



Eocene sea cows (Sirenia, Mammalia) from Hungary

by
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Abstract – Although the territory of Hungary is rich in Eocene sea cow remains, there are only few among the sporadic finds that hold significant systematic value. Because several new taxa have been described from the area in the past and new discoveries shed light on some important phylogenetic lineages, the author has attempted a revision of the most important sirenian remains of Hungary. Four taxa can be distinguished in the Eocene of Hungary: *Sirenavus hungaricus* KRETZOI (including *Paralitherium tarkanyense* KORDOS), *Anisosiren pannonica* KORDOS, *Sirenia* indet. I (earlier: *Protosiren*), and *Sirenia* indet. II (earlier: *Eotheroides* or “large form”). The present paper includes a list of all Eocene *Sirenia* finds from Hungary housed in State collections and in private hand.

Key words – Mammalia, Sirenia, Eocene, Hungary.

KORDOS, L. (2002): Eocene sea cows (Sirenia, Mammalia) from Hungary — *Fragmenta Palaeontologica Hungarica*, 20: 43–48.

Introduction

A large number of Eocene sea cow localities are known from the present territory of Hungary (Table 1). Three new genera and species, *Sirenavus hungaricus* KRETZOI, 1941; *Paralitherium tarkanyense* KORDOS, 1977 and *Anisosiren pannonica* KORDOS, 1979 have been described on the basis of poorly preserved material, while some well known taxa, e.g. *Protosiren* and *Eotheroides* were recognized (KORDOS 1978, 1980, 1981, 1983). During the past twenty years some of the old material became available for further preparations and thus, important anatomical details became uncovered. The new fundamental discoveries in Egypt, Pakistan and Jamaica opened a wider and

new horizon in our understanding of the phylogeny and systematics of the *Sirenia* (DOMNING 1994, 2001; DOMNING & CLARK 1993; DOMNING & GINGERICH 1994; GINGERICH et al. 1994, 1995; SAVAGE et al., 1994). These factors have necessitated a critical revision of the previous results of research on the Eocene *Sirenia* in Hungary.

Abbreviations: MÁFI = Magyar Állami Földtani Intézet (Geological Institute of Hungary); MTM = Magyar Természettudományi Múzeum, Föld- és Őslénytár (Hungarian Natural History Museum, Geological and Palaeontological Department)

Systematics

Sirenavus hungaricus KRETZOI, 1941

The type specimen of *Sirenavus hungaricus* KRETZOI, 1941 is a cranium (lacking premaxilla and teeth) articulated with the posterior parts of the left and right mandibles (including the fragment of M_3) as well as some ribs from the Middle Eocene of Felsőgalla, Hungary. KRETZOI (1941) did not have the chance to study the squamosal, jugal, zygomatic and mandibular parts of the specimen because they were largely covered by the embedding limestone. Further preparation of the type specimen in 1978 allowed observation of the fragmentary mandibles (KORDOS 1981). The ribs were lost between the two phases of examination.

Sirenavus hungaricus was the first nominal species and genus of sea cows from the Eocene of the Carpathian Basin. Following its scientific description, the vast majority of the remains of medium-sized Eocene sirenians were classified into the genus *Sirenavus* (MOTIL 1944; BALOGH & RÓNAI 1965; KORDOS 1983, 1985, 1992).

KORDOS (1977) described *Paralitherium tarkanyense* as a

new genus and species from the Late Eocene deposits of Felsőtárkány, N Hungary. At that time the mandibles of the type specimen of *Sirenavus hungaricus* had not yet been prepared and thus, the two specimens could not be compared.

Close to the site of the type locality of *Paralitherium* (western part of the Kis-Eged Hill at town Eger, North Hungary), a lower third molar (MÁFI V.15359) was found by F. Legányi in Late Eocene deposits in 1935 (KORDOS 1985). The associated blocks of M_3 contained vertebrae and ribs, and after preparation of the blocks an innominate bone in articulation with the femur was uncovered. Based on the great morphological similarity of the newly found M_3 to the type specimen of *Sirenavus*, KORDOS (1985) allocated it to the genus *Sirenavus*.

