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Early Cretaceous ostracod *Cypridea* Bosquet, 1852 in the dinosaur bearing bauxite from Cornet - Lens 204, north-western Romania

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Abstract. Bauxite deposit Cornet – Lens 204 is well known due to its rich vertebrate content: dinosaurs, birds and pterosaurs. Little attention has been paid to the invertebrates, although rare charophyte, ostracod and gastropod fragments have been mentioned. After the acquisition of new equipments for the Paleontology Lab of the Țării Crișurilor Museum, preparation of some ostracods was possible from the compact bauxite samples. The ostracods are preserved as internal casts of articulated valves, their interior being completely calcified. Morphological features of one of the best preserved carapaces permit the identification of the genus *Cypridea* Bosquet 1852. The presence of *Cypridea* sp. in the bauxite of Cornet-Lens 204 extends the Early Cretaceous record of the genus in Romania.

Introduction

The Early Cretaceous vertebrate fauna from the bauxites of Cornet-Lens 204, Northwestern Romania, is famous due to its unusual type of fossilization. The vertebrate remains preserved in bauxite consist of dinosaurs (Jurcsák and

Popa, 1979, 1983b; Jurcsak and Kessler, 1991; Jurcsak, 1982; Marinescu 1989; Benton et al. 1997) pterosaurs (Jurcsak and Popa, 1983a, 1984; Dyke et al., 2011) and birds (Kessler, 1984; Kessler and Jurcsak, 1986; Jurcsak and Kessler, 1991; Dyke et al., 2011). Bauxite deposits have a very poor fossil record worldwide.

Regarding vertebrates, Cornet Lens 204 is a unique place, due to the high number of bones preserved in the bauxite, the majority of bauxite deposits lacking preserved fossils, especially vertebrates. Beside Cornet, the only vertebrate remain recorded in bauxites is that reported by Kretzoi and Noszky (1951), namely a crocodilian tooth and a bone fragment preserved in the Alsópere Bauxite Formation, Bakony Mts, Hungary. The uncatalogued specimen was thought to be lost, but it was recently relocated (Ősi et al., 2015) in the collection of the Hungarian Geological Museum of the Hungarian Geological Institute. Ősi et al. (2015) analyzed the tooth, concluding that it belonged to Mesoeucrocodylia indet..

Plant and invertebrate remains occur sporadically in bauxites, the majority of fossils are generally poorly preserved consisting of casts or impressions of plants, gastropods, bivalves or ostracods (Bardossy, 1977).

The presence of invertebrates in the bauxite of Cornet - Lens 204 was first mentioned by Patrulius et al. (1983), noting the presence of a charophyte stem and a tiny gastropod in the hematitic, arenitic bauxite level. Dragastan et al. (1988) included the detrital, boehmitic – hematitic, bedded dinosaur bearing bauxite in the third bauxite level (N III) and mentioned two ostracods from the bauxite: the marine *Schuleridea mediocaudata* and *Asciocythere* cf. *circumdata*, emphasizing that the latter was reworked, but has not figured or described them.

Marinescu (1989) distinguished fragments of charophytes, an ostracod, a fragment of a brachiopod and of a bivalve (possible caprotinid). He mentioned that due to the poor preservation of the invertebrate fossils determination of species was impossible.

An internal cast of small gastropod was figured by Jurcsák and Kessler, (1991) as unidentified Gastropoda, Pulmonata g. et. sp.

Cornet – Lens 204 is one of the several hundreds of small bauxite lenses in the Pădurea Craiului Mts., deposited on the palaeosurface of Late Jurassic limestones. The sequence of sediments of Lens 204 has been detailed by Patrulius et al. (1983), Benton et al. (1997) and Posmoșanu and Cook (2000). The bauxite deposit of Cornet-Lens 204 was initially considered to be Lower Neocomian in age (Patrulius et al, 1983, Marinescu, 1989), respectively Lower Berriasian – Lower Barremian for the entire interval of bauxite formation. Later studies reduced this interval to Late Beriassian (Dragastan, 1988; Cociuba, 2000; Dragastan et al, 2009).

Material and method

Ostracods are widely distributed in marine and non-marine sediments and usually are prepared chemically, using acid dissolution and screen-washing. Preparation of fossils preserved in bauxites implies mechanical techniques, at least when the compact bauxites are regarded. Some authors (Dragastan et al, 2009) evidenced ostracods in the bauxites of Pădurea Craiului Mts. by using thin sections, in which taxonomical identification is almost impossible.

The specimens discussed in this paper have been prepared from bone bearing bauxite samples (Fig. 1) collected by Tiberiu Jurcsák and Elisabeta Popa during the fieldworks carried out in 1978-1983. Unfortunately there is no indication regarding the lito-stratigraphic position of the samples within the stratified bauxite deposit of Cornet – Lens 204.

Figure 1. Semi-prepared ostracod preserved in the compact bauxite.

The samples were examined under microscope (Nikon 1000 Stereomicroscope) and the identified ostracods were mechanically prepared with the use of the vibrating cutter. This process was extremely difficult due to the fragile nature of the microfossils and the hardness of the bauxite. All the recovered ostracods are preserved as internal casts of articulated valves, their interior being completely calcified.

Terminology used for morphological description of carapace outline (Fig. 2), is that defined by Sames (2011). Size parameters used in this paper also follow that of Sames (2011), respectively: small (length 0.60-1.00 mm); medium (length 1.00-1.50 mm); large (length 1.50-5.00 mm). The specimen described in this paper is deposited in the Paleontology Collection of the Department of Natural Sciences - Țării Crișurilor Museum Oradea.

Abbreviation. MTCO – Ţării Crişurilor Museum Oradea.

Systematic paleontology

Class OSTRACODA Latreille, 1802
Order PODOCOPIDA Müller, 1894
Suborder CYPRIDOCOPINA Jones, 1901
Superfamily CYPRIDOIDEA Baird, 1845
Family CYPRIDEIDAE Martin, 1940
Genus CYPRIDEA Bosquet, 1852
Cypridea sp. (Fig. 3)

Material: MTCO 25006/2 is one of the best preserved specimens.
Dimensions: L=1.90 mm; H =1.26 mm
Description: internal mold of the carapace, semi rectangular in lateral outline, being the highest in the anterior half of the dorsal margin. The curvature of the anterior and posterior margins is infracurvate, being more narrower rounded towards the venter. The dorsal margin is convex; the ventral margin is almost straight. At the anterior half of ventral margin there is a well developed rostrum, situated behind a slightly deep rostral groove (alveolar groove), which is clearly preserved. The rostral groove extends almost halfway across the shell, being slightly curved. The rostral groove is stronger developed on the left valve, which is slightly larger than the right one. On the posterolateral margin there is a cyathus-like protrusion, this extension of the postero-lateral margin is visible in both valves, but is more distinct in the larger one, the left valve. The L/H coefficient in this specimen is low (length/height=1.50). The ornamentation can not be determined, since this specimen is an internal cast.

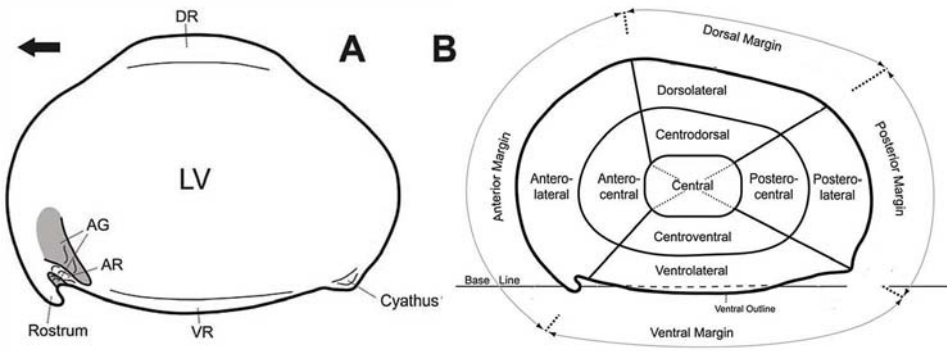

Figure 2. Terminology used in the text. A. Terminology used for morphological description. AG: alveolar groove; AR: alveolar ridge; DR: dorsal ridge; LV: left valve; VR: ventral ridge. B. Terminology used for the description of outline, outline regions and charapace margins of the genus *Cypridea*. (modified after Sames, 2011)

Discussion

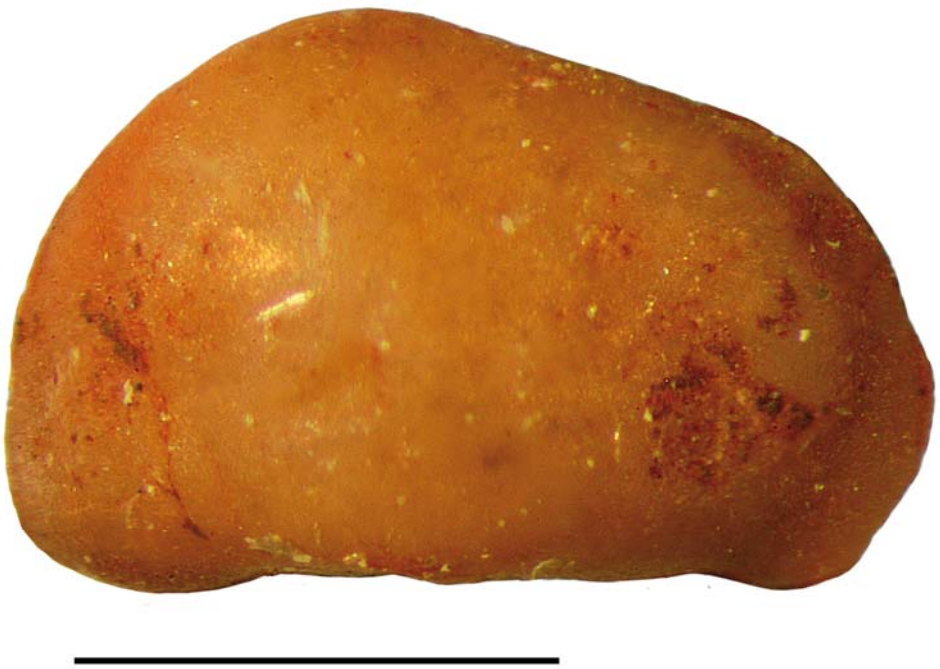

Figure 3. *Cypridea* sp., left valve in lateral view (MTCO 25006/2).

The taxonomy of the species within the genus *Cypridea* has been discussed in detail by several authors (Horne and Colin, 2005; Schudack and Schudack, 2009b, Sames, 2011). Although the external ornamentation of the MTCO 25006/2 specimen from Cornet – Lens 204 can not be determined, its morphology (i.e., subrectangular outline, the relatively high carapace, well developed rostrum with an extending, curved rostral groove and the distinct cyathus-like extension on the posterolateral margin, low L/H-coefficient), resembles species within the *Cypridea alta* species group. According to Sames (2011) "this group is characterized by a relatively high carapace [i.e., low L/H-coefficient], a distinct punctation, and a short but well-developed rostrum. Additionally, representatives of this group are all strongly inequivalve, have a distinct but small, weakly obtuse-angled cyathus with a narrow basis, and bear a strong ventral ridge". The Cornet specimen differs from *Cypridea alta* – species group by its larger size and the lack of dorsal ridge, the latter may be due to preservation.

The poor preservation of the Cornet specimen and the lack of any internal characters do not allow determination at species level, but based on its main morphological characters it can be determined as *Cypridea* sp.

Cypridea Bosquet 1852 is a widespread fresh-water ostracod genus, with a stratigraphic range extending from Kimmeridgian to Eocene (Horne and Colin, 2005; Sames, 2011). Biostratigraphical value of this genus has been widely used for Purbeck – Wealden sediments in England (Anderson, 1967; Anderson, 1985; Horne, 1988; Horne, 1995), Spain (Schudack and Schudack, 2009a; Schudack and Schudack, 2011) or Germany (Arp and Mennerich, 2008). In Romania a comprehensive study of the Purbeck sediments have been made by Marius Stoica in his PhD thesis. Stoica (1997) listed an ostracod association for the *Cypridea dunkeri* and *Cypridea granulosa* Biozones for the Early and Middle Purbeck of Dobrogea, South-Eastern Romania. According to Stoica (2007), there are several *Cypridea* species in Dobrogea: *Cypridea dunkeri dunkeri, C. dunkeri carinata, C. granulosa, C. setina, C. tumescens tumescens and C. tumescens praecursor*.

The presence of *Cypridea* Bosquet 1852 in the bauxite of Cornet - Lens 204 completes the record of the genus for the Early Cretaceous of Romania.

Further study of the ostracods from Cornet-Lens 204 is undergoing and will bring new paleontological and paleoecological data for this unique bauxite deposit.

Acknowledgments

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European Paleofloristic Affinities of the Romanian Jurassic Macroflora

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Abstract. Based on the floristical affinity method, this study is the first paleofloristic approach to the entire Jurassic macroflora of Romania. A complete list of the European Jurassic plant macrofossil species is provided. The Jurassic macroflora from Romania is the second most diverse in Europe, after that of the United Kingdom. However, the affinity of Romanian flora to the United Kingdom flora is only the fourth, after its affinities to the Hungarian, Polish, and Norwegian floras. The Polish flora is the second by the number of common species shared with the Romanian flora, and the Hungarian flora is the third. However, the floristic comparison shows that the flora from Romania has the highest affinity to the flora from Hungary. The island paleogeography of the Southern margin of the European Jurassic carbonate platform is the principal cause of this outstanding floristic affinity. The Jurassic macrofloras from Denmark, Italy, and Germany, have less common species with Romanian flora, but are at least as diverse as the flora from Hungary; the estimations show that the affinities to these floras of the Romanian flora are lower. Reported to their rather small number of species, the Jurassic macrofloras from Norway and Serbia have relatively big number of common species with the flora from Romania, thus the affinities to their floras of the Romanian flora are higher than even the affinities to the Danish, German, Italian, and French floras, which are much more diverse. There is no floristic affinity of Romanian to Swiss Jurassic macroflora, because these floras do not share any common species.

Keywords. Europe, Floristical Affinity Method, Jurassic, Macroflora, Romania.

Introduction

A paleofloristic comparison of the Lower Jurassic macroflora from Romania with the Lower Jurassic macrofloras of a number of European states was given by Czier (1997a). However, more recent data provided by Givulescu (1998), Czier (2000; 2011; 2014), Barbacka *et al.* (2014), Popa (2014), allow more detailed comparisons with some European macrofloras. The present paper is the first paleofloristic approach to the entire Jurassic macroflora from Romania, in the European context. The comparisons nowadays are limited to those countries from which the most complete data are available (Fig. 1).

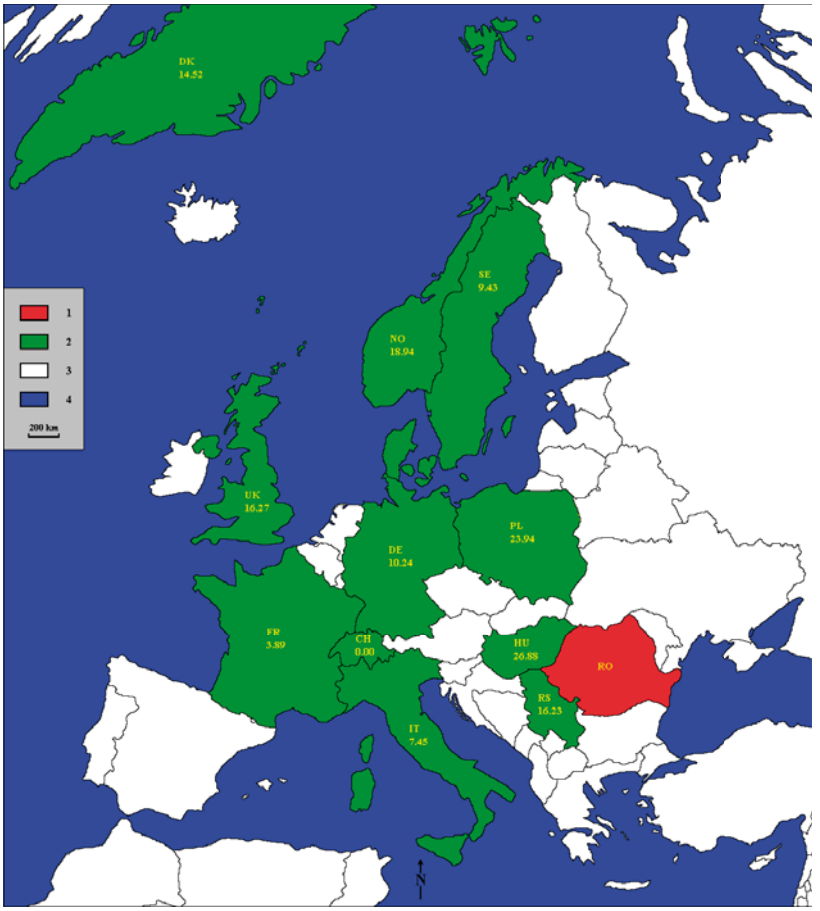

Figure 1. Geographical position of Romania involving other European states with Jurassic macrofloras. 1 – state with the reference flora: Romania (RO); 2 – states with the compared floras: Switzerland (CH), Germany (DE), Denmark (DK), France (FR), Hungary (HU), Italy (IT), Norway (NO), Poland (PL), Serbia (RS), Sweden (SE), United Kingdom (UK); 3 – regions with incomplete yet not compared data; 4 – ocean and seas; Numbers – floristic affinities (%).

The Floristical Affinity Method

The statistic method used for the proposed paleofloristic comparison is the Floristical Affinity Method (FAM) defined by Czier (2002). The main advantage of the method is the possibility to compare the floras based on their floristic affinity, which is a botanical concept, not an abstract statistic term. This method is not only a statistic method, but also a botanical (paleobotanical) method, based on a real botanical concept. Therefore, it is adequate for any floristic (paleofloristic) comparison, and is recommendable for all the similar comparative studies.

The extensive description of the method is not repeated here. The calculation formulas of the three defined affinities are:

- The reference affinity: $$Ar = \frac{Nrc}{Nr} \times 100$$

- The comparison affinity: $$Ac = \frac{Nrc}{Nc} \times 100$$

- The floristic affinity: $$Af = \frac{Nrc \times (Nc + Nr)}{Nr \times Nc} \times 50$$

The complexity of the problem (n = 11) needs usage of the general variant of the method. Therefore, the abbreviations are the following. Ur = reference unit, $Uc_{1\text{-}11}$ = comparison units, Nr = number of species in the reference unit, $Nc_{1\text{-}11}$ = number of species in each comparison unit, $Nrc_{1\text{-}11}$ = number of common species in the reference unit and each comparison unit, Ar = reference affinity, Ac = comparison affinity, Af = floristic affinity.

Before doing any calculus and interpretation based on FAM, it is of crucial importance to understand that the floristic affinity is not equal with the number of common species, nor with the number of total species. A big or small number of common species and a high or low affinity is not the same. Two localities sharing the biggest number of common species may be or not the localities with the highest floristic affinity. The calculi decide clearly such dilemmas, simply, by ordering the floras in decreasing order of their floristic affinities.

The floristic affinity is in direct proportional dependence with the number of the common species, but inversely with the total species number. Although the

number of common species of two floras directly influences the floristic affinity, their total number of species is inversely determinative. Therefore, it is a normal situation, when the results of the calculi show that a flora with many common species and many total species has lower affinity than another flora with few common species and few total species. Also normal is when the calculi show higher affinity, even in a resemblant case. The most important thing is just to not make mistakes when calculating the affinities, and then to accept the results with no hesitation, because arithmetic calculi are objective. They do not depend on any inclination of anybody; they do not favourite and do not ignore anything. The method was elaborated expressly to make possible much more precise comparisons between the floras than simple or maybe subjective comparisons of their taxonomical lists.

Paleofloristic composition of the European Jurassic macroflora

The floristic affinity should base on the most possible complete list of the published species, in the current case evidently on the list of those species that are present in the Jurassic macroflora of Europe.

This study is based on the list of taxa of the European Jurassic macrofloras published by Barbacka *et al*. (2014). In this study, the list has been completed by including other taxa described by Dragastan, Bărbulescu (1980), Czier (1994; 1995a; 1995b; 1995c; 1996; 1997b; 1998a; 1998b; 2000; 2001a; 2001b; 2004; 2005; 2006; 2008; 2009; 2010; 2011; 2014), and Popa (2014).

- Addition to the floristical composition of Romania of *Abietites praelinkii* Givulescu, *Aninopteris formosa* Givulescu, *Anomozamites inconstans* (Göppert) Schimper, *Arctopteris inexpectata* Givulescu, *Banatozamites calvus* Czier, *Banatozamites chlamydostomus* Czier, *Banatozamites remotus* Czier, *Brachyphyllum aureliae* Dragastan, *Bucklandia aninaensis* Czier, *Carpolithes liasinus* Andrae, *Cheirolepidium muensteri* (Schenk) Takhtadjan, *Cladophlebis browniana* (Dunker) Seward, *Cladophlebis haiburnensis* Lindley *et* Hutton, *Cladophlebis insignis* (Lindley *et* Hutton) Raciborski, *Cladophlebis naliokini* Thomas, *Cladophlebis roesserti* (Schenk) Saporta, *Cladophlebis rumana* Semaka, *Cladophlebis semakai* Czier, *Cladophlebis silvaeregis* Czier, *Cladophlebis whitbiensis* (Brongniart) Brongniart, *Coniopteris hymenophylloides* (Brongniart) Seward, *Ctenis grandifolia* Fontaine, *Ctenis hungarica* Staub, *Cycadocarpidium swabii* Nathorst, *Czekanowskia hartzi* Harris, *Czekanowskia rigida* Heer, *Dictyophyllum acutilobum* (Braun) Schenk, *Dictyophyllum muensteri* Saporta, *Eboracia lobifolia* (Philips) Thomas, *Equisetites arenaceus* (Jaeger) Schenk, *Equisetites columnaris* Brongniart, *Equisetites muensteri* (Sternberg) Harris,

Equisetites ungeri Ettingshausen, *Equisetites veronensis* Zigno, *Equisetum laterale* Phillips *em*. Harris, *Ginkgo baieraeformis* (Kilpper) Czier, *Ginkgo digitata* (Brongniart) Heer, *Ginkgo ettingshausenii* (Krasser) Czier, *Ginkgo marginata* (Nathorst) Czier, *Ginkgo minima* (Yabe *et* Oishi) Czier, *Ginkgo parvifolia* Tuzson, *Ginkgo polymorpha* (Samylina) Czier, *Ginkgo skottsbergii* (Lundblad) Czier, *Klukia exilis* (Phillips) Raciborski, *Leptostrobus laxiflora* Heer, *Marattiopsis hoerensis* (Schimper) Thomas, *Matonidium goepperti* (Ettingshausen) Schenk, *Nellostrobus inconstans* Semaka, *Nellostrobus quadraticus* Semaka, *Neocalamites carcinoides* Harris, *Nilssonia inaequalis* Givulescu, *Nilssonia schaumburgensis* (Dunker) Nathorst, *Nilssoniopteris tenuinervis* (Brongniart) Florin, *Nilssoniopteris vittata* Brongniart, *Palissya braunii* Endlicher, *Phlebopteris braunii* (Göppert) Hirmer et Hörhammer, *Phlebopteris dunkeri* Schenk, *Phlebopteris polypodioides* Brongniart, *Phoenicopsis angustifolia* Heer, *Pityophyllum follini* (Nathorst) Möller, *Podozamites lanceolatus* (Lindley *et* Hutton) Braun, *Podozamites mucronatus* Harris, *Protorhipis buchii* Andrae, *Pseudocycas dunkeriana* (Goeppert) Florin, *Pseudotorellia nordenskjoldi* (Nathorst) Florin, *Pterophyllum cuspidatum* Ettingshausen, *Pterophyllum inconforme* Givulescu, *Pterophyllum magoti* Semaka, *Pterophyllum marginata* (Braun) Unger, *Pterophyllum pectinatum* (Jaeger) Csaki *et* Ulrichs *em*. Czier, *Ptilophyllum aninaensis* Czier, *Ptilophyllum caucasicum* Doludenko *et* Svanidze, *Ptilophyllum minor* Dragastan *in* Dragastan *et* Bărbulescu, *Receaphyllum grandis* Czier, *Sagenopteris nilssoniana* (Brongniart) Ward, *Sagenopteris phillipsii* Brongniart, *Schizolepis follinii* Nathorst, *Selenocarpus muensterianus* (Presl *in* Sternberg) Schenk, *Sphenobaiera colchica* (Prynada) Delle, *Sphenobaiera crassa* Givulescu, *Sphenobaiera rarefurcata* Semaka, *Sphenopteris hoeninghausi* Brongniart, *Sphenopteris obtusifolia* Andrae, *Taeniopteris multinervis* Weiss, *Taeniopteris münsteri* Göppert, *Taeniopteris tenuinervis* Brauns, *Todites denticulatus* Brongniart, *Todites haiburnensis* (Lindley et Hutton) Kilpper, *Todites princeps* Presl, *Williamsonia aninaensis* Czier, *Williamsonia danubii* Dragastan *in* Dragastan *et* Bărbulescu, *Williamsonia pecten* Phillips, *Zamites vachrameevii* Doludenko;

- Addition to the floristical composition of Hungary of *Cladophlebis baueri* Czier, *Cladophlebis mecsekensis* Czier, *Pachypteris rhomboidalis* (Ettingshausen) Nathorst, *Palissya sphenolepis* (Braun) Brongniart, *Phlebopteris muensteri* (Schenk) Hirmer *et* Hörhammer.

