

Bajocian and Bathonian brachiopods in Hungary: a review

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(With 3 figures)

The Bajocian and Bathonian brachiopod faunas of Hungary, collected in the last decades, have been reviewed by the author. In the Pelsonia terrane (Bakony and Vértes Mts.), the Bajocian stage is especially rich in brachiopods: 18 species have been determined from the more than five hundred specimens. In the Tisia terrane (southern Transdanubia), the Bathonian beds provided very diverse brachiopod faunas: around 500 specimens and 9 species have been found in the Mecsek Mts., whereas the local occurrence in the Villány Mts. provided 11 specimens belonging to 4 species. The Pelsonia terrane belonged to the Mediterranean faunal province in the Bajocian, while the Tisia terrane was under the mixed influence of the NW-European and Mediterranean provinces in Bathonian times.

Introduction

Brachiopods have rather limited significance in stratigraphical subdivision of Jurassic strata, therefore they contribute little or none to the resolution of the Bajocian/Bathonian boundary problem. However, due to their relative abundance, they may help in a better paleontological definition of the respective stages in certain regions, in this case in Hungary.

The territory of Hungary can be subdivided into two main tectono-stratigraphic terranes of different Mesozoic facies, divided by the WSW–ENE trending Mid-Hungarian Lineament (see VÖRÖS 1993a; KOVÁCS et al. 2000) (Fig. 1). The northern terrane (named as *Pelsonia*) embraces roughly the Transdanubian Central Range where the Jurassic system is dominated by carbonates with faunas of Mediterranean character. The Jurassic rocks of the southern terrane (*Tisia*) crop out in southern

Transdanubia, in the Mecsek and Villány Mts.; they are less calcareous (terrigenous detrital in the Lower Jurassic) and their fauna shows NW-European affinity, at least in the first half of the Jurassic.

The Jurassic brachiopods of Hungary have been reviewed by VÖRÖS (1993b; 1997). The very diverse Sinemurian and Pliensbachian faunas were wiped out by the Early Toarcian global extinction event and after a slow recovery, the Bajocian and Bathonian saw a secondary flourishing period. Bajocian and Bathonian brachiopods were frequently found in the Transdanubian Central Range (Bakony, Vértes) and in southern Transdanubia (Mecsek, Villány Mts.), respectively (Fig. 1). A review of these faunas is given here, with some hints to their paleoecology and paleobiogeography.

Transdanubian Central Range

Middle Jurassic brachiopods were first mentioned by NOSZKY (1943) from the Bajocian of the Bakony Mts. and FÜLÖP et al. (1960) from the Vértes Mts. (attributed to the Bathonian). The new collections made in the last decades mainly by the workers of the Hungarian Geological Institute and A. GALÁ CZ, J. SZABÓ and A. VÖRÖS provided rich faunas from the Bakony Mts. and complemented the Vértes fauna.

Bajocian

The Lower Bajocian reddish, nodular limestones of the Lókút section (described by

GALÁ CZ 1976, 1991) yielded around 50 specimens belonging to the following species:

Septocrurella retrosinuata (VACEK) (Fig. 2–2)
Capillirhynchia ? bretoniaca (OPPEL)
"Rhynchonella" etalloni OPPEL

The Middle and Upper Bajocian shows diverse lithology: besides the usual pelagic limestone types, dark red, manganiferous limestones, biotrital limestones occur. The latter two rock types sometimes appear as neptunian dykes. A detailed ammonoid biostratigraphy of this stage was worked out by GALÁ CZ (1976, 1991). The density and diversity of brachiopods abruptly increases in the

Humphriesianum Zone and this bloom persisted until the end of the Bajocian.

