

GENNADY G. BOESKOROV, Jakutsk; A.A. AGADJANYAN, Moscow

Beavers *Castor fiber* L. in the Late Pleistocene and Holocene of Yakutia (Eastern Siberia)

Present and former natural area in Eastern Siberia

By the end of XX century the aboriginal Eastern Siberian population of a river beaver (*Castor fiber* L.) Have remained in the Upper Enisei, Tuva (Azas river) (DEZHKIN et al., 1986). The beaver remains were found at Neolithic and Eneolithic human sites of Cis-Baikal and Trans-Baikal regions (ERMOLOVA, 1978; DEZHKIN et al., 1986). The remains of ancient beaver dams were found on the Malii Patom river (OKLADNIKOV, 1946). It was supposed the beavers inhabited in Cis-Baikal region till XVII century (SKALON, 1951; KIRIKOV, 1961).

The views concerning the beaver natural area in Yakutia are contradictory. Today there is no beavers in the Republic. However GMELIN S.G. noted beavers had gone in the Vitim and Olyekma basins by the end of XVII century (SKALON, 1951). PALLAS P.S., SIMASHKO, N. and KEPPEM, Ph.P. mentioned about the beavers inhabiting in a basin of the Aldan river (SKALON, 1951). About dozens to hundreds beaver fells (skins) were registered sold during the fairs of Yakutsk from XIX till early XX century. Due to analysis of historic events, expeditions' materials and geographical names it was assumed at one time that the beavers inhabited in the basins of the Aldan, Vitim, Maya, Kolyma rivers not a long time ago (SKALON, 1951). The foregoing and information given by hunters who found „leavings of

trees and stubs in river floodlands, allowed“ to include the river beaver into the Red Book Data of Yakutia (1987) as to become extinct in Yakutia at the beginning of XX century. Anyway there is not enough factual evidence of this point of view. According to another assumption the beavers had disappeared in Yakutia before Russian Cossacks' arrival (XVII cent.). And the beaver fells sold at Yakutsk fairs in XIX century were transported from North America. Therefore the fells could belong to the Canadian beaver (*C. Canadensis* KUHL.) (OGNEV, 1926). The Yakut yasak books kept during XVII - XVIII centuries didn't contain information about beavers (KIRIKOV, 1961). Moreover the authors of the first summary on Yakutian mammals with ist materials collected in the mid 20s of the XX century didn't mention about the beaver even as one disappeared (TUGARINOV et al., 1934).

Until recently the factual materials have been evidence of that *C. fiber* inhabited within the Aldan basin in Late Pleistocene and Early Holocene. The beaver dams on the Aldan river bank of the Mamontova Gora outcrop (Mammoth Mountain) were discovered at a thickness of the 50-meter terrace dated to Late Pleistocene (RUSSANOV, 1968; AGADJANYAN, MOTUZKO, 1972). Noteworthy, the fruits of water nuts (*Trapa natans* L.) were found in sediments of the beaver dam. Therefore there could be more favourable climatic conditions in comparison

with present ones (BOESKOROV, AGADJANYAN, 1999). The river beaver bones were excavated out of the Pleistocene sediments of the Mammoth mountain (VANGENGEIM, 1961). And the beaver bone remains were excavated at an ancient human site of the Djuktaysky cave in the Upper Aldan. The layers contained these remains are dated towards Upper Palaeolithic and Early Mesolithic with the age of 35 - 8 thousand years (VANGENGEIM, 1977; MOČANOV, 1977).

The beaver mandible, which probably could be of Middle Pleistocene, was found at the Ulakhan Sullar outcrop of the Adycha river (GONČAROV, TITKOV, 1968).

Besides the poplar fragments perhaps processed by a Paleolithic man were found at the Interglacial outcrop of the Susuman in the Upper Kolyma (VASKOVSKY, OKLADNIKOV, 1948). Nevertheless, according to MOČANOV (1977) these wood remains are processed by a beaver as they are similar to those of the Mammoth mountain. For last years the newfound remains of *C. fiber* are supposed to broaden a notion about its former natural habitat in Yakutia (BOESKOROV, AGADJANYAN, 1999).

Locality and material

The Ulakhan Sullar outcrop (Verkhojansky region, Adycha river): A fragment of the skull and left lower mandible bone found in 80s of XX century and kept in the Verkhojnansk Museum of Nature. The multilayer site of Ulakhan Segeleljakh (South Eastern part of Yakutia, Tokko river, Oljekma basin): fragments of the right lower mandible bone and two – left and right – lower incisors excavated out of a medieval layer (4th layer of VII-XII centuries A.D.; Museum of Archaeology and Ethnography of Yak. St. Univ.) of the site by an archeologist KIRILLIN A.S.

