



A new Middle Jurassic (Bajocian) homolodromioid crab from northwest France; the earliest record of the Tanidromitidae

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Abstract

A new homolodromioid, *Tanidromites maerteni*, the earliest member of the genus and family, is recorded from the lower upper Bajocian (*Niortense* Zone) of Calvados, northwest France. It is noted that carapace morphologies of other Jurassic brachyuran taxa within the family Prosopidae are closely similar to those of tanidromitids, and that diagnoses of recently erected Jurassic families and genera partially overlap or have conflict among them. Thus, the taxonomy of the earliest brachyuran groups appears to be less stable than currently thought. In recent years, knowledge of primitive extinct brachyurans has greatly benefitted from findings made by amateur collectors, the present paper included.

Keywords: Crustacea, Homolodromioida, Tanidromitidae, Middle Jurassic, France, new species.

Resumen

Se reporta un nuevo homolodromioideo, *Tanidromites maerteni*, el miembro más antiguo del género y la familia, para la parte inferior del Bajociano superior (Zona Niortense) de Calvados, noroeste de Francia. Se hace notar que las morfologías del caparazón de otros taxa de braquiuros del Jurásico de la familia Prosopidae son muy similares a las de los tanidromitidos, y que las diagnósis de familias y géneros del Jurásico recientemente propuestas parcialmente se sobrelapan o crean conflicto. Por lo tanto, parece ser que la taxonomía de los grupos primitivos de braquiuros es menos estable de lo que se cree. En años recientes, el conocimiento de los braquiuros primitivos extintos se ha visto muy beneficiado por los hallazgos realizados por colectores aficionados, siendo el presente trabajo un ejemplo.

Palabras Clave: Crustacea, Homolodromioida, Tanidromitidae, Jurásico Medio, Francia, nueva especie.

1. Introduction

With a delay of more than a decade, the PhD dissertation by Wehner (1988) sparked a renewed interest in Jurassic brachyurans, and a plethora of papers on the taxonomy, phylogenetics and paleoecology of these taxa has appeared in recent years (e.g., Müller *et al.*, 2000; Schweigert, 2006; Schweitzer *et al.*, 2007; Krobicki and Zatoń, 2008; Schweitzer and Feldmann, 2008a, 2008b, 2009a, 2009b, 2010; Crônier and Boursicot, 2009; Hyžný *et al.*, 2011; Starzyk *et al.*, 2011, 2012). The family Tanidromitidae, erected by Schweitzer and Feldmann (2008a), currently comprises two genera, namely *Gabriella* Collins, Ross, Genzano and Mianzan, 2006 and *Tanidromites* Schweitzer and Feldmann, 2008a. Seven species have been assigned to the genus *Tanidromites*, which ranges from the upper Bajocian to the Tithonian (Schweitzer and Feldmann, 2008a, 2009b), with records from England, France, Germany, Switzerland, Austria, the Czech Republic, Poland, Romania and Lithuania (e.g., Schweitzer and Feldmann, 2009b; Hyžný *et al.*, 2011; Schweigert and Koppka, 2011); we here add the eighth, *Tanidromites maerteni* n. sp. Some undescribed species of *Tanidromites* have also been recorded from the Tithonian (uppermost Jurassic) of Ernstbrunn (Austria) and Štramberk (Czech Republic) by Schweitzer and Feldmann (2009b). For a detailed overview of all known representatives of the genus *Tanidromites*, reference is made to Hyžný *et al.* (2011, p. 3, table 1).

The holotype of *Tanidromites richardsoni* (Woodward, 1907) stems from the Anabacia Limestone (*Clypeus* Grit) of the southern Cotswolds, England (Withers, 1951). According to Hunter and Underwood (2009), this unit is of earliest Bathonian (Middle Jurassic) age. Two additional specimens of the same species were recorded from the Upper Coral Beds (*Parkinsoni* Zone, *Truellei* Subzone; upper upper Bajocian) of Somerset (England) by Withers (1951) and Donovan (1962), respectively. Recently, Schweigert and Koppka (2011) have described another specimen of *T. richardsoni* from coeval levels (Sengenthal Formation, Parkinsonien-Oolith Member) at Göllersreuth near Thalmässing (southern Germany).