More than 500 specimens were collected from three important localities (Hárskút, Gyenespuszta; Lókút, Fenyveskút; Bakonybél, Som-hegy) from the Bakony Mts. Recently, GALÁ CZ (1995a) proved the presence of Bajocian beds, besides the formerly known Bathonian at Csókakő (Vértes Mts.). It is highly probable that the "Bathonian" brachiopods described from here by FÜLÖP et al. (1960) came from these Bajocian limestones. The following species were determined from the Middle and Upper Bajocian of the Bakony and Vértes Mts.:

- Stolmorhynchia* ? *dubari* ROUSSELLE
Apringia atla (OPPEL) (Fig. 2-1)
A. alontina (DI STEFANO)
Capillirhynchia ? *brentoniaca* (OPPEL)
Capillirhynchia ? *kardonikensis* KAMYSHAN
Cardinirhynchia galatensis (DI STEFANO) (Fig. 2-3)
Septocrurella ? *microcephala* (PARONA) (Fig. 2-4)
S. retrosinuata (VACEK)
S. micula (OPPEL)
Striirhynchia subechinata (OPPEL)
S. berchta (OPPEL) (Fig. 2-5)
Linguithyris nepos (CANAVARI) (Fig. 2-8)
Karadagithyris gerda (OPPEL) (Fig. 2-6)
Viallithyris ? *alamanni* (DI STEFANO)
Papodina ? *recuperoi* (DI STEFANO) (Fig. 2-7)
Zugmayeria ? *pygopoides* (DI STEFANO) (Fig. 2-10)
"Terebratula" fylgia OPPEL (Fig. 2-9)
"Terebratula" laticoxa OPPEL
"Terebratula" seguenzae DI STEFANO

The whole fauna has a markedly Mediterranean character and shows strong similarity to the South Alpine and some Sicilian faunas (VÖRÖS 1993a).

The Bajocian diversity peak was interpreted by VÖRÖS (1993b) in terms of local tectonic movements. An important factor, controlling the distribution of brachiopods was the hard substratum, necessary for attachment. In Jurassic times, the Bakony area was dominated by block-faulted submarine highs (GALÁ CZ & VÖRÖS 1972; VÖRÖS 1986, VÖRÖS & GALÁ CZ 1998). The tectonic movements produced fresh, empty rocky surfaces and triggered rock-falls (scarp breccias: GALÁ CZ 1988). The big limestone boulders scattered at the feet of the escarpments of the highs, in the marginal zones of the adjacent basins might have served as rocky substrata in an otherwise muddy environment (VÖRÖS 1991).

The Bajocian extensional tectonics have been evidenced by (1) opening phases of neptunian dykes (e. g. Som-hegy, Humphriesianum Zone: GALÁ CZ 1976) and (2) scarp-breccias (e. g. Fenyveskút, Garantiana Zone: GALÁ CZ 1988). All these repeated tectonic movements greatly enhanced the proliferation of brachiopod communities. Another factor might be the changing activity of submarine cold seeps carrying nutrients to the starving environment, as suggested by VÖRÖS (1995a). The rejuvenation of tectonic movements might trigger stronger flow of submarine seeps along the fracture zones bordering the highs.



Fig. 1. Map of Hungary, showing the two main terranes and the most important Bajocian and Bathonian brachiopod localities. 1. Gyenes-puszta at Hárskút, Bakony Mts., 2: Fenyves-kút and Lókút Hill at Lókút, Bakony Mts., 3: Som Hill at Bakonybél, Bakony Mts., 4: Csóka Hill at Csókakő, Vértes Mts., 5: Hidasi Valley at Hosszúhetény, Mecsek Mts., 6: Zengővárkony, Mecsek Mts., 7: Templom Hill at Villány, Villány Mts.

Mecsek Mts.

BÖCKH (1881) was the first to mention Middle Jurassic brachiopods from the Mecsek Mts.; he described and figured some Bathonian species in his monograph devoted to the ammonoid fauna. Later, VADÁSZ (1935) listed a few brachiopods from the Bajocian and Bathonian beds. In the last decade, new, detailed collections (lead by A. GALÁ CZ) resulted in a rich fossil material (see GALÁ CZ 1995b for a lithological and stratigraphical description).

Bajocian

This stage is represented mainly by “spotted marls” (alternation of shale and limestone beds); the recently collected brachiopod fauna is poor (7 specimens). The following taxa were determined:

Capillirhynchia bretoniaca (OPPEL)
Karadagithyris eduardi VÖRÖS
Linguithyris sp.
Zittelina ? sp.

