

First record of discinid brachiopods from Late Jurassic Plattenkalk deposits of southern Germany

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Introduction

The Kimmeridgian and Tithonian Plattenkalk deposits of southern Germany (e.g., Solnhofen, Eichstätt, Pfalzpaint, Painten, Brunn, Wattendorf) are famous for their diverse and exceptionally preserved fauna and flora. So far, there are around 1,800 species, mostly macrofossils, reported from these strata. However, with the help of non-applied or hitherto unused micropalaeontological methods, new (or so far unrecorded) species or groups can be detected.

In the present study we report the first find of organophosphatic-shelled brachiopods (Linguliformea: Discinoidea) from the Late Jurassic Plattenkalk deposits of southern Germany.

Fossil and modern Discinida

Linguliform brachiopods were major components of marine assemblages from the Early Cambrian onwards, but their evolution and palaeogeography during the Jurassic–Cretaceous is poorly understood, as a result of a sparse fossil record.

Discinid brachiopods are epifaunal, fixo-sessile invertebrates, common in some Recent environments (intertidal) and attached by a highly muscular pedicle to various hard substrates. The discinid pedicle acts as an anchor, and it supports the weight of the shell and holds it in relative position to the substratum (Fig. A), a feature that discinids share with craniids and articulate thecideid brachiopods. Modern discinids (solitary or known in clusters; Fig. B) have a cryptic mode of life on the underside of pebbles or attached to larger boulders embedded in soft substrate.

In the fossil record (since the Ordovician), discinids are also known attached to articulate brachiopods, bivalves, cephalopods, and conulariids.

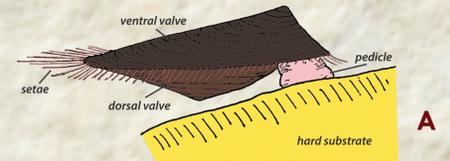


Fig. A: The Recent *Disciniscia lamellosa* in natural position (from Morse 1902, modified).



Fig. B: The Recent *Disciniscia lamellosa* (Broderip, 1833) – Pacific Ocean, intertidal, Gulf of Panama. (1) Dorsal valve in outer (a), inner (b), and lateral (c) view; (2) Ventral valve in outer (a), inner (b), and lateral view (LM). Please note the muscle scars and the mantle canal system in 1b+2b.

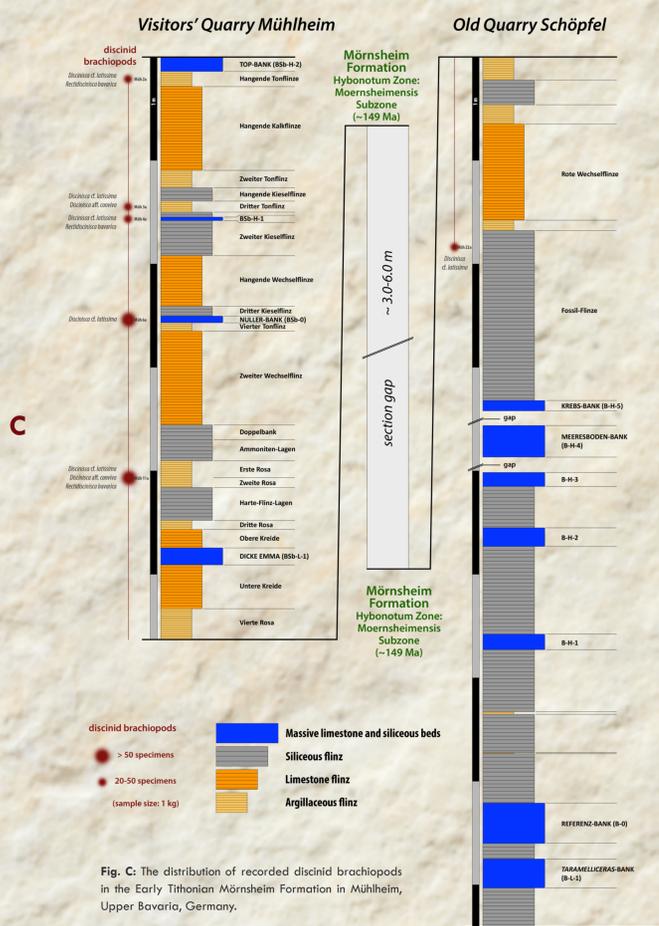


Fig. C: The distribution of recorded discinid brachiopods in the Early Tithonian Mörnsheim Formation in Mühlheim, Upper Bavaria, Germany.

Importance of the material

As already stated this is the first record of organophosphatic-shelled brachiopods from Late Jurassic Plattenkalk deposits of southern Germany. Summarized, our data reveal a linguliform brachiopod diversity hitherto unknown from Jurassic Plattenkalk Lagerstätten. The new recorded data will help to develop a more detailed palaeobiodiversity as well as palaeoecological interpretation of Late Jurassic Plattenkalk deposits in southern Germany. The discovery of a diverse discinid brachiopod fauna offers in part new insight into palaeoenvironmental patterns and former benthic habitats of the Late Jurassic Solnhofen Archipelago. The applied micropalaeontological methods in isolating microscopic/mesoscopic invertebrates is seen to be promising for the study of neglected or overlooked fossils in general.

