Revision of the Eocene decapod crustaceans deposited in the Liptov Museum Čierny Orol (Liptovský Mikuláš, Slovakia)

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Revízia eocénnych desaťnožcov (Crustacea: Decapoda) deponovaných v Liptovskom múzeu Čierny Orol (Liptovský Mikuláš, Slovensko)

Abstract: Decapod crustaceans originating from the Eocene strata of the Borové Formation of the Liptovská kotlina Depression and deposited in the Liptov Museum – Čierny Orol in Liptovský Mikuláš, Slovakia were re-examined. Two taxa, *Lophoranina reussi* (Raninidae) and *Harpactoxanthopsis quadrilobata* (Zanthopsidae), were identified. In the latter, sexual dimorphism was observable in the nature of abdomina. Additional field works in the studied area may provide more data on the already known decapod association.

Key words: Decapod crustaceans, Slovakia, Liptovská kotlina Depression, Borové Formation, Eocene, *Lophoranina*, *Harpactoxanthopsis*

1. INTRODUCTION

The aim of this short contribution is to report on the fossil decapod crustaceans deposited in the Liptov Museum – Čierny Orol in Liptovský Mikuláš (northern Slovakia). In the past, decapod crustaceans were neglected in the systematic studies on fossil faunas from Slovakia. Except rather informative mentions on the occurrences of decapods at studied localities, there were almost no systematic treatments focused on this group. This contribution should be considered as a part of the revision of fossil decapod crustaceans deposited in Slovak museums conducted by the author.

2. DECAPOD CRUSTACEANS OF THE BOROVÉ FORMATION

The Borové Formation (Gross et al., 1984) of the Subtatric Group is known of several crab genera (infraorder Brachyura) coming from several different localities where the Middle and Upper Eocene rocks are exposed.

The first mention of the presence of fossil decapod crustaceans in this formation is that by Reuss (1859) who described *Ranina hazslinskyi* from Radács (today Radatice, eastern Slovakia) on the basis of one rather poorly preserved specimen. The lithostratigraphic unit, in which the specimen was found, was later formally named as the Tomášovce Member and its age was estimated as predominantly Latest Priabonian (Filo & Siráňová, 1996). Several brachyuran genera were identified in the strata of this lithostratigraphic unit coming mostly from the Ďurkovec stratotype locality (1 km south of Spišské Tomášovce) in the Spišská Nová Ves district (Hyžný, 2007).

Remains of the decapod crustaceans from the Middle Eocene strata of the Borové Fm of the Liptovská kotlina Depression have been known since the work by Dornyay (1913) who reported the presence of *Harpactoxanthopsis quadrilobata* (Desmarest, 1822) at the Mních locality near the Ružomberok town (formerly Rózsahegy). Later, the presence of the species was confirmed by Lőrenthey & Beurlen (1929) and Papšová (1970). Lőrenthey & Beurlen (1929) mentioned two more species from the same area: *Raninoides fabianii* (Lőrenthey in Lőrenthey & Beurlen, 1929) and *Harpactocarcinus punctulatus* A. Milne-Edwards, 1862.

Dornyay (1913) also reported decapods from the Upper Eocene strata of the Ružomberok area. He identified *Lophoranina bittneri* (Lőrenthey, 1902) and *L. reussi* (Woodward, 1866). However, re-examination of the material presented here revealed the presence of *L. reussi* only.

Additional indeterminate decapod remains at several other localities of presumed Middle to Late Eocene age of the Liptovská kotlina Depression were reported by Papšová (1970, 1975, 1978).

It should be noted that except the systematic treatments of Reuss (1859) and Lőrenthey & Beurlen (1929), nearly all mentions on the decapod crustacean remains in the Borové Fm have informative character only. Since, no re-examination of the known decapod material has been conducted.

