УДК **599.61**

РАЗВЕДКА ПАЛЕОНТОЛОГИЧЕСКИХ И АРХЕОЛОГИЧЕСКИХ ПАМЯТНИКОВ НА СЕВЕРЕ ЯКУТИИ

[1]Фишер Д., [2]Горбунов С., [3]Buigues B., [4]Тихонов А.Н.

[1]Музей палеонтологии Мичиганского университета, АннАрбор;
[2]Международный мамонтовый комитет, Москва;
[3]Международный мамонтовый комитет, Сен-Жан-де-Люз;
[4]Зоологический институт, РАН, Санкт-Петербург

В статье дан обзор полевых исследований директором Палеонтологического музея Мичиганского университета Д. Фишером и его коллегами местонахождений мамонтовой фауны на севере Усть-Янского района Республики Саха (Якутия) в 2012 году. Командой д-ра Фишера изучены бивни мамонта из палеонтологических сборов родовой общины «Юкагир» и собраны коренные зубы этого самого северного представителя хоботных в разных местонахождениях – Булчурхан Юрюете и Сопливая гора (Муус Хая). По бивням и коренным зубам можно восстановить особенности жизни и экологии каждого мамонта, останки которого были найдены. Сделаны трехмерные модели бивней. Кроме того, были изучены местонахождения Ойягосский яр и район озера Чахчалах, где в 2010-2011 гг. членами общины «Юкагир» были обнаружены находки с мягкими тканями молодого мамонта, взрослого самца бизона и фрагменты туши среднеголоценовой лошади.

Ключевые слова: мамонт, местонахождения, палеоэкология

RECONNAISSANCE OF PALEONTOLOGICAL AND ARCHAEOLOGICAL SITES IN NORTHERN YAKUTIA

[1]Fisher D.C., [2]Gorbunov S., [3] Buigues B., [4]Tikhonov A.N.

[1]Museum of Paleontology, University of Michigan, Ann Arbor;
[2]International Mammoth Committee, Moscow;
[3]International Mammoth Committee, St. Jean de Luz;
[4]Zoological Institute, Russian Academy of Sciences, Saint-Petersburg

This paper surveys the field research director of the Paleontological Museum of the University of Michigan J. Fisher and his colleagues locations mammoth fauna in the north of the Ust-Yana region of the Republic of Sakha (Yakutia) in 2012. The team of Dr. Fischer studied mammoth tusks of paleontological collections clan «Yukagir» and collected the molars of the northernmost representative of the Proboscidea in different localities - Bulchurhan Yuryuete and Snotty Mountain (Muus Haya). According tusks and molars can be restored features of life and environment of each mammoth, whose remains have been found. Made three-dimensional model of tusks. In addition, examined the location and brightness Oyyagossky Chahchalah Lake area, where in 2010-2011. members of the community, «Yukagir 'findings have been found with soft tissues of a young mammoth adult male bison carcasses and fragments of mid-Holocene horse.

Keywords: mammoth, location, paleoecology

In February 2012, the Institute of Applied Ecology of the North (part of North-East Federal University, or NEFU) and the Sakha Academy of Sciences (ANRS) announced discovery of three remarkable fossil specimens with preserved soft tissues, from the northern part of the Sakha Republic (Yakutia). These specimens – a partial carcass of a young woolly mammoth, the head and partial body of a horse, and a complete carcass of a young male steppe bison – were found by associates of Mr. Vasily Gorokhov, leader of the Yukagir community, of the Ust-Yanskiy District, northern Yakutia. A team of Yakutian, Russian, and foreign scientists studied all three specimens, with results to be published elsewhere. In addition to learning about these specimens, we discussed with Mr. Gorokhov two sites with notable concentrations of fossil remains: Sappliva (also called Muus Khaya), near the Yana River archaeological site excavated by Vladimir Pitulko and colleagues, and a previously unreported site in northern Yakutia, Bulchurkhan Yuriuetta. With help from our Yakutian colleagues, we arranged a joint field expedition with Mr. Gorokhov for late summer 2012. Although our interests and his were quite different, we developed a productive partnership, the details of which I will outline today.

Mr. Gorokhov was interested mainly in collecting mammoth tusks for the commercial ivory trade. In contrast, our research usually involves detailed laboratory analysis of tusks to extract data on the growth histories and ecologies of mammoths. Clearly, both goals could not be fully satisfied with the same specimens, at the same time. Fortunately, some data on mammoth tusks can be acquired from simple measurements and photographs, and for this type of study, we were able to benefit even from specimens that were destined to be sold. In addition, we were able to shift our primary focus from mammoth tusks to mammoth molars. Molars grow in much the same way as tusks and yield similar kinds of data on life history. A tusk is better for us, because it yields a record of multiple decades of life and is relatively easy to sample, but molars often record data on an interval of 5-10 years, and for some

purposes, this is enough to be useful. Our agreement with Mr. Gorokhov was essentially that he would take the tusks (allowing us to measure and photograph the best ones) and we would take the molars, which had little commercial value.

