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Medieval animal management practices at Proezzhaia I: Insights from dietary stable isotope analysis

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ABSTRACT

In this paper, we report the stable carbon and nitrogen isotope analysis results of wild (n = 15) and domestic (n = 21) animal samples from the Proezzhaia I site, a fortified Medieval settlement in Trans-Baikal, Siberia. Additionally, we analyzed five modern freshwater fish samples from the Shilka River, which flows immediately north of the site. Together, these samples provide the first dietary stable isotope data for the entire Trans-Baikal region. Our results reveal a C_3 plant dominated diet for all animal taxa sampled, but with a possible minor inclusion of C_4 plant material in the diets of some cattle (*Bos* sp.) and horses (*Equus* sp.). We infer this C_4 plant was likely a type of millet, the remains of which were identified at a contemporaneous site upriver. Additionally, these results indicate that some cattle and horses consumed plant material grown in ^{15}N-enriched soil, which suggests several distinct animal management practices, or may indicate a trade in or movement of animals from an area with a different nitrogen isotope baseline.

1. Introduction

The use of carbon and nitrogen stable isotope analysis in making inferences about ancient animal management practices such as weaning (Balasse and Tresset 2002), foddering and provisioning (Hamilton et al. 2009; Pechenkina et al. 2013; White et al. 2001), and corralling or pasturing (Macharia et al. 2012; Makarewicz 2014) is well-established in archaeology. Increasingly, this scholarship focuses on the mosaic of animal management practices employed by ancient peoples (Honeychurch and Makarewicz 2016), which in some locations included the economic interdependence of sedentary and mobile pastoralists living in close proximity (Gilbert 1983; Khazanov 1994; Lee and Bates 1974). Archaeological research has shown some members of sedentary agricultural societies adopted mobile pastoralism as either a temporary or permanent solution to economic and/or political pressures (Anthony and Brown 2007; Chang 2015; Spengler et al. 2013). This underscores that the archaeological identification of a human group as strictly “sedentary” or “mobile” can fail to acknowledge the breadth of practices employed in past societies, and that actual animal management practices in the past need to be better documented through analyses of various forms of archaeological data.

The Medieval period in the Trans-Baikal region of Siberia was marked by relatively frequent shifts in socioeconomic and political organization (Kim 2011), related in part to the fact that its inhabitants were ethnically diverse. Some groups practiced markedly different settlement and subsistence patterns, ranging from mobile reindeer herding and hunting among the region's Tungusic-speaking peoples of the taiga to seemingly sedentary forms of agriculture and pastoralism among the Mohe, a group of people originating in regions to the east-southeast who colonized parts of Trans-Baikal.

This region is also ecologically diverse, with its southern regions being characterized by patches of steppe, forest-steppe, and taiga (boreal forest), while its northern portions mostly are comprised of taiga. *Trans*-Baikal is bordered by Manchuria to the east-southeast, and Mongolia to its south. This paper examines animal management practices at the Proezzhaia I site, a fortified Medieval settlement in the southern portion of eastern Trans-Baikal. To accomplish this, we apply $\delta^{13}C$ and $\delta^{15}N$ analysis to faunal remains recovered from the site and a set of modern fish from the Shilka River, which together constitute the first stable isotope data for the entire Trans-Baikal region.

