

Two bivalve species, hitherto unrecorded, from the Upper Jurassic of the Transdanubian Range (Hungary)

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Két, a Dunántúli-középhegység felső jurájából eddig nem dokumentált kagylófaj

Összefoglalás

A Dunántúli-középhegység felső jurájából a 2010-es évek elejéig előkerült kagylókat az utóbbi évtizedben megjelent két tanulmány ismerteti. A publikációk megjelenését követően a területéről korábban nem ismert két faj egy-egy példánya került elő. Az antimarginális irányú redőkkel díszített teknőjű osztrigafélék közé tartozó *Actinostreon* aff. *gregareum* (J. SOWERBY, 1815) teknőjét a tatai Kálvária-dombon feltárt vörös, *Saccocoma*-maradványokban gazdag kimmeridgei mészkő egy 2015-ben, törmelékben talált darabja tartalmazza, míg a tágabb értelemben vett *Pholadomya*-féléket képviselő *Procardia* aff. *acuminata* (HARTMANN, 1830) példánya a hárskúti Közöskúti-árok vörös, gumós, ammoniteszes, tithon mészkövéből 2022-ben került elő. Mindkét előfordulás a Pálhálási Mészkő formációt képviseli.

A jelen dolgozatban dokumentált formák kevés példánnyal képviselt, kis diverzitású kagylófaunának elemei. Feltételezhető, hogy az *A. aff. gregareum* teknője sekélyebb vízi régióból, áthalmazódás útján került a beágyazódási helyére. A leletek egyben a két genus első ismert előfordulását jelentik a Dunántúli-középhegység jurájában. Mind az *Actinostreon* and, mind a *Procardia* kifejezetten ritka a Földközi-tengert övező térség mélyebb vízi, pelágikus felső jurájában.

Tárgyszavak: Mediterrán jura, kimmeridgei, tithon, Bakony, Tata, Ostreoidea, Pholadomyoidea

Abstract

Upper Jurassic bivalves yielded by the Transdanubian Range until the early 2010s were documented in two papers published in the last decade. Following the publication of them, two specimens representing species previously unknown from the area have been found. The Kimmeridgian limestone of Kálvária Hill, located in the town of Tata has yielded the lophate oyster *Actinostreon* aff. *gregareum* (J. SOWERBY, 1815), while a specimen of the pholadomyoidean *Procardia* aff. *acuminata* (HARTMANN, 1830) was collected from the Tithonian limestone exposed in the Közöskúti Ravine, located near the village of Hárskút (Bakony Mts). The new finds represent the first known occurrence of the genera *Actinostreon* and *Procardia* in the Jurassic of the Transdanubian Range. Both genera are particularly uncommon in the deeper water pelagic Upper Jurassic of the peri-Mediterranean region.

Keywords: Mediterranean Jurassic, Kimmeridgian, Tithonian, Bakony, Tata, Ostreoidea, Pholadomyoidea

Introduction

Bivalve fossils are remarkably rare in deeper water pelagic facies of the Mediterranean Late Jurassic (ZIEGLER 1971) and this statement applies to the Transdanubian Range as well. Based on a study of approx. 250 specimens accumulated in Hungary in public collections since the second half of the 19th century, however, a relatively diverse assemblage, altogether composed of around 30 species assigned to 17

genera, has recently been documented from the Gerecse Mts. and its surroundings including the Kálvária Hill of Tata, as well as from the Bakony Mts., by SZENTE (2013) and SZENTE (2022), respectively.

Since the publication of the afore-mentioned papers, two specimens representing two further species (as well as genera) have been found. In 2015, during the large-scale reconstruction of the ELTE Geological Garden located at the Kálvária Hill, a loose slab of the red Kimmeridgian limestone

assigned to the Pálihálás Limestone Formation, a unit displaying variable lithology and usually rich in *Saccocomma*-remains, ammonites as well as manganese-oxide nodules, was found to contain a lophate oyster identified as *Actinostreon* aff. *gregareum* (J. SOWERBY, 1815). In October of 2022, when participating in a field exercise for the course “Fossil collecting and preparation”, András SZABÓ, a geology student at the Eötvös University collected a specimen of the pholadomyoidean *Procardia* aff. *acuminata* (HARTMANN, 1830), yielded by red, nodular, ammonite-rich Tithonian limestone (Pálihálás Limestone Formation) of the HK-12 section, located in the Közöskút Ravine. Details on the locality, including data on fossil assemblages, can be found in FÜLÖP (1976) and in FÖZY et al. (2022). Since both genera are new for the Jurassic of the Transdanubian Range, these unique finds are worth documenting here.

