

GC31B-0467 High-latitude steppe vegetation and the mineral nutrition of Pleistocene herbivores

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High-latitude steppes were widespread and zonal in the Late Pleistocene and formed a landscape basis for the Mammoth Biome. Now the patches of these steppes survived on steep slopes under southern aspects. These steppes serve as unique information sources about the Late Pleistocene "Mammoth" steppe. Numerous data obtained by palynological, carpological, and DNA analysis of plant remains from feces and stomach contents of Pleistocene herbivore mummies, as well as from buried soils and enclosing deposits show that they are similar to modern steppe plant assemblage in taxa composition. Plant's nutrient concentrations are of fundamental importance across Pleistocene grass-rich ecosystems because of their role in the support of large herbivores. The average weight of an adult mammoth skeleton (about 0.5 tons) and of a woolly rhinoceros (about 0.2 tons) clearly suggests this. Detailed studies on fossil bone remains showed mineral deficiency in large Pleistocene herbivores. A three-year study of ash and mineral contents of two types of relict steppe vegetation at the Kolyma Lowland, Arctic Siberia has been carried out. Nowadays refugia of similar vegetation are located not far (1 - 15km) from the Yedoma permafrost outcrops where abundant fossil remains are found. Dominant species of the steppe vegetation were sampled. Preliminary studies indicate that the ash-content varied 1.5-2 times in species of steppe herbs. The Ca, P, Mg, K element contents were higher for most steppe species than in the local herbaceous vegetation, especially in Ca and P. One of the most important elements of the mineral nutrition, the phosphorus, was always found in higher concentrations in the steppe vegetation than in plants of recently dominant landscapes of the study area. It should be noted that the mineral nutrient content of the modern steppe vegetation of Siberian Arctic is comparable to that of the recent zonal steppe of Transbaikalian Region. This study supports the hypothesis that aboveground mineral concentrations of late Pleistocene grass-rich ecosystems were consistently higher than that of the recent common species of Siberian Arctic grassland. The source of mineral nutrients in the Pleistocene high-latitude steppe vegetation served as one of the reasons for the existence and survival of large herbivores in the Mammoth Biome.

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