A new genus of prosopid crabs (Decapoda: Brachyura: Dromiacea) from the Upper Jurassic of southern Germany

**ABSTRACT**

A new monotypic genus and species of brachyurans, *Petersbuchia thauckei* n. gen. n. sp., is described from southern Germany. The holotype, an incompletely preserved carapace, was collected from a thick-bedded spongiolitic limestone of the Upper Jurassic Treuchtlingen Formation (early late Kimmeridgian, Acanthicum Zone). *Petersbuchia* adds to the diversification hotspot of early true crabs within the sponge-microbial magnafacies along the northern shelf of the Tethys Ocean in general and to the brachyuran fauna of the Treuchtlingen Formation in special.

**Keywords:** Homolodromioidea, diversification, Late Jurassic, palaeoecology, Treuchtlingen Formation, Bavaria, Germany.

**RESUMEN**

Un nuevo género de cangrejos prosópidos (Decapoda: Brachyura: Dromiacea) del Jurásico Superior del sur de Alemania

**Palabras clave:** Homolodromioidea, diversificación, Jurásico Tardío, palaeoecología, Formación Treuchtlingen, Bavaria, Alemania.
1. Introduction

In modern marine benthic environments, brachyuran crabs are well represented by approximately 7,250 species (Davie et al., 2015). The most primitive ones, sometimes controversially discussed, have been recorded from clayey marine strata of Early Jurassic (Pliensbachian) age ( Förster, 1986; Schweitzer and Feldmann, 2010d; Haug and Haug, 2014; Krzemińska et al., 2020; Scholz, 2020). Brachyuran records from the Middle Jurassic are still scarce (Krobicki and Zatoń, 2008; Fraaije et al., 2013). In the Late Jurassic, siliceous sponge-microbial magnacacies as well as coeval coral reefs became widespread along the northern margin of the Tethys Ocean (e.g., Leinfelder et al., 1994, 1996). This probably triggered the first great diversification and biogeographical expansion of crabs (Wehner, 1988; Müller et al., 2000; Klompmaker et al., 2013). The Upper Jurassic of southern Germany, which was part of this northern Tethyan reef belt, is not only a classical area for early brachyuran studies (von Meyer, 1842, 1860) but was probably also a diversification hotspot of this group, although geographically isolated brachyuran records even come from the western Pacific area (Karasawa and Kato, 2007; Kato et al., 2010; Karasawa and Hirota, 2019). Early records from the southern Tethys (Forster, 1985) are of dubious origination (see Krobicki and Zatoń, 2008).

In the course of an extensive revision and update of the ‘Treatise’ volume dedicated to decapod crustaceans (Glaessner, 1969), numerous taxonomic revisions of the original type material from old collections became necessary, and additional taxa based on newly discovered or differently interpreted Jurassic crab material were occasionally added (Feldmann et al., 2006; Schweitzer et al., 2007, 2018; Schweitzer and Feldmann, 2008a, 2008b, 2009a, 2009b, 2009c, 2009d; 2010a, 2010b, 2010c; Frăncescu, 2011; Schweigert and Koppka, 2011; Starzyk et al., 2012; Hyžný et al., 2015; Starzyk, 2015a, 2015b, 2020; Schweigert and Robins, 2016; Schweigert, 2019; Klompmaker et al., 2020).

The aim of this study is to report a new genus and species of the Prosopidae. The abbreviation SMNS is used for Staatliches Museum für Naturkunde Stuttgart, Germany.

