Triassic Brachiopods from Aghdarband (NE-Iran)

By MILOŠ SIBLIK*

With 4 Text-Figures and 1 Plate

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Zusammenfassung

Unter den bearbeiteten mitteltriassischen Brachiopoden wurden die folgenden neuen Taxa ermittelt: Costirhynchopsis ruttneri sp. n., Tethyspira persis gen. n. et sp. n. und Dareithyris vulgaris gen. n. et sp. n.

Abstract

Among the Middle Triassic brachiopods studied the following new taxa have been ascertained: Costirhynchopsis ruttneri sp. n., Tethyspira persis gen. n. et sp. n. and Dareithyris vulgaris gen. n. et sp. n.

1. Introduction

The brachiopod fauna dealt with in this paper comes from the area of Aghdarband, NE Iran. The study was based mostly on material collected in 1975 and 1976 by Dr. A. W. RUTTNER, and partly also by Swiss geologist Dr. K. T. GOLDSCHMID in 1956.

The present author is deeply indebted to Dr. A. W. RUTTNER (Vienna) for his kind offer to study the material and for giving him necessary information concerning the localities. Many thanks are due to Dr. F. TATZREITER who made available all the material deposited now in the Geologische Bundesanstalt (Museum) in Vienna.

According to the personal communication by A. W. RUTTNER, brachiopod fauna derives mostly from 2 fossiliferous, locally ammonite-bearing levels (ammonites studied by F. TATZREITER and L. KRYS'TYN).

Horizon 1 (o1) = Nazarkardeh Formation – Lower Anisian – Bithynian (sensu ASSERETO, 1974) (Osmani and Ismidicus Zones);

Horizon 2 (o2) = Faqir Marl Bed at the base of Shale Member, Sina Formation – Upper Ladinian – Langobardian 3 (Frankites regoledanus Zone).

There are 2 brachiopod species, most frequent and characteristic of the area. Tethyspira persis gen. et sp. n. is Upper Ladinian in age according to the accompanying ammonites and can be considered typical of the horizon 2. The age of the second brachiopod Costirhynchopsis ruttneri sp. n. is somewhat doubtful. It was partly found in the localities (e.g. Agh 75/11, Agh 75/18, Agh 75/26) lacking determinable ammonites and at present supposed to be of Anisian age by A. W. RUTTNER (pers. comm.). On the other hand, this species was

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**) The symbol "o" is supposed to be a fossil symbol which is unfortunately not among the typesetting characters at our disposal.
1.1. Brachiopod Localities

P 56/160 (collected by K. T. GODSCHMID): Tethyspira persis Horizon 2.
Agh 75/11 (Horizon 1 according to RUTTNER, pers. comm.):
Costirhynchopsis ruttneri, Dareithyris vulgaris, Tetractinella trigonella.
Agh 75/16(2) Tethyspira persis.
Agh 75/17(2) Costirhynchopsis ruttneri.
Agh 75/18(1) Costirhynchopsis ruttneri, Dareithyris vulgaris.
Agh 75/22a(1) 1 poorly preserved specimen of Costirhynchopsis ruttneri.
Agh 75/23a(1) Costirhynchopsis ruttneri, Tethyspira persis, Camerothyris (?). Secondary mixture (see introductory part).
Agh 75/25(1) Undeterminable semicostate rhynchonellid.
Agh 75/26(1) Costirhynchopsis ruttneri, Dareithyris vulgaris. Costirhynchopsis ruttneri, Tethyspira persis.
Agh 75/28(1) Secondary mixture?
Agh 75/30(2) Tethyspira persis, 3 fragmentary depressed specimens of Costirhynchopsis ruttneri(?).
Agh 75/35(2) Tethyspira persis.
Agh 75/36/1(2) Tethyspira persis.
Agh 75/37(1) Punctospirella aff. fragilis.
Agh 75/42b(2) Tethyspira persis.
Agh 76/60 Tethyspira persis, 2 depressed specimens most probably of Costirhynchopsis ruttneri. Secondary mixture(?)
Agh 76/82 Mostly small single valves resembling Costirhynchopsis ruttneri but insufficient for definitive determination.
Agh 76/92 Unidentifiable fragments of small spiriferinid and smooth rhynchonellid brachiopods.

