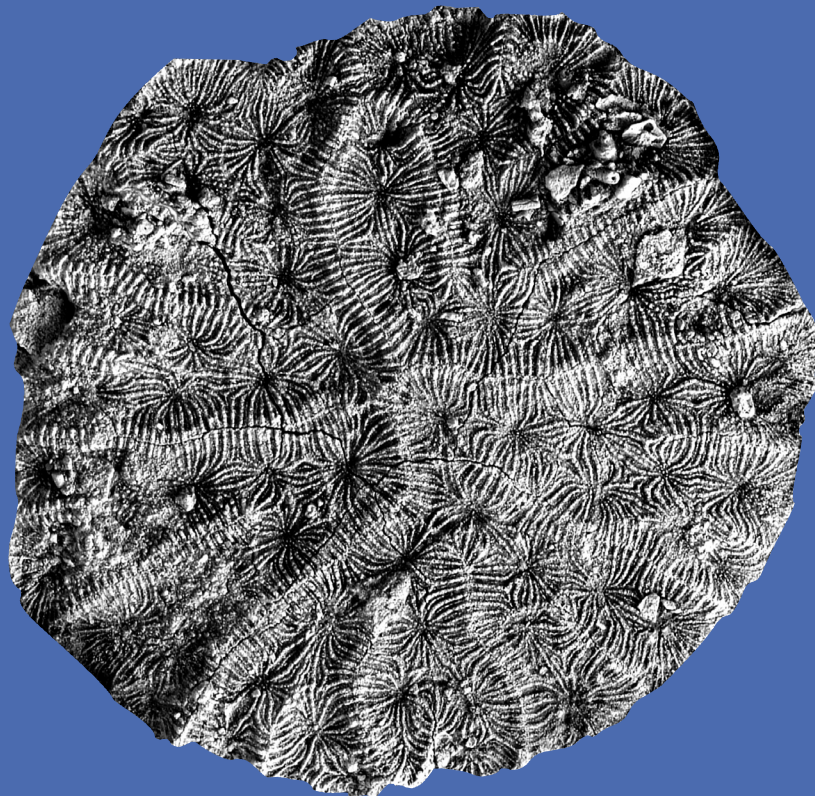


# Zitteliana

An International Journal  
of Palaeontology and Geobiology

Series A/Reihe A  
Mitteilungen der Bayerischen Staatssammlung  
für Paläontologie und Geologie

46



München 2006

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ISSN 1612-412X

Druck: Gebr. Geiselberger GmbH, Altötting

**Cover Illustration:** Coral *Collignonastraea meandra* (D'ORBIGNY, 1850) from the Toarcian (Lower Jurassic) of the Kuh-e-Shisui area (Iran); PIW2004III 40. For details see PANDEY & FÜRSICH: Jurassic corals from the Shemshak Formation of the Alborz Mountains, Iran, pp. 41-74 in this issue.

**Umschlagbild:** Koralle *Collignonastraea meandra* (D'ORBIGNY, 1850) aus dem Toarcium (Unterjura) der Gegend um Kuh-e-Shisui (Iran); PIW2004III 40. Für weitere Informationen siehe PANDEY & FÜRSICH: Jurassic corals from the Shemshak Formation of the Alborz Mountains, Iran, S. 41–74 in diesem Heft.

Zitteliana	A46	85-89	3 Figs	München, 31.12.2006	ISSN 1612-412X
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# The first cycloid arthropod from the Late Jurassic

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Manuscript received August 15, 2006; revision accepted September 20, 2006.

## Abstract

An unequivocal specimen of a cycloid arthropod is reported from a sponge-microbial mound of the Upper Jurassic Massenkalk Formation (upper Kimmeridgian) from Örlinger Tal near Ulm (SE Swabian Alb, Germany). The specimen was briefly described by QUENSTEDT in the 19<sup>th</sup> century, but overlooked in all later studies of cycloids. A new genus and species, *Stagmacaris quenstedtii*, is erected. It links the recently described records of Mesozoic cycloids between the Early Jurassic and the latest Cretaceous. The genus *Stagma* v. MEYER, 1865, to which the holotype of *S. quenstedtii* has originally been assigned, must be considered a *nomen dubium*.

