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RECORD OF *SCHIZODELPHIS SULCATUS* (CETACEA, ODONTOCETI) FROM THE MIOCENE OF PREPLANS, FRIULI (CARNIAN PRE-ALPS)

SEGNALAZIONE DI SCHIZODELPHIS SULCATUS *(CETACEA, ODONTOCETI) DAL MIOCENE DI PREPLANS, FRIULI (PREALPI CARNICHE)*

Abstract — The skull of an adult *Schizodelphis sulcatus* (P. GERVAIS, 1853) is described. The specimen originates from the Lower Miocene of Preplans, Friuli, Carnian Pre-alps. The biometric values are compared with those of skulls from the Belluno Miocene. The geographical distribution of *Schizodelphis* is discussed.

Key words: Cetacea Odontoceti Acrodelphidae, Lower Miocene, Carnian Pre-alps, North Italy.

Riassunto breve — *Viene descritto il cranio di un adulto di* Schizodelphis sulcatus *(P. GERVAIS, 1853). L'esemplare proviene dal Miocene inferiore di Preplans (Friuli, Prealpi carniche). I dati biometrici vengono comparati con quelli degli esemplari provenienti dal Miocene del bellunese. Viene discussa la distribuzione geografica di* Schizodelphis.

Parole chiave: *Cetacea Odontoceti Acrodelphidae, Miocene inferiore, Prealpi carniche, Nord Italia.*

Introduction

The fossil remains of a denticete examined below belong to the Paleontology Collection of the Friuli Museum of Natural History in Udine. They were discovered by Mr. Sergio Spizzamiglio in 1975 in the region of Preplans (Meduno), on the right bank of the Meduna Creek (fig. 1).

There is an outcrop here of a terrigenous succession, about 2100 metres deep,

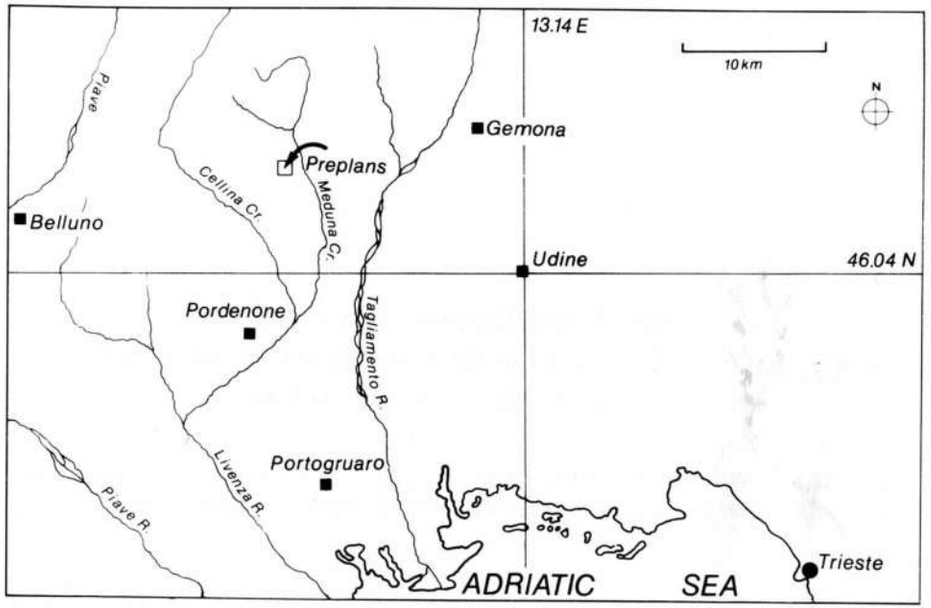

Fig. 1 - The finding out place is marked by an arrow.
- *La località del ritrovamento è segnata da una freccia.*

noted for its Miocene fossil remains. It has already been illustrated by a numer of authors, and particularly by STEFANINI (1915) and subsequently by GELATI (1969), MARTINIS (1969) and STEFANI (1984). Along the Meduna Creek, the outcrops appear particularly complete and continuous up to the Middle Miocene, subdivided according to STEFANI (loc. cit.) into six lithozones.