2. Descriptions

Order Rhynchonellida KUHN, 1949
Superfamily Rhynchonellacea GRAY, 1848
Family Rhynchonellidae GRAY, 1848
Subfamily Tetractinellinae AGER, 1965
Genus Costirhynchasia DAGYS, 1977
Type-species: Costirhynchasia spatiosa DAGYS, 1974.
Carnian of the Caucasus.

Costirhynchasia ruttneri sp. n.

(Museum) in Vienna under registered number GBA 1982/9/3.

Stratum typicum et locus typicus: Nazarkardeh Formation, Bithynian (see introductory part), Aghdarband, loc. Agh 75/18.

Derivatio nominis: After Dr. Anton W. RUTTNER.

Material: In addition to the holotype, 19 mostly incomplete specimens with joint valves, 18 brachial and 5 pedicle valves, partly decorticated. Dimensions of better preserved specimens in mm:

<table>
<thead>
<tr>
<th>Length</th>
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<th>Thickness</th>
</tr>
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<tbody>
<tr>
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<td>15.5</td>
<td>18.8</td>
<td>10.9</td>
</tr>
<tr>
<td>15.1</td>
<td>ca. 19.0</td>
<td>9.2</td>
</tr>
</tbody>
</table>

Description: Medium-sized biconvex shells of rounded triangular outline. Width apparently exceeding length in most specimens, the maximum-width situated in the anterior third of shell. Low, but always well-developed uniplication of the anterior commissure present, with subquadrate linguiform extension. Fold and sulcus poorly marked. Costae sharp and clear right from beaks, without bifurcation. There are between 13 and 17 costae on each valve, 4 or 5 of which (in 2 specimens as many as 7) are confined to the uniplication. Posterolateral, somewhat sunken planareas well-delimited in some specimens. Beak of pedicle valve suberect to erect in lateral view, with sharp ridges. Pedicle opening hypothyrid. Apical angle 100 to 115 degrees.

Delthyrial cavity subquadrate, between well-developed subparallel to slightly ventrally diverging dental lamellae. Lateral umbonal cavities semicircular or subtriangular in cross-section. Massive hinge-teeth dorsally expanded and inserted in large sockets. Some specimens revealed tightly held teeth, stronger than as shown in Text-Fig. 1. Crenulation poorly developed. Stout, but short denticula to be seen late­ rally. Hinge-plates thick and clearly demarcated from the inner socket-ridges. Their orientation is subhorizontal, but the deflection towards pedicle valve was ascertained in some specimens. Short and narrow septa­ lium present. Dorsal septum thick and very short in the dorso-ventral plane, but long in the longitudinal direction, extending as a low ridge beyond the ends of crura. Crura raduliform in general shape, strongly recurving into the cavity of pedicle valve and giving origin to the diabolo-shaped transverse sections (AGER-CHILDS-PEARSON, 1972, p. 185).

Remarks: New species described here is attributed to Costirhynchasia DAGYS, 1977, though considerable external resemblances could be found in some specimens of Fissirhyncha PEARSON, 1977 (type-species F. fissicostata [Suess, 1854] from the Alpine Rhaetian). This genus is characterized, however, by stronger development of beak of pedicle valve, by bifurcation of ribs and by its canaliform crura. New species reminds one of some variants of “Ryn­ chonella” mentzeli (BUCH, 1843) from the Alpine Anisian that was prosirorily referred by DAGYS to Costirhyn­
Costirhynchopsis rutteni sp. n.
Serial transverse sections through the posterior part of the shell.
Original length of specimen 15.5 mm. Dorsal septum traceable to 4.9 mm. Agh 75/18. Magnified.

chopsis (originally Costirhynchia DAGYS, 1974). C. rutteni sp. n. differs from mentelli in its much bigger size and in higher and better delimited plication. Some similarity could be found also in multicostate "Rhyynchonella" orientalis PETERS, 1867, from the Carnian of Dobrogea.