**Key words:** cycloid, arthropods, sponge-microbial mounds, Jurassic, SW Germany

## Kurzfassung

Aus einem Schwamm-Mikroben-Bioherm der oberjurassischen Massenkalk-Formation (Ober-Kimmeridgium) vom Örlinger Tal nahe Ulm (SE Schwäbische Alb, Deutschland) wird ein unzweifelhafter Cyclide beschrieben. Das Exemplar war bereits im 19. Jahrhundert von QUENSTEDT kurz vorgestellt worden, wurde jedoch in allen späteren Arbeiten über Cycliden übersehen. Eine neue Gattung und Art, *Stagmacaris quenstedtii*, wird dafür eingeführt. Sie vermittelt zwischen den kürzlich nachgewiesenen mesozoischen Cycliden des Unterjura und der jüngsten Kreide. Die Gattung *Stagma* v. MEYER, 1865, zu der der Holotypus ursprünglich gerechnet worden ist, muss als *nomen dubium* angesehen werden.

**Schlüsselwörter:** Cycliden, Arthropoden, Schwamm-Mikroben-Bioherme, Jura, SW-Deutschland

## 1. Introduction

The cycloids are an enigmatic group of arthropods mostly known only by their carapaces resembling small crabs. One of the best known cycloids is the genus *Halycine* v. MEYER,

1844, first described from the Middle Triassic of southwestern Germany (v. MEYER 1838, 1844, 1847). The appendages have been reported from few taxa, especially *Halycine* (GALL & GRAUVOGEL 1967; SCHRAM et al. 1997; GALL & GRAUVOGEL-STAMM 1999; BRAMBILLA et al. 2002; PASINI & GARASSINO 2003), but some important features are still incompletely known due to the mostly poor and incomplete preservation. Therefore the systematic position of cycloids within arthropods is not yet resolved. Recently, SCHRAM et al. (1997) pointed out that a cladistic analysis suggested the nearest living relatives of cycloids seem to be the copepods.

For a long time the known fossil record of cycloids ended in the Late Triassic and it was assumed that they became extinct at the Triassic/Jurassic boundary. Then, however, several specimens were described from the Maastrichtian of the Netherlands, all belonging to a single genus and species, *Maastrichtiocaris rostratus* FRAAIJE, SCHRAM & VONK, 2003. Subsequently, a cycloid from the Early Jurassic was described from the Lower Jurassic Posidonienschiefer Formation ('Posidonia Shale') of southern Germany that is the second recognized post-Triassic record (SCHWEIGERT 2007, in press). However, in the mid 19<sup>th</sup> century, QUENSTEDT (1857) reported a minute problematic crustacean from the Upper Jurassic of southern Germany. Later, QUENSTEDT (1883) tentatively assigned the same specimen to '*Stagma ovale*', a taxon erected by v. MEYER (1865). It is interesting to note that QUENSTEDT compared this specimen with the Late Permian cycloid *Hemitrochiscus paradoxus* v. SCHAUROTH, 1854, but his reference was obviously forgotten since then, probably because the illustration of the specimen was too small and misleading, and not accompanied by a detailed description. Also, the genus *Stagma* v. MEYER, 1865, remained doubtful. In this study both the unique specimen reported by QUENSTEDT and the poorly known genus *Stagma* are discussed.

## 2. Provenance of material

In the 19<sup>th</sup> century the fossil site "Örlinger Thal" in eastern Swabia was famous for its rich invertebrate faunas, especially crinoids, echinoids and crustaceans. It was located a few kilometres north of the town of Ulm along a railway cutting (Fig. 1), but by the beginning of the 20<sup>th</sup> century this locality

