



The Brachiopod Fauna of the Adnet Limestone at its Type Locality (Adnet, Austria)

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3 Text-Figures

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Die Brachiopoden-Fauna des Adnet Kalkes an seiner Typlokalität (Adnet, Österreich)

Zusammenfassung

Der Adnet Kalk sensu stricto des locus classicus in den Adnet Steinbrüchen lieferte zwar keine reiche, aber dafür eine umso mehr charakteristische Assoziation von Brachiopoden-Arten, die klar den mediterranen Charakter dieser Sinemur-Fauna belegt: *Apringia paolii* (CANAVARI), *Pisirhynchia* ex gr. *retroplicata* (ZITTEL), *Calcirhynchia* (?) *laevicosta* (STUR in GEYER), *Linguithyris aspasia* (ZITTEL) und *Bakonyithyris apenninica* (ZITTEL). Die Brachiopoden-Assoziationen der liegenden Schnöll-Formation des Hettang (Langmoos-, Guggen- und Enzesfeld-Subformation) wurden bereits in BÖHM et al. (1999) dokumentiert.

Abstract

The Adnet Limestone of the Adnet quarries yielded not numerous but characteristic brachiopod species: *Apringia paolii* (CANAVARI), *Pisirhynchia* ex gr. *retroplicata* (ZITTEL), *Calcirhynchia* (?) *laevicosta* (STUR in GEYER), *Linguithyris aspasia* (ZITTEL) and *Bakonyithyris apenninica* (ZITTEL). These smooth or sulcated species document well the Mediterranean character of the local brachiopod assemblage in the Adnet Limestone.

1. Introduction

The present contribution offers some new data on the brachiopod fauna from the Adnet Limestone. The collection has been made in the Adnet quarries during several last years.

Generally speaking, the Adnet Limestone seems to be very poor in the present days in brachiopods within the Adnet area; the only exception is the quarry no. XXXVIII (Wolfgrub Quarry), ENE of Adnet (numbering of quarries follows KIESLINGER [1964]). Moreover, some undeterminable fragments of smooth brachiopod valves were found in the Adnet Limestone of some other quarries in the surrounding, e.g. nos. XII (Lienbacher Quarry), XXVIII (Wimberger or Platten Quarry), XXXI (Schnöll Quarry) and XLI (Deisl Quarry). Essentially all material described here

comes from the Lower Adnet Formation (sensu BÖHM et al., 1999) of the Wolfgrub Quarry no. XXXVIII. In this quarry, the Lower Adnet Formation is well exposed and also the hanging Upper Adnet Formation with its basal unit, the breccia of the Scheck Member is cropping out here. The Lower Adnet Fm. is represented by medium- to thin-bedded, partly nodular red limestones of the Sinemurian Schmiedwirt Member (BÖHM et al., 1995, 1999). This is the typical Adnet Limestone s. str., showing a microfacies of intraclastic wackestones with ostracodes, foraminifera, sponge spicules and crinoidal debris (BÖHM et al., 1999).

These limestones in the eastern part of the quarry yielded *Apringia paolii* (CANAVARI), *Pisirhynchia* ex gr. *retroplicata* (ZITTEL), *Linguithyris aspasia* (ZITTEL) and *Bakonyithyris apenninica*

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(ZITTEL). This level belongs to *Obtusum* Zone (according to the ammonite fauna studied by DOMMARGUES, MEISTER & BÖHM, 1995). The specimen of *Calcirhynchia* (?) *laevicosta* (STUR in GEYER) was found in the scree of the Adnet Limestone in the W. part of the same quarry. The specific composition of the brachiopod fauna (smooth valves, sulcated shells) documents clearly its Mediterranean character and thus the narrow relations to the South European brachiopod assemblages. No trace has been found during our field investigations of *Securithyris adnethensis* (SUESS, 1855), which in the past was reported from the local Adnet Limestone and which is known from the Pliensbachian level at some other localities of the Northern Calcareous Alps and Southern Alps. In the present times, the specimens of this species coming from Adnet are to be found in the older collections only (e.g. in the Haus der Natur in Salzburg) but never accompanied with exacter localization than "Adnet".

Remark: The present contribution to the brachiopod fauna of the Adnet Limestone was not included in the paper by BÖHM et al. (1999) as the initial intention of that paper was the study of the Adnet Hettangian only, and thus my contribution was at that time focused only on Hettangian brachiopods.

