

TRIASSIC FORAMINIFERAL ASSEMBLAGES OF STRATIGRAPHIC  
VALUE IN HUNGARY

by

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Until the last ten year period, Triassic micropaleontology was one of the most neglected sectors of stratigraphic paleontology both in Hungary and abroad. It is probably due not only to the sparsity and, in general, poor preservation of the Triassic microfossils but also to the fact that the marine Triassic sediments are but of slight interest for raw material exploration. However, recently these investigations got a great impulse.

A very considerable part of the Hungarian Mesozoic sequences consists of marine Triassic deposits, including several well-known classical sections. Their subdivisions have been based mostly on macrofaunistical features. In many cases, however, these layers contain very typical and determinable microfaunal assemblages, too. By the thorough study of these, a more complete stratigraphic and economic knowledge can be achieved, even in those formations which are poor in macrofossils.

In the Triassic microfaunas, beside the flourishing Dasycladaceae, several groups of foraminifers, ostracods, condonts and different types of microscopical remains of echinoderms are represented.

Of these groups, the present writer studies the foraminifers which are of considerable interest because of their variety and practical stratigraphic value.

In addition numerous echinoderm fragments, holothurian sclerites, asteroid fragments and ophiroids were studied, which are valuable for age and facies

determinations. These were regarded only as supplementary elements in the samples; some typical forms were identified. Their detailed investigation should be done in the years to come.

The method used in Foraminifera investigations was to study both outer and inner structures. The isolated specimens obtained by the traditional washing procedures were mounted into Canada balsam. The inner structures were studied using series of sections of different depth. In the case of limestones and other unwashable materials the traditional thin section method was followed. This is sometimes faster and more convenient because in a rather large number slides-beside the oblique sections also well orientated specimens occur, and even species determinations are possible. Another great advantage of thin section examinations is that the whole original microfacies is visible without any subjectivism, which is unavoidable during picking from washing residues.

In the following a very brief summary of some typical Hungarian Triassic foraminiferal assemblages ranging in age from Lower Campilian to uppermost Rhaetian should be given.

The Lower Triassic sediments are subordinate in the sections studied. The majority of them are fine-grained sandstones and chemical deposits: dolomites with some anhydrite. The mostly hypersaline environment of course excluded the possibility of life.

At the beginning of the Campilian marine regime of normal salinity was established with favourable life-conditions for Foraminifera. In the Campilian marls and marly limestones the agglutinate forms appear first. These mostly belong to the genus Ammodiscus, and to Glomospirella. They are closely related to some Upper Permian microfaunas.

In the upper part of the Campilian beds, in the limestones of the *Tirolites cassianus* Zone, a very characteristic foraminifer fauna has been found. It is very homogenous, consisting of thousands of specimens of *Meandrosira iulia* (PREMOLI SILVA) in each cubic centimetre. This species is a very good guide-fossil: its hemera is restricted to the Campilian. It is extremely abundant not only in Hungary, but also in 16 localities of the Dinarids, in 6 localities in the Alps and in several parts of China. This widespread occurrence and great abundance would suggest a planktonic way of life, but of course the adults of this species were benthonic forms.

In the Anisian stage the foraminifer faunas are less abundant but much more varied. We have encountered them at two localities:

1.) Aggtelek, North-East Hungary. There is a series of Pelsonian-Illyrian limestone outcrops full of different types of Dasycladacea. This is a well recognizable reefal facies. The foraminiferal assemblage consists of some rather well preserved specimens of *Ammobaculites radstadtensis* KRISTIAN-TOLLMAN, *A. wirzi* KOEHN-ZAN, *Neandrothyra reicheli* REITLINGER, *Endothyranella bicamerata* SALAJ, *E. pentacamerata* SALAJ, *Earlandinita elongata* SALAJ, *E. oberhauseri* SALAJ, and first of all the *Meandrosira dinarica* KOCHANSKY, DEVIDÉ-PANTIC, which indicates Anisian age.

