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ACANTHOCHAETETES FISCHERI N. SP. (CORALLINE DEMOSPONGE) FROM THE UPPER PALEOCENE (THANETIAN) OF IRAQ (KURDISTAN REGION) AND IRAN (SISTAN SUTURE ZONE)

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Abstract The new coralline demosponge *Acanthochaetetes fischeri* n. sp. is described from the upper Paleocene (Thanetian) of Iraq (Kurdistan Region, Khurmala Formation) and Iran (Sistan Suture Zone). The genus *Acanthochaetetes* Fischer is a long-ranging genus known from the Upper Jurassic (*A. foroiuliensis*), through Upper Cretaceous (e.g., Coniacian *A.*? *krumbachensis*) and Eocene (*A. eocenica*) to Recent. *A. fischeri* n. sp. is the first record from the Paleocene following the K-Pg mass-extinction, thereby closing the gap within the Santonian-Eocene interval. It occurs in platform-margin/upper slope depositional settings associated with coralline algae, corals, and echinoids.

Keywords: Sponges, systematics, early Paleogene, Middle East

INTRODUCTION

Known since the Upper Jurassic, the Recent coralline demosponge with massive basal skeleton (= hypercalcified sponge) *Acanthochaetetes wellsi* Hartman & Goreau, 1975 is often considered as conservative and a living fossil (e.g., Hartman & Goreau, 1975; Reitner & Engeser, 1987; Rützler & Vacelet, 2002). During the Cretaceous, representatives of *Acanthochaetetes* have been described from three different depositional settings (or niches), (i) shallow open marine, (ii) deep fore-reef and (iii) cryptic niches (e.g., reef caves) (Reitner & Wörheide, 2002). In our studies, *Acanthochaetetes* has also been observed associated with iron-stained hardground communities of encrusting foraminifera, serpulids and siliceous sponges (Fig. 1). It is worth mentioning that the genus *Acanthochaetetes* exhibits a skeleton build up of high-magnesium calcite accounting for a dark micritic appearance in thin-sections (e.g., Reitner & Gautret, 1996; Reitner et al., 1997; Vacelet et al., 2010; West, 2011; Gilis et al., 2013). Spicules incorporated into the skeleton have been evidenced by Reitner & Engeser (1983). Within its rather long stratigraphic record, *Acanthochaetetes* species are discontinuously reported. There are records from the Upper Jurassic (Fischer, 1970), Lower Cretaceous (Fischer, 1970; Reitner & Engeser, 1987), and the Upper Cretaceous (Cenomanian: e.g., West, 2011; Coniacian: Senowbari-Daryan et al., 2004). In the Santonian–middle/upper Paleocene interval, however,there are, according to our knowledge, no records of *Acanthochaetetes* in the literature. The first evidence after the K/Pg boundary event is represented by the species *Chaetetes* (*Septachaetetes*) *eocenus* described from the Middle Eocene (Lutetian) of Spain (Ríos & Almela, 1944) and treated as belonging to *Acanthochaetetes* by Senowbari-Daryan et al. (2004). From Pleistocene reef limestones of the Vanuatu Archipelago, Pacific, specimens of *Acanthochaetetes* sp. have been recorded by Millet & Kiessling (2009). Last but not least, the "living acanthochaetid" *A. wellsi* was described by Hartman & Goreau (1975) from the western Pacific region (e.g., Marianas, Caroline, Marshall, Fiji Islands). The here described *Acanthochaetetes fischeri* n. sp. from Iraq (type-locality) and Iran represents the first record of the genus from the Paleocene.

GEOLOGICAL SETTING

The type-locality of the new species (including the majority of the illustrated specimens) is located in Iraq. Three specimens, coming from three rock samples, derive from Iran.

Iraq

The type section of the Khurmala Formation (Paleocene-lower Eocene) was described for the first time by Bellen et al. (1959) in the Kirkuk-114 well, consisting of ~185 m dolomite. In the last two decades, the formation was studied in different locations in the Kurdistan Region by several authors (Al-Qayim, 1995; Al-Bannai et al., 2006; Al-Lihaibi, 2012; Salih, 2013; Karim, 2016; Kamal et al., 2018; Assad & Balaky, 2018; Bucur et al., 2018). The Khurmala Formation consists generally of dolomitic limestones and recrystallized limestones with rather poor fossil content including benthic foraminifera, green algae and gastropods. The studied section crops out in the Nawar Mountains, about 15 km north-west of Halabja town in the Kurdistan region, northeastern Iraq (Fig. 2).