In the light of the new information on the old material the following specimens are hereby included in the genus *Sirenavus* on the basis of shared morphological characters: (1) type of *Sirenavus hungaricus*, Middle-Eocene, Felsőgalla [Tatabánya],

(KRETZOI 1941; KORDOS 1981), (2) type of *Paralitherium tarkamyense*, Late Eocene, Felsőtárkány (KORDOS 1977), (3) specimen of the Legányi Coll., Late Eocene, Eger – Kis-Eged (KORDOS 1985), (4) “*Sirenavus* or *Eotheroides*”, MTM V.60.685, Middle Eocene, Tatabánya Basin (KORDOS 1983), (5) “*Eotherium* or *Prototherium*”, Late Eocene, Kolozsvár [Cluj-Napoca], (TULOGDY 1944).

Cranium — The premaxillae contact frontals; the zygomatic-orbital bridge of the maxilla is low, less than 1 cm above the palate; the nasals are large and meet in the midline; the supraorbital process of the frontal is well developed and has a prominent, dorsoventrally flattened posterolateral corner; the frontal roof is convex; the sagittal crest is probably absent [According to KRETZOI (1941), but recently this part of the bone is missing]; the endocranial sagittal suture is well developed; the post-tympanic process of the squamosal is absent; the sigmoid ridge is present and well developed; the retroversal process of the squamosal is probably present and moderately inflected; the medial side of the zygomatic process of the squamosal is not swollen, appears relatively concave and inclined inward dorsally; the posterior process of the jugal is lower than the diameter of the orbit; the posterior border of the palatine is not incised but slightly concave; the palatines extend anteriorly beyond the posterior edge of the zygomatic/orbital ridge.

Mandibles — The mandibular symphysis is antero-posteriorly elongated, laterally compressed, with narrow masticatory surface; the symphyseal surface is deflected at about 45° to the occlusal plane; the mental foramen is large; the number of accessory mental foramina is three to four; the horizontal ramus of the mandible is relatively short antero-posteriorly, compressed laterally; the coronoid process is high, very narrow and extends anterior to its base above M₃; the mandibular canal is large, bean-shaped in cross-section, and opens posteriorly.

Dentition — Among the upper molars M² is the largest as determined by the alveolar surface; among the lower molars M₃ is the largest; shape of M₃ is elongated with alternate lophid system; in M₃ the proto- and metalophulids are well developed and they are separated by a deep transverse crest; the hypoconulid of M₃ is an independent, asymmetric, divided or undivided cusp; four premolars (represented as roots) and three molars are present on the masticatory surface of the mandible; the dental formula is probably 3.1.5.3 both in the upper and lower jaws.

Thoracic vertebrae — The corpus is relatively short anteroposteriorly and broad transversally; the centrum is dorsoventrally compressed, with a concave dorsal and convex ventral surface. The neural canal is dorsoventrally low. On the ventral side it has an arched, flat crest that is crescent-shaped in cross section. The diapophyses are extremely short and drop-shaped. In the dorsal part of the diapophysis a slight depression separates the rudiments of the anapophysis and metapophysis. The anterior and posterior zygapophyses are short. The neural spine is probably well developed.

Ribs — The cross-section of the distal and middle parts of the ribs is rectangularly arched and compact. The proximal part

is narrower than the thicker middle or distal ones. The capitulum is divided by the capitis into two facies of unequal size. Distally from the tuberculum the corpus is gradually increasing in diameter. According to MÖTTL (1944) the ribs of the type specimen of *Sirenavus hungaricus* had a low degree of pachyostosis, their cross section was compressed anteroposteriorly and elliptical.

Innominate bone — It has a rod-like ilium, a flattened and well-developed ischium and pelvis; the acetabulum is large, distinct and elliptical; the obturator foramen must have been present.

Femur — The shaft of the femur is straight, antero-posteriorly flattened; the caput femoris is well-developed, elliptical with distinct margins; the neck is short; the femur has a distinct greater and probably a lesser trochanter; the patellar surface is present.

Discussion and conclusion — The following minor morphological differences exist between the type specimen of the Middle Eocene *Sirenavus hungaricus* and the Late Eocene “*Paralitherium*” individuals: (1) The distance between the posterior end of M₃ and the anterior margin of the coronoid process is greater with the Middle Eocene holotype than with the Late Eocene specimens. (2) The deep crest between the postero- and mesolophids of M₃ is interrupted by a cristid that does not form a connection between them in the *S. hungaricus* type specimen. The same cristid is better developed with the MÁFI V.15359 specimen and connects the postero- and mesolophids. (3) The M₃ hypoconulid lophule is undivided in the type specimen of *S. hungaricus* whereas it is divided in two parts in MÁFI V.15359.