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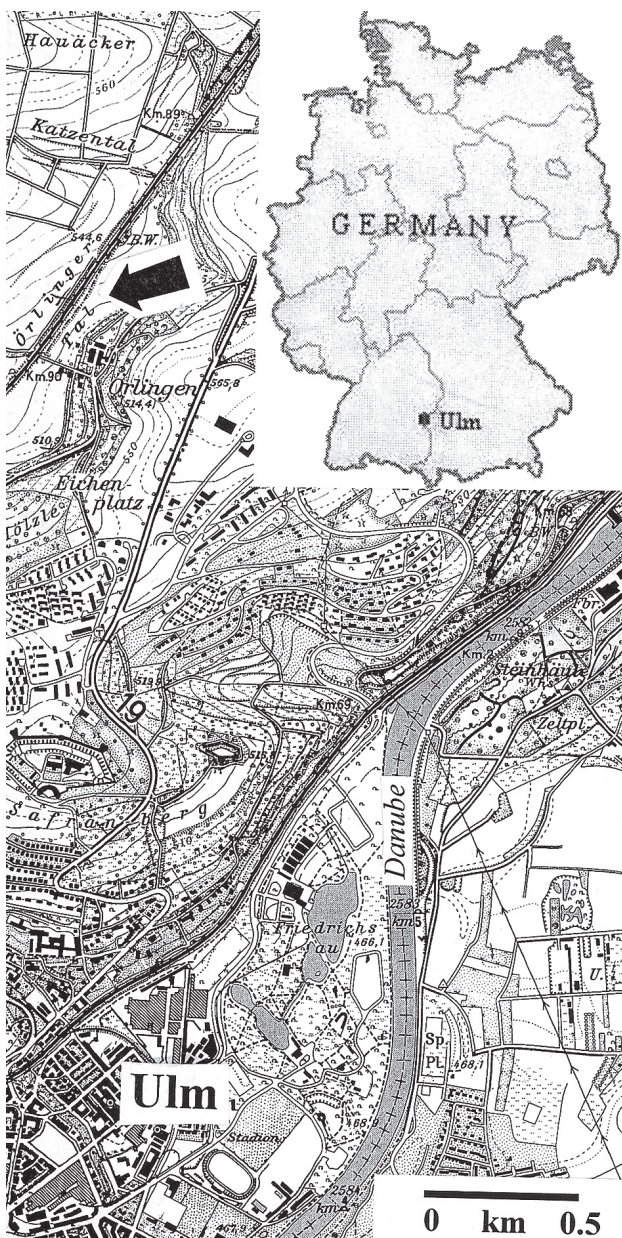


Figure 1: Provenience of the studied specimen in the Upper Jurassic of SW Germany (arrow).

was no longer accessible (ENGEL 1908: 451). In the middle of the 19<sup>th</sup> century, the massive sponge-microbial limestones (= Massenkalk Formation of modern usage) outcropping along this railway cutting were strongly exploited for fossils by numerous fossil traders and amateur palaeontologists, among them the pharmacist August WETZLER. The latter sent some of his material to Hermann v. MEYER, a German authority in palaeontology, for determination and description. In the context of studies of small brachyurans, especially prosopids and galatheids, this locality was said to be one of the richest in the Upper Jurassic of southern Germany (v. MEYER 1857, 1860, 1865; BEURLEN 1925; WEHNER 1988; MÜLLER et al. 2000). The lithology formerly exposed at “Örlinger Thal” (modern spelling “Örlinger Tal”) consists of a pure yellowish massive

sponge microbial limestone; adjacent are more marly bedded layers very rich in echinoderm debris. The described cycloid comes from the more massive centre of the sponge-microbial mound according to the pelletoidal lithology of the small slab in which it is contained.

### 3. Systematic palaeontology

Class Maxillipoda DAHL, 1956

Subclass Halicyna GALL & GRAUVOGEL, 1967

Superfamily Cycloidea GLAESSNER, 1928

Family Cyclidae PACKARD, 1885

Genus *Stagmacaris* n. gen.

Type species: *Stagmacaris quenstedtii* n. sp.

Etymology: After Greek *stagma* = drop, referring to v. MEYER'S taxon used by QUENSTEDT, and Greek *caris* = crustacean.

Diagnosis: See diagnosis of type species.

Included species: Monotypic.

*Stagmacaris quenstedtii* n. sp.

Figs 2–3

v 1857 Problematicum. – QUENSTEDT: 779, pl. 95, fig. 52.

v 1883 *Stagma ovale*. – QUENSTEDT: 403, pl. 31, fig. 24.

Holotype: Specimen illustrated in Fig. 3 (= QUENSTEDT 1857, pl. 95, fig. 52 and QUENSTEDT 1883: pl. 31, fig. 24), housed in the collection of the Institut für Geowissenschaften der Universität Tübingen (IGT, QUENSTEDT collection, without number).

Etymology: After the palaeontologist Friedrich August QUENSTEDT (1809–1889) who was the first to illustrate the holotype of this taxon.

