

TASBACKA DANICA N. SP., A NEW EOCENE MARINE TURTLE OF DENMARK (TESTUDINES: CHELONIOIDEA)

Tasbacka danica n. sp. (Testudines: Cheloniidae), nueva tortuga marina del Eoceno de Dinamarca

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ABSTRACT: *Tasbacka danica* n. sp. (Testudines: Cryptodira: Cheloniidae) is described on the basis of a nearly complete juvenile specimen in dorsal view from the Fur formation, Early Eocene of Ejerslev Moclaypit, Jutland, Denmark. *Tasbacka salisburgensis* (Karl, 1996) is a new combination for an Austrian species. The discovery of *Tasbacka* in Denmark and the Austrian material suggests a wider geographic distribution of this genus during the Paleocene-Eocene boundary.

Key words: *Tasbacka danica* n. spec., Ejerslev Moclaypit, Isle of Mors, Jutland, Denmark, Fur formation, Early Eocene, description and discussion.

RESUMEN: Se describe *Tasbacka danica* nov. sp. (Testudines: Cryptodira: Cheloniidae) como un casi completo individuo juvenil en vista dorsal, procedente de la formación Fur de la base del Eoceno en Ejerslev Moclaypit (Jutlandia, Dinamarca). Se describe una nueva combinación para *Tasbacka salisburgensis* del Eoceno de Austria. El descubrimiento de *Tasbacka* en Dinamarca y el

material de Austria sugieren una amplia distribución del género durante el límite Paleoceno-Eoceno.

Palabras clave: *Tasbacka danica* n. sp., Ejerslev Moclapyt, Isla de Mors, Jutlandia, Dinamarca, Formación Fur, Eoceno inferior, descripción y discusión.

INTRODUCTION

Fossil turtles from the Eocene of Denmark have been known since NILSEN (1959) describes *Eospargis breineri*, a dermochelyid seaturtle. Contrary to the horizons of the hitherto known species which are Late Paleocene in age, the Danish Fur-Formation range from the Early Eocene (HEILMANN-CLAUSEN & SURLYK, 2006).

The preservation of fossils in this sediment is extraordinary good. From the same facies birds are known of the family Psittacidae, e. g. *Mopsitta tanta*, the largest fossil parrot yet known (WATERHOUSE *et al.*, 2008). The present paper is one result of the SYNTHESYS project DK-TAF 4140 by the first author.

The specimens are housed in the Moclapy Museum (MHM). Both finds of *Tasbacka danica* n. sp. is preserved in a calcareous concretion which is split with a geological hammer. The two specimens are found in 2008 by Henrik Madsen. The holotype *Tasbacka danica* n. sp. is prepared by Henrik Madsen and the second specimen is prepared by conservator Frank Osbæk on The Museums conservation centre in Skive.

SYSTEMATIC PALAEONTOLOGY

Order Testudines Linnaeus, 1758

(Chelonii Brongniart, 1800; Latreille, 1800)

Infraorder Cryptodira Cope, 1868

Superfamily Chelonioidea Baur, 1893

Family Cheloniidae Gray, 1825

Subfamily Cheloniinae Dollo, 1886

Tribe Cheloniini Zangerl & Turnball, 1955

Genus *Tasbacka* Nessov, 1987

TYPE SPECIES: *Tasbacka aldabergeni* Nessov, 1987.

LOCALITY: Zhylga, Kazakhstan.

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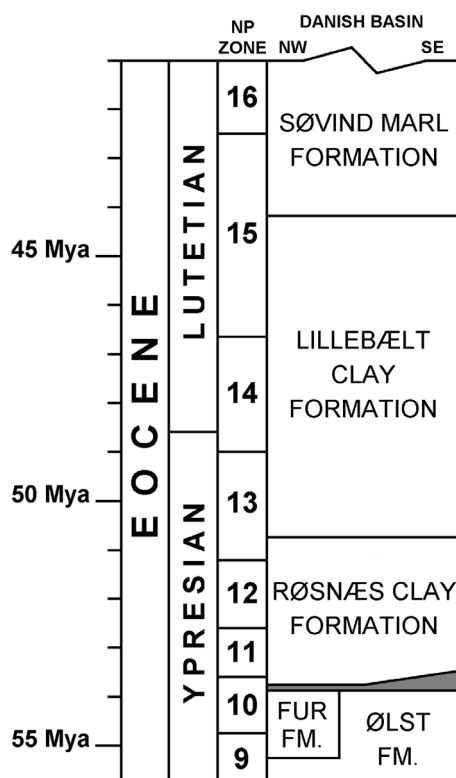


Figure 1a: Position of the type locality of *Tasbacka danica* sp. n. Current position of the island of Mors, Jutland; b: Stratigraphic column of the Danish lower-middle Eocene with the position of Fur Formation according HEILMANN-CLAUSEN & SURLYK, 2006.

