

PARAFAVREINA COPROLITES FROM THE UPPERMOST TRIASSIC OF THE WESTERN CARPATHIANS

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Abstract: The anomuran thalassinid coprolite *Parafavreina thoronetensis* Brönnimann, Caron & Zaninetti 1972 is described from thin sections of the Norovica Formation (uppermost Triassic) from the Strážovské vrchy Mountains in central Slovakia. This ichnospecies is one of the most common in the Norian-Rhaetian shallow marine carbonate rocks of the Tethys Realm.

Key words: Triassic (Rhaetian), Western Carpathians, crustacean microcoprolites.

Introduction

This paper provides the documentation of the Late Triassic fecal pellets (coprolites) based upon material (thin sections)

collected from the Radošovec site near Ilava, a locality in the Western Carpathians shown on Figs. 1–2.

Former works describing Late Triassic coprolites from the Krížna Unit (Fatric) of the Western Carpathians were done

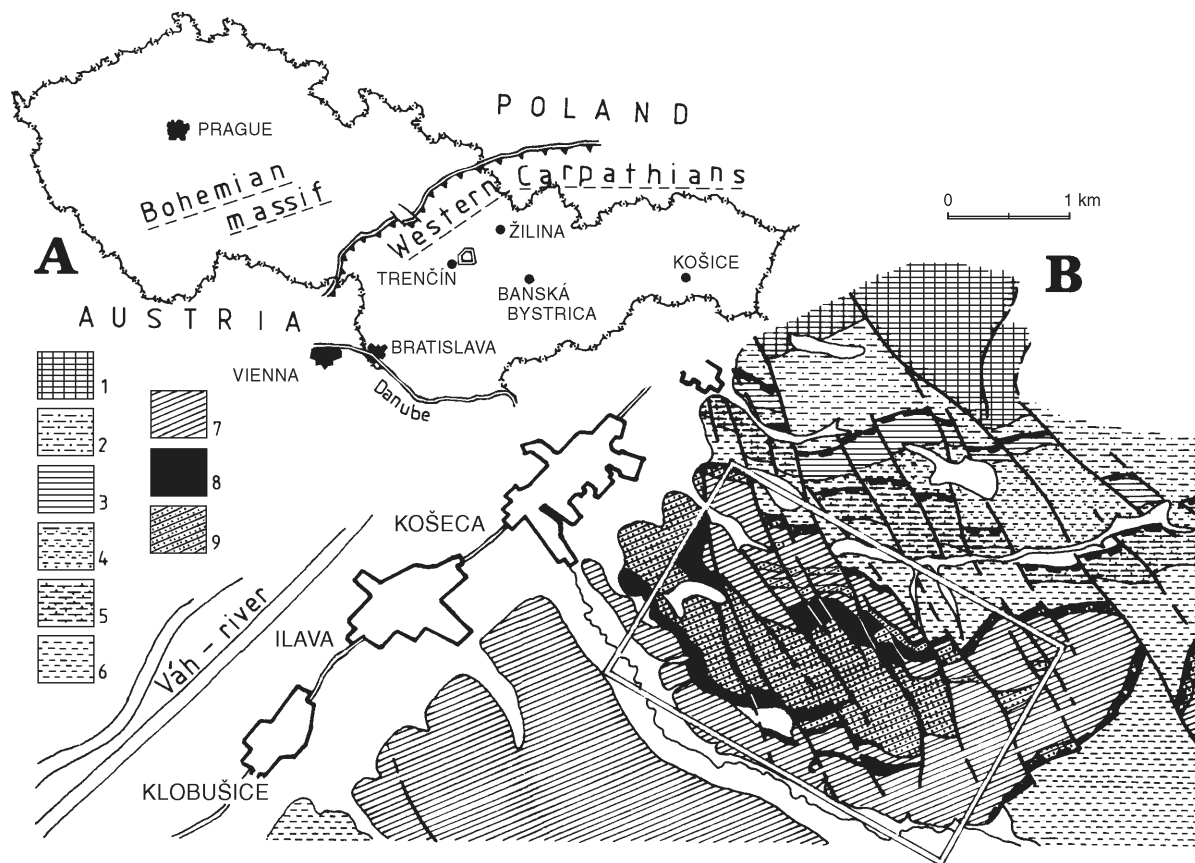


Fig. 1. Maps showing location of Mt. Norovica area: **A** — position of studied area in central Slovakia (arrowed); **B** — geological sketch of the Košeca environs in the Strážovské vrchy Mts: 1–2 Kališče-Butkov structure: 1 — Jurassic-Lower Cretaceous limestones, 2 — Mid-Cretaceous shales; 3–4 Nozdrovica digitation: 3 — “Neocomian” limestones, 4 — Albian marls; 5–6 — Mrázňica digitation: 5 — Mrázňica Formation Valanginian-Barremian limestones, 6 — Poruba Formation (Albian); 7–9 — Choč Nappe: 7 — Hauptdolomit (Upper Triassic), 8 — Norovica Formation (Rhaetian), 9 — Jurassic-Lower Cretaceous strata.