Bathonian

Following a marked change in facies, this stage is represented by red, nodular, ammonitic calcareous marl. The fauna is dominated by ammonoids (GALÁ CZ 1995b), but bivalves and sponges are also frequent. The systematic

description of the very rich brachiopod fauna (415 specimens) was given by VÖRÖS (1995b). The faunal list:

Caucasella voutensis (OPPEL) (Fig. 3–1)
Stolmorhynchia sp., aff. *stolidota* BUCKMAN
Apringia ? *penninica* (UHLIG)
Dichotomosella galaczi VÖRÖS
Capillirhynchia bretoniaca (OPPEL)
Linguithyris nepos (CANAVARI) (Fig. 3–2)
Karadagella zorae TCHORSZHEVSKY & RADULOVIC (Fig. 3–4)
Karadagithyris eduardi VÖRÖS
Zittelina ? *benecke*i (PARONA) (Fig. 3–3)

Both the Bajocian and the Bathonian brachiopod fauna show rather strong Mediterranean affinity; some species occurred in the NW–European province, as well. The close similarity to the fauna of the Pieniny Klippen Belt of the Carpathians is remarkable.

The marked increase of diversity and density of brachiopods in the Bathonian can be explained by the sudden decrease in the rate of sedimentation: the empty ammonite and other shells might have been exposed for a long time on the bottom as hard objects providing attachment surfaces for brachiopods and other sessile benthic organisms. This might be enhanced by a collecting bias: the Bathonian red limestones, by their rich ammonoid fauna, specially attracted the collectors, and the more comprehensive collecting work resulted in more brachiopods.

Villány Mts.

Bathonian

Bathonian brachiopods were mentioned in faunal list by LÓCZY (1915), however these turned to be of Lower Jurassic (Pliensbachian) in age (AGER & CALLOMON 1971).

In the very incomplete Jurassic sequence of the Villány Mts. the Bathonian is represented only in a single quarry at the village Villány. Here, a local lense of sandy limestone, less than 10 cm thick and two metres across, rests on the eroded surface of a Pliensbachian, massive, crinoidal limestone and is covered by the famous Callovian ammonite-rich bank. For a more detailed stratigraphy, see GÉCZY & GALÁ CZ (1998) who ranged the sandy limestone into the Upper Bathonian *Retrocostatum* Zone. Due to the exhaustive collecting work done by J. FÜLÖP, G. VIGH, A. GALÁ CZ, B. GÉCZY and A. VÖRÖS, the local lense was completely destroyed. The poorly preserved, few brachiopods (11 specimens) represent the following taxa:

Acanthorhynchia cf. *panacanthina* (BUCKMAN & WALKER) (Fig. 3–5)
Cererithyris cf. *fleischeri* (OPPEL) (Fig. 3–6)

Dorsoplicathyris cf. *dorsoplicata* (DESLONGCHAMPS)
Aulacothyris cf. *pala* (BUCH) (Fig. 3–7)

By its dominant NW–European elements, the fauna might belong to the “Submediterranean” faunal region.