Biostratigraphically speaking, the find is to be assigned to the Upper Aquitanian, isochronous with the cetacean fauna of the Belluno sandstones. From the stratigraphic standpoint, both areas, Belluno and Friuli, are very similar (Massari, personal communication).

The denticete remains comprise a neurocranium with a rostrum split up into a number of segments, on one of which three single complete teeth have remained; there are also vertebral bodies without apophyses, rib fragments and smaller bone fragments, still embedded in sediment. The left mandibular ramus is fused with the cranium; a separate piece of the mandibular, in front of the symphyseal angle, is also preserved.

Ordo	*Cetacea*
Subordo	*Odontoceti*
Familia	*Acrodelphidae* ABEL, 1905
Genus	*Schizodelphis* GERVAIS, 1861

Schizodelphis sulcatus (GERVAIS, 1853)
MFSN No. 1768 GP

Description

In dorsal view (fig. 2; plate I, A), the neurocranium appears roughly rectangular, longer than it is wide. Both condyles are very prominent, the articular facets being latero-caudally oriented. The supraoccipitale displays rounded caudo-lateral contours, with the sutura to the frontale running almost straight horizontally. The two nasalia form a high trapezium with the frontale. The width of the frontale is 94 mm dorso-caudally and 50 mm rostrally; the length is 43 mm. The nasalia are 20 mm wide and 15 mm long; the total width is 50 mm. The premaxillaria are wide, each projecting with a narrow lip between the frontal and the maxillary caudally. The vomerine groove is relatively narrow, the dorsal opening between the two premaxillaria being about 80 cm in length. It is flanked on both side by an oblique 10 - 12 cm mediodorsal sulcus, oriented from caudo-lateral to rostro-medial. In the preparation of the fossil, the sulcus was obliterated by a second medio-concave sulcus, which is artificial (see plate I, arrows).

The pre- and maxillaria gradually taper to a narrow rostrum. In caudal view, (plate II, B), a skull deformation due to the effect of pressure appears. The condyles are roughly half-moon shaped, their vertical axes also being oriented from dorso-lateral to ventro-medial.

The base is most severely damaged and few structural details are discernible. A distal part of the rostrum is fused with the corresponding part of the mandibula (plate II A, C), on which six teeth are visible. Three of them have preserved crowns. They are distanced from each other, the crowns are hight, spear-shaped, and coated with smooth, dark enamel.

The mandibula (plate I, C) displays a long symphysis with a very acute symphyseal angle. Ventro-laterally, the medio-distal part of the mandibula is traversed by a groove, which is characteristic of *Schizodelphis*.

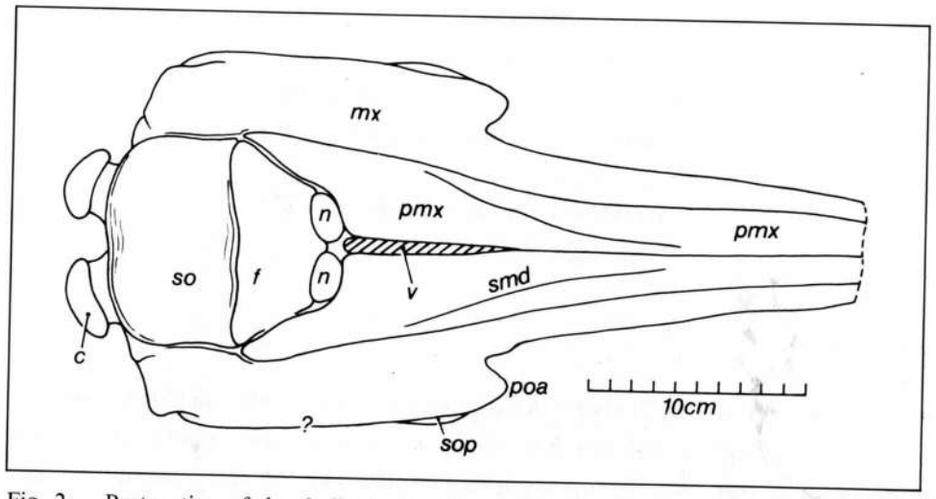

Fig. 2 - Restoration of the skull of *Schizodelphis sulcatus* from Preplans, Meduna creek. Dorsal aspect.
c = occipital condyle, f = frontale, mx = maxillare, n = nasale, pmx = premaxillare, poa = preorbital angle, smd = mesio-dorsal groove, so = supraoccipitale, sop = supraorbital process.