Remarks on the new finds

Actinostreon aff. *gregareum* (J. SOWERBY, 1815) (Figure 1, A)

The specimen is a slightly worn right valve exposed on the surface of a slab of dark red limestone. It bears around 35 plicae oriented in antimarginal direction. Their crest is composed of alternative swellings and depressions, presumably indicating the presence of empty shell chambers. On the basis of the afore-mentioned features, the specimen corresponds to the description of *Actinostreon gregareum* given recently by KOPPKA (2015). The only argument against this interpretation is the large number of plicae compared to the small size of the specimen (height = 14 mm, width = 8 mm). The number of plicae increases either by bifurcation or intercalation during ontogeny in *A. gregareum* and reaches a maximum of 35 in specimens considerably larger than the

one at Tata (up to 70 mm in height, KOPPKA 2015, see also MACHALSKI 1998). The specimen documented here is either a dwarf representative of *A. gregareum* or belongs to a new species.

As reviewed by KOPPKA (2015), *A. gregareum* was an ecologically tolerant and widely distributed form adapted to various marine environments ranging from reefs including the Tithonian Štramberg Limestone of Moravia (BOEHM 1883, REMEŠ 1903) to “relatively calm subtidal environments.” It forms shell beds, e.g., in the Kimmeridgian Coquina Formation of the Mesozoic Border of the Holy Cross Mountains of Poland, a unit deposited in “a relatively shallow-water setting” (MACHALSKI 1998, ZATOŃ & MACHALSKI 2013). There, two morphotypes reflecting different life positions (“mud-sticker” and “recliner” sensu SEILACHER 1984) occur. As indicated by its straight and elongated outline, the Tata specimen seems to represent the former mode of life.

In contrast to coeval shallow-marine rocks of Europe, however, this species – and, actually, lophate oysters in general – are extremely rare in deeper water Late Jurassic facies of the peri-Mediterranean region. Apparently, the only previously documented occurrence is the specimen identified as *Lopha* (*Lopha*) *solitaria* (J. DE C. SOWERBY, 1832) by MONARI (1995) from the Kimmeridgian “Calcarei Diasprigni” of the Terminilietto outcrop (Umbria-Marche Apennines, Italy), a section rich in re-deposited clasts of shallower-water origin (BARTOLINI et al. 1996). According to KOPPKA (2015) “*L. solitaria*” is a name applied by several authors to *A. gregareum*. *Actinostreon* was a cementing form attached to solid substrate by its left valve. The substrate is, however, unknown in both cases. Thus, it cannot be excluded that the specimens in question are allochthonous elements, re-deposited from areas covered by shallower-water. The Tata specimen forms part of a sparse and low-diversity bivalve fauna dominated by the byssally attached epifaunal *Camptonectes*? sp. (SZENTE 2013).

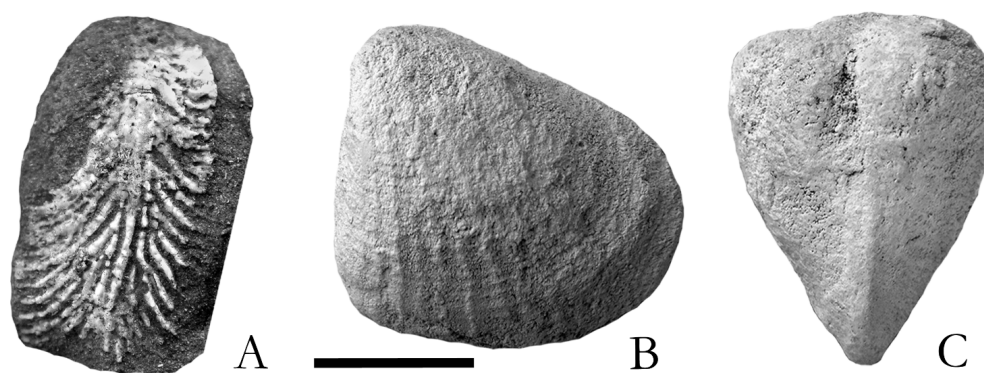


Figure 1. Upper Jurassic bivalves from the Transdanubian Range. A) *Actinostreon* aff. *gregareum* (J. SOWERBY, 1815) from the Kimmeridgian of the Kálvária Hill (Tata); B, C) *Procardia* aff. *acuminata* (HARTMANN, 1830) from the Tithonian of the Közöskút Ravine (Hárskút, Bakony Mts), B: lateral view, C: dorsal view. B and C covered with ammonium-chloride. Scale bar represents 7 mm for (A) and 10 mm for (B) and (C). The specimens are housed in the collection of the ELTE Tata Geological Garden

