

## TAXONOMIC REMARKS ON *SIDEROLITES JURASSICA* YOUSSEF & EL-SOROgy, 2015, CALLOVIAN OF SAUDI-ARABIA

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**Abstract** The increasing availability of numerous journals with limited peer review and editorial standards has led to an ever-increasing introduction of new fossil taxa that ultimately need taxonomic revision. The introduction of dubious and poorly described taxa adds confusion to the scientific literature. Furthermore, their potential inclusion in global taxonomic databases, and the subsequent usage of this data in review papers necessitates critical comment and thoughtful clarification. The recent introduction of *Siderolites jurassica* Youssef & El-Sorogy is a good example of a taxon that is both poorly described and which clouds the literature, thus requiring revision. This species was described and illustrated from just one isolated specimen obtained from Callovian marls in Saudi Arabia. *Siderolites* represents an exclusively Upper Cretaceous (Campanian-Maastrichtian) complex rotaloid Large Benthic Foraminifera with a distinctive identity that can be clearly deciphered by studying oriented and random thin-sections. A Jurassic occurrence would overturn our current understanding of foraminiferal evolution as well as their usage for biostratigraphic analyses. It is suspected that the Middle Jurassic specimen described from Saudi Arabia belongs to a small-sized group of arenaceous benthic foraminifera exhibiting conical protuberances (or spines) such as *Thurammina* Brady and should neither be regarded as belonging to the genus *Siderolites* nor any other siderolitid representative.

**Keywords:** Foraminifera, taxonomy, phylogeny, Jurassic, Cretaceous.

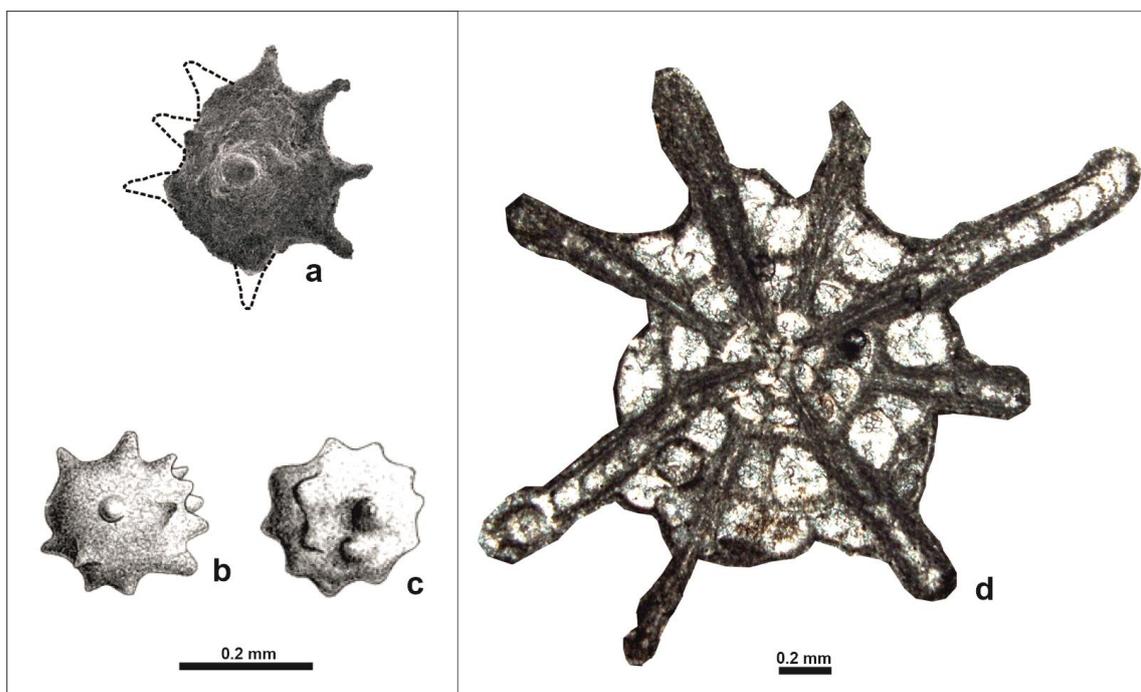
### INTRODUCTION

As (micro)palaeontological research progresses, it is inevitable that new taxa are identified and described. Some will be valid, being both well-described, researched, and sufficiently distinctive from pre-existing taxa. Others will be poorly described and published without sufficient research into their likely identity. For benthic foraminifera, descriptions should adhere to the International Code of Zoological Nomenclature (ICZN). To ensure that best practice has been followed in erecting a new taxon, it is essential that a review is undertaken by an appropriate expert. This requires that a journal editor seeks adequate reviews. In the case that the editor is not specialist in the field concerned, the recommendations of the reviewers should be followed or a third opinion in controversial cases be provided. Even if all pre-publication requirements are fulfilled, specialists may still have different views on the taxonomic interpretation or the rank of any feature (e.g., specific or generic). It is only natural that this happens, but if possible, care should be taken to ensure that taxa are not introduced that are in complete contradiction of accepted evolutionary concepts. Today, newly established taxa are included in a variety of online data bases that can be freely accessed and used by subsequent workers, e.g., for a review paper or general statistical analyses. Examples are the World Register of Marine Species ([www.marinespecies.org](http://www.marinespecies.org)) WoRMS, the Encyclopedia of Life ([www.eol.org](http://www.eol.org)), or the Global Biodiversity Information Facility ([www.gnif.org](http://www.gnif.org)). The entry of new inadequately classified or described taxa in these data bases has become facilitated by an increasing number of (often open access) journals without any, or no adequate peer-reviews. Such entries devalue the databases and are

simply misleading to early career researchers developing their understanding of a given taxonomic group of (micro)fossil. Here, a recent example of potential confusion is presented by *Siderolites jurassica* described by Youssef & El-Sorogy (2015) from the Callovian of Saudi Arabia.