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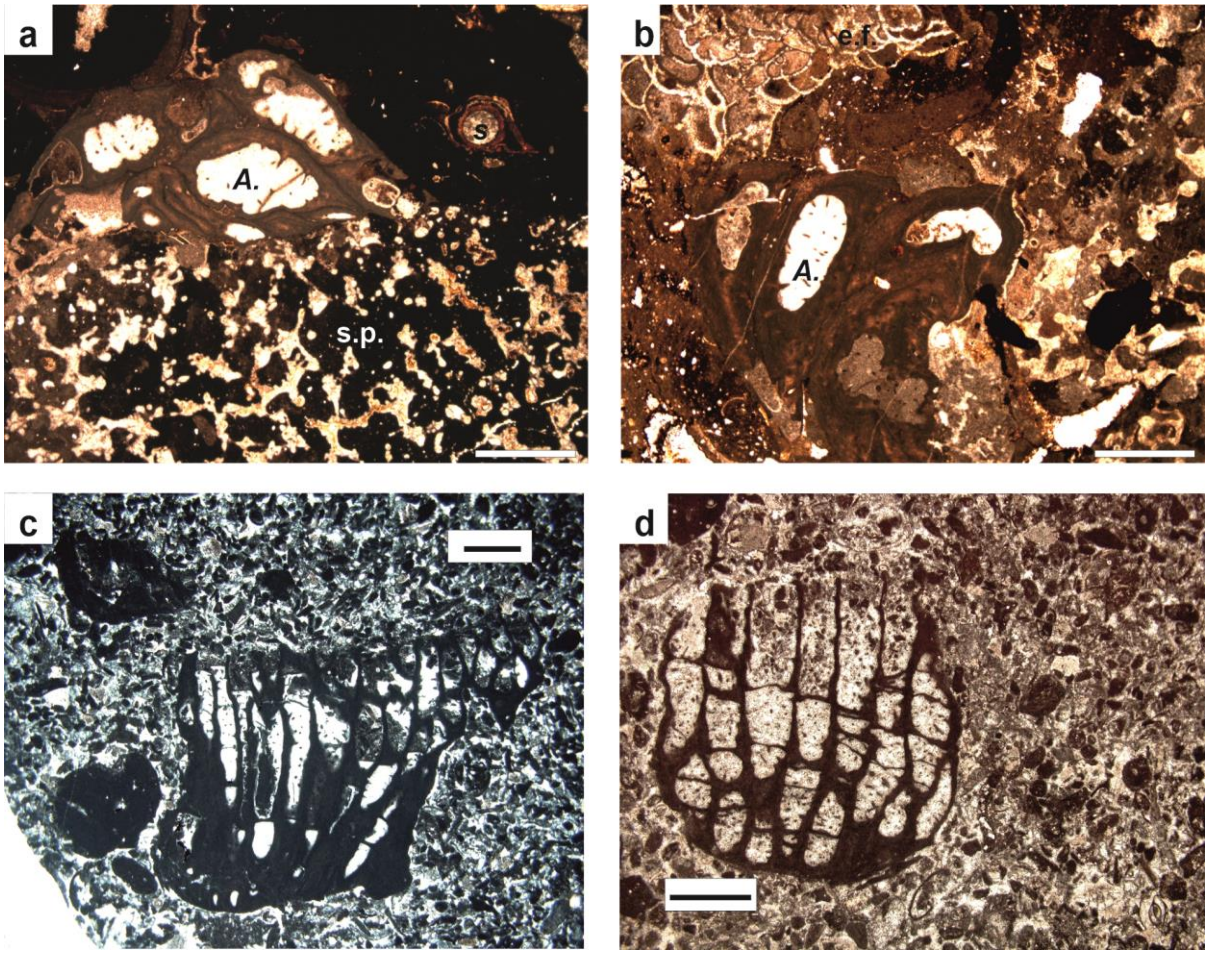

Fig. 1 a-b *Acanthochetetes* sp. from a lower Albian hardground (base of Meruelo Formation) of Cape Ajo, Cantabria, N Spain. *A.* = *Acanthochaetetes*, s = serpulid tube, s.p. = siliceous sponge, e.f. = encrusting foraminifera. Scale bars = 1.0 mm. **c-d** Bioclastic packstone (upper slope facies) with *Acanthochaetetes fischeri* n. sp. from the upper Paleocene of eastern Iran; thin-sections 2pz 95 and BN 89. Scale bars 1.0 mm(a-b), 0.9 mm (c) and 0.6 mm (d).

It is located at the western limb of the Balambo Anticline within the folded zone of the Zagros chains (Al-Qayim, et al. 2012) and was studied for the first time by Daoud (2020). The coordinates of the section are 35° 7'44.56"N and 45°52'6.27"E. Here, the thickness of the Khurmala Formation is ~73 m consisting of dolomitic, and poorly fossiliferous, light grey and yellowish-grey limestones. The here named Nawar section can be divided into two parts, with blocks in the lower part and bedded limestones (thickness of beds 0.1-1.0 m) in the upper part. The studied samples with *Acanthochaethetes fischeri* n. sp. are from the middle part of the section (Fig. 2). Contrasting other sections of the Khurmala Formation, this section is devoid of larger benthic foraminifera with biostratigraphic importance. From the Nawar section Daoud (2020) indicated the presence of *Idalina sinjarica* Grimsdale accounting for a middle Paleocene-early Eocene age (Serra-Kiel et al., 1998, SBZ 3 to SBZ 6).