Table 1 contains the new floristic enumeration, mentioning also the presence (1) or absence (0) of each species in the Jurassic floras of the states.

The floristical list resulted by centralizing the occurrences of the species in each locality of the states: Switzerland (Basel), Germany (Franken, Solnhofen,

Nussplingen, Brunn), Denmark (Scoresby), France (Vendée, Causses, Mamers, Jura), Hungary (Mecsek), Italy (Veneto, Sardegna), Norway (Brent, Andoya), Poland (Holy Cross, Grojec, Wólka), Romania (Banat, Braşov, King Forest, Dobrogea), Serbia (Stara Planina), Sweden (Scania), United Kingdom (Bearreraig, Sutherland, Stonesfield, Yorkshire).

No new determinations are added on this occasion, nor unpublished own revisions. Only some nomenclatural changes are proposed in the case of the Romanian and Hungarian floras, where such issues stringently need corrections. To be in maximal though acceptable concordance with the style of the old list, specimens that are not revised in the published literature are let with their original determinations.

The FAM stipulates that full-determined and valid species constitute basis of the calculi. Only these can lead to relevant comparisons and conclusions. Unpublished species, *nomina nuda*, invalid species, uncertainly determined species, species with zero presence in all the listed floras, and genera containing no one species in no one flora, are not subject of this paper. Consequently, paleobotanists, biostratigraphers, paleophytogeographers, paleoclimatologists, and other scientists may trust equally in the obtained results.

Comparing the new list to the old list, basically, the determinations of the maintained species are unchanged. Varieties, if present, are not rejected, just omitted, being not required by the method. Therefore, in no case the same species is written several times, in distinct rows. Anyway, such writings may cause errant sums at counting, though they do not increase the real number of the species. The already mentioned necessary nomenclatural proposals are concretised as follows.

- Major changes based on the priority principle, in accordance with Art. 11 of the International Code of Nomenclature for algae, fungi, and plants (McNeill *et al*. 2012), namely that the later homonyms are illegitimate and must be rejected, and the valid names should be used: *Pachypteris rhomboidalis* (Ettingshausen) Nathorst instead of *Pachypteris rhomboidalis* (Ettingshausen) Doludenko; *Weltrichia alfredi* (Krasser) Harris instead of *Weltrichia alfredii* (Krasser) Popa – moreover twice appeared in the old list; *Weltrichia banatica* (Krasser) Givulescu instead of *Weltrichia banatica* (Krasser) Popa; *Williamsonia banatica* Krasser instead of *Williamsonia banatica* (Krasser) Popa, which in fact is not a real combination, but only an illegitimate later writing; *Williamsonia latecostata* Semaka instead of *Williamsonia latecostata* (Semaka) Popa, which also is false, because Semaka described the species *Williamsonia latecostata* as new one, so combining it in the same genus is superfluous, and in fact impossible;

- Minor changes are done to write completely and correctly some

combinations: *Clathropteris meniscioides* (Brongniart) Brongniart instead of *Clathropteris meniscioides* Brongniart; *Dictyophyllum nervulosum* (Sternberg) Kilpper instead of *Dictyophyllum nervulosum* Kilpper; *Ginkgo skottsbergii* (Lundblad) Czier instead of *Ginkgo scottsbergii* Lundblad; *Otozamites gracilis* (Kurr) Miquel instead of *Otozamites gracilis*; *Podozamites distans* (Presl) Braun instead of *Podozamites distans* (Braun) Presl.

Calculi and results

The first calculi are simple additions of the presences of the species in each flora. These permit to mention the states in order of their species number: United Kingdom with 263 species, Romania with 157 species, France with 109 species, Sweden with 107 species, Poland with 83 species, Denmark with 77 species, Italy with 67 species, Germany with 52 species, Hungary with 52 species, Norway with 28 species, Serbia with 25 species, Switzerland with 7 species.

The flora from Romania has 32 common species with the flora from the United Kingdom, 26 common species with the flora from Poland, 21 common species with the flora from Hungary, 15 common species with the flora from Denmark, 12 common species with the flora from Sweden, 9 common species with the flora from Norway, 8 common species with the flora from Germany, 7 common species with the flora from Italy, 7 common species with the flora from Serbia, 5 common species with the flora from France, and no one common species with the flora from Switzerland.

Subsequently operations are calculi of the affinities, using the method's formulas. Table 2 contains the calculi in this respect. The results are written in the table, besides the enumeration of the species, in conformity with the method.

The Jurassic macroflora from Romania has various floristic affinities to the Jurassic macrofloras of the European states, in this order: Hungary (26.88), Poland (23.94), Norway (18.94), United Kingdom (16.27), Serbia (16.23), Denmark (14.52), Germany (10.24), Sweden (9.43), Italy (7.45), France (3.89), and Switzerland (0.00). The results clearly show that the flora from Romania has the highest affinity to the flora from Hungary. Although this at first sight seems to be contradictory with the mentioned fact that Romania and the United Kingdom have 32 species in common in contrast to 21 species in common with Hungary, there is no real contradiction, if we look at the mathematical definition and formula of the floristic affinity (Czier 2002, p. 14).

Comparisons and interpretations

The Romanian Jurassic macroflora appears to be the second most diverse in Europe, after that of the United Kingdom. However, this does not mean automatically that the Romanian flora has the highest affinity to the United Kingdom flora, because their common species also must take into consideration, and the calculi of the floristic affinities indeed show that it has not! The affinity of the Romanian flora to the United Kingdom flora is only the fourth, after its affinities to the Hungarian, Polish, and Norwegian floras.

Even if the United Kingdom and the Romanian floras are the richest in species in Europe, the big number of their common species is more likely a consequence of their paleogeographic positions than of their big number of total species. The number of their common species much probably would be smaller if Gondwanian elements also were present in one of them like in the Italian flora (Scanu *et al*. 2012), and perhaps even could tend to zero, if one of these floras were completely Gondwanian. Of course, they are European floras; therefore, it is easy to understand that they may have even a big number of common species. However, the big number of their common species is not only a consequence of their high diversity, because there are other states with less diverse floras, but with several common species with the flora from Romania.

The number of the common species between the Jurassic flora from Romania and that from the United Kingdom is, therefore, only partly explainable by the number of their species, and this generally appears true in the case of the rest of the floras. The result of the common species counting in the case of the Romanian and the Polish floras is about what were expectable only because of the number of the species. However, France and Sweden have fewer common species with the flora from Romania, than what could be expected just because of their species number.

Hungary, with about half number of species than France or Sweden, has much more common species with the flora from Romania. This result is at least partly explainable by the confirmed supposition that Mecsek and the King Forest in Jurassic were parts of the same island, situated along the Southern margin of the European carbonate platform, belonging to the Tisza Superunit (Kovács *et al*. 1987; Gawlick *et al*. 1999; Márton 2000; Vörös 2001; Czier 2001c, 2006).

The FAM confirms the resemblance of the Romanian and Hungarian floras, otherwise somewhat supposable owing to their geographical positions. Evidently, the same insular origin of a part of their floras is not the only explanation of this outstanding affinity. The Romanian flora has considerable affinities to other floras too, for example to those from Poland and Norway, although they

paleogeographically more or less were isolated from each other. Therefore, other causes, like resemblant ecosystems, or the general spread of some species in the European province of the Euro-Sinian region, and even beyond, also are enough important to be considered. Such species, present not only in the floras of these two neighbour states, but in at least five European states are *Cladophlebis denticulata* (Brongniart) Fontaine (5 states), *Cladophlebis haiburnensis* Lindley *et* Hutton (7 states), *Clathropteris meniscioides* (Brongniart) Brongniart (6 states), *Coniopteris hymenophylloides* (Brongniart) Seward (6 states), *Dictyophyllum nilssonii* (Brongniart) Göppert (5 states), *Ginkgo marginata* (Nathorst) Czier (5 states), *Pachypteris rhomboidalis* (Ettingshausen) Nathorst (5 states), *Phlebopteris angustiloba* (Presl) Hirmer *et* Hörhammer (6 states), *Phlebopteris muensteri* (Schenk) Hirmer *et* Hörhammer (5 states), *Sagenopteris nilssoniana* (Brongniart) Ward (7 states), *Thaumatopteris brauniana* Popp (6 states), *Todites princeps* Presl (7 states).

Denmark, Italy, and Germany, have in their Jurassic floras at least so many species as Hungary, and all of them have much fewer common species with Romania, therefore the affinities of their floras are smaller than the affinity of the Hungarian flora. Reported to their rather small number of species, Norway and Serbia have relatively big number of common species with Romania, hence it is not a surprise if the calculi show that the affinities of their floras are higher than the affinities of the Danish, German, Swiss, Italian, and French floras. Switzerland and Romania have no common Jurassic macroflora species, the floristic affinity in this case being zero.

Correlation and future prospects

A correlation between the total numbers of the species, the common species numbers, and the floristic affinities of the Romanian Jurassic macroflora to other European Jurassic macrofloras, outcome from the calculi and the results given in Table 3. The graphic representation may help identify the relations between these elements (Fig. 2).

The floristic affinities of the Romanian flora to the other floras are lower than 27 percentages, so they do not exceed the first third on the vertical axis. These reasonably appear as low to middle affinities. However, a general classification of the floristic affinities will be possible only after applying the FAM in several cases, by comparing also other floras between them.

Comparisons might be later extended to the countries for the moment white on the map. Until then, the results of the present study can be used as they are, or as starting points for diverse researches on Jurassic macrofloras. In a larger

context, they hopefully will be utile for paleofloristic researches within the Factor 1 (Permian – Early Cretaceous) established by Cleal, Cascales-Miñana (2014, p. 7), which "is dominated by Pinopsida conifers, Ginkgoopsida and Pteropsida ferns, with some significant contribution from Bennettitopsida, and is essentially equivalent to the Mesophytic Flora of Gothan (1912)".

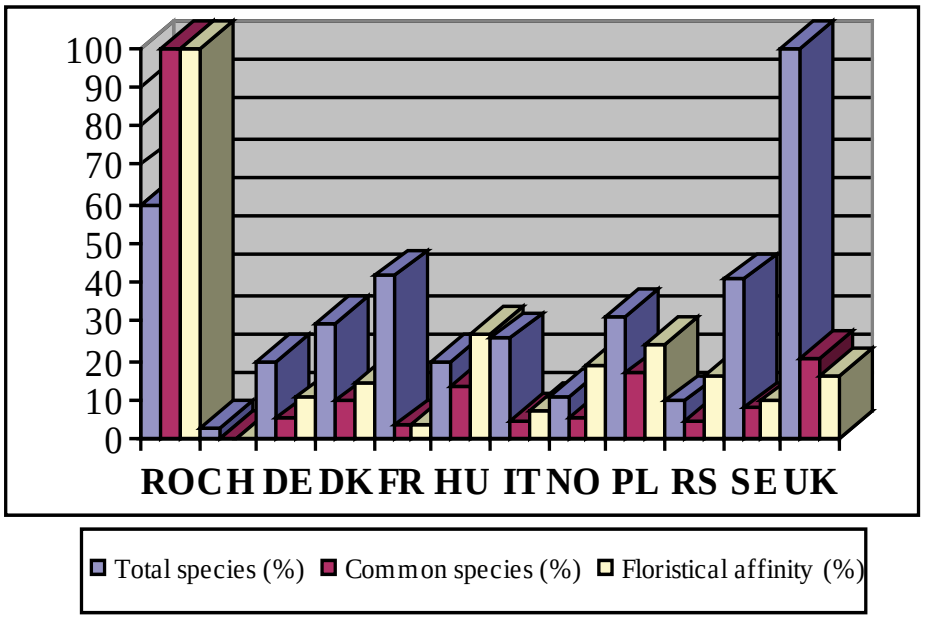

Figure 2. Correlation chart of the total number of species (Nr – Nc_{1-11}), number of common species (Nrc_r – Nrc_{1-11}), and floristic affinities of the Jurassic macroflora from Romania (RO) to the Jurassic macrofloras of Switzerland (CH), Germany (DE), Denmark (DK), France (FR), Hungary (HU), Italy (IT), Norway (NO), Poland (PL), Serbia (RS), Sweden (SE), United Kingdom (UK).

Conclusions

Because of the total number of species, the Jurassic macroflora from Romania is the second diverse in Europe, after the United Kingdom Jurassic macroflora.

The practical application of the FAM shows that the Jurassic macroflora from Romania has the highest affinity to the Jurassic macroflora from Hungary.

The outstanding affinity between the Romanian and Hungarian Jurassic macrofloras mainly appears as consequence of the island paleogeography of the Southern margin of the European carbonate platform.

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Table 1. Affinities of the Jurassic macroflora from Romania in the European context, based on a new list of species. State abbreviations: RO = Romania, CH = Switzerland, DE = Germany, DK = Denmark, FR = France, HU = Hungary, IT = Italy, NO = Norway, PL = Poland, RS = Serbia, SE = Sweden, UK = United Kingdom. FAM abbreviations see in the main text.

STATE / SPECIES	RO	CH	DE	DK	FR	HU	IT	NO	PL	RS	SE	UK
	Ur	Uc_1	Uc_2	Uc_3	Uc_4	Uc_5	Uc_6	Uc_7	Uc_8	Uc_9	Uc_{10}	Uc_{11}
Abietites praelinkii Givulescu	1	0	0	0	0	0	0	0	0	0	0	0
Algacites truncatus Schlotheim	0	0	1	0	0	0	0	0	0	0	0	0
Allicospermum ellipticum Harris	1	0	0	0	0	0	0	0	0	0	0	0
Allicospermum ooides Harris	0	0	0	1	0	0	0	0	0	0	0	0
Allicospermum xystum Harris	0	0	0	1	0	0	0	0	0	0	0	0
Amphorispermum major Harris	0	0	0	1	0	0	0	0	0	0	0	0
Amphorispermum pullum Harris	0	0	0	0	0	0	0	0	0	0	0	1
Androstrobus balmei Hill	0	0	0	0	0	0	0	0	0	0	0	1
Androstrobus major Van Konijnenburg-van Cittert	0	0	0	0	0	0	0	0	0	0	0	1
Androstrobus manis Harris	0	0	0	0	0	0	0	0	0	0	0	1
Androstrobus prisma Thomas *et* Harris	0	0	0	0	0	0	0	0	0	0	0	1
Androstrobus szei Harris	0	0	0	0	0	0	0	0	0	0	0	1
Androstrobus wonnacotti Harris	0	0	0	0	0	0	0	0	0	0	0	1
Angiopteris blackii Van Konijnenburg-van Cittert	0	0	0	0	0	0	0	0	0	0	0	1
Aninopteris formosa Givulescu	1	0	0	0	0	0	0	0	0	0	0	0
Annulariopsis simpsoni Phillips	0	0	0	0	0	0	0	0	0	0	0	1
Anomozamites affinis Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Anomozamites hartzi Harris	0	0	0	1	0	0	0	0	0	0	0	0
Anomozamites inconstans (Göppert) Schimper	1	0	0	0	0	0	0	0	0	0	0	0
Anomozamites marginatus (Unger) Nathorst	0	0	0	1	0	1	0	0	0	0	1	0

Tabel 1. Continued

Anomozamites minor Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Anomozamites nilssoni Phillips	0	0	0	0	0	0	0	0	0	0	0	1
Anomozamites thomasi Harris	0	0	0	0	0	0	0	0	0	0	0	1
Anthrophyopsis crassinervis Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Anthrophyopsis nilssoni Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Anthrophyopsis tenuinervis Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Apoldia latifolia (Schimper) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Araucarites brodiei Carruthers	0	0	0	0	0	0	0	0	0	0	0	1
Araucarites falsanii (Saporta) Barale	0	0	1	0	1	0	0	0	0	0	0	0
Araucarites microphylla (Saporta) Seward	0	0	0	0	1	0	0	0	0	0	0	0
Araucarites moreauana (Saporta) Seward	0	1	0	0	1	0	0	0	0	0	0	0
Araucarites phillipsii Carruthers	0	0	0	0	0	0	0	0	0	0	0	1
Araucarites pictaviensis (Saporta) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Arctopteris inexpectata Givulescu	1	0	0	0	0	0	0	0	0	0	0	0
Arthrotaxites baliostichus Sternberg	0	0	1	0	0	0	0	0	0	0	0	0
Arthrotaxites frischmanni Unger	0	0	1	0	0	0	0	0	0	0	0	0
Aspidites thomasi Harris	0	0	0	0	0	0	0	0	0	0	0	1
Asplenium rigidum Vassilevskaja	0	0	0	0	0	0	0	0	0	0	0	1
Baiera brauniana Dunk	0	0	0	0	0	0	0	0	0	0	0	1
Baiera curvata Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Baiera furcata (Lindley *et* Hutton) Braun	0	0	0	0	0	1	0	0	0	0	0	1

Tabel 1. Continued

Baiera gracilis Bunbury	0	0	0	0	0	0	0	1	0	0	0	0
Baiera lindleyana Schimper	0	0	0	0	0	0	0	0	0	0	0	1
Baiera longifolia Pomel	0	0	1	0	0	0	0	0	0	1	0	0
Baiera muensteriana (Presl) Heer	0	0	1	0	0	0	0	0	0	1	0	0
Baiera paucipartita Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Baiera verrucosa Barale	0	0	1	0	1	0	0	0	0	0	0	0
Banatozamites calvus Czier	1	0	0	0	0	0	0	0	0	0	0	0
Banatozamites chlamydostomus Czier	1	0	0	0	0	0	0	0	0	0	0	0
Banatozamites remotus Czier	1	0	0	0	0	0	0	0	0	0	0	0
Beania carruthersi Nathorst	0	0	0	0	0	0	0	0	0	0	0	1
Beania gracilis Carruthers	0	0	0	0	0	0	0	1	0	0	0	1
Beania kochi Harris	0	0	0	1	0	0	0	0	0	0	0	0
Beania mamayi Thomas *et* Harris	0	0	0	0	0	0	0	0	0	0	0	1
Bennetticarpus diodon Harris	0	0	0	0	0	0	0	0	0	0	0	1
Bennetticarpus exiguus Harris	0	0	0	0	0	0	0	0	0	0	1	0
Bennetticarpus fragum Harris	0	0	0	0	0	0	0	0	0	0	0	1
Bennetticarpus litchi Harris	0	0	0	0	0	0	0	0	0	0	0	1
Bennetticarpus tylotus Harris	0	0	0	1	0	0	0	0	0	0	0	0
Bennettistemon bursigerum Harris	0	0	0	0	0	0	0	0	0	0	1	0
Bennettites peachianus Carruthers	0	0	0	0	0	0	0	0	0	0	0	1
Bernettia inopinata Gothan	0	0	1	0	0	0	0	0	0	0	0	0

Tabel 1. Continued

Bernettia phialophora Harris	0	0	0	1	0	0	0	0	0	0	0	0
Bilsdalea dura Harris	0	0	0	0	0	0	0	0	1	0	0	1
Bjuvia simplex Florin	0	0	0	0	0	1	0	0	0	0	0	0
Brachyphyllum appropinquatum Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Brachyphyllum ardenicum Harris	0	0	0	0	0	0	0	0	0	0	0	1
Brachyphyllum aureliae Dragastan *in* Dragastan *et* Bărbulescu	1	0	0	0	0	0	0	0	0	0	0	0
Brachyphyllum crucis Kendall	0	0	0	0	0	1	0	0	1	0	0	1
Brachyphyllum cyclophorum Reymanówna	0	0	0	0	0	0	0	0	1	0	0	0
Brachyphyllum desnoyersii (Brongniart) Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Brachyphyllum elegans (Saporta) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Brachyphyllum expansum (Sternberg) Seward	1	0	0	0	1	0	1	0	0	0	0	1
Brachyphyllum flexile Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Brachyphyllum frischmanni Unger	0	0	1	0	0	0	0	0	0	0	0	0
Brachyphyllum graciliforme Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Brachyphyllum hettangense Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Brachyphyllum kendallianum Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Brachyphyllum mamillare (Braun) Lindley *et* Hutton	0	0	0	0	0	1	0	0	0	0	0	1
Brachyphyllum nepos Saporta	0	0	1	0	0	0	0	0	0	0	0	0
Brachyphyllum nordenskioeldii Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Brachyphyllum papareli Saporta	0	0	0	0	1	1	0	0	0	0	0	0
Brachyphyllum praetermissum Wesley	0	0	0	0	0	0	1	0	0	0	0	0

Tabel 1. Continued

Brachyphyllum speciosa (Pomel) Saporta	0	0	1	0	1	0	0	0	0	0	0	0
Brachyphyllum thuioides (Pomel) Barale	0	1	1	0	1	0	0	0	0	0	0	0
Brachyphyllum trautii Barale *et* Contini	0	0	0	0	1	0	0	0	0	0	0	0
Brachyphyllum tropidimorphum Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Bucklandia aninaensis Czier	1	0	0	0	0	0	0	0	0	0	0	0
Bucklandia gigas Seward	0	0	0	0	0	0	0	0	0	0	0	1
Bucklandia milleriana Carruthers	0	0	0	0	0	0	0	0	0	0	0	1
Bysmatospermum macrotrachelum Harris	0	0	0	1	0	0	0	0	0	0	0	0
Calamites rotifer Harris	0	0	0	0	0	0	0	0	0	0	0	1
Callipitys leptoderma Harris	0	0	0	1	0	0	0	0	0	0	0	0
Camptopteris incisa Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Camptopteris serrata Kurr	0	0	0	0	0	0	0	0	0	0	1	0
Camptopteris spiralis Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Carpolithes cepa Harris	0	0	0	0	0	0	0	0	0	0	0	1
Carpolithes diospyriformis Sternberg	0	0	0	0	0	0	0	0	0	0	0	1
Carpolithes liasinus Andrae	1	0	0	0	0	0	0	0	0	0	0	0
Caytonanthus arberi (Thomas) Harris	0	0	0	0	0	0	0	0	0	0	0	1
Caytonanthus kochi Harris	0	0	0	1	0	0	0	0	0	0	0	0
Caytonanthus oncodes Harris	0	0	0	0	0	0	0	0	0	0	0	1
Caytonia kendalli Harris	0	0	0	0	0	0	0	0	0	0	0	1
Caytonia nathorsti Thomas	0	0	0	0	0	0	0	0	0	0	0	1