Occurrence: Bithynian, possibly up to Upper Ladinian, Aghdarband, loc. Agh 75/11, Agh 75/17, Agh 75/18, Agh 75/23a, Agh 75/26, Agh 75/28, Agh 75/30?, Agh 76/60?.

Order Spiriferida WAGEN, 1883
Superfamily Spiriferinacea DAVIDSON, 1884
Family Spiriferinidae DAVIDSON, 1884
Subfamily Mentzelinae DAGYS, 1974
Genus Tethyspira gen. n.
Type-species: Tethyspira persis sp. n.
Ladinian of Aghdarband, NE Iran.


Remarks: This genus is close to both Mentzelinae DAGYS, 1974 and Laballinae DAGYS, 1962. The representatives of the former subfamily differ only in their twice smaller size and incomplete bridge of jugum. Semipyramidal pedicle valves and plates supporting descending lamellae of spiralia are absent in Tethyspira but are on the other hand characteristic of some Laballinae. Tethyspira gen. n. resembles most Laballinae by a ventral septum entering spondylium-like structure and thus differs from Mentzelinae in this special feature. With some doubts, Tethyspira gen. n. is placed in Mentzelinae.
Included species: Apart from the type-species the following species and subspecies may be attributed to Tethyspira gen. n.:

Spiriferina ampla BITTNER, 1890 from the "Cassianer Schichten" (sensu ROTHPLETZ, 1886) of the Bavarian Alps.
Spiriferina (Mentzelia) ampla bathycolpos SALOMON, 1895, Spiriferina (Mentzelia) ampla radiata SALOMON, 1895 – both latter from the Ladinian of the Southern Alps (Marmolata).


Tethyspira persis sp. n.

Holotype: Specimen figured on Plate 1, Fig. 1 and deposited in the collections of the Geologische Bundesanstalt (Museum) in Vienna under registered number GBA 1982/8/4.

Stratum typicum and locus typicus: Faqir Marl Bed at the base of the Shale Member, Sina Formation, Langobard 3, Aghdarband, loc. Agh 75/36/1.

Material: 21 specimens with joint valves, 29 pedicle valves and 5 brachial valves, all more or less fragmentary internal moulds with shell remains. Dimesions of better preserved specimens in mm:

<table>
<thead>
<tr>
<th>Length of brachial valve</th>
<th>Width</th>
<th>Thickness</th>
<th>Width of card. area</th>
<th>Width of delthyrium</th>
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<td>28.0</td>
<td>27.1</td>
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<td>37.1</td>
<td>27.0</td>
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<tr>
<td>37.0</td>
<td>28.1</td>
<td>ca. 48.0</td>
<td>24.2</td>
<td>27.0</td>
</tr>
</tbody>
</table>

Description: Large, transversally elongated shells with rounded lateral margins and high uniplication. Straight hinge-line shorter than the maximum width. Both valves smooth, moderately vaulted. Brachial valve bearing strong rounded fold traceable for almost the length of valve. Corresponding sulcus deep and wide, extending from anterior margin to umbo. Triangular apsacline cardinal area large, sharply delimited, wider than high, and gently concave. Delthyrial angle variable, 24 to 50 degrees. Beak of pedicle valve suberect. Very faint costation observed on the whole surface of 1 specimen. Growth-lines well marked in the anterior halves of shells. Punctuation only poorly developed, it has been ascertainment to form very limited spots in 3 specimens only. Interior of pedicle valve with spondylium-like structure formed by coalesced ventral septum and dental lamellae. Delthyrial cover not observed. Strong septum thickened at its base, entering spondylium-like structure and extending for about half length of valve. Hinge-teeth normally strong but short. Brachial valve with bilobed cardinal process. Sockets broad and shallow. Spiralia with 14–15 volutions in each posterolaterally directed spire. Transverse jugum V-shaped.

