The frozen mummy of the woolly rhinoceros, *Coelodonta antiquitatis* Blum., 1799 calf: a new data on early ontogenesis of the extinct species

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Introduction

The extinct Woolly rhino (Coelodonta antiquitatis Blum., 1799) is the second largest species of the megafauna that inhabited a wide territory of Eurasia that stretched from the Pyrenees to the eastern fringes of Siberia, and from British and high arctic islands to southern Europe, southern Siberia and northeastern China during the second half of the Pleistocene (Kahlke, 1999; Boeskorov, 2001; Garutt & Boeskorov, 2001). However, unlike woolly mammoths, findings of the frozen corpses of the woolly rhino are very rare. [illegible]

Fig. 1. The Sasha Rhino before the study.

Fig. 2. The Sasha Rhino locality

Location, Geography and Geology

[illegible]

	Description	Thickness (cm)
[illegible]	[illegible]	[illegible]

Fig. 3. The studied cryosection (left) and brief description (right)

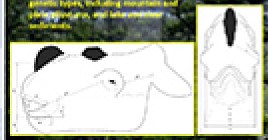
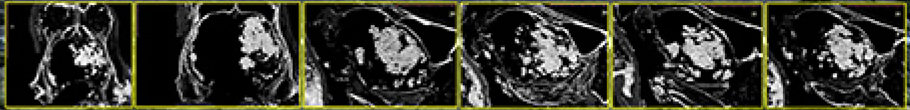


Fig. 4. Measurements of the Sasha Rhino head



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RESULTS

Overall External Morphology of the Sasha Rhino Body

[illegible]

Hide

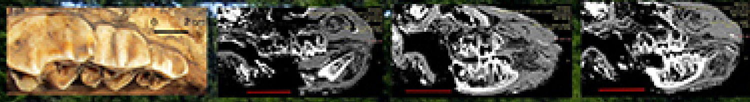
[illegible]

Head

[illegible]

Skull

[illegible]



Teeth

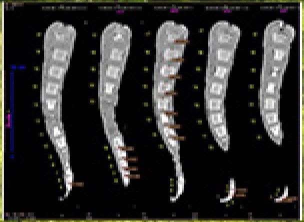
[illegible]

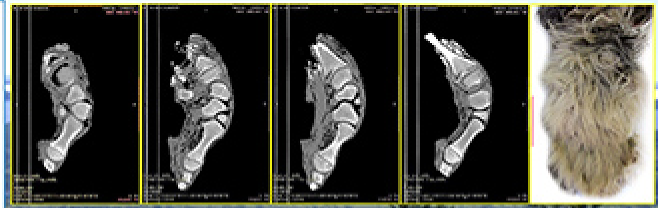
Cheek Teeth

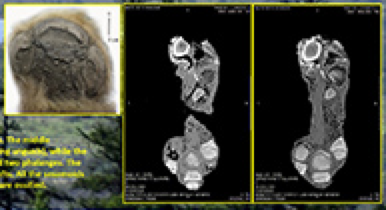
[illegible]

Tail

[illegible]







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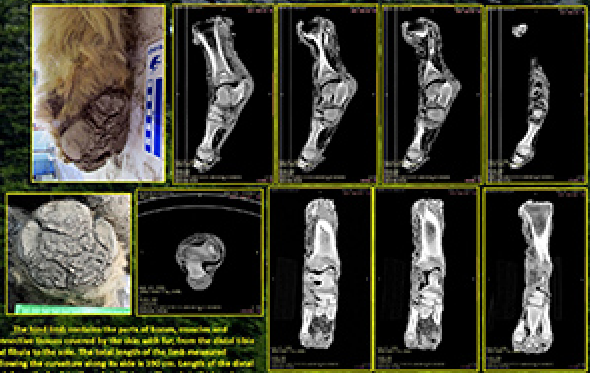

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Acknowledgements

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References

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The new woolly rhino calf 'Sasha" was found thawed out from the bank deposits of the unnamed tributary of the Semyulyakh River in Abyi District of Yakutia (Sakha) Republic in September 2014. It represents the first find of a frozen mummy of the extinct species of such a young age.

The woolly rhino comprises about a half of the animal's body, which is covered by light brown hair. The preserved specimen retained the head, with some missing skin on its back, the left ear, eye lids, the tightly attached nasal and frontal horns, the left fore and hind limbs, and a large piece of skin from the torso. The missing parts may still remain in the sediments of the Sasha locality.

The horns are very small in size: the nasal horn is relatively narrow from the base to the tip, has a rounded, smooth top and is taller than the frontal horn. The frontal horn has the appearance of a "tower", with rounded edges on the dorsal surface worn to the flat plateau. This wear may have been the result of rubbing against its mothers belly since birth while nursing.

The CT scan of the head revealed few preserved internal organs, including the tongue, brain tissue, the complete right eye with supporting tissues, the completely intact and intricate nasal concha with un-ossified nasal septum, and internal morphology of the foramens and canals containing blood vessels and soft tissues (? nerves). The calf also possessed two sets of the maxillary and mandibular deciduous incisors and four deciduous premolars in each jaw quadrangle. Three crowns of unerupted permanent M1 in different developmental stages are in the alveoli. The deciduous premolars and M1 development and wear places the specimen in the early phase of the group IV (1-1.5 years) of the modern white rhinoceros (*Ceratotherium simum*) dental stages and in the early phase of the group C-I (1-1.5 years) of the woolly rhinoceros. At this age, Sasha would have still been nursing.

Sasha's infantile age determination is supported by visible sutures between most of the skull bones, including the occipito-squamosal, basioccipital-basisphenoidal, basisphenoid-pterigoidal, premaxillae-maxillary and palatals. The fore limb epiphyses are not completely formed and not fused, but at least two terminal phalanges (hoofs) are ossified.

The definite cause of Sasha death is not yet detected. However, the presence of some sediment in both nasal airways over the upper deciduous DI1-Dp3, and sediment completely blocking the left nasal airway over the Dp2-Dp4 indicate the baby's entrapment in the mud hole, and a possible cause of death by asphyxia from drowning.

Citation:
Protopopov, A., Potapova, O., Plotnikov, V., Maschenko, E., Boeskorov G., Klimovskii A., Banderov A., Ivanov S., Kolesov S., Pavlov I., 2015. The frozen mummy of the woolly rhinoceros, *Coelodonta antiquitatis* Blum., 1799 calf: a new data on early ontogenesis of the extinct species. Abstracts 75th Annual SVP meeting, October 14-17th, 2015, Dallas, TX. P. 199.

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