Slovak Geol. Mag., 7, 1(2001),85–89

Lithostratigraphy of radiolarian limestones and radiolarites of the Hronicum in the Strážovské vrchy Mts.

MILAN POLÁK[1] and LADISLAVA OŽVOLDOVÁ[2]

[1]Geological Survey of Slovak Republic, Mlynská dolina 1, 817 04 Bratislava, Slovakia
[2]Department of Geology and Paleontology, Faculty of Science Comenius University, Mlynská dolina G, 842 15 Bratislava, Slovakia

Abstract. From the formation of Middle to Upper Jurassic radiolarian limestones of the Hronicum (sequence of Rohatá skala) in the Strážovské vrchy Mts. a radiolarian microfauna representing the stratigraphical range– middle Bathonian – early Callovian was obtained.

Key words: Radiolarian limestones radiolarites, microfacies, radiolarians, age, Hronicum, Strážovské vrchy Mts., Western Carpathians, Slovakia.

Introduction

In the last time in the frame of the project Tectogenesis of sedimentary basins of the Western Carpathians we have been focused on the documentation and study of the formation of radiolarian limestones and radiolarites in the Hronicum of the Western Carpathians. From this significant tectonic unit there so far has not been any direct paleontological evidence of their age as well as lithology and detailed microfacial content. This way we have obtained direct paleontological data on the stratigraphic range of this formation in the Tatricum, Krížna nappe and Hronicum, thus in the main tectonic units of the central part of the Inner Western Carpathians.

For the first time the so called series of Rohatá skala with the fundamental Jurassic members was distinguished by Kulcsár (1917, 1934). Later he assigned it to the so called limestone nappe being essentially the Choč and Strážov nappes ranged to the Hronicum at present. This sequence was later mentioned by Andrusov (1936, 1938), Maheľ (1985) described in the sequence of Rohatá skala the mentioned formation relatively in detail as „cherty limestones" and ranged them stratigraphically to the Lower – Middle Dogger.

Lithology

An almost complete profile of the formation of radiolarian limestones and radiolarites of the Choč nappe (Hronicum) of the Strážovské vrchy Mts. is creping out in the old forest path cut about 600 m southwest of the village Mojtín. Directly under-lying are grey pink crinoidal limestones, the uppermost part of which is formed by a thin layer of condensed facies of Toarcian age. Overlying are red nodular limestones of Kimmeridgian age.

The lowermost part of the profile is formed by a layer of about 90 cm thick greenish, greyishgreen, banked limestones with nodules of dark-grey radiolarites. After a short break the profile continues with red and violet banked (5–10 cm) radiolarian limestones with nodules of red radiolarites, of maximum size up to 10 cm. Thickness of this layer is about 300 cm. Above them is a passage of 300 cm thick grey weakly marly thin-banked (5 cm) limestones with nodules of black cherts. A further layer, about 200 cm thick, is formed by red, violet, radiolarian limestones with nodules and thin layers of red radiolarites. Thickness of banks varies from 5 to 10 cm. The formation continues by a layer 200 cm thick, formed by light-grey to white weakly marly, banked (10–15 cm) limestones with nodules of pink radiolarites. After a longer break of the profile defilé ends with an about 10 m thick layer of variegated (pink, red, violet, green) disintegrating radiolarites.

In texture they are prevailingly biomicrites, more rarely biomicrosparites of wackestone type. In limestones of the mentioned formation the radiolarian microfacies is mostly spread. The share of radiolarians, which are a rock-building component, varies from 40 to 85 %. The major part of radiolarians, to the contrary to most studied profiles in the Krížna nappe, is silicified, an essentially lower share of radiolarians is calcified only. On the basis of preservation of original composition also the measure of possibility of obtaining suitable micropaleontological material depends. Almost 60 % of radiolarians belong to spumellarian forms the rest is represented by nassellarians.

The form and way of preservation of radiolarians are very diverse. Often ostracodes, globochaets are present, fragments of crinoid ossicles are more rare. There are also fragments of lamellibranchs, aptychi. In the upper parts of the profile the share of filaments, detritus of aptychi, cross sections of planctonic crinoids *Saccocoma* sp. increase. The clastic admixture is present sporadically in form of angular fragments of quartz of aleuritic size category.