2. Geological setting

The herein described specimen was collected from thick-bedded limestones of the Treuchtlingen Formation (Niebuhr and Pürner, 2014) quarried in the Petersbuch-Erkertshofen district, which is part of the township of Markt Titting in Bavaria (Germany) (Figure 1). Due to its usage as a building stone these limestones are well-known and traded as “Treuchtlingen Marble”. The limestones of the Treuchtlingen Formation yield abundant ammonites, belemnite rostra, siliceous and calcareous sponges, brachiopods, and echinoids. In contrast, hermatypic corals are totally absent from this lithology. In the finer rock matrix macroscopically visible foraminifera with a whitish wall (“Tubiphytes”) are extremely common and characteristic for this lithology. The ammonite fauna allows a precise dating of these rocks within the late Kimmeridgian (Zeiss, 1964; Bantz, 1970; Schlampp, 2004, 2009). The environmental conditions during which the Treuchtlingen Formation was deposited have been discussed controversially in the past. A very shallow depositional model was suggested by Kott (1989); however, subsequently many arguments, especially the total absence of a typical shallow-water fauna (hermatypic corals, thick-shelled bivalves, large gastropods), have been put forward in favour of greater water depths within a range of ca. 50 to 150 metres, certainly below the storm-weather wave basis (e.g., Leinfelder et al., 1994, 1996; Schmid, 1996; Schmid et al., 2005). The occurring decapod crustacean fauna consists of small-sized crabs (see below), is relatively low-diverse and does not comprise any species otherwise restricted to Upper Jurassic coral reefs (cf. Schweitzer et al., 2018).

Although numerous amateur collectors are hunting for fossils in the Franconian Treuchtlingen Formation these tiny fossils are not in their focus
and they are mostly ignored and overlooked. Here is a list of brachyurans from the Treuchtlingen Formation (compiled after Wehner, 1988, Schweigert and Kuschel, 2018, and own observations; taxonomy modified after Schweitzer et al., 2018):

- *Eodromites grandis* (von Meyer, 1857)
- *Laeviprosopon laeve* (von Meyer, 1857)
- *Nodoprosopon ornatum* (von Meyer, 1842)
- *Petersbuchia thauckei* n. gen., n. sp. (herein)
- *Pilidromia thiedeae* (Schweigert and Koppka, 2011)
- *Planoprosopon heydeni* (von Meyer, 1857)
- *Tanidromites insignis* (von Meyer, 1857)
- *Tanidromites scheffnerae* Schweigert and Koppka, 2011.
- *Verrucarcinus torosus* (von Meyer, 1857)

Figure 1  Locality of the holotype. Arrow indicates location of the Petersbuch quarry at Markt Titting-Petersbuch, Bavaria, southern Germany. Map based on OpenStreetMap (www.openstreetmap.org).
3. Systematic palaeontology

The classification follows Schweitzer et al. (2010).

**Order Decapoda Latreille, 1802**

**Infraorder Brachyura Linnaeus, 1758**

**Section Dromiacea De Haan, 1833**

**Superfamily Homolodromioidea Alcock, 1900**

**Family Prosopidae von Meyer, 1860**

**Genus Petersbuchia nov.**

**Type species:** Petersbuchia thauckei n. gen., n. sp., monotypic. Gender is feminine. **Diagnosis:** See diagnosis of the type species (monotypic).

**Petersbuchia thauckei n. gen., n. sp.**

Figures 2A to 2D, 3

**Etymology:** Named after Thomas Taucke (Freystadt-Mörsdorf), who collected and donated the sole specimen.

**Holotype:** Specimen SMNS 70622 (Figure 2).

**Type locality:** Quarry area of Petersbuch/Erkertshofen, Markt Titting, Franconian Alb, Germany (Figure 1).

**Type horizon:** Treuchtlingen Formation, Petersbuch Member (Upper Jurassic, late Kimmeridgian, Acanthicum Zone; Niebuhr and Pürner, 2014). Exact bed not traceable, because the rock with the fossil was found ex-situ on top of a dump close to a quarry.

**Studied material:** Holotype only.

**Occurrence:** At present only known from the type locality.

**Diagnosis:** Carapace subquadrate, with long protrusive outer orbital spine; Surface coarsely pustulose, anterior part with a few prominent tubercles. Rostrum trid, with spatulate margins. Hepatic and gastric areas not separated by grooves.

