TRIASSIC RADIOLARIANS FROM THE DARNÓ AREA (HUNGARY)

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Radiolarites belonging to the Darnó series and interbedding within hyaloclastites and basalts yielded radiolarians of Triassic age: Ladinian (-Carnian). These data prove that volcanic activity was effective at least as early as mid-Triassic times and revealed, by the same way, some affinities between Darnó and Tethyan sequences.

Des radiolarites appartenant aux séries de Darnó intercalées dans des hyaloclastites et des basaltes ont livré des radiolaires triasiques: Ladinien (-Carnien). Ces données montrent qu'une activité volcanique existait dès le Trias moyen confortant ainsi le rapprochement effectué entre séries de Darno et séries tethysiennes.

Keywords: Triassic, radiolarians, Darnó series, Tethys

Introduction

Samples have been collected in the Darnó and Bükk Mountains in order to study radiolarians and date the corresponding strata.

Among forty collected samples only ten were positive and four of them yielded identifiable radiolarians from two localities (see below), both belonging to the Darnó series.

The samples have been selected on the field with a hand lense (without on-site etching) and treated in laboratory with dilute (4%) hydrofluoric acid for one to six days, according to the technique developed by Dumitrică (1970) and described by several authors since (Pessagno and Newport, 1972; De Wever et al., 1979; De Wever, 1982). This method is based on the selective dissolution of the silica of the matrix versus the silica of biogenic components (ratio of etched surface/volume of crystals).

Localities and age

Radiolarites associated with hyaloclastites and basalts of the Darnó series are well exposed in different places. One of the good outcrops yielding radiolarians is situated at Dallapuszta, near the road, halfway between Recsk...
and Sirok (Fig. 1). The section is approximately 6 metres long, and shows well-laminated red radiolarites. It has been sampled every 0.3–0.5 metres (Fig. 2).

Radiolarian shells are poorly preserved, thus spongy and delicate shells disappeared and only parts of robust radiolarians remained identifiable in three samples: H 198, H 200 and H 204.

Samples H 200 and H 204 yielded Eptingium manfredi, Triassocampe deweveri and Sarla sp. Sample H 198 is richer. The list of identified radiolarians is presented in Table I:

<table>
<thead>
<tr>
<th>Dallapuszta</th>
<th>Triassic</th>
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<tbody>
<tr>
<td>Sample H 198</td>
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<table>
<thead>
<tr>
<th>Species</th>
<th>Anisian</th>
<th>Ladinian</th>
<th>Carnian</th>
<th>Norian</th>
<th>Rhaetian</th>
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<tbody>
<tr>
<td>Baumgartneria stellata Dumitričá</td>
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<tr>
<td>Baumgartneria curvispina Dumitričá</td>
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<tr>
<td>Falcispongus falciformis Dumitričá</td>
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<tr>
<td>Falcispongus hamatus ? Dumitričá</td>
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<tr>
<td>Falcispongus rastratus ? Dumitričá</td>
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<tr>
<td>Oertlispongus inaequispinosus Dumit.</td>
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<tr>
<td>Spongoserrula rarauana Dumitričá T</td>
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<tr>
<td>Capnuchosphaera ? sp. A De Wever et al.</td>
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<tr>
<td>Triassocampe deweveri (Nakaseko and Nishimura)</td>
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<td></td>
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<tr>
<td>Eptingium manfredi Dumitričá</td>
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<tr>
<td>Platkerium abatti Pessagno (cf.)</td>
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<tr>
<td>Poulpus piabyx De Wever</td>
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<tr>
<td>Sepsagon langispinosum (Kozur and Mostler)</td>
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</table>

The first seven species in the Table have been hitherto found only in the Buchenstein Formation of the Southern Alps and in deposits of the Transylvanian nappes of the East Carpathians (Rarau and Percani Mountains, Romania), except Oertlispongus inaequispinosus which is mentioned also from the Melaia Group from Držkovce (Czechoslovakia), with Eptingium manfredi, as in Dallapuszta.