3. MATERIAL STUDIED

Material presented here is that originally described by Dornyay (1913). It is deposited in the Liptov Museum – Čierny Orol in Liptovský Mikuláš (PEV). One specimen of *Harpactoxanthopsis quadrilobata* is deposited in the Natural History Museum of

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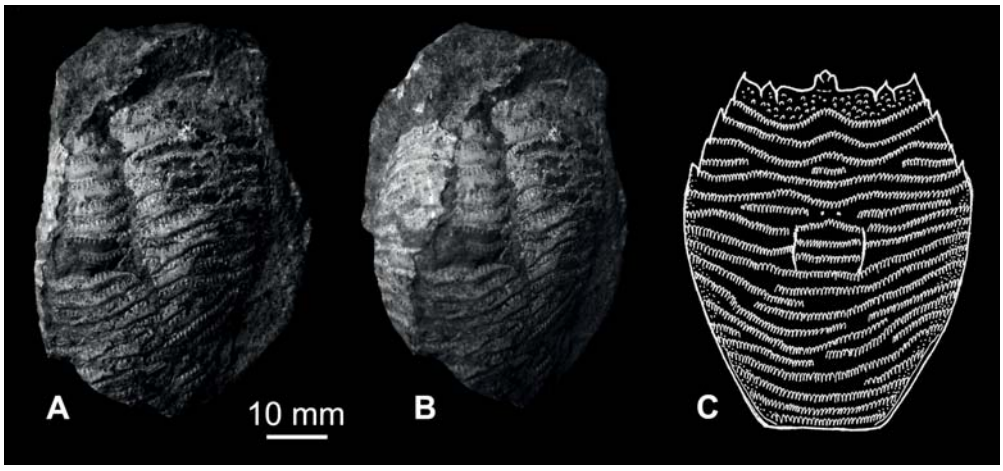

Fig. 1. ***Lophoranina reussi*** **(Woodward, 1866); A, B – two views on the broken and deformed dorsal carapace (PEV P–1538/2); C – reconstruction of dorsal carapace partly based on Beschin et al. (1988).**
Obr. 1. ***Lophoranina reussi*** **(Woodward, 1866); A, B – dva pohľady na polámaný a deformovaný dorzálny karapax (PEV P–1538/2); C – rekonštrukcia dorzálneho karapaxu čiastočne podľa Beschina et al. (1988).**

Slovak National Museum in Bratislava (SNM Z–277), which actually represents a near-complete female individual figured by Dornyay (1913, pl. 2, fig. 7) and later re-figured by Lőrenthey & Beurlen (1929, pl. 9, fig. 4). The specimen was given to SNM in 1955 as a gift from the Liptov Museum, however, without any further reference except the locality (P. Klepsatel, pers. comm. 2006).

The studied collection consists of up to 30 specimens coming from several localities of the Ružomberok surroundings in the Liptovská kotlina Depression, namely Mních, Klein's quarry and Kubala's quarry. The material was donated the 8th of October 1913 and is ascribed to Béla Dornyay or „brothers Kürti". In the documentation of the museum the presence of several different species is mentioned, specifically *Ranina bittneri*, *Ranina reussi*, *Palaeocarpilius* sp., *Harpactocarcinus quadrilobatus* and *Xanthopsis* sp. However, the re-examination of the material presented here revealed that most material is referable to the species treated in current taxonomy (Schweitzer et al., 2010) as *Harpactoxanthopsis quadrilobata*; other remains belong to *Lophoranina reussi*. As mentioned above, Dornyay (1913) and Lőrenthey & Beurlen (1929) reported also several other brachyuran taxa coming from the same area and strata. Unfortunately, no field work focused on fossil decapod crustaceans have been conducted in the area in last decades.

4. SYSTEMATIC PART

The systematic arrangements proposed by Martin & Davis (2001) and De Grave et al. (2009) are adopted.

Subphylum Crustacea Brünnich, 1772
Class Malacostraca Latreille, 1802
Order Decapoda Latreille, 1802
Infraorder Brachyura Linnaeus, 1758
Section Raninoida De Haan, 1839
Family Raninidae De Haan, 1839
Subfamily Raninae De Haan, 1839
Genus *Lophoranina* Fabiani, 1910
Type species: *Ranina marestiana* König, 1825

Lophoranina reussi **(Woodward, 1866)**
Fig. 1A-C

1859 – *Ranina* sp. – Reuss, p. 21, pl. 5, figs. 3-4
*1866 – *Ranina Reussii* Woodward, p. 591
2006 – *Lophoranina reussi* (Woodward) – De Angeli & Garassino, p. 35 (cum. syn.)
2009 – *Lophoranina reussi* (Woodward) – De Angeli et al., p. 121
2010 – *Lophoranina reussi* (Woodward) – Schweitzer et al., p. 74

Material: Six specimens of indeterminate sex (PEV P–1503; P–1505; P–1515/1–2; P–1538/1–3). Preservation is rather poor and most specimens represent fragments only. One fragment represents pterygostomial region. The only near-complete specimen (PEV P–1538/2–3) lacks the frontal margin and is broken and deformed (Fig. 1A–B).