Description

Both remains from the Ulakhan Sullar outcrop are strongly mineralized and of dark brown color. They do not have signs of rubbing. Both remains have cheek teeth. The upper mandible bones with incisor alveoli, fore parts of cheekbones arcs and palatine bones are partially preserved in the skull fragment. The teeth are of intact. The lower mandible bone has a part of

the incisor alveolus. The teeth are damaged. The whole posterior part of the bone is broken off. The size figures are shown in the table.

The cheek teeth are of prismatic structure being typical to beavers. Incoming folds bring heavy accumulation of external cement. Root laying is not expressed. Enamel marks are absent. Upper teeth reduce from front to back gradually. Each of them have three incoming folds at front. The deepest of them is a middle fold. At front each tooth has one incoming fold which reaches a midst of the masticatory surface.

A tendency of lower teeth to size reduction from front to back isn't expressed. A length of P³ and M³ teeth crowns are approximately similar. At front each lower tooth has one incoming fold that almost reaches a middle line of the masticatory surface; and at back each has three incoming folds. The deepest fold is front one.

The beaver remains from Ulakhan Segeleljakh are mineralized weakly. A fragment of the lower jawbone represents a small section of the symphysis with a part of the incisor alveolus. A posterior part of the right incisor is broken off; the incisor itself has a longitudinal crack. A length of the preserved incisor part is about 70 mm on an external curvature. The left incisor has a front part preserved only which length equals to 50 mm.

Comparison

The tracteries on a masticatory surface of the beaver cheek teeth from Ulakhan Sullar completely correspond to those of the present *C. fiber* (initial stage of wearing). The molars of most Asian Miocene and Pliocene beavers have a considerably more amount of enamel folds and smaller sizes. The Pliocene-Pleistocene beaver *Trogotherium cuvieri* Fischer looks much larger than beavers of the genus of *Castor*. Moreover through ontogenesis the cheek teeth of the trogontherian beavers tend to lay roots and the incoming folds are locking to the marks on the masticatory surface. According to other peculiarities (tooth sizes, diastem length, a height of the lower jawbone, a form of the incisor foramina and choanal foramen) the described finds are also included into limits of variability of the river beavers. It makes possible to relate them to a species of *C. fiber* L. It'd be noted there are

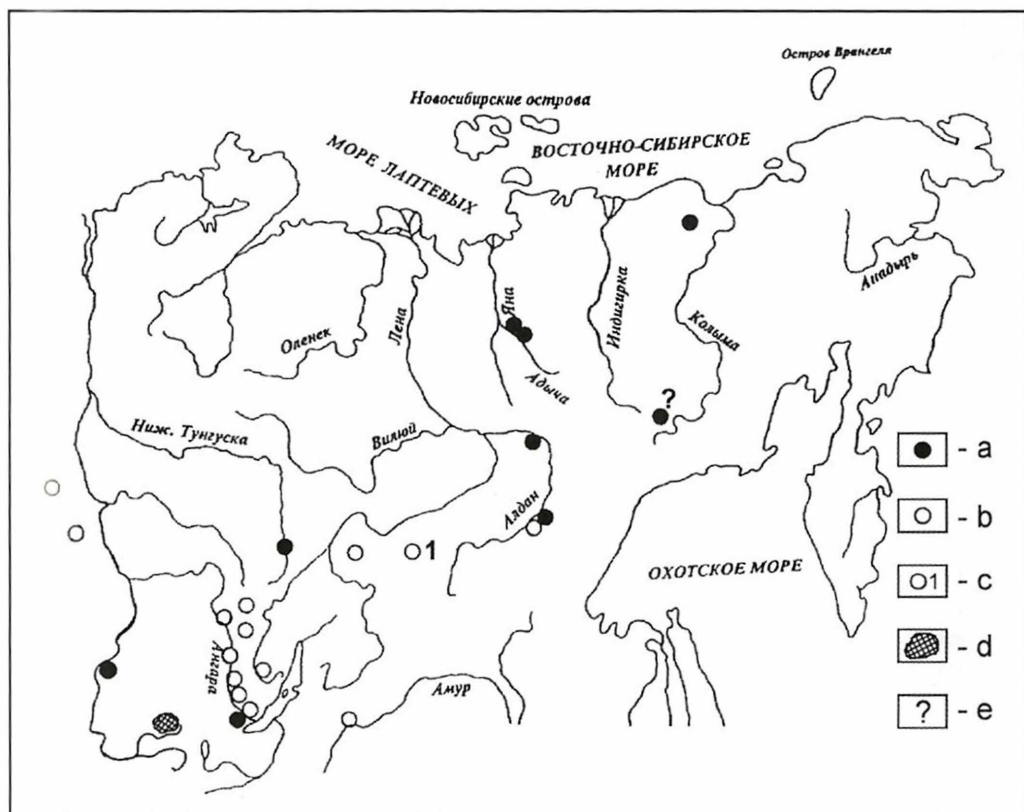


Fig. 1 Previous and modern distribution of *Castor fiber* in Eastern Siberia: a - finds of beaver remains and beaver activities in the Pleistocene (dams); b - finds of beaver remains and beaver activities (dams, cutted trees) in the Holocene; c - Ulakhan Segelennyakh settlement; d - modern area (Тыва, the Azas River); e - the find is unclear.

the sediments dated from Late Pliocene to Late Pleistocene on the outcrop of Ulakhan Sullar (SHER, 1971; LAZAREV, TOMSKAYA, 1987). The well preservation of the mentioned remains allowed us dates them to Pleistocene; perhaps to the end of the period. This is one of the northeast finds of the extinct river beavers in Eastern Siberia.