**Description:** The small-sized holotype SMNS 70622 (Figure 2) is represented by the three-dimensionally preserved inner cast of the carapace. The left side of the carapace is partly lost prior to burial due to breakage. Surface of carapace densely pustulose in all areas. Outline of carapace subquadrate, with broad trid rostrum. Total length of carapace excluding rostrum 3.7 mm, including rostrum 4.6 mm; reconstructed width by mirroring in symmetry plane 3.6 mm, maximum height 2.1 mm. Trid rostrum with spatulate upturned margins and downturned tip in the centre. Rounded orbital margin connects base of rostrum and protrusive outer orbital spine. Frontal aspects of orbital area hidden. Hepatic, protogastric and epigastric areas not separated from each other. Mesogastric area well separated by lateral grooves, with two coarser tubercles in its symmetry plane. Posterior gastric muscle scars with subparallel, spring-like ornamentation. In addition to the general pustulose ornamentation, four strong and prominent tubercles are developed in the anterior part of the carapace, one close to the mesogastric groove, another one in the outer third of the hepatic region, close to the cervical groove, the third one near the centre of the joint hepatic-protogastric region and the last one in the epigastric region, at the base of the rostrum. Subhepatic region not separated from hepatic region but posteriorwards forming a lobe. Cervical groove and branchiocardiac groove well developed. Epi- and mesobranchial regions fused. Meta- and urogastric regions fused as well. Cardiac region triangular, but hardly separated from adjacent branchial region. Outer lateral margin of branchial region parallel to longitudinal axis of carapace. Posterior margin of carapace forming a smooth rim, with concavities placed laterally from the intestinal area. Sternal region not preserved. Close to the specimen, there is an incompletely preserved chela possibly belonging to the same individual (Figure 3). The propodus is twice as long as broad and widens distally. Surface of propodus with similar pustulose ornamentation as in the carapace. Fixed finger thick, smooth, distally broken, but slightly curved imprint points to a sickle-like outline. Free finger lost.

**Remarks:** It is impossible to state whether the sole small-sized specimen of Petersbuchia thauckei n. gen., n. sp. was an adult or a juvenile.
Figure 2  *Petersbuchia thauckei* n. gen. n. sp., holotype, SMNS 70622, Upper Jurassic, Treuchtlingen Formation, Petersbuch Member; late Kimmeridgian, Acanthicum Zone, Markt Titting-Petersbuch, Bavaria, southern Germany. Dorsal (A, C), lateral (B) and frontal (D) views. A with artificially enhanced contrast. Scale bar = 2 mm.
4. Discussion

At present, *Petersbuchia thauckei* n. gen. n., sp. from the late Kimmeridgian of Franconia represents the only species assigned to this new genus. In first view, the number and arrangement of prominent tubercles in the hepatic region of *Petersbuchia thauckei* n. gen., n. sp. is strikingly reminiscent to *Laeviprosopon sublaeve* (von Meyer, 1857), another very rare taxon reported from Upper Jurassic beds of similar age and lithology.

Some species of *Laeviprosopon* including the type species exhibit a similar trifid rostrum as in *Petersbuchia* n. gen. However, *Laeviprosopon sublaeve* lacks a pustulose ornamentation of the carapace as well as an outer orbital spine. It must be stressed that ornamentation is usually less developed in inner casts than on the cuticle. Therefore, if the cuticle of *Petersbuchia* n. gen. was preserved it would have been even stronger ornamented. Moreover, in *Laeviprosopon sublaeve* the anterior part of the carapace exhibits a trapezoidal outline.

The posterior margin of the carapace showing laterally placed concavities is shared with a few other genera safely assigned to Prosopidae (Prosopon von Meyer, 1835 s. str.; Europrosopon Klompmaker, Starzyk, Fraaije and Schweigert, 2020; Protuberosa Schweitzer and Feldmann, 2009a), but this character does not occur within species of *Laeviprosopon* (see Klompmaker et al., 2020). Hence, *Petersbuchia* n. gen. is well distinct from *Laeviprosopon* and shows only some superficially convergent characters with this co-occurring genus.
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References

Alcock, A., 1900, Materials for a carcinological fauna of India, No. 5. The Brachyura Primigenia or Dromiacea: Journal of the Asiatic Society of Bengal, 68, 123-169. https://doi.org/10.5962/bhl.title.15343

Bantz, H.U., 1970, Der Fossilinhalt des Treuchtlinger Marmors (Mittleres Unterkimmeriode der Südlichen Frankenalb); Erlanger Geologische Abhandlungen, 82, 1-86.