For tusks that we measured and photographed, we used photogrammetric software, back in our lab in the US, to generate accurate 3-dimensional models from a series of photos taken from points all around the specimen and at different levels. We will next subject these models to quantitative study to determine the growth parameters responsible for the form of each tusk. By comparing multiple specimens, we can learn how growth and form differ in males and females, how they vary among individuals of the same sex, and how they change with age.

A second goal of our research was to visit the discovery site for each of the remarkably preserved carcasses we had studied in Yakutsk, to gain some first-hand understanding of the lithology, the stratigraphy, and the nature of the fossil assemblage associated with each. The mammoth and the horse had been found relatively close to one another at a locality known as Oyagoskiy Yar, on the north-facing coast of the Laptev Sea. This region was moderately fossiliferous, and yet there was no evidence of any unusual concentration of remains that would suggest a unique setting for fossil preservation. The same characterization held for the locality that had produced the steppe bison, along the shore of Lake Chukhchalach.

Although we have not yet had the opportunity to undertake detailed laboratory analysis of the mammoth, the horse, or the bison, we anticipate being able to do this in the future, and we should be able to determine, among other things, the season of the year at which each died and their condition in the years prior to death. This kind of analysis could shed light on their causes of death and help to reconstruct aspects of the environment in which they lived. However, our ability to interpret such data would be greatest if we could analyze a larger sample of isolated deaths from broadly similar preservational settings. Therefore, a third goal of our fieldwork was to collect molars of mammoths in particular, and other fauna, if possible, to document general patterns of seasonal mortality in this fauna. We expect cause of death and season of death to vary among individuals, but the distribution of season of death in a large sample should reveal how seasonal changes in weather conditions, food availability, and risk of accidental trauma affected mortality in Pleistocene populations. Season of death can be determined by histological and microCT analysis of the growing ends of tooth roots, supplemented by serial analyses of oxygen, carbon, and nitrogen isotope ratios in dentin hydroxyapatite and collagen. It depends on finding teeth that were still actively growing at the time of death, yielding dentin formed over several years prior to death. Fortunately, this is easy to evaluate by inspection of tooth roots at the time of collection. In this fashion, by prospecting many kilometers of coastal cliffs, inland outcrops, river margins, and margins of thermokarst lakes, we found 38 molars (mostly mammoth) with open roots suitable for analysis. These specimens constitute an excellent comparative sample.

The fourth goal of our fieldwork was to sample sites with unusual concentrations of fossil remains. At the new Bulchurkhan Yuriuetta locality, we collected 79 molars (mostly mammoth) with open roots suitable for analysis. We also recovered lithic flakes at this site; together with clear signs of carcass processing on skeletal material, this represents strong evidence of human association at this site. It is not clear yet whether human activity is responsible for the deaths of all these animals, but human agency is at least involved in postmortem treatment of carcasses. To understand the formation of this site, we propose to determine the perimortem nutritional condition and season of death of many, if not all, of the teeth we collected. In addition, we will compare the patterns revealed in this sample with those from our sample of isolated deaths. These kinds of studies are extremely labor-intensive, but they have great potential to enhance understanding of human-megafaunal interaction during the Pleistocene history of this region.

We also pursued our fourth goal at Sappliva, the better-known locality with an unusual concentration of megafaunal remains adjacent to the Yana River archaeological site. Unlike Bulchurkhan Yuriuetta, this site has already been dated and is known to reflect a time 27,000 – 30,000 years ago; it is one of the earliest well-documented human occupations of the high arctic. Unfortunately, late summer rains caused a dramatic rise in the level of the Yana River just before we returned to conduct our main survey of this site. Because much of the site was flooded, we were only able to collect 15 teeth (again, mostly mammoth). Although this is a smaller sample than we would like to have collected, it should still allow us to gain new insights into a locality that is already important for our understanding of Pleistocene paleoecology and human activity. A great deal remains to be learned about these times and places, but studies such as those we have begun will elucidate the lives of both ancient humans and megafauna in unprecedented detail.

We are thankful to Vasily Gorokhov and his family, friends, and associates for helping us succeed in our objectives. Mr. Gorokhov's unexpected death this past fall was a loss to us all. We are also grateful to our Yakutian colleagues for assistance before, during, and after our fieldwork.