Iran

The samples with *Acanthochaetetes fischeri* n. sp. are from a section of the Palang Formation located SE of Bandan village, about 215 km distance to Zahedan, the central province city, and close to the border to Afghanistan. The so-called Kuh-e-Patorgi section (see Schlagintweit et al., 2019) is located on Bandan map 1:100000 (Eftekhar Nezhad et al., 1990). Geotectonically, the study area is located between the Lut Block in the west and Helmand (or Afghan) Block to the east and known as East Iran Flysch Zone or Sistan Suture Zone. Lithologically, it mainly includes ophiolitic mélanges and Upper Cretaceous to Paleogene sediments (Tirrul et al., 1983). The Kuh-e-Patorgi section still needs detailed micropaleontological studies. The coordinates of the section base are 31°22'59.10"N, and 60°49'36.58"E.

There are no biostratigraphic data from the rhodophycean-dominated samples with *A. fischeri* n. sp. in the top parts of the Kuh-e-Patorgi section. Below, the frequent occurrence of dasycladalean algae is worth mentioning, including forms like *Rostroporella oviformis* Segonzac, *Hamulusella sedalenensis* Elliott, and *Acroporella anceps* Segonzac. These data, together with the occurrence of the foraminifera *Rotorbinella detrecta* Hottinger allow to assign the layers with *A. fischeri* n. sp. to the late Paleocene (Thanetian) (e.g., Barattolo 2002; Hottinger, 2014).

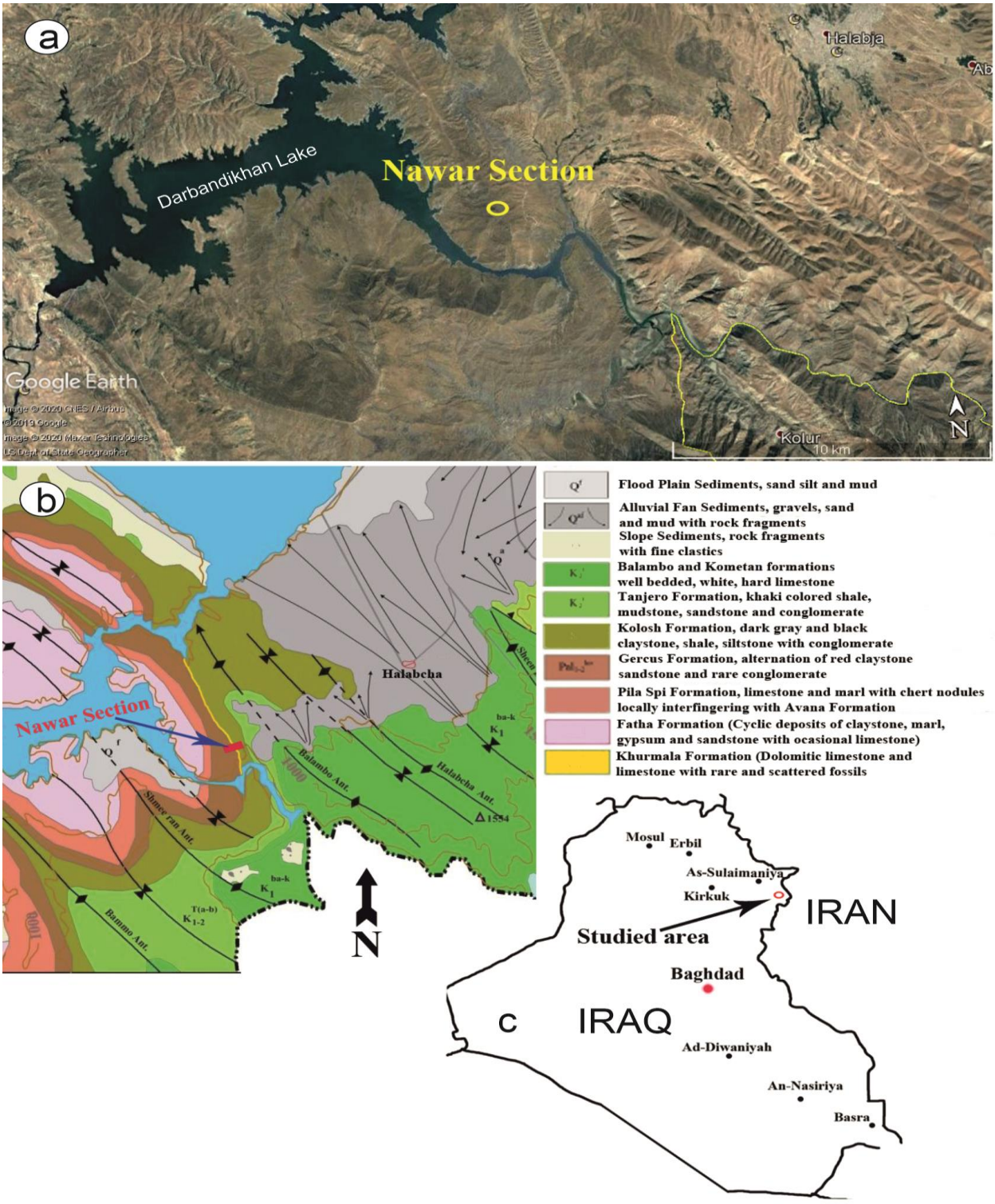

Fig. 2 Type-locality of *Acanthochaetetes fischeri* n. sp. in northern Sulaymaniyah Governorate, Iraq. **a** Location of the Nawar section close to Darbandikhan Lake (from google Earth). **b** Geological map showing the distribution of the Kolosh Formation. **c** Location of the type-locality of *Acanthochaetetes fischeri* n. sp. in northeastern Iraq close to the border to Iran.

