A NEW SPECIES OF SEAL FROM THE MIDDLE SARMATIAN DEPOSIT OF THE CRIMEA

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Despite the frequently encountered postcranial skeleton discovery of seal fossils, the craniological fragments are practically unknown. Therefore, all the more interesting is the discovery of two well-preserved skulls of a seal from Tarchankut. Such features as the presence of 10 incisors in the maxilla and mandible, the morphology of the facial and rear parts of the skull, the large suborbital opening, the auditory bullae structure, and the size of the mastoid process allow ascertaining that the Tarchankut seal belong to the subfamily Phocinae.

Only four fragments of mandible fossils, related to four different genera, are described in the literature: *Phoca*, *Pristiphoca*, *Miophoca*, and *Praepusa* of the single family Phocidae. The great mandibular similarity of the Tarchankut seal to the mandible of the genus *Praepusa*, described by M. Kretzoi (1941) from the middle Sarmatian of Hungary, allows allocating the discovery from the Crimea to the genus *Praepusa* Kretzoi, 1941. In any case, this is more appropriate than to separate a new taxon of generic rank.

The genus *Praepusa*, with the single species *P. pannonica*, was described on the basis of the mandible fragment, containing the M_1 and alveoli I_2–P_4. On the basis of almost identical measurements of the horizontal ramus of the mandible, the presence of a large tuberosity on the molars, and weak development of the canines, the owner of this fragment was allocated by the author to the ancestral form of the genus *Pusa*. However, the presented description does not allow

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determining the morphological features with adequate accuracy, characterizing the isolated genus. A study of the seal fossil fragments from the middle Sarmatian deposits of Cape Tarchankut (western part of the Crimean Peninsula) allowed on the one hand greatly broadening and specifying the diagnosis of the genus *Praepusa*, inasmuch as the mandibular structure practically does not differ from the mandibular features described by Kretzoi, and on the other hand to make a comparison of the given taxon with other genera of the subfamily Phocinae.

Phocidae Gray, 1825

Phocinae Gill, 1866

Praepusa Kretzoi, 1941

TYPE-SPECIES.—*Praepusa pannonica* Kretzoi, 1941; early? or middle Sarmatian of Hungary (according to the initial designation and the monotype).

DIAGNOSIS.—The jugular processes are well developed; the osseous lamella that connects the malar and mastoid processes is absent; the vomer drops in on the presphenoid. The canine teeth are slightly developed; the cheek teeth, except $P^1{}_1$ and $M^1{}_1$, are three-cusped. The symphyseal part of the lower jaw is bluntly rounded. The chin prominence is situated between P_3–P_4.

INCLUDED SPECIES.—*P. pannonica* Kretzoi, 1941; early? or middle Sarmatian of Hungary; *P. tarchankutica* Koretskaya, sp. n.; middle Sarmatian of the Crimea.

COMPARISON.-- According to the dimensions, the skulls are close to the representatives of the recent genus *Pusa*, but differ from it by the single-cusped P^1_1 and M^1_1 and the three cusps on P^2_2–P^4_4; by the smaller height of the mandible ramus at P_2; by the bigger length of the P_4 alveolus than M_1; the arrangement of the chin prominence between P_3–P_4; by the width of the orbit that is much greater than the width of the palatine bone; by the equal space between the auditory bullae, and by their length; by the larger posteroexternal side of the auditory bullae than the anteroexternal; by the oval bone blade of the meatus acousticus externus; by the foramen ovale located at the level of the auditory bullae.

It differs from *Phoca* by the smaller skull dimensions; by the spaces between the teeth of the lower jaw (the space between P_3–P_4 and P_4–M_1 is larger than between the other premolar teeth); by the single-cusped P^1_1, M^1_1; by the three-cusped P^2_2–P^4_4; by the externolateral arrangement of the bone blade of the meatus acousticus; by the width of the orbit that is much greater than the width of the palatine bone; by the protoconid on the P^2, P^4 that is greater in height than the paraconid and metaconids.

It differs from *Erignathus* by the ptosis of the skull sector; by the single-cusped P_1; by the small height and thickness of the lower jaw; by an absence of a lingual protuberance on the posterior edge of the palatine bones; by the presence of osseous blades on the externoventral edges of the acoustic meati and by their thickened walls. It differs from *Halichoerus* by the close arrangement of the teeth; by the small diastema between P_4–M_1; by the ptosis of the facial sector of the skull; by the premolars with the lateral apexes; by the shortened facial part of the skull.

