

LEVEL OF ORGANIZATION AND PHYLOGENY: A CASE FOR KEEPING THE CURRENT CLASSIFICATION OF THE FORAMINIFERIDA

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Higher level taxonomy is not set in stone, indeed it is an artificial construct developed to facilitate the investigation of various taxa. The current tools of phylogenetic analysis provide logical guidelines within which taxa can be classified.

Recently, there have been recommendations in the literature to elevate the Order Foraminifera to Class level. The primary reasons for such a change have been based upon the apparent importance and overall size of the group (more than 60,000 fossil and 4,000 extant species in 12 suborders). The arguments for elevation to Class stem from the idea that the grade of organization is the most important aspect of a group's hierarchical classification. However, modern classification relies most heavily on the degree of similarity in shared derived characters, or clade, rather than the "importance" or grade of a group of organisms.

The question of clade versus grade may be addressed in two different arenas. The first, is in the fossil record. The level of difference between the foraminifera and other fossil protists, such as the siliceous microplankton, calcareous nannoplankton, or radiolaria is great. Using the degree of sophistication available in the fossil record to determine the level of difference between fossil protists, an argument can be made for elevation of the foraminifera to Class status. Fortunately, the foraminifera and most other test producing protists are represented by extant members. There are also similar extant taxa, with which they can be compared, that do not possess fossilizable tests. The biology of these groups has been studied, obtaining a more cogent level of understanding of their relatedness.

Analysis of the biology of the foraminifera shows them to be members of the Class Granuloreticulosea, which is a monophyletic group within the Phylum Sarcomastigophora. This phylum also contains the Filosea (e.g. *Gromia*), Lobosea (e.g. *Amoeba*), and Polycystinea (eg. radiolaria), as well as other less well known members. Elevating the foraminifera to class status would alter the entire classification scheme for the Sarcomastigophora, creating paraphyletic groupings.

An example of a problem stemming from paraphyly in another group of organisms is found in the Classes Aves and Reptilia. Included in the reptiles are two groups, the Dinosauria and the Crocodylia, with shared characteristics similar to those found in the birds. Cladistically, an argument can be made to place Aves as an Order within the Reptilia, rather than having the birds judged by grade, and be left as a Class. Currently, Reptilia is a paraphyletic grouping without Aves. Due to the burden of history of the classification of the birds, however, reclassifying them as an Order is not practical. But the foraminifera are currently classed at the Ordinal level, and should remain there. Using the criteria of modern systematics, the current hierarchical classification scheme for the Sarcomastigophora, specifically the Foraminifera is certainly adequate.