MATERIAL AND DEPOSITORY

The samples containing *Acanthochaetetes fischeri* n. sp. from the Khurmala Formation of Iraq belong to ten thin sections labeled in the field as follows: NA14-Iraq, NA15-Iraq, NA16-Iraq, NA17-Iraq, NA18-Iraq, NA22-Iraq, NA24-Iraq, NA26-Iraq, NA30-Iraq, NA36-Iraq, and are deposited under the numbers 17 to 26 in the Geology Laboratory of the Water Resources Engineering Department, College of Engineering, University of Sulaimani, Sulaimani city, Iraq. The three thin-sections from eastern Iran, labeled 2pz93, 2pz95, and BN 89 are deposited at the Department of Geology, Yazd University (Rashidi collection).

SYSTEMATIC PALAEONTOLOGY

The suprageneric systematics follows Hartman & Goreau (1975) adopted by Reitner & Engeser (1983).
Class Sclerospongiae Hartman & Goreau, 1975
Order Tabulospongida Hartman & Goreau, 1975
Family Acanthochaetetidae Fischer, 1970
Genus *Acanthochaetetes* Fischer, 1970
Acanthochaetetes fischeri n. sp.
Figs. 1b–c, 3–4

Synonymy:
2009 Bryozoa – Salih & Abdullah, fig 9.4 (Thanetian Sinjar Formation, NE Iraq)
2013 Bryozoa – Rajabi, pl. 1, figs 5–6 (legend erroneously placed for plate 2) (Thanetian of Tale-Zang Fm., Lorestan Basin, Iran).
2020 *Acanthochaetetes* sp. – Daoud, figs 5.4, 5.7–5.8, 5.10.

Origin of name: The species name is dedicated to J.-C. Fischer for his fundamental work on the Chaetetidae noting that the family Acanthochaetidae and the genus *Acanthochaetetes* were described by him.

Type locality: The section crops out in the Nawar Mountains, about 15 km north-west of Halabja town in the Kurdistan region, northeastern Iraq (Fig. 1). Section located at the western limb of the Balambo Anticline within the Nawar Mountains of the folded Zagros zone of northern Iraq.

Type stratum: Bedded limestones of the Khurmala Formation.

Holotype: Longitudinal-oblique section illustrated in figure 3c; thin-section NA – 14 Iraq, Paleocene of Irak, deposited at the Geology Laboratory of the Water Resources Engineering Department, College of Engineering, University of Sulaimani, Sulaimani city, Iraq.

Diagnosis: Acanthochaetid sponge with broad calicles ranging from 1.5 to 2.5 per mm^2, and massive double walls, which attain values of up to 300 µm. This combination of features is species diagnostic within the genus *Acanthochaetetes.*

Description:

Primary skeleton: *Acanthochaetetes fischeri* n. sp. does not bear recognisable spicule pseudomorphs. Specimens in thin section appear to be strongly silicified. Nonetheless, characteristics of its secondary skeleton allows its recognition as an achantochaetetid sponge.

Secondary skeleton: The basal skeleton shows a chaetetid structure, i.e. built by individual calicles that are separated from each other by means of a wall. No direct evidence to its growth form is available, as all specimens are observed from thin sections. The calicles are mostly oval to elliptical, yet some can be completely round in cross section (Fig. 3d, 3f). Division by both fissiparous and intraparietal gemmation can be seen (Figs. 4e–f). Mean value of calicles density per mm^2 is 1.5 to 2.5, mostly approaching to the former value. Calicle centre to centre diameter measures 0.5 to 0.8 mm, with a high tendency to the latter value. Calicle diameter ranges from 0.3 to 0.7 mm. In some cases, however, this value is close to zero due to the presence of some tubular thickenings. Double wall thickness values lie between 90 and 300 mm (Fig. 3a–b). The latter value is considered high among chaetetids (e.g., Fischer, 1970; Sánchez-Beristain et al., 2012; Sánchez-Beristain et al., 2019). Mode tends to 250 mm. Horizontal tabulae can seldom be seen within calicles. They can measure from 90 to up to 225 µm in width, and are not always concordant between adjacent calicles (e.g., Fig. 3a). Intertabular spaces range from 450 to more than 2 mm; they and are not always present, since there are few longitudinal sections available.

Internal characters:

Calicles are mostly oval to elliptical, yet some can be completely round in cross section. Division by both fissiparous and intraparietal gemmation can be seen. Mean value of calicles per mm^2 is 1.5 to 2.5, mostly approaching to the former value. Frequent lamellae of the upward-moving soft tissue can be seen in longitudinal section (e.g., Fig. 3c). Calicle centre to centre diameter measures 0.5 to 0.8 mm, with a high tendency to the latter value.

Discussion: Although the material has undergone silicification from a presumed original carbonate mineralogy, the appearance of the fossils in Figs. 1, 3 and 4 are sufficiently detailed to accept that the silicification has remained within the skeletal structure of the chaetetids and not extended into either the calicle internal space, or outwards to cause thickening of the calicle walls. Thus we are confident that the structures displayed in the thin sections are representative of the original architecture, although of course any microstructure is no longer preserved.