HORIZON: Late Paleocene.

CHARACTERS: The cervical scute is absent. According NISSOV (1987) and TONG & HIRAYAMA (2002) secondary palate strongly developed, anterior margin of apertura narium interna behind anterior margin of fossa temporale inferior; substantial participation of pterygoid in palate; postorbital bone with thick transverse ridge at bottom which extends onto parietal bone, lower jaw narrow with long symphysis, but no reaching foramen dentofaciale majus (NISSOV, 1987).

NORTH AFRICAN SPECIES: *Tasbacka ouleabdounensis* Tong & Hirayama, 2002.

LOCALITY: Couche 2, Recette 4, Ouled Abdoun phosphate basin, Morocco.

HORIZON: Thanetian, Late Paleocene.

CHARACTERS: According TONG & HIRAYAMA (2002) differs to *Tasbacka aldabergeni* in having a more strongly developed secondary palate, the anterior margin of apertura narium interna placed at a level of midlength of fossa temporale inferior, and in having deeper temporal emarginations. For anterior part of carapace see fig. 2-1.

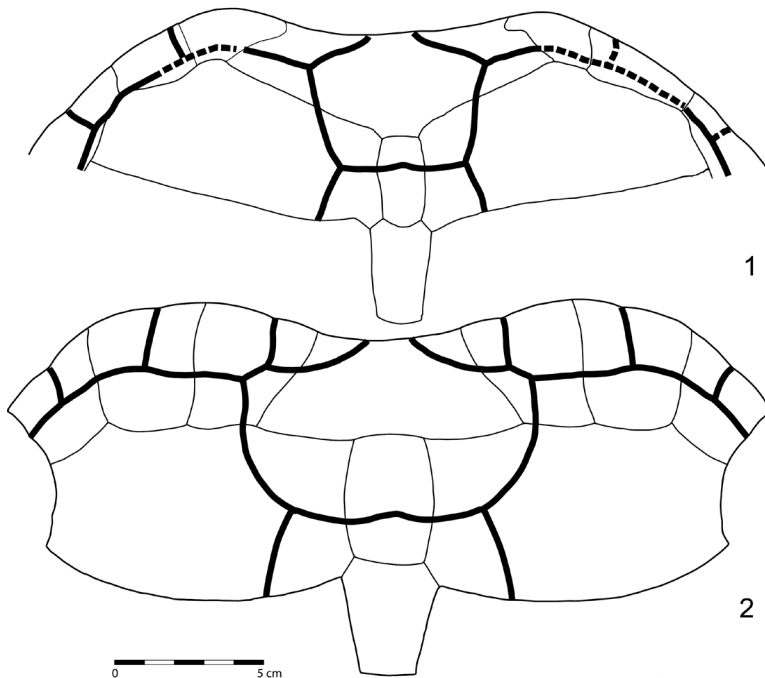


Figure 2. Comparison of anterior carapace area of 1: *Tasbacka aldabergeni* Nessov, 1987 according NISSOV (1987) and 2: *Tasbacka salisburgensis* (Karl, 1996) from KARL (1996).

