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FANTHALAMIA KADIRI NOV. SP., A NEW "SPHINCTOZOAN" SPONGE FROM THE TRIASSIC (CARNIAN) OF TURKEY

BABA SENOWBARI-DARYAN¹, MICHAEL LINK¹ & DIEGO C. GARCÍA-BELLIDO²

ABSTRACT. A new sphinctozoid sponge - *Fanthalamia kadiri* - is described from the Upper Triassic (Carnian) of the Antalya area, southern Turkey. This is the second species of the genus *Fanthalamia* found in Upper Triassic rocks of Turkey.

Key Words: Sponge, "Sphinctozoa", Triassic, Carnian, Turkey

INTRODUCTION

Coralline sponges ("Sphinctozoida", "Inozoida" and "Chatetetida") are the most important reef building organisms within the Upper Triassic reefs in the Tethyan realm and also in reef limestones in different nappes of the Antalya area (southern Turkey). In some localities (e.g. Dereköy area) the fossils are in excellent aragonitic preservation. Investigations concerning the microstructure and systematic description of sponges have been carried out by Cuif & Gautret 1987, Gautret 1985, Gautret & Cuif 1989, Riedel 1990, Cremer 1994, Senowbari-Daryan 1990, 1994 and Senowbari-Daryan & Link 1998 among others.

The reef organisms of different Carnian and Norian-Rhaetian localities exposed north of Antalya were collected and a variety of sponges were found. Here the species *Fanthalamia kadiri* nov. sp. is described from the Carnian limestones of Bucakdere.

GEOLOGICAL SETTING AND POSITION OF LOCALITY

Part of the Upper Triassic sediments in Taurus Mountains (Southwestern Turkey) were deposited in a regional marginal basin of the Tethys, which was subdivided into several smaller basins. The most important of these is the Kasimlar Basin, represented now as a tectonic window located north of Antalya.

The Kasimlar Basin contains series of Carnian-Norian deposits, composed of alternating terrigenous siliciclastic detritus and carbonate sedimentation, with some local variations, depending on tectonic events.

Three types of carbonate sedimentation can be differentiated in the terrigenous siliciclastic succession of the Kasimlar Basin:

a) During the Carnian, three limestone units were deposited that are intercalated with the siliciclastic sediments. The most important of these units is the Bucakdere Carbonate Unit, with a thickness of 5 to 100 meters in the type locality north of the small village of Bucakdere.

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b) Around the Carnian / Norian boundary endemic sponge-dominated patch reefs developed. Because of tectonic events and sea level fluctuations, many fragments of these patch reefs were transported to a deeper area of the basin and redeposited in clays and silts as reef boulders (i.e. "Cipits").

c) The filling of the Kasimlar Basin ended with accumulation of lagoonal limestones and dolomites. Carbonate deposition occurred only in the southwestern parts of the basin during the Laciian. In the Alaunian, carbonate sedimentation took place again across the whole basin.

The sponge described in this paper occurs in the central area of the Bucakdere Carbonate Unit. In the type locality of this unit, north of the small village of Bucakdere (west of Kasimlar), the carbonates are tectonically displaced (Senel et al. 1992). The individual parts of the unit are dipping almost vertically and form a dome-shaped anticline structure with a diameter of approximately 2.5 km. In the center of 'Bucakdere dome' diabase tuffits were found as a local deposit here underlying the carbonates (see Flügel & Link 1996). This volcanic activity probably caused particular ecological conditions in this part of the basin, where biostromes with corals and sponges occur.

The sponge described in this paper was found at Kursunluk Hill, on the eastern part of Bucakdere dome (see fig. 1).

SYSTEMATIC PALEONTOLOGY

Class Demospongia SOLLAS, 1875

Order Permosphincta TERMIER & TERMIER, 1974

Suborder Porata SEILACHER, 1962

Family Polytholosiidae SEILACHER, 1962

Subfamily Fanthalamiinae SENOWBARI-DARYAN, 1990

Genus *Fanthalamia* (SENOWBARI-DARYAN & ENGESER, 1996)

(pro *Fania* SENOWBARI-DARYAN, 1990)

Type species - *Polytholusia astoma* SEILACHER, 1962

Diagnosis - "Moniliforme bis unregelmäßige Stämmchen ohne Spongocoel. In unterschiedlichen Abständen können Austrittsöffnungen (Osculi) entwickelt sein. Ein Füllskelett von tubulärem Typ, rudimentär oder fehlend. Poren sind mehrfach verzweigt. Vesiculae wurden nicht beobachtet." (Senowbari-Daryan 1990, p.83). (Moniliform to irregular bodies without spongocoel. Exhalant canals (osculi) can develop at different distances. Tubular filling skeleton rudimentary or absent. Pores are multibranched. Vesiculae have not been observed.)

