Hantkeniana 10, 107–112., Budapest, 2015
Barnabás Géczy Jubilee Volume

# Brachiopod fauna of the Lower Cretaceous Bersek Marl (Gerecse Mountains, Hungary)

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Abstract

The brachiopod fauna of the Lower Cretaceous Bersek Marl (Gerecse Mountains, Hungary) is briefly described. The scanty material of the historical collections consists of 26 specimens, mostly from the Hauterivian of the Bersek Hill, and 6 specimens from the Valanginian of Nyagda Ravine. Only two species of a single genus have been identified: *Triangope triangulus* (Valenciennes in Lamarck, 1819) and *T.* cf. *rectangularis* (Pictet, 1867). An intriguing feature of the material is that the valves are almost always strongly deformed or distorted by the compaction of the marly sediment. The genus *Triangope* is regarded as a marker of deeper or calmer marine environments and a characteristic Tethyan element of the Mediterranean faunal province.

*Keywords: Brachiopoda, Lower Cretaceous, Gerecse, Hungary*

## Introduction

The siliciclastic Lower Cretaceous formations of the Gerecse Mountains (marls to sandstones) and their rich ammonoid fauna called the attention of the early workers (Hantken 1868, Hofmann 1884). The several hundred metres thick sedimentary complex has been exposed century-long in a big quarry of the Lábatlan cement factory and many other, scattered outcrops. A detailed, monographic geological and palaeontological description of the two major Lower Cretaceous formations (Bersek Marl and Lábatlan Sandstone) was published by Fülöp (1958). The Berriasian to Barremian, coarsening upward sequence has been regarded for a long time as a regressive, shallowing upward sedimentary cycle, until recent studies proved that it was deposited as a submarine fan in a deep slope environment (Kázmér 1987, Császár & Árgyelán 1994). The deepening of the basin and the input of the coarsening clastic material was due to an approaching nappe pile thrust over the downwarped basin (Fodor & Főzy 2013).

Up-to-date syntheses of the Lower Cretaceous stratigraphy of the Gerecse Mountains were given by Főzy & Fogarasi (2002) and Főzy & Janssen (2009). These works revised the ammonoid biostratigraphy of the measured sections on the basis of the old and recent collections and gave a review of the other fossil groups. The whole fauna is dominated by ammonoids, besides belemnoids; benthonic fossils (echinoids, crinoids, bivalves, brachiopods) are subordinate. Brachiopods form an insignificant component of the benthonic fauna of the Bersek Marl Formation of the Gerecse Mountains, yet, in order to accomplish the knowledge on the fossil fauna of the formation, the illustration of this group seemed to be reasonable.

## The fauna

The historical collections, mainly those carried out in the 1950's, under the supervision of J. Fülöp, yielded a scarce brachiopod assemblages from two localities: 26 specimens, mostly from the Hauterivian of the big quarry of the Bersek Hill, and 6 specimens from the Valanginian of Nyagda Ravine, two kilometres to the north-west of the first mentioned locality (Figure 1; Table 1).

The taxonomic diversity of the brachiopod fauna is extremely low; only two species of a single genus have been identified: *Triangope triangulus* (Valenciennes in Lamarck, 1819) and *T.* cf. *rectangularis* (Pictet, 1867). The specimens from the Bersek Hill are of very poor preservation: the valves are frequently disarticulated and even the articulated valves are almost always strongly deformed or distorted by the compaction of the marly sediment Plate

