

A new record of the enigmatic lobster genus *Stenodactylina* Beurlen, 1928 (Crustacea: Decapoda: Erymidae) from the Middle Jurassic of south-western Germany

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Abstract A second species of the previously monotypic lobster genus *Stenodactylina* Beurlen, 1928, *Stenodactylina rogerfurzei* n. sp. is recorded from the upper Aalenian of the Wutach area (Baden-Württemberg, SW Germany). Like the type species, *Stenodactylina liasina* Beurlen, 1928, the new species is based only on a single chela. Originally the type horizon of *S. liasina* was erroneously reported as being late Toarcian in age, but it in fact came from a bituminous limestone bed within the lower Toarcian Posidonia Shale. Hence, the known stratigraphical range of *Stenodactylina* is expanded from the early Toarcian to the late Aalenian.

Keywords Decapoda · Lobsters · Fossil record · Aalenian · Jurassic · Germany

Kurzfassung Aus dem Ober–Aalenium des Wutachgebiets (Baden-Württemberg, SW-Deutschland) wird eine neue Art der zuvor monotypischen Hummergeattung *Stenodactylina* Beurlen, 1928, *Stenodactylina rogerfurzei* n. sp., beschrieben. Ebenso wie die Typusart *Stenodactylina liasina* Beurlen, 1928, ist auch die neue Art auf eine einzelne Schere begründet. Als Typuslokalität von *S. liasina* war irrtümlich Ober–Toarcium angegeben gewesen. Sie stammt jedoch aus einer bituminösen Kalksteinbank der Posidonienschiefer-Formation und damit aus dem Unter–Toarcium. Die bekannte stratigraphische Reichweite von *Stenodactylina* erweitert sich damit vom Unter–Toarcium bis in das Ober–Aalenium.

Schlüsselwörter Zehnfüßkrebse · Hummerartige · Fossilbericht · Aalenium · Jura · Deutschland

Introduction

The bulk of the decapod crustaceans from the Lower and Middle Jurassic of Southern Germany have been described by von Meyer (1840, 1854), Quenstedt (1854, 1857), Oppel (1861, 1862), and Beurlen (1928, 1930). Revisions of this material are still scarce, and only a few taxa have been added since these old descriptions (e.g., Glaessner 1932; Förster 1966, 1980, 1986; Schweigert et al. 2003; Schweigert 2006; Schweigert and Koppka 2011).

In 1928 Beurlen erected a new genus and species of lobster, *Stenodactylina liasina*, based on a single, incompletely preserved left chela from the Lower Jurassic of Holzmaden, Southern Germany. Due to its incompleteness and unique shape, its taxonomic position remained unclear, although Beurlen tentatively assigned it to Erymidae van Straelen, 1924. Later, this taxon was listed by Glaessner (1929, 1969) and Schweitzer et al. (2010), and it was retained in Erymidae. During the re-study of the type, some erroneous data related to the specimen became obvious. These errors are corrected here.

Provenance of *Stenodactylina liasina*

The holotype of *S. liasina* (Fig. 1) was donated in 1892 by Bernhard Hauff sen. from Holzmaden to the Naturalienkabinett (today: Staatliches Museum für Naturkunde) in Stuttgart. Bernhard Hauff sen. (1866–1950) was one of the foremost experts in fossils from the lower Toarcian Posidonienschiefer Formation (Posidonia Shale) and the

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Fig. 1 *Stenodactylina liasina* Beurlen, 1928, holotype. Posidonien-schiefer Formation (Posidonia Shale), Oberer Stein Bed, Holzmaden; lower Toarcian, Falciferum Zone. SMNS 7785 (leg. B. Hauff sen.). Scale bar 10 mm