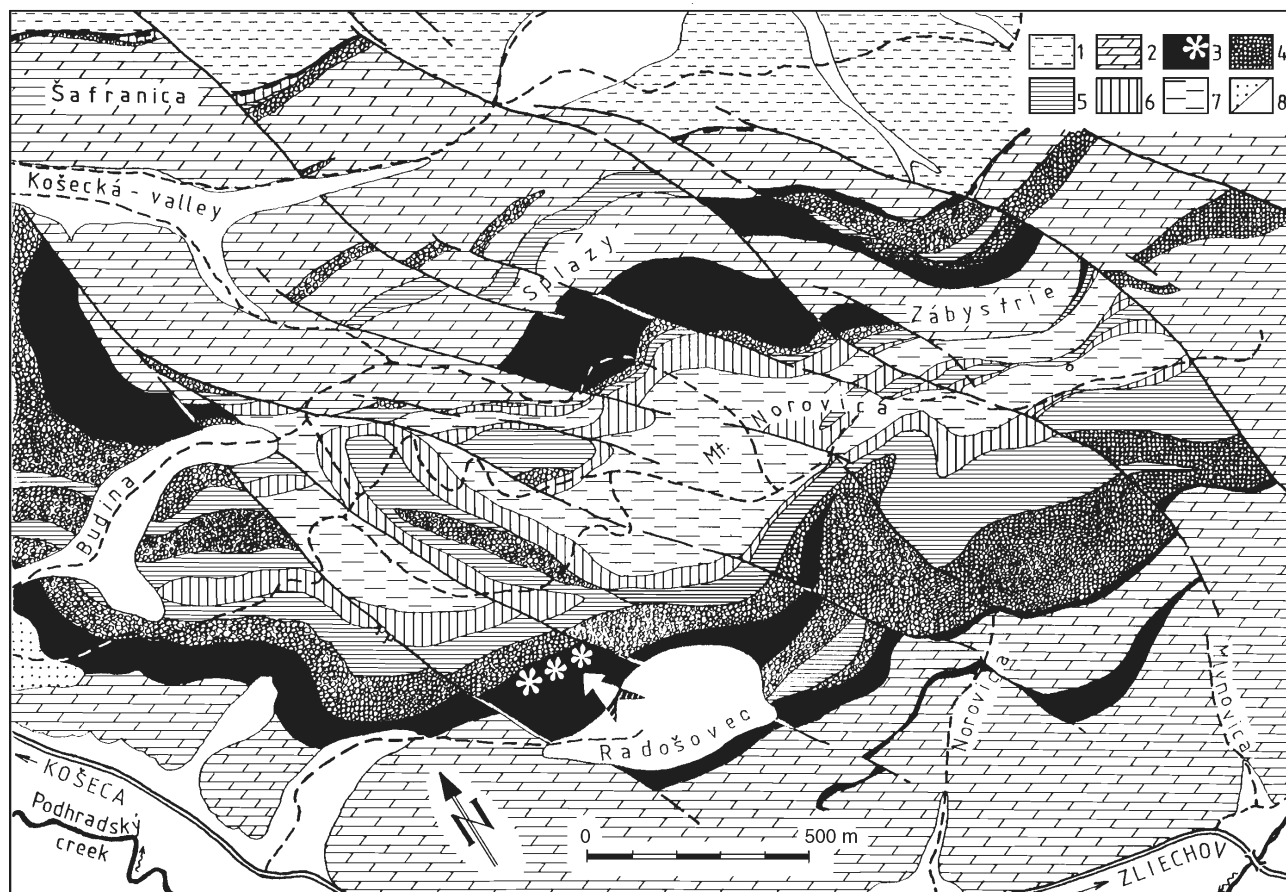


Fig. 2. Geological map of the Mt. Norovica area. **1** — Poruba Formation (Albian) of the Križna Nappe; **2–7** — Choč Nappe: **2** — Hauptdolomit (Upper Triassic), **3** — Norovica Formation (Rhaetian) showing the location of the studied *Parafavreina* coprolites (arrowed), **4** — Lower Jurassic crinoidal limestones, **5** — Middle Jurassic siliceous limestones, cherty crinoidal limestones and marls, **6** — Upper Jurassic red nodular limestones and marlstone, **7** — Biancône limestone, marly limestone and marls (Upper Tithonian-Hauterivian); **8** — Neogene-Quaternary cover.

by Horák (1960) from the Svätý Jakub Formation (?Rhaetian) nearby Banská Bystrica, and by Gaždžicki (1974, 1977) from the Fatra Formation (Rhaetian) of the Polish Tatra Mountains.

Here, we report anomuran crustacean coprolites belonging to the *Parafavreina thoronetensis* ichnospecies, which have been found in the uppermost Triassic strata of the Choč Unit (Hronic), and at the Radošovec locality they are very abundant (Pl. I). The study also enables us one to reconstruct the environment where Rhaetian biotas lived.

The paper was prepared in the frame of the scientific cooperation between the Institute of Geology of the Slovak Academy of Sciences (Bratislava) and the Institute of Paleobiology of the Polish Academy of Sciences (Warsaw).

The investigated thin sections are housed in the Geological Institute of the Slovak Academy of Sciences in Bratislava.

Geological and stratigraphical setting

The Strážovské vrchy Mountains are situated in central Slovakia in the northwestern part of the central Western Carpathians and are built up of the Palealpine (Austrian) nappe system (Fig. 1). The uppermost Triassic strata at the Rado-

šovec locality occur in a ridge on the SW slope of Mt. Norovica above the Podhradská Valley (Fig. 2). Small rock outcrops in a woody slope are formed by pale grey limestones i.e. the Mojtn Limestone Member of the Norovica Formation (Gaždžicki & Michalík 1980), lying on a thick Hauptdolomit complex. Organogenic and organodetrital (biomicrites to biosparites) limestone types prevail in the lower part, while the higher part consists mostly of oolitic limestones (oöpelbiosparites) alternating with thin bands of micritic limestone. The layer containing the *Parafavreina* coprolites occurs precisely in this part of the sequence (Pl. I: Figs. 1–2). Rich occurrence of the benthic involutinid foraminifers, mostly *Triasina hantkeni* Majzon indicates the Rhaetian age of the formation (Gaždžicki 1974, 1983). The sequence is terminated by an erosional plane covered by the Liassic crinoidal limestone (Fig. 2).