- *Ricostruzione del cranio di* Schizodelphis sulcatus *proveniente da Preplans, Torrente Meduna. Vista dorsale.*
c = condilo occipitale, f = frontale, mx = maxillare, n = nasale, pmx = premaxillare, poa = angolo preorbitale, smd = solco meso-dorsale, so = sopraoccipitale, sop = processo sopraorbitale.

Plate I - Skull of *Schizodelphis sulcatus* from Preplans, Meduna creek, Friuli, Carnian Pre-alps. Coll. Museo Friulano di Storia Naturale, Udine. No. MFSN 1768 GP. A = dorsal aspect of the skull (the groove, indicated by arrows are artificial); B = dorsal aspect of mandible; C = ventral aspect of the symphysary portion of the mandible; c = condyle; f = frontale; m = mandible; mx = maxillare; n = nasale; pmx = premaxillare; s = symphysis of mandible; sa = symphysis angle; so = supraoccipitale; sop = supraorbital process; tr = tooth row; v = vomer; zy = zygomatic process.

- *Cranio di* Schizodelphis sulcatus *proveniente da Preplans, Torrente Meduna, Friuli, Prealpi carniche. Collezione del Museo Friulano di Storia Naturale, Udine, n. MFSN 1768 GP. A = vista dorsale del cranio (i solchi indicati dalle frecce sono artificiali); B = vista dorsale della mandibola; C = vista ventrale della porzione sinfisale della mandibola; c = condilo; f = frontale; m = mandibola; mx = maxillare; n = nasale; pmx = premaxillare; s = sinfisi della mandibola; sa = angolo sinfisale; so = sopraoccipitale; sop = processo sopraorbitale; tr = solco alveolare; v = vomero; zy = processo zigomatico.*

