

**New occurrence of the red alga *Norithamnium madoniensis*
SENOWBARI-DARYAN, KEUPP, ABATE & VARTIS-MATARANGAS, 2002
(Corallinales, Rhodophyta) in the Anisian reef boulders from
Karaburun Peninsula, Turkey**

By

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with 1 figure and 1 plate

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Abstract

From the Anisian reef boulders embedded within the Gerence Formation in Karaburun Peninsula, Turkey the species *Norithamnium madoniensis* (Corallinales, Rhodophyta) is described. The genus was known until now from the Norian-Rhaetian reef limestones of Sicily, Greece, and Austria. The Anisian of Karaburun is the fourth locality and probably the oldest occurrence.

an encrusting organism as *Paralithoporella sinensis* which was compared with *Lithoporella*. *Paralithoporella* is assigned to the Corallinales (Melobesioideae) by the same author.

For the discussion concerning the similarities between *Norithamnium* and modern corallineans and possibly the Permian ancestral representatives of corallineans (*Archaeolithoporella*) see SENOWBARI-DARYAN et al. (2002).

Zusammenfassung

Aus den in der Gerence-Formation eingebetteten anisischen Riffkalkblöcken der Halbinsel Karaburun (Türkei) wird die Rotalge (Rhodophyceae) *Norithamnium madoniensis* beschrieben. Die Gattung war bis jetzt nur aus den norisch-rhätischen Riffkalcken von Sizilien, Griechenland und Österreich bekannt. Das Vorkommen auf Karaburun stellt das älteste Auftreten und die vierte Lokalität dieser Alge dar.

2. Locality and age of the *Norithamnium*-bearing reef boulders

The Karaburun Peninsula is situated on the western margin of Turkey, west of Izmir (Fig. 1). Geologically Karaburun is a part of the Izmir-Ankara zone corresponding to the Vardar zone in Greece (BRINKMANN et al. 1972, ERDOGAN et al. 1990). Deposits from Carboniferous to Neogene age are exposed in the northern part of the peninsula, where the study area is located.

The Mesozoic deposits start with the Lower-Middle Triassic (Skythian?-Anisian) Denizgiren group that is subdivided into the Karareis Formation and Gerence Formation (ERDOGAN et al. 1990).

In the east and middle west of the peninsula, within the detritic-carbonate deposits of the Gerence Formation reef boulders of usually 10 cm up to 2 m in diameter occur (Koyutepe Unit of BRINKMANN et al. 1972).

The reef boulders, found in Sicakbuk locality (Fig. 1), are most probably Anisian in age. They contain different reef organisms (e.g. sponges, corals, etc.) associated with green algae, solenoporacean red algae and *Norithamnium* described in this paper. Some of the mentioned algae have been described by SENOWBARI-DARYAN et al. (2006). The samples were collected in an outcrop (Anisian Gerence Formation, Koyutepe Unit of BRINKMANN et al. 1972, Sicakbuk locality) near the road Mordogan to Balikliova, about 12.5 km south of Mordogan (Fig. 1).

For more information about the geology, stratigraphy and palaeontology of the Triassic sediments of Karaburun see BRINKMANN et al. (1972), GUŠIĆ et al. (1984), ERDOGAN et al. (1990), STEUBER (1992), ISINTEK et al. (2000), and ISINTEK (2002). Algae from Karaburun have been described by DÜZBASTILAR (1976, 1978), DRAGASTAN & DÜZBASTILAR (1993), and SENOWBARI-DARYAN et al. (2006).

The herein analysed material is deposited in the Institute of Paleontology, University Erlangen-Nürnberg (Material:

1. Introduction

Coralline algae are a group of calcified marine red algae characterized by thalli with branched cell filaments with a coherent pseudoparenchymatous organization. For a long time they were known as appearing first in Lower Cretaceous, extending to Recent time (AGUIRRE et al. 2000). *Norithamnium madoniensis*, an encrusting coralline alga with differentiated hypo- and perithallus, was described and attributed to Rhodophyceae red algae by SENOWBARI-DARYAN et al. (2002) from Late Triassic (Norian-Rhaetian) reef limestones of following localities: Madonie Mountains in Sicily, Argolis peninsula in Greece, and Gosaukamm in Austria.