Kershaw et al. (2021) showed that the skeletal structure of Devonian stromatoporoids from Australia and Canada responds differently to silicification compared to gallery spaces. In the Canadian samples, the process of silicification altered significantly both the skeleton and galleries. However, the overall structure of the secondary skeleton remained, to some extent, unaffected, thus being able to recognise the original stromatoporoid fabric; a process called fabric-retentive recrystallisation. In addition, Kershaw (pers. comm.) detected the same process in two partly-silicified Carboniferous chaetetid sponges from England and from Central USA, emphasising that despite diagenesis, the identification of diagnostic characters and structures is reliable. Thus, the presence of some diagnostic characters, allow us to propose *Acanthochaetetes fischeri* n. sp. as a new species.

In the following, characters within the new species will be compared with those from other genera of the Acanthochaetetidae followed by a differential comparison between *A. fischeri* n. sp. and other representatives of *Acanthochaetetes.*The family Acanthochaetetidae Fischer is made up of two genera: *Willardia* Willenz & Pomponi and *Acanthochaetetes* Fischer. *Willardia*, a recent sponge,

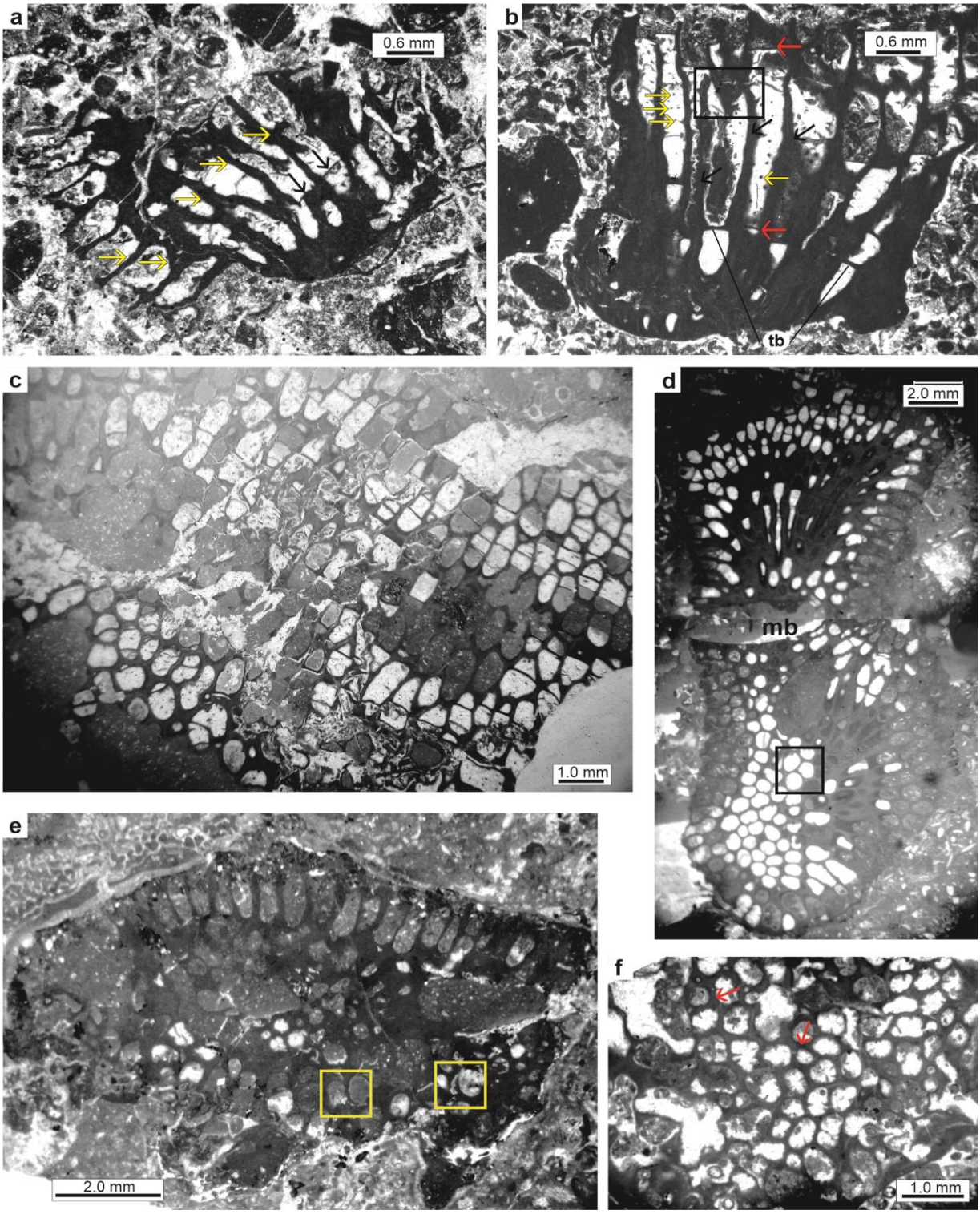

Fig. 3. *Acanthochaetetes fischeri* n. sp. from the upper Paleocene of eastern Iran (**a–b**) and northeastern Iraq (**c–f**). **a** Longitudinal section, showing notable walls (yellow arrows) and tabulae (black arrows), the latter occurring seldom. Thin-section 2pz 93. **b** Longitudinal section, with spines within calicles, diagnostic for the genus *Acanthochaetetes* Fischer (yellow arrows). Spines in only one calicle are shown. Note also the huge intertabular space (between red arrows), measuring > 2 mm as a rule. In addition, thick double walls, diagnostic for *A. fischeri* n. sp. can be seen (black arrows). A fissiparous division process (black square) is highlighted. Thin-section 2pz 95. **c–e** Oblique section, where the high density of calicles/mm^2 (1.5 to 2.5) can be confirmed. This trait can also be seen in d and e especially in the marked areas (squares). Thin-sections 24, 15, and 14. **f** Cross section, showing the remarkably thick double walls (red arrows), which can attain up to 0.3 mm. See text and table 1 for further details. Thin-section 26. Abbreviations: mb= macroboring (e.g. *Gastrochaenolites*-type), tb = tubulae.