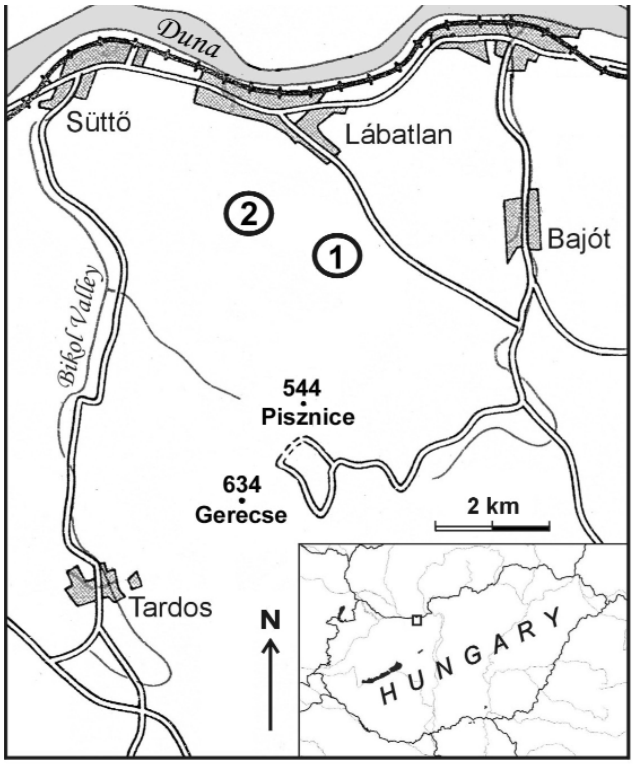


**Figure 1.** Brachiopod bearing localities of the Bersek Marl Formation in the Gerecse Mountains. 1 – Bersek Hill; 2 – Nyagda Ravine

the Late Jurassic to the Berriasian according to JARRE (1962) and from the Tithonian to the Berriasian according to Dieni & Middlemiss (1981).

The genus *Triangope*, as a typical member of the Family Pygopidae, is usually regarded as a marker of deeper or calmer marine environments (AGER 1965, VÖRÖS 2005); this largely fits to the current palaeogeographical interpretation of the Early Cretaceous sequence of the Gerecse (FODOR & FŐZY 2013).

From palaeobiogeographical point of view, *Triangope* is a characteristic Tethyan element of the Mediterranean province (VÖRÖS 1993). At the same time it is surprising that other pygopid species, e. g. *Pygope catulloi* (PICTET, 1867), *P. janitor* (PICTET, 1867), and *P. diphya* (BUCH, 1834), frequent in contemporaneous localities in the Transdanubian Range (Bakony Mountains: SOMODY, 1992) and other parts of the Alpine-Mediterranean region (DIENI & MIDDLEMISS 1981), have not been recorded in the Gerecse.

## Systematic palaeontology

The identified species are well known from the recent palaeontological literature and do not need detailed description, neither the study of their internal morphology; therefore only abridged synonym lists and short remarks will be given. In the systematic descriptions, the classification of the revised "Treatise" (LEE et al. 2006) is followed. The material is deposited in the collection of the Department of Paleontology and Geology of the Hungarian Natural History Museum (HNHM), Budapest. The figured specimens are under the inventory numbers prefixed by "INV".

**Table 1.** List of identified brachiopod taxa and number of specimens from various sampling points and ages from the Bersek Marl of the Gerecse Mountains

| Bed | Age | Taxon | Specimen |
|---|---|---|---|
| Bersek Hill | | | |
| 36 | Barremian | *Triangope* sp. | 1 |
| 201 | Barremian | *Triangope* sp. | 1 |
| 208 | Late Hauterivian | *Triangope triangulus* (VALENCIENNES in LAMARCK, 1819) | 9 |
| | | *Triangope* sp. | 2 |
| 211 | | *Triangope triangulus* (VALENCIENNES in LAMARCK, 1819) | 3 |
| | | *Triangope* cf. *rectangularis* (PICTET, 1867) | 1 |
| 212 | | *Triangope triangulus* (VALENCIENNES in LAMARCK, 1819) | 3 |
| 213 | Early Hauterivian | *Triangope triangulus* (VALENCIENNES in LAMARCK, 1819) | 1 |
| 216 | | *Triangope triangulus* (VALENCIENNES in LAMARCK, 1819) | 2 |
| 221 | | *Triangope triangulus* (VALENCIENNES in LAMARCK, 1819) | 1 |
| 233 | | *Triangope* cf. *rectangularis* (PICTET, 1867) | 1 |
| 241 | Valanginian | *Triangope* cf. *triangulus* (VALENCIENNES in LAMARCK, 1819) | 1 |
| Nyagda Ravine | | | |
| | Valanginian | *Triangope triangulus* (VALENCIENNES in LAMARCK, 1819) | 5 |
| | | *Triangope* cf. *rectangularis* (PICTET, 1867) | 1 |

1: A–P). The preservation is somewhat better in the case of the specimens from the more calcareous lithology of the Nyagda Ravine (Plate 1: S–Y).