Description: Dorsal carapace longitudinally ovate, weakly vaulted, longer than wide, widest in the anterior half at the position of anterolateral spines; frontal margin and rostrum not preserved. Regions not well defined, branchiocardiac groove is the only discernible furrow. The entire surface of carapace covered with subparallel transverse ridges. The spines on the ridges closely spaced. First anterior ridges are sinuous and continuous, ridges of the posterior half of the carapace discontinuous.

Remarks: Species within the genus *Lophoranina* are distinguished from one another based on the characters of rostrum, frontal and anterolateral margins and the development and pattern of the carapace transverse ridges (Feldmann et al., 1998, p. 4; Vega et al., 2001, p. 932). Although none of the present specimens possesses a preserved frontal margin, the carapace ridges

are visible enough for the specific determination. *Lophoranina reussi* has complex, rather discontinuous ridges; however, the first three ridges are continuous and distinctly sinuous (Beschin et al., 1988, 2004). The ridges are more discontinuous on the posterior half of the carapace. All these characters are present on studied specimens and therefore allow the assignment of the specimens to this species.

Dornyay (1913) reported two species of *Ranina* – *R. reussi* and *R. bittneri* (both are today classified within the genus *Lophoranina*) from the Upper Eocene of the Ružomberok area. However, the material deposited in the Liptov Museum belongs to a single species only. The presence of *L. bittneri* in the studied area cannot be ruled out until additional field work being done.

Lophoranina reussi is known from the Middle to Upper Eocene rocks of Italy (De Angeli & Garassino, 2006), Spain (Vía Boada, 1969), Hungary (Lőrenthey & Beurlen, 1929) and Slovakia (Dornyay, 1913).

Section Eubrachyura de Saint Laurent, 1980
Subsection Heterotremata Guinot, 1977
Superfamily Carpilioidea Ortmann, 1893
Family Zanthopsidae Vía Boada, 1959
Genus *Harpactoxanthopsis* Vía Boada, 1959
Type species: *Cancer quadrilobatus* Desmarest, 1822

Harpactoxanthopsis quadrilobata (Desmarest, 1822)
Fig. 2A–F

*1822 – *Cancer quadrilobatus* Desmarest, p. 93, pl. 8, figs. 1-2
2009 – *Harpactoxanthopsis quadrilobata* (Desmarest) – Beschin et al., p. 70 (cum. syn.)
2010 – *Harpactoxanthopsis quadrilobatus* (Desmarest) – Schweitzer et al., p. 117