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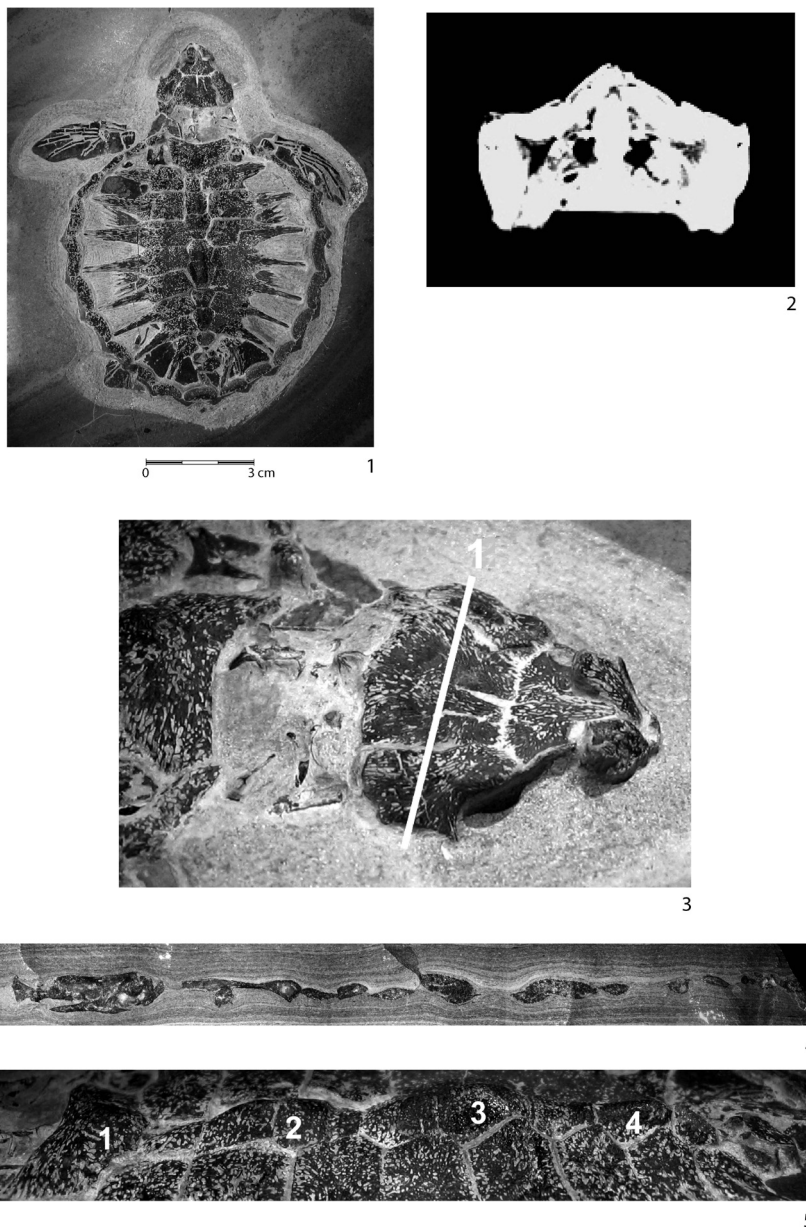


Plate 1. *Tasbacka danica* sp. n., holotype from Ejerslev Moclayspit, Jutland, Denmark. Figure 1: dorsal view, 2: skull from right side, 3: knob row from left side, anterior part at left, 4: general aspect of the specimen with dorsal view of the fossil before preparation, anterior part at left. Remark the skull roof, neural knob row and the calcareous concretion with ash layers.

CENTRAL EUROPEAN SPECIES: *Tasbacka salisburgensis* (Karl, 1996) n. comb.

ORIGINAL NAME: *Osteopygis salisburgensis* Karl, 1996.

LOCALITY: Haunsberg near Sankt Pankraz, Federal country Salzburg, Austria.

HORIZON: Roterzschicht, Early Cuisian, Early Eocene.

CHARACTERS: Differs to *Tasbacka aldabergeni* in the position of the proximate marginalia sulcus along the middle of the peripherals. In *Tasbacka aldabergeni* this sulcus is positioned along or at the proximate peripheralia suture. The cervical scute is absent also (fig. 2-2).

***Tasbacka danica* n. sp.**

HOLOTYPE: Moclay Museum number MHM-K2, a complete juvenile individual in dorsal view at a slab (plate 1).

ETYMOLOGY: *danica*, from Denmark.

TYPE LOCALITY: Ejerslev Moclaypit, Isle of Mors, Jutland, Denmark.

TYPE HORIZON: Fur formation, late NP 10, Early Eocene. Preserved in a calcareous concretion with ash layer +31.

DIAGNOSIS: Supraoccipital shorter as in *Tasbacka ouleabdounensis* and the type species, temporal emarginations not deep as in *Tasbacka ouleabdounensis*, metacarpale 1 thick and swollen.

OTHER MATERIAL: Moclay Museum number MHM K1, skull, anterior part of carapace, neck and arm remains of a adult individual (plate 2). The detailed description will be made after full preparation and removal of the mandible. A cervical scute ist no visible. That individual is positioned here (c.f.) because of the geographic and stratigraphic neighborhood. In contrast to the juvenile holotype it represents an adult individual. It was found on the same locality as the holotype. Preserved in a calcareous concretion with ash layer +15 b and c.