Both identified species are long-ranging forms: *Triangope triangulus* (VALENCIENNES in LAMARCK, 1819) is known from the latest Kimmeridgian to the earliest Barremian (DIENI & MIDDLEMISS 1981), while the species *Triangope rectangularis* (PICTET, 1867) was recorded from

Order Terebratulida WAAGEN, 1883
Suborder Terebratulidina WAAGEN, 1883
Superfamily Dyscolioidea FISCHER, OEHLERT, 1891
Family Pygopidae MUIR-WOOD, 1965
Subfamily Triangopinae MANCEŃIDO, 1993

## Genus *Triangope* DIENI et MIDDLEMISS, 1981

### *Triangope triangulus* (VALENCIENNES in LAMARCK, 1819) Plate 1: A–P, S–Y.

*1819 *Terebratula triangulus*; LAMARCK, Histoire naturelle, p. 250, No. 21.
1962 *Pygope triangulus* Lamarck sp., 1819; JARRE, Pygope, p. 70, pl. E, fig. 4, pl. F, figs 1–6.
1981 *Triangope triangulus* (VALENCIENNES, 1819); DIENI & MIDDLEMISS, Venetian Alps., p. 40, pl. 4, fig. 5, pl. 5, figs 1–6, pl. 6, fig. 1, text-figs 5, 6.
2013 *Triangope triangulus* (VALENCIENNES, 1819); VÖRÖS, Gerecse and Pilis, p. 399 (cum syn.), pl. 4, figs 1–4.

Material: 24 poorly preserved, deformed and distorted specimens from the Bersek Hill, Valanginian to Hauterivian, and 5 moderately preserved specimens from the Nyagda Ravine, Valanginian.

Remarks: This well known species of the Alpine–Mediterranean region was profusely illustrated, and taxonomically discussed by JARRE (1962), DIENI & MIDDLEMISS (1981) and VÖRÖS (2013). On this basis, in spite of their poor and deformed state of preservation, our specimens were identified undoubtedly as *Triangope triangulus* (VALENCIENNES in LAMARCK, 1819).

The occurrence of our specimens fits well into the known range of this species (latest Kimmeridgian to the earliest Barremian).

### *Triangope* cf. *rectangularis* (PICTET, 1867) Plate 1: Q, R.

*1867 *Terebratula rectangularis*, PICTET; PICTET, Groupe T. diphya, p. 181, pl. 34, fig. 4.
1962 *Pygope rectangularis* PICTET sp., 1867; JARRE, Pygope, p. 75, pl. G, figs 1–6.
2013 *Triangope rectangularis* (PICTET, 1867); VÖRÖS, Gerecse and Pilis, p. 399, pl. 4, fig. 5.

Material: Two single valves from the Bersek Hill, Hauterivian, and one single valve from the Nyagda Ravine, Valanginian.

Remarks: The valves of this small-sized species occur rather rarely. DIENI & MIDDLEMISS (1981) queried *T. rectangularis* as an independent species but VÖRÖS (2013), partly relied upon the opinion by JARRE (1962), endorsed its validity. *T. rectangularis* is usually smaller and less convex than *T. triangulus* (VALENCIENNES, 1819), and has a subquadratic outline. In some cases it bears a weak dorsal sulcus, but the sinus of the anterior commissure is shallow, in contrast to the deep sinus of *T. triangulus*.

The occurrences of our specimens in the Valanginian and Hauterivian strata seem to expand the range of *T. rectangularis,* previously recorded only from the Tithonian to Berriasian.

## Acknowledgements

The brachiopod specimens were kindly offered for study to the author by István FŐZY, whose advices and help in taking the photographs are also deeply acknowledged.