Paleontological notes

Order **Decapoda** (Anomura)
Subfamily **Thalassinioidea**

Genus *Parafavreina* Brönnimann, Caron & Zaninetti 1972

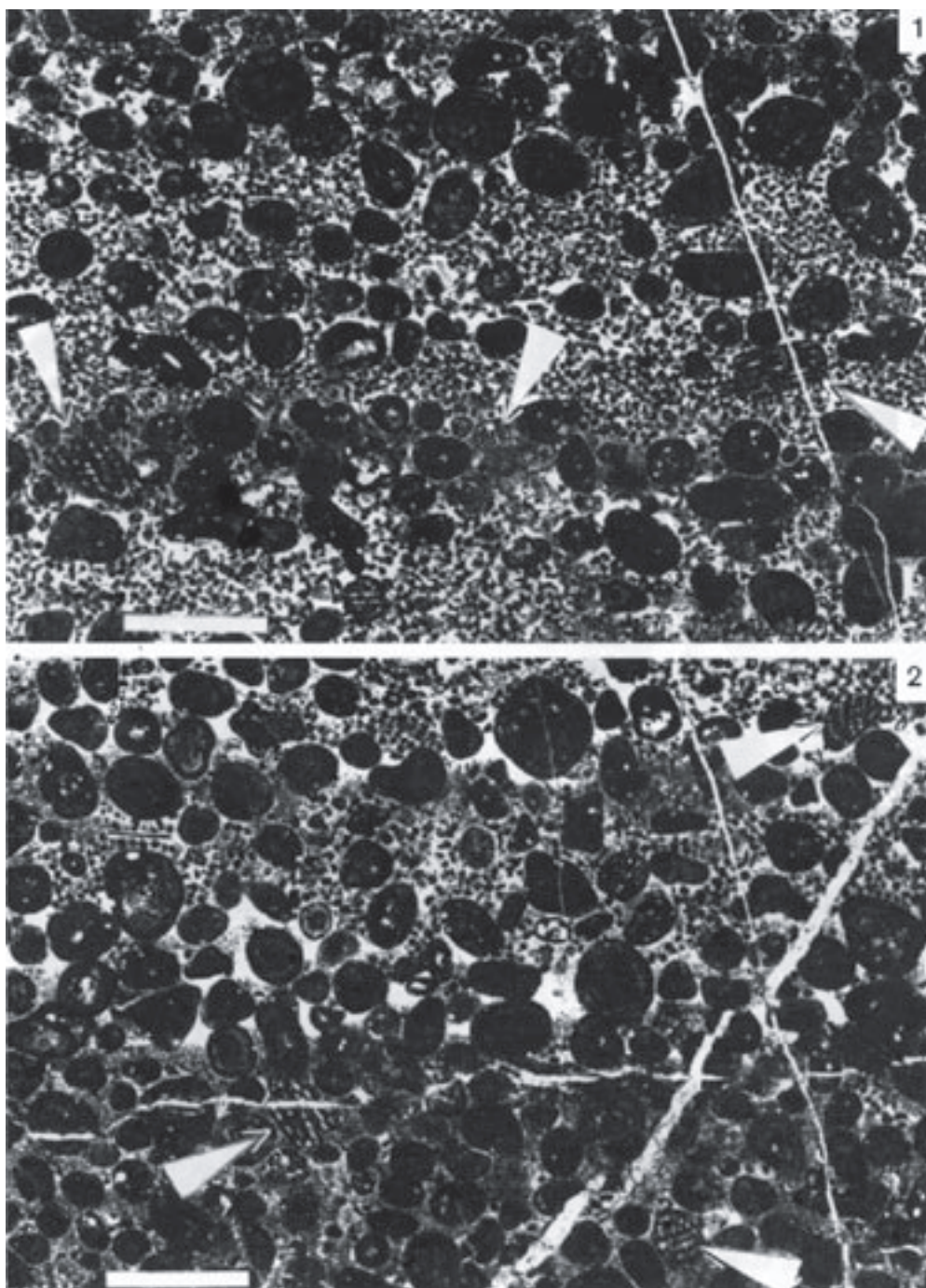


Plate I: Fig. 1 — *Parafavreina thoronetensis* microfacies. Mojti Limestone Member of the Norovica Formation (Rhaetian). Radošovec. Thin section No. GLÚ 20525. **Fig. 2** — Oolite with *Parafavreina thoronetensis* Brönnimann, Caron & Zaninetti coprolites (arrowed). Mojti Limestone Member, Norovica Formation (Rhaetian). Radošovec. Thin section No. GLÚ 20525. Scale bars = 1 mm.

Parafavreina thoronetensis Brönnimann, Caron & Zaninetti
1972 (Pl. I: Figs. 1–2, Pl. II: Figs. 1–8)

1960 *Coprolithus salevensis* Horák, 12–15, Figs. 1–6

1972 *Parafavreina thoronetensis* n.sp. Brönnimann, Caron & Zaninetti, 941–956, Pl. 1: Figs. 1–16, Pl. 2: Figs. 1–10. With synonymy

1980 *Parafavreina thoronetensis* Brönnimann, Caron & Zaninetti; Bércziné Makk, Pl. 4: Fig. 2

1986 *Parafavreina thoronetensis* Brönnimann, Caron & Zaninetti; Senowbari-Daryan & Stanley, 345–348, Fig. 3D(1), Fig. 4A(1), 4CD, Fig. 4E(2). With synonymy

1993 *Parafavreina thoronetensis* Blau, Grün & Senff, 193–214, Fig. 5D–H. With synonymy

1994 *Parafavreina thoronetensis* Blau, Rosas & Senff, 521–527, Fig. 5i–m

Material: Over 20 specimens in two thin sections.

