambers (X 140).
- 3: Sudden spurt in the growth of last few chambers (X 140).
- 4: Abnormal growth and inflation throughout (X 210).
- 5: Twining due to coalescence of the megalospheric proloculii and growth into normal adults (X 160).