Remarks: Spiriferina ampla BITTNER, 1890 from the Wendelstein area differs externally from T. persis sp. n. only in its much smaller size. Internal characters of ampla are not known except for ventral septum shorter than that of persis. Spiriferina (Mentzelia) ampla bathycolpos SALOMON, 1895 from Marmolata differs from both ampla and persis in lower, massive and incurved beak of pedicle valve.

Occurrence: Faqir Marl Bed at the base of the Shale Member, Sina Formation, Langobardian 3, Aghdarband, loc. P 56/160, Agh 75/16, Agh 75/30, Agh 75/35, Agh 75/36/1, Agh 75/42b. Tectonically mixed: Agh 75/23a, Agh 75/28, Agh 76/60.

Subfamily Punctospirellinae DAGYS, 1974
Genus Punctospirella DAGYS, 1974
Type-species: Terebratula fragilis SCHLOTHEIM, 1814. Anisian of Germany.

Punctospirella aff. fragilis (SCHLOTHEIM, 1814)

Material: 1 incomplete mould of pedicle valve. Its length measures 21.0 mm.

Description: Valve of semicircular outline, with greatest width at straight hinge-line. Cardinal area wide and slightly curved, well-delimited. Beak low. Relatively narrow median sulcus flanked by 5 strong, subangular lateral costae on either side, extending from anterior margin to umbo. Another faint rib at each lateral extremity present.

Remark: Studied specimen reminds one very much of Punctospirella fragilis (SCHL.) but its size is two times greater and its beak lower.


Order Athyridida BOUCOT-JOHNSON-STATON, 1964
Superfamily Athyridacea DAVIDSON, 1844
Family Spirigerellidae GRUNT, 1965
Subfamily Spirigerellinae GRUNT, 1965
Genus Tetractinella BITTNER, 1890
Type-species: Terebratulites trigonellus SCHLOTHEIM, 1820. Anisian of Germany.

Tetractinella trigonellus (SCHLOTHEIM, 1820)

(Pl. 1, Figs. 1, 6-8; Text-Figs. 4-15 (cum syn.))

1972 Tetractinella trigonella (SCHLOTHEIM)-SIBLIX, p. 189, Pl. 61, Figs. 1–6; Text-Figs. 4–15 (cum syn.)
1972 Tetractinella trigonella (SCHLOTHEIM)-SCHOLZ, p. 342, Pl. 8, Fig. 1.

Material: 1 fragmentary internal mould. Its dimensions: 18.5×7×10.7 mm.
Text-Fig. 2.
Tethyspira persis sp. n.
Specimen ground normal to the commissural plane.
Original length 37.0 mm. Agh 75/36/1. Magnified.
Description: Biconvex shell of sharply pentagonal outline. Fold and sulcus wanting. Each valve with 4 strong ribs extending right to umbo. Umbo of pedicle valve high and relatively narrow, strongly developed. Shell impuctate.

Remark: Despite its incomplete preservation, the specimen studied belongs indubitably to this species which is a characteristic element of the Anisian brachiopod faunas of Europe.

Occurrence: The species is quite common in the Anisian of Europe. Basing on some older data, it was found also in Ladinian. Bithynian, Aghdarband, loc. Agh 75/11.

Text-Fig. 3. Dareithyris vulgaris sp. n.

Original length of specimen 21.0 mm. Agh 75/11. Magnified.
Order Terebratulida Waagen, 1883
Superfamily Dielasmatacea Schuchert, 1913
Family Dielasmataeidae Schuchert, 1913
Subfamily Dielasmatinae Schuchert, 1913
Genus Dareithyris gen. n.

Type-species: *Dareithyris vulgaris* sp. n.
Anisian of Aghdarband, NE Iran.

*Derivatio nominis*: Lat. Dareus – king of Persia.


*Remarks*: The interior of the new genus differs substantially from that in other known Triassic terebratulids, even if the knowledge of some internal details is still incomplete. The differences are sufficient for separating Aghdarband forms from other possible allied genera. Development of dental lamellae, long dorsal septum, dielasmoid crura with unusually well-marked bases, and presumed simple loop, about half valve length long are the most distinctive characters of *Dareithyris* gen. n.