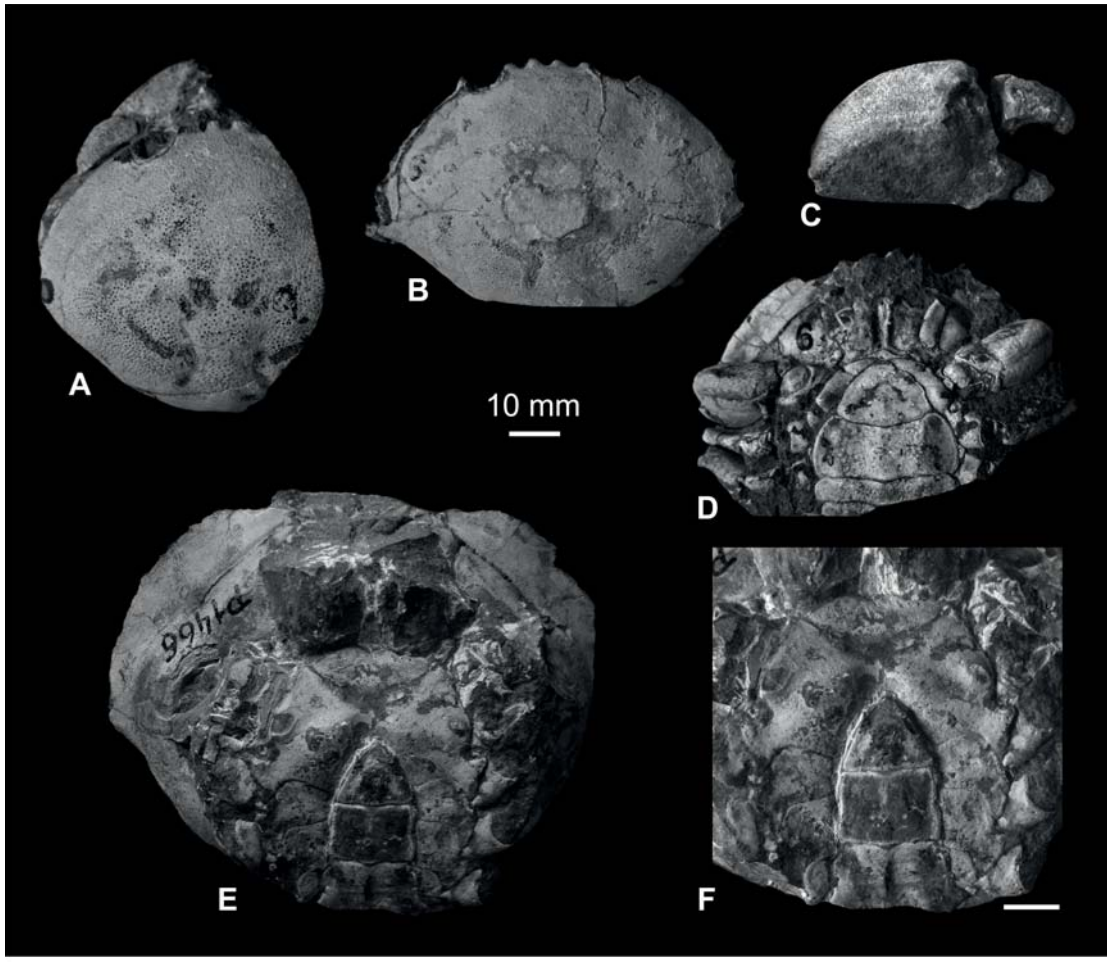

Fig. 2. ***Harpactoxanthopsis quadrilobata*** **(Desmarest, 1822); A – fragmented dorsal carapace with portion of left cheliped of an individual of indeterminate sex (PEV P–1475/2); B – fragmented dorsal carapace of female (PEV P–375/2); C – right propodus and dactylus of major chela (PEV P–1462/5); D – ventral surface of female (PEV P–375/2); E – ventral surface of male (PEV P–1466); F – detail of ventral surface of male (PEV P–1466). Scale bar (10 mm) for A–E; separate scale bar for F equals also 10 mm.**

Obr. 2. ***Harpactoxanthopsis quadrilobata*** **(Desmarest, 1822); A – fragmentovaný dorzálny karapax s čiastočne zachovaným ľavým klepetom jedinca neznámeho pohlavia (PEV P–1475/2); B – fragmentovaný dorzálny karapax samičky (PEV P–375/2); C – pravý propodus a dactylus veľkého klepeta (PEV P–1462/5); D – ventrum samičky (PEV P–375/2); E – ventrum samčeka (PEV P–1466); F – detail ventra samčeka (PEV P–1466). Mierka (10 mm) pre A–E; samostatná mierka pre F taktiež reprezentuje 10 mm.**

Tab. 1. Measurements (in mm) taken on the dorsal carapace of *Harpactoxanthopsis quadrilobata* (Desmarest, 1822). F = female; M = male; ? = indeterminate sex; W1 = maximum carapace width; W2 = width of posterior margin; W3 = fronto-orbital width measured between outer orbital spines; W4 = width of frontal margin measured between inter orbital spines; W5 = orbital width; L1 = maximum carapace length; L2 = length from anterior to position of maximum carapace width.

Tab. 1. Merané parametre (v mm) na dorzálnych karapaxoch druhu *Harpactoxanthopsis quadrilobata* (Desmarest, 1822). F = samička; M = samček; ? = pohlavie neznáme; W1 = maximálna šírka karapaxu; W2 = šírka posteriórneho okraja; W3 = fronto-orbitálna šírka meraná medzi vonkajšími orbitálnymi tŕňmi; W4 = šírka frontálneho okraja meraná medzi vnútornými orbitálnymi tŕňmi; W5 = šírka orbity; L1 = maximálna dĺžka karapaxu; L2 = dĺžka od predného okraja po maximálnu šírku karapaxu.