Tabel 1. Continued

Caytonia sewardii Thomas	0	0	0	0	0	0	0	0	0	0	0	1
Caytonia thomasi Harris	0	0	0	1	0	0	0	0	0	0	0	0
Cedroxylon hornei Seward	0	0	0	0	0	0	0	0	0	0	0	1
Changarniera benstedtii (Seward) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Changarniera colymbeaeforme (Flishe) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Changarniera cupressiniforme (Flishe) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Changarniera dubia Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Changarniera inquirenda Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Changarniera latisulcatum (Sah) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Changarniera locardii (Saporta) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Changarniera rajmahalense (Gupta) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Cheirolepidium muensteri (Schenk) Takhtajan	1	0	0	0	0	0	0	0	0	0	0	0
Chlamydolepis lautneri (Boersma) Van Konijnenburg-van Cittert	0	0	1	0	0	0	0	0	0	0	0	0
Cladophlebis aktashensis Turutanova-Ketova	0	0	0	0	0	0	0	0	0	0	0	1
Cladophlebis aurita Raciborski	0	0	0	0	0	0	0	0	1	0	0	0
Cladophlebis baueri Czier	0	0	0	0	0	1	0	0	0	0	0	0
Cladophlebis browniana (Dunker) Seward	1	0	0	0	0	0	0	0	0	0	0	0
Cladophlebis denticulata (Brongniart) Fontaine	1	0	0	0	0	1	0	0	1	1	0	1
Cladophlebis distans Heer	0	0	0	0	0	0	0	0	0	0	0	1
Cladophlebis haiburnensis Lindley et Hutton	1	0	0	1	0	1	0	1	1	1	0	1
Cladophlebis insignis (Lindley et Hutton) Raciborski	1	0	0	0	0	0	0	0	0	0	0	0

Tabel 1. Continued

Cladophlebis mecsekensis Czier	0	0	0	0	0	1	0	0	0	0	0	0
Cladophlebis naliokini Thomas	1	0	0	0	0	0	0	0	0	0	0	0
Cladophlebis nebbensis (Brongniart) Nathorst	1	0	0	0	0	0	0	0	0	0	1	0
Cladophlebis roesserti (Schenk) Saporta	1	0	0	0	0	1	0	0	1	0	0	0
Cladophlebis rumana Semaka	1	0	0	0	0	0	0	0	0	0	0	0
Cladophlebis scoresbyensis Harris	0	0	0	0	0	0	0	0	0	0	1	0
Cladophlebis semakai Czier	1	0	0	0	0	0	0	0	0	0	0	0
Cladophlebis silvaeregis Czier	1	0	0	0	0	0	0	0	0	0	0	0
Cladophlebis svedbergii Johansson	0	0	0	1	0	0	0	0	0	0	1	0
Cladophlebis whitbiensis (Brongniart) Brongniart	1	0	0	0	0	0	0	0	0	0	0	0
Classostrobus lozerianus Thévenard	0	0	0	0	1	0	0	0	0	0	0	0
Classostrobus rishra (Barnard) Alvin	0	0	0	0	1	0	0	0	0	0	0	0
Clathropteris meniscioides (Brongniart) Brongniart	1	0	1	1	0	1	0	0	1	0	1	0
Clathropteris obovata Oishi	0	0	0	0	0	0	0	0	0	0	0	1
Clathropteris platyphylla Gothan	0	0	0	0	0	0	0	0	0	0	1	0
Condylites brongniartii (Saporta) Barale	0	0	1	0	1	0	0	0	0	0	0	0
Coniferocaulon colymbaeforme Fliche	0	0	0	0	0	0	0	0	0	0	0	1
Coniopteris arguta Lindley et Hutton	0	0	0	0	0	0	0	0	0	0	0	1
Coniopteris bella Harris	0	0	0	0	0	0	0	0	0	0	0	1
Coniopteris burejensis Zalessky	0	0	0	0	0	0	0	0	0	0	0	1
Coniopteris hymenophylloides (Brongniart) Seward	1	0	0	0	0	1	1	1	1	0	0	1
Coniopteris margaretae Harris	0	0	0	0	0	0	0	0	0	0	0	1

Tabel 1. Continued

Coniopteris murrayana Brongniart	1	0	0	0	0	0	0	0	1	0	0	1
Coniopteris quinqueloba Phillips	0	0	0	0	0	0	0	0	0	0	0	1
Coniopteris setacea Vakhrameev	0	0	0	0	0	0	0	0	0	0	0	1
Coniopteris simplex Lindley *et* Hutton	0	0	0	0	0	0	1	1	1	0	0	1
Conites bucklandii (Sternberg) Cleal *et* Rees	0	0	0	0	0	0	0	0	0	0	0	1
Conites pontisgirardi Lignier	0	0	0	0	1	0	0	0	0	0	0	0
Conites juddi Seward	0	0	0	0	0	0	0	0	0	0	0	1
Ctenis exilis Harris	0	0	0	0	0	0	0	0	0	0	0	1
Ctenis grandifolia Fontaine	1	0	0	0	0	0	0	0	0	0	0	0
Ctenis hungarica Staub	1	0	0	0	0	0	0	0	0	0	0	0
Ctenis kaneharai Yokoyama	0	0	0	0	0	0	0	0	0	0	0	1
Ctenis nilssonii (Nathorst) Harris	0	0	0	0	0	0	0	0	1	0	0	0
Ctenis potockii Stur	0	0	0	0	0	0	0	0	1	0	0	0
Ctenis reedi Harris	0	0	0	0	0	0	0	0	0	0	0	1
Ctenis stewartiana Harris	0	0	0	1	0	0	0	0	0	0	0	0
Ctenis sulcicaulis (Phillips) Ward	0	0	0	0	0	0	0	0	0	1	0	1
Ctenis yamanarii Kawasaki	1	0	0	0	0	0	0	0	0	0	0	0
Ctenopteris falcata Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Ctenozamites cycadea Berger	1	0	0	0	1	1	0	0	0	0	0	1
Ctenozamites leckenbyi (Leckenby) Nathorst	0	0	0	0	0	0	0	0	0	0	0	1
Ctenozamites megalostoma Harris	0	0	0	0	0	0	0	0	0	0	0	1

Tabel 1. Continued

Cupressinocladus itieri (Saporta) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Cupressinocladus strobilifer (Schimper) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Cyatheites decurrens Roemer	1	0	0	0	0	0	0	0	0	0	0	0
Cycadeomyleon hettangense Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Cycadeospermum lovisatoi Krasser	0	0	0	0	0	0	1	0	0	0	0	0
Cycadites delessei Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Cycadites gramineus Heer	0	0	0	0	0	0	0	0	1	0	0	0
Cycadites longifolius Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Cycadites lortetii Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Cycadites rectangularis Brauns	0	0	0	0	1	0	0	0	0	0	0	0
Cycadocarpidium erdtmanii Nathorst	0	0	0	0	0	0	0	0	1	0	0	0
Cycadocarpidium swabii Nathorst	1	0	0	0	0	0	0	0	0	0	0	0
Cycadolepis eriphorus Harris	0	0	0	0	0	0	0	0	0	0	0	1
Cycadolepis gracilis Barale	0	0	0	0	1	0	0	0	0	0	0	0
Cycadolepis hallei Harris	0	0	0	0	0	0	0	0	0	0	0	1
Cycadolepis harrisianus Barale	0	0	0	0	1	0	0	0	0	0	0	0
Cycadolepis hypene Harris	0	0	0	0	0	0	0	0	0	0	0	1
Cycadolepis infundibulum Barale	0	0	0	0	1	0	0	0	0	0	0	0
Cycadolepis johannae Barbacka	0	0	0	0	0	1	0	0	0	0	0	0
Cycadolepis nitens Harris	0	0	0	0	0	0	0	0	0	0	0	1
Cycadolepis pelecus Harris	0	0	0	0	0	0	0	0	0	0	0	1

Tabel 1. Continued

Cycadolepis pellegrii Barale	0	0	0	0	1	0	0	0	0	0	0	0
Cycadolepis rotundatus Barale	0	0	0	0	1	0	0	0	0	0	0	0
Cycadolepis rugosa Harris	0	0	0	1	0	1	0	0	0	0	0	0
Cycadolepis spheniscus Harris	0	0	0	0	0	0	0	0	0	0	0	1
Cycadolepis stenopus Harris	0	0	0	0	0	0	0	0	0	0	0	1
Cycadolepis thysanota Harris	0	0	0	0	0	0	0	0	0	0	0	1
Cycadolepis villosa Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Cycadopteris brauniana (Zigno) Barale	0	0	0	0	0	0	1	0	0	0	0	0
Cycadopteris heterophylla Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Cycadopteris jurensis (Kurr) Schenk	0	0	1	0	1	0	0	0	0	0	0	0
Cycadopteris moretiana (Saporta) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Cycadopteris obtusifolia (Andrae) Popa	1	0	0	0	0	0	0	0	0	0	0	0
Cycadospadix attenuatus Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Cycadospadix hennoquei (Pomel) Schimper	0	0	0	0	1	0	0	0	0	0	0	0
Cycadospadix integrus Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Cycadospadix pasinianus Zigno	0	0	0	0	0	0	0	0	0	0	0	1
Cycadospermum impresum Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Cycadospermum laevigatum Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Cycadospermum pungens Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Cycadospermum striolatum Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Cycalacis saportae Barale	0	0	0	0	1	0	0	0	0	0	0	0

Tabel 1. Continued

Cyclopteris minor Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Cyparisidium blachii Harris	0	0	0	0	0	0	0	0	0	0	0	1
Cyparisidium falsanii (Saporta) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Cyparisidium rudlandicum Harris	0	0	0	0	0	0	0	0	0	0	0	1
Cyperites tuberosus Brongniart	0	0	1	0	0	0	0	0	0	0	0	0
Czekanowskia blackii Harris	0	0	0	0	0	0	0	0	0	0	0	1
Czekanowskia furcata Harris *et* Miller	0	0	0	0	0	0	1	1	0	0	0	1
Czekanowskia hartzi Harris	1	0	0	1	0	0	0	0	1	0	0	0
Czekanowskia longissima Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Czekanowskia microphylla Phillips	0	0	0	0	0	0	0	0	0	0	0	1
Czekanowskia nathorstii Harris	0	0	0	1	0	0	0	0	0	0	1	0
Czekanowskia murrayana Lindley *et* Hutton	0	0	0	0	0	0	0	0	0	0	0	1
Czekanowskia rigida Heer	1	0	0	0	0	0	0	0	1	0	0	1
Czekanowskia setacea Brongniart	0	0	0	0	0	0	0	0	1	0	0	0
Czekanowskia thomasii Harris	0	0	0	0	0	0	0	0	0	0	0	1
Dactylethrophyllum pesostictum Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Danaeopsis fecunda Halle	0	0	0	0	0	0	0	0	0	0	1	0
Danaeopsis marantacea Heer	0	0	0	0	1	0	0	0	0	0	0	0
Deltolepis calyptera Harris	0	0	0	0	0	0	0	0	0	0	0	1
Deltolepis crepidota Harris	0	0	0	0	0	0	0	0	0	0	0	1
Deltolepis mitra Harris	0	0	0	0	0	0	0	0	0	0	0	1

Tabel 1. Continued

Desmiophyllum cyclostomum Lundblad	0	0	0	0	0	0	0	0	0	0	1	0
Desmiophyllum gothani Florin	0	0	1	0	0	0	0	0	0	0	0	0
Desmiophyllum gramineum Harris	0	0	0	0	0	0	0	0	0	0	0	1
Desmiophyllum rigidum (Zigno) Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Desmiophyllum zeillerianum (Zigno) Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Dichopteris pomelii Saporta	0	0	0	0	0	0	0	0	0	0	0	1
Dichopteris visianica Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Dicksonia kendalli Harris	1	0	0	0	0	0	0	0	0	0	0	1
Dicksonia mariopteris Wilson *et* Yates	0	0	0	0	0	0	0	0	0	0	0	1
Dictyophyllum acutilobum (Braun) Schenk	1	0	1	0	0	0	0	0	1	0	0	0
Dictyophyllum carlsoni Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Dictyophyllum dunkeri Nathorst	0	0	0	0	0	0	0	0	1	0	0	0
Dictyophyllum irregularis Givulescu *et* Popa	1	0	0	0	0	0	0	0	0	0	0	0
Dictyophyllum muensteri Saporta	1	0	0	1	1	0	0	0	0	0	0	0
Dictyophyllum nervulosum (Sternberg) Kilpper	1	0	0	0	0	0	0	0	0	0	0	0
Dictyophyllum nilssonii (Brongniart) Göppert	1	0	0	1	0	1	0	0	1	1	0	0
Dictyophyllum obsoletum Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Dictyophyllum obtusilobum Braun	0	0	0	0	0	0	0	0	0	0	1	0
Dictyophyllum rugosum Lindley *et* Hutton	0	0	0	0	0	1	0	0	1	0	0	1
Dictyozamites hawelli Seward	0	0	0	0	0	0	0	0	0	0	0	1
Dioonites dunkerianus Göppert	0	0	0	0	0	0	0	0	0	0	0	1

Tabel 1. Continued

Doratophyllum astartensis Harris	0	0	0	0	0	0	0	0	0	0	1	0
Doratophyllum nathorstii Florin	0	0	0	0	0	0	0	0	0	0	1	0
Doratophyllum scanicum Lundblad	0	0	0	0	0	0	0	0	0	0	1	0
Eboracia lobifolia (Philips) Thomas	1	0	0	0	0	0	0	0	0	0	0	1
Elatides curvifolia Dunker	0	0	0	0	0	0	0	0	0	0	0	1
Elatides sternbergiana Schenk	0	0	0	0	0	0	0	0	0	0	0	1
Elatides thomassi Harris	0	0	0	0	0	0	0	0	0	0	0	1
Elatides williamsonii (Lindley *et* Hutton) Nathorst	0	0	0	0	1	0	0	0	0	0	0	1
Elatocladus amblus Harris	0	0	0	1	0	0	0	0	0	0	0	0
Elatocladus laxus Phillips	0	0	0	0	0	0	0	0	0	0	0	1
Elatocladus microphyllus (Saporta) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Elatocladus oligostomus Harris	0	0	0	1	0	0	0	0	0	0	0	0
Elatocladus pachyteichus Harris	0	0	0	1	0	0	0	0	0	0	0	0
Elatocladus patens Harris	0	0	0	1	0	0	0	0	0	0	0	0
Elatocladus ramosus (Florin) Harris	0	0	0	0	0	0	0	0	0	0	0	1
Elatocladus setosus (Phillips) Harris	0	0	0	0	0	0	0	0	0	0	0	1
Elatocladus sideriticus Bose	0	0	0	0	0	0	0	0	0	0	0	1
Elatocladus tuberculatus Harris	0	0	0	1	0	0	0	0	0	0	0	0
Elatocladus veronensis Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Elatocladus zamioides (Leckenby) Seward	0	0	0	0	0	0	0	0	0	0	0	1
Elatocladus zignoi Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Equisetites arenaceus (Jaeger) Schenk	1	0	0	0	0	0	0	0	0	0	0	0

Tabel 1. Continued

Equisetites beani Bunbury	0	0	0	0	0	0	0	0	0	0	0	1
Equisetites blandum (Raciborski) Harris	0	0	0	0	0	0	0	0	0	0	0	1
Equisetites broraensis Stopes	0	0	0	0	0	0	0	0	0	0	0	1
Equisetites bunburyanus Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Equisetites columnaris Brongniart	1	0	0	0	0	0	1	0	1	1	0	1
Equisetites gracilis (Nathorst) Halle	0	0	0	0	0	0	0	0	0	0	1	0
Equisetites laevis Halle	0	0	0	1	0	0	0	0	0	0	1	0
Equisetites lateralis (Phillips) Gould	0	0	0	0	0	0	0	0	1	0	0	1
Equisetites muensteri (Sternberg) Harris	1	0	0	1	0	1	0	0	0	0	0	0
Equisetites oblongus Grandori	0	0	0	0	0	0	1	0	0	0	0	0
Equisetites sarrani (Zeiler) Harris	0	0	0	1	0	0	0	0	0	0	0	0
Equisetites ungeri Ettingshausen	1	0	0	0	0	0	0	0	0	0	0	0
Equisetites veronensis Zigno	1	0	0	0	0	0	0	0	0	0	0	0
Equisetum beani Bunbury	0	0	0	0	0	0	0	0	0	0	0	1
Equisetum columnare Brongniart	0	0	0	0	0	1	0	0	0	0	0	1
Equisetum duvalii Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Equisetum fluviatile Linnae	0	0	0	0	1	0	0	0	0	0	0	0
Equisetum hommeyi Lignier	0	0	0	0	1	0	0	0	0	0	0	0
Equisetum laterale Phillips *em.* Harris	1	0	0	0	0	0	0	0	0	0	0	0
Equisetum mamertinus Linnae	0	0	0	0	1	0	0	0	0	0	0	0
Equisetum sarthensis Linnae	0	0	0	0	1	0	0	0	0	0	0	0

Tabel 1. Continued

Eretmophyllum caussenese Thévenard	0	0	0	0	1	0	0	0	0	0	0	0
Eretmophyllum pubescens Thomas	0	0	0	0	0	0	0	0	0	0	0	1
Eretmophyllum whitbiense Thomas	0	0	0	0	0	0	0	0	0	0	0	1
Geinitzia divaricata (Bunbury) Harris	0	0	0	0	0	0	1	0	0	0	0	1
Geinitzia rigida (Phillips) Harris	0	0	0	0	0	0	0	0	0	0	0	1
Ginkgo baieraeformis (Kilpper) Czier	1	0	0	0	0	0	0	0	0	0	0	0
Ginkgo dahllii Manum *et* Bose	0	0	0	0	0	0	0	1	0	0	0	0
Ginkgo digitata (Brongniart) Heer	1	0	0	0	0	0	0	0	1	0	0	1
Ginkgo ettingshausenii (Krasser) Czier	1	0	0	0	0	0	0	0	0	0	0	0
Ginkgo flabellatus Unger	0	0	1	0	0	0	0	0	0	0	0	0
Ginkgo huttoni (Sternberg) Heer	0	0	0	0	0	0	0	1	0	0	0	1
Ginkgo longifolius (Phillips) Harris	0	0	0	0	0	0	0	0	0	0	0	1
Ginkgo marginata (Nathorst) Czier	1	0	0	1	0	1	0	0	1	0	1	0
Ginkgo minima (Yabe *et* Oishi) Czier	1	0	0	0	0	0	0	0	0	0	0	0
Ginkgo parasingularis Kilpper	1	0	0	0	0	0	0	0	0	0	0	0
Ginkgo parvifolia Tuzson	1	0	0	0	0	0	0	0	0	0	0	0
Ginkgo polymorpha (Samylina) Czier	1	0	0	0	0	0	0	0	0	0	0	0
Ginkgo rarefurcata Linneus	1	0	0	0	0	0	0	0	0	0	0	0
Ginkgo sibirica Heer	0	0	0	0	0	0	0	0	1	0	0	1
Ginkgo skottsbergii (Lundblad) Czier	1	0	0	0	0	0	0	0	0	0	0	0
Ginkgo whitbiensis Harris	0	0	0	0	0	0	0	0	1	0	0	1

Tabel 1. Continued

Ginkgoites hermelini (Hartz) Harris	0	0	0	1	0	0	0	0	0	0	0	0
Ginkgoites marginatus (Nathorst) Florin	0	0	0	0	0	1	0	0	1	0	1	0
Ginkgoites minuta (Nathorst) Harris	0	0	0	1	0	1	0	0	0	0	1	0
Ginkgoites taeniatus (Braun) Harris	0	0	0	1	0	0	0	0	0	0	0	0
Ginkgospermum globulare Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Gleichenia rostafinskii Raciborski	0	0	0	0	0	0	0	0	1	0	0	0
Gleichenites elegans Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Gleichenites nitida Harris	0	0	0	1	0	0	0	0	0	0	0	0
Glyptostrobites affinis Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Glyptostrobites nilssonianus Brongniart	0	0	0	0	0	0	0	0	0	0	1	0
Goeppertella microlobus (Schenk) Oishi *et* Yamasita	0	0	0	0	0	0	0	0	1	0	0	0
Gonatosorus nathorstii Raciborski	0	0	0	0	0	0	0	0	1	0	0	0
Gutbiera angustiloba Presl	0	0	0	0	0	0	1	0	0	1	0	0
Hastyostrobus muirii Van Konijnenburg-van Cittert	0	0	0	0	0	0	0	0	0	0	0	1
Hausmannia asarifolia Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Hausmannia buchii (Andrae) Seward	1	0	0	0	0	0	0	0	0	0	0	1
Hausmannia cracoviensis (Raciborski) Richter	0	0	0	0	0	0	0	0	1	0	0	0
Hausmannia crenata Nathorst	0	0	0	0	0	0	0	0	1	0	0	0
Hausmannia dichotoma Dunk	0	0	0	0	0	0	0	0	0	0	0	1
Hausmannia forchhameri Bartholin	0	0	0	0	0	0	0	0	1	0	0	0
Hausmannia richteri Seward	0	0	0	0	0	0	0	0	0	0	0	1
Hausmannia ussuriensis Kryshtofovich	1	0	0	0	0	0	0	0	0	0	0	0

Tabel 1. Continued

Hepaticites amaurus Harris	0	0	0	1	0	0	0	0	0	0	0	0
Hepaticites arcuatus Lindley *et* Hutton	1	0	0	0	0	0	0	0	0	0	0	1
Hepaticites globosus Harris	0	0	0	1	0	0	0	0	0	0	0	0
Hepaticites haiburnensis Harris	0	0	0	1	0	0	0	0	0	0	0	1
Hepaticites hymenoptera Harris	0	0	0	0	0	0	0	0	0	0	0	1
Hepaticites laevis Harris	0	0	0	1	0	0	0	0	0	0	0	0
Hepaticites rosenkranzi Harris	0	0	0	1	0	0	0	0	0	0	0	0
Hepaticites wonnacotti Harris	0	0	0	0	0	0	0	0	0	0	0	1
Hirmeriella airelensis Muir *et* Van Cittert	0	0	0	0	1	1	0	0	0	0	0	0
Hirmeriella estonensis (Kendall) Harris	0	0	0	0	0	0	0	0	0	0	0	1
Hirmeriella kendaliae Harris	0	0	0	0	0	0	0	0	0	0	0	1
Hirmeriella maculosum (Kendall) Van Konijnenburg-van Cittert	0	0	0	0	1	0	0	0	0	0	0	1
Hirmeriella muensteri (Schenk) Jung	0	0	1	0	1	1	0	0	1	0	1	0
Hirmeriella peregrinum Thévenard	0	0	0	0	1	0	0	0	0	0	0	0
Hydropterangium hyllingensis Lundblad	0	0	0	0	0	0	0	0	0	0	1	0
Hydropterangium marsilioides Halle	0	0	0	0	0	0	0	0	0	0	1	0
Isoetes cruciformis Unger	0	0	1	0	0	0	0	0	0	0	0	0
Ixostrobus groenlandicus Harris	0	0	0	1	0	0	0	0	0	0	0	0
Ixostrobus siemieradzkii Raciborski	0	0	0	0	0	0	0	0	1	0	0	0
Ixostrobus whitbiensis Harris	0	0	0	0	0	0	0	0	0	0	0	1
Karkenia huptmannii Hauptmann *et* Van Konijnenburg-van Cittert	0	0	1	0	0	0	0	0	0	0	0	0
Klukia exilis (Phillips) Raciborski	1	0	0	0	0	0	0	0	1	0	0	1