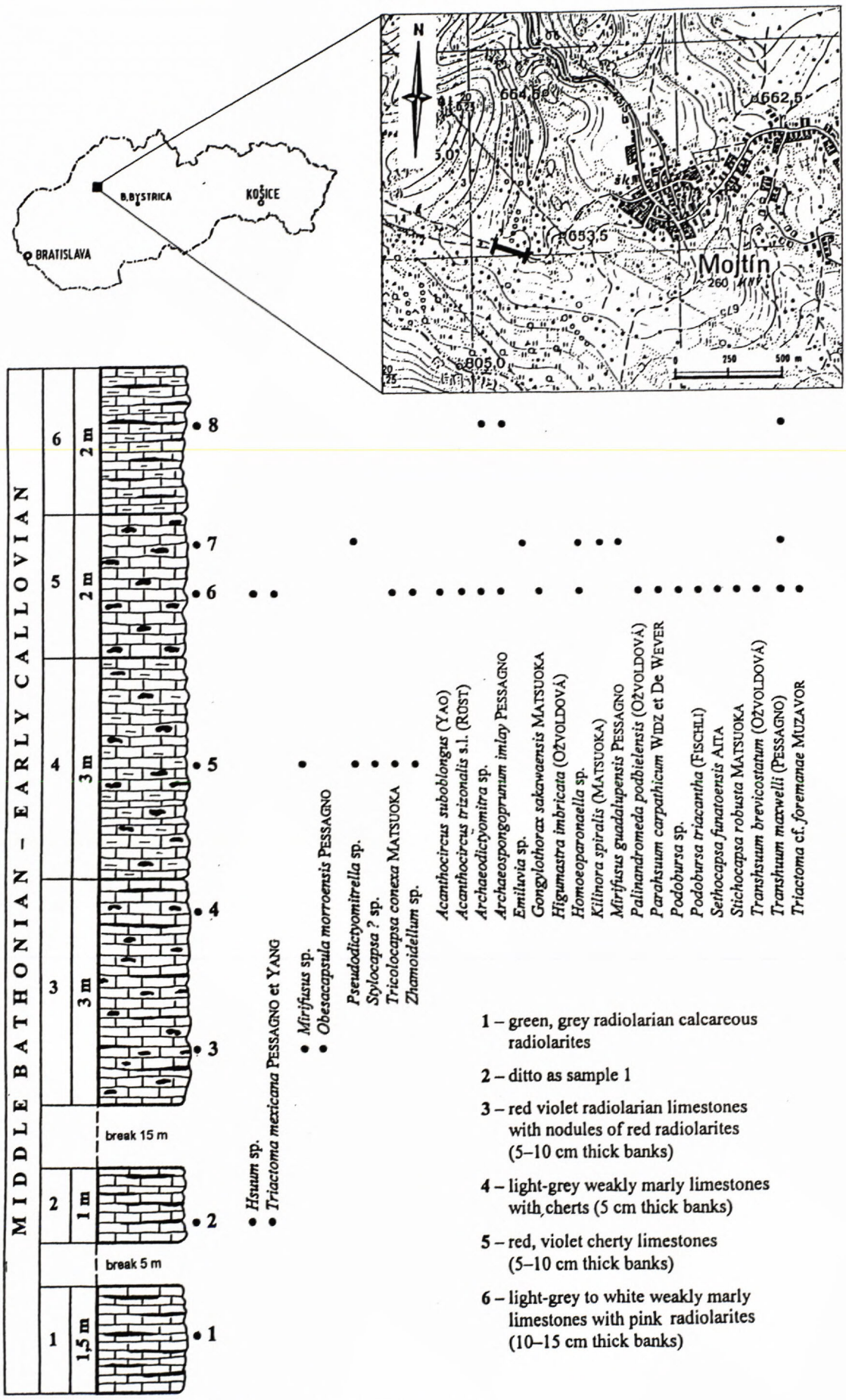


Fig. 1 Location and lithostratigraphic column of the section studied

Tab. 1 Distribution of radiolarians in the samples studied

Sample / Radiolarian fauna	M-2	M-3	M-5	M-6	M-7	M-8
Acanthocircus suboblongus (YAO)				*		
Acanthocircus trizonalis s.l. (RÜST)				*		
Archaeodictyomitra sp.				*		*
Archaeospongoprunum imlayi PESSAGNO						*
Emiluvia sp.					*	
Gongylothorax sakawaensis MATSUOKA				*		
Higumastra imbricata (OŽVOLDOVÁ)				*		
Homoeoparonaella sp.				*	*	
Hsuum sp.	*			*		
Kilinora spiralis (MATSUOKA)					*	
Mirifusus guadalupensis PESSAGNO					*	
Mirifusus sp.		*	*			
Obesacapsula morroensis PESSAGNO		*				
Palinandromeda podbielensis (OŽVOLDOVÁ)				*		
Parahsuum carpathicum WIDZ et DE WEVER				*		
Podobursa sp.				*		
Podobursa triacantha (FISCHLI)				*		
Pseudodictyomitrella sp.			*		*	
Sethocapsa funatoensis AITA				*	*	
Stichocapsa robusta MATSUOKA				*		
Stylocapsa ? sp.			*			
Transhsuum brevicostatum (OŽVOLDOVÁ)				*		
Transhsuum maxwelli (PESSAGNO)				*	*	*
Triactoma cf. *foremanae* MUZAVOR				*		
Triactoma mexicana PESSAGNO et YANG	*			*		
Tricolocapsa conexa MATSUOKA			*	*		
Zhamoidellum sp.			*	*		

Radiolarites form the second distinct rock part of the formation. They predominantly are found in limestones in form of irregular ellipsoidal nodules of various size. They are almost always parallel with bedding. Often these nodules are connected, giving rise to layers and strips of radiolarites.

Radiolarites similarly as limestones are of relatively variegated colours from black, through grey, green, red and violet varieties.

From microfacial point of view we evaluate them as silicite-calcite biomicrites with a high frequency of radiolarians, prevailingly of spumellarian type, which are mainly formed by the original fine-grained quartz substance. From organic remnants there are still sporadical ostracodes and very rarely spicules of sponges are present. A characteristic feature is the prezence of idiomorphic authigenic rhomboids, formed by calcite and/or dolomite. These rhombohedrons are almost always bound to organic remnants, which usually form their central part.