The differences in character states between the *Sirenavus hungaricus* holotype and the type specimen of *Paralitherium tarkamyense*, and the other specimens discussed above are not significant. Consequently, *Paralitherium tarkamyense* is a synonym of *Sirenavus hungaricus* and not a separate species of *Sirenavus* as stated before (KORDOS 1999).

Among the Eocene taxa, *Sirenavus* stands closest to the cranium of *Eotheroides aegyptiacum* (OWEN) figured by ABEL (1913, Taf. I. 2., Taf. II. 1-2., Ind. III.) as concluded from the shared morphological characters, which are as follows: (1) the premaxillae contact the frontals; (2) the zygomatic-orbital bridge of the maxilla is low; (3) the nasals meet in the midline; (4) the supraorbital process of the frontal is well-developed with a prominent, dorsoventrally flattened posterolateral corner; (5) frontal roof is convex; (6) the sigmoid ridge is present and well-developed; (6) the processus retroversus of the squamosal is present and moderately inflected; (7) the posterior process of the jugal is lower than the diameter of the orbit; (8) the posterior border of palatine is not incised but slightly concave; (9) the palatines extend anteriorly beyond the posterior edge of the zygomatic-orbital bridge. Important difference between the skulls of both taxa is that the frontal roof of *Sirenavus hungaricus* is deeper in comparison with *Eotheroides aegyptiacum*.

The very evolved, recently described *Halitherium taulanense* SAGNE, 2001 from the Upper Eocene of France has some morphological similarities with the *Sirenavus*.

Sirenavus is a small-sized Sirenia regarded as primitive, because its premaxillae contact the frontals; the large nasals meet in the midline; the mandibular symphysis is elongated and laterally compressed. On the other hand, it was highly adapted to the aquatic environment, as concluded from the extremely inflated symphyseal part of its mandibles; from the strongly concave ventral border of the horizontal mandibular ramus; from its very compact bones as well as from the relatively small

hind limbs that were in function. The overall morphology of *Sirenavus* has a great resemblance to *Eotheroides aegyptiacum* OWEN 1875 (in ABEL 1912, Taf. I. 2., Taf. II. 1-2., Ind. III). In agreement with this, the cladistic analysis of DOMNING (1994) placed *Sirenavus* close to *Eotheroides aegyptiacum*.

From the systematic point of view *Sirenavus* is an incertae sedis of Dugongidae (DOMNING 1996), or belongs to the subfamily Halitheriinae.

Anisosiren pannonica KORDOS, 1979

From the Middle Eocene of Oroszlány, KORDOS (1979) described the new fossil sea cow *Anisosiren pannonica* on the basis of a left maxilla with P³, P⁴-M³ (MÁFI V.11748, Vt.77). Revised characters of the specimen are the following ones:

Maxilla — The zygomatic-orbital bridge of the maxilla is nearly in the same level as the palate; the anterior margin of the orbit is located in the level of M².

Upper dentition — The tooth-row is strongly convex; the greatest breadth of the palate (in reconstruction) is reached at the level of M²; the largest molar is M³.

M² — The M² has a biloph structure and is bucco-lingually wide; the anterior cingula with cusp are well-developed; the lingual cingula are strong; the most buccal paracon and the mesio-distally oriented protocone build a protoloph; the

metaloph has a rhomboid form, including a larger hypocone and a smaller metacone; between the proto- and metaloph there is a deep transverse valley.

M³ — The length and the breadth of the tooth is almost equal; the anterior cingula are well-developed, form a crista; the lingual cingula are very strong, close around a large depression; the metaloph is divided in three cusps (with a large undivided hypo-metaconus at the midline and one smaller cusp on both the lingual and buccal sides).

No significant differences in the morphological characters of the upper dentition indicate the allocation of *Anisosiren* to another genus or the recognition of the type specimen as an independent genus and species. Following the classification of DOMNING (1996), *Anisosiren* is a Dugongidae incertae sedis.

Sirenia indet. I (earlier: *Protosiren*)

