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ABSTRACT BOOK

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Discovery of a woolly mammoth (*Mammuthus primigenius*) carcass from Malyi Lyakhovski Island (New Siberian Islands)

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A partial carcass of an adult woolly mammoth (*Mammuthus primigenius*) was found on Malyi Lyakhovsky Island in mid-August 2012 by mammoth tusk collectors. This island is located in the Laptev Sea and is one of the New Siberian Islands. The remains were found 200 m from the northeast coast of the island, on a low hill. Originally exposed material included several bones, skull fragments, and the trunk, which lay on the left tusk.

Excavation of this mammoth was undertaken in May 2013, by staff of the Institute of Applied Ecology of the North, North-Eastern Federal University. Only the lower half of the mammoth carcass remained intact (Fig. 1); this was removed from the permafrost and delivered to the settlement of Kazachie (Ust'-Yanskiy district). In August, 2013 an international group of scientists (the authors of this article and the South Korean biotechnology research group Sooam) conducted a preliminary examination of the carcass with sampling for different types of analysis.

The following parts of the body were preserved with soft tissues covered by skin: the lower part of the head, part of the trunk (Fig. 2A), the lower neck and belly, the front legs, and the distal half of the right hind leg. In its visual impact, the best-preserved region is the trunk, where muscle tissues even have a natural, red color. Forelimb

muscle tissues are less well preserved and are brownish in color. Much of the remaining skin, especially around the mouth, retains its elasticity.

Remaining upper parts of the body – the skull, vertebrae, dorsal parts of ribs, right innominate, right femur, and the left hind leg – recovered from the surface of the tundra, were gnawed by predators or scavengers and are represented only by separate bones. During the excavation, most of the vertebrae and about half of the ribs were not recovered, suggesting that they were removed by scavengers. The left innominate is also absent, and the skull is broken into several pieces. In the hind portion of the carcass, the left leg was in anatomical association, pulled back in a horizontal position, with wool and fat tissue preserved around the knee and foot.

The upper teeth (Fig. 2B) are deeply worn (anterior plates worn to the roots) and are smaller (length ≈ 15 cm) than would be expected for M3s. Both are abnormally curved (concave toward the midline). Curvature of the left is more extreme, but the right is additionally affected by resorption along its lingual margin. In contrast, both lower teeth are m3s with normal configurations and lamellar frequencies of about 9.0 (Fig. 2C). The wear stage of the left m3 matches Laws' (1966) age group XXV (the right is slightly more advanced), suggesting an