Tabel 1. Continued

Komlopteris nordenskioeldii (Nathorst) Barbacka	1	0	0	0	0	1	0	0	0	0	1	1
Komlopteris speciosa (Ettingshausen) Cleal *et* Rees	0	0	0	0	0	0	0	0	0	0	0	1
Kylikipteris arguta Lindley *et* Hutton	1	0	0	0	0	0	0	0	0	0	0	1
Laccopteris dunkeri Schenk	0	0	0	0	0	0	0	0	0	0	0	1
Laccopteris rotzoana Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Lepacyclotes kirchneri Bauer, Kustatscher, Dütsch, Schmeißner, Krings *et* Van Konijnenburg-van Cittert	0	0	1	0	0	0	0	0	0	0	0	0
Lepidopteris ottonis (Göppert) Schimper	0	0	0	0	0	0	0	0	1	0	1	0
Leptostrobus cancer Harris	0	0	0	0	0	0	0	0	0	0	0	1
Leptostrobus laxiflora Heer	1	0	0	0	0	0	0	0	0	0	0	0
Leptostrobus longus Harris	0	0	0	1	0	0	0	0	0	0	0	0
Lindleycladus lanceolatus (Lindley *et* Hutton) Harris	0	0	0	0	0	0	0	0	0	0	0	1
Lomatopteris jurensis (Kurr) Schimper	0	0	1	0	0	0	1	0	0	0	0	0
Lomatopteris schimperi Schenk	0	0	0	0	0	0	0	0	0	1	0	0
Lycopodites scanicus Nathorst *ex* Halle	0	0	0	0	0	0	0	0	0	0	1	0
Lycostrobus scotti Nathorst	0	0	0	1	0	0	0	0	0	0	0	0
Marattia anglica Thomas	0	0	0	0	0	0	0	0	0	0	0	1
Marattia intermedia (Münster) Kilpper	1	0	0	0	0	0	0	0	0	0	0	0
Marattia muensteri (Göppert) Schimper	0	0	0	0	0	0	0	0	1	1	0	0
Marattiopsis boweri Seward	0	0	0	0	0	0	0	0	0	0	0	1
Marattiopsis crenulatus Lundblad	0	0	0	0	0	0	0	0	0	0	1	0

Tabel 1. Continued

Marattiopsis hoerensis (Schimper) Thomas	1	0	0	1	0	1	0	0	0	0	0	0
Marskea jurassica (Florin) Harris	0	0	0	0	0	0	0	0	0	0	0	1
Marskea laticosta Reymanówna	0	0	0	0	0	0	0	0	1	0	0	0
Masculostrobus dorchensis Barale	0	0	1	0	1	0	0	0	0	0	0	0
Masculostrobus graiterensis Allenbach *et* Van Konijnenburg-van Cittert	0	1	0	0	0	0	0	0	0	0	0	0
Masculostrobus zeilleri Seward	0	0	0	0	0	0	0	0	0	0	0	1
Matonia braunii (Göppert) Harris	1	0	0	0	0	0	0	0	0	0	0	1
Matonidium goepperti (Ettingshausen) Schenk	1	0	0	0	0	0	0	1	1	0	0	1
Mirovia lagerheimii (Johansson) Bose *et* Manum	0	0	0	0	0	0	0	1	0	0	0	0
Mirovia persulcata (Johansson) Bose *et* Manum	0	0	0	0	0	0	0	1	0	0	0	0
Nageiopsis longifolia Fontaine	0	0	0	0	0	0	0	0	0	1	0	0
Nellostrobus inconstans Semaka	1	0	0	0	0	0	0	0	0	0	0	0
Nellostrobus quadraticus Semaka	1	0	0	0	0	0	0	0	0	0	0	0
Neocalamites carcinoides Harris	1	0	0	0	0	1	0	0	0	0	0	0
Neocalamites carrerei (Zeiler) Halle	0	0	0	1	0	0	0	0	0	0	0	0
Neocalamites hoerensis Schimper	0	0	0	0	0	1	0	0	1	0	1	1
Neocalamites lehmannianus (Göppert) Weber	0	0	1	0	0	0	0	0	1	0	0	0
Neocalamites minutus Gee, Meyer *et* Van	0	1	1	0	0	0	0	0	0	0	0	0
Neocalamites nathorsti Erdtman	0	0	0	0	0	0	0	1	0	0	0	1
Nilssonia acuminata (Presl) Göppert	0	0	1	0	0	0	0	0	1	1	1	0
Nilssonia banatica Semaka	1	0	0	0	0	0	0	0	0	0	0	0

Tabel 1. Continued

Nilssonia brevis Brogniart	0	0	0	0	0	0	0	0	0	0	0	1
Nilssonia compta (Phillips) Brongniart	0	0	0	0	0	0	0	0	0	0	0	1
Nilssonia culgowerensis Van Konijnenburg-van Cittert *et* Van der Burgh	0	0	0	0	0	0	0	0	0	0	0	1
Nilssonia inaequalis Givulescu	1	0	0	0	0	0	0	0	0	0	0	0
Nilssonia incisoserrata Harris	0	0	0	1	0	0	0	0	0	0	0	0
Nilssonia inouyeni Yokoyama	0	0	0	0	0	0	0	0	1	0	0	0
Nilssonia kendalli Harris	0	0	0	0	0	0	0	0	0	0	0	1
Nilssonia mediana Leckenby	0	0	0	0	0	0	0	0	0	0	0	1
Nilssonia minima Gothan	0	0	0	0	0	0	0	0	0	1	0	0
Nilssonia morayensis Van Konijnenburg-van Cittert *et* Van der Burgh	0	0	0	0	0	0	0	0	0	0	0	1
Nilssonia obtusa (Nathorst) Harris	0	0	0	1	0	1	0	0	0	0	0	0
Nilssonia orientalis Heer	1	0	0	0	0	0	0	0	1	1	0	1
Nilssonia polymorpha Schenk	0	0	1	1	1	1	0	0	0	0	1	0
Nilssonia pterophylloides Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Nilssonia revoluta Harris	0	0	0	0	0	1	0	0	0	0	0	1
Nilssonia schaumburgensis (Dunker) Nathorst	1	0	0	0	0	0	0	0	0	0	0	0
Nilssonia simplex Nathorst	0	0	0	0	0	0	0	0	1	0	0	0
Nilssonia syllis Harris	0	0	0	0	0	0	0	0	0	0	0	1
Nilssonia tenuicaulis (Philips) Fox-Straggways	0	0	0	0	0	0	0	0	0	0	0	1
Nilssonia tenuinervis Seward	0	0	0	0	0	0	0	0	1	0	0	1

Tabel 1. Continued

Nilssonia undulata Harris	1	0	0	1	0	0	0	0	0	0	0	0
Nilssoniopteris aiorpokensis Harris	0	0	0	1	0	0	0	0	0	0	0	0
Nilssoniopteris major Lindley *et* Hutton	0	0	0	0	0	0	0	1	0	0	0	1
Nilssoniopteris norvegicus Manum *et* Bose	0	0	0	0	0	0	0	1	0	0	0	0
Nilssoniopteris pristis Harris	0	0	0	0	0	0	0	1	0	0	0	1
Nilssoniopteris tenuinervis (Brongniart) Florin	1	0	0	0	0	0	0	0	0	0	0	0
Nilssoniopteris vittata Brongniart	1	0	0	0	0	0	0	1	0	0	0	1
Odrolepis liassica Barbacka *et* Ziaja	0	0	0	0	0	0	0	0	1	0	0	0
Osmundopsis hillii Van Konijnenburg-van Cittert	0	0	0	0	0	0	0	0	0	0	0	1
Osmundopsis plectrophora Harris	0	0	0	1	0	0	0	0	0	0	0	0
Osmundopsis sturi (Raciborski) Harris	1	0	0	0	0	0	0	0	1	0	0	1
Oswaldheeria macrophylla (Florin) Bose *et* Manum	0	0	0	0	0	0	0	1	0	0	0	0
Otozamites anglica Seward	0	0	0	0	0	0	0	0	0	0	0	1
Otozamites beani (Brongniart) Lindley *et* Hutton	0	0	0	0	0	0	0	0	0	0	0	1
Otozamites brevifolius Braun	0	0	0	0	1	0	0	0	1	0	0	0
Otozamites bucklandii Brongniart	0	0	0	0	1	0	0	0	0	0	0	0
Otozamites bunburyanus Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Otozamites falcatus Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Otozamites falsus Harris	0	0	0	0	0	0	0	0	0	0	0	1
Otozamites feistmantelii Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Otozamites gracilis (Kurr) Miquel	0	0	0	0	0	0	0	0	0	1	0	0

Tabel 1. Continued

Otozamites gramineus (Brongniart) Phillips	0	0	0	0	0	0	0	0	0	0	0	1
Otozamites graphicus (Brongniart) Leckenby	0	0	0	0	0	0	0	0	0	0	0	1
Otozamites lagotis Brongniart	0	0	0	0	1	0	0	0	0	0	0	0
Otozamites leckenbyi Harris	0	0	0	0	0	0	0	0	0	0	0	1
Otozamites major Schimper	0	0	0	0	1	0	0	0	0	0	0	0
Otozamites mandeslohi Kurr	1	0	0	0	0	0	0	0	0	0	0	0
Otozamites marginatus Saporta	0	0	0	0	1	0	0	0	0	0	0	1
Otozamites massalongianus Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Otozamites mattiellianus Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Otozamites mimetes Harris	0	0	0	0	0	0	0	0	0	0	0	1
Otozamites molinianus Zigno	1	0	0	0	0	0	1	0	0	0	0	0
Otozamites mortonii Dower, Bateman *et* Stevenson	0	0	0	0	0	0	0	0	0	0	0	1
Otozamites nathorstii Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Otozamites parallelus Philips	0	0	0	0	0	0	0	0	0	0	0	1
Otozamites penna Harris	0	0	0	0	0	0	0	0	0	0	0	1
Otozamites pterophylloides Brongniart	0	0	0	0	1	0	0	0	0	0	0	0
Otozamites rechini Lignier	0	0	0	0	1	0	0	0	0	0	0	0
Otozamites reglei Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Otozamites simpsoni Harris	0	0	0	0	0	0	1	0	0	0	0	1
Otozamites tenuatus Leckenby	0	0	0	0	0	0	0	1	0	0	0	1
Otozamites terquemi Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Otozamites thomasi Harris	0	0	0	0	0	0	0	0	0	0	0	1

Tabel 1. Continued

Otozamites venosus Harris	0	0	0	0	0	0	0	0	0	0	0	1
Otozamites vicetinus Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Ourostrobus nathorsti Harris	0	0	0	1	0	0	0	0	0	0	0	0
Pachypteris banatica (Humml) Doludenko	1	0	0	0	0	1	0	0	0	0	0	0
Pachypteris dagincourtii Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Pachypteris desmomera (Saporta) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Pachypteris gradinauri Popa	1	0	0	0	0	0	0	0	0	0	0	0
Pachypteris hallei Frenguelli	0	0	0	0	1	0	0	0	0	0	0	0
Pachypteris lanceolata Brongniart	0	0	0	0	0	0	0	1	1	0	0	1
Pachypteris macrophylla Cleal *et* Rees	0	0	0	0	0	0	0	0	0	0	0	1
Pachypteris papillosa (Thomas *et* Bose) Harris	0	0	0	0	0	0	0	0	1	0	0	1
Pachypteris paroliana (Zigno) Schimper	0	0	0	0	1	0	0	0	0	0	0	0
Pachypteris rhomboidalis (Ettingshausen) Nathorst	1	0	0	0	0	1	0	0	1	0	1	1
Pachypteris speciosa (Ettingshausen) Andrae	1	0	0	0	0	0	0	0	0	0	0	0
Pachypteris stelzeana Geinitz	0	0	0	0	1	0	0	0	0	0	0	0
Pagiophyllum araucarinum (Pomel) Saporta	0	1	0	0	1	0	0	0	0	0	0	0
Pagiophyllum cirinicum (Saporta) Heer	0	1	1	0	1	0	0	0	0	0	0	0
Pagiophyllum creysensis (Saporta) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Pagiophyllum fragilis (Bose) Harris	0	0	0	0	0	0	0	0	0	0	0	1
Pagiophyllum insigne Kendall	0	0	0	0	0	0	0	0	0	0	0	1
Pagiophyllum kurrii (Schimper) Salfeld	0	0	0	0	1	0	0	0	0	1	0	1

Tabel 1. Continued

Pagiophyllum magnipapillare Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Pagiophyllum ordinatum Kendall	0	0	0	0	0	1	0	0	0	0	0	1
Pagiophyllum peregrinum (Lindley *et* Hutton) Schenk	0	0	0	0	0	1	0	0	0	0	0	0
Pagiophyllum revoltinum Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Pagiophyllum robustum Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Pagiophyllum rotzoanum (Massalongo) Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Pagiophyllum valdassense Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Pagiophyllum veronense Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Pagiophyllum vicentinum Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Palaeocyparis elegans Saporta	0	0	1	0	0	0	0	0	0	0	0	0
Palissya braunii Endlicher	1	0	0	0	0	0	0	0	0	0	0	0
Palissya decidua Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Palissya sphenolepis (Braun) Brongniart	0	0	0	0	0	1	0	0	0	0	0	0
Paracycas ctenis Harris	0	0	0	0	0	0	0	0	0	0	0	1
Paracycas minuta Barbacka	0	0	0	0	0	0	0	0	1	0	0	0
Pecopteris simplex Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Pelourdea megaphylla (Phillips) Seward	0	0	0	0	0	0	0	0	0	0	0	1
Peltaspermum rotula Harris	0	0	0	0	0	0	0	0	0	0	1	0
Phialopteris tenera Presl	0	0	1	0	0	0	0	0	0	0	0	0
Phlebopteris affinis Schenk	1	0	0	0	0	0	0	0	0	0	0	0
Phlebopteris angustiloba (Presl) Hirmer *et* Hörhammer	1	0	1	1	0	1	0	0	1	0	1	0

Tabel 1. Continued

Phlebopteris braunii (Göppert) Hirmer *et* Hörhammer	1	0	0	0	0	0	0	0	0	0	0	0
Phlebopteris dunkeri Schenk	1	0	0	0	1	0	0	1	1	0	0	1
Phlebopteris elegans Presl	0	0	0	0	0	0	0	0	1	0	0	0
Phlebopteris formosa Givulescu *et* Popa	1	0	0	0	0	0	0	0	0	0	0	0
Phlebopteris muensteri (Schenk) Hirmer *et* Hörhammer	1	0	1	1	0	1	0	0	1	0	0	0
Phlebopteris polypodioides Brongniart	1	0	0	0	1	0	1	0	0	0	1	1
Phlebopteris woodwardi Leckenby	1	0	0	0	0	0	0	1	0	0	0	1
Phoenicopsis angustifolia Heer	1	0	0	0	0	0	0	0	0	0	0	0
Phoenicopsis gunni Seward	0	0	0	0	0	0	0	0	0	0	0	1
Phoenicopsis potoniei Krasser	1	0	0	0	0	0	0	0	0	0	0	0
Phoenicopsis primaeva Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Phyllopteris plumula Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Phylloteca brongniartiana Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Phyllothallus latifrons Rothpletz	0	0	1	0	0	0	0	0	0	0	0	0
Pinites eiggensis Lindley *et* Hutton	0	0	0	0	0	0	0	0	0	0	0	1
Piroconites kuespertii Gothan	0	0	1	0	0	0	0	0	0	0	0	0
Pityanthus scalbergensis Van Konijnenburg-van Cittert	0	0	0	0	0	0	0	0	0	0	0	1
Pityocladus scarburgensis Harris	0	0	0	0	0	0	0	0	0	0	0	1
Pityophyllum angustifolium Nathorst	0	0	0	0	0	0	0	0	1	0	0	0
Pityophyllum follini (Nathorst) Möller	1	0	0	0	0	0	0	0	0	0	0	0
Pityophyllum longifolium Nathorst	0	0	0	0	0	0	0	0	1	1	0	0

Tabel 1. Continued

Platylepis impressa Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Podozamites angustifolius Eichenberg	0	0	0	0	0	0	0	0	1	0	0	0
Podozamites distans (Presl) Braun	1	0	0	0	0	0	0	0	0	0	0	0
Podozamites ensis Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Podozamites gramineus Heer	0	0	0	0	0	0	0	0	1	0	1	0
Podozamites lanceolatus (Lindley *et* Hutton) Braun	1	0	1	0	0	1	0	0	0	0	1	0
Podozamites mucronatus Harris	1	0	0	0	0	0	0	0	0	0	0	0
Podozamites paucinervis Boersma *et* Van Konijnenburg-van Cittert	1	0	0	0	0	0	0	0	0	0	0	0
Podozamites poaeformis Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Podozamites punctatus Harris	0	0	0	1	0	0	0	0	0	0	0	0
Podozamites schenki (Heer) Harris	0	0	0	0	0	1	0	0	1	0	0	0
Podozamites stobieckii Raciborski	0	0	0	0	0	0	0	0	1	0	0	0
Polypodites angelini Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Poteridion hallei Harris	0	0	0	0	0	0	0	0	0	0	0	1
Protorhipis buchii Andrae	1	0	0	0	0	0	0	0	0	0	1	0
Pseudoctenis crassinervis Seward	0	0	0	0	0	0	0	0	0	0	0	1
Pseudoctenis creysensis Barale	0	0	0	0	1	0	0	0	0	0	0	0
Pseudoctenis depressa Harris	0	0	0	1	0	0	0	0	0	0	0	0
Pseudoctenis eathiensis (Richards) Seward	0	0	0	0	0	0	0	0	0	0	0	1
Pseudoctenis florinii Lundblad	0	0	0	0	0	0	0	0	0	0	1	0

Tabel 1. Continued

Pseudoctenis herriesi Harris	0	0	0	0	0	0	0	1	0	0	0	1
Pseudoctenis lanei Thomas	0	0	0	0	0	0	0	0	0	0	0	1
Pseudoctenis locusta Harris	0	0	0	0	0	0	0	0	0	0	0	1
Pseudoctenis oleosa Harris	1	0	0	0	0	0	0	0	0	0	0	1
Pseudoctenis spectabilis Harris	0	0	0	1	0	0	0	0	0	0	0	0
Pseudocycas dunkeriana (Goeppert) Florin	1	0	0	0	0	0	0	0	0	0	0	0
Pseudosagenopteris angustifolia (Zigno) Grandori	0	0	0	0	0	0	1	0	0	0	0	0
Pseudotorellia ephela (Harris) Florin	0	0	0	1	0	0	0	0	0	0	0	0
Pseudotorellia grojecensis Reymanówna	0	0	0	0	0	0	0	1	1	0	0	0
Pseudotorellia nordenskjoldi (Nathorst) Florin	1	0	0	0	0	0	0	0	0	0	0	0
Pseudotorellia tibia Harris	0	0	0	0	0	0	0	0	0	0	0	1
Pteroma thomasi Harris	0	0	0	0	0	0	0	0	0	0	0	1
Pterophyllum aequale Brongniart	0	0	0	0	0	0	0	0	0	0	1	0
Pterophyllum alinae Barbacka	0	0	0	0	0	0	0	0	1	0	0	0
Pterophyllum angustum Braun	1	0	0	0	0	0	0	0	0	0	0	0
Pterophyllum brevipenne Kurr	1	0	0	0	0	0	0	0	0	0	0	0
Pterophyllum compressum Lundblad	0	0	0	0	0	0	0	0	0	0	1	0
Pterophyllum cuspidatum Ettingshausen	1	0	0	0	0	0	0	0	0	0	0	0
Pterophyllum cycadites Harris *et* Rest	0	0	0	0	0	0	0	0	0	0	0	1
Pterophyllum fossum Harris	0	0	0	0	0	0	0	0	0	0	0	1
Pterophyllum inconforme Givulescu	1	0	0	0	0	0	0	0	0	0	0	0

Tabel 1. Continued

Pterophyllum kochi Harris	0	0	0	0	0	0	0	0	0	0	1	0
Pterophyllum longifolium Brongniart	1	0	0	0	0	0	0	0	0	0	0	0
Pterophyllum magoti Semaka	1	0	0	0	0	0	0	0	0	0	0	0
Pterophyllum marginata (Braun) Unger	1	0	0	0	0	0	0	0	0	0	0	0
Pterophyllum nathorstii Schenk	0	0	0	0	0	0	0	0	1	0	0	1
Pterophyllum pectinatum (Jaeger) Csaki *et* Ulrichs *em.* Czier	1	0	0	0	0	0	0	0	0	0	0	0
Pterophyllum platyrrachis Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Pterophyllum propinquum Göppert	0	0	0	0	0	0	0	0	0	1	0	0
Pterophyllum ptilum Harris	0	0	0	0	0	0	0	0	0	0	1	0
Pterophyllum rectangulare Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Pterophyllum subaequale (Hartz) Harris	0	0	0	1	0	1	0	0	1	0	0	0
Pterophyllum thomasii Harris	0	0	0	0	0	0	1	0	0	0	0	1
Pterophyllum zinkenianum Germar	0	0	0	0	0	0	0	0	0	0	1	0
Pterygopteris angelini (Nathorst) Johansson	0	0	0	0	0	0	0	0	0	0	1	0
Ptilophyllum aninaensis Czier	1	0	0	0	0	0	0	0	0	0	0	0
Ptilophyllum cariae Scanu, Kustatscher *et* Pittau	0	0	0	0	0	0	1	0	0	0	0	0
Ptilophyllum caucasicum Doludenko *et* Svanidze	1	0	0	0	0	0	0	0	0	0	0	0
Ptilophyllum grandifolium Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Ptilophyllum hirsutum Thomas *et* Bancroft	0	0	0	0	0	0	0	0	0	0	0	1
Ptilophyllum maculatum Givulescu	1	0	0	0	0	0	0	0	0	0	0	0
Ptilophyllum minor Dragastan *in* Dragastan *et* Bărbulescu	1	0	0	0	0	0	0	0	0	0	0	0

Tabel 1. Continued

Ptilophyllum pecten Phillips	0	0	0	0	0	0	0	0	0	0	0	1
Ptilophyllum pectinoides Phillips	0	0	0	0	0	0	1	0	0	1	0	1
Ptilophyllum triangolare Wesley	0	0	0	0	0	0	1	0	0	0	0	0
Ptilozamites blasii Braun	0	0	0	0	0	0	1	0	0	0	1	0
Ptilozamites carlsoni Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Ptilozamites falcatus Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Ptilozamites fallax Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Ptilozamites heeri Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Ptilozamites linearis Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Ptilozamites nilssonii Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Ptilozamites oldhami Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Ptilozamites triangularis Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Ramsaia ednyana Manum *et* Bose	0	0	0	0	0	0	0	1	0	0	0	0
Receaphyllum grandis Czier	1	0	0	0	0	0	0	0	0	0	0	0
Rhaphidopteris astartensis (Harris) Barale	0	0	0	0	1	0	0	0	0	0	0	0
Rhaphidopteris dinosaurensis Barale	0	0	0	1	0	0	0	0	0	0	0	0
Rhaphidopteris fragilis Barale	0	0	0	0	1	0	0	0	0	0	0	0
Rhaphidopteris nana (Harris) Barale	0	0	0	0	0	0	0	0	0	0	0	1
Rhaphidopteris williamsonis (Brongniart) Barale	0	0	0	0	0	0	0	0	0	0	0	1
Rhizomopteris major Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Rhizomopteris gunni Seward	0	0	0	0	0	0	0	0	0	0	0	1