A mandible fragment of a small-sized animal with M₂ (MÁFI V.11423) from the Middle Eocene of the Felsőgalla locality (Tatabánya Basin) was referred to *Protosiren* cf. *fraasi* ABEL (KORDOS 1978) because its size and morphology was very similar to that of the small subadult dentary described and illustrated by PRIEM (1908) as *P. fraasi*. DOMNING et al. (1982) identified some specimens, including a small mandible (USNM 214596), as *Protosiren* species from the Eocene of North Carolina. GINGERICH et al. (1994) re-investigated the type skull of *Protosiren fraasi* ABEL (CGM 10171) and concluded that *Protosiren fraasi* is a valid genus and species distinct from *Eotheroides aegyptiacum* (OWEN). *Protosiren* has a large dentary with large molars and wide mandibular rostrum, whereas *Eotheroides* has a smaller dentale with smaller molars and a narrower rostrum than the Egyptian specimen (PRIEM 1908). DOMNING & GINGERICH (1994) described a new species, *Protosiren smithae* as a probable direct descendant of *P. fraasi*. These authors concluded that the narrow-jawed sirenian from the Eocene of North Carolina referred to *Protosiren* sp. by DOMNING et al. (1982) does not belong to that genus. The third species of this genus is *Protosiren sattaensis* from the Pakistan Middle Eocene (GINGERICH et al. 1995).

In conclusion, on the level of our present knowledge, the

small-sized specimens from the Middle Eocene of Egypt (PRIEM 1908), from Hungary (KORDOS 1978), from North Carolina and Florida (DOMNING et al. 1982; DOMNING 2001) formerly known as *Protosiren* do not belong in that genus. These specimens await systematic description.

In contrast with the mandible illustrated by PRIEM (1908), the MÁFI V.11423 specimen has the following characters of M₂: well developed mesio-buccal cingular cusp ("Vorderer Basalband"); entoconid in lateral view more asymmetric; well-developed cristid obliqua that is longer and has a connection buccally with the protolophid; hypoconulid lophule has three pointed cusps, the buccal one is connected with the mesolophid.

For the M₂ of the USNM 214596 specimen characteristics are in lateral view the meta- and entoconids are symmetrical; the transverse crest is wide; the cristid obliqua is weakly developed and is connected with the protolophid at the midline of the tooth; the hypoconulid lophule connects to the metalophid at the midline with a short crest.

The morphology of M₂ of PRIEM (1908) specimen from Egypt is simpler than that of the specimens MÁFI V.11423 and USNM 214596. The latter one has a complicated M₂ structure developed in different direction than the two others

Sirenia indet. II (= *Eotheroides* sp.)

The largest Eocene sirenian mandible (MTM V.72.03) originates from the Middle Eocene of the Balinka and was referred to as "*Eotheroides* sp." by KORDOS (1980). The

mandibular symphysis is narrower than with *E. libyca*; the symphyseal surface is deflected at about 35° to the occlusal plane; there are three larger and one smaller accessory mental

foramina; the horizontal ramus of the mandible is slender and bucco-lingually broad; the lower tooth-row is straight.

The great number of sporadic finds of ribs from different localities shows that, among the smaller forms a much larger-

sized *Sirenia* was also present in the Eocene sediments of Hungary (SICKENBERG 1934; MOTTIL 1944; KRETZOI 1953; 1955). The available material does not allow a more accurate allocation of this larger form.

Conclusions

The present revision of the Eocene sirenian material of Hungary revealed that four taxa should be retained: *Sirenavus hungaricus*, *Anisosiren pannonica*, *Sirenia* indet. I (small form) and *Sirenia* indet. II (large form). *Siranavus* and *Sirenia* indet. I. have some closer morphological connection to the Egyptian

finds. The taxonomic position of *Anisosiren* is uncertain. The *Sirenia* indet. II. (large form) is common in the Hungarian Eocene but the lack of more informative material to date prevents a definite systematic allocation of this taxon.

Table I – List of the Eocene sea cow finds of Hungary. In the taxon column, the first row reflects the results of the present paper.