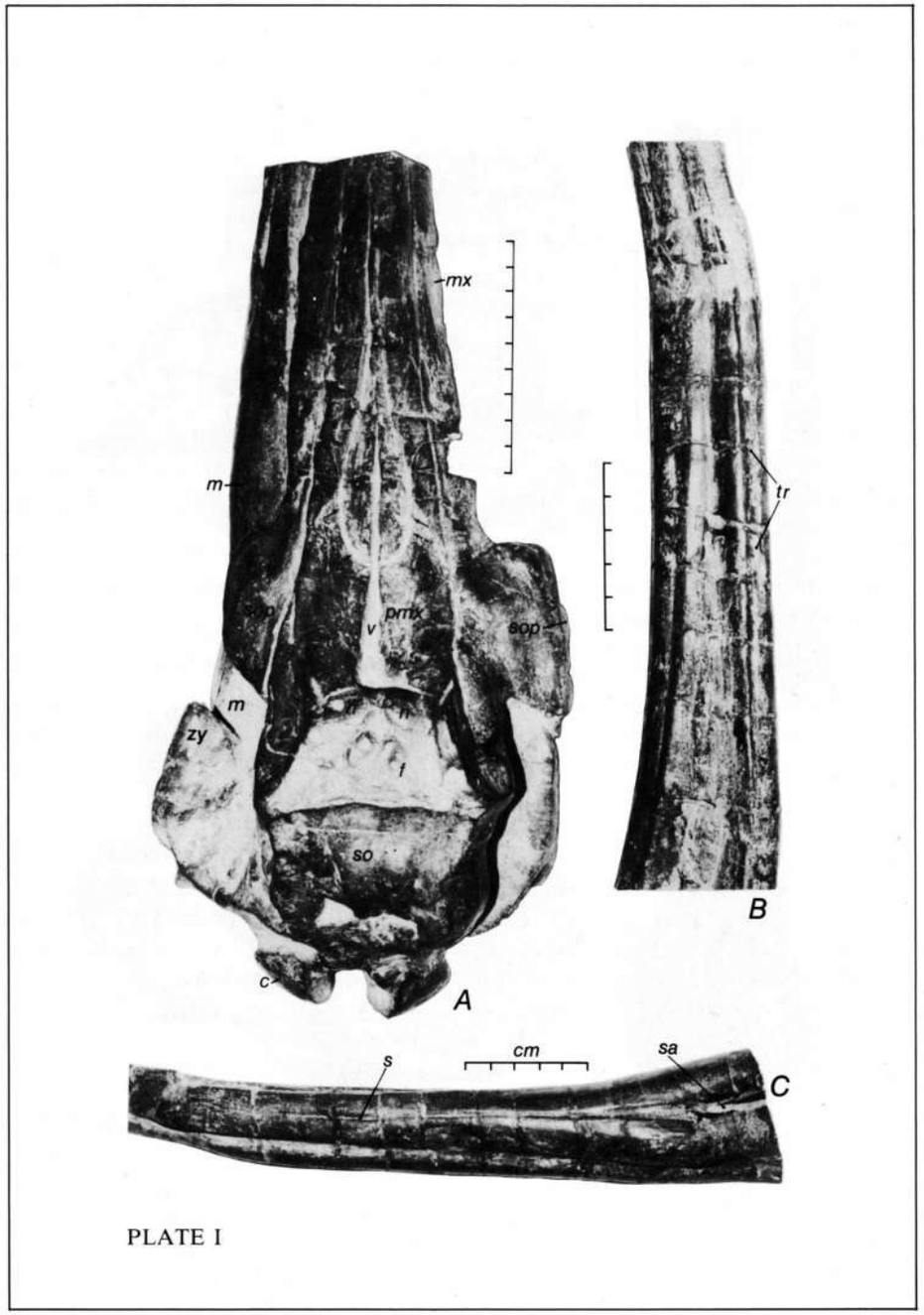

PLATE I

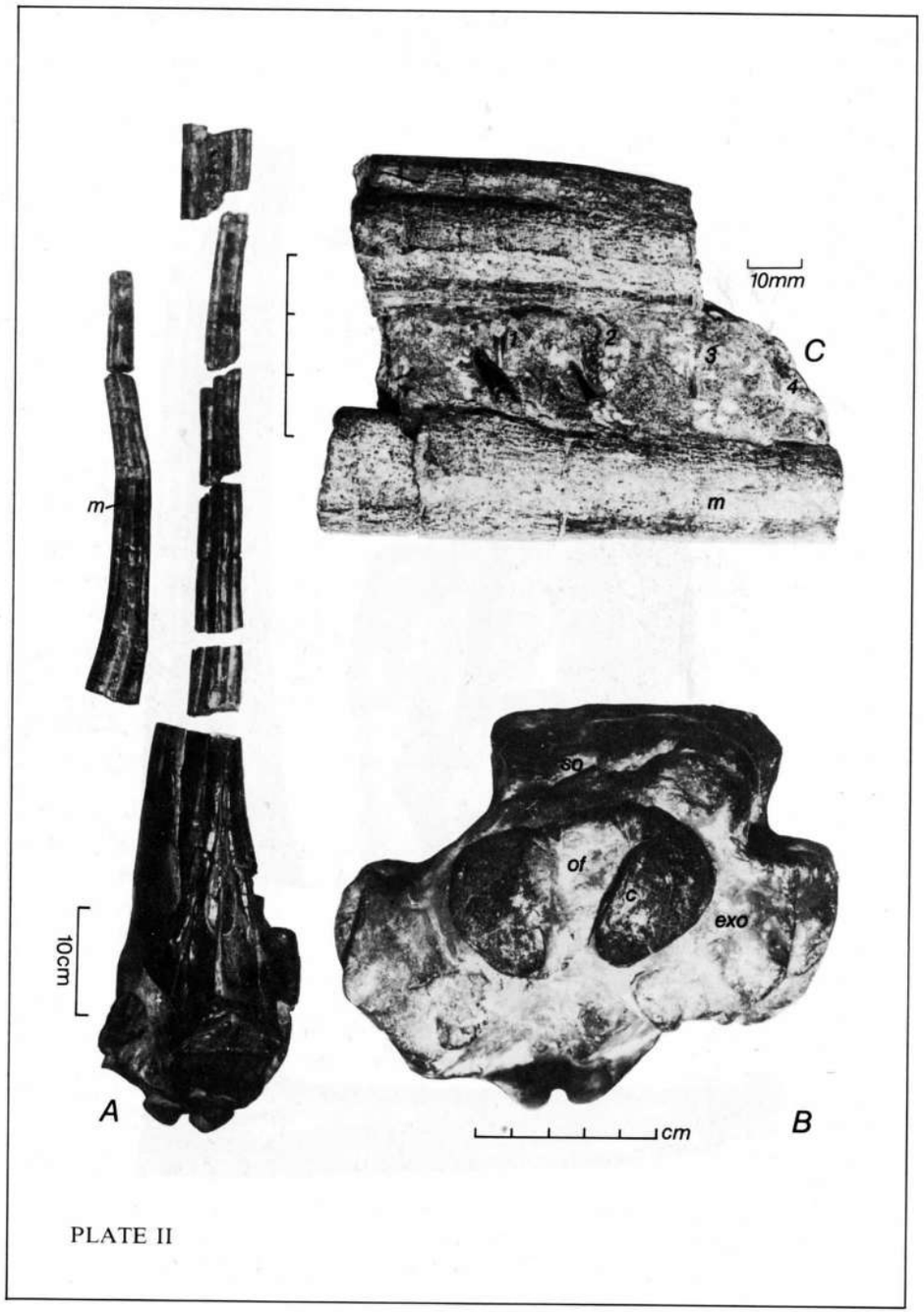

PLATE II

The skull measurements are given in table I. For purposes of comparison, they are accompanied by the corresponding linear dimensions of four *Schizodelphis sulcatus* skulls from the collection of the Paleontology Institute of Padua University (see PILLERI, 1985). This shows, with the exception of deformed structures, which provide unreliable measurements, a substantial morphometric agreement. This, combined with the close osteological similarity, supports the taxonomic diagnosis: *Schizodelphis sulcatus* (GERVAIS, 1853).

Comments

As can be seen from the map (fig. 3) and table III, *Schizodelphis sulcatus* in the European Miocene was a widespread, successful species which lived both in the Tethys and Paratethys. The genus is presumed to have migrated from Europe to North America (Florida, Maryland) (TRUE, 1908; ALLEN, 1921). The oldest finds originate from Egypt and are attributed to the Lower Miocene (STROMER, 1903; FOURTAU, 1920; HAMILTON, 1973). Three North American specimens were discovered in Tortonian and Sarmatian strata, but the taxonomy should be verified. *Schizodelphis bobengi* (CASE, 1934), for example, has a perioticum which is atypical of the genus, while both the shape and position of the processus zygomatici differ from those of *Schizodelphis*.

In addition to *Schizodelphis sulcatus* (GERVAIS, 1853) TROUESSART (1898, Catalogus mammalium) lists the following species:

Plate II - Skull of *Schizodelphis sulcatus* from Preplans, Meduna creek, Friuli, Carnian Pre-alps. Coll. Museo Friulano di Storia Naturale, Udine, No. MFSN 1768 GP. A = dorsal aspect of the skull fragments; B = caudal view of neurocranium; C = rostral portion of mandible and rostrum fused together; c = condyle; exo = exoccipitale; m = mandible; of = occipital foramen; so = supraoccipitale; 1-4 = tooth.