It differs from *Pagophoca* by the absence of diastemata between P_1–P_3; by the single-cusped M_1, P_1; by the ptosis of the facial part of the skull; by the transverse width of the orbit that greatly exceeds the width of the palatine bone.

It differs from *Histriophoca* by the three-cusped, closely arranged $P^1{}_1$–$P^4{}_4$; by the I_2 that exceeds the height of I_1; by the absence of a jaw angle; by the straight arrangement of the bulla tympanica; by their triangular shape; by the orbit width that greatly exceeds the palatine bone width. As for the genus *Miophoca*—it is represented only by a horizontal ramus of the mandible (Zapfe, 1937) that greatly exceeds the dimensions of the Tarchankut form; moreover, *Praepusa* differs from *Miophoca* by the presence of a diastema between P_4–M_1; by the relatively smaller height of the ramus of the lower jaw.

Praepusa tarchankutica[*] Koretskaya, sp. n.; Figures 1-3, Tables 1-2.

HOLOTYPE.—Skull lacking a facial sector, adult, collection 64-469, Institute of Zoology, Academy of Sciences of the Ukrainian SSR; Cape Tarchankut, western part of the Crimean Peninsula (Antonuk, 1972-1974; Antonuk et al., 1975); middle Sarmatian.

ORIGINAL MATERIAL.—The skull with the mandible is without the articular and venal processes; from the same individual: a scapula, humerus, and radius, juv.; coll. N 64-468, Institute of Zoology, Academy of Sciences of the Ukrainian SSR. Geological Age.—middle Sarmatian of the Ukraine.

DIAGNOSIS.—Smaller than the Recent *Pusa sibirica*: $P^4{}_4$ exceeds the dimensions of $M^1{}_1$, the summit of P_1 attains 2/3 the height of the canine.

[*] The species is named after Cape Tarchankut.

DESCRIPTION.—The skull (Table 1, Figure 1) is markedly lower in the facial part than in the braincase. The dental formula is as in the other representatives of the subfamily: I^{3}_{3}, P^{4}_{4} M^{1}_{1}. The alisphenoid canal is absent. The alveolus diameter of the upper canine is 28.0% of the diameter foramen infraorbitale. The width of the rostral part of the skull of the young individual is 3.5 times smaller than the mastoid width. The apex of the nasal bones is wedge-shaped. The greatest length of the zygomatic bone (from the ends of its lateral projections) of the mature specimen exceeds the space between the internal edges of the foramen infraorbitale. The zygomas are without an expressed anteroventral process. The acoustic duct is formed by the temporal bone. The transverse width of the articular fossa is 1.5 times smaller than the length of the auditory bullae (in true seals it is 2.5–3.0 times smaller). The retroarticular process is 9.0 mm removed from the osseous lobe of the meatus acousticus externus.

The postglenoideus and mastoideus processes are merged and form a pronounced protuberance to the side of the auditory bullae. The jugular processes are large (their height and width at the base equal 9.0 mm, which is almost the height of the auditory bullae), they do not adjoin the mastoid process, and are concave at the anterior part. The vomer enters on the presphenoid bone, reaching the auditory bullae in the mature specimen and extending to the foramen ovale in the juvenile. There are well-developed osseous lobes at the externoventral edge of the acoustic meatus, they are oval at the end and project forward prominently, resembling a tube flattened in the longitudinal direction. The bony lamella between the zygomatic process of the temporal bone and the mastoid suture is absent, it is well expressed on the skull of Recent species, the body of the wedge-shaped bone is greatly elongated. The palatal incisure in the young specimen has a narrow, bracket-like shape that widens in the process of growth and becomes parallel to the incisors. The canines of the maxilla are somewhat longer than the canines of the mandible, they are

of the same shape as in the genus *Pusa*. P^1 is single-rooted without the little basal cingulum, it is single-cusped (its metacone is barely projected). P^2–P^4 are double-rooted with wide little basal cingulum, their paracone noticeably yield to the metacone in size. M^1 is double-rooted, with a single-cusped crown of a triangular form, without a little basal cingulum, its length amounts to 14% of the P^4 length.

The mandible (Table 2, Figure 2). The incisors correspond in form and size to incisors of representatives from the genus *Pusa*. The canines are small, the summit of P^1 barely attains 2/3 the height of a canine. The premolars are located obliquely with respect to the axis of the tooth row, with a labial displacement of the back part of the tooth. P_1 is single-rooted, single-cusped. On the molars (except M_1) the paraconids attain 2/3 the height of the protoconids; M_1 is single-cusped, double-rooted, with a protoconid of triangular shape; on P_2–P_4 the protoconid is rounded-triangular. The diastema between M_1–P_4 is larger than between P_3–P_4. The chin prominence is situated between P_3–P_4.