The stratigraphic ranges of the radiolarians present in sample H 198 made possible to date this rock as Upper Ladinian. Two species seem not to fit with this age: Capnuchosphaera sp. A in De Wever et al., 1979, and Poulpus piabyx, but these two species have been mentioned so far only from Sicily, and from Greece and Austria, respectively. This situation may result from collection from rocks of different stratigraphic levels.
Fig. 1. Topographic map showing the exact location of the two studied outcrops (stars): east of Dallapuszta and the quarry of Darnó Mélyvölgy
The other exposure is located in Darnó Mélyvölgy (Fig. 1). In a quarry of hyaloclastites and basalts some intercalated amygdales of red cherts yielded radiolarians Table II.:

<table>
<thead>
<tr>
<th>Darnó mélyvölgy</th>
<th>Triassic</th>
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<tbody>
<tr>
<td>Sample HUNG 2A</td>
<td>Middle</td>
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<tr>
<td>Species</td>
<td>Anisian</td>
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<tr>
<td>Pentaspongodiscus ? ruesti</td>
<td>Kazur and Mostler</td>
</tr>
<tr>
<td>Pentaspongodiscus dercourtii</td>
<td>De Wever</td>
</tr>
<tr>
<td>Pentaspongodiscus hexaspina (Dumitrica, Kazur and Mostler)</td>
<td>-</td>
</tr>
<tr>
<td>Sepsoago longissinosus (Kazur and Mostler)</td>
<td>-</td>
</tr>
<tr>
<td>Capnuchosphaera cf. lea De Wever</td>
<td>-</td>
</tr>
<tr>
<td>Triassocampe deweveri (Nakaseko and Nishimura)</td>
<td>-</td>
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</table>

All these species have been recorded in different places of the European Tethys; the last one is also mentioned from Japan. These radiolarians give a Ladinian–Lower Carnian age, and more precisely Lower Ladinian, if the stratigraphic range of Pentaspongodiscus ? ruesti is confirmed. In this case Capnuchosphaera cf. triassica does not seem to correspond in age, but this species has not been identified with confidence because of the poor preservation. This stratigraphic range is thus not misfitting.

Fig. 2. Sketch of the Dallapuszta section. The numbers (H 194 to H 206) are the indices of the studied samples with their relative position within the section. The westward dipping of strata is approximate.

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The age proposed herein (Ladinian–Lower Carnian and probably Lower Ladinian) is the same as that suggested by Dumitrică and Mello (1982) for the Meliata Group.

Taxonomy and stratigraphic ranges

Only genera and species are mentioned here.

**Eptingium Dumitrică 1978**

*Type species:* *Eptingium manfredi* Dumitrică

_Eptingium manfredi_ Dumitrică, 1978, p. 33, Pl. III, Figs 3, 4; Pl. IV, Figs 1, 2, 5–7.

**Occurrence:**

- Middle Triassic (Lower Ladinian) from the Vicentian Alps, northern Italy and from the East Carpathians (Rarau Mts, Romania) (Dumitrică, 1978);
- Middle to Upper Triassic (Ladinian–Lower Carnian) from Sperchios, Greece (De Wever, 1982);
- Middle Triassic (Upper Anisian–Lower Ladinian) from the Meliata Group, Czechoslovakia (Dumitrică and Mello, 1982);
- Dallapuszta, sample H 198.

**Oertlispongus Dumitrică, Kozur and Mostler 1980**

*Type species:* *Oertlispongus inaequispinosus* Dumitrică, Kozur and Mostler

_Oertlispongus inaequispinosus_ Dumitrică, Kozur and Mostler 1980, p. 5, Pl. 10, Fig. 7.

**Occurrence:**

- Middle Triassic (uppermost Anisian–Lower Ladinian) from the Southern Alps (Recoaro, Italy) and from the East Carpathians (Rarau Mts, Romania) (Dumitrică, 1980);
- Middle Triassic (Upper Anisian–Lower Ladinian) from the Meliata Group, Czechoslovakia (Dumitrică and Mello, 1982);
- Dallapuszta, sample H 198.
1. *Baumgartneria* 'stellata' Dumitrică. Sample H 198, ph. 8301-25, G × 100
2, 3, 5. *Spongocerula rarauana* Dumitrică. Sample H 198, ph. 8301-22 (Fig. 2), 8301-29 (Fig. 3), 8301-19 (Fig. 5), Fig. 2, 3, 5: G × 100
4. g. sp. indet. Sample H 198, ph. 8301-03, G × 100

**Falcispongus Dumitrică, 1980**

Type species: *Falcispongus falciformis* Dumitrică

*Falcispongus falciformis* Dumitrică, 1980, Pl. 1, Fig. 5; Pl. 2, Figs 1, 3, 7; Pl. 3, Figs 2, 3, 5, 6.