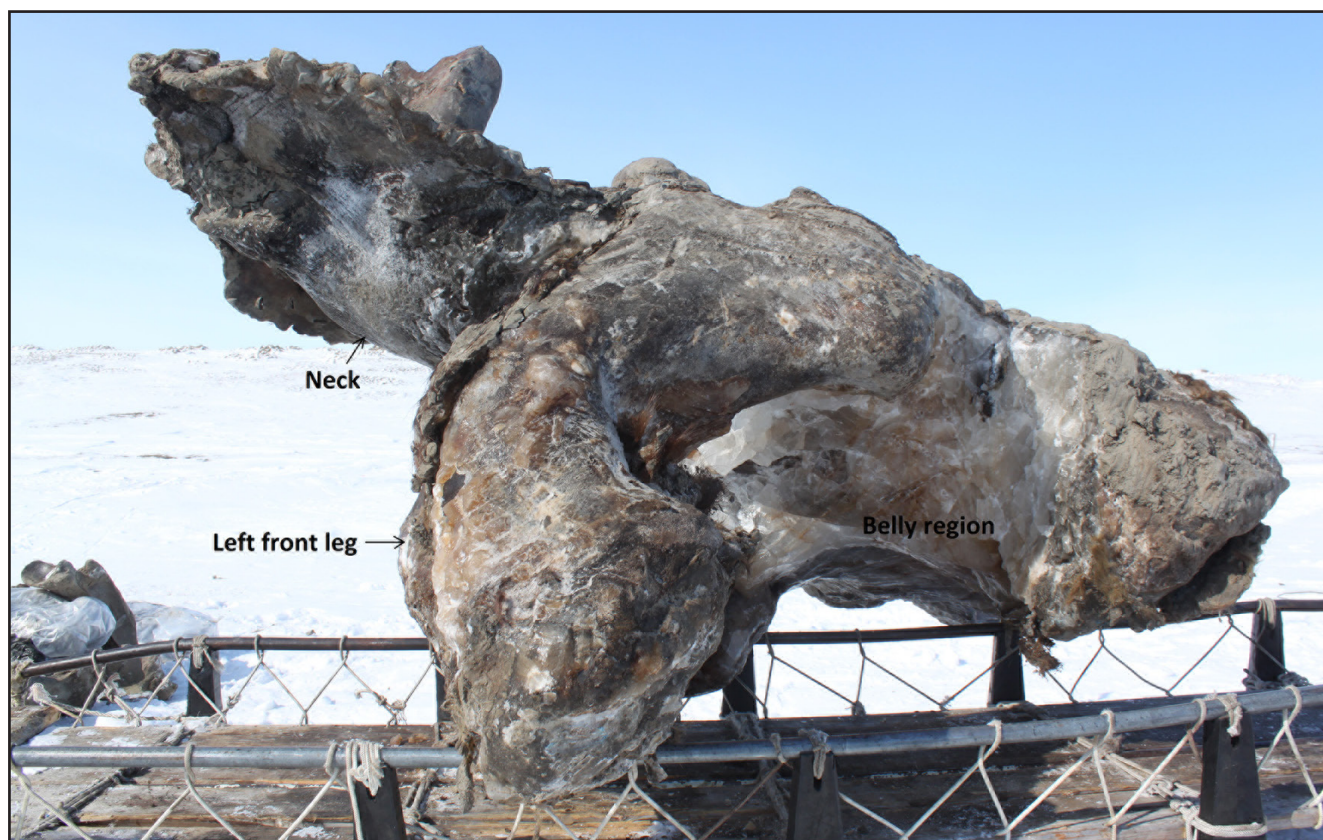


Fig. 1. Side view of mammoth carcass from Malyi Lyakhovski Island (New Siberian Islands).



Fig. 2. A, trunk; B, maxilla; C, left m3 of the woolly mammoth carcass from Malyi Lyakhovski Island (New Siberian Islands).

age of about 47 yr. If the uppers are M3s, it is unusual for them to be more advanced in wear than the lowers (normally, lowers are more advanced). The uppers may therefore be M2s that did not progress anteriorly in the normal fashion because of their contorted form, inhibiting development of the M3s. Occlusion of the uppers, first with m2s and then with m3s, would explain their advanced attrition.

The size and shape of the tusks, the small size of the body of this fully adult individual, and discovery of well-developed nipples and mammae on the anteroventral aspect of the thorax all imply that this was a female. The right tusk weighs 17.6 kg and is 207.5 cm long on its outside curve, with a basal circumference of 26.8 cm and a circumference of 27.9 cm at mid-length. The left tusk weighs 16.6 kg and is 223 cm long on its outside curve, with a basal circumference of 25.4 cm and a circumference of 29.7 cm at mid-length. The length from the anterior edge of the sole of left hind foot to the knee joint is 54 cm. Anteroposterior length of the sole of the left front foot is 34 cm. The right rear foot is 31 cm long, with a maximum width of 27.5 cm.

The height of this mammoth, computed following the method of Dubrovo (1982), was 230 cm. Adding 5% to account for missing soft tissues, height at the shoulders was about 240-250 cm.

During excavation in ice cavities below the belly and underarm area in two places, there was an accumulation of small amounts of dark-brown liquid, 3 ml of which were transferred to two tubes. Speculation that this is blood has not yet been confirmed, but erythrocytes from blood vessels in the trunk have been detected.

The remaining part of the visceral cavity is still mostly covered by permafrost; for this reason, we cannot yet judge the condition of remaining internal organs. Wool samples from different parts of the body were collected. Although the wool coat from most parts of the skin is preserved, hairs have separated from the skin surface as a result of destruction of the epithelial layer and subsequent freezing in water.

This carcass of a mammoth from Malyi Lyakhovsky Island is the best-preserved specimen of an adult female woolly mammoth. The animal appears to have been trapped in a depression that accommodated about half the body volume. Water later filled the depression and froze, preserving part of the carcass. The carcass remained in excellent condition for thousands of years because the severe climatic conditions of the Arctic islands kept it locked inside almost pure ice, which never melted.

References

- Dubrovo I.A. 1982. Yuribei mammoth skeleton morphology. In: Yuribei mammoth, Moscow, pp. 53-98.
- Laws, R.M. 1966. Age criteria for the African elephant, *Loxodonta a. africana*. East African Wildlife Journal 4, 1-37.

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