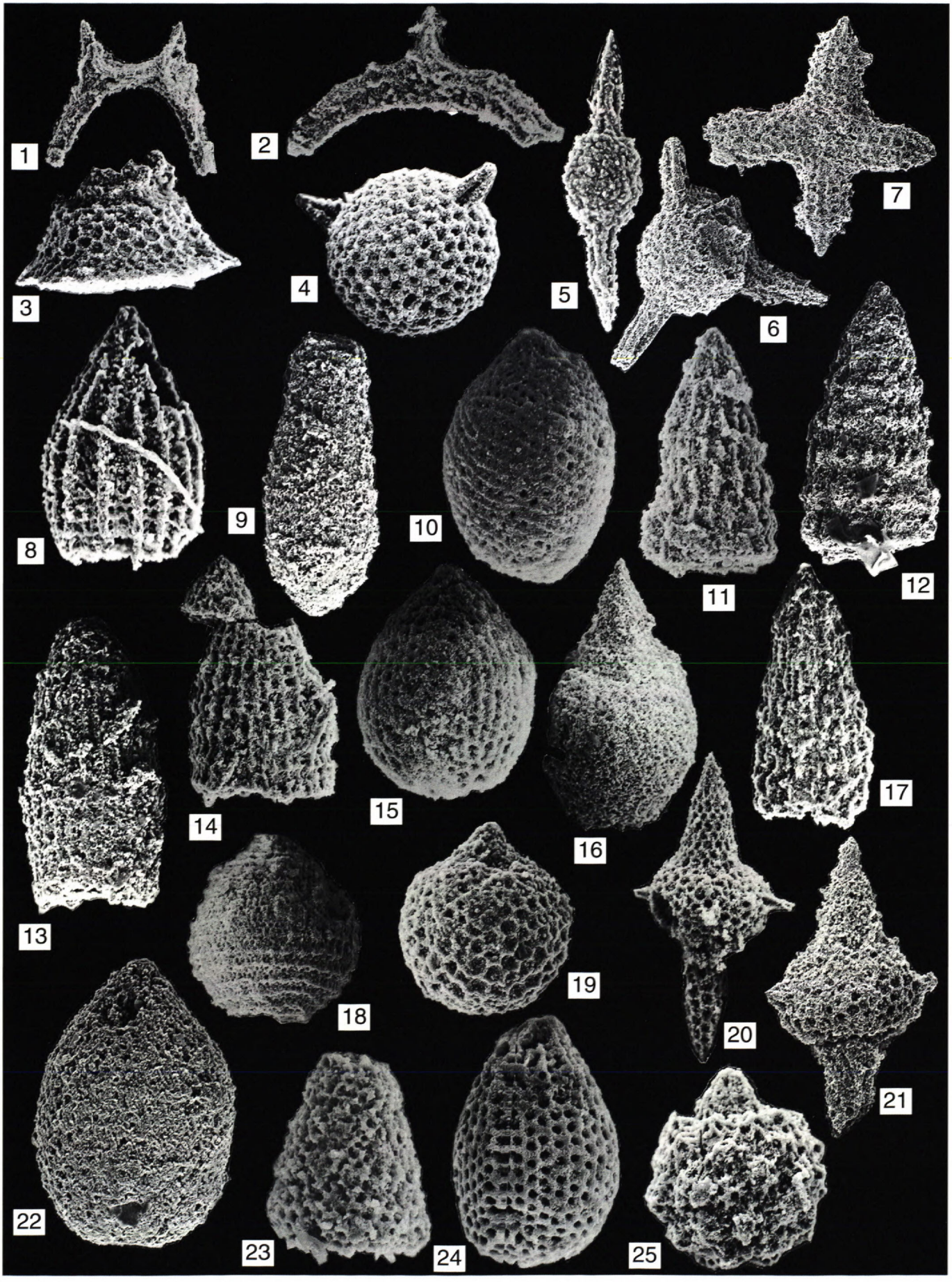
Biostratigraphical evaluation

In samples M-2/99 to M-9/99 the prevailing part of the present radiolarian microfauna was represented in form of cores only. A relatively more numerous, medium preserved microfauna, making possible to establish the range of age of the associations was found in samples M-6/99 and M-7/99 only. Also in these samples, however, the relatively considerable occurrence of cores perevented from finding out quatitative representation of the individual taxa.

In sample M-6/99 the presence of the species *Tricolocapsa conexa* MATSUOKA, *Stichocapsa robusta* MATSUOKA and *Gongylothorax sakawaensis* MATSUOKA, the occurrence of which, according to biozonation of Baumgartner et al. (1995), ends in the U.A.Z. 7 (late Bathonian – early Callovian), indicates that the associations are not younger than the Lower Callovian. The lower boundary of the range of age is given by the species *Gongylothorax sakawaensis*, which according to this biozonation starts to occur in the U.A.Z. 6 – in the Middle Bathonian.

In sample M-7/99 the occurrence of the species *Tricolocapsa conexa* MATSUOKA and *Kilinora spiralis* (MATSUOKA), which cease to be found in the U.A.Z. 7, also indicates an association not younger than the early Callovian. The lower boundary of the range is indicated by the first occurrence of the species *Kilinora spiralis* – in the U.A.Z. 6 Zone – in the middle Bathonian.

From the analysis of both associations according to the above mentioned biozonation it results that they may be ranged in their age to the stratigraphic interval – middle