(PEV)	sex	W1	W2	W3	W4	W5	L1	L2
P–374	F	> 120	32.2	-	-	-	> 91	48
P–375/1	F	79	21.1	-	-	8.2	60	31
P–375/2	F	71.6	-	33.3	16.1	8	> 50	34.6
P–375/3	F	> 70	25.7	-	-	-	> 61	-
P–376	F	> 65.6	21.2	30.8	16.8	6.9	50.9	27.2
P–1462/0	F	-	>26	-	-	-	-	-
P–1462/1	F	-	23.7	-	-	-	71	-
P–1462/2	F	> 90	-	-	-	-	> 60	-
P–1465	?	> 50	-	28	13.4	7.5	38.6	22.7
P–1466	M	> 100	-	~ 45	-	10.9	-	-
P–1475/1	F	> 105	-	~ 48	26	11.8	> 90	63
P–1475/2	?	> 60	-	-	>15	6.9	53.6	30
P–1491	?	82	-	-	-	9	60.4	29.4
P–1524	?	~ 110	-	-	-	-	82,6	46
P–1525/1	M	> 85	29.6	43	-	11.4	> 73	> 48
P–1525/2	F	> 101	-	-	24.4	12	73	43
P–1525/3	?	58	-	30.2	16.4	6.4	> 35	22

Material: Dorsal carapaces (usually also with preserved venter) of two male specimens (PEV P–1466; P–1525/1), ten female specimens (PEV P–374; P–375/1–3; P–376; P–1462/0–2; P–1475/1; P–1525/2), and five specimens of indeterminate sex (PEV P–1465; P–1475/2; P–1491; P–1524; P–1525/3); isolated cheliped fragments: one right carpus (PEV P–1462/3), three fragmented right propodi (PEV P–1462/4; P–1462/6–7), one right propodus with articulated dactylus (PEV P–1462/5). For measurements see Tab. 1.

Description: Dorsal carapace wider than long, rounded pentagonal in outline (Fig. 2A–B); front with four blunt spines including inner orbital spines; orbits circular, entire, weakly rimmed, directed forward; anterolateral margin convex, with three spines excluding outer orbital spine; posterolateral margin entire, straight, weakly concave, or weakly convex; posterior margin entire, narrow, straight. Carapace regions poorly defined; branchiocardiac groove well-defined along lateral margins of cardiac region. Entire carapace surface covered with numerous small pits.

Sternum distinctly longer than wide; the first and second sternites forming triangle; the grooves between the second and third sternites forming together with median groove distinct „Y" (Fig. 2E–F). Male abdomen narrow; abdominal somites three-five fused, sixth abdominal somite square, telson triangular (Fig. 2E–F). Female abdomen covers nearly the entire surface of the sternum, all somites free; the sixth somite widest, its lateral margins enlarged and distinctly convex; telson triangular and rounded (Fig. 2D).

Right cheliped is robust. Manus triangular in outline, with distinct spine on the lower margin positioned proximally (Fig. 2C), the upper margin with several tubercles on the inner side.

Remarks: The material presented here exhibits all diagnostic features of the species, namely the overall shape of the carapace, the number of anterolateral spines, characters of male abdomen and the nature of chelipeds. Sexual dimorphism is typically exhibited in the nature of abdomen (Fig. 2D–F). *Harpactoxanthopsis quadrilobata* is strongly heterochelous. Interestingly, all cheliped fragments presented here belong to large right chelae. Also, many figures in the literature (Lőrenthey & Beurlen, 1929, pl. 9, fig. 3; Glaessner, 1969, fig. 326.10b; Beschin et al., 1998; Tarlao, 2000, fig. 2A, C) show specimens with right cheliped being larger. On the other hand, the above mentioned specimen (SNM Z–277) is left-handed.

The material assignable to this species was treated in the documentation of the museum under several different taxonomic names (see above). However, it clearly belongs to the same species. All studied specimens, even fragmented ones, possess diagnostic characters of *H. quadrilobata* as discussed above.