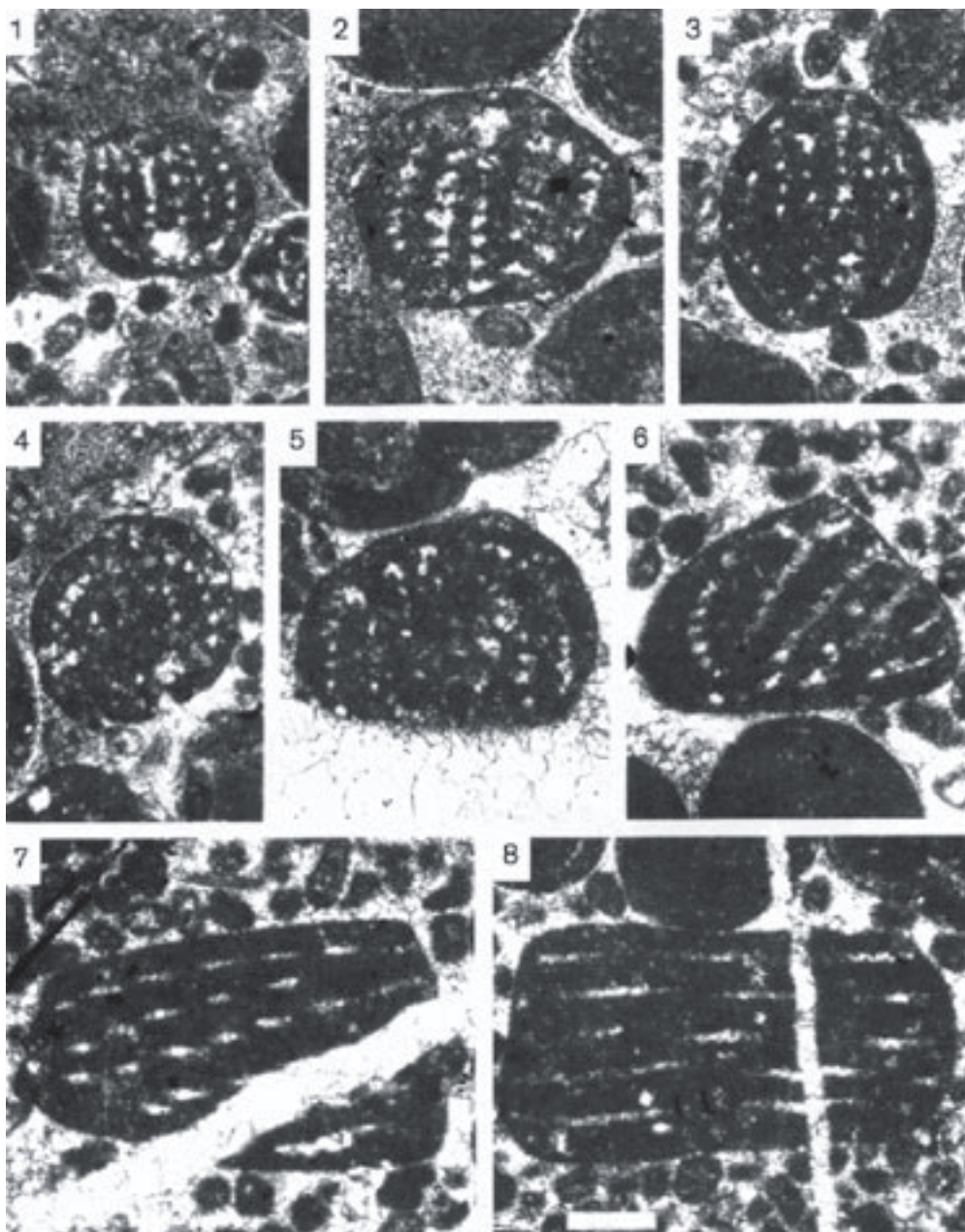


Plate II: *Parafavreina thoronetensis* Brönnimann, Caron & Zaninetti 1972. **Figs. 1–4** — cross-sections, **Figs. 5–6** — oblique sections, **Figs. 7–8** — longitudinal sections. Mojtín Limestone Member of the Norovica Formation (Rhaetian). Radošovec. Thin section No. GIÚ 20525. Magnification of all figures is uniform: scale bar = 0.2 mm.

Dimensions: The coprolites are 0.38 mm to 0.64 in diameter, and up to 0.93 mm in length.