The only other Middle Jurassic species, *Gabriella lugobaensis* (Förster, 1985), originates from reefal limestones near the top of the Lugoba Formation, as exposed two kilometres southeast of Lugoba, northern Tanzania. Although a number of ammonites held typical of the lower Bajocian *Sauzei-Humphresianum* Zone were recorded by Kapilima (2003b) from the middle part of the Lugoba Formation, the same author (Kapilima, 2003a) dated the reefal limestones near the top of the unit as Bathonian.

The present specimen, collected by Lionel Maerten (October 2, 2010) from the oolitic limestones locally called “Oolithes ferrugineuses de Bayeux” in the Commune de Maizet, Calvados (northwest France), is of early late Bajocian (*Niortense* Zone) age and thus constitutes the earliest record of the genus *Tanidromites* and of the family

Tanidromitidae.

2. Systematic paleontology

Order Decapoda Latreille, 1802
 Infraorder Brachyura Latreille, 1802
 Section Podotremata Guinot, 1977
 Subsection Dromioidia De Haan, 1833
 Superfamily Homolodromioidea Alcock, 1900
 Family Tanidromitidae Schweitzer and Feldmann, 2008a
 Genus *Tanidromites* Schweitzer and Feldmann, 2008a

Type species. *Prosopon insigne* von Meyer, 1857, by original designation

Tanidromites maerteni n. sp.
 Figure 1

2.1. Material examined

The holotype, and sole specimen known to date, is MNHN.F.A47612 (leg. L. Maerten) in the collections of the Muséum National d’Histoire Naturelle, Département Histoire de la Terre (Paris).

2.2. Etymology

In honor of Lionel Maerten, who collected the holotype and kindly donated it to the MNHN collections.

2.3. Type locality and stratigraphy

The type specimen originates from the town quarry of the Commune de Maizet, Calvados (northwest France) from a level which is locally referred to as the “Oolithes ferrugineuses de Bayeux”, the age of which is early late Bajocian (*Niortense* Zone) (Gauthier *et al.*, 1996).

Table 1. Ammonite zones of the upper Bajocian (after Callomon, 2003).

Zones	Subzones
<i>Parkinsoni</i>	<i>Bomfordi</i>
	<i>Truellei</i>
	<i>Acris</i>
<i>Garantiana</i>	<i>Tetragona</i>
	<i>Garantiana</i>
	<i>Dichotoma</i>
<i>Niortense</i>	<i>Baculata</i>
	<i>Polygyralis</i>
	<i>Banksii</i>