1.1. Archaeological context

Proezzhaia I is located on a terrace along the southeastern bank of

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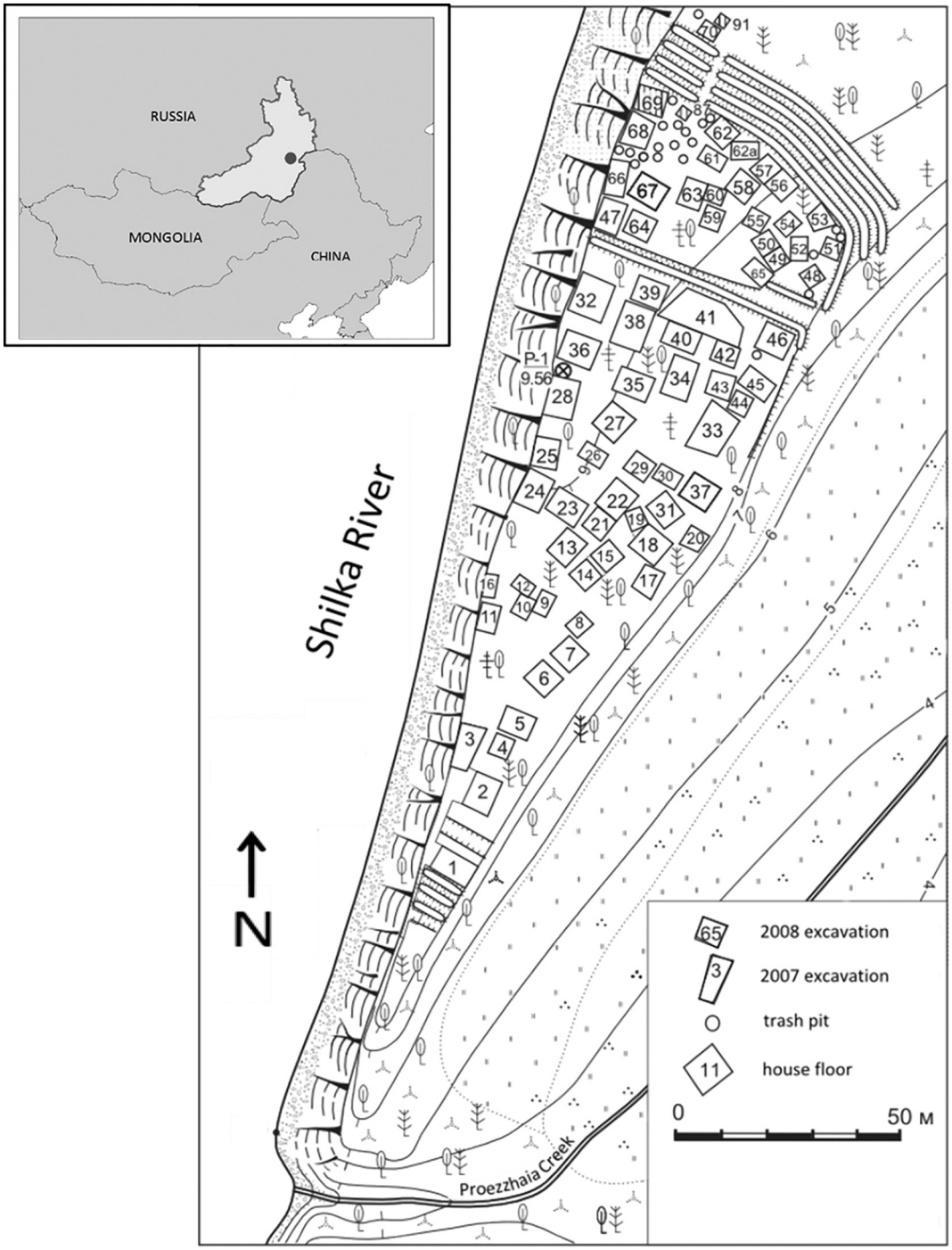

Fig. 1. Plan view of the Proezzhaia I site. Inset: location of Proezzhaia I in Trans-Baikal. Proezzhaia I map courtesy of E.V. Kovychev.

the Shilka River in a forested area just north of the Russia-China border (Fig. 1). The nearest large stretches of steppe and forest-steppe are found about 160 km to the southeast. The Trans-Baikal region is bisected by the Iablonovyi Mountains, which geographically divide it into eastern and western portions (Kradin 2005:79); in total, Transbaikal encompasses nearly one million square kilometers. In the Medieval period, the Proezzhaia I area was likely culturally and economically tied to Outer Manchuria, to the east (Janhunen 1996:5), as it is positioned east of the Iablonovyi range. The Shilka River is the northern source of the Amur River. At 506 km long, it drains a watershed of 206,000 km^2 (Simonov and Dahmer 2008:22). Its bottom is generally formed by large pebbles and boulders, and it is prone to flooding during the summer months (Simonov and Dahmer 2008:22). As part of the Amur watershed, the Shilka is home to the famed Kaluga sturgeon (*Huso dauricus*), which can grow to lengths of up to 5.6 m and weigh over 1000 kg (Krykhtin and Svirskii 1997:231). It is also a habitat for much smaller benthopelagic fish such as the Amur ide (*Leuciscus waleckii*), the Prussian carp (*Carassius gibelio*), the redfin (*Pseudaspius leptocephalus*), the yellow catfish (*Tachysurus fulvidraco*), and the common carp (*Cyprinus carpio*), none of which typically reaches > 30 cm in length (Froese and Pauly, 2018). Modern specimens from these taxa were included in the stable isotope analysis and are discussed later.

Proezzhaia I was first identified and described in the 1950s by A.P. Okladnikov, who referred to it as “Pad'Katonga.” The materials described here were obtained during excavation by the Verkhneamursk archaeological expedition from Trans-Baikal State Pedagogical Institute