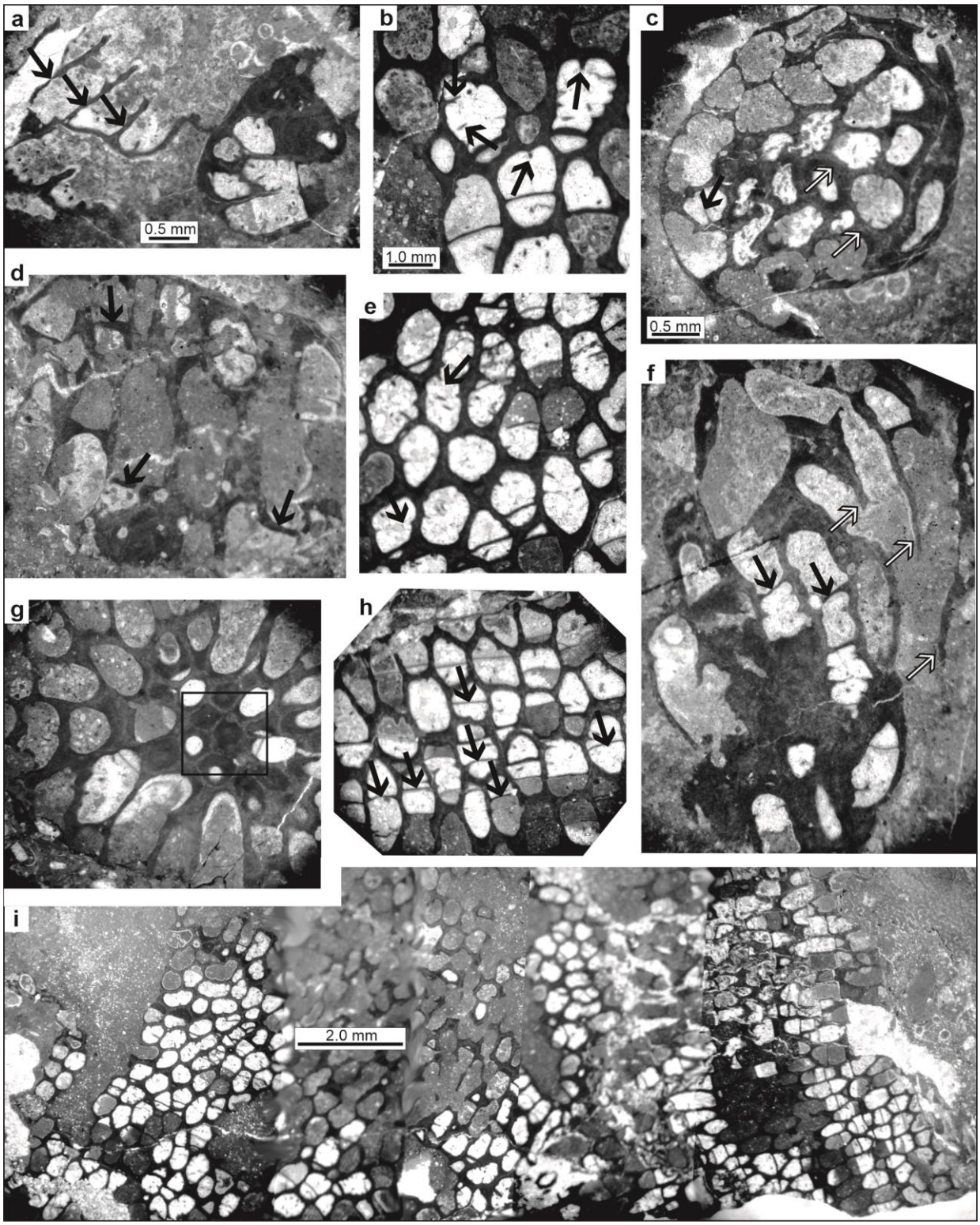

Fig. 4 *Acanthochaetetes fischeri* n. sp. from the upper Paleocene of northeastern Iraq. **a** Longitudinal (left) and cross (right) sections. Note the thick double walls (black arrows). Thin-section 18. **b–c** cross sections, where spines inside calicles (black arrows) and thick double walls (white arrows in c) can be seen. Thin-sections 24 and 17. **d** Oblique section, showing scarce tabulae (black arrows). Thin-section 17. **e** Cross section. Note the round/oval to elliptical shape of calicles, as well as two fissiparous division processes (black arrows). Thin-section 24. **f** Longitudinal section, where tabulae (black arrows) and subsequent fissiparous division processes (grey arrows) can be observed. Thin-section 17. **g** Cross-to-oblique section, showing massive thickenings (square; common for all Acanthochaetetidae; compare Reitner, 1991; Sánchez-Beristain et al., 2019, 2021). Thin-section 16. **h** Oblique section, with abundant lamellae (black arrows), common for all Acanthochaetetidae (compare Reitner, 1991). Thin-section 24. **i** Cross-oblique section, showing round to elliptical shape of calicles, as well as multiple lamellae (right side of the picture). See text and table 1 for further details. Thin-section 24.

Table 1. Dimensions of *Acanthochaetetes fischeri* n. sp. from the late Paleocene of northeastern Iraq and eastern Iran compared to other species of the genus.

TAXON	Calicles/ mm^2	Center-to-center diameter	Intertabular space	Double wall thickness	Oldest occurrence and place	Main reference
Acanthochaetetes foroiuliensis	4 to 9	0.45 mm	~ 1 mm	0.1 mm	Oxfordian; Friuli, Italy	Zuffardi-Comerci, 1926; Fischer, 1970
Acanthochaetetes huauclillensis	3 to 4	0.5 to 0.6 mm	0.2 to 1.2 mm	0.15 to 0.35 mm (mode = 0.22 mm)	Hauterivian - Barremian; Santiago Huauclilla, Mexico	Sánchez-Beristain et al., 2019; Barman et al., 2021; Sánchez-Beristain et al., 2021
Spirastrella (*Acanthochaetetes*) *seunesi*	1 to 1.5	0.6 to 1.2 (mode = 0.9 mm)	0.1 to 2 mm	0.05- 0.16 mm (mode = 0.1 mm)	Upper Albian; Basque Country, Spain.	Fischer, 1970; Reitner & Engeser, 1983, 1987