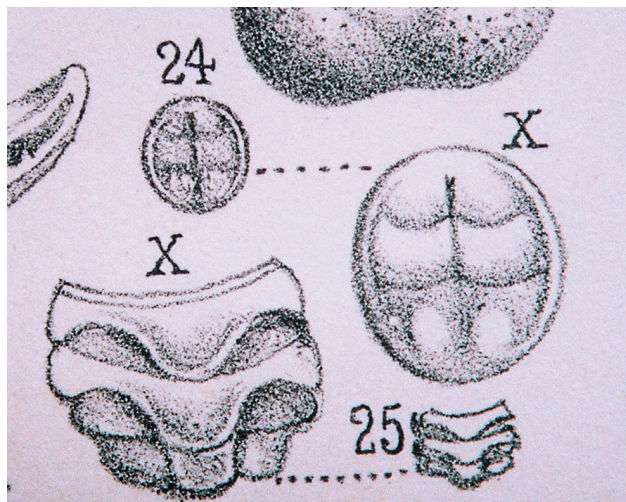
Type locality: Railway cutting in the “Örlinger Tal” N Ulm (Fig. 1; SE Swabian Alb, SW Germany).

Type horizon: “Weißer Jura Epsilon” after QUENSTEDT (1857); sponge-microbial mound of the Massenkalk Formation (late Kimmeridgian, Beckeri Zone, Ulmense Subzone).

Diagnosis: Cycloid of minute size; carapace oval, bordered with (sub-)vertical marginal shelf; distinct median furrow developed in anterior part of the carapace; frontal rostrum absent.

Description: Carapace small, oval in outline, little longer than wide. Maximum width in the anterior third of the carapace. Carapace shield laterally bordered by a vertical, moderately broad shelf. Surface poorly preserved in white, chalky calcite, in some parts of the outer margin ornamented with papillae; smooth surface of shield is most likely a preservation artefact. Lateral shelf with accentuated angular edge, except from terminal part where the shelf edge is rounded. Frontal part of carapace laterally bordered by a short notch on each





**Figure 2:** *Stgmacaris quenstedtii* n. g. n. sp.; original poor and misleading drawing from QUENSTEDT 1883: pl. 31, fig. 24, “*Stagma ovale* v. MEYER”, enlarged without scale.

side. No ocular incisions developed. Rostrum absent. Distinct median furrow in anterior part of the carapace, abruptly ending before reaching the frontal margin, and posteriorly fading out. Median furrow laterally bordered by anterior and posterior pairs of bulges (termed post-optic and cardiac bulges by FRAAIJE et al. 2003). Anterior bulges larger than posterior bulges, both pairs of bulges separated from each other by a shallow groove, which meets the lateral notch. Posterior bulges fused with neighbouring parts of the shield. Appendages not preserved. On the right side of the holotype, the carapace shows a transversal fracture.

Measurements: Length: 4.7 mm; width: 4.1 mm, height of marginal shelf ca. 0.8 mm.

Comparisons: Apart from the absence of a rostrum, *Stgmacaris quenstedtii* n. sp. is very close to *Maastrichtiocaris rostratus* FRAAIJE, SCHRAM & VONK, 2003, from the Late Cretaceous, especially with respect to the subvertical marginal shelf of the carapace and the development of two pairs of bulges. Most likely they have also a papillate ornamentation of the shell in common, but the outer surface of the shell is almost abraded in the holotype of *S. quenstedtii*. In cycloid taxa assigned to Hemitrochiscidae the carapace is always helmet-shaped or ovoid, without a distinct outer margin, and lacking any bulges and notches in the anterior part of the carapace (see GLAESSNER 1969). The other Jurassic species mentioned above (SCHWEIGERT 2007) is much closer to *Halycine*. It differs from *Stgmacaris* e.g. in a blunt rostrum present, laterally surrounded by deep optic notches, and two longitudinal furrows running parallel on the posterior part of the carapace. Moreover, in the species from the Toarcian the carapace exhibits papillose ornamentation, and no angular edge of the shelf is developed.

#### 4. Remarks on the genus *Stagma* v. MEYER, 1865

In a published written communication with H.B. GEINITZ, who was one of the editors of the journal “Neues Jahrbuch



**Figure 3:** *Stgmacaris quenstedtii* n. g. n. sp., holotype (= specimen figured by QUENSTEDT 1857: pl. 95, fig. 52); Massenkalk Formation, late Kimmeridgian, Beckeri Zone, Ulmense Subzone; Örlinger Tal near Ulm (SW Germany); IGT, QUENSTEDT collection, without number. – x 10.