Occurrence:
- Middle Triassic (uppermost Anisian–Lower Ladinian) from the Southern Alps (Recoaro, Italy) and from the East Carpathians (Rarau Mts, Romania) (Dumitrică, 1980);
- Dallapuszta, sample H 198.

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1, 2, 4. *Spongoserrula rarauana* Dumitrăcă. Sample H 198, ph. 8302–01 (Fig. 1), 8302–11 (Fig. 2), 8302–12 (Fig. 4), $G \times 100$
3. g. sp. indet. Twisted spine, frequent shape in Triassic, Sample H 198, ph. 8302–23, $G \times 100$
5. *Eptingium manfredi* Dumitrăcă? Sample H 198, ph. 8302–20 $G \times 100$
6. *Oertlisponginae* g. sp. indet. Sample H 198, ph. 8302–08, $G \times 100$
7. G. sp. indet. According to the decreasing size of spines laterally and to their direction it is probably an *Oertlisponginae* rather than a *Saturnalid*. Sample H 198, $G \times 100$
8. *Capnuchosphaera* sp. A. Sample H 198, ph. 8302–18, $G \times 100$

*Falcispongus hamatus* Dumitrăcă, 1980, Pl. 3, Figs 1, 4; Pl. 4, Fig. 1.

**Remarks:**
In the present material the identification is uncertain because of the uncertainty about the bump before the curve: is it a corroded bump or an original shape?
Plate III

1. *Falcispongus calcaneum* Dumitrica. Sample H 198 ph. 8302–10
3, 4. *Poulpus piabyx* De Wever. Sample H 198, ph. 8302–16 (Fig. 3), 8302–17 (Fig. 4), G × 100
5. g. sp. indet. Sample H 198, ph. 8302–05, G × 100
6. *Falcispongus* sp. Sample H 198, ph. 8302–09, G × 100
7. *Sepsogon longispinosus* (Kozur and Mostler). Sample H 198, ph. 8302–21, G × 100
8. *Falcispongus falciformis* Dumitrícia. Sample H 198, ph. 8301–17, G × 100
10. *Plafkerium* sp. Sample H 198, ph. 8302–27, G × 100

All the Scanning Electron Microscope pictures have been taken at the University of Lille, and developed by O. Faÿ (Univ. of Paris VI).

The numbers ph. are those corresponding to the number of each picture as recorded in the author’s film collection.
Occurrence:

- Middle–Upper Triassic (Upper Ladinian–Carnian) of the East-Carpathians (Rarau Mts, Romania) (Dumitrică, 1980);
- Dallapuszta, sample H 198.

_Falicispongus rostratus_ Dumitrică, 1980, Pl. 3, Figs 8, 9; Pl. 4, Figs 2, 3, 5, 6; Pl. 5, Figs 2?, 4.

Remarks:
The uncertainty of the identification results from the presence of a thick ridge on the polar axis (see Plate 3/2). Such a ridge does not seem to exist on the specimen figured by Dumitrică.

Occurrence:

- Middle Triassic (Upper Ladinian) from the East Carpathians (Rarau Mts, Romania) (Dumitrică, 1980);
- Dallapuszta, sample H 198.

_Spongoserrula_ Dumitrică, 1980

_Type species:_ _Spongoserrula rarauana_ Dumitrică

_Spongoserrula rarauana_ Dumitrică, 1980, Pl. 5, Figs 5–7; Pl. 6, Figs 1–5; Pl. 7, Fig. 4; Pl. 12, Figs 10–13.

Remarks:
This species is the most common radiolarian in sample H 198.