Acanthochaetetes ramulosus ≈ *Spirastrella* (*Acanthochaetetes*) *dendroformis*	2 to 4	0.35 to 0.70 (mode = 0.5 mm)	0.2 to 2 mm	0.45 - 1.2 mm (mode = 0.6 mm)	Lower Albian; Albeniz, Spain	Fischer, 1970; Reitner, 1991
Spirastrella (Acanthochaetetes) wellsi	8 to 9	0.35 - 0.7 mm	0.05 to 0.5 mm	0.07 - 0.14 mm (mode = 0.075 mm)	Recent; Pacific Ocean	Hartman & Goreau, 1975; Reitner, 1991
Acanthochaetetes sloveniensis	4	0.5 mm	0.2 to 1.5 mm	0.025 to 0.1 mm	Cenomanian; Radeče, Central Slovenia	Flügel & Ramovš, 1978.
Acanthochaetetes krumbachensis	n/a	n/a	n/a	0.025 - 0.1 mm	Coniacian; Krumbachalm, Northern Calcareous Alps, Austria.	Schlagintweit et al., 2004.
Chaetetes (*Acanthochaetetes*) *eocena*	n/a	0.7 - 1.5 mm	mean 1.5; max. 3 mm	n/a	Eocene; Huesca, Spain	Ríos & Almela, 1944; Reitner & Keupp, 1991
Acanthochaetetes fischeri n. sp.	1.5 to 2.5	0.5 - 0.8 mm	0.45 to > 2 mm	0.09 to 0.3 mm (mode = 0.25 mm)	Palaeocene; Kurdistan, Irak; and eastern Iran.	This work.

has externally free edges curling downward (Willenz & and Pomponi, 1996). In addition, its surface is compactly ornamented by finger-like protrusions. Neither of these characters can be observed in the samples analysed in this work, since they are only found in thin sections. Furthermore, *Willardia* is an encrusting sponge, whereas no information with this respect can be obtained from *A. fischeri* n. sp. Moreover, the secondary skeleton of *Willardia* is made of aragonite. As for most *Acanthochaetetes* (compare Reitner & Kaupp, 1991; Sánchez-Beristain et al., 2019), it is likely that the original mineralogy of *Acanthochaetetes fischeri* n. sp. had been high-Mg calcite. This, in spite of the dominant low-Mg calcite mineralogy during the Late Cretaceous-Early Paleogene seas (Sánchez-Beristain et al., 2016). In addition, *Willardia* can only be found in the Recent times, and it does not have any fossil findings to date. Species of the genus *Acanthochaetetes* have notable similarities with all specimens analysed in this work, specially the presence of tubular thickenings and the spine-like processes within calicles. In the following, *Acanthochaetetes fischeri* n. sp. is compared with selected *Acanthochaetetes* species (Table 1), in order to sustain its constitution as a new taxon.

