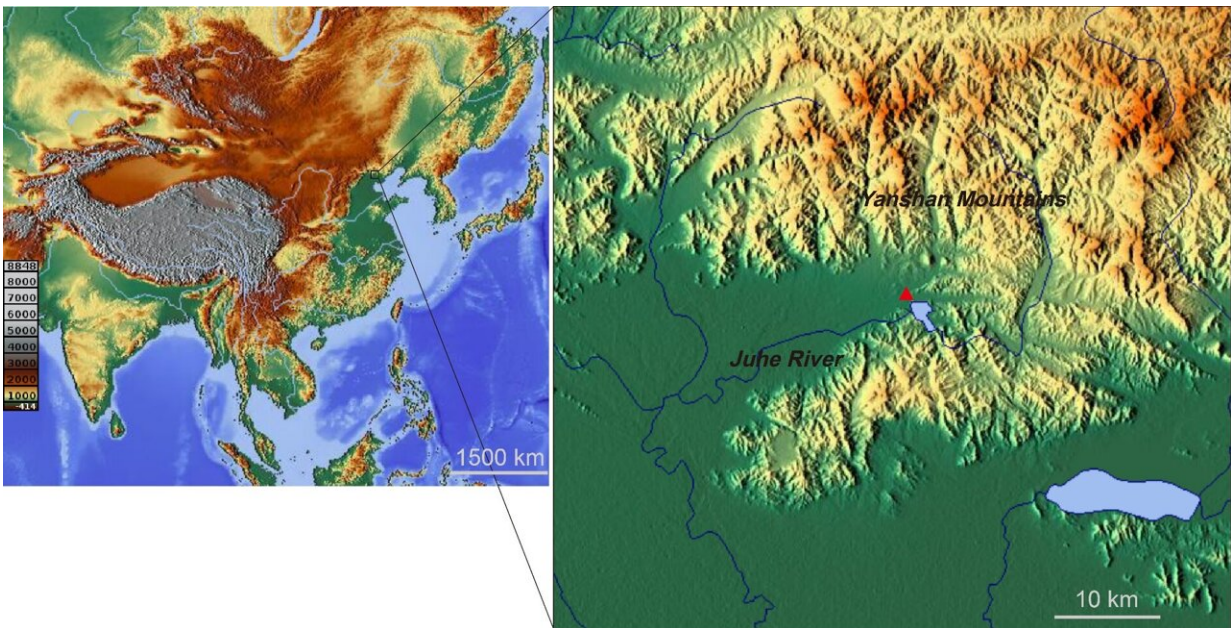


Ancient Shangzhai people consumed broomcorn millet, meat and dairy of ruminants during the Middle to Late Neolithic

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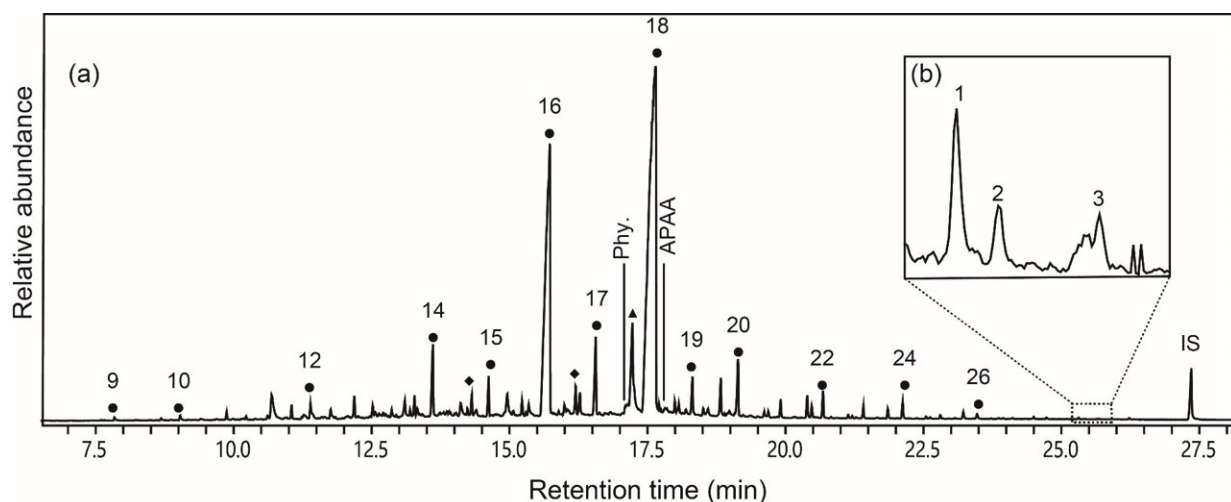
On the left can be seen that the area where the Shangzhai site located is in North China. On the right is the exact location of the Shangzhai site, south of the Yanshan Mountains and north of the Juhe River. Credit: Science China Press