- *Cranio di* Schizodelphis sulcatus *proveniente da Preplans, Torrente Meduna, Friuli, Prealpi carniche. Collezione del Museo Friulano di Storia Naturale, Udine, n. MFSN 1768 GP. A = vista dorsale dei frammenti del cranio; B = vista caudale del neurocranio; C = porzione rostrale della mandibola e rostro uniti; c = condilo; exo = exoccipitale; m = mandibola; of = forame occipitale; so = sopraoccipitale; 1-4 = denti.*

Collection No.	Nat. Hist. Mus. Udine MFSN 1768 GP	Museum of Paleontology, Padua** 26054	26065	26066	26409
Condylobasal length (fragment)	870	—	760	—	830
Length of rostrum (fragment)	670	—	620	—	640
Width of rostrum at base	85	83	90	—	90
Width of rostrum at 1/2 length	40	37	—	—	35
Greatest width of premaxillare	60	62	68	73	70
Width of premaxillares at 1/2 length	21	19	22	—	25
Greatest preorbital width	125	125	—	—	117
Greatest postorbital width	135	153	—	—	155
Greatest width of external nares	23	29	30	30	28
Zygomatic width	165	160	—	—	160
Parietal width	85	110?	102	108	85
Height of braincase	80*	90	85	90	105
Length of temporal fossa	73	45?	55	45	80
Height of temporal fossa	47	45	47	40	60
Length of orbit	40	57	60	—	47
Condyle, vertical diameter	46	43	—	42	40
Condyle, horizontal diameter	31	29	—	29	—
Condyle, distance between the external margins	78	79	—	68	64
Foramen occipitale, vertical diameter	26*	25	—	22	28
Foramen occipitale, horizontal diameter	28	32	—	—	27
Zygomatic process, vertical diameter	31	—	—	—	—
Width of mandibula at symphysis	43	—	—	—	—
Width of mandibula at 1/2	33	—	—	—	—
Distance between the mandibular furrows at 1/2	23	—	—	—	—
Tooth crown (middle row), height	8.6	—	—	—	—
Tooth crown, mesio-distal diameter	3.8	—	—	—	—

* estimated

** see PILLERI, 1985

Table I - Morphometric comparison of the skull of *Schizodelphis* from Meduno with skulls of the Molasse of Belluno.

- *Confronto fra i dati morfometrici del cranio di* Schizodelphis *proveniente da Meduno e quelli della Molassa del bellunese.*

S. planus (GERVAIS, 1852)

S. canaliculatus (MEYER, 1853)

S. depereti PAQUIER, 1894

S. elongatus PROBST, 1886

S. compressus PORTIS, 1886

S. canaliculatus is synonymous with *S. sulcatus*. *S. elongatus* is a physeterid. The *S. compressus* remains are so deformed as to render any identification doubt-