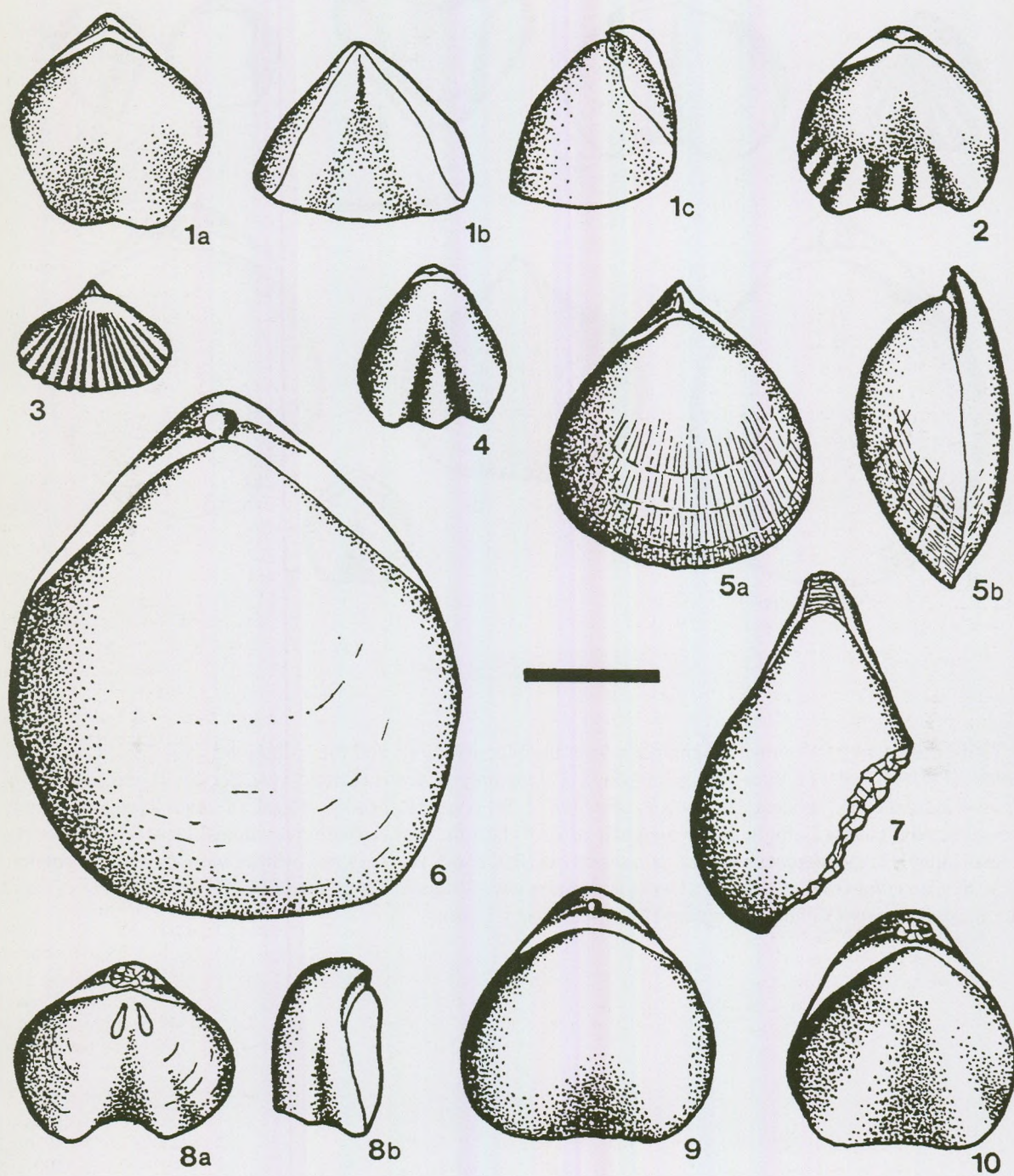
This faunal affinity seems to be in contrast with the more Mediterranean character of the contemporaneous brachiopod fauna of the Mecsek Mts., considering that both territories are held to belong to the same, Tisia terrane. The Tisia crustal fragment was part of the European shelf complex, on the northern side of the Tethys Ocean in Early Mesozoic times (GÉCZY 1973), then, in the Middle Jurassic, it started to move as a separate microcontinent (VÖRÖS 1988; 1993a). This movement is in synchrony with the appearance of definitely Mediterranean brachiopods in the deep-water Bathonian of the Mecsek, while the shallow marine Villány region remained under the influence of the NW–European province. It seems that in this case we have to count with the interplay between paleobiogeography and paleoecology, i. e. the general pattern of brachiopod distribution may be overprinted by the environmental control.

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Fig. 2. Representative Bajocian brachiopods from the Bakony Mts.: 1 *Apringia atla* (OPPEL), in dorsal (a), anterior (b) and lateral (c) views (Bakonybél, Som Hill); 2: *Septocrurella retrosinuata* (VACEK), dorsal view (Lókút, Lókút Hill); 3: *Cardinirhynchia galatensis* (DI STEFANO), dorsal view (Hárskút, Gyenes-puszta); 4: *Septocrurella ? microcephala* (PARONA), dorsal view (Hárskút, Gyenes-puszta); 5: *Striirhynchia berchta* (OPPEL), in dorsal (a) and lateral (b) views (Lókút, Fenyves-kút); 6: *Karadagithyris gerda* (OPPEL), in dorsal view (Lókút, Fenyves-kút); 7: *Papodina ? recuperioi* (DI STEFANO), dorsal view (Lókút, Fenyves-kút); 8: *Linguithyris nepos* (CANAVARI), in dorsal (a) and lateral (b) views (Bakonybél, Som-hegy); 9: *Terebratula ? fylgia* Oppel, dorsal view (Bakonybél, Som-hegy); 10: *Zugmayeria ? pygopoides* (DI STEFANO), dorsal view (Lókút, Fenyves-kút) (Scale bar = 1 cm).