### TAXONOMIC REMARKS ON *SIDEROLITES JURASSICA* YOUSSEF & EL-SOROgy, 2015

Here reference is made to the following paper: Youssef, M. & El-Sorogy, A.S., 2015. Paleocology of benthic foraminifera in coral reefs recorded in the Jurassic Tuwaiq Mountain Formation of the Khashm Al-Qaddiyah Area, Central Saudi Arabia. *Journal of Earth Science*, vol. 26, number 2, 224-235 (printed in China). Referring to the acknowledgements therein, no reviewers have been thanked, thus suspecting the lack of any review. The foraminifera *Siderolites jurassica* was described from marls of the Callovian Tuwaiq Mountain Limestone Formation at the Khashm Al Giddiyah section. The new species was illustrated with a single isolated specimen (Fig. 1a). As no holotype was designated, this specimen should then represent its type (see articles 73.1.1 and 73.1.2 ICZN). The following description was provided for *S. jurassica*: "Test globular, with 8 round spines. Sides of the test rounded. Test covered by coarse pustules especially in the central area. Chambers and sutures are not visible from the outside. Spines commonly present in one plane around the periphery, and with longitudinal ribs. The central area is large. Diameter: including spines up to 0.34 mm". For comparison it was remarked that



**Fig. 1 a**, *Siderolites jurassica*, Callovian of Saudi-Arabia (from Youssef & El-Sorogy (2015, Fig. 4). **b-c**, Variety of *Thurammia papillata* Brady, Middle Jurassic of Germany (from Häusler, 1883, pl. 8, figs. 25, and 4). These illustrations are for comparative purposes only and do not necessarily imply a taxonomic identity. **d**, Siderolitid *Canalispirina iapygia* Robles-Salcedo et al. showing eight spines, late Maastrichtian Tarbur Formation of Iran (note the different scales).

“this species is more or less rounded than *Siderolites laevigatus* (d’Orbigny) and *Siderolites calcitrapoides* Lamarck”. *Siderolites* Lamarck, 1801 represents an exclusively Upper Cretaceous (late Campanian-Maastrichtian) complex Large Benthic Foraminifera with taxonomic features in the internal shell best observable in thin-sections (Wannier, 1983; Robles-Salcedo, 2014: fig. 8.1; Robles-Salcedo et al., 2018). According to Robles Salcedo et al. (2018), siderolitids inhabited shallow waters of tropical to subtropical platforms with moderate-to-high water energy conditions. Siderolitids are a group of bilamellar perforate foraminifera within the superfamily Rotaloidea Ehrenberg, 1839 whose oldest representatives are Coniacian (Loeblich and Tappan, 1987: p. 652). Therefore, the occurrence of *Siderolites* in the Jurassic would overturn any stratigraphic distribution scheme of larger benthic foraminifera established so far. As internal features (e.g., wall structure) are not accessible in the isolated specimen of “*Siderolites jurassica*” presented by Youssef & El-Sorogy (2015) we can only remark that the maximum observed diameter including the spines of up to 0.34 mm, a measurement much too small for any siderolitid: type-species *S. calcitrapoides* Lamarck, 1801 = 2.11 mm to 3.0 mm, *Siderolites praecalcatrapoides* Neumann, 1986 = 0.94 mm to 1.4 mm, and *S. denticulatus* Douvillé, 1907 = 1.9 mm to 3.4 mm (Robles-Salcedo, 2014). It is herein suspected that the Middle Jurassic specimen might belong to small-sized arenaceous benthic foraminifera exhibiting conical protuberances (or spines) such as *Thurammia* Brady, 1879 (Fig. 1b-c) and should not be regarded as belonging to the genus *Siderolites*.

Representatives of *Thurammia* instead have a well-established record through the Middle-Upper Jurassic (Häusler, 1883; Riegraf, 1988; Reolíd et al., 2008; Nagy et al., 2009), although generally from deeper water settings. They may be associated with Jurassic sponge reefs (see Guilbault et al., 2006) or partly living in the sediment surface (Nagy, 1992). For Recent representatives, Brady (1879, p. 46) indicated test diameters of 0.25 mm to 0.5 mm, which is curiously exactly within the range of test diameter of “*Siderolites jurassica*”. Another difference refers to the protuberances of the Middle Jurassic “*Siderolites jurassica*” and the spines of late Cretaceous (Maastrichtian) *Siderolites*. The short conical protuberances of *Thurammia* arise from the surface as external ornamentation and are irregularly distributed (Fig. 1a-c) whereas in *Siderolites* they are much longer, arising near the embryo and are located at the equatorial (or coiling) plane (e.g., Robles-Salcedo, 2014) (Fig. 1d). Finally, it is also worth mentioning that also other determinations provided by Youssef & El-Sorogy (2015) are highly likely to be incorrect, such as the occurrence of *Pfenderina neo-comiensis* (Pfender) in Callovian strata.

## CONCLUSIONS

The discovery of a new species of *Siderolites* from the Jurassic of Saudi Arabia (Youssef & El-Sorogy, 2015) is thought to be mistaken on the basis of incompatible (limited) description since it strongly challenges well established concepts of foraminiferal evolution. More research is needed, but it may well be a species of agglutinated

foraminifera such as *Thaurammia*. This case highlights the necessity for publication of new taxa only after adequate editorial and peer review that would enforce taxonomic rigour.

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