*Range and distribution*: Anisian of NE Iran.

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*Dareithyris vulgaris* sp. n.

*(Pl. 1, Figs. 7,9; Text-Figs. 3-4)*

*Holotype*: Specimen figured on Plate 1, Fig. 9 and deposited in the collections of the Geologische Bundesanstalt (Museum) in Vienna under registered number GBA 1982/8/10.


*Derivatio nominis*: Lat. vulgaris – ordinary.

*Material*: 4 partially decorticated specimens with both valves and 2 pedicle valves. Dimensions in mm:

<table>
<thead>
<tr>
<th>Length</th>
<th>Width</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.8</td>
<td>18.0</td>
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<td>21.0</td>
<td>18.7</td>
<td>10.2</td>
</tr>
<tr>
<td>20.0</td>
<td>16.8</td>
<td>9.0</td>
</tr>
</tbody>
</table>

*Description*: Medium-sized smooth shells of ovate-subpentagonal outline. Maximum-width situated at or backward of mid-length. In lateral profile, valves are equi- or slightly ventribiconvex. Anterior commissure with faint sulcation. Brachial valve gently sulciplicate, narrow median sulcation reaching up to umbo. Corresponding fold of pedicle valve well-developed, though not sharply delimited from lateral shell curvature. Beak strongly developed, showing erect to incurved orientation. Blunt beak-ridges present. Dorsal adductor muscle-scar narrowly linguiform. Ventral muscle-scars difficult to interpret.


*Remarks*: *Dareithyris* gen. n. is monotypic. No species of Triassic dielasmatid or zeilleriid brachiopods known to the author resembles closely new species described herein from Aghdarband area (dielasmatid and zeilleriid stocks may be more closely related than it was supposed before, according to Hoover, 1979, p. 18).


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Superfamily Zeilleriacea Allan, 1940
Family Zeilleriidae Allan, 1940
Genus Camerothyris Bittner, 1890

Type-species: *Terebratula raumsaueri* Sues, 1855.
Hallstatt Limestone of the Northern Alps.

*Camerothyris* (?)* sp.*

*Material*: 3 moulds of brachial valves. They measure 16.0 x ca. 15.5 mm, ca. 15.0 x 16.1 mm and 14.8 x 14.0 mm.

*Description*: Valve of circular outline, moderately vaulted. Slight median sulcation reaching the umbo present, anterior commissure nearly rectimarginate. Dorsal septum extending to the anterior half of valve length. Punctuation well visible.

*Remark*: Certain external resemblances could be only found in some specimens of Camerothyris dualis (Bittner, 1890) and *C. sandlingensis* (Bittner, 1890), both of them coming from the Upper Triassic of the Alps.

*Occurrence*: Aghdarband, loc. Agh 73/23a (with secondarily mixed fauna?).
Plate 1

Triassic Brachiopods from Aghdarband.

Fig. 1: *Tethyspira persis* sp. n.
× 1.

Fig. 2: *Costirhynchopsis ruttneri* sp. n.
Agh 75/26. GBA no. 1982/8/1.
× 2.

Fig. 3: *Tethyspira persis* sp. n.
Agh 75/36/1. GBA no. 1982/8/5.
× 1.

Fig. 4: *Costirhynchopsis ruttneri* sp. n.
Agh 75/18, GBA no. 1982/8/2.
× 2.

Fig. 5: *Costirhynchopsis ruttneri* sp. n.
× 2.

Fig. 6: *Tetraclionella trigonella* (SCHLOTHEIM). 
Agh 75/11. GBA no. 1982/8/7.
× 2.

Fig. 7: *Dareithyris vulgaris* sp. n.
× 2.

Fig. 8: *Punctospirella aff. fragilis* (SCHLOTHEIM). 
× 2.

Fig. 9: *Dareithyris vulgaris* sp. n.
× 2.

Fig. 10: *Tethyspira persis* sp. n.
× 3.

All specimens were coated with ammonium chloride before photographing.
Photographs by Mr. J. BROŽEK.
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