Locality	Taxon	Material	Inv. No.	Collected	References
Balinka	<i>Sirenia</i> indet.	1 costa	MÁFI.V.10070	BADINSZKY, 1964	KORDOS 1980
Balinka East coalfield, V. osztó, 5. vágat	<i>Sirenia</i> indet II <i>Eotheroides</i> sp.	2 mandible frs.	MTM.V.72.03.	KOPEK & KECSKEMÉTI 1970	KORDOS 1980
Balinka, Ba-332 borehole, 535m	<i>Sirenia</i> indet.	1 costa	MÁFI.V.15412	PLATSCHEK 1987	
Budapest-Szépvölgy	<i>Sirenia</i> indet.	1 costa			KOCH 1900, 1911 SICKENBERG 1934 KRETZOI 1941
Diósgyőr, sandpit	<i>Sirenia</i> indet. (<i>Halitherium</i> sp.)	3 costae	MTM.V.72.40.	Wallacher 1965	ALFÖLDI et al. 1975
Dudar-Kossuth L. gallery, cover of coal-measure	<i>Sirenia</i> indet. (<i>Eotherium</i> sp.)	2 costae fr.	MÁFI.V.15423	BERTALAN 1949	KRETZOI 1953, 1955
Dudar-Szabadság-akna, zero level	<i>Sirenia</i> indet.	1 vertebra 4 costae	MÁFI.V.15427	LAKATOS 1952	KRETZOI 1953
Dudar-Ikerakna	<i>Sirenia</i> indet.	2 costae	MÁFI V.15426	LAKATOS ?	
Dudar-Ikerakna	<i>Sirenia</i> indet.	1 costa	MTM. V.72.28.	LAKATOS 1955	
Dudar-Ikerakna	<i>Sirenia</i> indet.	5 costae	MÁFI V.15429		KRETZOI 1953
Dudar-Ikerakna, S coalfield	<i>Sirenia</i> indet.	1 costa	MTM.V.63.1911	STREDA 1960	
Dudar	<i>Sirenia</i> indet.	1 vertebra	MÁFI. V.15424	BONCZ 1979	
Dudar	<i>Sirenia</i> indet.	5 costae	MÁFI. V.15421	ALBA REGIA SPELEO CLUB 1984	
Dudar, waste stockpile	<i>Sirenia</i> indet.	1 vertebra	MÁFI. V.14551	HUSZÁR 1987	
Dudar	<i>Sirenia</i> indet.	2 costae	MÁFI. V.15422		
Gánt-Museum mine	<i>Sirenia</i> indet.	2 costae	MÁFI. V.15441	SOLT 1980	
Oroszlány-XXIII/D mineshaft, Szépvizér	<i>Anisosiren pannonica</i> (holotype)	max.fr., P ⁴ -M ³ , I	MÁFI. V.11748 Vt.77	LÁSZLÓ & SOLT 1977	KORDOS 1979
Oroszlány-XXIII/D mineshaft, Szépvizér	<i>Sirenia</i> indet.	scapula fr., 2 costae	MÁFI V.15409	SOLT 1977	KORDOS 1979
Oroszlány-XXIII/D mineshaft, Szépvizér	<i>Sirenia</i> indet.	6 costae 5 costae 3 costae 4 costae 1 costa 2 costae 3 costa frs 7 vertebrae 8 vertebrae 5 vertebra frs	MÁFI V.15455 MÁFI V.15456 MÁFI V.15457 MÁFI V.15458 MÁFI V.15459 MÁFI V.15460 MÁFI V.15461-15463 MÁFI V.15464 MÁFI V.15465 MÁFI V.15466-15470	SOLT & KORDOS 1976	KORDOS 1979
Pusztavám-Ikerakna, cover of II. measure	<i>Sirenia</i> indet.	3 costae	MÁFI V.15420	BERGER jr. 1958	
Pusztavám-Ikerakna	<i>Sirenia</i> indet.	2 costae	MÁFI V.15417	GONDOZÓ 1959	
Pusztavám-surface mine	<i>Sirenia</i> indet.	5 costae	MÁFI V.15425	GONDOZÓ 1959	
Pusztavám-E coalpit	<i>Sirenia</i> indet.	1 vertebra	MÁFI V.15419	SOLT 1979	
Pusztavám-E coalpit	<i>Sirenia</i> indet.	1 vertebra	MÁFI V.15418	SOLT 1979	
Pusztavám	<i>Sirenia</i> indet.	1 costa	Tés, Alba Regia Speleo Club	ALBA REGIA SPELEO CLUB 1982	
Tatabánya-Felsőgalla	<i>Sirenia</i> indet.	3 vertebrae	MTM V.60.703	1956	