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Disciniscia cf. latissima (Sowerby, 1816)

Originally described from Kimmeridgian (and Oxfordian) strata of the U.K. Modern revision (including types) is needed. Very common in the Early Tithonian section of Mühlheim, Upper Bavaria, Germany.

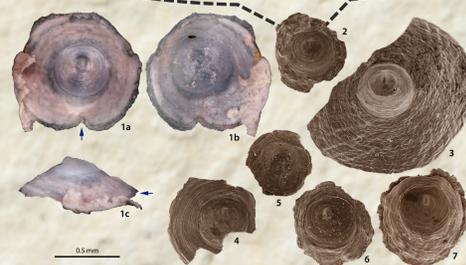


Fig. D: *Disciniscia cf. latissima*. (1) Complete dorsal valve in outer (a), inner (b), and lateral view (LM); (2) Incomplete dorsal valve in outer view (SEM) [both from Müh 6a]; (3) Large dorsal valve in outer view, showing the well preserved protegulum and brephic shell (SEM) [from Müh 22a]; (4) Incomplete dorsal valve in outer view (SEM) [from Müh 6a]; (5) Incomplete dorsal valve in inner view (SEM) [from Müh 3a]; (6-7) Incomplete dorsal valves in outer view (SEM) [both from Müh 11 a].

Disciniscia aff. conviva Gerassimov, 1955

Originally (but poorly) described from Early Tithonian strata of central Russia (Yaroslavl Oblast). Rare in strata of the Early Tithonian section of Mühlheim, Upper Bavaria, Germany.

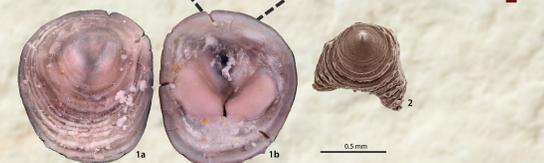


Fig. E: *Disciniscia aff. conviva*. (1) Complete dorsal valve in outer (a), and inner (b) view (LM). Please note the solid muscle scars [from Müh 11 a]; (2) Incomplete dorsal valve in outer view (SEM) [from Müh 3a].

“*Patella lithographica* Schlosser, 1881” = *Disciniscia lithographica* (Schlosser, 1881) = nomen dubium

Originally described by Max Schlosser as a limpet from the “Mörnsheim beds” near Solnhofen. Most probably synonymous with the common *Disciniscia cf. latissima* (Sowerby, 1816) figured above; the only specimen and holotype is incomplete with the shell missing in large parts (housed at the SNSB-BSPG Munich).



Fig. F: *Disciniscia lithographica*. (1) Incomplete type specimen; (2) original drawings, and corresponding labels.

Rectidisciniscia bavarica gen. et sp. nov.

Shows morphological characters of both related genera, *Disciniscia* and *Discradisca*, but is unique among Discinidae. Common in some strata of the Early Tithonian section of Mühlheim, Upper Bavaria, Germany.

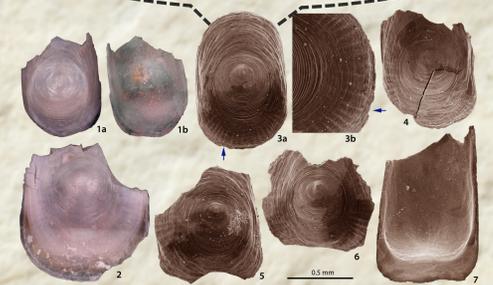


Fig. G: The new *Rectidisciniscia bavarica*. (1) Broken dorsal valve in outer (a), and inner (b) view (LM); (2) Incomplete dorsal valve in outer view (LM) [both from Müh 11 a]; (3) Complete dorsal valve in outer (a) view, showing the special surface ornamentation (enlargement in b) (SEM) [from Müh 4a]; (4-6) Incomplete dorsal valves in outer view (SEM) [from Müh 2a+4a]; (7) Broken dorsal valve in inner view (SEM) [from Müh 4a].

Results

Discinid brachiopod shells (especially ventral valves) are generally rare in the Mesozoic/Cenozoic fossil record, therefore they have often been taken to indicate a low preservational potential. The here presented organophosphatic brachiopod material is based on >100 (microscopic/mesoscopic) isolated valves (rock disintegration by using buffered acetic acid) from the Early Tithonian Mörnsheim Formation (Hybonotum Zone: Moernsheimensis Subzone, ~149 Ma; Fig. C) of two sections in Mühlheim near Solnhofen, Upper Bavaria, Germany.

Three species of the Discinidae (Figs. D-G) can be identified from our strata, including a new genus and species (related to *Disciniscia* and *Discradisca*). In addition, we documented the associated macro-, meso-, and micro-fauna (Reich et al. in prep.) of the studied sections. All recorded discinid brachiopods are associated with sponges (Hexactinellida, Demospongiae), bivalves and other invertebrates and microfossils.