Description: As given by Brönnimann, Caron & Zaninetti (1972), and Senowbari-Daryan & Stanley (1986).

Remarks: The *Parafavreina thoronetensis* has a circular or subcircular shape in cross section, and is sometimes flattened on the “ventral” side” (Fig. 3, Pl. II: Figs. 1, 3). It shows two bilateral symmetrical groups of longitudinal canals (35–40 in numbers), which in cross-section are mostly triangular and sometimes crescent shape (Fig. 3, Pl. II: Fig. 2). The size of the canals is 0.03–0.04 mm in diameter. The studied coproli-

tes correspond well with descriptions and illustrations given by Brönnimann et al. (1972), Senowbari-Daryan & Stanley (1986) and Blau et al. (1993) as well as with forms described as *Coprolithus salevensis* by Horák (1960) from the Svätý Jakub Formation of the Western Carpathians.

Occurrence: So far this ichnospecies is known from several Late Triassic–Early Jurassic localities of France, Italy, Greece, Spain, Algeria, Afghanistan and Iran (Brönnimann et al. 1972), Austria and Germany (Piller 1976; Senowbari-Daryan 1979, 1980; Flügel 1982; Ott 1987; Blau et al. 1993), Hungary (Bércziné Makk 1980), California, North America (Kristan-

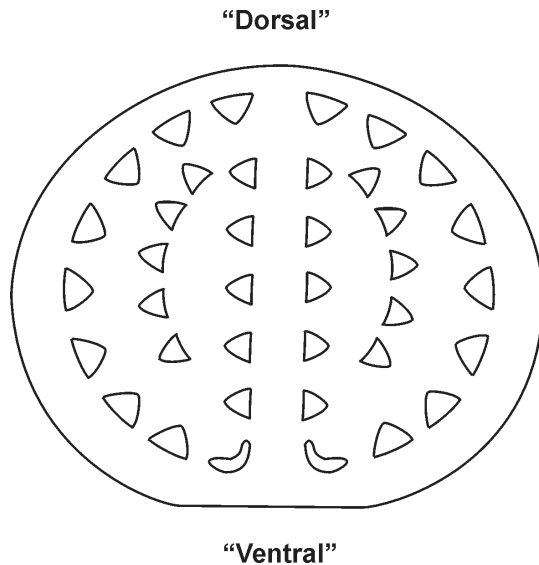


Fig. 3. Cross-section of *Parafavreina thoronetensis* Brönnimann, Caron & Zaninetti, showing the arrangements of internal canals (modified after Brönnimann et al. 1972, Fig. 2; see also Blau et al. 1994, Fig. 3).

Tollmann & Tollmann 1983), as well as from Peru and Colombia, South America (Senowbari-Daryan & Stanley 1986; Blau et al. 1993; Blau et al. 1994).

Sedimentary conditions and paleogeographical remarks

The Norovica Formation, which contains the studied coprolites, is a product of the Rhaetian marine transgression, which renewed marine sedimentation in the northern West-Carpathian units. It was deposited in the northern proximity of the elevated Dachstein carbonate platform complex, partially separating both the Kössen- and Fatra Formations lagoonal and intraplatform basin systems from the open sea. The surface of this platform was covered by the shallow sea with lime, and in more restricted parts also with dolomitic sedimentation, and with coral reefs on the external edge. The carbonate rocks of the Norovica Formation itself were deposited on the more protected inner side of this platform, with shallow channels and oolitic bars. The abundant, widespread and well preserved biota assemblages (algae, foraminifers, corals, brachiopods, molluscs, conodonts) enable detailed biostratigraphical and paleoecological studies of this formation (Gaździcki 1978; Gaździcki & Michalik 1980; Michalik 1982, 1993, 1994; Michalik & Gaździcki 1983).

The recognized anomuran crustaceans coprolites of the *Parafavreina thoronetensis* in the Western Carpathians occur within a stratigraphically well documented, shallow marine, mostly lagoonal facies of the uppermost Triassic (Rhaetian) carbonate sequences (Horák 1960; Gaździcki & Michalik 1980; Salaj & Jendrejáková 1984).

Parafavreina thoronetensis crustacean microcoprolite is one of the most common in the Norian-Rhaetian strata of the Tethys Realm as well as from the western margin of Gondwana (Blau et al. 1993).

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