DESCRIPTION AND COMPARISON

The general treatment of seaturtle skull morphology and terminology is in GAFFNEY (1972, 1979), comparisons between *Tasbacka* skulls in TONG & HIRAYAMA (2002), shell patterns in ZANGERL (1980), taxonomy in HIRAYAMA (1994) and paleozoogeography in KARL (2002) and MOODY (1993).

General aspect: The carapace outline is serrate (fig. 3-2). The length- breadth-ratio is 1,0625, it is nearly breadth as long. The maximate wide is between the peripherals 5 and 6. In compare, the peripherals in *Tasbacka danica* sp. n. (fig. 3-2) to *Puppigerus* sp. (plate 3, fig. 3-1) are much smaller, the smallest shows the Oligocene *Glarchelys knorri* (fig. 3-3). The length-breadth-ratio of skull (20 mm) is 4.25; the length-breadth-ratio of manus is 3.4. Furthermore the breadth-

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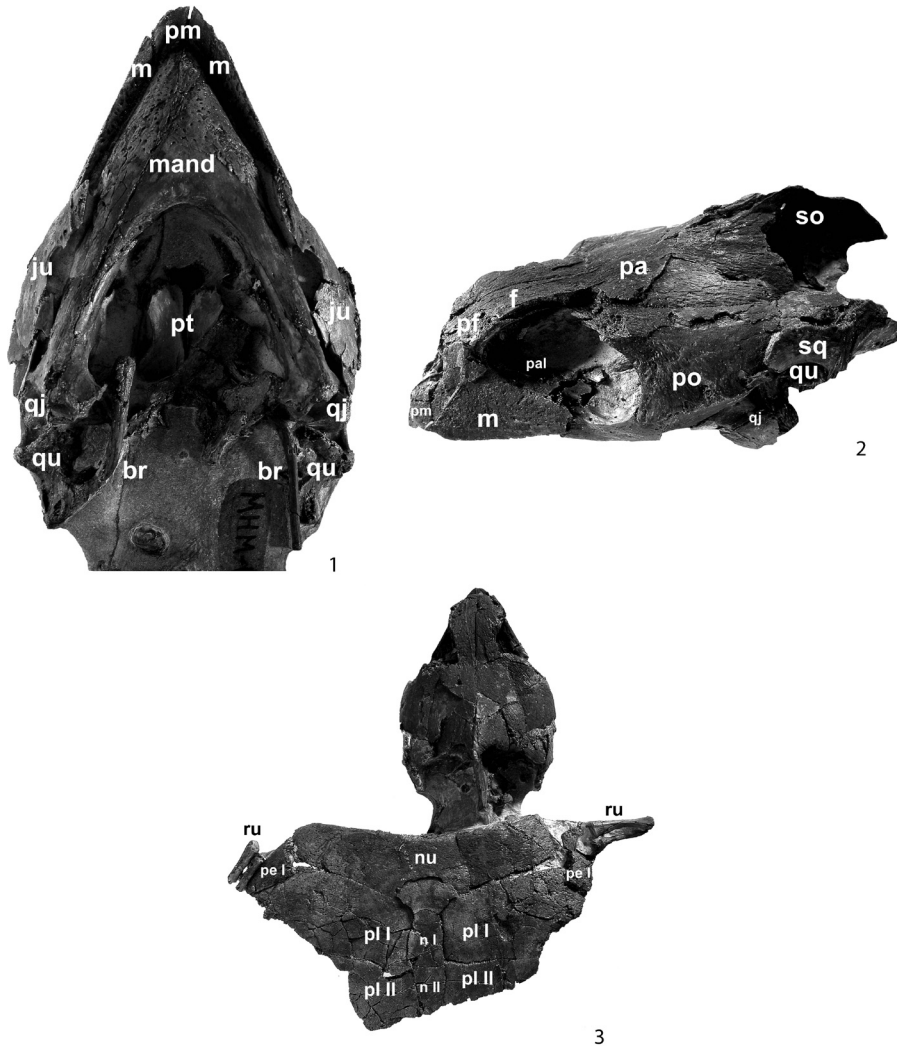


Plate 2. *Tasbacka danica* sp. n., large specimen from Ejerslev Mo claypit, Jutland, Denmark.
 1: skull in side view from left; 2: skull in palatal view with lower jaw in situ; 3: general aspect of the specimen in dorsal view before preparation; 4: CT-scan photo of part of the skull. Without scale bar.

ratio of skull is 4.0 and the breadth-manus ratio 3.2. In contrary to other fossil and recent seaturtle hatchlings e. g. *Glarichelys knorri* (fig. 3) the flipper are relatively short (plate 1, fig. 1).