Other species -

Fanthalamia polystoma (SEILACHER, 1962)

Fanthalamia utriculus (VINASSA DE REGNY, 1915)

Fanthalamia? aksuensis (SENOWBARI-DARYAN, 1990)

Fanthalamia multicanalis STANLEY & SENOWBARI-DARYAN, 1999

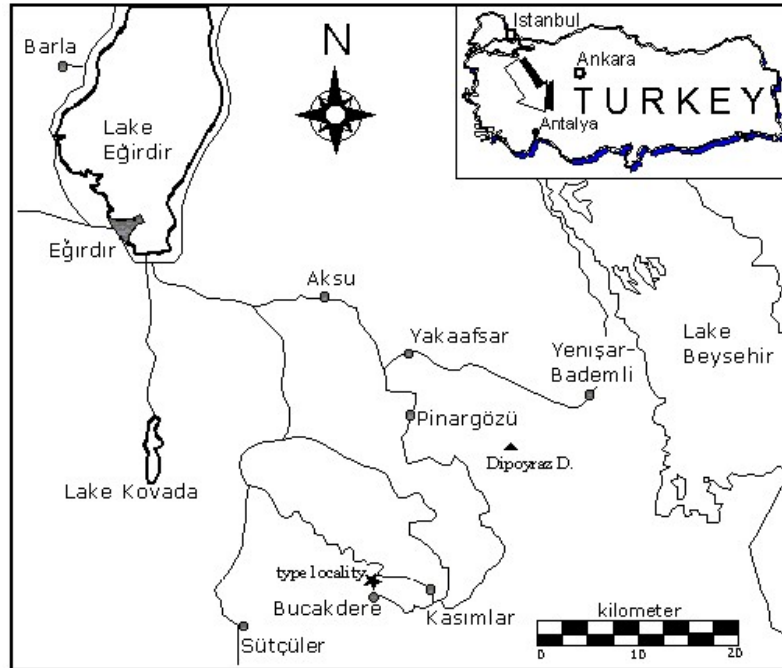


Fig. 1 - Location map of the study area. Outcrops referred to in the text occur north of Bucakdere village, indicated by the star.

***Fanthalamia kadiri* nov. sp.**
(Pl. I, figs. 1-5)

Etymology: This species is named after Kadir Can (Eğirdir, Isparta) who supported our field work with his knowledge about the localities.

Type specimens: We designate as holotype the specimen cut in longitudinal section and documented in Pl. I, fig. 3a and 4a. The holotype and paratypes in the same sample occur in two polished slabs.

Type locality: Kusunluk Hill, north of the village of Bucakdere (Eğirdir, Isparta).

Type level: Bucakdere Carbonate Unit (Carnian).

Diagnosis. - Multibranched stems of moniliform arranged chambers. Without spongocoel. Dichotomously branched specimens are common, with a conspicuous oscular apparatus consisting of a bundle of several large pores, in the pit between the branches. Porate exo- and interwalls. Filling structure of tubular type, when present.

Material. - Several specimens on part and counterpart of polished slabs and several specimens observed *in situ* but not collected (Pl. I, figs. 1, 2, 5).

Depository: The holotype (Pl. I, figs. 1-5, except 3a and 4a) and paratypes (Pl. I, fig. 3a and 4a) in the two polished slabs of sample BU 42 are deposited at the Research Institute Senckenberg, Frankfurt/Main (Germany). Inv.-Nr. "SMF XXVI 313 - *Fanthalamia kadiri*".

Description.- Segmented sponges with an aspiculate aragonitic skeleton and lacking a central spongocoel. The chambers are crescentic to hemisphaerical in shape. Outer segmentation is poorly developed and almost not recognizable from the outside, but internal segmentation is very well developed.

The largest specimen is 93 mm long and 15 mm wide. Most specimens have chambers that range between 7 and 12 mm wide, and between 3 and 6,5 mm high. Exowall is almost twice as thick as interwall, but both have pores of approximately the same size. The so-called "Oscular-Apparat" (Seilacher 1962) is composed of several large pores that connect one or more chambers with the outside. The whole bundle of pores is about 6 mm in diameter. The sponge branches after the formation of the oscular apparatus (Pl. I, figs. 2, 5), after its formation the normal form of the sponge is disturbed (Pl. I, figs. 1, 3.a, 4.a). Most specimens lack internal filling structures, but when present they are of tubular type (Pl. I, fig. 1).