lithostratigraphy of this formation (e.g., Hauff 1921). On the oldest label related to the *Stenodactylina* specimen, it was indicated that it came from a “Stinkstein des L[ias]. ε” in Holzmaden. In modern terms, this means that it was found in a bituminous limestone of the Posidonia Shale. According to the rock matrix, this indication is correct; the lithology clearly corresponds to the “Oberer Stein” bed, which is early Toarcian, Falciferum Zone, in age (cf. Riegraf et al. 1984). Most strangely, disregarding the original information, the specimen was later labeled as coming from the “Lias ζ,” the Jurensismergel Formation of late Toarcian age. The specimen was listed neither in the otherwise largely complete fossil lists provided by Engel (1908) nor in the list of the Posidonia Shale nor in the list of the Jurensismergel Formation, although E. Schütze (who compiled these lists) made a note on another label of the specimen indicating that he thought it might belong to a completely new genus and species. Finally, Beurlen (1928) followed this opinion and described the specimen, albeit assigning an erroneous type horizon.

Occurrence of *Stenodactylina* in the Middle Jurassic

To my knowledge, no further specimens of *S. liasina* have been recovered from the Lower Jurassic Posidonia Shale or other Jurassic strata since 1892. In the following section, a second species of *Stenodactylina*, *S. rogerfurzei* n. sp., is described. It comes from the early Middle Jurassic Achdorf Formation of the Wutach area (Fig. 2). The beds of the Middle Jurassic are perfectly accessible there due to natural exposure resulting from historical and recent landslides. The Achdorf Formation has its type locality at the western slope of Eichberg hill, north of the village of Achdorf, only ca. 1.2 km away from the locality of the new species. The Achdorf Formation (formerly Eichberg Formation; Franz and Rohn 2004) and its biostratigraphy and lithostratigraphical characterization have recently been described by Franz and Nitsch (2009). A lithological section of the

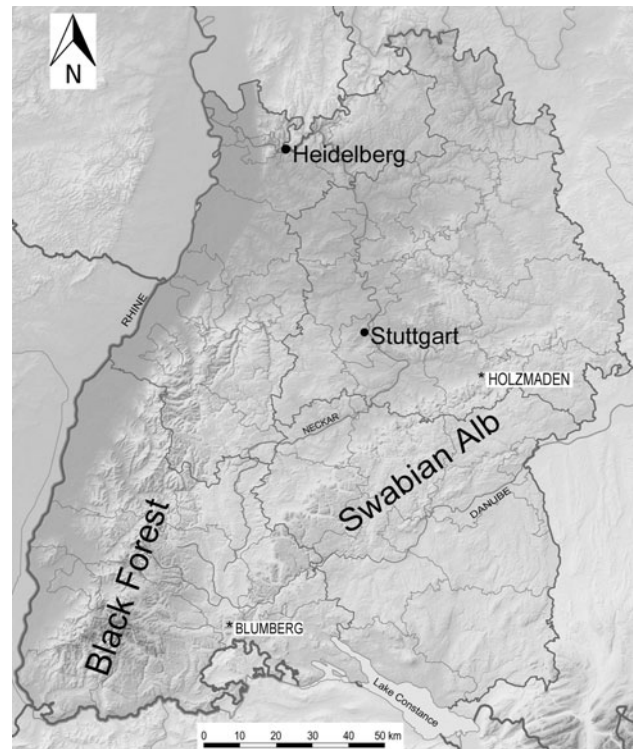


Fig. 2 Provenance of *Stenodactylina* in the Lower and Middle Jurassic of SW Germany, respectively. Holzmaden: *S. liasina* Beurlen, 1928; Blumberg: *S. rogerfurzei* n. sp. (map based on http://de.wikipedia.org/wiki/Datei:Baden-Wuerttemberg_relief_location_map.jpg; GNU Free Documentation License, version 1.2)

Achdorf Formation in its type area was published by Franz and Rohn (2004). No other decapod crustacean remains from the “Staufensibank” (sensu Rieber 1963), the uppermost bed of the chamosite-oolitic “Staufensis-Oolith,” and other beds of the Achdorf Formation have been described, despite the otherwise very rich invertebrate fauna (ammonites, belemnites, brachiopods, bivalves, and echinoderm debris). The “Staufensibank” is named after the age-diagnostic ammonite *Staufenia staufensis* (Oppel), which is common in this bed. The *staufensis* biohorizon corresponds to the basal Bradfordensis Zone of the late Aalenian (Contini et al. 1997).