Acanthochaetetes foroiuliensis (Zuffardi-Comerci) (Oxfordian of Friuli, Italy) is a massive spherical sponge. Its intertabular space (~ 1 mm) and its double wall thickness fall within the range of *Acanthochaetetes fischeri* n. sp. However, its calicle/mm^2 ratio is at least, twice than for *A. fischeri* n. sp., with 1.5 to 2/mm^2. In addition, the centre-to centre diameter in *A. foroiuliensis* (0.45 mm) is smaller than in *A. fischeri* n. sp. (0.5 to 0.8 mm). In addition, the only finding of this species can be taxonomically attributed to *A. seunesi* (Fischer, 1970).

Spirastrella (Acanthochaetetes) seunesi (Fischer) is a widely known achanthochaetetid from the Upper Cretaceous. It can be recognised by its broad calicular diameter in cross-section, which is reflected also in the calicle ratio per mm^2 (1 to 1.5). Although its higher value falls within the range of *A. fischeri* n. sp., the calicle density in the latter is higher than in the former, as calicles of *A. fischeri* n. sp. are smaller in cross-section (calicle centre to centre from 0.5 to 0.8 mm in comparison to 0.6 to 1.2 mm in *S.* (*A.*) *seunesi*. Moreover, double-wall thickness in *S.* (*A.*) *seunesi* is overall smaller (mode 0.1 mm) in comparison to 0.25 mm from *A. fischeri* n. sp.

Acanthochaetetes ramulosus (Michelin) (Albian to Cenomanian, Spain and France), is characterised by the branched shape of the skeleton, which cannot be ascertained for *A. fischeri* nov. sp. In addition, *A. ramulosus* can attain a lenght of "various" decimeters (Fischer, 1970). Furthermore, its calicle/ mm^2 density attains at most 4, whereas in *Acanthochaetetes fischeri* n. sp., the maximum value is 2.5. Moreover, this taxon has been considered a synonym to *Spirastrella* (*Acanthochaetetes*) *dendroformis* Reitner (Reitner, 1991). However, Reitner (1991) did not define any measure of calicular characters.

Spirastrella (*Acanthochaetetes*) *wellsi* Reitner is a sponge with a lamellar microstructure and a calcitic skeleton made up of contiguous vertical tabulated calicles with vertical rows of irregular clumps of spines growing within. This sponge lives in cryptic habitats on reefs in the Western Pacific Ocean (Marshall Islands; Hartman & Goreau, 1975). Calicular lumen can either be elliptical or polygonal. Calicle diameter can attain up to 0.6 mm. Double wall thickness range from 0.07 to 0.14 mm, which is overall smaller than it *Acanthochaetetes fischeri* n. sp., which ranges from 0.09 to 0.3 mm. Furthermore, average calicular density of *S.* (*A.*) *wellsi* ranges from 8 to 9 / mm^2, almost fourfold than for *Acanthochaetetes fischeri* n. sp.

Acanthochaetetes huauclillensis Sánchez-Beristain & García-Barrera (Hauterivian-Barremian, Oaxaca, Mexico, to Aptian-Cenomanian, Ladakh Himalaya, India) despite having similar double wall thickness values of 0.15 to 0.35 mm (in comparison to 0.09 to 0.3 mm in *A. fischeri* n. sp.), has overall smaller intertabular spaces (from 0.2 to 1.2 mm vs. 0.45 to >2 mm in *A. fischeri* n. sp.). In addition, its calicle density/mm^2 is higher (3 to 4) than for *A. fischeri* n. sp., with a maximum value of 2.5.

Acanthochaetetes sloveniensis Flügel & Ramovš (Cenomanian, Central Slovenia), has been recognised by its internal measurements, most remarkably its double wall thickness (0.025 to 0.1 mm). This value is overall much smaller than in *Acanthochaetetes fischeri* n. sp. In addition, *A. sloveniensis* has been reported only once (Flügel & Ramovš, 1978).

Acanthochaetetes? *krumbachensis* Senowbari-Daryan, Schlagintweit & Sanders (Coniacian, Northern Calcareous Alps, Austria) has been reported for one location (Senowbari-Daryan et al., 2003). It has been described from only thin sections; however, its only available character (double-wall thickness at 0.025 to 0.1 mm) is much smaller than in *Acanthochaetetes fischeri* n. sp., with 0.09 to 0.3 mm.

Chaetetes (*A.*) *eocena* Ríos & Almela (Eocene; Huesca, Spain) records intertabular spaces to up to 3 mm (mean 1.5), which is notably higher than in *A. fischeri* n. sp. (ranging from 0.45 to more than 2 mm). In addition, its calicle centre to centre diameter measures from 0.7 to 1.5 mm, which is almost twice than in *Acanthochaetetes fischeri* n. sp. Considering these features, *Acanthochaetetes fischeri* n. sp. can be reliably erected as a new species within the genus *Acanthochaetetes*.

CONCLUSIONS

We present here *Acanthochaetetes fischeri* n. sp., a new acanthochaetetid sponge defined by the presence of the following diagnostic characters: calicles ranging from 1.5 to 2.5 per mm^2, and massive double walls, up to 300 µm. In addition, this report constitutes the first record of the genus for the Paleocene. Further work in different disciplines (paleoecology, paleobiogeography) is needed in order to better comprehend the natural history of *A. fischeri* n.sp. and of acanthochaetetids in general.

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