The species is known from the Middle Eocene (Lutetian) of Italy, Spain, France, Germany, Hungary, Slovakia, Croatia, and Albania (Lőrenthey & Beurlen, 1929; De Angeli & Garassino, 2006).

5. CONCLUSIONS

Both species discussed are well known Eocene taxa. The present short contribution gives new data on the material from Slovakia, which has until now been insufficiently or wrongly described (Dornyay, 1913). It presents the results of the study of already deposited material only and no subsequent field work has been done. This should be the aim of future research in the studied area. As indicated by Lőrenthey & Beurlen (1929), decapod crustacean association from the Eocene strata of the Liptovská kotlina Depression consists of at least four different taxa (see above). If compared with other studied coeval decapod faunas of Italy (De Angeli & Garassino, 2006 and references therein) and Spain (Vía Boada, 1959, 1969), a higher decapod diversity than already known may be revealed through future field research of the Liptovská kotlina Depression.

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References

Beschin C., Busulini A., De Angeli A. & Tessier G., 1988: Raninidae del Terziaro berico-lessineo (Italia settentrionale). *Lavori – Società Veneziana di Scienze Naturali*, 12, 155–215.

Beschin C., Busulini A., De Angeli A., Tessier G. & Ungaro S., 1998: Crostacei eocenici di „Cava Rossi" presso Monte di Malo (Vicenza – Italia settentrionale). *Studi Trentini di Scienze Naturali – Acta Geologica*, 73, (1996), 7–34.

Beschin C., Busulini A., De Angeli A. & Tessier G., 2004: The Eocene decapod crustacean fauna of „Main" quarry in Arzignano (Vicenza – NE Italy) with the description of a new species of Raninidae. *Lavori – Società Veneziana di Scienze Naturali*, 29, 109–117.

Beschin C., De Angeli A. & Zorzin R., 2009: Crostacei fossili del Veneto: una inedita fauna eocenica dei Lessini orientali (Monte Serea di San Giovanni Ilarione, Verona), con descrizione di tre nuove specie. *Bollettino del Museo Civico di Storia Naturale di Verona*, 33, 59–83.

Brünnich M.Th., 1772: Zoologiae fundamenta praelectionibus academicis accomodata. Grunde i Dyrelaeren. Apud Frider. Christ. Pelt., Hafniae et Lipsiae, Copenhagen and Leipzig, 254 p.

De Angeli A. & Garassino A., 2006: Catalog and bibliography of the fossil Stomatopoda and Decapoda from Italy. *Memorie della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano*, 35, 1, 1–95.

De Angeli A., dall'Igna G.L. & Ceccon L., 2009: Segnalazione di *Ranina* sp. (Decapoda, Brachyura, Raninidae) dell'Eocene superiore di Monte di Malo (Vicenza, Italia settentrionale). *Lavori – Società Veneziana di Scienze Naturali*, 34, 119–122.

De Grave S., Pentcheff D.N., Ahyong S.T., Chan T.-Y., Crandall K.A., Dworschak P.C., Felder D.L., Feldmann R.M., Fransen C.H.J.M., Goulding L.Y.D., Lemaitre R., Low M.E.Y., Martin J.W., Ng P.K.L., Schweitzer C.E., Tan S.H., Tshudy D. & Wetzer R., 2009: A classification of living and fossil genera of decapod crustaceans. *The Raffles Bulletin of Zoology*, Supplement 21, 1–109.

De Haan W., 1833-1850: Crustacea. *In:* von Siebold P.F. (Ed.): Fauna Japonica sive Descriptio Animalium, quae in Itinere per Japoniam, Jussu et Auspiciis Superiorum, qui summum in India Batava Imperium Tenent, Suscepto, Annis 1823–1830 Collegit, Notis, Observationibus et Adumbrationibus Illustravit, A. Arnz, London, i-xvii, i-xxxi, ix-xvi, 1–243, 1–55.

Desmarest A.G., 1822: Les crustacés proprement dits. *In:* Brongniart A. & Desmarest A.G. (Eds.): Histoire naturelle des crustacés fossiles sous les rapports zoologiques et géologiques. Paris: F.-G. Levrault, 67–154.

de Saint Laurent M., 1980: Sur la classification et la phylogénie des Crustacés Décapodes Brachyoures. I. Podotremata Guinot, 1977, et Eubrachyura sect. nov. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences, Paris, (D)*, 290, 1265–1268.