Institutional abbreviation: Staatliches Museum für Naturkunde Stuttgart (SMNS), Germany.

Systematic palaeontology

Order Decapoda Latreille, 1803

Suborder Astacidea Latreille, 1803

Family Erymidae van Straelen, 1924

Genus *Stenodactylina* Beurlen, 1928

Type species: *S. liasina* Beurlen, 1928.

Included species: *S. liasina* Beurlen, 1928; *S. rogerfurzei* n. sp., herein.

Diagnosis: Erymid lobster with propodus of first pereopod longer than wide, upper surface ornamented with transversely running row of spines; index extremely slender.

S. rogerfurzei n. sp.
(Fig. 3).

Etymology: Dedicated in honour of the amateur paleontologist Roger Furze (Deggenhausertal), who kindly donated the holotype for description.

Holotype: Specimen illustrated in Fig. 3, SMNS 70043.

Type locality: Eastern slope of Scheffheu hill, NW of Blumberg-Achdorf, Wutach area, SW Germany.

Type horizon: Achdorf Formation, “Staufensis-Oolith,” “Staufensisbank” sensu Rieber (1963); upper Aalenian, Bradfordensis Zone, *staufensis* horizon.

Material: Holotype only.

Diagnosis: Species of *Stenodactylina* with an extremely slender, curved index, differing from the type species *S. liasina* in a more pustulose ornamentation of the surface of the propodus, but lacking an inner row of spines.

Description: The specimen consists of an incompletely preserved but uncompressed left propodus with proximal

parts of a slender, slightly curved, remarkably thin index. As in the holotype of the type species, the corresponding dactylus is not preserved. In most parts of the specimen, the calcified cuticle is still present. Apart from a finer granulation, its upper surface bears several acute spines. Some of them are arranged in a line extending in exactly the same position as in *S. liasina*. The granulated lower surface of the chela lacks any additional spines. The inner and outer margin of the chela is rounded. The occlusal surface of the preserved proximal part of the index shows three distantly arranged teeth. Preserved length of the specimen: 50.8 mm. Preserved length of propodus: 34 mm. Maximum width of propodus: 23.7 mm. Thickness of propodus: 15 mm.

Comparisons and discussion: Apart from its smaller size (which may be due to a different age of the individual), *S. liasina* mainly differs in the less strongly developed ornamentation, with coarse spines and a different spatial distribution of these spines. In the description by Beurlen (1928), the index of the latter was said to be completely smooth. This observation, however, cannot be confirmed since on the lateral side several wide-spaced stubs of broken, spiny tubercles are even present on the steinkern, where the shell is lost. In *S. rogerfurzei* n. sp., such sockets are also present on the surface of the index, but are more randomly distributed.

Eryma insignis Oppel, 1862, also based on an isolated chela, exhibits a long, irregularly curved fixed finger