As the crossroads of prehistoric cultures, the Beijing region is an important area for studying the exchange of prehistoric culture and the

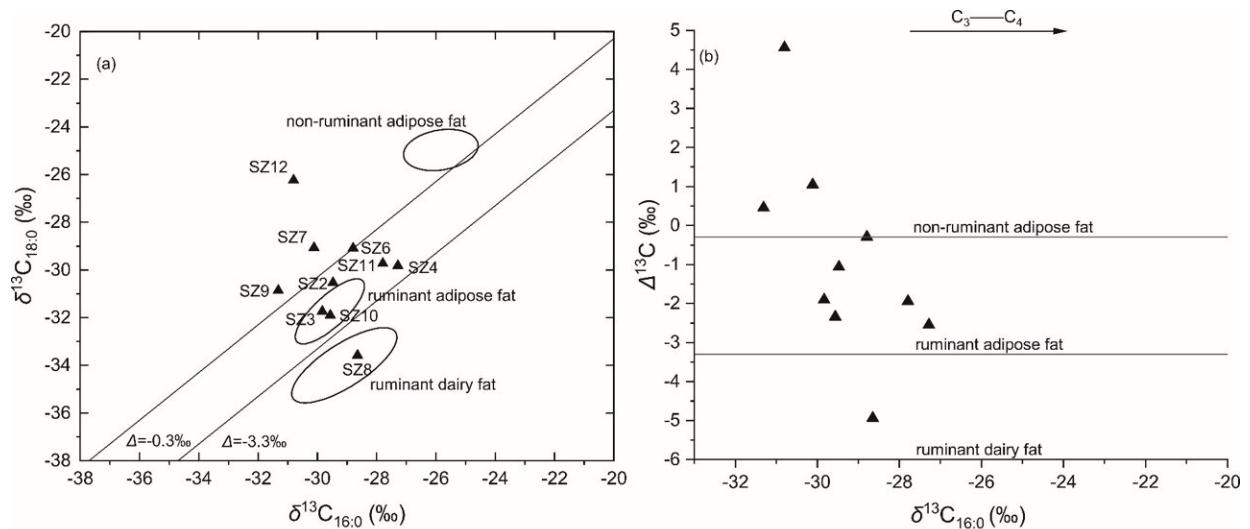
spread of millet agriculture, while there is a gap of approximately 2,000 years between millet remains founded in the Neolithic sites (the early Donghulin site and the late Shangzhai site).

The Shangzhai site is located in the Pinggu Basin in eastern Beijing, and it has a large time span with sequential strata; however, there are few macro animals and plant remains found at this site, thus the subsistence strategy of ancient people remains unclear.

For this reason, the absorbed lipids of pottery sherds unearthed in the Neolithic cultural layer of the Shangzhai site were extracted and analyzed by gas chromatography-mass spectrometry (GC-MS) and gas chromatography-combustion-isotope ratio mass spectrometry (GC-C-IRMS).



(a) Major lipids of SZ10, with saturated fatty acid (●), saturated fatty acid with a branched chain (◆), monounsaturated enoic acid (▲), phytanic acid (Phy.), C18 APAA (APAA), C36 alkane (IS). (b) Pentacyclic triterpene type compounds: 1, β -amyrin ME; 2, Miliacin; 3, α -amyrin ME. Credit: Science China Press



(a) $\delta^{13}\text{C}_{16:0}$ - $\delta^{13}\text{C}_{18:0}$, the confidence ellipses represent non-ruminant (porcine) adipose fat, ruminants (sheep/goats, cattle) adipose fat and dairy fat from top to bottom, respectively, based on modern animals fed on C3 plants; (b) $\Delta^{13}\text{C} = \delta^{13}\text{C}_{18:0} - \delta^{13}\text{C}_{16:0}$, the two lines correspond to $\Delta = -0.3\text{‰}$ and $\Delta = -3.3\text{‰}$, respectively. Credit: Science China Press

The results show that these potteries were used to process [millet](#), the meat of terrestrial non-ruminants and wild ruminants, and dairy of wild ruminants, providing new insights for the subsistence strategy and the development of millet agriculture in the Middle and Late Neolithic Age of Beijing. In addition, the food processing in pottery may be an internal heating method, such as stone boiling.

It remains to be verified whether there is a continuation of dry-land [agriculture](#) between the Donghulin site and Shangzhai site, and the cultivation of millet in Shangzhai may have been influenced by the Zhaobaogou [culture](#) in the North.

The findings are published in the journal *Science China Earth Sciences*.

More information: Nanning Lyu et al, Pottery lipid analysis at the Shangzhai site, Beijing, and its implication for subsistence strategy, *Science China Earth Sciences* (2023). [DOI: 10.1007/s11430-022-1121-4](https://doi.org/10.1007/s11430-022-1121-4)

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