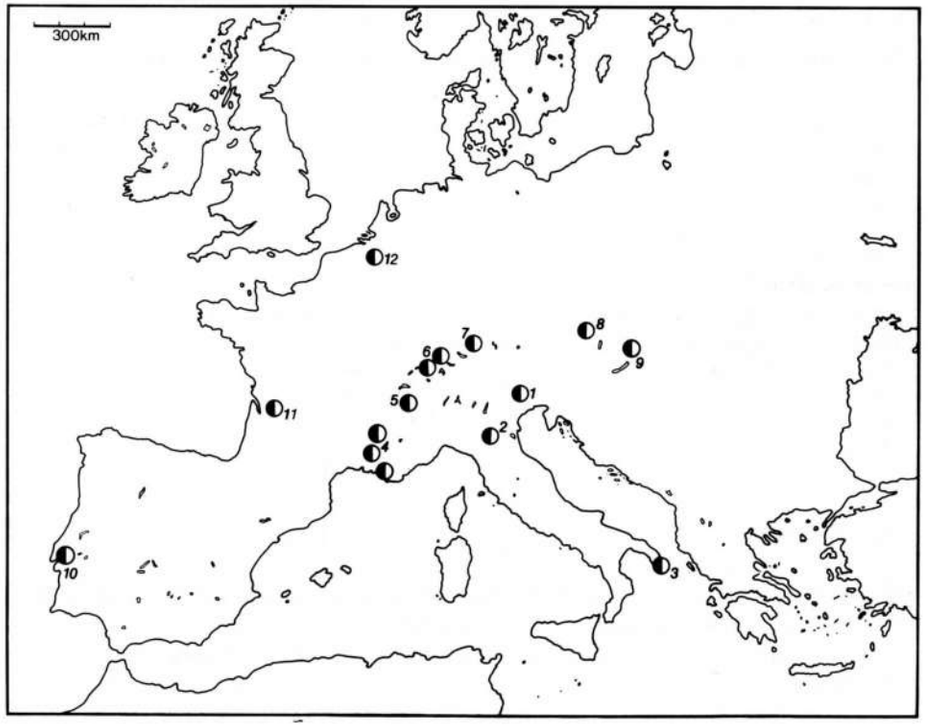

Fig. 3 - Records of *Schizodelphis sulcatus* in Europa: (1) Belluno sandstones and Meduna creek, (2) Emilian Apennines, (3) Lecce, (4-7) Perialpine Burdigalian Sea, (8) Vienna, (9) Hungarian records, (10) Xabregas (Portugal), (11) Gironde, (12) Crag of Antwerpen.

- *Segnalazioni di* Schizodelphis sulcatus *in Europa:*
(1) Arenarie del bellunese e Torrente Meduna, (2) Appennino emiliano, (3) Lecce, (4-7) Mare burdigaliano perialpino, (8) Vienna, (9) Ungheria, (10) Xabregas (Portogallo), (11) Gironde, (12) Depositi del Crag di Anversa.

Vertebra	A	B	C	D	E	F
Length of the corpus vertebrae	81	80	65	56	62	37
Horizontal diameter	58	—	—	—	48	40
Dorso-ventral diameter	58	—	—	—	48	38

Table II - Measurements of the six vertebral bodies found next to the skull.
- *Misure delle sei vertebre ritrovate vicino al cranio.*

ful. I was unable to verify the taxonomic status of *S. depereti* and *S. planus*. *S. gresalensis* (DAL PIAZ, 1977), *S. brachycephalus* and *S. yablokovi*, three species from the Belluno Miocene (PILLERI, 1985) also belong to the European fauna. *S. bogachowi* (Mchedlidze, personal communication) is from the Caucasian Miocene.

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Country	Locality	Authors
Portugal	Xabregas (Lissabon)	LYDEKKER (1887)
West France	Salles (Gironde); Touraine	ABEL (1905)
East France	Cornonsec; Castries; Vendargues Pézénaz; La Vérune; Poussan; Loupian (Hérault); Romans; Chamaret (Drôme)	GERVAIS (1853) ABEL (1905) PACUIER (1894)
Belgium	Crag of Antwerp	ABEL (1905)
Switzerland	Othmarsingen; Zofingen (Aargau)	MEYER (1856) PROBST (1886) PILLERI (1985)
Württemberg	Baltringen	PROBST (1886)
Lower Austria	Eggenburg; Gaudensdorf; Heiligenstadt; Hernals	ABEL (1905)
Hungary	Neudorf an der March; Szent Margitta; Sopron Mayeben	ABEL (1905) PILLERI and PILLERI (1982)
North Italy	Belluno; Preplans (Friuli); Monte Paderno (Bologna); Visiano	ABEL (1905) CIGALA-FULGOSI and PILLERI (1985) PILLERI (1985)
South Italy	Lecce (Otranto)	ABEL (1905)
Egypt	Dêr Baramus (Wadi Fâregh); Moghara; Siwa	STROMER (1905) FOURTAU (1920) HAMILTON (1973)

Table III- Geographical sites of *Schizodelphis sulcatus* GERVAIS, 1853.
- *Distribuzione geografica delle località di ritrovamento di* Schizodelphis sulcatus *(*GERVAIS, *1853).*

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