2. Palaeontological Descriptions

Order: Rhynchonellida KUHN, 1949

Genus: *Apringia* DE GREGORIO, 1886

Apringia paolii (CANAVARI, 1880)

(Text-Figs. 1 and 3-1)

1880 *Rhynchonella Paolii*, nov. form. – CANAVARI, p. 69, Pl. 1, Fig. 1.

? 1889 *Rhynchonella Paoli* CANAV. – GEYER, p. 67, Pl. 7, Fig. 23, non Fig. 22 (?).

1893 *Rhynchonella Paolii* CANAVARI – BÖSE, p. 191, Pl. 14, Figs. 1–4.

non 1894 *Rhynchonella Paolii* CAN. – FUCINI, p. 61, Pl. 7, Fig. 6.

Material: 42 internal moulds with fragments of shells, up to 11.5 mm long, 13.5 mm wide and 8.0 mm thick. The figured specimen measures 9.2 x 9.0 x 6.0 mm.

Internal characters: Delthyrial cavity subquadrate, lateral umbonal cavities semicircular in cross-section. Dental lamellae short. Hinge teeth laterally expanded and freely situated in shallow, crenulated sockets. Hinge plates posteriorly fused, then subhorizontally or dorsally slightly converging, with dorsally situated crural bases. Neither septalium nor median septum developed. Crura arcuiform (?).

Remarks: The figured specimen agrees in its outline and character of plication well with that depicted by CANAVARI (1880) and differs from it by its smaller dimensions only. Rare Adnet specimens have higher and narrower linguiform plication. Most specimens show short, poorly visible costellae near the anterior margins of valves. A large collection enabled BÖSE (1893) to study the great variability of this species, showing specimens from smooth, through poorly ribbed to ribbed. Very variable is according to him also the character of folding. Moreover, BÖSE tried to distinguish "paolii" from other similar species. *Apringia mariottii* (ZITTEL, 1869) differs from "paolii" in mainly stronger ribbing and in better developed dorsal folding, clearly delimited from the lateral parts of valve. I was able to prove it in Munich, where ZITTEL's type specimen of "mariottii" is deposited in the "Bayerische Staatssammlung" (no. 1868 X 94). *Rhynchonella Stachei* was described by BÖSE (1893) and it represents according to him a passage form between *Rhynchonella Paolii* and *Rhynchonella*

la Dalmasi DUMORTIER, differing from "paolii" in the presence of well-developed beak ridges. Especially the specimens from "Hinterschafberg", N of St. Wolfgang figured by BÖSE in Pl. 14, Figs. 6–7, could be differentiated from "paolii" with difficulties only. Both "paolii" and "stachei" develop smooth up to semiplicate shells of very variable outline and of variable shape of plication; a great difference in thickness between pedicle and brachial valves is characteristic of both species, too. The specimen of subrounded outline and ribbed valves figured as *Rhynchonella Paolii* in FUCINI (1894) differs substantially from species under consideration.

Occurrence: The species was described by CANAVARI (1880) from the Middle Liassic of Suavicino. Recently, it was reported except Pliensbachian also from the Sinemurian of Gerecse and Pilis Mts. in Hungary by VÖRÖS (1995, p. 13). In Adnet, it was found in the *Obtusum* Zone in the quarry XXXVIII.

Genus: *Pisirhynchia* BUCKMAN, 1918

Pisirhynchia ex gr. *retroplicata* (ZITTEL, 1869)

(Fig. 3-2)

ex gr. 1869 *Rhynchonella retroplicata* ZITT. – ZITTEL, p. 128, Pl. 14, Figs. 13–14.

Material: 1 complete specimen of the dimensions 8.0 x 7.9 x 4.8 mm.

Remarks: Small, finely capillate shell with 3 rounded costae anteriorly in a shallow dorsal sulcation. Beak low, incurved. The specimen seems to be close to *Pisirhynchia retroplicata* (ZITTEL) and differs from both syntypes in different lateral profile and in much shallower sulcation containing 3 ribs (instead of 1). It could be verified in the "Bayerische Staatssammlung für Paläontologie und historische Geologie" in Munich where ZITTEL's specimens are deposited (1869, Pl. 14, Figs. 14-15, nos. 1868 X 523-524). More common *Pisirhynchia* species – *P. inversa* (OPPEL, 1861) and *P. pisoides* (ZITTEL, 1869) – develop globular shells with deeper sulcation. *Pisirhynchia retroplicata* itself can be distinguished from some specimens of *Pisirhynchia inversa* with difficulties only, and already GEYER (1889, p. 70) admitted the possible synonymy of the two species. Further comparisons are made difficult at present owing to the scarcity of material.