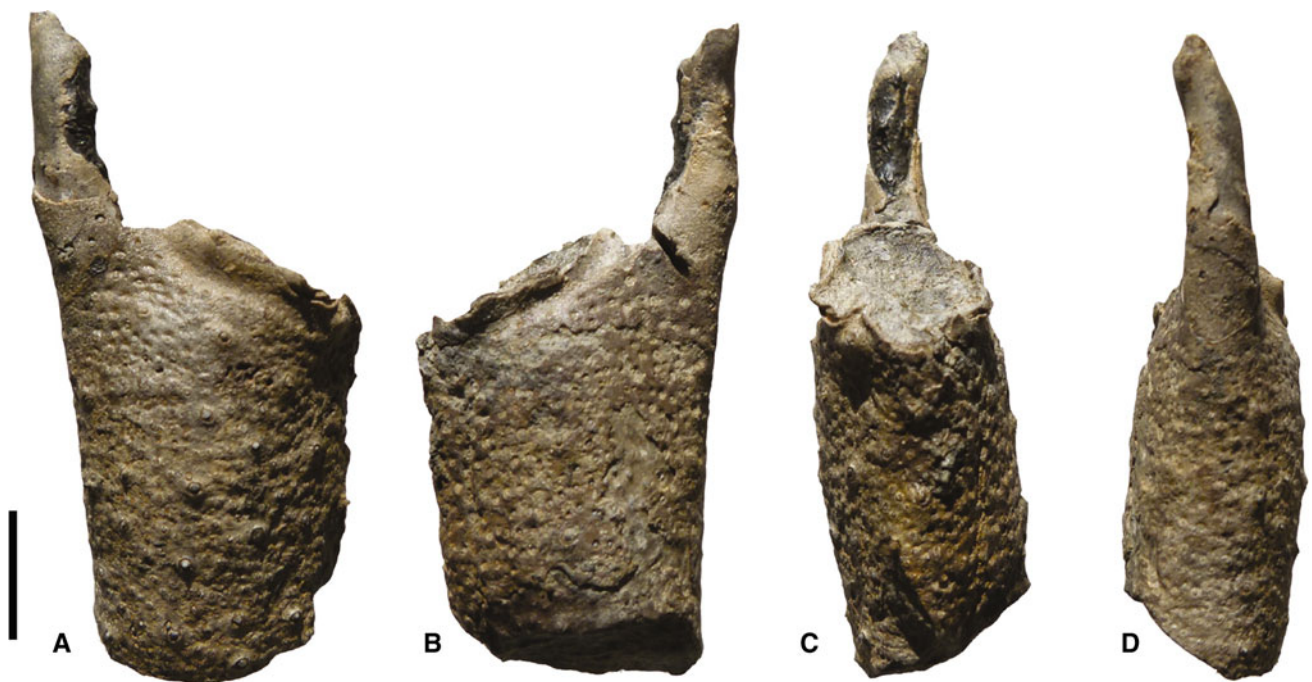


Fig. 3 *Stenodactylina rogerfurzei* n. sp., holotype. **a** Dorsal, **b** ventral, **c**, **d** lateral views. Scheffheu hill near Blumberg-Achdorf, Achdorf Formation, Staufensisbank, upper Aalenian, Bradfordensis Zone,

staufensis horizon. SMNS 70043 (leg. R. Furze, Deggenhausertal). Scale bar 10 mm

somewhat similar to that in *Stenodactylina*. The specimen was collected and illustrated from the Oxfordian “Terrain à Chailles” of Eastern France (Étallon 1861). No further specimen of this extremely rare species has been recovered (Charbonnier et al. 2012), so nothing is known about morphological variation or possible heterochely within that species. *E. insignis* Oppel, 1862 was assigned to *Eryma* s.str. by Schweitzer et al. (2010). However, if one accepts the genus *Erymastacus* Beurlen, 1928 for a clade of erymids bearing first chelae with remarkably long fingers, *E. insignis* may alternatively be assigned to *Erymastacus*, as Beurlen (1928) suggested. The ornamentation of *E. insignis* is quite different from that of *Stenodactylina*, so the development of a long and irregularly curved fixed finger is most likely related to a similar function.

Conclusions

The record of *S. rogerfurzei* n. sp. expands the stratigraphic range of the genus from the early Toarcian (Falciferum Zone) to the late Aalenian (Bradfordensis Zone). The occurrence in an oolitic, coarse-grained sediment together with an epibenthic macrofauna indicates well-oxygenated conditions at the sea floor (Franz and Nitsch 2009), which may have been a favorable environment. The special shape of the chela points to some very special adaptations. Since the shape of the free finger remains unknown, no further speculation about the nature of this adaptation is possible. The rareness of *Stenodactylina* may result from the hard and splintery rocks from which they were collected, making both recognition in the field and easy preparation almost impossible. Taxonomically, the new find provides no further hints at the systematic position of the genus, but an erymid affinity still appears most likely.

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