

MONCHARMONTIA DE CASTRO, 1967, FLEURYANA DE CASTRO ET AL., 1994 AND SOLAKIANA GEN. NOV.: A SPECIAL GROUP OF BENTHIC FORAMINIFERA FROM UPPER CRETACEOUS SHALLOW-WATER CARBONATES

Felix Schlagintweit

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Abstract. *Moncharmontia* De Castro (type-species *M. apenninica*) and *Fleuryana* De Castro et al. (type-species *F. adriatica*) represent two exclusively Upper Cretaceous genera of relatively small-sized benthic foraminifera with similar morphology and wall structure but distinguished primarily by the type of the aperture/foramina (multiple cribrate versus a single, central, arched slit piercing the septum). *Solakiana* gen. nov. (type-species *Fleuryana gediki* Solak et al.) differs from both taxa by its type of aperture, represented by a basal slit bordered at the base by the external wall of the previous whorl. Apertural/foraminal lips or septal plates are present in all three genera. The canalliculate wall-structure, well preserved in *Moncharmontia* and *Fleuryana* but poorly preserved in *Solakiana*, refer them tentatively to the family Charentiidae Loeblich & Tappan. The three genera are widely reported from neritic carbonates spanning the Cenomanian-Maastrichtian interval, each with different stratigraphic ranges. The group became extinct at the K-Pg boundary.

Keywords: Foraminifera, taxonomy, foramen, aperture, wall-structure, Upper Cretaceous.

INTRODUCTION

Upper Cretaceous neritic faunal assemblages are characterized by larger and small-sized benthic foraminifera, the former typically represented by, for example, alveolinoids and orbitolinids (e.g., Schroeder & Neumann, 1985). Among the small-sized taxa, groups like the nezzatids and other planispirally coiled taxa are common (e.g., Simmons & Bidgood, 2023; Simmons et al., 2025a, b). Among the planispirally coiled forms, two genera are closely allied by their morphology and canalliculate wall-structure: *Moncharmontia* De Castro, 1967 (Type-species *Neoendothyra apenninica* De Castro, 1966) and *Fleuryana* De Castro et al., 1994 (type-species *Fleuryana adriatica* De Castro et al., 1994), differing primarily by their type of foraminal/apertural features. This criterion is of generic significance as implemented in the present classification of benthic foraminifera with various examples (e.g., Loeblich & Tappan, 1987; Kaminski, 2014). Recently, a second species of *Fleuryana* has been described as *F. gediki* by Solak et al. (2020) from the Upper Cretaceous of Türkiye. Although differing in the foraminal/apertural features from *Fleuryana sensu stricto*, the Turkish species has nonetheless been referred to this genus. It is here re-described as representing a new genus: *Solakiana* with the new combination *Solakiana gediki* (Solak et al.).

MATERIAL

Concerning the new genus *Solakiana*, no new material has been used, instead referring exclusively to the material/figures from the original description of Solak et al. (2020). The author's own material of *Moncharmontia apenninica* (De Castro) is used from the Cenomanian of Iran (Schlagintweit & Yazdi-Moghadam,

2023) and the Campanian of Brač Island Croatia (e.g., Cvetko Tešović et al., 2001, 2020; Schlagintweit et al., 2025). The author's own material of *Fleuryana adriatica* De Castro et al. comes from the late Maastrichtian Tarbur Formation of Iran (Schlagintweit & Rashidi, 2016).

SYSTEMATIC PALAEONTOLOGY

The classification of agglutinated benthic foraminifera follows Kaminski (2014).

Order Loftusiida Kaminski in Kaminski & Mikhalevich, 2004

Suborder Biokovinina Kaminski, 2004

Superfamily Biokovinoidea Gušić, 1977

Family Charentiidae Loeblich & Tappan, 1985

Remarks: The Charentiidae were introduced by Loeblich & Tappan (1985, p. 94) to include planispirally coiled benthic foraminifera with simple inner structure and a finely agglutinated wall bearing cylindrical pseudoalveoles covered by an imperforate outer epidermis giving an almost keriothecal appearance. Loeblich & Tappan (1987) included a few genera in the Charentiidae among *Moncharmontia* De Castro, 1967. In the classifications of Kaminski (2000, 2014), *Fleuryana* De Castro et al., 1994 was not treated. As the main difference between *Moncharmontia* and *Fleuryana*, as stated by De Castro et al. (1994) refers to the different aperture, it is logical to include also the latter taxon into the Charentiidae by following the classification concept of Loeblich & Tappan (1987). With respect to *Solakiana* gen. nov., the canalliculate wall structure reported by Solak et al. (2020, p. 25) 'is evidently not easy to determine in the relatively thin walls.....therefore its presence remains equivocal' as remarked by Simmons &

Bidgood (2023). *Solakiana* gen. nov. is therefore only tentatively placed within the Charentiidae.