Occurrence: *Pisirhynchia retroplicata* originated from the Pliensbachian of the Apennines but was reported recently by DULAI (1998) also from the Sinemurian Pisznice Limestone of the Gerecse Mts. in Hungary. In Adnet, it was found in the red nodular limestones of the *Obtusum* Zone in the quarry XXXVIII.

Genus: *Calcirhynchia* BUCKMAN, 1918

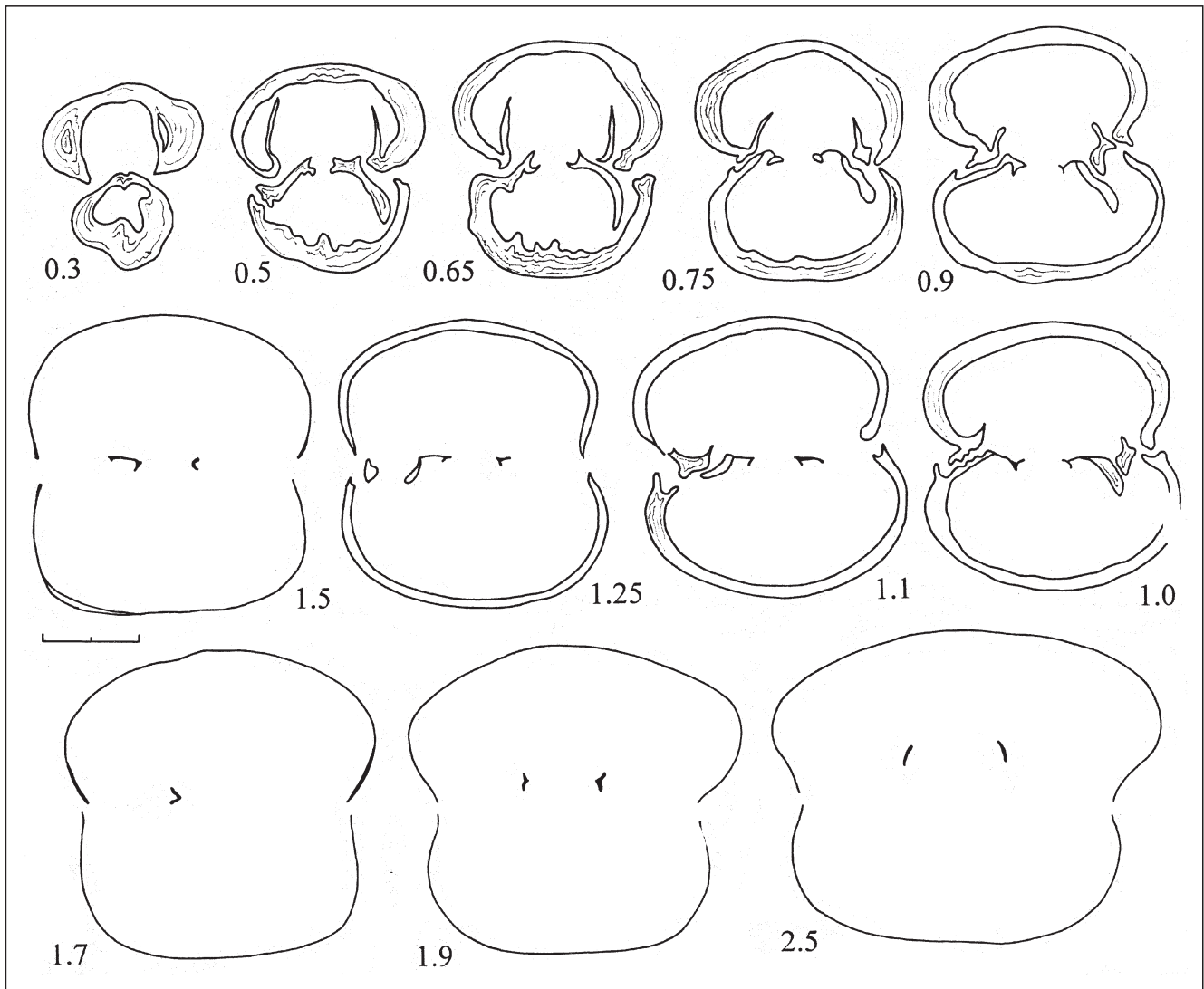
Calcirhynchia (?) *laevicosta* (STUR in GEYER, 1889)