Occurrence:

- Middle-Upper Triassic (Upper Ladinian–Upper Carnian) from the East Carpathians (Rarau Mts Romania) (Dumitrică, 1980);
- Dallapuszta, sample H 198.

_Baumgartneria_ Dumitrică, 1980

_Type species:_ _Baumgartneria curvispinata_ Dumitrică

_Baumgartneria curvispinata_ Dumitrică, 1980, Pl. 12, Figs 1, 2, 4.
Occurrence:

- Middle Triassic (Upper Ladinian) from the East Carpathians (Rarau Mts, Romania) (Dumitrică, 1980);
- Dallapuszta, sample H 198.

Baumgartneria stellata Dumitrică, 1980, Pl. 10, Fig. 5; Pl. 11, Figs 1–3.

Occurrence:

- Middle Triassic (Upper Anisian–Lower Ladinian) from the Southern Alps (Recoaro, Italy) and from the East Carpathians (Rarau Mts, Romania) (Dumitrică, 1980);
- Dallapuszta, sample H 198.

Capnuchosphaera De Wever 1979

Type species: Capnuchosphaera triassica De Wever

Capnuchosphaera ? sp. A in De Wever et al., 1979, p. 85, Pl. 4, Fig. 12.

Occurrence:

- Upper Triassic (uppermost Carnian) of the Cammarata Zone (Sicily) (De Wever et al., 1979);
- Dallapuszta, sample H 198.

Triassocampe Dumitrică, Kozur and Mostler 1980

Type species: Triassocampe scalaris Dumitrică, Kozur and Mostler

Triassocampe deweveni (Nakaseko and Nishimura) 1979, p. 77, Pl. 10, Figs 8, 9.

Occurrence:

- Middle Triassic (Anisian–Ladinian) from SW Japan (Yao et al., 1981);
- undifferentiated Permian–Jurassic from Kamiaso, SW Japan (Nakaseko and Nishimura 1979);
- Upper Triassic from Shima Peninsula (Inuyama, SW Japan) (Nakaseko and Nishimura, 1979) and from the Cammarata Zone (Sicily) (De Wever et al., 1979);
- Upper Triassic (Lower Carnian) from the Pindos Zone (Greece) (De Wever et al., 1979);
— Upper Triassic (Upper Carnian–Norian) from Wajiko-cho (SW Japan) (Nakaseko and Nishimura, 1979);
— Dallapusztta, sample H 198.

Plafkerium Pessagno 1979

*Type species*: Plafkerium abbotti Pessagno

*Plafkerium cf. abbotti* Pessagno 1979, p. 179, Pl. 9, Figs 6, 10, 14.

*Remarks*:

The preservation of the specimen is not good enough to allow identification with confidence. (The stratigraphic range indicated in Table 1 is that of *P. abbotti*.)

Poulpus De Wever 1979

*Type species*: Poulpus piabyx De Wever


*Occurrence*:

— Upper Triassic (Lower Carnian) from the Pindos Zone, Greece (De Wever et al., 1979);
— Upper Triassic (Lower Carnian) from Austria (Kozur and Mostler, 1979);
— Dallapusztta, sample H 198.

Sepsagon Dumitrică, Kozur and Mostler 1980

*Type species*: Triactoma longispinosum Kozur and Mostler 1979

*Sepsagon longispinosus* (Kozur and Mostler) 1979, p. 59, Pl. 1, Fig. 6; Pl. 11, Figs 3, 8; Pl. 12, Fig. 6; Pl. 13, Fig. 1.

*Occurrence*:

— Middle-Upper Triassic (Ladinian–Carnian) of the European Tethys (Dumitrică et al., 1980);
— Dallapusztta, sample H 198.
Conclusions

Triassic radiolarites are thus well dated in the Darnó Hills among volcanic rocks. They are thick and well-bedded and Upper Ladinian in age at Dallapuszta, or intimately integrated within hyaloclastites and probably of Lower Ladinian at Darnó Mélyvölgy. Thus the well-bedded radiolarites seem younger than the cherts mixed within hyaloclastites. These datations can be compared with those obtained by Dumitrică and Mello (1982) for the Meliata Group by means of radiolarians and previously by Kozur and Mock (1973) by means of conodonts.

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REFERENCES