The scapulae (Figures 3, 4). The scapular spine ends smoothly, without reaching the articular angle. The acromion was not retained. The tuberculum supraglenoidale is located in the collum region above the upper edge of the cavitas glenoidalis. The tuberculum supraglenoidale is not expressed. The fossa supraspinata is wider and deeper than the fossa infraspinata. The medial edge of the scapula is exactly perpendicular to the scapular spine. The greatest scapula width amounts to 77.4% of its absolute length. The main measurements of the juv. (mm) are: The absolute length – 62.0; the collum width – 12.0; the anteroposterior diameter of the cavitas glenoidale – 8.0; the transverse diameter of the cavitas glenoidale – 9.5; the anteroposterior diameter of the lower epiphysis – 15.0; distance from the base to the lower end of the spine – 6.5; maximal thickness of the scapula in its spine – 6.5.

The humerus (Figures 3, 1-3). the small tubercle has a sphenoid shape, it is located below the caput of the humerus, the latter is elongated along the shaft of the bone. The index of the humerus caput length to its width amounts to 96.4%. The small tubercle is separated from the caput by a deep narrow sulcus. The crista deltoidea resembles a sharp blade, smoothly by dropping towards to the condyles, where it ends in a deep fossa coronoidea extended along the bone. There is a foramen entepicondyloideum above the medial condyle. The maximal width of crista deltoidea is in its proximal part. The main measurements (mm.) of the juv. are: absolute length – 55.5; length of the crista deltoidea – 36.0; width of the distal epiphysis – 20.0; width of the proximal epiphysis – 17.0; width of the posterior sector of the trochlea – 11.0; width of the crista deltoidea in the proximal area – 18.0; width of the crista deltoidea in the middle area – ??.

Figure 1. Skull ad. *Praepusa tarchankutica*: a – dorsal view; b – ventral view; c – lateral view; d – caudal view.

Figure 2. Skull with lower jaw of juv. *Praepusa tarchankutica*: a – lateral view; b – ventral view.

Figure 3. *Praepusa tarchankutica*: 1 – humerus, view from medial surface; 2 – ditto; view from ventral surface; 3 – ditto, view from dorsal surface; 4 – scapula; 5 – radius.

Table 1 Skull measurements of *Praepusa tarchankutica* sp. n.

Measurements	**juv.**	**ad.**
Basic length	116.0	
Condylobasal length	127.0	
Length of rostral part	47.0	

" of orbit	38.5	49.0
of skull base	58.0	87.0
" of skull case	83.0	110.0
" of the P^1–M^1 row	34.0	
" of bony auditory bullae	23.0	28.0
Crista of articular pit	11.5	17.0
Mastoid width	67.0	87.0
Width of palatine bone between P^1–P^1	9.0	
" M^1–M^1	35.0	29.5
" of zygomatic arches	66.0	94.0
Interorbital width	5.5	6.5
Width of bony auditory bullae	22.5	27.0
" of osseous lobe of the meatus acousticus	6.0	6.5
Space between the auditory bullae	19.5	28.0
Greatest width of the suborbital opening	7.0	8.0
Greatest " of palate bone	37.0	36.5
Greatest height of skull	52.0	
Space between the crista of the articular pit and the osseous lobe of the meatus acousticus	8.0	9.0
Space from the stylomastoid opening to the postglenoid opening	14.5	13.0
Alveolus diameter of the upper canine	4.5	

Table 2. Main mandible measurements of the genus *Praepusa*.

Measurements	***pannonica***	***tarchankutica***
Main length	–	79.0
I_1–M_1 row length	35.5	40.0
P_1–P_4 row length	–	15.0
P_4 alveolus length	–	6.0
M_1 alveolus length	7.0	5.5
P_1–M_1 row length	31.5	34.0

P_3 length	–	7.0
P_3 height	–	4.0
P_3 width	–	3.5
M_1 width	2.7	3.0
Jaw height of M_1	–	10.5
Jaw height of P_2	–	10.5
Jaw height behind M_1	–	9.0
Jaw height between P_3–P_4	–	12.0
Jaw thickness under M_1	–	4.5
Diastema between P_4–M_1	–	2.0