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

Bathonian to late Bathonian – early Callovian (U.A.Z.6 – U.A.Z. 7).

According to up to present data from radiolarian research in the Western Carpathians the composition of the associations M-6/99 and M-7/99 is very similar to associations of samples B/5 and B/f to B/b from the profile at the locality Butkov (Rakús & Ožvoldová, 1999). Besides similar species composition, only at this locality the species *Kilinora spiralis* (MATSUOKA), was found (sample B/5). The difference of the associations of the studied samples essentially consisted in poorer preservation only.

In the studied associations the species *Transhsuum maxwelli* (PESSAGNO) was distinctly predominating, the numerous occurrence of which together with the species *Transhsuum brevicostatum* (OŽVOLDOVÁ) is characteristic of all associations of this stratigraphic range in the Pieniny Klippen Belt. In relatively less amount specimens of the genus *Podobursa* are found.

The composition of microfauna in the individual samples is mentioned in Tab. 1. Besides radiolarian microfauna the sample M-5/99 contained the form *Globuligerina* sp.

The best preserved forms in the associations are figured in the enclosed photographic plate.

Conclusion

For the first time the age of radiolarian limestones and radiolarites in the Choč nappe (Hronicum) of the Western Carpathians was established by direct paleontological methods.

From red radiolarian limestones and radiolarites a radiolarian microfauna was obtained, which according to biozonation points to the stratigraphical interval – middle Bathonian to late Bathonian – early Callovian (U.A.Z. 7).