Norithamnium madoniensis is very similar to recent *Synarthrophyton schielianum* WOELKERLING & FOSTER (1989), attributed to the subfamily Melobesioideae. However, no conceptacles were found in *Norithamnium* as they are present in *Synarthrophyton*. BERRA et al. (2005) reported from the Anisian of Lombardy Basin (Southern Alps) the occurrence of "oldest coralline red algae" with some calcite-filled cavities which are interpreted as possible conceptacles. The lack of hypo- and perithallus differs this alga from *Norithamnium madoniensis*. WU (1991) described

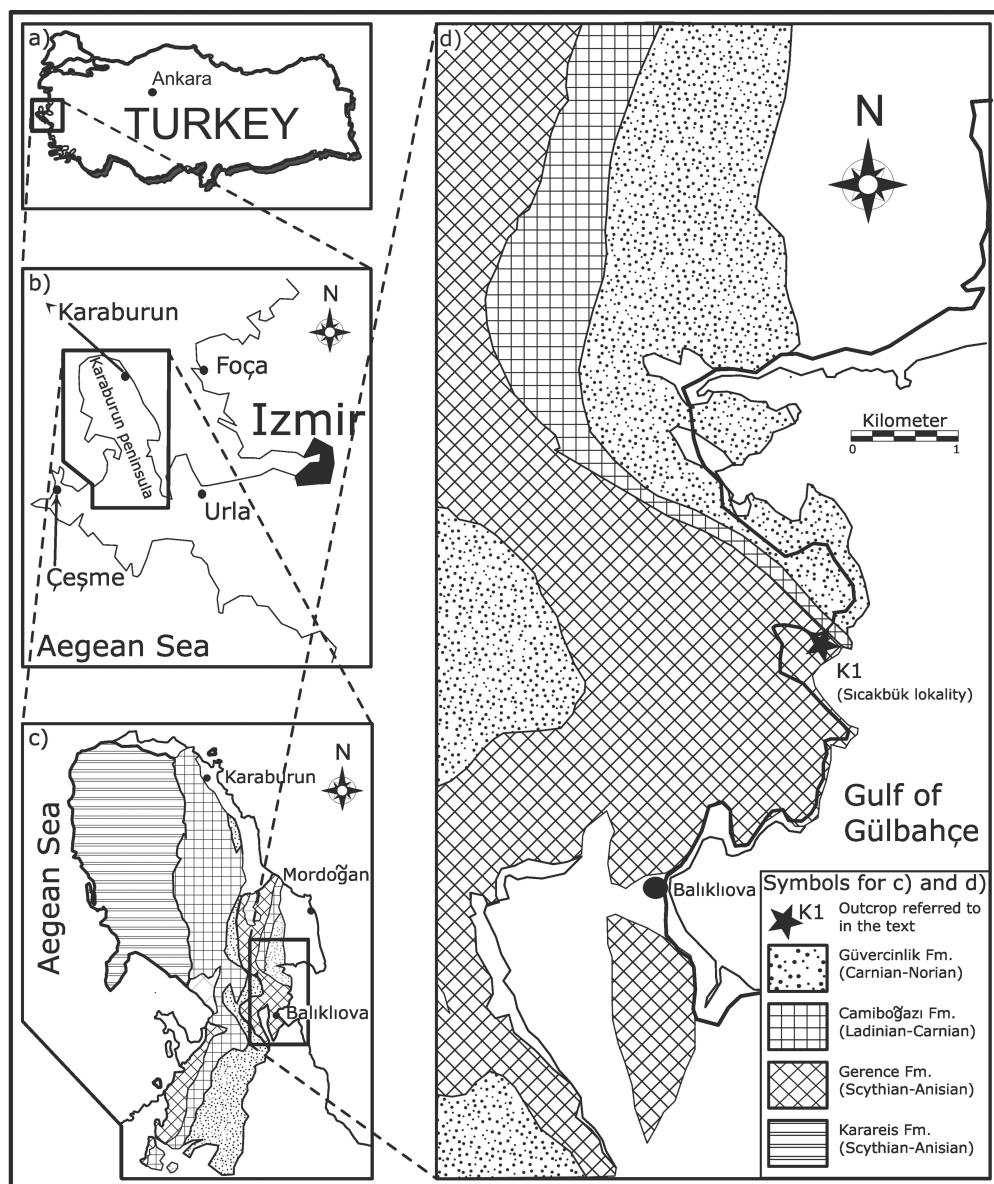


Fig. 1. Geographical and geological location of the new occurrence of *Norithamnium madoniensis* in Anisian reef boulders exposed in Karaburun, near the town of Balıklıova.

Senowbari-Daryan, Karaburun, Turkey).

3. Systematic Paleontology

Division Rhodophyta WETTSTEIN, 1901
Class Rhodophyceae RABENHORST, 1863
Order Corallinales SILVA & JOHANSEN, 1968

Genus *Norithamnium* SENOWBARI-DARYAN, KEUPP, ABATE & VARTIS-MATARANGAS, 2002

Type species: *Norithamnium madoniensis* SENOWBARI-DARYAN, KEUPP, ABATE & VARTIS-MATARANGAS, 2002

Diagnosis: “Encrusting alga exhibiting a thin, sometimes multiple layered peripheral region (= ‘perithallus’) and a thick plumose ventral core (= ‘hypothallus’). Numerous, partly branched struts arise from the core and hang downwards. The cellular filaments are arranged perpendicularly

to the substrate in the peripheral tissue, divergent and fan-like in the ventral core including the struts” (SENOWBARI-DARYAN et al. 2002: 202).

Norithamnium madoniensis SENOWBARI-DARYAN, KEUPP, ABATE & VARTIS-MATARANGAS, 2002 (pl. 1, figs. 1-3)

Norithamnium madoniensis sp. nov. - SENOWBARI-DARYAN, KEUPP, ABATE & VARTIS-MATARANGAS, p. 202-203, pl. 1, figs. 1-6, pl. 2, figs. 1-9, text-figs. 1-3.

Material: One specimen in thin section K1/25, Sıcakbük locality.