Dornyay B., 1913: Rózsahegy környékének földtani viszonyairól. Budapest, 51 p.

Fabiani R., 1910: I crostacei terziarî del Vicentino. *Bolletin Museo Civico Vicenza*, 1, 1, 29–45.

Feldmann R.M., Bice K.L., Schweitzer-Hopkins C., Salva E.W. & Pickford K., 1998: Decapod crustaceans from the Eocene Castle Hayne Limestone,

North Carolina: Paleoceanographic implications. *Paleontological Society Memoir*, 48, 1–28.

Filo I. & Siráňová Z., 1996: The Tomášovce Member – A new litostratigraphic unit of the Subtatric Group. *Geologické práce, Správy*,102, 41–49 (in Slovak).

Glaessner M.F., 1969: Decapoda. *In:* Moore R.C. (Ed.): Treatise on Invertebrate Paleontology, Part R. Arthropoda 4 (2). Geological Society of America and the University of Kansas Press, Lawrence, R399–R533, R626–R628.

Gross P., Köhler E. & Samuel O., 1984: A new lithostratigraphical division of the Inner-Carpathian Paleogene. *Geologické Práce, Správy*, 81, 103–107 (in Slovak).

Guinot D., 1977: Propositions pour une nouvelle classification des Crustacés Décapodes Brachyoures. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences, Paris, (D)*, 285, 1049–1052.

Hyžný M., 2007: Paleogene crab fauna of Borové Formation (localities Ďurkovec and Hlinisko), Western Carpathians, Slovakia. *In:* Garassino A., Feldmann R. & Teruzzi G. (Eds.): 3rd Symposium on Mesozoic and Cenozoic Decapod Crustaceans – Museo di Storia Naturale di Milano. *Memorie della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano*, 35, 2, 59–61.

König C., 1825: Icones fossilum sectiles. G. B. Sowerby, London, 1–4.

Latreille P.A., 1802: Histoire naturelle générale et particulière des Crustacés et des Insectes, 3, 1–467.

Linnaeus C., 1758: Systema Naturae per Regna Tria Naturae, Secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis, Synonymis, Locis, (10 Edition), Vol. 1, i–iii, 1–824.

Lőrenthey E., 1902: Neuere Beiträge zur Tertiären Dekapodenfauna Ungarns. *Mathematische und Naturwissenschaftliche Berichte aus Ungarn*, 18, 98–120.

Lőrenthey E. & Beurlen K., 1929: Die fossilen Dekapoden der Länder der Ungarischen Krone. *Geologica Hungarica, Series Palaeontologica*, 3, 1–421.

Martin J.W. & Davis G.E., 2001: An updated classification of the Recent Crustacea. *Natural History Museum of Los Angeles County, Science Series*, 39, 1–124.

Milne-Edwards A., 1862: Monographie des Crustacés de la famille Cancériens. *Annales des Sciences Naturelles, Zoologie,* 4, 18, 31–85.

Ortmann A.E., 1893: Die Decapoden-Krebse des Strassburger Museums, mit besonderer Berücksichtigung der von Herrn Dr. Döderlein bei Japan und bei den Liu-Kiu-Inseln gesammelten und zur Zeit im Strassburger Museum aufbewahrten Formen. VII. Theil. Abtheilung: Brachyura (Brachyura genuina Boas) II. Unterabtheilung: Cancroidea, 2. Section: Cancrinea, 1. Gruppe: Cyclometopa. *Zoologische Jahrbücher. Abteilung für Systematik, Geographie und Biologie der Thiere*, 7, 3, 411–495.

Papšová J., 1970: Palaeogene macrofauna of the Liptov Depression: Ružomberok (1:50 000). Final report, Manuscript, archive GÚDŠ, Bratislava, 30 p. (in Slovak).

Papšová J., 1975: Macrofauna of the middle part of the Liptov Depression: Huty, Demänová, Smrečany, Liptovský Hrádok. Partial report, Manuscript, archive GÚDŠ, Bratislava, 41 p. (in Slovak).