Davie, P.J.F., Guinot, D., Ng, P.K.L., 2015, Systematics and classification of Brachyura, in Castro, P., Davie, P.J.F., Guinot, D., Schram, F. R., von Vaupel Klein, J.C. (eds.), Treatise on zoology – anatomy, taxonomy, biology. The Crustacea, 9C-II: Leiden, Brill, 1049-1130. https://doi.org/10.1163/9789004190832_021

De Haan, W., 1833, Crustacea, in von Siebold, P. F. (ed.), Fauna Japonica sive Descriptio Animalium, quae in Itinere per Japoniam, Jussu et Auspicis Superiorum, qui summum in India Batava Imperium Tenent, Suscepto, Annis 1823-1830 Collegit, Notis, Observationibus et Adumbrationibus Illustravit. J. Müller et Co., Lugduni Batavorum, 243 p. https://doi.org/10.5962/bhl.title.124951

Feldmann, R.M., Lazăr, I., Schweitzer, C.E., 2006, New crabs (Decapoda: Brachyura: Prosopidae) from Jurassic (Oxfordian) sponge bioherms of Dobrogea, Romania: Bulletin of the Mizunami Fossil Museum, 33, 1-20.

 Förster, R., 1985, Frühe Anomuren und Brachyuren (Decapoda, Crustacea) aus dem mittleren Dogger: Mitteilungen der Bayerischen Staatssammlung für Paläontologie und Historische Geologie, 25, 45-60.

 Förster, R., 1986, Der erste Nachweis eines brachyuren Krebses aus dem Lias (oberes Pliensbach) Mitteleuropas: Mitteilungen der Bayerischen Staatssammlung für Paläontologie und Historische Geologie, 26, 25-31.

Fraaije, R.H.B., van Bakel, B.W.M., Guinot, D., Jagt, J.W.M., 2013, A new Middle Jurassic (Bajocian) homodromioid crab from northwest France; the earliest record of the Tanidromitidae: Boletín de la Sociedad Geológica Mexicana, 65, 249-254. https://doi.org/10.18268/bsgm2013v65n2a6

Frăncescu, O. D., 2011, Brachyuran decapods (including five new species and one new genus) from Jurassic (Oxfordian-Kimmeridgian) coral reef limestones from Dobrogea, Romania: Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, 259, 271-297. https://doi.org/10.1127/0077-7749/2010/0110

Glaessner, M., 1969, Decapoda, in Moore, R.C. (ed.), Treatise on Invertebrate Paleontology, Pt. R4(2). Boulder and Lawrence, Geological Society of America and University of Kansas Press, R400-R533, R626-628.

Haug, J.T., Haug, C., 2014, Eoprosopon klugi (Brachyura) the oldest unequivocal and most “primitive” crab reconsidered: Palaeodiversity, 7, 149-158.

Hyžný, M., Starzyk, N., Robins, C., Kočová Veselská, M., 2015, Taxonomy and palaeoecology of a decapod crustacean assemblage from the Oxfordian of Stráňská skála (Southern Moravia, Czech Republic):
New crab of the Jurassic in Germany

REFERENCES

Karasawa, H., Hirota, T., 2019, Two new species of Planoprosopon (Decapoda: Brachyura: Longodromitidae) from the Torinosu Group (Upper Jurassic–Lower Cretaceous), Shikoku, Japan: Bulletin of the Mizunami Fossil Museum, 45, 27-32.

Karasawa, H., Kato, H., 2007, New prosopid crabs (Crustacea, Decapoda, Brachyura) from the Upper Jurassic Torinosu Group, Shikoku, Japan: Memorie della Società italiana di Scienze naturali e del Museo civico di Storia naturale di Milano, 35, 62-65.