2.) Another Anisian microfauna was studied from South Hungary, from the Villány Mountains. In the thin sections of the Pelsonian so-called "recoaro" limestones there are numerous echinoderm and ostracod fragments, and only a few poorly preserved foraminifers, mostly belonging to the genera *Glomospira* and *Dentalina*. The most peculiar organic remains on this microfauna are the various ophiuroid elements which have been described nowhere, as to the author's knowledge.

Unfortunately the famous Anisian and Ladinian profiles of the Balaton Highland have not yet been examined microfaunistically in detail. Nevertheless, from these outcrops a very characteristic foraminifer fauna is expected on the analogy of the Alpine occurrences. This investigation is one of the tasks of the years to come.

The basal beds of the Carnian develop with continuous lithological and faunistic transition from the uppermost Ladinian. There are several good exposures of them in the Bakony Mountains. Among others the Lower Carnian outcrops on the Northern shore of Lake Balaton were studied microfaunistically, too. This is the so-called "Lower Marl Group" with Estheria and with the marker ammonite species Carnites floridus. I should like to mention that the description of these Foraminifera - by E. VADÁSZ in 1910 - was one of the first publications dealing with Triassic microfossils in the history of micropaleontology.

This microfauna is composed almost entirely of nodosarids. The most important and frequent species are Pseudonodosaria obconica (REUSS), Lenticulina carnica (OBERHAUSER) and Fronicularia klebelbergi (OBERHAUSER). These are characteristic of the Raibler beds. Carnian marls and limestones have also been intersected by our deep-structure exploratory boreholes (at the Northern border of the Bakony Mountains: Borehole Bakonyszücs 1. and in the mountains on the left bank of the Danube: Borehole Csővár 1.). The thickness of the intersected Carnian-Ladinian sequence was more than 1000 m. There is a striking lithological, faciological and faunistic difference between the formations cut in these two boreholes:

a.) In the Northern Bakony area there was a quiet silty shallow water environment favourable for thin-walled small Foraminifera. Homogenous fine-grained pelitic sediments were deposited. About 50 species of 8 foraminiferal families are encountered. Out of them two significant groups merit particular attention. The representatives of the Miliolacea are the most

typical and common members of this microfauna with some new species described from here.

The other are the members of the Variostomidae, because Variostoma exile KRISTIAN-TOLLMAN and V. pralogense KRISTIAN-TOLLMAN - indicative of the Cordevolian - are found as far only in this material beside the Austrian type locality.

b.) On the contrary, in the Csóvár area in this period sedimentation of organogenetic limestones was going on in a very near-shore environment in the belt of the rolling sea. This clean, agitated water saturated with oxygen, and of high carbonate content deriving from the calcareous bottom rocks provided optimal life conditions for the larger, thick-walled Foraminifera. This accounts for the presence of the most varied and well-preserved foraminiferal assemblage yet described from Carnian deposits. The description and illustration of the whole fauna is in progress.

In the Hungarian Central Mountains during the Norian-Rhaetian ages a vigorous carbonatic sedimentation took place, forming the well-known deposits of the Hauptdolomit and the Dachsteinkalk of considerable thickness, interfingering with each other. The slides of the dolomite are generally void of microfossils, but the Dachsteinkalk samples sometimes may contain a very rich microfauna (for instance in Borehole Tata 5.). First of all Triasina hantkeni (described in Hungary by MAJZON in 1954) should be mentioned. This species appears in a great quantity and in this level only. Along with Triasinas the various species of Involutina (I. communis KRISTIAN, I. tenuis KRISTIAN, I. impressa KRISTIAN), of glomospireliids (G. friedli KRISTIAN), of trocholinids (T. pemodiscoides OBERH.) are common.

In the "Dachsteinkalk sequence" there are often interbedded thin layers of yellow marly limestone. Their microfauna consists of some thin, fragile ostracod fragments and different sections of Turrispirillina minima PANTIĆ.