The remains from Ulakhan Segelennyakh give poor information. The enamel of left and right incisors has a reddish color typical of beavers. The size and form of incisors do not differ from those of the present *C. fiber*. The beaver remains from the Ulakhan Segelennyakh site were excavated with the bones of the mammals which could be met in the today taiga fauna of this region too: *Ochotona hyperborea*, *Tamias sibiricus*, *Microtus oeconomus*, *Myopus schisticolor*, *Martes zibellina*, *Ursus arctos*, *Cervus*

elaphus, *Alces alces*, *Rangifer tarandus*, *Moschus moschiferus* (BOESKOROV, KIRILLIN, 1995; BOESKOROV, 1998). In this layer the river beaver remains make up 3 % in a total amount of the distinguishable bones. This could be indirect evidence of a extremely low number of beavers in South Yakutia in the Middle Ages (BOESKOROV, AGADJANYAN, 1999). For instance, in Western Siberia the beaver bones average 35 % in a total number of the wild animals' bones among "kitchen" remains at the medieval human settlements (after KOSINTSEV, 1984).

In conclusion it could be established that the river beaver had a very wide spreading on a territory of Yakutia in Late Pleistocene. However in Holocene its natural area considerably reduced and might not exceed the bounds of South Yakutia to the North. It'd be noted a number of the

beaver seemed never to be high in this region. The finds from Ulakhan Segelennyakh is the first reliable evidence of the rodent inhabiting in South Yakutia in the Middle Ages. As it has already been assumed (SKALON, 1951), the river beaver was obviously exterminated by a man in Yakutia relatively not so long time ago.

Summary

The views concerning *C. fiber* former distribution in Yakutia are contradictory. At present time the beavers are absent at the territory of Yakutia. However it was supposed that they have been widely distributed in Yakutia at the historical and prehistorical epochs. Nevertheless the actual data confirming this point of view are very poor. Some remains of the *C. fiber* were found in the Pleistocene sediments of Adycha river (Ulakhan Sullar outcrop) and Aldan river (Dyuktayskaya cave). The remains of beaver dam were found in the Pleistocene sediments of Mamontova gora outcrop (lower stream of Aldan river). Early Holocene beaver remains are known from Dyuktayskaya cave. Some new finds of *C. fiber* remains found in Pleistocene sediments of Ulakhan Sullar outcrop (Adycha river) and in medieval settlement Ulakhan Segelennyakh (South-Western Yakutia) are described in this article.

The find from Ulakhan Sullar is one of the most northern in Eastern Siberia. The beavers were rather widely distributed in Late Pleistocene and Holocene in Yakutia but they were never numerous in this region. The finds from Ulakhan Segelennyakh are the first reliable evidence the beavers presence at Southern Yakutia in Middle Ages. Probably these fur-bearing rodents were eliminated by man relatively not long ago. A new locality of the Pleistocene *Castor fiber* find is registered from Chukochiya river on the Kolyma Lowland.

Zusammenfassung

Biber *Castor fiber* L. im späten Pleistozän und Holozän Jakutiens (Ostsibirien)

Während der Biber im Pleistozän und Holozän in Jakutien weit verbreitet war, fehlt er heute in dieser Region. Es gibt Nachweise aus

pleistozänen Sedimenten des Adycha- und Aldan-Flusses. Am Unterlauf des Aldan-Flusses (Mamontova gora) konnten sogar Biberdämme pleistozänen Ursprungs gefunden werden. Aus dem frühen Holozän wurden Biberreste aus der Djuktajskaja Höhle bekannt. Neuere Belege liegen ebenfalls vom Adycha-Fluss und aus Südwest-Jakutien vor. Der Fund von Ulakhan Sullar ist einer der nördlichsten in Ostsibirien. Funde von Ulakhan Segelennyakh belegen die Biberpresenz in Südjakutien bis in das Mittelalter, wo die Art vom Menschen eliminiert wurde. Ein neuer, bisher nicht publizierter pleistozäner Biberfund stammt vom Chukochija-Fluss aus dem Kolyma-Tiefland.

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Addresses of authors

Dr. G.G. BOESKOROV
Mammoth Museum
Lenina prospekt 39
677891 Jakutsk
Russia

Dr. A.K. AGADJANYAN
Paleotological Institute
Russian Acad. Sciences
Moscow

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Autor(en)/Author(s): Boeskorov Gennady G., Agadjanian Alexander

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