Kato, H., Takahashi, T., Taira, M., 2010, Late Jurassic decapod crustaceans from northeast Japan: Palaeontology, 53(4), 761-770. https://doi.org/10.1111/j.1475-4983.2010.00960.x

Klompmaker, A.A., Schweitzer, C.E., Feldmann, R.M., Kowalewski, M., 2013, The influence of reefs on the rise of Mesozoic marine crustaceans: Geology, 41, 1179-1182. https://doi.org/10.1130/G34768.1

Klompmaker, A.A., Starzyk, N., Fraaije, R.H.B., Schweigert, G., 2020, Systematics and convergent evolution of reef-associated Jurassic and Cretaceous crabs (Decapoda, Brachyura): Palaeontologica Electronica, 23(2), a32. https://doi.org/10.26879/1045

Kott, R., 1989, Fazies und Geochemie des Treuchtlinger Marmors: Unter- und Mittel-Kimmeridge, Südlıche Frankenalb: Berliner Geowissenschaftliche Abhandlungen, Reihe a Geology Palaeontology, 111, 1-115.

Krolicki, M., Zatoń, M., 2008, Middle and Late Jurassic roots of brachyuran crabs: palaeoenvironmental distribution during their early evolution: Palaeogeography, Palaeoclimatology, Palaeoecology, 263, 30-43. https://doi.org/10.1016/j.palaeo.2008.01.025

Krzemińska, E., Starzyk, N., Schweigert, G., Whicher, J., Chandler, R.B., Fraaije, R.H.B., 2020, New records of Eogastrodorus (Decapoda, Anomura, Gastrodororidae) from the Middle Jurassic (Bajocian) of England and France: Neues Jahrbuch für Geologie und Paläontologie Abhandlungen, 296(1-2), 147-156. https://doi.org/10.1127/njgpa/2020/0876

Latreille, P.A., 1802, Histoire naturelle, générale et particulière, des Crustacés et des Insectes, v. 3. F. Dufart, Paris.

Leinfelder, R.R., Krautter, M., Laternser, R., Nose, M., Schmid, D.U., Schweigert, G., Werner, W., Keupp, H., Brugger, H., Herrmann, R., Rehfeld-Kiefer, U., Schroeder, J.H., Reinhold, C., Koch, R., Zeiss, A., Schweizer, V., Christmann, H., Menges, G., Luterbacher, H., 1994, The origin of Jurassic reefs. Current research developments and results: Facies, 31, 1-56. https://doi.org/10.1007/BF02536932

Leinfelder, R. R., Werner, W., Nose, M., Schmid, D. U., Krautter, M., Laternser, R., Takaćs, M., Hartmann, D., 1996, Paleoeology, growth parameters and dynamics of coral, sponge and microbialite reefs from the Late Jurassic. In Reitner, J., Neuweiler, F., Gunkel, F. (eds.), Global and regional controls on biogenic sedimentation. I. Reef evolution. Research Reports: Göttinger Arbeiten zur Geologie und Paläontologie, Sonderband, 2, 227-248.

Linnaeus, C., 1758, Systema Naturae per Regna tria Naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis (ed. 10), vol 1. Laurentius Salvius, Holmia. https://doi.org/10.5962/bhl.title.156772

Müller, P., Krolicki, M., Wehner, G., 2000, Jurassic and Cretaceous primitive crabs of the family Prosopidae (Decapoda: Brachyura)-their taxonomy, ecology and biogeography: Annales Societatis Geologorum Poloniae, 70, 49-79.

Niebuhr, B., Pürner, T., 2014, Plattenkalk und Frankendolomit - Lithosratigraphie der Weißjura-Gruppe der Frankenalb (außeralpine Oberjura, Bayern):
Schürmann, M., 2019, Palaeoecology and biodiversity of the Jurassic and Cretaceous Of the Upper Jurassic and Cretaceous: Palaeontologia Electronica, 22, 81. https://doi.org/10.7812/PTL/19-1
Schürmann, M., 2020, New species of the genus Cystodromites (Decapoda: Brachyura: Tanidromitidae) from the Upper Jurassic of Germany: Journal of Crustacean Biology, 40(2), 194-201. https://doi.org/10.1093/jcbiol/ruy092
Schürmann, M., Kuschel, H., 2018, Schwäbische und Fränkische Alb – ein Paradies für Jurassicbrabiche: Fossilien, 35(4), 14-23.
Schürmann, G., Robins, C., 2016, Earliest representatives of Lecithocaridae (Crustacea: Brachyura) from the Upper Jurassic of southern Germany: Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, 280, 325-330. https://doi.org/10.1127/njgpa/2016/0583
Schürmann, M., Kuschel, H., 2018, Schwäbische und Fränkische Alb – ein Paradies für Jurassicbrabiche: Fossilien, 35(4), 14-23.