Tabel 1. Continued

Sagenopteris colpodes Harris	0	0	0	0	0	0	0	0	1	0	0	1
Sagenopteris dentata Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Sagenopteris goeppertiana Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Sagenopteris hallei Harris	0	0	0	1	0	1	0	0	0	0	0	0
Sagenopteris nilssoniana (Brongniart) Ward	1	0	0	1	0	1	1	0	1	1	1	0
Sagenopteris phillipsii Brongniart	1	0	0	0	0	0	1	0	1	1	0	1
Sagenopteris pilosa Barbacka	0	0	0	0	0	1	0	0	0	0	0	0
Sagenopteris undulata (Nathorst) Halle	0	0	0	0	0	0	0	0	0	0	1	0
Scarburgia hillii Harris	0	0	0	0	0	0	0	0	0	0	0	1
Schizolepis braunii Schenk	0	0	0	0	0	0	0	0	1	0	0	0
Schizolepis follinii Nathorst	1	0	0	0	0	0	0	0	1	0	1	0
Schizolepis liasokeuperiana Braun	0	0	1	0	0	0	0	0	0	0	0	1
Schizolepis moelleri Seward	0	0	0	0	0	0	0	0	1	0	0	0
Schizolepis obtusa Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Schizoneura carcinoides Harris	1	0	0	1	0	0	0	0	0	0	0	0
Schizoneura stenophylla Harris	0	0	0	0	0	0	0	0	0	0	0	1
Schmeissneria microstachys (Presl) Van Konijnenburg-van Cittert	0	0	1	0	0	0	0	0	0	0	0	0
Scoresbya dentata Harris	0	0	0	1	0	0	0	0	0	0	0	0
Selaginellites falcatus (Lindley et Hutton) Schweitzer, Van Konijnenburg-van Cittert *et* Van der Burgh	0	0	0	0	0	0	0	0	0	0	0	1
Selaginellites hallei Lundblad	0	0	0	0	0	0	0	0	0	0	1	0

Tabel 1. Continued

Selenocarpus muensterianus (Presl) Schenk	1	0	1	0	0	0	0	0	0	0	0	0
Selleyopteris morayensis Van Konijnenburg-van Cittert *et* Van der Burgh	0	0	0	0	0	0	0	0	0	0	0	1
Solenites vimineus (Phillips) Harris	0	0	0	0	0	0	0	0	0	0	0	1
Sorosaccus gracilis Harris	0	0	0	1	0	0	0	0	0	0	0	0
Sorosaccus minor Harris	0	0	0	1	0	0	0	0	0	0	0	0
Sphenarion muiriae Harris	0	0	0	0	0	0	0	0	0	0	0	1
Sphenobaiera colchica (Prynada) Delle	1	0	0	0	0	0	0	0	0	0	0	0
Sphenobaiera crassa Givulescu	1	0	0	0	0	0	0	0	0	0	0	0
Sphenobaiera dragastanii Givulescu	1	0	0	0	0	0	0	0	0	0	0	0
Sphenobaiera grandis Kilpper	1	0	0	0	0	0	0	0	0	0	0	0
Sphenobaiera gyron Harris	0	0	0	0	0	0	0	0	0	0	0	1
Sphenobaiera leptophylla (Harris) Florin	0	0	0	0	0	1	0	0	0	0	0	0
Sphenobaiera longifolia (Pomel) Florin	1	0	0	0	0	1	0	1	0	0	0	1
Sphenobaiera ophioglossum Harris	0	0	0	0	0	0	0	0	0	0	0	1
Sphenobaiera pecten Harris	0	0	0	0	0	0	0	0	0	0	0	1
Sphenobaiera rarefurcata Semaka	1	0	0	0	0	0	0	0	0	0	0	0
Sphenobaiera spectabilis (Nathorst) Florin	0	0	0	1	0	0	0	0	0	0	0	0
Sphenolepidium kurrianum Dunker	0	0	0	0	0	0	0	0	0	0	0	1
Sphenolepis terquemi Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Sphenopteris compacta (Saporta) Barale	0	0	1	0	1	0	0	0	0	0	0	0
Sphenopteris hoeninghausi Brongniart	1	0	0	0	0	0	0	0	0	0	0	0

Tabel 1. Continued

Sphenopteris leckenbyi (Zigno) Halle	0	0	0	0	0	0	1	0	0	0	0	0
Sphenopteris litographica Barale	0	0	0	0	1	0	0	0	0	0	0	0
Sphenopteris metzgerioides Harris	0	0	0	0	0	0	0	1	0	0	0	1
Sphenopteris minutifolia Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Sphenopteris obtusifolia Andrae	1	0	0	0	0	0	0	0	0	0	0	0
Sphenopteris onychiopsoides Seward	0	0	0	0	0	0	0	0	0	0	0	1
Sphenopteris pellatii Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Sphenopteris pulchella Raciborski	0	0	0	0	0	0	0	0	1	0	0	0
Sphenozamites bellii Seward	0	0	0	0	0	0	0	0	0	0	0	1
Sphenozamites brongniartii Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Sphenozamites latifolius (Schimper) Saporta	0	0	1	0	0	0	0	0	0	0	0	0
Sphenozamites rossii Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Stachypteris spicans Pomel	0	0	1	0	1	0	0	0	0	0	0	1
Stenomischus athrous Harris	0	0	0	1	0	0	0	0	0	0	0	0
Stenopteris desmomera Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Stenorrhachis dubius Antevs	0	0	0	1	0	0	0	0	0	0	0	0
Storgaardia spectabilis Harris	0	0	0	1	0	0	0	0	0	0	0	0
Strobilites milleri Seward	0	0	0	0	0	0	0	0	0	0	0	1
Swedenborgia benkerti (Kräusel) Weber	0	0	1	0	0	0	0	0	0	0	0	0
Swedenborgia cryptomerides Nathorst	0	0	1	1	0	0	0	0	1	0	0	0
Swedenborgia major Harris	0	0	1	1	0	0	0	0	0	0	0	0

Tabel 1. Continued

Swedenborgia minor Harris	0	0	0	1	0	0	0	0	0	0	0	0
Taeniopteris gigantea Schenk	0	0	0	0	0	0	0	0	0	0	1	0
Taeniopteris hastata Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Taeniopteris immersa Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Taeniopteris minuta Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Taeniopteris multinervis Weiss	1	0	0	0	0	0	0	0	0	0	0	0
Taeniopteris münsteri Göppert	1	0	0	0	0	0	0	0	0	0	0	0
Taeniopteris obtusa (Nathorst) Harris	0	0	0	0	0	0	0	0	0	0	1	0
Taeniopteris tenuinervis Brauns	1	0	0	0	0	0	0	0	0	0	0	0
Taeniopteris vittata Brongniart	0	0	0	0	0	0	0	0	1	0	0	1
Taxites jeffreyi Seward	0	0	0	0	0	0	0	0	0	0	0	1
Taxodiophyllum scoticum Van Konijnenburg-van Cittert *et* Van der Burgh	0	0	0	0	0	0	0	0	0	0	0	1
Thaumatopteris brauniana Popp	1	0	1	1	0	1	0	0	1	0	1	0
Thaumatopteris exilis Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Thaumatopteris muensteri Göppert	0	0	0	0	0	0	0	0	0	1	0	0
Thinnfeldia arctica Heer	0	0	0	0	0	0	0	0	0	0	0	1
Thinnfeldia de Geeri Nathorst	0	0	0	0	0	0	0	0	0	0	0	1
Thinnfeldia decurrens Schenk	0	0	0	0	0	0	0	0	0	0	1	0
Thinnfeldia rotundata Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Thinnfeldia saligna Schenk	0	0	0	0	0	0	0	0	0	0	1	0
Thinnfeldia schwarzi Gothan	0	0	0	0	0	0	0	0	0	1	0	0

Tabel 1. Continued

Thinnfeldia scotica Seward	0	0	0	0	0	0	0	0	0	0	0	1
Todites denticulatus Brongniart	1	0	0	0	0	0	0	1	0	0	0	1
Todites goeppertianus (Münster) Krasser	0	0	0	0	0	1	0	0	1	0	1	0
Todites haiburnensis (Lindley et Hutton) Kilpper	1	0	0	0	0	0	0	0	0	0	0	0
Todites hartzi Harris	0	0	0	1	0	0	0	0	0	0	0	0
Todites princeps Presl	1	0	1	1	0	1	0	1	1	0	0	1
Todites recurvatus Harris	0	0	0	1	0	0	0	0	0	0	0	0
Todites roesserti (Presl) Saporta	0	0	1	0	0	1	0	0	0	0	0	0
Todites thomasi Harris	0	0	0	0	0	0	0	0	0	0	0	1
Todites williamsoni Brongniart	0	0	0	1	0	1	1	0	1	1	0	1
Torreya gracilis Florin	0	0	0	0	0	0	0	0	0	0	0	1
Torreya valida Florin	0	0	0	0	0	0	0	0	0	0	0	1
Trevisania furcallata De Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Trulla nitens Harris	0	0	0	0	0	0	0	0	0	0	0	1
Watsoniocladus iteri Saporta	0	0	1	0	0	0	0	0	0	0	0	0
Weltrichia alfredi (Krasser) Harris	1	0	0	0	0	0	0	0	0	0	0	0
Weltrichia antonii Popa	1	0	0	0	0	0	0	0	0	0	0	0
Weltrichia banatica (Krasser) Givulescu	1	0	0	0	0	0	0	0	0	0	0	0
Weltrichia givulescui Popa	1	0	0	0	0	0	0	0	0	0	0	0
Weltrichia johannae Popa	1	0	0	0	0	0	0	0	0	0	0	0
Weltrichia oolithica Saporta	0	0	0	0	0	0	1	0	0	0	0	0

Tabel 1. Continued

Weltrichia pecten (Leckenby) Harris	0	0	0	0	0	0	0	0	0	0	0	1
Weltrichia setosa (Nathorst) Harris	0	0	0	0	0	0	0	0	0	0	0	1
Weltrichia sol Harris	0	0	0	0	0	0	0	0	0	0	0	1
Weltrichia steierdorfensis Popa	1	0	0	0	0	0	0	0	0	0	0	0
Weltrichia spectabilis Nathorst	0	0	0	0	0	0	0	0	0	0	0	1
Weltrichia whitbiensis (Nathorst) Harris	0	0	0	0	0	0	0	0	0	0	0	1
Wielandiella angustifolia Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Williamsonia aninaensis Czier	1	0	0	0	0	0	0	0	0	0	0	0
Williamsonia banatica Krasser	1	0	0	0	0	0	0	0	0	0	0	0
Williamsonia danubii Dragastan *in* Dragastan *et* Bărbulescu	1	0	0	0	0	0	0	0	0	0	0	0
Williamsonia fabrei Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Williamsonia feneonis Barale	0	0	0	0	1	0	0	0	0	0	0	0
Williamsonia gigas Carruthers	0	0	0	0	0	0	0	0	0	0	0	1
Williamsonia haydenii Seward	1	0	0	0	0	0	0	0	0	0	0	0
Williamsonia hildae Harris	0	0	0	0	0	0	1	0	0	0	0	0
Williamsonia himas Harris	0	0	0	0	0	0	0	0	0	0	0	1
Williamsonia italica Saporta	0	0	0	0	0	0	1	0	0	0	0	0
Williamsonia latecostata Semaka	1	0	0	0	0	0	0	0	0	0	0	0
Williamsonia leckenbyi Nathorst	0	0	0	0	0	0	0	0	0	0	0	1
Williamsonia pecten Phillips	1	0	0	0	0	0	0	0	0	0	0	1
Williamsonia pougnieti Saporta	0	0	0	0	1	0	0	0	0	0	0	0

Tabel 1. Continued

Williamsoniella coronata Thomas	0	0	0	0	0	0	0	0	0	0	0	1
Williamsoniella papillosa Cridland	0	0	0	0	0	0	0	0	0	0	0	1
Yatesia crassa Carruthers	0	0	0	0	0	0	0	0	0	0	0	1
Yatesia joassiana Carruthers	0	0	0	0	0	0	0	0	0	0	0	1
Yuccites angustiformis Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Yuccites hettangensis Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Yuccites schimperianus Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Yuccites vittaeformis Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Zamiostrobus stenorrhachis Nathorst	0	0	0	0	0	0	0	0	0	0	1	0
Zamites andraeanus (Semaka) Givulescu	1	0	0	0	0	0	0	0	0	0	0	0
Zamites aninaensis (Semaka) Givulescu	1	0	0	0	0	0	0	0	0	0	0	0
Zamites approximatus Eichwald	0	0	0	0	1	0	0	0	0	0	0	0
Zamites buchianus Ettingshausen	0	0	0	0	0	0	0	0	0	1	0	1
Zamites carpentieri Barale	0	0	0	0	1	0	0	0	0	0	0	0
Zamites carruthersi Seward	0	0	0	0	0	0	0	0	0	0	0	1
Zamites confusus Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Zamites distractus Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Zamites dubisensis Barale	0	0	0	0	1	0	0	0	0	0	0	0
Zamites feneonis (Pomel) Ettingshausen	0	1	1	0	1	0	0	0	0	0	0	0
Zamites gigas Lindley *et* Hutton	1	0	0	0	0	0	0	0	0	0	0	1
Zamites goeppertii Schenk	0	0	0	0	0	1	0	0	0	0	0	0

Tabel 1. Continued

Zamites guptai (Sharma) Dower, Bateman *et* Stevenson	0	0	0	0	0	0	0	0	0	0	0	1
Zamites moreaui Brongniart	0	0	0	0	1	0	0	0	0	0	0	0
Zamites pumilio Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Zamites quiniae Harris	0	0	0	0	0	0	0	0	0	0	0	1
Zamites ribeiroanus Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Zamites rotzoanus Zigno	0	0	0	0	0	0	1	0	0	0	0	0
Zamites schmiedelii Presl	1	0	0	0	0	0	0	0	0	0	0	0
Zamites senior Saporta	0	0	0	0	1	0	0	0	0	0	0	0
Zamites vachrameevii Doludenko	1	0	0	0	0	0	0	0	0	0	0	0
Nr	157											
Nc_{1-11}		7	52	77	109	52	67	28	83	25	107	263
Nrc_{1-11}		0	8	15	5	21	7	9	26	7	12	32
Ar (%)		0.00	5.10	9.55	3.18	13.38	4.46	5.73	16.56	4.46	7.64	20.38
Ac (%)		0.00	15.38	19.48	4.59	40.38	10.45	32.14	31.33	28.00	11.21	12.17
Af (%)		0.00	10.24	14.52	3.89	26.88	7.45	18.94	23.94	16.23	9.43	16.27

Table 2. Calculi of the affinities. State abbreviations: RO = Romania, CH = Switzerland, DE = Germany, DK = Denmark, FR = France, HU = Hungary, IT = Italy, NO = Norway, PL = Poland, RS = Serbia, SE = Sweden, UK = United Kingdom. FAM abbreviations see in the main text.

SPECIES NUMBER AND AFFINITIES	STATE	RO	CH	DE	DK	FR	HU	IT	NO	PL	RS	SE	UK
		Ur	Uc_1	Uc_2	Uc_3	Uc_4	Uc_5	Uc_6	Uc_7	Uc_8	Uc_9	Uc_{10}	Uc_{11}
Nr		157											
Nc_{1-11}			7	52	77	109	52	67	28	83	25	107	263
Nrc_{1-11}			0	8	15	5	21	7	9	26	7	12	32
Ar (%)			0.00	5.10	9.55	3.18	13.38	4.46	5.73	16.56	4.46	7.64	20.38
Ac (%)			0.00	15.38	19.48	4.59	40.38	10.45	32.14	31.33	28.00	11.21	12.17
Af (%)			0.00	10.24	14.52	3.89	26.88	7.45	18.94	23.94	16.23	9.43	16.27

Tabel 2. Continued

CALCULI

1. Ar_1 (%) = 0/157*100 = 0.00
2. Ar_2 (%) = 8/157*100 = 5.10
3. Ar_3 (%) = 15/157*100 = 9.55
4. Ar_4 (%) = 5/157*100 = 3.18
5. Ar_5 (%) = 21/157*100 = 13.38
6. Ar_6 (%) = 7/157*100 = 4.46
7. Ar_7 (%) = 9/157*100 = 5.73
8. Ar_8 (%) = 26/157*100 = 16.56
9. Ar_9 (%) = 7/157*100 = 4.46
10. Ar_{10} (%) = 12/157*100 = 7.64
11. Ar_{11} (%) = 32/157*100 = 20.38
12. Ac_1 (%) = 0/7*100 = 0.00
13. Ac_2 (%) = 8/52*100 = 15.38
14. Ac_3 (%) = 15/77*100 = 19.48
15. Ac_4 (%) = 5/109*100 = 4.59
16. Ac_5 (%) = 21/52*100 = 40.38
17. Ac_6 (%) = 7/67*100 = 10.45
18. Ac_7 (%) = 9/28*100 = 32.14
19. Ac_8 (%) = 26/83*100 = 31.33
20. Ac_9 (%) = 7/25*100 = 28.00
21. Ac_{10} (%) = 12/107*100 = 11.21
22. Ac_{11} (%) = 32/263*100 = 12.17
23. Af_1 (%) = 0*(7+157)*50/(157*7) = 0.00
24. Af_2 (%) = 8*(52+157)*50/(157*52) = 10.24
25. Af_3 (%) = 15*(77+157)*50/(157*77) = 14.52
26. Af_4 (%) = 5*(109+157)*50/(157*109) = 3.89
27. Af_5 (%) = 21*(52+157)*50/(157*52) = 26.88
28. Af_6 (%) = 7*(67+157)*50/(157*67) = 7.45
29. Af_7 (%) = 9*(28+157)*50/(157*28) = 18.94
30. Af_8 (%) = 26*(83+157)*50/(157*83) = 23.94
31. Af_9 (%) = 7*(25+157)*50/(157*25) = 16.23
32. Af_{10} (%) = 12*(107+157)*50/(157*107) = 9.43
33. Af_{11} (%) = 32*(263+157)*50/(157*263) = 16.27

Table 3. Correlation base of the number of species (Nr – Nc_{1-11}), number of common species (Nrc_r – Nrc_{1-11}), and the floristic affinities of the Jurassic macroflora from Romania to other European Jurassic macrofloras. State abbreviations: RO = Romania, CH = Switzerland, DE = Germany, DK = Denmark, FR = France, HU = Hungary, IT = Italy, NO = Norway, PL = Poland, RS = Serbia, SE = Sweden, UK = United Kingdom. FAM abbreviations see in the main text.

STATE / SPECIES AND FLORISTICAL AFFINITIES	RO	CH	DE	DK	FR	HU	IT	NO	PL	RS	SE	UK
	Ur	Uc_1	Uc_2	Uc_3	Uc_4	Uc_5	Uc_6	Uc_7	Uc_8	Uc_9	Uc_{10}	Uc_{11}
Nr – Nc_{1-11} (numbers)	157	7	52	77	109	52	67	28	83	25	107	263
Nr – Nc_{1-11} (%)	59.70	2.66	19.77	29.28	41.44	19.77	25.48	10.65	31.56	9.51	40.68	100.00
Nrc_r – Nrc_{1-11} (numbers)	157	0	8	15	5	21	7	9	26	7	12	32
Nrc_r – Nrc_{1-11} (%)	100.00	0.00	5.10	9.55	3.18	13.38	4.46	5.73	16.56	4.46	7.64	20.38
Af (%)	100.00	0.00	10.24	14.52	3.89	26.88	7.45	18.94	23.94	16.23	9.43	16.27

NOTES

1. The total number of species of the flora from Romania (Nr) evidently is equal with the number of 'common species' (Nrc_r) in the same flora, so all the three 'affinities' in this case are 100 (%).
2. For a clear graphical representation, the total number of species and the number of common species are converted in the table above to percentages. The conversion is made with simple rule of three, considering the highest value of the species number 100 (%).

Tabel 3. Continued

CALCULI

1. Nr (%) = 157/263*100 = 59.70
2. Nc_1 (%) = 7/263*100 = 2.66
3. Nc_2 (%) = 52/263*100 = 19.77
4. Nc_3 (%) = 77/263*100 = 29.28
5. Nc_4 (%) = 109/263*100 = 41.44
6. Nc_5 (%) = 52/263*100 = 19.77
7. Nc_6 (%) = 67/263*100 = 25.48
8. Nc_7 (%) = 28/263*100 = 10.65
9. Nc_8 (%) = 83/263*100 = 31.56
10. Nc_9 (%) = 25/263*100 = 9.51
11. Nc_{10} (%) = 107/263*100 = 40.68
12. Nc_{11} (%) = 263/263*100 = 100.00
13. Nrc_1 (%) = 0/157*100 = 0.00
14. Nrc_2 (%) = 8/157*100 = 5.10
15. Nrc_3 (%) = 15/157*100 = 9.55
16. Nrc_4 (%) = 5/157*100 = 3.18
17. Nrc_5 (%) = 21/157*100 = 13.38
18. Nrc_6 (%) = 7/157*100 = 4.46
19. Nrc_7 (%) = 9/157*100 = 5.73
20. Nrc_8 (%) = 26/157*100 = 16.56
21. Nrc_9 (%) = 7/157*100 = 4.46
22. Nrc_{10} (%) = 12/157*100 = 7.64
23. Nrc_{11} (%) = 32/157*100 = 20.38
24. Nrc_r (%) = 157/157*100 = 100.00

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Revision of the invertebrates collection of Karl Brancsik (1842 – 1915) deposited in the Ţării Crişurilor Museum, Oradea

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Abstract. A part of the historical collection of invertebrates (non-Insecta) of Karl Brancsik is housed in Ţării Crişurilor Museum, Oradea. While its Gastropods part has been only partially published before, this paper is a completed and revised catalog of that collection, adding also the Bivalves, Polyplacophora and Anthozoa. The collection consists of 223 genera and 342 species, mostly of Gastropods, plus Polyplacophora, Bivalvia and Anthozoa, of which 38 are endemic taxa and 11 specimens are possibly paratypes.

Introduction

Karel Brančik (in Slovakian, or formally Karl Brancsik) (13 March 1842, Stará Bystrica - 18 November 1915, Trenčín) was an Austrian-Hungarian physician and naturalist. Besides practising medicine at Trenčín (Slovakia), he was interested in entomology, malacology and botany. Brancsik began his general studies at Cieszyn (now in Poland), Bratislava, and Sopron (now in Hungary), then studied medicine in Vienna, Prague and Graz, graduating in 1872. Since 1874 he worked

as a physician in Trenčín and in 1879 was promoted as county principal physician. In 1913 he founded the museum of that city, and as an amateur zoologist he assembled by collecting and exchanges several important collections, first of all a large collection of Coleoptera, now deposited in the Field Museum of Natural History Chicago.

His passion for natural studies and collections developed while attending the Evangelical Gymnasium in Cieszyn, then at Bratislava and Sopron. During his medical studies at the University of Prague he entered in contact with several collectors of Coleoptera and started his own collection (150000 specimens from 30904 species, with 123 newly described species), which he continued in Graz, and in 1871 he published a monographic paper on the Coleoptera of Styria. With the help from many other collectors, mostly missionaries from abroad, he gathered and prepared a rich entomological material. Since 1878 he collected and studied Hemiptera (2000 species, with seven new species), and since 1891 Orthoptera (more than 1000 species, with type specimens of 101 new species and 13 new genera). He described two new species of Hymenoptera, and donated his Hymenoptera and Diptera collections to the Gymnasium in Kalocsa (Hungary).

Besides insects, Brancsik assembled a large malacological collection of more than 100,000 specimens (the main part of which is now deposited in the Hungarian National Museum), and also an extended herbarium with 8000 species, dealing with the flora of Trenčín county and donated by him to the city museum. At his suggestion, the Society for Natural Sciences of Trenčín county was established in 1878. The society maintained relations with 125 scientific institutions all over the world, and he edited the society's annuary until his death. Between 1862 and 1914 he published 66 scientific papers on subjects dealing with entomology, malacology and botany (listed in Hetschko 1932), and, while acting more like a splitter, according to the habits of his time, his contribution to the knowledge of central European biodiversity remains remarkably valuable.