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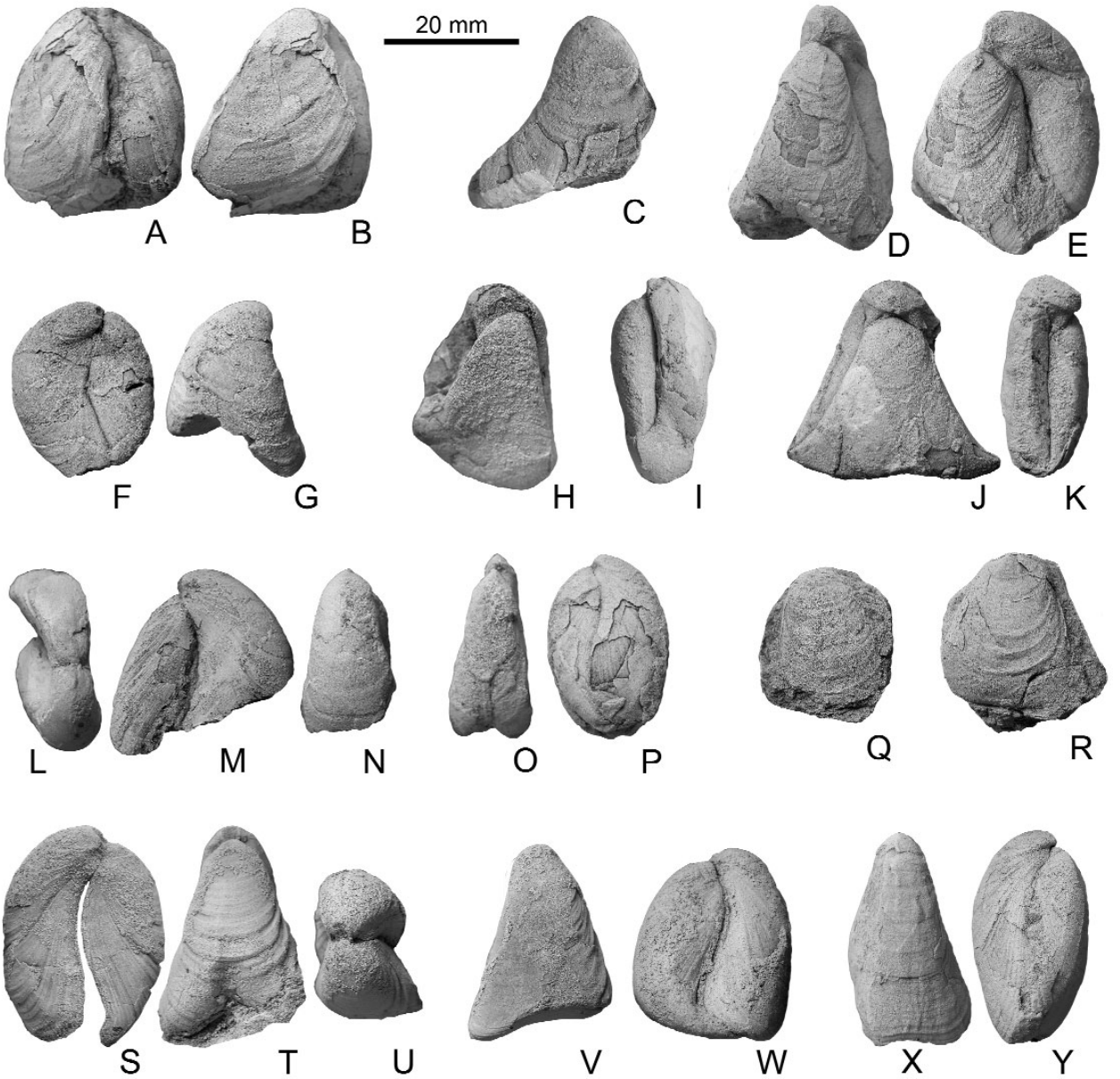


**Plate 1.**
***Triangope* specimens from the Bersek Marl Formation from the Gerecse Mountains**

A–P = *Triangope triangulus* (VALENCIENNES in LAMARCK, 1819), Bersek Hill.
A–B = INV 2014.191, Bed 211, Hauterivian, lateral and dorsal views.
C = INV 2014.192, Bed 211, Hauterivian, ventral view.
D–E = INV 2014.193, Bed 211, Hauterivian, dorsal and lateral views.
F-G = INV 2014.194, Bed 216, Hauterivian, lateral and ventral views.
H–I = INV 2014.195, Bed 216, Hauterivian, dorsal and lateral views.
J–K = INV 2014.196, Bed 221, Hauterivian, dorsal and lateral views.
L-N = INV 2014.197, Bed 213, Hauterivian, posterior, lateral and ventral views.
O-P = INV 2014.198, Bed 241, Valanginian, dorsal and lateral views.
Q–R = *Triangope* cf. *rectangularis* (PICTET, 1867), Bersek Hill.
Q = INV 2014.199, Bed 211, Hauterivian, dorsal view.
R = INV 2014.200, Bed 233, Hauterivian, dorsal view.
S-Y = *Triangope triangulus* (VALENCIENNES in LAMARCK, 1819), Nyagda Ravine, Valanginian.
S-U = INV 2014.201, lateral, dorsal and posterior views.
V–W = INV 2014.202, ventral and lateral views.
X–Y = INV 2014.203, ventral and lateral views.

(All figures are in natural size. Specimens have been coated with ammonium chloride before photography.)