Skull roof: Skull roof scale sulci are not preserved in the type specimen, it is a juvenile character. The skull shape is a cross-sectional shape of a roof (plate 1, fig. 4). The skull length of the large specimen is 110 mm and it breadth 70 mm (plate 1, fig. 2).

Carapace: The total length of type specimen is 107 mm, carapace length 76 mm and carapace breadth 77 mm. The neural formula is 4/ 6A/ 6A/ 6A/ 6A/ 6A/ 6A/ 6A as in *Tasbacka aldabergeni*. As in all juvenile sea turtles large peripheral fontanelles are present. The sulci of horny scutes are mostly absent, only the central 3 is remarkable. The nuchal notch is morately deep. Around the peripheral outline thin films of the horny marginals are preserved. The nuchal is much broader than long like in *Tasbacka aldabergeni* (fig. 2-1), in contrary to *Tasbacka salisburgensis* (fig. 2-2). The measurements of the large specimen are: anterior breadth = 71 mm, posterior breadth = 12 mm, anterolateral length = 26/27 mm, posterolateral length = 55 mm and maximate length = 33 mm (plate 2, fig. 3).

The pygal is moved because it is still separately in young sea turtles, not fused with the metaneural and the peripheral margin (fig. 4).

The peripherals of adults are much longer than broad like in *Tasbacka aldabergeni*, in *Tasbacka salisburgensis* the peripherals relatively long as broad and the marginal sulci are positioned in the middle of peripherals.

Four neural nodes are visible along the midline including the nuchal, neurals I-III, neurals IV-V and neurals VI-VIII (plate 1, fig. 3). The neural nodes are a juvenile feature. It is a character of recent immature loggerhead turtles (*Caretta caretta*) also (fig. 4).

Plastron: Only the visceral surface of lateral processus of the hyoplastron (axillar butress) and the hyoplastron (inguinal butress) is visible.

Vertebrae: Only remains of three colum vertebrae remains are demonstrable.

Forelimbs: The phalanges formula is 2/ 3/ 3/ 3/ 2, the tooth formula 3/ 4/ 5/ 2/ 1. The metacarpus 1 is thicker and more swollen as in *Tasbacka aldabergeni*. The follow measurements made with a Euromex binocular microscope with a micrometer ocular:

Hindlimbs: Only remains of three toes of the left (outside the shell) and four toes of the righth foot (under the carapace) are visible.



Plate 3. Puppigerus spec. from Færkerbede, Fur Island, Dansk Moler Industry quarry find in 1953. Without scale bar.

