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A reevaluation of the lineage development of Pararotalia and Praepararotalia including new material from the Rupelian of the southern Upper Rhine Graben

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The lineage of the benthic Foraminifera Praepararotalia and Pararotalia has a known record since the Late Cretaceous to recent. Showing a wide range of morphologic variations, the most recent thorough generic definition of Pararotalia is heavily based on internal structures (e.g., HOTTINGER et al. 1991). Thus many of the older, not revised species are still assigned to Pararotalia by means of visible external structures.
This applies also to the genus Praepararotalia (Cretaceous to Late Eocene), erected by LIU et al. (1998) as a "simple" predecessor-taxon with generally round, smooth to pustulated chambers of slowly increasing diameter, very low to flat spiral side and small overall size. Wall texture and aperture are identical in both genera. According to LIU et al. (1998) Pararotalia s.str. is characterized by a general size increase, planoconvex test, the development of peripheral pseudospines, keel and increasingly conical chambers ("angular" habitus) as well as a distinct umbilical sutures and plug. Pararotalia macneilli (Danian) and P. ishamae (Thanetian) are considered to represent linking species, the main difference being the initial development of an umbilical plug. The separation of the two genera took place in the Late Cretaceous or Earliest Paleogene, with Praepararotalia cretacea being the ancestral species (LIU et al. 1998).
We present here a reevaluation of the morphogroups based on material from the Rupelian of the southern Upper Rhine Graben and the analysis of the record of reported species from literature. Four different groups can be separated in terms of external morphology.
The first group represents the Praepararotalia-habitus of small size. New material from the Rupelian of the southern Upper Rhine Graben may be attributed to this group. It differs in a higher number of chambers in the last whorl and total chamber numbers (5-6 vs. 6-7, 11-16 vs. up to 22), a much larger size (up to 500μm) and a higher trochospire. Some specimens show a more rapid increase of chamber size. The necessity of a new genus is in discussion.
The second group includes the small intermediate species as Pararotalia ishamae, characterized by inflated globular chambers, a general absence of a keel, partial development of small pseudospines and umbilical plugs. This group can be traced up to recent, as is indicated by the occurrence of small sized Pararotalia cananeiaensis (DEBENAY et al. 2001). Material from the research area (PIRKENSEER 2007), though of generally larger size is attributed to the Rupelian P. curryi. It however shows variation in the development of pseudospines, the lateral profile and umbilicus. The latter species may be a synonym of the similar Late Eocene P. parva.
The third group consists only of Pararotalia spinigera (Lutetian) and Pararotalia canui (Rupelian) with an inflated angular lateral profile and a relatively large size. Material from the research area attributed to P. canui shows massive well-developed peripheral pseudospines, a strong umbilical plug and a rounded keel. Double pseudospines occur sporadically. The apertural lip is heavily toothed.
The fourth group consists of species with a very angular lateral profile, conical chambers, distinct umbilical plug and a moderate to very large size (up to 600μm), ranging from the Thanetian (Pararotalia minimalis) at least to the Pliocene (P. padana, MANCIN et al. 2000).
This reevaluation indicates the perseverance of the "primitive" group of Pararotalia macneilli until today. It thus contradicts a gradual development of the genus Pararotalia to more spineous, angular and larger forms. The latter morphogroup exists well defined since the Paleocene with representatives throughout the Paleogene and Neogene.

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