für Geologie, Mineralogie und Palaeontologie”, v. MEYER (1865: 220) mentioned that August WETZLER, a pharmacist and amateur palaeontologist from southern Germany, had sent him several new specimens of crustaceans from the two localities at “Örlinger Thal” near Ulm and Aufhausen near the town of Geislingen an der Steige. Based on these finds he erected a new genus *Stagma*, with two species included, i.e. *S. gracile* and *S. ovale*, both accompanied by a brief description. However, illustrations of the new species were not provided and a type species of this genus was not nominated. Maybe his death in 1869 prevented him from giving more detailed descriptions and illustrations. Later QUENSTEDT (1883) interpreted the herein described cycloid to be probably conspecific with one of v. MEYER’s taxa, *S. ovale*. However, apart from their minute sizes, the descriptions of *S. ovale* or *S. gracile* hardly support such an interpretation. VON MEYER noted a superficial resemblance of *Stagma* with the modern crab genus *Cancer*, although the carapaces of the fossil forms are much smaller. He also mentioned the presence of six short, indistinct incisions along the frontal part of the carapace, but did not report the presence of a subvertical marginal shelf nor refer to the illustration of QUENSTEDT’s specimen (QUENSTEDT 1857: pl. 95, fig. 52). Unfortunately, the type specimens of the two taxa from WETZLER’s collection seem to be lost. The type specimens of *S. ovale* were already untraceable in the Munich collection at the beginning of the 20<sup>th</sup> century when the genus *Stagma* was briefly restudied by HAIZMANN (1902). HAIZMANN cited and commented on the original descriptions of *Stagma* by v. MEYER and he figured two specimens of *S. gracile* which belonged to the syntypes. These specimens are now also untraceable and must be considered as being lost. Most likely they were destroyed in Munich during World War II (DEHM 1984). The poor drawings given by HAIZMANN (1902) do not allow a closer

interpretation of these crustaceans. BEURLEN (1925, 1928, 1929) and GLAESSNER (1933) gave overviews on the fossil record and phylogeny of early crabs, but they neither mentioned nor discussed *Stagma*. Only GLAESSNER (1929) listed the two species – with the genus name in brackets, indicating that it was probably invalid – and a specimen figured by HAIZMANN (1902) in open nomenclature (the latter is today untraceable in the Tübingen collection), but he gave no further comments. Any reference to the specimen figured by QUENSTEDT (1857, 1883) is also missing. Later, the genus *Stagma* v. MEYER seemed to have been forgotten. Due to the complete loss of the type specimens and no further material being available, a restudy of this genus is impossible today and, therefore, *Stagma* v. MEYER, 1865 must be considered a *nomen dubium*.

## 5. Discussion

The genus *Stagmacaris* n. gen., monotypically recorded from the Upper Jurassic of southern Germany, represents the second unequivocal cycloid from the Jurassic, which is the third record from post-Triassic deposits. Surely both the poor sclerotization and calcification of the carapace, and the minute size hamper our recognition of the fossil record of post-Palaeozoic cycloids.

*Stagmacaris quenstedtii* occurs in a moderately shallow marine carbonate ramp deposit on the northern shelf of the Tethys Ocean within a reefal environment (e.g., KOCH et al. 1994; LEINFELDER 1993; LEINFELDER et al. 1994, 1996). This occurrence is similar to that of the Late Cretaceous genus *Maastrichtiocaris*, which is also morphologically rather close to *Stagmacaris*. Like in the Maastrichtian of the Netherlands (cf. FRAAIJE 2003), it co-occurs with numerous true crabs. For *Halycine*-like cycloids a parasitic, pseudo-planktonic lifestyle was suggested, mainly because of the shape of the appendages resembling those of the modern fish louse *Argulus*, but also due to their occurrences in somewhat restricted palaeoenvironments or even laminated sedimentary rocks lacking any benthos (SCHWEIGERT 2007, in press). The absence of ocular incisions in *Stagmacaris* suggests it was either blind or the eyes were completely hidden by the carapace. In both cases this contradicts an actively vagile lifestyle, hence also supporting the idea of a pseudo-planktonic lifestyle, possibly parasitic, although the appendages of *Stagmacaris* are unknown.

## Acknowledgements

Dr. H. SCHULZ (Tübingen, Germany) gave generous access to the collection and loaned the specimen studied herein. Dr. M. NOSE (Munich, Germany) showed me the crustaceans in the collection under his care. Dr. W. WERNER (Munich, Germany) is thanked for providing rare literature. Dr. S.K. DONOVAN (Leiden, The Netherlands) kindly improved the language. I am also grateful to the reviewers R. FRAAIJE (Boxtel, The Netherlands) and an anonymous referee.

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