Fig. 2.



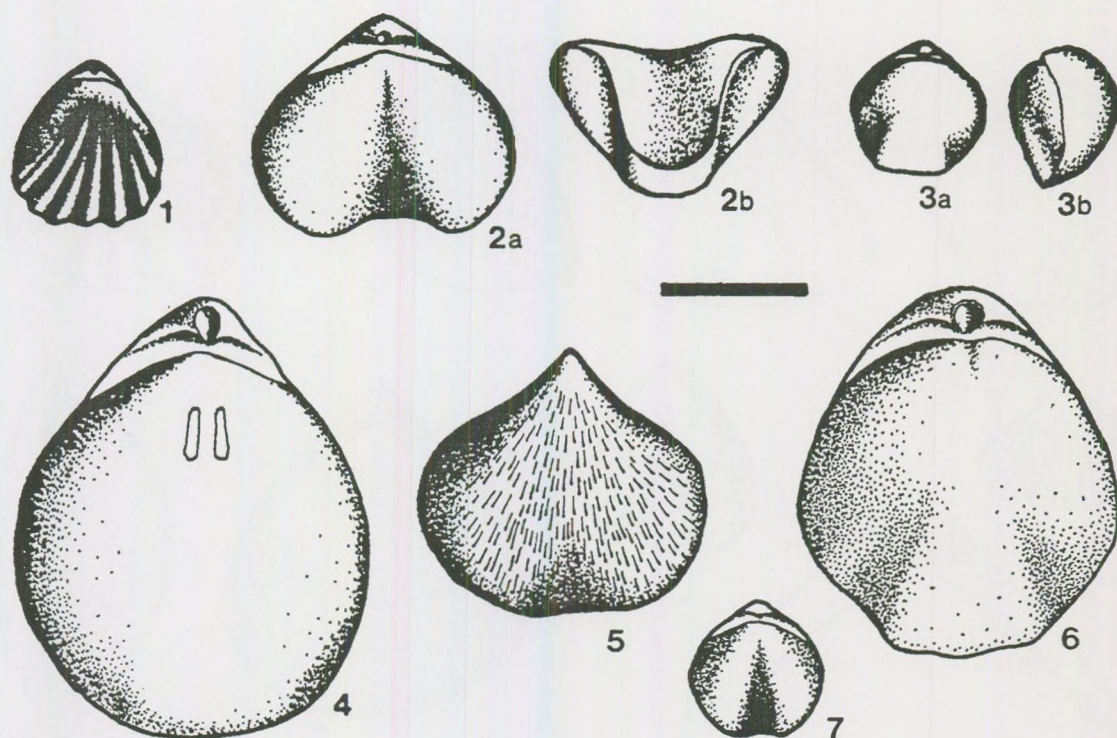


Fig. 3. Representative Bathonian brachiopods from the Mecsek (1–4.) and the Villány Mts. (5–7.): 1: *Caucasella vultensis* (OPPEL), dorsal view (Zengővárkony); 2: *Linguithyris nepos* (CANAVARI), dorsal (a) and anterior (b) views (Hosszúhetény, Hidasi Valley); 3: *Zittelina ? benecke* (PARONA), dorsal (a) and lateral (b) views (Hosszúhetény, Hidasi Valley); 4: *Karadagella zorae* Tchorszhevsky & Radulovic, dorsal view (Hosszúhetény, Hidasi Valley); 5: *Acanthorhynchia* cf. *panacanthina* (BUCKMAN & WALKER), ventral view (Villány, Templom Hill); 6: *Cererithyris* cf. *fleischeri* (OPPEL), dorsal view (Villány, Templom Hill); 7: *Aulacothyris* cf. *pala* (BUCH), dorsal view (Villány, Templom Hill) (Scale bar = 1 cm).