1889 *Rhynchonella laevicosta* nov. sp. STUR m. s. – GEYER, p. 66, Pl. 7, Figs. 20–21.

1893 *Rhynchonella laevicosta* STUR. m. s. – BÖSE, p. 644, Pl. 15, Fig. 1.

Material: 1 deformed and slightly damaged specimen of the dimensions ?16.0 x ?17.0 x ?7.0 mm.

Remarks: The specimen agrees in all observed external features well with specimens figured by GEYER (1889) and BÖSE (1893) with the only difference that GEYER's smaller specimen (Pl. 7, Fig. 20) reveals poorly developed lateral planareas, which are totally missing in Adnet and BÖSE's specimens. There are 25–26 faint costellae



Text-Fig. 1.
Apringia paolii (CANAVARI) – Serial transverse sections through the posterior part of shell.
 Adnet, quarry XXXVIII (Wolfgrub Quarry).
 Total length of specimen 10.4 mm. Enlarged, scale bar equals 2 mm.

on each valve reaching umbos of our specimen (9 of them confined to the low fold).

Occurrence: The species has been rarely described from the Sinemurian of the Northern Calcareous Alps (Hierlatz, Hindelang). VÖRÖS (1997, p.13) reported it from the Sinemurian of the Bakony and Gerecse Mts. in Hungary. In Adnet, the species was collected in the scree in the western part of the quarry XXXVIII.

Order: Terebratula WAAGEN, 1883
Genus: *Linguithyris* BUCKMAN, 1918

***Linguithyris aspasia* (ZITTEL, 1869)**

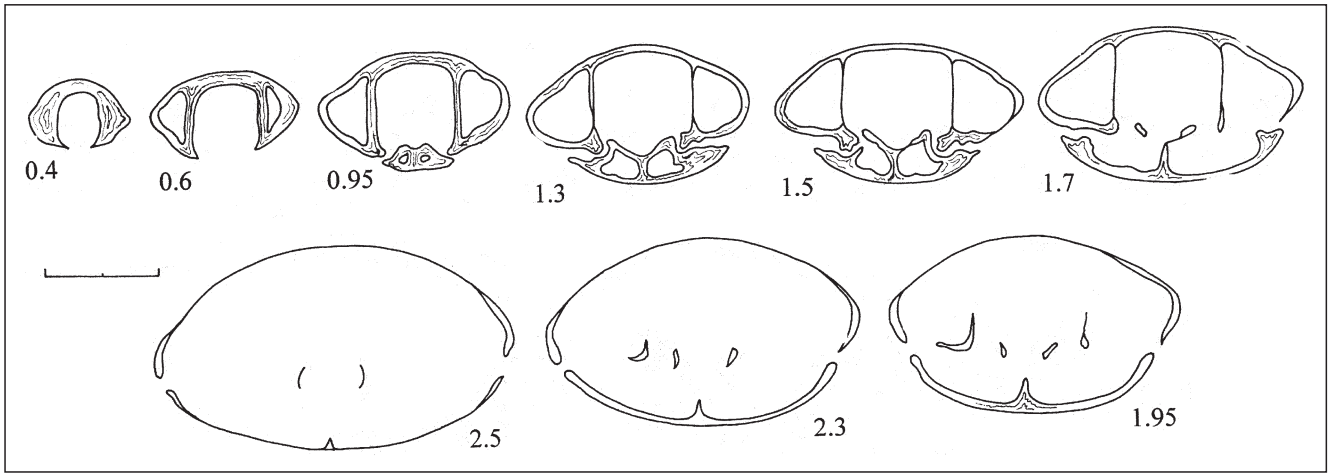
- 1869 *Terebratula Aspasia*. MENEHINI. – ZITTEL, p. 126, Pl.14, Figs. 1–4 (incl. var. *major* and *minor*).
- 1984 *Propygope aspasia* (MENEHINI) – GSCHWEND, p. 76, Pl. 4, Fig. 6.
- 1988 *Linguithyris aspasia* (MENEHINI) – IÑESTA, p. 59, Pl. 1, Fig. 3, Text-Fig. 3 (bottom).
- 1992 *Linguithyris aspasia* (MENEHINI) – DULAI, p. 67, Pl. 4, Fig. 3, Text-Fig. 25 (cum syn.).
- 1993 *Linguithyris aspasia* (MENEHINI) – MANCEÑIDO, p. 91 (cum syn.).