Genus *Solakiana* gen. nov.

Type-species: *Fleuryana gediki* Solak et al., 2020

Etymology: Dedicated to Cemile Solak for her contributions to the micropalaeontology of middle-Upper Cretaceous carbonates of Türkiye.

Holotype: Equatorial section illustrated in Solak et al. (2020, fig. 14A) stored at the thin section archive of the General Geology Laboratory, Department of Geological Engineering, Mersin University, Türkiye, thin-section labelled F247 re-illustrated here in Fig. 1B.

Horizon and locality: Turonian, Finike district of Antalya, southern Türkiye.

Diagnosis (based on the species diagnosis of Solak et al., 2020): Subspherical shell with rounded periphery, planispirally coiled, involute, consisting of 1.0 to 2.5 whorls. Aperture single, a wide basal slit rimmed by a peristomal rim or a septal plate. Wall thin, microgranular and canaliculate.

Comparisons: With equivalent general morphology (e.g., coiling mode), size and wall structure, *Solakiana*

gen. nov. can be compared with *Montcharmontia* De Castro, 1967 and *Fleuryana* De Castro et al., 1994 (Fig. 1). *Montcharmontia* possesses a multiple, cribrate aperture (irregularly arranged pores) distributed preferentially in the lower to middle part of the apertural face (Figs. 1D). *Fleuryana* possess a single areal aperture rimmed by a single continuous lip (Figs. 1E, 2A-G). The foramen of *Fleuryana* is bordered on both sides (upper and lower) by the septum (septal plates) while in *Solakiana* the base of the foramen is formed by the external wall of the previous whorl. See the Species Key Chart of Simmons & Bidgood (2023, appendix) for further diagnostic and other characteristics.

Solakiana gediki (Solak et al.) comb. nov.

Fig. 1A-C

2020 *Fleuryana gediki* sp. nov. – Solak et al., p. 19, figs. 14A-E, 15.

2023 *Fleuryana gediki* – Simmons & Bidgood, p. 73, fig. 23.

Remarks: Due to the lack of own material nothing can be added to the description of ‘*Fleuryana*’ *gediki*