References

Schriftenreihe der Deutschen Gesellschaft für Geowissenschaften, 83, 5-71. https://doi.org/10.1127/sdgg/83/2014/5
Scholz, G., 2020, Eocarcinus praecursor Withers, 1932 (Malacostraca, Decapoda, Meiura) is a stem group brachyuran: Arthropod Structure & Development, 59, 100991. https://doi.org/10.1016/j.asd.2020.100991
Schlampp, V., 2004, Die Malm-Ammoniten der Fränkischen Alb gamma 3 und delta: Fossilien, 21(4), 208-219.
Schlampp, V., 2009, Ammoniten aus dem Treuchtlinger Marmor: Der Steinkern, 3, 40-48.
Schmid, D. U., 1996, Marine Mikrobolithe und Mikroinkrustierer aus dem Oberjura: Profil, 9, 101-251.
Schmid, D. U., Leinfelder, R. R., Schweigert, G., 2005, Stratigraphy and palaeoenvironments of the Upper Jurassic of Southern Germany – a review: Zitteliana, 26B, 31-41.
Schweigert, G., 2019, An additional representative of Lecithocaridae (Brachyura: Dromiaeae) from the Upper Jurassic of southern Germany: Journal of Crustacean Biology, 39(1), 36-39. https://doi.org/10.1093/jcbiol/ruy092
Schweigert, G., Koppka, J., 2011, Decapods (Crustacea: Brachyura) from the Jurassic of Germany and Lithuania, with descriptions of new species of Planoprosopon and Tanidromites: Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, 260, 221-235. https://doi.org/10.1127/0077-7749/2011/0136
Schweigert, G., Kuschel, H., 2018, Schwäbische und Fränkische Alb – ein Paradies für Jurassickrabben: Fossilien, 35(4), 14-23.
Schweigert, G., Robins, C., 2016, Earliest representatives of Lecithocaridae (Crustacea: Brachyura) from the Upper Jurassic of southern Germany: Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, 280, 325-330. https://doi.org/10.1127/njgpa/2016/0583
Schweitzer, C. E., Feldmann, R. M., 2008a, A new classification for some Jurassic Brachyura (Crustacea: Decapoda: Brachyura: Homolodromioidea): Families Goniodromitidae Beurlen, 1932 and Tanidromitidae new family: Senckenbergiana lethai, 87, 119-156. https://doi.org/10.1007/BF03043911
Schweitzer, C. E., Feldmann, R. M., 2008b, Revision of the genus Laeviprosopon Glaessner, 1933, (Decapoda: Brachyura: Homolodromioidea: Prosopidae) including two new species: Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, 250, 273-285. https://doi.org/10.1127/0077-7749/2008/0250-0273
Schweitzer, C. E., Feldmann, R. M. 2009a, Revision of the Prosopinae sensu Glaessner, 1969 (Crustacea: Decapoda: Brachyura) including four new families, four new genera, and five new species: Annalen des Naturhistorischen Museums in Wien, 110A, 55-121.
Schweitzer, C. E., Feldmann, R. M., 2009b, New species of Longodromitidae Schweitzer and Feldmann, 2009, from the Ernstbrunn Formation, Late Jurassic (Tithonian), Austria: Annalen des Naturhistorischen Museums in Wien, 111A, 207-224.
Schweitzer, C. E., Feldmann, R. M., 2009c, Revision of the genus Cyclothyreus Remeš, 1895 (Decapoda: Brachyura: Dromioidea): Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, 253, 357-372. https://doi.org/10.1127/0077-7749/2009/0253-0357
Schweitzer, C. E., Feldmann, R. M., 2010a, A new family of Mesozoic Brachyura (Glaessneropsoidea) and revaluation of Distefania Checchia-Rispoli, 1917
(Homolodromioidea: Goniodromitidae): Neues Jahrbuch für Geologie und Paläontologie Abhandlungen, 256, 363-380. https://doi.org/10.1127/0077-7749/2010/0059

Schweitzer, C.E., Feldmann, R.M., 2010b, Revision of Cycloprosopon and additional notes on Eodromites (Brachyura: Homolodromioidea: Goniodromitidae): Annalen des Naturhistorischen Museums in Wien, Serie A, 112, 169-194.