A smaller part of his malacological collection was acquired by the Ţării Crişurilor Museum in 1971 from the private collector Silvia Popovici in Timişoara. The present paper aimed to revise and complete the catalog of Gastropods from Brancsik's collection deposited in the Ţării Crişurilor Museum (Grossu & Paina 1974) and also to include all of Brancsik's invertebrate specimens from that collection (Bivalvia, Polyplacophora and Anthozoa).

Material and methods

All his mollusks specimens deposited in the Ţării Crişurilor Museum were listed in this catalog, adding the Bivalves, a Polyplacophora and a coral specimen, and the

Gastropods part was completed, revised and/or updated according to the accepted classification.

Classification is according to Bouchet & Rocroi 2005 and Carter et al. 2011, simplified (no infraclasses, cohorts, subcohorts, clades, subclades, informal groups, megaorders, superorders, hyporders, minorders, epifamilies). The families are listed phyletically, according to Bouchet & Rocroi 2005 and Carter et al. 2011, in each genus the species being arranged alphabetically and with validity of their names verified (when no reference is mentioned, WoRMS 2016 is implied).

Abbreviations. spec(s). = specimen(s); end. = endemic.

Results

Phylum MOLLUSCA Linnaeus, 1758
Class POLYPLACOPHORA Blainville, 1816
Order Chitonida Thiele, 1910
Fam. Chitonidae Rafinesque, 1815
Subfam. Chitoninae Rafinesque, 1815

Chiton (Rhyssoplax) olivaceus Spengler, 1797, 1 spec., Sicily (Italy).

Class GASTROPODA Cuvier, 1795
Superfam. Patelloidea Rafinesque, 1815
Fam. Patellidae Rafinesque, 1815

Patella caerulea Linnaeus, 1758, 4 specs..

Superfam. Lottioidea Gray, 1840
Fam. Lottiidae Gray, 1840
Subfam. Lottiinae Gray, 1840

Lottia digitalis (Rathke, 1833), 1 spec., USA, Bering Sea.

Superfam. Trochoidea Rafinesque, 1815
Fam. Trochidae Rafinesque, 1815
Subfam. Trochinae Rafinesque, 1815

Clanculus (C.) corallinus (Gmelin, 1791), 2 specs., Mediterranean Sea.
Clanculus (C.) cruciatus (Linnaeus, 1758), 1 spec., Cannes (France).
Clanculus (Clanculopsis) jussieui (Payraudeau, 1826), 1 spec., Mediterranean Sea.
Tectus (Rochia) pyramis (Born, 1778), 1 spec..
Trochus nigropunctatus Reeve, 1848, 1 spec..

Subfam. Stomatellinae Gray, 1840

Stomatella auricula Lamarck, 1816 (Tröndlé & Boutet 2009, Herbert 2015), 1 spec., New Zealand.

Subfam. Cantharidinae Gray, 1857

Cantharidus callichroa (Philippi, 1849) (Grossu & Paina 1974, Hardy 2016), 1 spec., Tasmania (Australia).
Gibbula (G.) divaricata (Linnaeus, 1758), 1 spec., Mediterranean Sea.
Gibbula (G.) tumida (Montagu, 1803), 1 spec., England.
Gibbula (G.) umbilicalis (da Costa, 1778), 1 spec., England.
Gibbula (Phorcas) varia (Linnaeus, 1758), 2 specs., Mediterranean Sea.
Jujubinus striatus (Linnaeus, 1758), 1 spec., United Kingdom, „Forbay, England" (?) (Grossu & Paina 1974).
Jujubinus suarezensis (P. Fischer, 1878), 1 spec..

Subfam. Umboniinae H. Adams & A. Adams, 1854 (1840)

Umbonium (Suchium) costatum (Kiener, 1839), 5 specs. without data; 1 spec., Japan.
Umbonium (U.) vestiarium (Linnaeus, 1758), 1 spec., India (east coast).

Subfam. Monodontinae Gray, 1857

Diloma concameratum (Wood, 1828) (Hardy 2016), 1 spec., New Zealand.

Fam. Calliostomatidae Thiele, 1924 (1847)
Subfam. Calliostomatinae Thiele, 1924 (1847)

Calliostoma variegatum Carpenter, 1864, 1 spec..

Superfam. Turbinoidea Rafinesque, 1815
Fam. Turbinidae Rafinesque, 1815
Subfam. Turbininae Rafinesque, 1815

Turbo radiatus Gmelin, 1791, 1 spec., Red Sea.

Subfam. Tegulinae Kuroda, Habe & Oyama, 1971

Tegula (Chlorostoma) tridentata (Potiez & Michaud, 1838) (Hardy 2016), 1 spec..

Superfam. Phasianelloidea Swainson, 1840
Fam. Phasianellidae Swainson, 1840
Subfam. Tricoliinae Swainson, 1840

Tricolia speciosa (Mühlfeldt, 1824), 1 spec., Cannes (Provence-Alpes-Cote d'Azur, France).

Fam. Colloniidae Cossmann, 1917
Subfam. Colloniinae Cossmann, 1917

Collonista costulosa (Sowerby, 1886), 1 spec., Indian Ocean.

Superfam. Helicinoidea Férussac, 1822
Fam. Helicinidae Férussac, 1822

Helicina (Alcadia) barbata Guppy, 1867 (Grossu & Paina 1974), 1 spec., Trinidad-Tobago.
Helicina orbiculata (Say, 1818) (Pilsbry 1948, Strenth & Littleton 2000), 1 spec., Dallas (Texas, USA).

Superfam. Neritoidea Rafinesque, 1815
Fam. Neritidae Rafinesque, 1815
Subfam. Neritinae Rafinesque, 1815

Clithon morosa (Gassies, 1870) (Hardy 2016), 1 spec., Sri Lanka.
Neripteron violaceum (Gmelin, 1791) (Hardy 2016), 1 spec., Sri Lanka.
Nerita (Theliostyla) exuvia (Linnaeus, 1758), 1 spec..
Nerita (Lisanerita) morio (G. B. Sowerby, 1833) (Spencer & al. 2007), 1 spec..
Nerita (N.) peloronta Linnaeus, 1758 (Carpenter 2002), 1 spec., Indian Ocean.
Nerita (Ritena) plicata Linnaeus, 1758, 1 spec., Indian Ocean.
Nerita (Theliostyla) tessellata Gmelin, 1791, 1 spec..
Nerita (N.) textilis Gmelin, 1791, 1 spec., no data; 1 spec., Indian Ocean.
Nerita (N.) versicolor Gmelin, 1791, 1 spec..
Nerita (N.) yoldii Récluz, 1841, 1 spec., Indian Ocean.
Neritina (Vittina) communis (Quoy & Gaimard, 1832) (Grossu & Paina 1974), 1 spec., Philippines. Very variable species.
Neritina (Vittina) gagates (Lamarck, 1815), 1 spec., Fiji.

Neritina meleagris Lamarck, 1822, 1 spec., Sao Paulo (Brazil).
Theodoxus (T.) danubialis (C. Pfeiffer, 1828), 1 spec., Blagaj, at source of River Buna (Bosnia and Herzegovina); 2 specs., Croatia; 2 specs. („var. strangulatus"), Carniola (Kranj) (Slovenia).
Theodoxus (T.) fluviatilis (Linnaeus, 1758), 3 specs., Split (Croatia); 1 spec., Lake Garda (Italy).
Theodoxus (T.) prevostianus (C. Pfeiffer, 1828), 2 specs., Hungary.

Superfam. Cyclophoroidea Gray, 1847
Fam. Cyclophoridae Gray, 1847

Leptopoma vitreum (Lesson, 1830) (Grossu & Paina 1974), 1 spec., Japan.

Fam. Megalomastomatidae Blanford, 1864

Megalomastoma seminudum Poey, 1854 (Grossu & Paina 1974), 1 spec., Trinidad-Tobago.

Fam. Cochlostomatidae Kobelt, 1902

Cochlostoma (Auritus) auritum (Rossmässler, 1837) (AnimalBase Project Group 2005-2016), 2 specs., Dalmatia (Croatia), end.
Cochlostoma (C.) elegans (Clessin, 1879) (AnimalBase Project Group 2005-2016), 2 specs., „Yugoslavia".

Cochlostoma (Turritus) gracile reitteri (Boettger, 1880) (AnimalBase Project Group 2005-2016), 2 specs., Croatia. Subspecies end. for Croatia.
Cochlostoma (C.) henricae henricae (Strobel, 1851) (AnimalBase Project Group 2005-2016), 2 specs., Trieste (Italy).
Cochlostoma (Turritus) philippianum (Gredler, 1853) (AnimalBase Project Group 2005-2016), 1 spec., Austria; 2 specs, Italy; end. for the Alps Mountains.
Cochlostoma (Turritus) tergestinum tortiva (Westerlund, 1885) (AnimalBase Project Group 2005-2016), 2 specs.. Subspecies end. for the eastern coast of the Adriatic Sea (Slovenia, Croatia).

Superfam. Cerithioidea Fleming, 1822
Fam. Cerithiidae Fleming, 1822
Subfam. Cerithiinae Fleming, 1822

Cerithium lifuense (Melvill & Standen, 1895), 3 specs..
Cerithium (Thericium) muscarum Say, 1832, 1 spec..
Cerithium (Thericium) vulgatum Bruguyère, 1792 (Gofas & al. 2004), 2 specs., Mediterranean Sea.

Subfam. Bittiinae Cossmann, 1906

Bittium latreillei (Payraudeau, 1826), 3 specs., Balearic Islands (Spain).

Fam. Melanopsidae H. Adams & A. Adams, 1854
Subfam. Melanopsinae H. Adams & A. Adams, 1854

Holandriana holandrii (C. Pfeiffer, 1828), 2 specs., Carniola (Kranj), Slovenia. Rare.
Melanopsis parreyssii (Philippi, 1847) (AnimalBase Project Group 2005-2016), 1 spec., Băile 1 Mai, Lake Peţea (Romania). End., extinct in the wild since 2014.
Microcolpia daudebartii acicularis (Férussac, 1823) (Smoleń & Falniowski 2009, Neubauer & al. 2014), 2 specs.. Rare.

Fam. Planaxidae Gray, 1850
Subfam. Planaxinae Gray, 1850

Planaxis savignyi Deshayes, 1844, 1 spec., Suez (Egypt).

Fam. Pleuroceridae Fischer, 1885

Elimia vanuxemiana (Lea, 1843) (Bogan 2011), 1 spec., River Coosa, Alabama (USA). End. for Alabama, possibly extinct (Bogan 2011).
Pleurocera acuta Rafinesque, 1831 (Strong 2005, Benson 2008), 1 spec., Illinois (USA).

Fam. Semisulcospiridae Morrison, 1952

Juga (J.) plicifera (Lea, 1838) (Burch 1982, Strong & Koehler 2009), 1 spec., Oregon (USA).

Fam. Potamididae H. Adams & A. Adams, 1854

Cerithideopsis californica (Haldeman, 1840), 1 spec., Oakland (California, USA).
Terebralia palustris (Linnaeus, 1767), 1 spec..

Fam. Thiaridae Gill, 1871 (1823)

Thiara thiarella (Lamarck) (Grossu & Paina 1974), 1 spec., Isle of Nossibé (Madagascar).
Thiara truncata (Lamarck) (Grossu & Paina 1974), 1 spec., North America.

Fam. Turritellidae Lovén, 1847

Turritella communis Risso, 1826, 3 specs.

Superfam. Calyptraeoidea Lamarck, 1809
Fam. Calyptraeidae Lamarck, 1809

Bostrycapulus aculeatus (Gmelin, 1791), 1 spec., New Zealand.
Maoricrypta monoxyla (Lesson, 1831), 1 spec., New Zealand. End. for the coasts of the Northern Island (New Zealand).

Superfam. Cypraeoidea Rafinesque, 1815
Fam. Cypraeidae Rafinesque, 1815

Erronea caurica (Linnaeus, 1758), 2 specs..
Erosaria helvola (Linnaeus, 1758), 1 spec., Indian Ocean.
Luria isabella (Linnaeus, 1758), 1 spec..
Luria lurida (Linnaeus, 1758), 1 spec., Atlantic Ocean.
Lyncina carneola (Linnaeus, 1758), 1 spec., Indian Ocean.
Monetaria annulus (Linnaeus, 1758), 2 specs., Indian Ocean.
Monetaria moneta (Linnaeus, 1758), 3 specs..
Palmadusta asellus (Linnaeus, 1758), 1 spec., Indian Ocean.

Superfam. Littorinoidea Children, 1834
Fam. Littorinidae Children, 1834
Subfam. Littorininae Children, 1834

Austrolittorina unifasciata (Gray, 1826), 1 spec., Victoria (Australia).
Littoraria (Littorinopsis) angulifera (Lamarck, 1822), 1 spec., Bahamas.
Littoraria (L.) irrorata (Say, 1822), 1 spec., Florida (USA).
Littoraria (L.) mauritiana (Lamarck, 1822), 2 specs., Madagascar.
Littorina (L.) obtusata (Linnaeus, 1758), 1 spec., Mediterranean Sea; 1 spec., European coasts of the Atlantic Ocean.

Littorina (L.) saxatilis (Olivi, 1792), 1 spec., Reykjavik (Island).
Littorina (L.) scutulata (Gould, 1849), 1 spec., San Francisco (California, USA).
Melarhaphe neritoides (Linnaeus, 1758), 2 spec., Mediterranean Sea.
Tectarius pagodus (Linnaeus, 1758), 1 spec..

Fam. Pomatiidae Newton, 1891 (1828)
Subfam. Pomatiinae Newton, 1891 (1828)

Pomatias elegans (Müller, 1774) (Frank 2000), 1 spec., Riva di Trento, Italy.
Pomatias rivularis (Eichwald, 1829) (Frank 2000, AnimalBase Project Group 2005-2016), 5 specs., Băile Herculane (Romania); 1 spec., Caucasus Mountains.
Tropidophora zanguebarica (Petit, 1850) (Petit 1850, Bourguignat 1889, Rowson & al. 2010, Gittenberger & van Bruggen 2013), 1 spec., Mozambic.
Tudora versicolor (Pfeiffer) (Poulsen 1878, Héra 2006), 1 spec., Curacao (The Netherlands).
Tudorella sulcata (Draparnaud, 1801) (AnimalBase Project Group 2005-2016), 1 spec., Segesta, in Alcamo (Sicily, Italy).

Superfam. Naticoidea Guilding, 1834
Fam. Naticidae Guilding, 1834
Subfam. Polinicinae Gray, 1847

Euspira intricata (Donovan, 1804), 1 spec., Algeria.
Polinices mammillla (Linnaeus, 1758), 1 spec., Isle of Nosy Be, Madagascar.
Polinices otis (Broderip & G. B. Sowerby, 1829), 2 specs.

Subfam. Naticinae Guilding, 1834

Naticarius stercusmuscarum (Gmelin, 1791), 1 spec..

Superfam. Rissooidea Gray, 1847
Fam. Amnicolidae Tryon, 1863
Subfam. Emmericiinae Brusina, 1870

Emmericia patula (Brumati, 1838) (Bank 2015), 1 spec., Split (Croatia).
Emmericia ventricosa Brusina, 1870 (Seddon 2011), 5 specs., Kotor (Montenegro).

Fam. Bithyniidae Gray, 1857

Bithynia mostarensis Moellendorff, 1873 (AnimalBase Project Group 2005-2016),

2 specs., Mostar (Bosnia and Herzegovina), end.
Bithynia tentaculata (Linnaeus, 1758) (AnimalBase Project Group 2005-2016), 2 specs., Germany.

Fam. Hydrobiidae Stimpson, 1865
Subfam. Lithoglyphinae Tryon, 1866

Lithoglyphus naticoides (C. Pfeiffer, 1828) (AnimalBase Project Group 2005-2016), 1 spec., Inovo (Smrdan) (Vidin, Bulgary).

Fam. Truncatellidae Gray, 1840

Geomelania (Merrilliana) elegans C. B. Adams, 1849 (Rosenberg & Muratov 2005), 1 spec., Cuba.

Superfam. Stromboidea Rafinesque, 1815
Fam. Strombidae Rafinesque, 1815
Subfam. Strombinae Rafinesque, 1815

Canarium labiatum labiatum (Röding, 1798), 1 spec..

Fam. Aporrhaidae Gray, 1850
Subfam. Aporrhainae Gray, 1850

Aporrhais pespelecani (Linnaeus, 1758), 8 specs., Mediterranean Sea.

Superfam. Tonnoidea Suter, 1913
Fam. Tonnidae, Suter 1931
Subfam. Tonninae Suter, 1913

Malea pomum (Linnaeus, 1758) (Carpenter 2002), 1 spec..

Fam. Ranellidae Gray, 1854
Subfam. Cymatiinae Iredale, 1913 (1854)

Septa rubecula (Linnaeus, 1758), 1 spec., Mauritius.

Subfam. Ranellinae Gray, 1854

Gyrineum gyrinum (Linnaeus, 1758), 1 spec..

Superfam. Velutinoidea Gray, 1840
Fam. Triviidae Troschel, 1863
Subfam. Eratoinae Gill, 1871

Erato (E.) voluta (Montagu, 1803), 1 spec., Mediterranean Sea.

Superfam. Vermetoidea Rafinesque, 1815
Fam. Vermetidae Rafinesque, 1815

Siphonium glomeratum, Gmelin (Grossu & Paina 1974), 1 spec.**,** Alpes-Maritimes, Provence (France).

Subfam. Dendropomatinae Bandel & Kowalke, 1997

Dendropoma cristatum (Biondi, 1859), 1 spec., Provence-Alpes-Cote d'Azur (France).

Superfam. Triphoroidea Gray, 1847
Fam. Cerithiopsidae H. Adams & A. Adams, 1853
Subfam. Cerithiopsinae H. Adams & A. Adams, 1853

Cerithiopsis tubercularis (Montagu, 1803), 1 spec., Adriatic Sea.

Superfam. Buccinoidea Rafinesque, 1815
Fam. Buccinidae Rafinesque, 1815

Siphonalia fuscolineata (Pease, 1860), 1 spec., New Zealand.

Subfam. Buccininae Rafinesque, 1815

Cominella (C.) glandiformis (Reeve, 1847), 1 spec., New Zealand, end.
Cominella (C.) lineolata (Lamarck, 1809), 1 spec., New Zealand, end.
Cominella (C.) maculosa (Martyn, 1784), 1 spec., New Zealand.

Subfam. Pisaniinae Gray, 1857

Pisania (P.) striata (Gmelin, 1791), 2 specs., Mediterranean Sea.
Pollia rubiginosa (Reeve, 1846), 1 spec., Red Sea.

Fam. Columbellidae Swainson, 1840

Subfam. Columbellinae Swainson, 1840

Columbella marrae Garcia, 1999, 1 spec., Honduras.
Columbella mercatoria (Linnaeus, 1758), 1 spec., Florida (USA).
Columbella rustica (Linnaeus, 1758), 1 spec., Adriatic Sea.

Subfam. Atiliinae Cossmann, 1901

Mitrella (M.) albofulvata Drivas & Jay, 1990, 1 spec., New Zealand.
Mitrella (Dentimitrella) menkeana (Reeve, 1858), 1 spec.. End. for the western coast of Australia.
Pardalinops testudinaria (Link, 1807), 1 spec., Japan.
Pyrene flava (Bruguyère, 1789), 1 spec., Indian Ocean.

Subfam. Pyreninae Suter, 1909

Bifurcium bicanaliferum (G. B. Sowerby, 1832), 1 spec..

Fam. Fasciolariidae Gray, 1853
Subfam. Fasciolariinae Gray, 1853

Tarantinaea lignaria (Linnaeus, 1758) (Avery Snyder 2003), 2 specs., Adriatic Sea.

Subfam. Fusininae Wrigley, 1927

Fusinus (F.) marcusi Hadorn & Rogers, 2000, 3 specs..

Fam. Nassariidae Iredale, 1916 (1835)
Subfam. Nassariinae Iredale, 1916 (1835)

Nassarius subspinosus (Lamarck, 1822), 2 specs..
Nassarius (Alectrion) spiratus (A. Adams, 1852) (Hardy 2016), 1 spec., Indian Ocean.
Nassarius (Hima) coralligenus (Pallary, 1900) (Hardy 2016), 1 spec., Adriatic Sea.

Nassarius (Plicarcularia) gibbosulus (Linnaeus, 1758), 1 spec., Mediterranean Sea.
Nassarius (Plicarcularia) graniferus (Kiener, 1834), 1 spec., Indian Ocean.
Nassarius (Plicarcularia) persicus (Martens, 1874) (Hardy 2016), 1 spec., Red Sea.
Nassarius (Zeuxis) concinnus (Powys, 1835), 1 spec., Victoria (Australia).
Nassarius (Niotha) splendidulus (Dunker, 1846), 2 specs..
Nassarius (N.) striatus (C. B. Adams, 1852), 1 spec., San Diego (California, USA).
Phrontis vibex (Say, 1822), 1 spec., Florida (USA).

Tritia corniculum (Olivi, 1792), 1 spec., Algeria.
Tritia incrassata (Strøm, 1768), 1 spec., Mediterranean Sea.
Tritia neritea (Linnaeus, 1758), 2 specs., Adriatic Sea.
Tritia obsoleta (Say, 1822), 1 spec., British Columbia (Canada).
Tritia pellucida (Risso, 1826), 1 spec., no data; 1 spec., Mediterranean Sea.
Tritia reticulata (Linnaeus, 1758), 1 spec., Adriatic Sea.

Superfam. Muricoidea Rafinesque, 1815
Fam. Muricidae Rafinesque, 1815
Subfam. Muricinae Rafinesque, 1815

Bolinus brandaris (Linnaeus, 1758), 1 spec., Adriatic Sea.
Hexaplex trunculus (Linnaeus, 1758), 1 spec., Mediterranean Sea.
Phyllonotus pomum (Gmelin, 1791), 1 spec..

Subfam. Muricopsinae Radwin & d'Attilio, 1971

Muricopsis (M.) cristata (Brocchi, 1814), 1 spec., Mediterranean Sea.

Subfam. Ocenebrinae Cossmann, 1903

Crassilabrum crassilabrum (G. B. Sowerby, 1834), 2 specs., Valparaiso (Chile); 1 spec., no data.
Nucella freycinetii (Deshayes, 1839), 1 spec., San Diego (California, USA).

Subfam. Rapaninae Gray, 1853

Concholepas concholepas (Bruguière, 1789), 1 spec., Peru.
Mancinella echinulata (Lamarck, 1822), 1 spec., Mauritius.
Semiricinula tissoti (Petit de La Saussaye, 1852), 1 spec..

Fam. Costellariidae MacDonald, 1860

Tongsuapusia duplex (Cernohorsky), 1982, 1 spec..
Vexillum (Costellaria) dautzenbergi Poppe, Guillot de Suduiraut & Tagaro, 2006, 1 spec..
Vexillum (Pusia) ebenus (Lamarck, 1811), 1 spec., Mediterranean Sea.

Fam. Cystiscidae Stimpson, 1865
Subfam. Persiculinae Coovert & Coovert, 1995

Persicula interruptolineata interruptolineata (Mühlfeldt, 1816), 1 spec..

Fam. Harpidae Bronn, 1849

Harpa harpa (Linnaeus, 1758) (Carpenter 1998), 1 spec..

Fam. Marginellidae Fleming, 1828
Subfam. Marginellinae Fleming, 1828

Prunum apicinum (Menke, 1828), 1 spec., Caribbean Sea.

Fam. Volutidae Rafinesque, 1815
Subfam. Athletinae Pilsbry & Olsson, 1954

Athleta abyssicola (Adams & Reeve, 1848), 1 spec., South Africa.