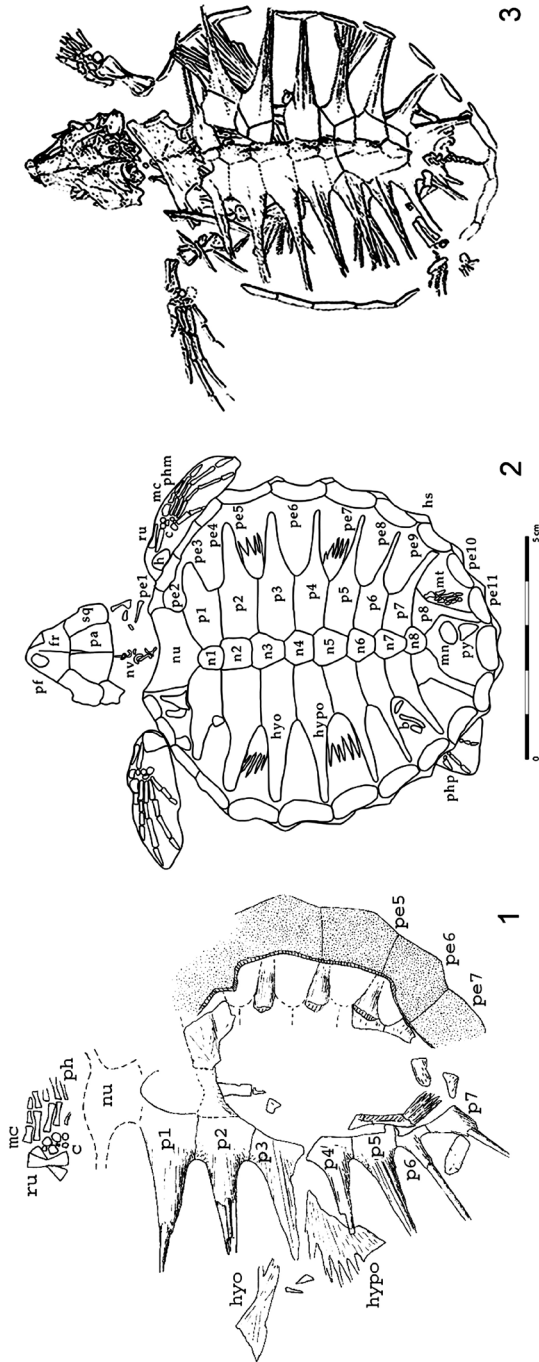


Figure 3. Compare of Paleogene sea turtle juvenile of Europe. 1: Puppigerus spec. from Færøerbede, Fur Island, Dansk Moler Industry quarry from NIELSEN (1959) length of the carapace 79 mm; 2: *Tasbacka danica* sp. n. from Ejerslev Moclappit, Jutland, Denmark, original drawing by Helke Künzel (TLDA) and 3: *Glanichelys knorri* (Gray, 1831) from the fish shale of Glarus, Glarn alps, Switzerland, from ZANGERL (1958).

Abbreviations: pf= prefrontal, fr= frontal, pa= parietal, nu= nuchal, n1-8= neurals, p1-8= pleurals, mc= metacarpals, phm= phalanges manus, mt= metatarsals, php= phalanges pedis, nu= nuchal, n1-8= neurals, p1-8= pleurals, mn= metaneural, py= pygal, pe1-11= peripherals, hs= imprint of horny scutes (marginals), hyo= hypoplastron, hypo= hypoplastron.

	LEFT	RIGHT
Humerus:	11	?2,5
Radius:	5,4	5,4
Ulna:	6,5	6,5
Phalanges:		
I 1	3,1	3,1
I 2	2,4	2,5
I 3	2,4	2,3
II 1	4,2	4,2
II 2	2,5	2,6
II 3	2,9	3
II 4	3,7	3,5
III 1	4,8	4,7
III 2	3,5	3,5
III 3	6,6	6,8
III 4	4	4
IV 1	4,6	4,5
IV 2	3,9	3,7
IV 3	5,5	5,5
IV 4	3,2	3
V 1	3,1	3,1
V 2	2,6	2,7
V 3	1,7	?1,2

DISCUSSION

NIELSEN (1959) described a small fossil sea turtle remain from Færkerhede, Fur Island, Dansk Moler Industry quarry find in 1953 as *Glarichelys* sp., held in the Fur Museum (plate 3). The length of the carapace is 7,9 cm. The characters of that relates to the genus *Puppigerus*, known from several Eocene localities in Europe. In contrast to *Tasbacka* and *Glarichelys* are the peripherals much wider. The younger Oligocene species *Glarichelys knorri* shows more pelagic specialisations in flippers than *Tasbacka*. No neural nodes or serrated margins are known in that genus (fig. 3). Another distinctive feature of *Tasbacka* is the roof-shaped skull (pentagon). The new evidences of *Tasbacka* in Denmark and the new interpreted Austrian material suggest a wider geographic distribution of this genus during the Paleocene-Eocene boundary.

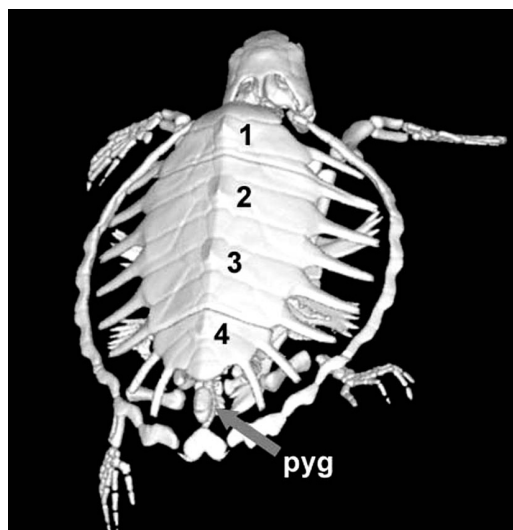


Figure 4. CT image of a recent immature loggerhead skeleton (*Caretta caretta*) showing shows neural nodes from WYNEKEN (2001: fig. 96). 1-4= neural nodes, pyg= separate pygal plate.

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