Table 1

Dimensions of *Fanthalamia kadiri* nov. sp. (all measurements in mm).

Chamber Hight Width	Wall thickness Exowall Interwall	Pore diameter Exopores Interpores	Oscular apparatus' pores Number Hight Width	Filling structures Diameter
3 – 6.5	0.7 – 1.3	0.1 – 0.2	5 – 10	0.5 – 1
7 – 12	0.4 – 0.6	0.1 – 0.2	2.7 – 3 0.7 – 1.2	

Discussion.- Here we follow the systematic paleontology proposed by Seilacher (1962) and Senowbari-Daryan (1990). Absence of spicules in the walls and the probably aragonitic skeleton place these sponges in the Order Permosphincta, within the Class Demospongea. The presence of pores indicates that our specimens fall within the Suborder Porata. The type of filling structure was taken by Seilacher (1962) and Senowbari-Daryan (1990) to be a diagnostic character at the family level. In this case, the tubular filling structure, although not well developed, would indicate an affinity to the family Polytholosiidae. In this sponge family, the only subfamily without a spongocoel is the Subfamily Fanthalamiinae, with a single genus *Fanthalamia*.

The position of the oscular apparatus, as seen in whole specimens (Seilacher 1962: Pl. 4, fig. 2), occurs between the branches or changes the growth direction of the sponge, as it does on other species of the genus. However, this may not be apparent when the branching is in a plane not parallel to that of the section, and it may only be inferred by a minor bend in stem direction.

There are several differences between our species and those described before from Nevada and Sonora. The most conspicuous one is the different development of the filling structures: while tubes are common in the North American specimens, often filling the whole chambers (Senowbari-Daryan 1990, pl. 26, figs. 3 and 4), they are barely recognizable here. The difference in chamber size is quite striking: the chambers of *Fanthalamia polystoma* from Sonora and Nevada are 20 to 30 mm wide and only 2 to 13 mm high. This is a height/width ratio of up to 1:10, compared to 1:2 observed in *Fanthalamia kadiri* nov. sp. This could account for the fact that the oscular

apparatus in the North American specimens runs vertically through several chambers rather than affecting only contiguous chambers, as is the case of the Turkish specimens. We also noted that our samples show an interwall thinner than the exowall, which is not seen in *Fanthalamia polystoma*.

Other features, such as oscular apparatus design and size, pore diameter, exowall thickness, and overall arrangement of chambers, are similar. However, the paleogeographic distribution: *Fanthalamia polystoma* in North America and *Fanthalamia kadiri* nov. sp. in Turkey, is also taken into consideration in recognizing the specimens described here as belonging to a new species.

Compared to *Fanthalamia kadiri* nov. sp., *Fanthalamia? aksunensis*, the other species of this genus found in Turkey, has much thicker walls, and the filling structure, when present, is very dense, almost obliterating the chambers. Size and shape of the chambers are also more irregular than in our specimens (see Plate 27, figs. 1-7 in Senowbari-Daryan 1990).

Fanthalamia multicanalis and other species of the genus, described from the Quesnel Terrane of central British Columbia (Canada) by Stanley & Senowbari-Daryan (1999) differs from *F. kadiri* nov. sp. by irregularly arranged chambers and, especially, by numerous large tubes piercing the chamber roofs, tubes that are totally absent in this new species.

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PLATES

Plate I - *Fanthalamia kadiri* nov. sp. from Carnian rocks in Bucakdere, north of Antalya, southern Turkey.

- Fig.1.** Field photograph showing two specimens with tubular filling structures within the interiors of the chambers. x2.5.
- Fig.2.** Field photograph of a branched specimen showing the "Oscular-Apparat" at the branching point. Arrows point to the "Oscular-Apparat", where the "normal" growth of the sponge is disturbed and the chambers are developed only on one side of it. x2.
- Fig.3.** a) Holotype (half of it is in fig. 4.a) is cut in longitudinal section and with several paratypes show the characteristics of the sponge. Polished slab. x1.
- Fig.4.** a) Holotype. The arrows point to the "Oscular-Apparat", where the "normal" growth of the sponge is disturbed. Polished slab (the distance between two slabs is about 0.7 mm). x1.
- Fig.5.** Field photograph of a branched specimen showing the "Oscular-Apparat" at the branching point. x2.