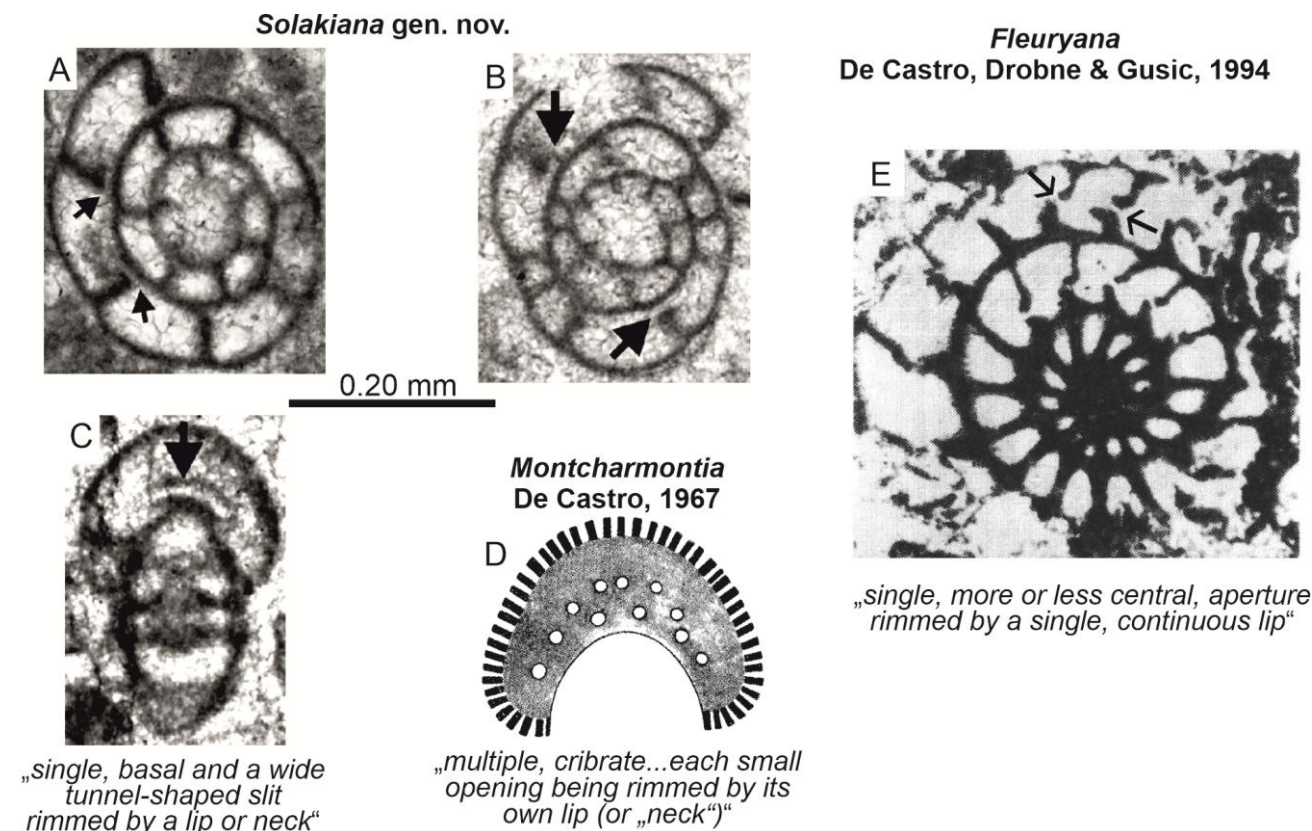


Fig. 1. Comparison of the foraminiferal/apertural features of *Solakiana* gen. nov., *Montcharmontia* De Castro, and *Fleuryana* De Castro et al. **A-C:** *Solakiana gediki* (Solak et al.) gen. et sp. nov. (from Solak et al., 2020, fig. 15R, 14A = holotype, and 14B, Turonian-Coniacian? of Türkiye). **D:** *Montcharmontia apenninica* (De Castro) (from De Castro, 1966, fig. 6B, Upper Cretaceous of Italy). **E:** *Fleuryana adriatica* De Castro et al. (from De Castro et al., 1994, pl. 2, fig. 12, late Maastrichtian of Croatia). Arrows = foramina. Scale bars only for *Solakiana gediki* (A-C).