Papšová J., 1978: Paleogene macrofauna of the eastern part of the Liptov Depression. Partial report, Manuscript, archive GÚDŠ, Bratislava, 56 p. (in Slovak).

Reuss A.E., 1859: Zur Kenntnis fossiler Krabben. *Denkschriften der kaiserlichen Akademie der Wissenschaften Wien*, 17, 1–90.

Schweitzer C.E., Feldmann R.M., Garassino A., Karasawa H. & Schweigert G., 2010: Systematic list of fossil decapod crustacean species. *Crustaceana Monographs*, 10, 1–222.

Tarlao A., 2000: Considerazioni sui decapodi brachiuri dell'Istria e Loro attribuzione a *Harpactoxanthopsis quadrilobata* (Desmarest, 1822). *Natura Nascosta*, 21, 29–34.

Vega F.J., Cosma T., Coutiño M.A., Feldmann R.M., Nyborg T.G., Schweitzer C.E. & Waugh D.A., 2001: New middle Eocene decapods (Crustacea) from Chiapas, Mexico. *Journal of Paleontology*, 75, 5, 929–946.

Vía Boada L., 1959: Decápodos fósiles del Eoceno español. *Boletín del Istituto Geológico y Minero de España*, 70, 331–402.

Vía Boada L., 1969: Crustacéos Decápodos del Eoceno español. *Pirineos*, 91–94, 1–479.

Woodward H., 1866: Note on a new species of *Ranina* (*Ranina porifera*) from the Tertiary strata of Trinidad. *Quarterly Journal of the Geological Society of London*, 22, 591–592.

Resumé: Príspevok reviduje fosílny materiál desaťnožcov uložený v Liptovskom múzeu Čierny Orol v Liptovskom Mikuláši, pochádzajúci z vrstiev borovského súvrstvia stredného a vrchného eocénu okolia mesta Ružomberok. Z borovského súvrstvia sú zvyšky desaťnožcov známe už z 19. storočia (Reuss, 1859), neskôr im bola venovaná pozornosť na stratotypovej lokalite sedimentárneho člena tomášovských vrstiev – Ďurkovec (Hyžný, 2007). Z dlhodobého hľadiska sa systematickému výskumu desaťnožcov na území Slovenska venovala v minulosti iba veľmi malá pozornosť, pričom v odborných prácach má spomenutie výskytu fosílnych desaťnožcov skôr informatívny charakter.

Študovaný materiál eocénnych desaťnožcov z okolia Ružomberka bol v krátkosti opísaný už Dornyayom (1913), odvtedy však k jeho revízii nedošlo. Materiál pochádza z troch lokalít: Mních, Kleinov lom a Kubalov lom. Vyhodnotené boli fosílne zvyšky asi tridsiatich jedincov. Aj napriek nie práve najlepšiemu zachovaniu ich je možné systematicky zaradiť do dvoch taxónov infraradu Brachyura (kraby): *Lophoranina reussi* (Woodward, 1866) a *Harpactoxanthopsis quadrilobata* (Desmarest, 1822). Väčšina materiálu patrí druhu *H. quadrilobata*, pričom ide najmä o dorzálne karapaxy obvykle zachované aj s ventrom, takže je možné určiť pohlavie na základe znakov na zadočku. Druh *L. reussi* je reprezentovaný iba viac-menej fragmentárnym materiálom, v jednom prípade ide o takmer kompletný deformovaný dorzálny karapax. Oba taxóny sú dobre známe zo sedimentov eocénneho veku Európy a v oboch prípadoch ide o zástupcov vyhynutých rodov.

Z okolia Ružomberka uvádzajú zo sedimentov eocénneho veku Lőrenthey & Beurlen (1929) prítomnosť ďalších taxónov: *Raninoides fabianii* (Lőrenthey in Lőrenthey & Beurlen, 1929) a *Harpactocarcinus punctulatus* A. Milne-Edwards, 1862. Podobne Dornyay (1913) uvádza tiež výskyt druhu *Lophoranina bittneri* (Lőrenthey, 1902). V zbierkovom fonde Liptovského múzea sa však zvyšky týchto taxónov nenachádzajú. Potvrdenie ich výskytu v študovanej oblasti ako aj ďalšie poznatky o ich vzťahu k revidovaným druhom by mal priniesť ďalší terénny výskum.