- 1993 *Linguithyris aspasia* (MENEHINI) – SIBLIK, p. 971, Pl. 2, Figs. 1, 8, Text-Fig. 6 (cum syn.).
- 1993a *Linguithyris aspasia* (MENEHINI) – SIBLIK, Pl. 2, Figs. 1, 4.
- 1997 *Linguithyris aspasia* (ZITTEL) – VÖRÖS, p. 105, Fig. 24.
- 1999 *Linguithyris aspasia* (ZITTEL) – SIBLIK in BÖHM et al., p. 201 (cum syn.).
- 1999 *Linguithyris aspasia* (MENEHINI) – SULSER, p. 153, 1 Text-Fig.

Material: 22 mostly fragmentary specimens, the biggest one measures 12.5 x 20.6 x ca. 8.0 mm.

Remarks: Great external variability of this already many times described and figured species is well known. The biggest specimen from Adnet corresponds well to that figured by ZITTEL, 1869 in Pl. 14, Fig. 3 under the name *Terebratula Aspasia* var. *minor*, which is deposited in the collections of the “Bayerische Staatssammlung für Paläontologie und Historische Geologie” in Munich (no. 1868 X 538). Some of our specimens are relatively narrow and have a shallow sulcation only, approaching thus to the shape of *Linguithyris nimbat* (OPPEL). DULAI’s opinion (1992) on the synonymy of both species is not followed in the present study, however.

Occurrence: The species is reported from the Hettangian to the Domerian (Enzesfeld, Adnet, Hierlatz, Untersberg, Schafberg, Kratzalpe [Hagengebirge], Brixlegg and Steinplatte [Tyrol], etc.).



Text-Fig. 2

Bakonyithyris apenninica (ZITTEL) – Serial transverse sections through the shell. Adnet, quarry XXXVIII (Wolfgrub Quarry). Original length of specimen 9.0 mm. Enlarged, scale bar equals 2 mm.

Genus: *Bakonyithyris* VÖRÖS, 1983

Bakonyithyris apenninica (ZITTEL, 1869)

(Text-Figs. 2 and 3-3)

- 1869 *Terebratula (Waldheimia) Apenninica* ZITT. – ZITTEL, p. 127, Pl. 14, Fig. 9.
 1889 *Waldheimia Apenninica* v. ZITTEL – GEYER p. 33, Pl. 4, Figs. 8–12.
 1892 *Waldheimia apenninica* ZITT. – PARONA, p. 49, Pl. 2, Fig. 27.
 1897 *Waldheimia apenninica* ZITTEL – BÖSE, p. 177, Pl. 12, Fig. 37.
 1967 *Zeilleria apenninica* (ZITT.) – SACCHI VIALLI & CANTALUPPI, p. 103, Pl. 15, Fig. 6, Text-Fig. 26.

Material: 18 specimens, more or less damaged internal moulds. The biggest one measures 11.0 x 11.8 x 6.0 mm. The figured specimen has the dimensions 8.8 x 9.9 x 4.8 mm.