Table I — continued

Locality	Taxon	Material	Inv. No.	Collected	References
Tatabánya (Felsőgalla)–Nagykeselő-mine	<i>Sirenavus hungaricus</i> (holotype)	1 cranium 2 mandible frs	MTM V.60.1712 V.83.42		KRETZOI 1941, 1953, 1955; MOTTL 1944; REINHART 1959; KORDOS 1981
Tatabánya–Felsőgalla	Sirenia indet.	2 costae 13 costae frs	MÁFI V.15373 MÁFI V.15374	REMÉNYI 1953	
Tatabánya–Keselő-hegy mine	Sirenia indet.	skeleton fr.	MTM	KECSKEMÉTI	
Tatabánya–Keselő-hegy mine	Sirenia indet.	1 vertebra 1 scapula fr. 8 div. frs	MÁFI V.15375 MÁFI V.15376	VELLAI & ORVOS-NAGY 1986	
Tatabánya–Nagykeselő mine	Sirenia indet.	1 mandible fr.	Sarkadi T., Tatabánya	SARKADI 1976	
Tatabánya–Keselő-hegy railway cut	Sirenia indet.	3 vertebrae	MÁFI V.15403	ORVOS-NAGY 1987	
Tatabánya–Keselő-hegy quarry	Sirenia indet.	2 costae 5 costae 4 costae 19 costae frs 3 vertebrae	MÁFI V.15380 MÁFI V.15381 MÁFI V.15382 MÁFI V.15383 MÁFI V.15384	SOLT 1988	
Tatabánya–Keselő-hegy, railway cut	Sirenia indet.	1 costae 1 vertebra 1 costa 1 costa	MÁFI V.15402 MÁFI V.15404 MÁFI V.15405 MÁFI V.15406	KRONOME & NAGY 1986	
Tatabánya–Felső station, railway cut W	Sirenia indet.	3 costae	MÁFI V.15408	SOLT 1988	
Tatabánya–Keselő-hegy	Sirenia indet.	2 costae	MÁFI V.15407	FEDOR 1988	
Tatabánya–Nagykeselyű quarry	Sirenia indet.	6 costae	MÁFI V.15357	SZÖRÉNYI 1931	
Tatabánya–Felsőgalla	Sirenia indet. I <i>Protosiren cf. fraasi</i>	mand. fr. with M ₃	MÁFI V.11423	VÍGH 1949	KORDOS 1978
Tatabánya–Felsőgalla	Sirenia indet.	6 costae	MTM V.63.1910	STREDA 1960	
Tatabánya–Felsőgalla	Sirenia indet.	1 vertebra	MÁFI V.11655		
Tatabánya–Keselő-hegy mine	Sirenia indet.	6 vertebrae	MÁFI V.15466	ORVOS-NAGY 1988	
Tatabánya–Keselő-hegy mine	<i>Protosiren fraasi</i>	1 mandible fr.	MÁFI V.15379	ORVOS-NAGY 1987	
Tatabánya-basin (?Tata)	<i>Sirenavus hungaricus</i> (= <i>Sirenavus</i> or <i>Eotheroides</i>)	M ₂ – M ₃	MTM V.60.685		KORDOS 1983
Tatabánya (?)	Sirenia indet.	vertebra, scapula	MTM		
Tokod	Sirenia indet.	1 vertebra	MTM V.60.679		
Zsámbék-62. fúrás, 198.3–198.5m	Sirenia indet.	1 vertebra	MÁFI V.15487	MUNTYÁNNÉ 1989	
Üröm, Varga mine	<i>Sirenavus</i> sp.	vertebrae, costae, scapula	MTM V.60.10	HAMPEL 1941	MOTTL 1944; KRETZOI 1953
Zirc, quarry S from Porva	Sirenia indet. (= " <i>Erytherium</i> ")	1 costa	MÁFI V.15410	TAEGER 1900	
Eger–Kis-Eged, west side	<i>Sirenavus</i> sp.	1 M ₃ 1 M ₂ fr. 4 costae 10 costae 7 vertebrae 19 vertebrae 1 fr. 1 innominate 1 femur	MÁFI V.15359 MÁFI V.15360 MÁFI V.15361 MÁFI V.15362 MÁFI V.15363 MÁFI V.15364 MÁFI V.15365 MÁFI V.15366 MÁFI V.15367	LEGÁNYI 1935	BALOGH & RÓNAI 1965 KORDOS 1985
Eger–Kis-Eged north-east side	Sirenia indet. (<i>Halitherium</i>)	1 costa	MÁFI V.15353	LEGÁNYI 1925	
Eger–Kis-Eged east side	Sirenia indet. (<i>Halitherium</i> sp.)	costae	Szilvásvár	LEGÁNYI	KORDOS 1985
Eger–Kis-Eged	Sirenia indet.	vertebrae, costae	MÁFI V.15482		
Eger–Kis-Eged	Sirenia indet.	2 costae	MÁFI V.15354		
Felsőtárkány–Várkút roadcut	<i>Sirenavus</i> sp. (<i>Paralitherium tarkanyense</i> , holotype) (<i>Halitherium</i> sp.)	2 mandible, M ₃ 1 vertebra 2 vertebrae 10 costae	MÁFI V.10934 MÁFI V.10935 MÁFI V.10936 MÁFI V.10937	LEGÁNYI 1934	KORDOS 1977, 1985

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