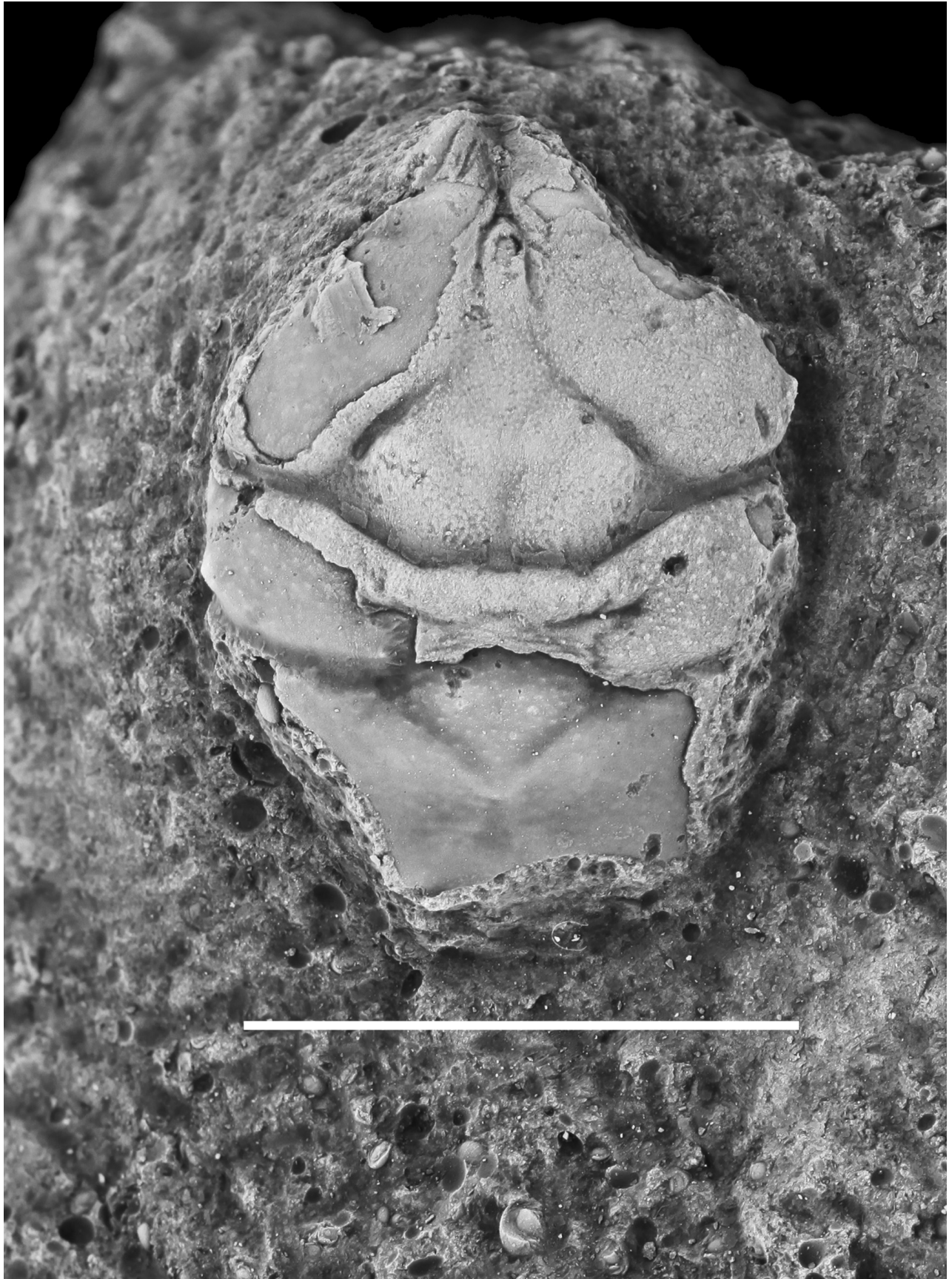


Figure 1. *Tanidromites maerteni* n. sp. with a maximum length of 14 mm, a maximum height of 4 mm and a maximum width of 11 mm, measured across epibranchial region. Scale bar = 1 cm.

2.4. Diagnosis

A tanidromitid with lateral epibranchial spine, a slightly concave portion of the cervical groove at the central posterior margin of the mesogastric region; two faint, yet clearly visible, V-shaped grooves on the central part of the mesogastric region; relatively deep and long postcervical grooves; pustulate ornament on cardiac, epibranchial and epigastric regions.

2.5. Description

Carapace rectangular in outline with a maximum length of 14 mm, a maximum height of 4 mm and a maximum width of 11 mm, measured across epibranchial region. Strongly vaulted in longitudinal and transverse sections. Broad-based triangular rostrum, downturned, with median sulcus. Orbits and orbital sockets not preserved, but weak rim present. Mesogastric region well defined, widening considerably posteriorly with a faint median sulcus on the posterior part and two faint, V-shaped sulci medially, in parallel arrangement. Pronounced cervical groove, slightly concave medially and sinuous towards the lateral sides, which incises it distinctly. Inflated urogastric region posteriorly bordered by relatively long and distinct postcervical grooves. Distinct epibranchial region in between deeply incisive cervical and branchiocardiac grooves with lateral epibranchial spine in posterior part. Cardiac region pentagonal. Ornament pustulate on all inflated regions, but most pronounced on epigastric and cardiac regions. Appendages, ventral side and abdomen not preserved.

2.6. Remarks

Tanidromites maerteni n. sp. differs from all other members of the genus in possessing a lateral epibranchial spine; the central base of the mesogastric region is slightly concave, whereas all other species show a more V-shaped cervical groove medially and the mesogastric region has two highly inflated lateral parts and two V-shaped sulci medially; in addition, the pronounced postcervical grooves are the longest within the genus.