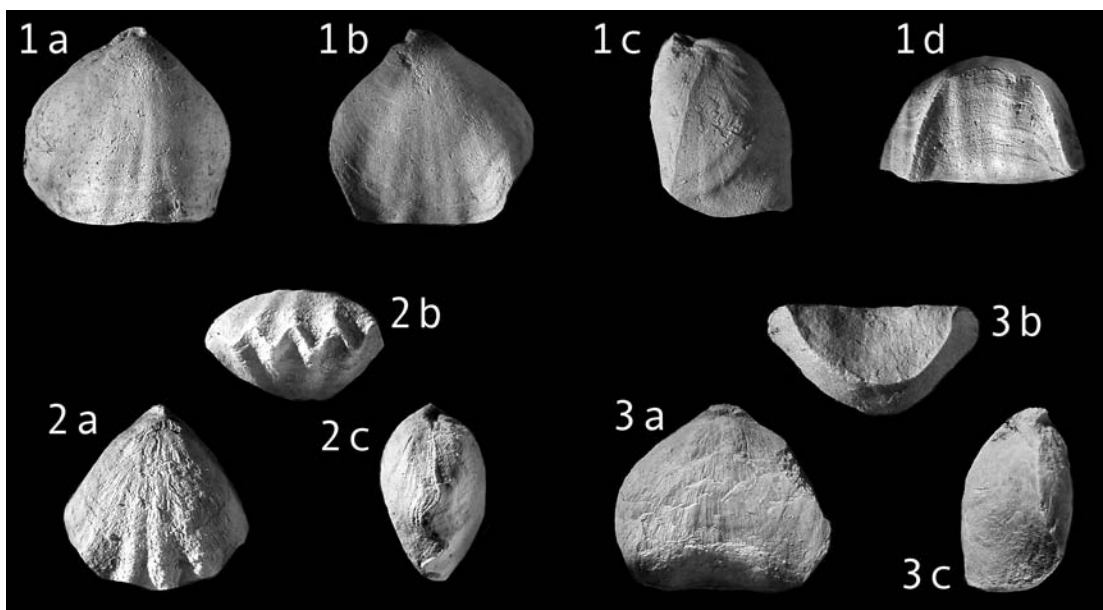
Internal characters: Relatively long, subparallel dental plates separate delthyrial cavity from subtrigonal lateral cavities. Hinge teeth strong. No cardinal process ascertained. Large, not crenulated sockets present, with inner socket ridges better developed than the outer ones. Broadly V-shaped septalium deep, supported by strong but low dorsal septum. Other internal features not ascertainable due to bad preservation.

Remarks: Most Adnet specimens differ from evenly biconvex shells in their relatively wider, ventribiconvex shells with larger sulcation. Later authors showed the external variability of the species – mainly in outline and in character of anterior sulcation. Broader outline was figured e.g. by PARONA (1892). Specimens from Adnet are externally homoeomorphic with *Nucleata rheumatica* (CANAVARI, 1883), figured in SACCHI VIALLI & CANTALUPPI (1967, Pl.15, Figs. 4-5). This has quite different internal characters, however. There are several Lower-Middle Liassic species, which show certain resemblances with “*apenninica*”. Some specimens of *Bakonyithyris ewaldi* (OPPEL, 1861) have similar outline but differ in higher, robust beak. *Bakonyithyris pedemontana* (PARONA, 1892) can be distinguished by its subtrigonal outline and much stronger beak. The same outline and beak is also characteristic of “*Waldheimia*” *ampezzana* BÖSE & SCHLOSSER (1900) as figured by the authors in Pl. 17, Fig. 21. “*Waldheimia*” *furlana* ZITTEL (1869, Pl. 14, Fig. 8) is in average higher and has longer ventribiconvex shells with deep dorsal sulcation (this type specimen is deposited in the Bayerische Staatssammlung in Munich under no. 1868 X 91).

Occurrence: The species originates from the Middle Liassic of the Apennines but its occurrence is reported by

Text-Fig. 3.

- 1) *Apringia paolii* (CANAVARI)
GBA no. 2001/5/1.
 - 2) *Pisirhynchia* ex gr. *retroplicata* (ZITTEL).
GBA no. 2001/5/2.
 - 3) *Bakonyithyris apenninica* (ZITTEL).
GBA no. 2001/5/3.
- All specimens come from Adnet, quarry XXXVIII (Wolfgrub Quarry) and are deposited in the collections of the Geologische Bundesanstalt in Vienna. They were coated with ammonium chloride before photographing. Photos: Mr. J. BROŽEK (Prague). Magnification ×3.



later authors also from the Lower Liassic. It is known e.g. from Hierlatz, SW of Neukirchen (Ob. Kirchbergmoos) near Ebensee, Grimming – Schober, Kratzalpe in the Hagengebirge etc. VÖRÖS (1997) reports the occurrence in the Sinemurian of the Gerecse Mts. and in the Sinemurian, Carixian and Domerian of the Bakony Mts. in Hungary.

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