References

Andrusov, D., 1936: Subtatranské příkrovy Zápaních Karpat. Carpathica I, Praha, 3–33. (In Czech).

Andrusov, D., 1938: Geológia Slovenska. Slovensko a Podkarpatská Rus. Sbor. pro Výz. Slovenska a Podkarp. Rusi, Praha, 111 s. (In Slovak).

Baumgartner, P.O., Bartolini, A., Carter, E., Conti, M., Cortese, G., Danelian, T., De Wever, P., Dumitrică, P., Dumitrică-Jud, R., Goričan, S., Guex, J.M., Hull, D., Kito, N., Marcucci, M., Matsuoka, A., Murchey, B., O'Dogherty, L., Savary J., Vishnevskaja, V., Widz, D. & Yao, A., 1995: Middle Jurassic to Early Cretaceous radiolarian biochronology of Tethys based on Unitary Associations. In: Baumgartner, P.O., O'Dogherty, L., Goričan, S., Urquhart, E., Pillevuit, A. & De Wever, P. (Eds.): Middle Jurassic to Lower Cretaceous Radiolaria of Tethys: Occurrences, Systematics, Biochronology. Mémoires de Géologie (Lausanne), 23, 1013–1048.

Kulcsár, K., 1917: Geologische Beobachtungen in den nordwestlichen Karpaten. Jahr. Ung. geol. Reichsanst., Budapest., 185–214.

Kulcsár, K., 1934: Die geologischen Verhältnisse des Gebietes zwischen Tothalom, Illava, Viszolaj und Egyházasnádas. JUGA f. 1917–1924, Budapest.

Maheľ, M., 1985:Geologická stavba Strážovských vrchov. Geo. Úst. D. Štúra, Bratislava, 1–221. (In Slovak, Engl. summary).

Rakús, M. & Ožvoldová, L., 1999: On the age of radiolarites from the Manín Unit (Butkov Klippe, Middle Váh valley, Western Carpathians). Mineralia Slovaca, 31, 79–86.

Pl. I

Fig. 1 – *Acanthocircus suboblongus* (YAO) – M-6, 0113, 130x; 2 – *Acanthocircus trizonalis* s.l. (RÜST) – M-6, 0125, 150x; 3 – *Palinandromeda podbielensis* (OŽVOLDOVÁ) – M-6, 0122, 110x; 4 – *Triactoma mexicana* PESSAGNO et YANG – M-2, 0109, 110x; 5 – *Archaeospongoprunum imlayi* PESSAGNO – M-8, 0132, 135x; 6 – *Triactoma* cf. *foremanae* MUZAVOR – M-6, 7001, 120x; 7 – *Higumastra imbricata* (OŽVOLDOVÁ) – M-6, 7002, 105x; 8 – *Hsuum* sp. – M-2, 0110, 195x; 9 – *Gongylothorax sakawaensis* MATSUOKA – M-6, 7018, 300x; 10 – *Kilinora spiralis* (MATSUOKA) – M-7, 0136, 330x; 11 – *Transhsuum maxwelli* (PESSAGNO) – M-6, 0124, 195x; 12 – *Transhsuum brevicostatum* (OŽVOLDOVÁ) – M-6, 7017, 250x; 13 – *Archaeodictyomitra* sp. – M-6, 7016, 400x; 14 – *Parahsuum carpathicum* WIDZ et DE WEVER – M-6, 0111, 175x; 15 – *Tricolocapsa conexa* MATSUOKA – M-6, 0137, 29x; 16 – *Obesacapsula morroensis* PESSAGNO – M-3, 0105, 125; 17 – *Transhsuum maxwelli* (PESSAGNO) – M-6, 0112, 160x; 18 – *Mirifusus guadalupensis* PESSAGNO – M-7, 0133, 120x; 19 – *Zhamoidellum* sp. – M-6, 0128, 195x; 20 – *Podobursa triacantha* (FISCHLI) – M-6, 0120, 150x; 21 – *Podobursa* sp. – M-6, 7005, 180x; 22 – *Stichocapsa robusta* MATSUOKA – M-6, 7006, 300x; 23 – *Pseudodictyomitrella* sp. – M-5, 0100, 300x; 24 – *Stylocapsa* ? sp. – M-5, 0103, 350x; 25 – *Sethocapsa funatoensis* AITA – M-6, 0129, 220x.