Lately, it has become clear to us that the various published diagnoses of the family Tanidromitidae are insufficient to differentiate assigned species from those placed in Prosopidae von Meyer, 1860. Schweitzer and Feldmann (2008a) originally mentioned that the carapace was longer than wide. Subsequently, Schweitzer and Feldmann (2009b, p. 2) stated “width 70-85% maximum length”. The specimen described by Schweigert and Koppka (2011, p. 5, fig. 5) as *T. richardsoni* has a greater L/W ratio, and even though the rectangular carapace and groove pattern clearly match the Tanidromitidae, that particular specimen could not be assigned to the family if the emended diagnoses were strictly adopted. The most recent, adjusted diagnosis of the family Tanidromitidae,

by Schweitzer and Feldmann (2009b, p. 2) is as follows, “Carapace longer than wide, width 70-85% maximum length; lateral flanks of carapace strongly developed; regions well-defined, generally smooth, protogastric and hepatic regions confluent; rostrum downturned, blunt-triangular, axially sulcate; orbit small, directed forward, situated at base of rostrum, rimmed; augenrest usually rimmed, may have small spines or protuberances; fronto-orbital width 50-60 % maximum carapace width; lateral margins parallel, subparallel to one another, or diverging slightly posteriorly; subhepatic region may be markedly inflated; large portion of ventral side lies below ventral extension of branchiocardiac groove; ventral extension of cervical groove deep; ventral extension of branchiocardiac groove diminishing ventrally.”

The diagnosis of the family Prosopidae (see Schweitzer and Feldmann, 2009a, p. 65) is, “Carapace longer than wide, narrowing anteriorly, widest at branchial regions; regions well defined by grooves; cervical and branchiocardiac groove well developed; postcervical groove usually present; rostrum extending well beyond orbits; augenrest directed anterolaterally, bounded by inflated subhepatic region on suborbital rim and inner- and outer-orbital spine on upper-orbital margin; lateral margins well defined but not high; grooves deep and well marked, postcervical groove present; posterior margin bi-convex, apparently to accommodate fifth pereopods.” Thus, the only difference at the family level between Tanidromitidae and Prosopidae that can be used is the presence of a biconvex posterior margin in the latter. However, Schweitzer and Feldmann (2008b) included the genus *Laeviprosopon* in Prosopidae, despite the fact that they failed to document a biconvex posterior margin in both their diagnosis and illustrations. In short, in the current diagnoses of both families there are no unambiguous diagnostic differences.

The specimen described by Schweigert and Koppka (2011) as *T. richardsoni* differs from both the type species and from *T. maerteni* n. sp. in showing a much greater L/W ratio, in the shape of the cardiac region and shape and location of the postcervical groove. The former is a relatively small specimen and care should be taken to include L/W ratios in diagnoses of families, so long as little is known about ontogenetic developments of the species included. Considerable ontogenetic variation within Goniodromitidae has recently been demonstrated by Klompmaker *et al.* (2012) for several species from the Albian-Cenomanian (middle Cretaceous) of Koskobilo, northern Spain. Length/width ratios vary, with smaller specimens being relatively longer, more vaulted longitudinally and transversely, and showing a tendency towards a more triangular rostrum and more obscured ornament. Most Jurassic specimens lack their shell or large portions of it. In the diagnoses of Tanidromitidae by Schweitzer and Feldmann (2008a, p. 137; 2009b, p. 2), it reads, “regions mostly/generally smooth”. Schweigert and Koppka (2011) already noted that care should be taken in the case of internal moulds, because a new specimen of *Tanidromites sculpta* (Quenstedt, 1857)

did show a strong ornament, while all internal moulds of the same species were entirely smooth. It appears that most species of both *Tanidromites* and *Gabriella* did have pustulose, granulose and/or scabrous ornamented carapace regions. The holotype of *Tanidromites maerteni* n. sp. demonstrates both the internal mould and portions of cuticle; this clearly shows the difference in ornament.

Unfortunately, our study could not benefit from data presented by Krobicki and Zatoń (2008), because those authors did not provide any photographs or discuss any morphological details in their survey of the most diverse mid-Jurassic brachyuran fauna so far, with one new genus and four new species noted. It can only be hoped that these data will become available in the very near future.

Acknowledgements

We thank Dr. Sylvain Charbonnier for providing stratigraphic data and Mr Philippe Richir for a cast of the specimen (both Muséum National d'Histoire Naturelle, Département Histoire de la Terre, Paris); also to Mr. Lionel Maerten (Ver-sur-Mer, France) for donating the specimen. Thanks are due to Dr. Francisco Vega (Instituto de Geología, UNAM, Mexico), and an anonymous reviewer for their comments and improvements of an earlier typescript.

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Manuscript received: September 28, 2012.

Corrected manuscript received: October 20, 2012.

Manuscript accepted: October 22, 2012.