Description: The only one specimen of *N. madoniensis* is associated with undeterminable microbial crusts around the hypercalcified sponges. The specimen reaches a length of at least 13 mm (at the one side it is broken) and a thickness (without struts) of up to 1 mm. The thallus is not well

preserved, however, both layers of the cells are recognizable. The peripheral portion appears multilayered, reaching a maximum of 0.1 mm. The “hypothallus” (ventral core) has a maximum thickness of 0.9 mm. The cells in the peripheral layer are oriented perpendicular to the growth direction (perpendicular to the crust), those in the ventral core run more or less parallel to the crust appearing as fans. Because of poorly preservation the diameter of the cells cannot be measured. Numerous struts arise in irregular distance from the ventral core. The struts, reaching a length of up to 1 mm and a diameter of 0.3 mm, are oriented perpendicular to the crust and may be branched. The cells in struts runs fan-shaped in the same direction as in the ventral core. Conceptacles were not observed. The dimensions and all other characteristics of the Karaburun specimen correspond to the original description of the species (SENOWBARI-DARYAN et al. 2002).

Biotic association: As encrusting alga *Norithamnium madoniensis* occurs together with other microbial crusts around the reef-building organisms. The alga is associated with hypercalcified sponges (inozoans, sphinctozoans and chaetetids), some porostromate algae, ‘*Tubiphytes*’, echinoderms and rarely udoteacean algae.

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Plate 1

Fig. 1: Magnification from Fig. 3 showing the thin peripheral multilayered-appearing portion and the thick ventral core with cell filaments oriented more or less parallel to the crust appearing as fans. Numerous, partly branched struts arise in irregular distance from the ventral core.

Fig. 2: Magnification from Fig. 1 showing the ventral core (arrow) with recognizable fan-shaped cell filaments.

Fig. 3: General view of the crust of *Norithamnium madoniensis* associated with some microbial crusts.