Superfam. Olivoidea Latreille, 1825
Fam. Olividae Latreille, 1825

Olivancillaria urceus (Röding, 1798) (The Paleobiology Database), 1 spec., Rio Grande (Mexico).
Oliva (O.) oliva (Linnaeus, 1758), 1 spec., New Caledonia (France).
Oliva (Miniaceoliva) irisans irisans Lamarck, 1811, 1 spec., Indian Ocean.
Oliva (Neocylindrus) tessellata Lamarck, 1811, 1 spec., Indian Ocean.
Oliva (Strephona) venulata Lamarck, 1811, 1 spec., California (Mexico).

Fam. Olivellidae Troschel, 1869

Olivella (Callianax) biplicata (Sowerby 1825), 1 spec., California.

Superfam. Conoidea Fleming, 1822
Fam. Conidae Fleming, 1822
Subfam. Coninae Fleming, 1822

Conus (Atlanticonus) cuna Petuch, 1998 (Puillandre & al. 2015), 1 spec.. Distribution: Caribbean Sea, published locality („Indian Ocean") probably erroneous.
Conus (Virroconus) ebraeus Linnaeus, 1758 (Puillandre & al. 2015), 1 spec., Sri Lanka.
Conus (Rhizoconus) rattus Hwass in Bruguiere, 1792 (Puillandre & al. 2015), 1 spec., New Guinea.

Fam. Clavatulidae Gray, 1853
Subfam. Clavatulinae Gray, 1853

Clionella rosaria (Reeve, 1846), 1 spec., Cape of Good Hope (South Africa).
Turricula javana (Linnaeus, 1767), 2 specs..

Fam. Terebridae Mörch, 1852

Terebra elata Hinds, 1844, 1 spec..

Fam. Turridae H. Adams & A. Adams, 1853
Subfam. Turrinae H. Adams & A. Adams, 1853

Pleurotoma marmorata Link, 1807 (Kilburn & al. 2012), 1 spec.. Nomen dubium according to WoRMS 2016.
Turris babylonia (Linnaeus, 1758), 2 specs..
Turris ruthae Kilburn, 1983, 2 specs..

Superfam. Acteonoidea d'Orbigny, 1843
Fam. Acteonidae d'Orbigny, 1843
Subfam. Acteoninae d'Orbigny, 1843

Acteon (A.) tornatilis (Linnaeus, 1758), 1 spec., Mediterranean Sea.

Superfam. Philinoidea Gray, 1850
Fam. Cylichnidae H. Adams & A. Adams, 1853

Akera bullata O. F. Müller, 1776, 1 spec., Balearic Islands (Spain).

Superfam. Amphiboloidea Gray, 1840
Fam. Amphibolidae Gray, 1840
Subfam. Salinatorinae Starobogatov, 1970

Salinator sp. (species 101) (Poppe & Poppe 2011), 1 spec., Coonawarra (South Australia, Australia).

Superfam. Siphonarioidea Gray, 1827
Fam. Siphonariidae Gray, 1840

Siphonaria denticulata Quoy & Gaimard, 1833 (Hardy 2016), 1 spec., Australia.

Superfam. Lymnaeoidea Rafinesque, 1815
Fam. Lymnaeidae Rafinesque, 1815
Subfam. Lymnaeinae Rafinesque, 1815

Galba (G.) truncatula (O. F. Müller, 1774), Bratislava (Slovakia).
Radix balthica (Linnaeus, 1758), 1 spec., Estonia.
Radix labiata (Rossmässler, 1835), 6 specs..
Stagnicola traski (Tryon, 1863) (Jackiewicz 1998, Oliver & Bosworth 1999, Vinarski 2003), 1 spec., Oakland (California, USA). Protected, rare.
Stagnicola turricula (Held, 1836), 1 spec., Seeburg, Seegebiet Mansfelder Land (Mansfeld-Südharz, Sachsen-Anhalt, Germany).

Superfam. Planorboidea Rafinesque, 1815
Fam. Planorbidae Rafinesque, 1815
Subfam. Planorbinae Rafinesque, 1815

Planorbis (P.) planorbis (Linnaeus, 1758) (AnimalBase Project Group 2005-2016), 1 spec., Cluj-Napoca (Romania).

Subfam. Bulininae Fischer & Crosse, 1880

Planorbella subcrenata (Carpenter, 1857) (Harrold & Guralnick 2010), 1 spec., Santa Clara (California, USA).

Fam. Physidae Fitzinger, 1833
Subfam. Physinae Fitzinger, 1833

Physa fontinalis (Linnaeus, 1758) (AnimalBase Project Group 2005-2016), 1 spec., Trenčin (Slovakia).
Physa proteus Sowerby, 1873 (Grossu & Paina 1974), 1 spec., Australia.

Subfam. Aplexinae Starobogatov, 1967

Aplexa hypnorum (Linnaeus, 1758) (AnimalBase Project Group 2005-2016), 1 spec., France. Holarctic, rare.

Superfam. Ellobioidea Pfeiffer, 1854
Fam. Ellobiidae Pfeiffer, 1854
Subfam. Melampodinae Stimpson, 1851 (1850)

Melampus (Detracia) bullaoides (Montagu, 1808), 2 specs., Cuba.
Melampus (Detracia) lividus (Deshayes, 1830) (Hardy 2016), 1 spec., New Guinea.
Melampus (M.) luteus (Quoy & Gaimard, 1832), 1 spec., New Caledonia (France).

Subfam. Pythiinae Odhner, 1925 (1880)

Cassidula (C.) nucleus (Gmelin, 1791) (Hardy 2016), 1 spec., Red Sea.
Pythia plicata (Férussac, 1821), 1 spec., Hong Kong (China).

Superfam. Succineoidea Beck, 1837
Fam. Succineidae Beck, 1837
Subfam. Succineinae Beck, 1837

Oxyloma (O.) elegans (Risso, 1826) (AnimalBase Project Group 2005-2016), 8 specs., Anina (Romania); 14 specs., Thuringia (Germany).
Succinea putris (Linnaeus, 1758) (AnimalBase Project Group 2005-2016), 1 spec., Budapest (Hungary); 1 spec., Trenčin (Slovakia).

Superfam. Cochlicopoidea Pilsbry, 1900 (1879)
Fam. Cochlicopidae Pilsbry, 1900 (1879)

Cochlicopa lubrica (O. F. Müller, 1774) (AnimalBase Project Group 2005-2016), 2 specs., Slovakia.

Superfam. Pupilloidea Turton, 1831
Fam. Chondrinidae Steenberg, 1925

Chondrina arcadica (Reinhardt, 1881) (AnimalBase Project Group 2005-2016), 1 spec., Anina (Romania); 22 specs., no data.
Chondrina avenacea (Bruguière, 1792) (AnimalBase Project Group 2005-2016), 5 specs., Trenčin (Slovakia).
Chondrina spelta (Beck, 1837) (Stamol 2004, AnimalBase Project Group 2005-2016), 2 specs., Jajce (Bosnia and Herzegovina), end. subspecies.
Chondrina tenuimarginata (Des Moulins, 1835) (Bank 2015, AnimalBase Project Group 2005-2016), 2 specs., Isle of Madeira (Portugal).
Granaria frumentum (Draparnaud, 1801) (AnimalBase Project Group 2005-2016), 4 specs., Anina (Romania); 2 specs., Sibenik (Croatia).
Granaria frumentum illyrica (Rosmaessler, 1835) (AnimalBase Project Group 2005-2016), 2 specs., Metkovic (Croatia).

Fam. Orculidae Pilsbry, 1918
Subfam. Orculinae Pilsbry, 1918

Orcula dolium (Draparnaud, 1801) (AnimalBase Project Group 2005-2016), 4 specs., Trenčin (Slovakia).

Superfam. Enoidea Woodward, 1903
Fam. Enidae Woodward, 1903
Subfam. Eninae Woodward, 1903

Chondrula quinquedentata (Rossmässler, 1837) (AnimalBase Project Group 2005-2016), 1 spec., Omis (Croatia).
Chondrula tridens (Müller, 1774) (AnimalBase Project Group 2005-2016), 1 spec., Oraviţa (Romania); 2 specs., Sibiu (Romania); 1 spec., Cisnădie (Romania); 1 spec., Anina (Romania).
Ena concolor (Westerlund, 1887) (Bank 2015, AnimalBase Project Group 2005-2016), 1 spec..
Mastus pupa (Linnaeus, 1758) (AnimalBase Project Group 2005-2016), 1 spec., Sicily (Italy).
Mastus transsylvanicus (M. von Kimakowicz, 1883) (AnimalBase Project Group 2005-2016), 1 spec., Braşov (Romania), end.
Mastus venerabilis (L. Pfeiffer, 1855) (AnimalBase Project Group 2005-2016), 1 spec., Vâlcan Mountains, Zănoaga, Vulcan Gorge (Hunedoara, Romania); 1 spec., Bucegi Montains; end.
Merdigera obscura (Müller, 1774) (AnimalBase Project Group 2005-2016), 1 spec., Slovakia; 2 specs., Slavonia (Croatia).

Superfam. Clausilioidea Gray, 1855
Fam. Clausiliidae Gray, 1855
Subfam. Clausiliinae Gray, 1855

Clausilia (Andraea) dubia Draparnaud, 1805 (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Slovakia.
Clausilia (Andraea) dubia carpathica Brancsik, 1888 (Bank 2015), 2 specs., Trenčin, Szulyó (Slovakia); 4 specs., Rajecké-Teplice. End., possibly paratypes, leg. Brancik.
Clausilia (Andraea) dubia trencsinensis Brancsik, 1888 (Frank 1997, Nordsieck 2007a), 2 specs., Trenčin. Possibly paratypes.
Clausilia (C.) pumila C. Pfeiffer, 1828 (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Anina (Romania).
Clausilia (C.) rugosa parvula Férussac, 1807 (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 3 specs., Slovakia.
Erjavecia bergeri (Rossmässler, 1836) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 2 specs., Carinthia (Austria or Slovenia).
Macrogastra (Pyrostoma) borealis (Boettger, 1878) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Galicia (Poland or Ukraine).
Macrogastra (Pyrostoma) plicatula (Draparnaud, 1801) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 2 specs., Slovakia.
Macrogastra (M.) ventricosa (Draparnaud, 1801) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Slovakia.
Ruthenica filograna (Rossmässler, 1836) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 2 specs., Slovakia; 2 specs., no data.

Subfam. Alopiinae Wagner, 1913

Agathylla (A.) exarata (Rossmässler, 1835) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 5 specs., Dalmatia (Croatia), end.
Agathylla (A.) sulcosa (Wagner, 1829) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Dalmatia (Croatia), end.
Albinaria (A.) turrita (L. Pfeiffer, 1850) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Isle of Milos (Greece), end.
Alopia (A.) bielzii (L. Pfeiffer, 1848) (AnimalBase Project Group 2005-2016), 1 spec., Tălmaciu (Sibiu county, Romania), leg. Endrey, end.
Alopia (A.) canescens (Charpentier, 1852) (Nordsieck 2007a, AnimalBase Project

Group 2005-2016), 2 specs., Piatra Mare massif, western slope (Braşov county, Romania), end.
Alopia (Kimakowiczia) glauca (E. A. Bielz, 1853) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 5 specs., Romania; 1 spec., Bratocea, southwest of Ciucaş massif (Braşov county, Romania); 1 spec., Ciucaş massif (Romania), end.
Alopia (A.) lischkeana lischkeana (Charpentier, 1852) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Piatra Craiului Mountains, near Braşov (Romania); 1 spec., Piatra Craiului Mountains, Crăpătura (Romania); 1 spec., Braşov (Romania), end.
Alopia (A.) livida (Menke, 1828) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 2 specs., Bucegi Mountains (Romania), end.
Alopia (A.) plumbea (Rossmässler, 1839) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Braşov (Romania), end.
Alopia (A.) plumbea regalis (M. Bielz, 1851) (Nordsieck 2007a), 1 spec., Piatra Craiului Mountains, leg. Endrey, end.
Alopia (A.) straminicollis (Charpentier, 1852) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 2 specs., Postăvaru massif (Braşov county, Romania), end.
Charpentieria (C.) itala (von Martens, 1824) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Italy.
Cochlodina (C.) fimbriata (Rossmässler, 1835) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Croatia.
Cochlodina (C.) laminata (Montagu, 1803) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 2 specs., Anina (Romania); 3 specs., Caraş-Severin county (Romania); 3 specs., Dalmatia (Croatia); 2 specs., Slovakia.
Cochlodina (Paracochlodina) orthostoma (Menke, 1828) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Galicia (Poland or Ukraine); 1 spec., Slovakia. Relict.
Delima (Semirugata) bilabiata (J. A. Wagner, 1829) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Dalmatia (Croatia).
Delima (D.) binotata (Rossmässler, 1836) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 2 specs., Dalmatia (Croatia).
Delima (D.) binotata satura (Rossmässler, 1836) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 2 specs., Dalmatia (Croatia), end. subspecies.
Delima (D.) blanda (Rossmässler, 1836) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Dalmatia (Croatia).
Delima (D.) blanda fulcrata (Rossmässler, 1836) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 2 specs., Dalmatia (Croatia), end. subspecies.
Delima (D.) conspurcata (Rossmässler, 1836) (Nordsieck 2007a, AnimalBase Pro-

ject Group 2005-2016), 8 spec., Dalmatia (Croatia), end. subspecies.
Delima (D.) laevissima (Rossmässler, 1834) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Dalmatia (Croatia), end.
Delima (D.) latilabris (J. A. Wagner, 1829) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Dalmatia (Croatia), end. subspecies.
Delima (Semirugata) vidovichii (Pfeiffer, 1846) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Dalmatia (Croatia), end.
Dilataria succineata (Rossmässler, 1836) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Carinthia (Austria or Slovenia).
Herilla bosniensis (L. Pfeiffer, 1868) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 7 specs., Bosnia and Herzegovina.
Herilla bosniensis brandisi (Brancsik, 1888) (Nordsieck 2007a, Bank 2015), 2 specs., Bosnia and Herzegovina, end. subspecies. Possibly type specimens.
Herilla ziegleri dacica (L. Pfeiffer, 1848) (Nordsieck 2007a, Bank 2015), 1 spec..
Herilla ziegleri neglecta (Brancsik, 1888) (Nordsieck 2007a, Bank 2015), 1 spec., Bosnia and Herzegovina. Paratype.
Medora almissana (Kuster, 1847) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 2 specs., Dalmatia (Croatia), end..
Medora macascarensis (Sowerby, 1828) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Dalmatia (Croatia), end. subspecies.
Montenegrina cattaroensis (Rossmässler, 1835) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 2 specs., Dalmatia (Montenegro), end.
Siciliaria gibbula (Rossmässler, 1836) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 3 specs., Dalmatia (Croatia).
Siciliaria lamellata (Rossmässler, 1836) (AnimalBase Project Group 2005-2016), 2 specs., Dalmatia (Croatia). Present distribution: Albania and Greece.
Siciliaria stigmatica (Rossmässler, 1836) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Dalmatia (Croatia).

Subfam. Baleinae Wagner, 1913

Alinda (Pseudalinda) fallax (Rossmässler, 1836) (Nordsieck 2007a, b), 1 spec., Sălaj county (Romania); 2 specs., Caraş-Severin (Romania). Rare, legally protected.
Balea (Alinda) biplicata (Montagu, 1803) (Nordsieck 2007a, b, AnimalBase Project Group 2005-2016), 2 specs., Slovakia; 1 spec., no data.
Balea perversa (Linnaeus, 1758) (AnimalBase Project Group 2005-2016), 2 specs., Trenčin (Slovakia).
Balea (Pseudalinda) stabilis (L. Pfeiffer, 1847) (Nordsieck 2007a, b, AnimalBase

Project Group 2005-2016), 1 spec., Orlat (Sibiu county, Romania).
Bulgarica (Strigilecula) cana (Held, 1836) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 3 specs., Transylvania (Romania).
Bulgarica (B.) rugicollis (Rossmässler, 1836) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 2 specs., Banat (Romania); 1 spec., no data.
Bulgarica (Strigilecula) vetusta (Rossmässler, 1836) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 2 specs., Croatia.
Laciniaria plicata (Draparnaud, 1801) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 3 specs., Anina (Romania); 2 specs., Gagauzia (Republic of Moldova).
Vestia (V.) gulo (E. A. Bielz, 1859) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Romania.
Vestia (V.) turgida (Rossmässler, 1836) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Slovakia.

Subfam. Mentissoideinae Lindholm, 1924

Elia corpulenta (Pfeiffer, 1848) (Nordsieck 2007a, AnimalBase Project Group 2005-2016), 1 spec., Turkey, end.

Superfam. Punctoidea Morse, 1864
Fam. Discidae Thiele, 1931 (1866)

Discus (Gonyodiscus) perspectivus (Mühlfeld, 1816) (AnimalBase Project Group 2005-2016), 2 specs., Slovakia.
Discus (Gonyodiscus) rotundatus (Müller, 1774) (AnimalBase Project Group 2005-2016), 2 specs., Trenčin (Slovakia).
Discus (D.) ruderatus (Hartmann, 1821) (AnimalBase Project Group 2005-2016), 1 spec., Trenčin (Slovakia).

Superfam. Helicoidea Rafinesque, 1815
Fam. Helicidae Rafinesque, 1815
Subfam. Helicinae Rafinesque, 1815

Eobania vermiculata (O. F. Müller, 1774) (AnimalBase Project Group 2005-2016), 1 spec..

Subfam. Ariantinae Mörch, 1864

Chilostoma (Kosicia) intermedium (Férussac, 1832) (AnimalBase Project Group

2005-2016), 1 spec., Ulrichsberg (?), Carniolia (?) (Austria). Published locality in Grossu & Paina 1974: „Carniolia-Ulrichsberg (Austria)". Carniolia is a region in Slovenia, Ulrichsberg is in northern Austria.
Cylindrus obtusus (Draparnaud, 1805) (AnimalBase Project Group 2005-2016), 1 spec., Carinthia (Austria). End. for the Austrian Alps.
Helicigona (Faustina) faustina (Rossmässler, 1835) (AnimalBase Project Group 2005-2016), 1 spec., Trenčin (Slovakia); 1 spec., Hungary.
Isognomostoma isognomostomos (Schröter, 1784) (AnimalBase Project Group 2005-2016), 1 spec., Austria.

Fam. Cochlicellidae Schileyko, 1972

Cochlicella (C.) acuta (Müller, 1774) (AnimalBase Project Group 2005-2016), 13 specs., Makarska (Croatia).

Fam. Helicodontidae Kobelt, 1904
Subfam. Helicondontinae Kobelt, 1904

Helicodonta obvoluta (O. F. Müller, 1774) (AnimalBase Project Group 2005-2016), 1 spec., Paris (France).
Soosia diodonta (Férussac, 1832) (AnimalBase Project Group 2005-2016), 2 specs., Băile Herculane and Căldăruşani forest (Romania).

Subfam. Lindholmiolinae Schileyko, 1978

Lindholmiola lens (Férussac, 1832) (Bank 2015, AnimalBase Project Group 2005-2016), 1 spec., Athens (Greece).

Fam. Helminthoglyptidae Pilsbry, 1939

Cepolis (Hemitrochus) varians (Menke, 1829) (Grossu & Paina 1974), 1 spec., Puerto Rico (USA).

Fam. Hygromiidae Tryon, 1866
Subfam. Monachainae Wenz, 1930 (1904)

Monacha (M.) cantiana (Montagu, 1803) (AnimalBase Project Group 2005-2016), 1 spec..

Monacha (M.) cartusiana (Müller, 1774) (Bank 2015, AnimalBase Project Group 2005-2016), 1 spec., Gruz (Dubrovnik, Croatia); 1 spec., Split (Croatia); 1 spec., Dalmatia (Croatia); 1 spec., Travnik (Bosnia and Herzegovina); 1 spec., Barcy (France).
Monacha (M.) parumcincta (Menke, 1828) (AnimalBase Project Group 2005-2016), 1 spec., Dalmatia (Croatia).

Subfam. Hygromiinae Tryon, 1866

Candidula intersecta (Poiret, 1801) (AnimalBase Project Group 2005-2016), 1 spec., Sönderborg (Denmark); 2 specs., no data.
Cernuella (C.) cisalpina (Rossmässler, 1837) (Bank 2015, AnimalBase Project Group 2005-2016), 1 spec., Trieste (Italy); 1 spec., Kotor (Montenegro). Sometimes considered a synonym of *C. virgata* (Da Costa, 1778).
Cernuella (C.) virgata (Da Costa, 1778) (Bank 2015, AnimalBase Project Group 2005-2016), 1 spec., Zadar (Croatia); 1 spec., Yalta (Ukraine/Russia). Distribution: Europe, with the exception of northern regions.
Helicella itala (Linnaeus, 1758) (AnimalBase Project Group 2005-2016), 1 spec., Lüneburger Heide (Germany).
Helicopsis striata (O. F. Müller, 1774) (AnimalBase Project Group 2005-2016), 1 spec., Frankfurt am Main (Germany); 1 spec., Chatillon (France?). Two more localities by the same name („Chatillon") are in western Switzerland, and one in northern Italy. Rare, endangered in Germany.
Hygromia (H.) cinctella (Draparnaud, 1801) (Bank 2015, AnimalBase Project Group 2005-2016), 2 specs., Trieste (Italy).
Monachoides incarnatus (O. F. Müller, 1774) (AnimalBase Project Group 2005-2016), 1 spec., Trenčin (Slovakia).
Monachoides vicinus (Rossmässler, 1842) (AnimalBase Project Group 2005-2016), 1 spec., Trenčin, Vratna valley (Slovakia).
Perforatella bidentata (Gmelin, 1791) (AnimalBase Project Group 2005-2016), 1 spec., Trenčin (Slovakia).
Trochulus (T.) unidentatus (Draparnaud, 1805) (AnimalBase Project Group 2005-2016), 1 spec., Vratna (Trenčin, Slovakia).
Trochulus (T.) hispidus (Linnaeus, 1758) (AnimalBase Project Group 2005-2016), 2 specs., Kaliningrad (Russia).
Trochulus (T.) sericeus (Draparnaud, 1801) (AnimalBase Project Group 2005-2016), 1 spec., Wales (UK).
Xerocampylaea zelebori (L. Pfeiffer, 1853) (AnimalBase Project Group 2005-2016), 2 specs., Sarajevo, bank of River Miljacka (Bosnia and Herzegovina); 1 spec., Rovereto (Italy).

Xerolenta obvia (Menke, 1828) (Bank 2015, AnimalBase Project Group 2005-2016), 2 specs., Caraşova (Caraş-Severin county, Romania); 1 spec., Mostar (Bosnia and Herzegovina); 4 specs., no data.
Xeropicta derbentina (Krynicki, 1836) (AnimalBase Project Group 2005-2016), 1 spec., Mostar (Bosnia and Herzegovina), 1 spec., Crikvenica (Croatia).
Xerosecta (Xeromagna) cespitum (Draparnaud, 1801) (AnimalBase Project Group 2005-2016), 1 spec., Mostar (Bosnia and Herzegovina), 1 spec., Qusantinah (Constantine) (Algeria).
Xerosecta (Xeromagna) reboudiana (Bourguignat, 1863) (AnimalBase Project Group 2005-2016), 1 spec., Mostar (Bosnia and Herzegovina), 1 spec., Kerrata (Algeria).

Subfam. Geomitrinae Boettger, 1909

Trochoidea (T.) elegans (Gmelin, 1791) (AnimalBase Project Group 2005-2016), 1 spec., Mostar (Bosnia and Herzegovina), 1 spec., Marseille (France).
Trochoidea (T.) pyramidata (Draparnaud, 1805) (AnimalBase Project Group 2005-2016), 1 spec., Mostar (Bosnia and Herzegovina), 1 spec., Alghero, Sardinia (Italy).
Trochoidea (T.) trochoides (Poiret, 1789) (AnimalBase Project Group 2005-2016), 1 spec., Mostar (Bosnia and Herzegovina), 2 specs., Alpes Maritimes (France).