Schweitzer, C.E., Feldmann, R.M., 2010c, The genus Coelopus Étallon, 1861 (Brachyura: Glaessneropsoidea: Longodromitidae) with new species: Neues Jahrbuch für Geologie und Paläontologie Abhandlungen, 258, 51-60. https://doi.org/10.1127/0077-7749/2010/0084

Schweitzer, C.E., Feldmann, R.M., 2010d, The oldest Brachyura (Decapoda: Homolodromioidea: Glaessneropsoidea) known to date (Jurassic): Journal of Crustacean Biology, 30, 251-256. https://doi.org/10.1651/09-3231.1

Schweitzer, C.E., Feldmann, R.M., Garassino, A., Karasawa, H., Schweigert, G., 2010, Systematic list of fossil crustacean species: Crustaceana Monographs, 10, 222 p. https://doi.org/10.1163/15685406-0000222

Schweitzer, C.E., Feldmann, R.M., Lazăr, I., 2007, Decapods from Jurassic (Oxfordian) sponge megafacies of Dobrogea, Romania and reconsideration of Nodoprosopon Beurlen, 1928: Neues Jahrbuch für Geologie und Paläontologie Abhandlungen, 244, 99-113. https://doi.org/10.1127/0077-7749/2007/0244-0099

Schweitzer, C.E., Feldmann, R.M., Lazăr, I., Schweigert, G., Franteșcu, O., 2018, Decapoda (Anomura; Brachyura) from the Late Jurassic of the Carpathians, Romania: Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, 288, 307-341. https://doi.org/10.1127/njgpa/2018/0744

Starzyk, N., 2015a, Reappraisal of the primitive crab Eodromites, with description of three new species from European localities (Decapoda: Brachyura: Goniodromitidae): Palaeontologica Electronica, 18.3.50A, 1-19. https://doi.org/10.26879/513

Starzyk, N., 2015b, New species of the genus Tanidromites (Decapoda: Brachyura: Tanidromitidae) from the Oxfordian of Poland: Acta Zoologica Cracoviensia, 58, 129-136. https://doi.org/10.3409/azc.58_2.129

Starzyk, N., 2020, The oldest species of the genus Laeviprosopon (Decapoda: Brachyura: Prosopidae) from the Oxfordian of Poland: Acta Zoologica Cracoviensia, 63, 9-13. https://doi.org/10.3409/azc.63.02

Starzyk, N., Krzemińska, E., Krzemiński, W., 2012, A new crab species from the Oxfordian of Poland (Decapoda: Brachyura: Goniodromitidae): Neues Jahrbuch für Geologie und Paläontologie Abhandlungen, 263, 143-153. https://doi.org/10.1127/0077-7749/2012/0219

Von Meyer, H., 1835, Briefliche Mittheilungen, an Prof. Bronn gerichtet: Neues Jahrbuch für Mineralogie, Geognosie, Geologie und Petrefaktenkunde, 325.

Von Meyer, H., 1842, Ueber die in dem dichten gelben Jurakalk von Aalen in Württemberg vorkommenden Species des Crustaceengenus Prosopon: Beiträge zur Petrefaktenkunde, 5, 70-75.

Von Meyer, H., 1857, Briefliche Mittheilungen: Neues Jahrbuch für Mineralogie, Geognosie, Geologie und Petrefaktenkunde, 1857, 556.

Von Meyer, H., 1860, Die Prosoponiden oder die Familie der Maskenkrebse: Palaeontographica, 7, 183-222.

Wehner, G., 1988, Über die Prosoponiden (Crustacea, Decapoda): Doctoral thesis, Ludwig-Maximilians-Universität zu München, Germany.

Zeiss, A., 1964, Zur Malm Gamma-Delta-Grenze in Franken: Geologische Blätter für NO-Bayern und angrenzende Gebiete, 14, 104-115.