## REFERENCES

- BORZA, K. (1970): Mikrofazies mit *Glomospira densa* (PANTIC 1965) aus der mittleren Trias der Westkarpatien. Geol. Zbor., Geol. Carp. XXI. 1. Bratislava.
- BOSELLINI, A. - BROGLIO LORIGA C. (1966): Gli "Strati a Triasina" nel gruppo di Sella (Dolomit Occidentali). Mem. geopal. Univ. Ferrara, vol. 1. fasc. 2. Ferrara.
- FUCHS, W. (1967): Über Ursprung und Phylogenie der Trias - "Globigerinen" und die Bedeutung dieses Formenkreises für das echte Plankton. Verh. Geol. B. - A. Heft 1-2. Wien.
- GAZDZICKI, A. (1970): Triasina microfacies in the Sub-Tatric Rhaetic of the Tatra Mts. Bull. Acad. Pol. Sci. Ser. Geol., Geogr. vol. XVIII/2. Warsawa
- HO YEN (1959): Triassic Foraminifera from the Chialingchiang Limestone of South Szechuan. Acta Paleont. Sinica vol. 7., No. 5. Peking.
- JENDREJÁKOVÁ, O. (1970): Foraminiferen der oberen Trias des Slowakischen Karsten und des Muran-Plateau. Geol. Zbor., Geol. Carp. XXI. 2. Bratislava.

- KRISTIAN-TOLLMANN, E. (1960): Rotaliidae (Foraminife) aus der Trias der Ostalpen. Jb. Geol. B.-A. Sonderb. 5. Wien.
- KRISTIAN-TOLLMANN, E. (1969): Entwicklungsreihen der Triasforaminiferen. Paläont. 2. 37. 1-2. Stuttgart.
- KRISTIAN-TOLLMANN, E. (1970): Beiträge zur Mikrofauna des Rhät. III. Foraminiferen aus dem Rhät des Königsberzuges bei Göstling (N. Ö.). Mitt. Ges. Geol. Bergbaustud. Bd. 19. Wien.
- MAJZON, L. (1954): Contributions to the stratigraphy of the Dachstein limestone. Acta Geol. 2. 3-4. Budapest.
- MOSTLER, H. (1967): Conodonten und Holothuriensklerite aus norischen Hallstätter-Kalken von HERNSTEIN. Verh. Geol. B.-A. Heft 1-2. Wien.
- OBERHAUSER, R. (1964): Zur Kenntnis der Foraminiferen Gattungen Permodiscus, Trocholina und Triasina in der Alpinen Trias und ihre Einordnung zu den Archaeodisciden. Verh. Geol. B.-A. 2. Wien.
- ORAVECZNÉ SCHEFFER, A. (1965): Carnian Foraminifera from the Bakony Mts. MÁFI Évi. Jel. 1965. Budapest. (In Hungarian with English and Russian abstract).
- ORAVECZNÉ SCHEFFER, A. (1967): (Report on the micropaleontological studies of the Borehole Bakonyszűcs 1.) (Interim report, MS.)

- ORAVECZNÉ SCHEFFER, A. (1970): The representatives of the superfamily Miliolacea (Foraminifera) in the Carnian deposit, Borehole Bakonyszücs 1., Transdanubia, Hungary. MÁFI Évi Jel. 1968. Budapest. (In Hungarian, with English abstract).
- PREMOLI SILVA, I. (1964): Citaella iulia, n. gen, n. sp. de Trias inferiore della Carnia. Riv. Ital. Paleont., vol. No. 4. Milano.
- SALAJ, J. (1969): Essai de zonation dans le Trias des Carpathes Occidentales d'après les Foraminifères. Geol. Práce Sp. 48. Bratislava.
- SCHMID, M. E. (1967): Das Genus Austrocolomia OBERHAUSER 1966 (Foram., Nodisariidae). Verhandl. Geol. B.-A. - Heft. 1-2. Wien.
- TRIFONOVA, E. (1967): Some new Triassic Foraminifera in Bulgaria. Ann. Univ. Sofia vol. 60. L. 1. Sofia.
- VADÁSZ, E. (1910): Bakonyi triászforaminiferák. A Balaton Tudományos Tan. Eredm. I. köt. I. Függelék, a Balatonmellék Palaentológiája I. köt. I. f. Budapest.