Fam. Pleurodontidae Ihering, 1912

Pleurodonte peracutissima (Adams, 1845) (Wurtz 1955, Rosenberg & Muratov 2006), 1 spec., Martinique Island (France).

Fam. Polygyridae Pilsbry, 1895

Polygyra septemvolva volvoxis (Pfeiffer, 1846) (Pilsbry 1940), 1 spec., Florida (USA).
Stenotrema hirsutum (Say, 1817) (Walker 1906, Turgeon et al. 1988, AnimalBase Project Group 2005-2016), 1 spec., Ohio (USA).

Superfam. Gastrodontoidea Tryon, 1866
Fam. Oxychilidae Hesse in Geyer, 1927 (1879)
Subfam. Godwiniinae Cooke, 1921

Aegopinella nitens (Michaud, 1831) (AnimalBase Project Group 2005-2016), 2 specs., Slovakia.

Aegopinella nitidula (Draparnaud, 1805) (AnimalBase Project Group 2005-2016), 1 spec..

Subfam. Oxychilinae Hesse, 1927 (1879)

Oxychilus (O.) cellarius (O. F. Müller, 1774) (AnimalBase Project Group 2005-2016), 1 spec., Slovakia.
Oxychilus (O.) glaber (Rossmässler, 1835) (AnimalBase Project Group 2005-2016), 2 specs., Trenčin (Slovakia).

Superfam. Zonitoidea Mörch, 1864
Fam. Zonitidae Mörch, 1864

Ventridens ligera (Say, 1821) (Turgeon et al. 1988), 1 spec., Ohio (USA).

Class BIVALVIA Linnaeus, 1758
Subclass Autobranchia (Grobben, 1894)
Order Mytilida Férussac, 1822
Superfam. Mytiloidea Rafinesque, 1815
Fam. Mytilidae Rafinesque, 1815

Mytilus edulis Linnaeus, 1758 (AnimalBase Project Group 2005-2016), 4 specs..

Mytilus sp., 1 spec..

Order Arcoida Stolicka, 1871
Superfam. Arcoidea Lamarck, 1809
Fam. Arcidae Lamarck, 1809

Arca ventricosa (Lamarck, 1819), 1 spec..
Arca sp., 2 specs..
Pectunculus sp., 3 specs..

Fam. Glycymerididae Dall, 1908
Glycymeris nummaria (Linnaeus, 1758), 1 spec., Mediterranean Sea.
Tucetona pectunculus (Linnaeus, 1758), 5 specs..

Order Ostreida Férussac, 1822
Suborder Ostreidina Férussac, 1822
Superfam. Ostreoidea Rafinesque, 1815
Fam. Ostreidae Rafinesque, 1815

Ostrea edulis Linnaeus, 1758, 2 specs..

Suborder Malleidina Gray, 1854
Superfam. Pinnoidea, Leach 1819
Fam. Pinnidae, Leach 1819

Pinna bicolor Gmelin, 1791, 1 spec..

Superfam. Pterioidea Gray, 1847 (1820)
Fam. Pteriidae Gray, 1847

Pinctada margaritifera (Linnaeus, 1758), 1 spec..

Order Pectinida Gray, 1854
Suborder Pectinidina Gray, 1854
Superfam. Pectinoidea Rafinesque, 1815
Fam. Pectinidae, Wilkes 1810
Subfam. Pectininae Rafinesque, 1815

Pecten jacobaeus (Linnaeus, 1758), 1 spec..

Subfam. Chlamydinae Teppner, 1922

Flexopecten glaber (Linnaeus, 1758), 4 specs..
Mimachlamys varia (Linnaeus, 1758) (de Kluijver & al. 2015), 2 specs..

Fam. Spondylidae Gray, 1826

Spondylus sp., 1 spec..

Order Carditida Dall, 1889
Superfam. Crassatelloidea Férussac, 1822
Fam. Carditidae Lamarck, 1809

Carditamera radiata (G. B. Sowerby, 1833), 1 spec., Panama.
Glans trapezia (Linnaeus, 1767), 2 specs., Algiers (Algeria).

Order Cardiida Férussac, 1822

Suborder Cardiidina Férussac, 1822

Superfam. Cardioidea Lamarck, 1809

Fam. Cardiidae Lamarck, 1809

Subfam. Cardiinae Lamarck, 1809

Acanthocardia echinata (Linnaeus, 1758), 1 spec..
Cardium sp., 2 specs..

Superfam. Tellinoidea Blainville, 1814
Fam. Tellinidae Blainville, 1814

Acorylus gouldii (Hanley, 1846), 1 specs., Gulf of California.
Bosemprella incarnata (Linnaeus, 1758), 1 spec., Mediterranean Sea.
Fabulina fabula (Gmelin, 1791), 1 spec., Wales (UK).
Limecola balthica (Linnaeus, 1758), 2 specs., Great Britain; 2 specs., San Francisco (California, USA).
Macomangulustenuis (da Costa, 1778), 1 spec., no data; 2 specs., Mediterranean Sea.
Strigilla pisiformis (Linnaeus, 1758), 2 specs., Indian Ocean (?).
Tellina radiata Linnaeus, 1758, 2 specs., Cuba.

Fam. Donacidae Fleming, 1828

Donax (Paradonax) californicus Conrad, 1837, 2 specs., San Diego, California (USA).
Donax (Capsella) variegatus (Gmelin, 1791), 1 spec., Mediterranean Sea.
Donax semistriatus (Poli, 1795), 1 spec., Viareggio (Italy).
Donax (Serrula) trunculus (Linnaeus, 1758), 3 specs., Mediterranean Sea.

Fam. Semelidae Stoliczka, 1870

Abra alba (W. Wood, 1802), 2 specs., North Sea.

Superfam. Dreissenoidea Gray, 1840
Fam. Sphaeriidae Deshayes, 1855

Sphaerium corneum (Linnaeus, 1758) (Araujo 2011), 2 specs., France.
Sphaerium rivicola (Lamarck, 1818) (Araujo 2011, AnimalBase Project Group 2005-2016), 2 specs., Würzburg, River Main (Germany).

Superfam. Veneroidea Rafinesque, 1815
Fam. Veneridae Rafinesque, 1815

Gouldia minima (Montagu, 1803), 2 specs., Puerto de Mahon (Balearic Islands, Spain).
Meretrix lamarcki Deshayes, 1853, 6 specs..
Pectunculus sp., 1 spec..
Timoclea ovata (Pennant, 1777) (de Kluijver & al. 2015), 2 specs., Isle of Yeu (France).
Polititapes aureus (Gmelin, 1791), 1 spec., Mediterranean Sea.

Superfam. Cyrenoidea Gray, 1840
Fam. Cyrenidae Gray, 1840

Neocorbicula limosa Maton, 1809 (Graf & Cummings 2011), 2 specs., Rio Grande do Sul (Brazil).

Order Pholadida Gray, 1854
Superfam. Myoidea Lamarck, 1809
Fam. Corbulidae Lamarck, 1818

Corbula gibba (Olivi, 1792), 2 specs., Mediterranean Sea.

Order Thraciida Carter, 2011
Superfam. Thracioidea Stoliczka, 1870
Fam. Thraciidae Stoliczka, 1870

Thracia villosiuscula (MacGillivray, 1827), 1 spec., Cannes (France).

Order Solenida Dall, 1889
Superfam. Solenoidea Lamarck, 1809
Fam. Solenidae Lamarck, 1809

Solen grandis Dunker, 1862, 2 specs..

Phylum CNIDARIA Hatschek ,1888
Class ANTHOZOA Ehrenberg, 1834
Subclass Hexacorallia Haeckel, 1896
Order Scleractinia Bourne, 1900
Fam. Mussidae Ortmann, 1890

Platygyra daedalea (Ellis & Sollander, 1786) (Carpenter & Niem 1998), 1 spec., Israel, Red Sea.

Discussion

The part of Brancsik's collection housed in Ţării Crişurilor Museum consists mainly of Gastropods, with 186 genera and 299 species (the best represented families being Clausiliidae with 49 species, Hygromiidae with 23 species, and Trochidae, Neritidae and Nassariidae with 16 species each), plus 35 genera and 41 Bivalve species, and one of each Polyplacophora and Anthozoa species, of which 38 are endemic taxa (species and subspecies).

The most abundant are the Gastropods as well, with 563 specimens (Clausiliidae 128 specs., Chondrinidae 40, Neritidae 25, Trochidae 24 etc.), plus 81 specimens of Bivalves (Tellinidae 14 specs., Veneridae 12 etc.), one Polyplacophora specimen and one Anthozoan coral skeleton fragment.

The taxonomic status of several specimens is disputed. *Melanopsis parreyssii* (Philippi, 1847) is now considered by some authors a highly variable, thermal form of *Fagotia acicularis* (Sümegi et al. 2012), or is rather revised as *Microcolpia parreyssii* (Neubauer et al. 2014). Sadly, despite being legally protected, this endemism is extinct in the wild since Sept.-Oct. 2014 due to habitat degradation. Another Melanopsid, *Fagotia daudebartii acicularis* (Férussac, 1823), is now considered congeneric with *„Melanopsis" parreyssii* (Smoleń & Falniowski 2009) and thus should be revised as *Microcolpia daudebartii acicularis* (Neubauer et al. 2014).

Brancsik acted sometimes like a „splitter", according to the habits of the time, and besides subspecies such as the valid *Clausilia dubia carpatica* Brancsik, 1888 and the questioned *C. dubia trencsinensis* Brancsik, 1888, he tried to describe also forms and varieties, which are now considered obsolete. For example, he labelled an *Orcula dolium* (Draparnaud, 1801) specimen as „*Pupa dolium* Drp. v. *Titan* f. *obesa* Brk." (= Brancsik) and a *Clausilia dubia* Draparnaud, 1805 specimen as „*Clausilia dubia* Drp. v. *manina* Brancsik".

Other remarkable, presently protected species are represented in this historical collection, such as *Theodoxus prevostianus* (C. Pfeiffer, 1828) specimens

from „Hungary" (according to the original label), a protected, Pleistocene relict extinct in Romania since June 13, 2006, due to excavations for a sturgeon farm in Răbăgani (Bihor) at the site of its unique habitat in this country. *Elimia vanuxemiana* (Lea, 1843), endemic for Alabama (USA), has gone extinct before 2000 and its rediscovery in the same state in 2005 needs confirmation. *Holandriana holandrii* (C. Pfeiffer 1828) (collected in Slovenia) is now protected in Romania (Order no. 1198/2005 of MMGA, Annex 3B), and *Lithoglyphus naticoides* (C. Pfeiffer, 1828) (collected in Bulgaria), while being now rather abundant in Romania, is rare in Bulgaria because of water pollution.

Unfortunately, the collecting information on Brancsik's labels is usually incomplete, at best including only the species name and, sometimes vaguely, the place of collecting. Thus, while the specimens, both aquatic and terrestrial, originated from all over the world (no doubt as a result of Brancsik's exchanges with other collectors), in many cases a more precise assessment of their collecting circumstances is rather difficult to infer.

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A small and peculiar malacological sample from Kálmán Csák, with note on the first record of the bivalve *Pisidium supinum* A. Schmidt, 1851 (Mollusca, Pisiidae) in Romania

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Abstract. We report herein a small, but peculiar mollusc sample provided by Kálmán Csák from the collecting sites situated near Tinca (Bihor county) in the Crişul Negru River basin. Surprisingly it contains the bivalve *Pisidium supinum* A. Schmidt, 1851 (Mollusca, Pisiidae), representing the first record of that taxon from Romania.

Introduction

In March 2012 we were greatly surprised, even if we were aware of the existing collection of molluscs in the Tinca Museum, after receiving from Sr. Kálmán Csák (for his biography see Domokos 2011, 2012) five matchboxes with molluscs

samples collected around Tinca/Tenke and Luncasprie/Lankás. The first collecting date is from 1976, while the last one took place in August 1981.

However, a question should arise: is it important for a scientist to elaborate a paper for a handful of samples? The reply is yes, especially when we have overviewed the content of the boxes that produced a series of surprises. We shortly recognized that the samples contained a species that become extinct in the last 35-40 years, while another one represents its first faunal record from the area. The aim of the present paper is to complete a systematic review of the samples emphasizing their environmental and biogeographic significance.

Material and methods

The material consists of a small collection of shells of gastropods and bivalves stored in five matchboxes. All the samples are supplied with labels and provided with the name of the collecting place, the date of sampling, the collector's name and number of specimens. The five samples represent in total 13 different taxa: the first three samples consist of snails, whereas the fourth and fifth consist of bivalves. For the identification of mollusc taxa we used the works of Soós (1943) and Richnovszky & Pintér (1979).

Systematic part

1.Tinca (= Tenke), Large-bog and Small-bog (= Nagyláp és Kisláp), July 20, 1980; leg.: Csák Kálmán, Jr.

Aplexa hypnorum Linnaeus,1758

Material: five specimens

It should be a rare species because the only locality cited by Sîrbu (2006) from Romania is Oradea (Nagyvárad) and it is based on Riess` (1899) observation.

Lithoglyphus naticoides (C. Pfeiffer, 1828) (Fig.1A, B)

Material: three specimes
Remarks: It is cited by Sîrbu (2006) from the Holod stream, which is a tributary from the right side of the Crișu-Negru (Fekete-Körös) river.

Theodoxus prevostianus C. Pfeiffer, 1828 (Fig. 1C, D)

Material: nine specimens

Description: It is a known fact that based on the shell morphology alone it is not always possible to differentiate *Theodoxus danubialis* from *T. prevostianus* C.

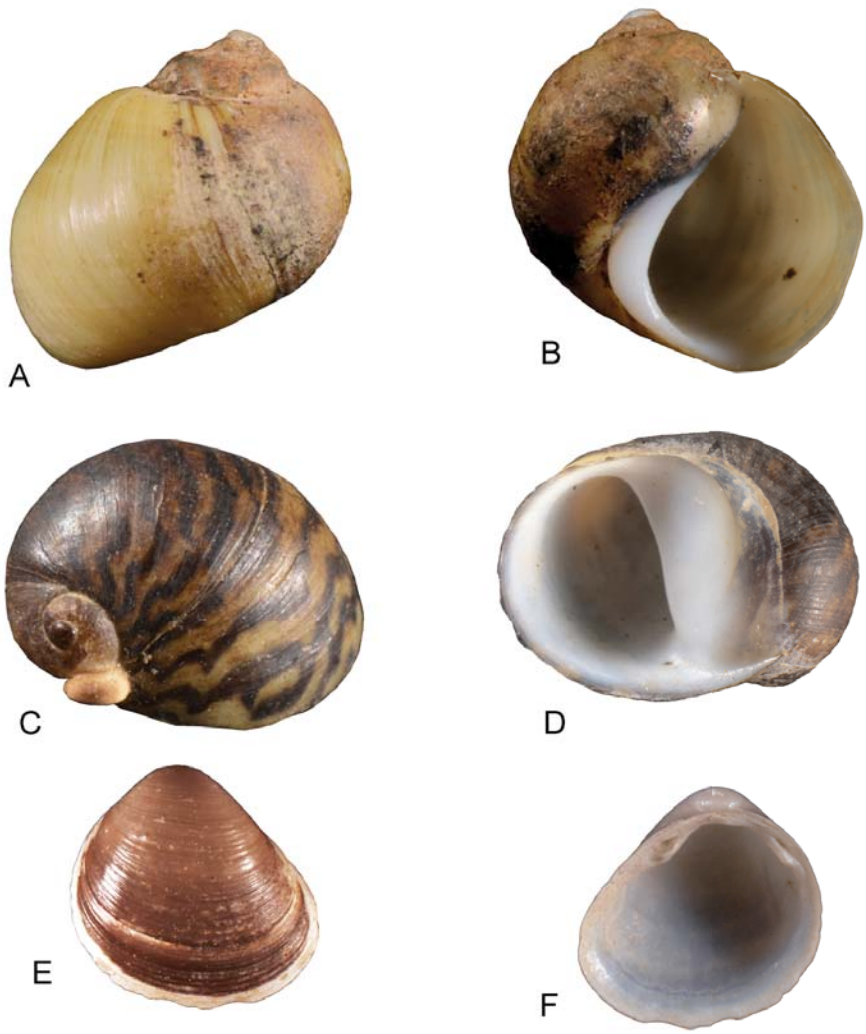

Figure 1. Molluscs from Pădurea Craiului Mountains. A, B: *Lithoglyphus naticoides* (size about 6 mm); C, D: *Theodoxus prevostianus* (size about 6 mm); E, F: *Pisidium supinum* (size about 4.5 mm).

Pfeiffer, 1828 (Fehér et al. 2007, Fehér pers. com.). The shells display various stages of development and are covered by a greyish translucent cover permitting on the last whorl the appearance on the blackish background colour of a yellowish zigzagged pattern with crisp margins. The size of the shells (length-width-height) ranges between: 10,1–7,4–5,4 mm in the largest, whereas 3,3–3,3–2,0 mm in the smallest. About half of the specimens bear one or two ovule remnants and the preservation state of the shells suggests that they may have belonged probably to recently perished animals. Therefore we may presume, as it is suggested also by the lack of opercula, that the shells were relocated from the area of Răbăgani (Grossu 1993; Sîrbu 2006).

Remarks: Based on the previous faunal assemblage of Large-bog and Small-bog near Tinca, we may presume that the water-source of the bogs was provided, at least partially, by the course of the Crișul Negru river. However, it is a known fact that both *Lithoglyphus naticoides* and *Theodoxus prevostianus* are rheophilic and are members of the limnobenthos adhering exclusively to a hard bottom. However, because the collecting site was a bog the above conditions cannot be fulfilled. Consequently, we cannot consider these records as in situ occurrences. Unfortunately, nowadays those bogs are dried out and transformed into illegal dumping-grounds, and therefore new sampling from that locality is not possible.

2. Pădurea Craiului (= Királyerdő) Mountains, Luncasprie (= Lankás), spring in Topliţa Valley, August, 1976; leg.: Csák Kálmán

Ancylus fluviatilis (C. Pfeiffer, 1828)

Material: seven specimens

Remarks: The shells are eroded and with signs of erosion due to transportation. The River Limpet is a small sized snail with about 5-10 mm shell length, that is relatively frequent in the area of Pădurea Craiului (=Királyerdő) Mountains. It prefers karstic spring and streams usually sticking to rocks and stones (Domokos & Lennert 2010).

3. Pădurea Craiului Mountains (= Királyerdő), Luncasprie (= Lankás), upper sector of Vida stream, August, 1981; leg.: Csák Kálmán

Bulgarica vetusta (Rossmässler,1836) (Fig. 2A, B, C)

Material: six specimens.

Remarks: It is a south-eastern European taxon that may be considered the most frequent clausilid from the Pădurea Craiului (= Királyerdő) Mountains (Domokos & Lennert 2010).

Isognomostoma isognomostoma (Gmelin, 1886) (Fig. 2D, E)

Material: one specimen

Remarks: This species is relatively rear in the Pădurea Craiului (=Királyerdő) Mountains (Domokos & Lennert 2010).

Laciniaria plicata Draparnaud, 1805

Material: one specimen

Lithoglyphus naticoides (C. Pfeiffer, 1828)

Material: two specimens

Remarks: The specimens collected from the Vida stream document the taxon's wider distribution, being reported earlier from the Crişul Negru River Basin in the Holod River, downstream of Răbăgani, in the Crişul Negru riverbed at Tinca and Zerind and from the Crişul Repede River at Cheresig by Sîrbu (2006).

4. Tinca (= Tenke) in Belfir (= Bélfenyér) stream, 1981, leg.: Csák Kálmán

Sphaerium corneum (Linnaeus, 1758)

Material: 10 specimens with single shell, four specimens with double shell.

5. Tinca (= Tenke), Crişul Negru (= Fekete-Körös), probably in early eighties, leg.: Csák Kálmán

Pisidium henslowanum Sheppard, 1823

Material: one specimen with double shell.

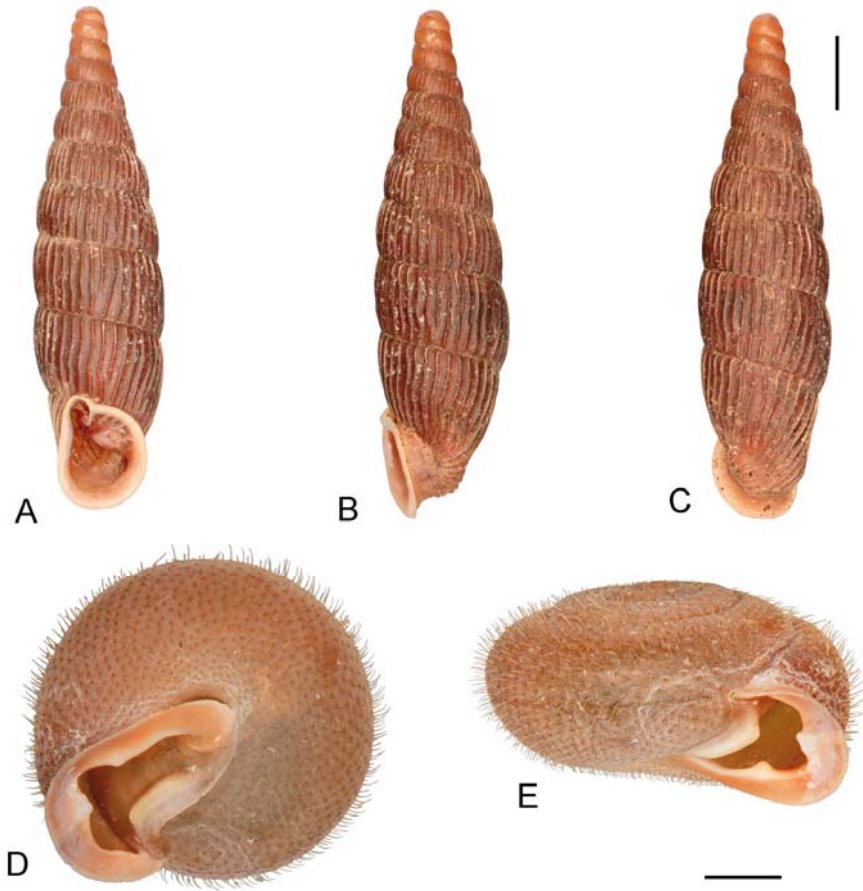

Figure 2. Molluscs from Pădurea Craiului Mountains. A-C: *Bulgarica vetusta*; D, E: *Isognomostoma isognomostoma*. Scale equals 2 mm.

Pisidium nitidum Jenyns, 1832

Material: one specimen with single shell

Pisidium supinum A. Schmidt, 1851 (Fig. 1E, F)

Material: one specimen with single shell

Remarks: The species is missing from the faunal list of Grossu (1993). Furthermore, taking into consideration the works of Glöer & Sîrbu (2005) and Sîrbu (2006) it is a new taxon for Romania and for the area of Țara Crișurilor. By adding this taxon to the faunal list of Romania, the number of *Pisidium* species increases up to 12.

Sphaerium riviculum (Lamarck, 1818)

Material: 30 specimens with single shell and four specimens with double shells.

Concluding remarks

In the last thirty years deep environmental changes occurred in the area of Crișul Negru Basin especially due to human intervention that affected especially the faunal assemblages closely linked to aquatic or semiaquatic habitats. As noted above some bogs (see above) were dried out and after that transformed into illegal dump deposits. Activities focused on freshwater fish culture and fish pond constructions in the area of Răbăgani resulted in the extinction of the last living population of *Theodoxus prevostianus* in Romania. Nevertheless, the samples of that species collected by Kálmán Csák in 1980 may have resulted from a more abundant and still alive population from Răbăgani.

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