1. ábra. Felső jura kagylók a Dunántúli-középhegységből. A) *Actinostreon* aff. *gregareum* (J. SOWERBY, 1815) a Tatai Kálvária-domb kimmeridgei mészkövéből; B, C) *Procardia* aff. *acuminata* (HARTMANN, 1830) a hárskúti (Bakony) Közöskúti-árok tithon mészkövéből. B: oldalnézet, C: háti nézet. B és C ammónium-kloriddal van bevonva. A mérete 7 mm (A); 10 mm (B, C). A példányok az ELTE Tatai Geológus Kert gyűjteményében találhatóak

Procardia aff. *acuminata* (HARTMANN, 1830)
(Figure 1, B, C)

The specimen is a small-sized (length = 22 mm, height = 19 mm) composite internal mould of rounded sub-triangular outline, bearing around 12 radial ribs. These features correspond to the description of “*Pholadomya (Pholadomya) acuminata*”, as given by DELVENE (2001). Ventral margin of the Hárskút specimen is, however, convex while that of *P. acuminata* figured in the literature is nearly straight.

Assignment of this relatively well-characterized species to *Procardia* MEEK, 1871 is, however, much more justified (e.g., SZTAJNER 2020). *Procardia* was treated either as a subgenus of *Pholadomya* (e.g., SZENTE 2003, SZTAJNER 2020), or as a separate genus (RUNEGGAR 1974, AMANO 2019, SZENTE 2022), and the latter view is shared here. Its systematic status is discussed in detail in AMANO (2019). According to BEU & RAINE (2009) *Procardia* belongs to the family Parilimyidae MORTON, 1981 and, consequently, to the order Poromyida RIDGEWOOD, 1903, instead of the order Pholadomyida NEWELL, 1965. AMANO (2019), however, assigned Parilimyidae to the superfamily Pholadomyoidea KING, 1844, and this taxonomic opinion is shared here.

Pholadomyoidean bivalves sensu stricto (family Pholadomyidae GRAY, 1847) are widely distributed in the European epicontinental Upper Jurassic (e.g., MOESCH 1874) and occasionally considered emblematic fossils of lithostratigraphic units, such as the “Pholadomyen” of the Oxfordian of the Jura Mts. (e.g., ÉTALLON 1863). On the other hand, Pholadomyoidean bivalves as a whole are uncommon elements in fossil assemblages of the deeper water pelagic facies of the peri-Mediterranean region and seem to be confined to rare finds of *Procardia*. A single specimen of *P. acuminata*, along with a diverse ammonite fauna, was documented by NICOLIS & PARONA (1886) from the Upper Tithonian of near Verona (Southern Alps) and another one has been figured by REMEŠ (1903) from the Štramberg Limestone of Moravia. The faunal association of the latter is unknown.

P. acuminata was a deep-burrower, low level suspension-feeder form (DELVENE 2001, SZTAJNER 2020). Thus, it is considered an autochthonous element of the low-diversity Upper Jurassic bivalve fauna of the HK–12 section, consist-

ing nearly exclusively of species of the epibenthic *Rhynchomytilus* ROLLIER, 1914. It is worth mentioning that in the Lower Cretaceous of the Transdanubian Range another *Procardia* species identified as *P. malbosii* (PICTET, 1863) is widely distributed and represented by at least a dozen specimens in public collections (SZENTE 2003, 2022). The latter bears a close resemblance to *P. acuminata* and is probably identical with it. Further studies are, however, needed to answer this question.

Conclusion

Since the publication of comprehensive papers on Upper Jurassic bivalves of the Transdanubian Range, two hitherto undocumented species represented by single specimens have been found and identified. These finds prove that extensively studied fossil localities occasionally yield unexpected, rare forms. Probably due to the relatively wide range of environments reflected by the lithological variety of the sections, as well as to the intensive collecting work carried out in the last one and a half century, the Transdanubian Range has yielded the most diverse bivalve assemblage of the deeper water pelagic Upper Jurassic of the peri-Mediterranean region.

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