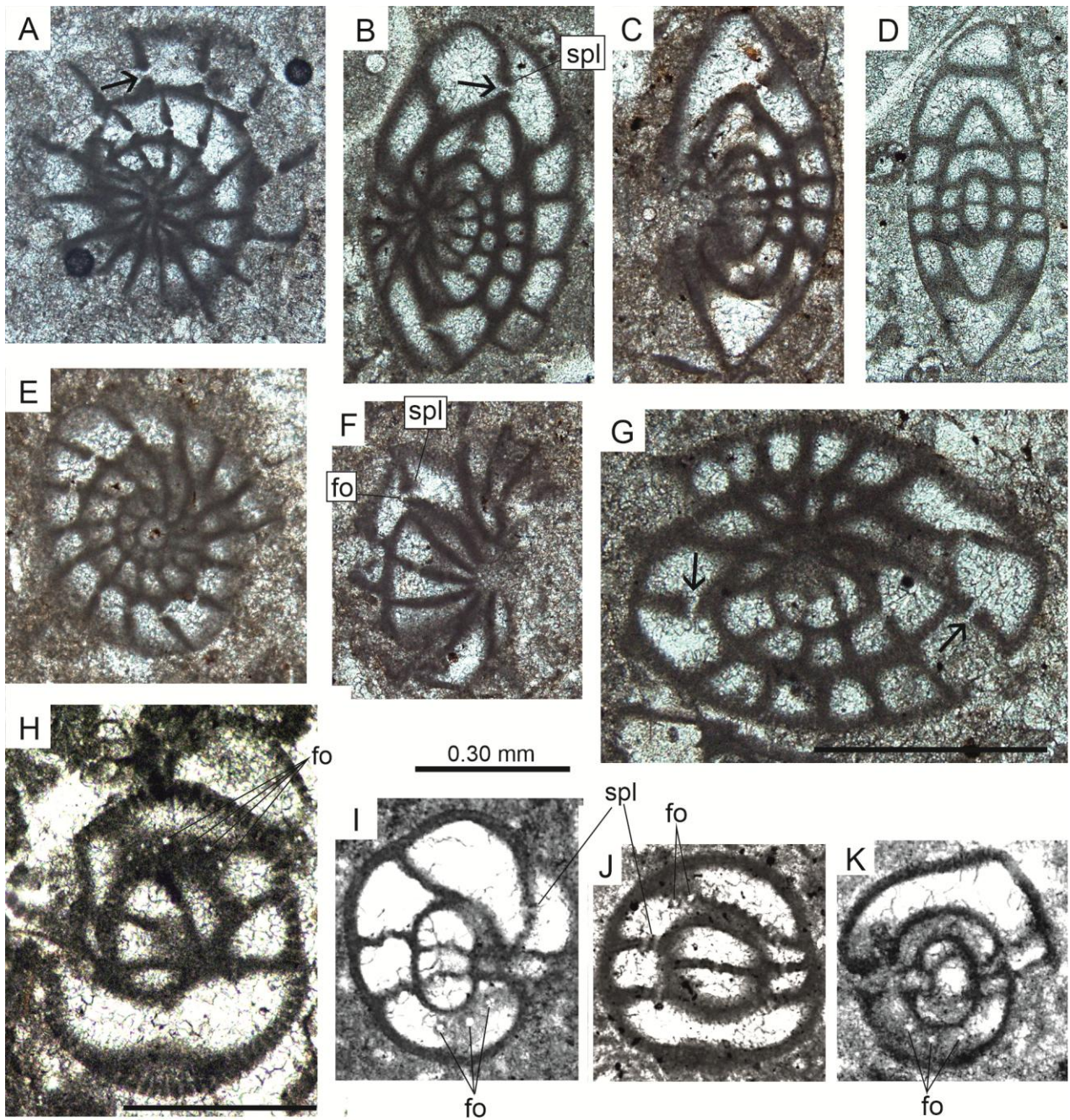


Fig. 2. *Fleuryana adriatica* De Castro et al. from the late Maastrichtian Tarbur Formation of SW Iran (A-G) and *Moncharmontia apenninica* (De Castro) from the early-middle Campanian of Croatia (H) and the middle-late Cenomanian Sarvak Formation of SW Iran (I-K). A, E: Equatorial sections. B-C, F-I, K: Oblique sections. D, J: Subaxial sections. Note the partly irregular coiling in H-I and K and the finely canaliculate wall, e.g. in G-H. Abbreviations and symbols: fo and arrows = foramen, spl = septal plate. All scale bars = 0.30 mm.

provided by Solak et al. (2020). The establishment of the new genus strictly follows the recognition of the foraminiferal-apertural features as a generic criterion as applied by Loeblich & Tappan (1987) and followed thereafter by Kaminski (2014). Other examples of genus-pairs with similar overall morphology but with apertural differences include *Magniezjanninius* Schlagintweit, 2024 and *Pseudocyclamina* Yabe & Hanzawa, 1926 or *Debarina* Fourcade et al., 1972 and *Haplophragmoides* Cushman, 1910.

Stratigraphy: According to Solak et al. (2020),

'Fleuryana' gediki was described from Turonian-Coniacian strata. *Moncharmontia* is known from the middle Cenomanian to Maastrichtian (see review of Simmons & Bidgood, 2023). *Fleuryana* appears stratigraphically much more restricted. The levels of various localities in the Dinarides in which it was found were all attributed to the late Maastrichtian by De Castro (1994), as also in the Tarbur Formation of SW Iran (by Schlagintweit & Rashidi, 2016) or in southern Italy (by Chicchini et al., 2012). The distribution and stratigraphy of *F. adriatica* was discussed in detail by Moro et al.

(2018) concluding a late early Campanian to Maastrichtian range. With the only record of '*F.*' *gediki* from the type-locality, it has a very limited geographic distribution (Simmons & Bidgood, 2023).

CONCLUSIONS

Solakiana gen. nov., *Moncharmontia* and *Fleuryana* represent a homogeneous group of relatively small-sized benthic foraminifera with comparable morphology and wall-structure but differentiated by their foraminal-apertural features as a generic criterion: cribrate in *Moncharmontia*, areal, single in *Fleuryana*, and single basal in *Solakiana*. The three genera are restricted to the Upper Cretaceous shallow-marine carbonates of the Neotethys each with different stratigraphic ranges. *Fleuryana*, the youngest genus became extinct at the K-Pg boundary.

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