

# The Problem of the Origin of Domestic Animals in Neolithic China

Yuan Jing

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## I. The Origin of Various Domestic Animals

Having identified the bones from a site, the archaeologist can apply at least three methods to determine whether they are wild or domestic. The first one is on the basis of morphology. That is, analysis of the size and diagnostic natures of the bone elements and teeth may indicate whether the fauna were domesticated or wild. The second method is based on archaeological features. For instance, an animal that was perfectly buried in the burial, ash pit (dump pit) and/or other specific features might suggest a cognitive behavior in the treatment of animals in that time period. During the Neolithic period a considerable number of bones found at some sites can be shown by this method to have been domesticated animals. The third method is the combination of the first two: measuring, morphology, and the analysis of archaeological distinctions; for example, based on the dental criteria one can estimate the ages of pigs, and classify them according to age profile; if most of pigs were only one year old, we may argue that these remains indicate intentional population control. This method is useful in Neolithic China. Further, in the Chinese case the distal end of meta carpal bone with some diagnostic pathological signs were found, suggesting that people used them to pull ploughs and wheeled carts and to carry heavy burdens over a long time period. This of course also shows that they were domesticated. In addition, one way of determining if a horse was domestic is to investigate the wear pattern of both sides of the lower second molar, which is caused by a wooden board used for riding. Such a wear pattern on the teeth is a sure sign that the horse was domesticated.

Certainly, these three methods are important and interrelated for determining whether animals were domestic or wild. Morphological measuring and investi-

gation are the basic approaches. Nevertheless, when exploring the origins of animal husbandry, ideally we first view the remains on the basis of archaeological features, then measure their morphological changes, and last, to quantify the archaeological remains. Unfortunately, the criterion for morphological change is difficult to define within transitional time periods.

To date, four major archaeological sites, with early evidence of farming and domestication, are radiocarbon dated to before 10,000 BP: the sites of Yuchanyan 玉蟾岩 in Hunan 湖南, Xianrendong 仙人洞 in Wannian 万年, Diaotonghuan 吊桶环 in Jiangxi 江西, and Nanzhuangtou 南庄头 in Xushui 徐水, Hebei 河北. Among these sites, the phytolith of cultivated rice, ceramics, stone tools, and bone tools have been discovered at Yuchanyan, Xianrendong, and Diaotonghuan. In addition, ceramics, bone, and stone implements were unearthed from Nanzhuangtou. Archaeological advances in the last decades have now pushed the beginning of agriculture and ceramic products in China to over 10,000 BP. However, no faunal remains have been shown to be from domestic animals.

From the site of Jiahu 贾湖 in Wuyang 舞阳, the dog remains with the date of 9,000 BP could be the earliest domestic animal in China. The remains of eleven dogs were separately discovered from residential areas and burials. The evidence reflects the range of domestic animals at that time.

The first evidence of domesticated pigs in Neolithic China came from the site Cishan 磁山 in Wuan 武安, Hebei, with the dates about 8,000 BP. The main indicators reveal the remains to be those of domestic pigs. First of all, several complete pig skeletons covered with millet were found in the storage pits. Second, the age profile of the assemblage was mostly 1 to 2 years old. And third, the measurements of the average length of the

pig's lower third molar are similar to those of domesticated pigs in later Neolithic China.

Early evidence for domesticated cattle and sheep comes from the sites of Dahezhuang 大何庄 and Qinweijia 秦魏家 in Yongjing 永靖, Gansu 甘肃 Province, dated to about 4,000 BP. The reason for their identification as domesticated was based on the archaeological features. That is, more than 50 lower jaws of sheep were unearthed. Further, sheep scapulae also used as oracle bones. 38 lower jaws of cattle come from the site of Qinweijia. In addition, one headless cow, with a baby calf in her body, was found on the pile of rocks nearby the ritual construction.

Based on the results of numerous studies mentioned above, domestic cattle and sheep were in use during this early period. According to the chronology previously put forth by archaeologists, however, the time of the first domesticated animal was more than one thousand years later when cultivated plants and ceramic manufacture had appeared.

## **II. Preconditions for the Origins of Animal Husbandry**

Since the origin of pig domestication in Neolithic China can be traced to approximately 8,000 BP, and domestic pigs also played an important role in prehistoric settlements, the issue of the origins of animal husbandry is focused on the evidence of the domestic pig.

Two important archaeological discoveries in China can be used to assess these preconditions in the Chinese domestic pigs. The first is at the Cishan Site. Remains of cultivated foxtail millet were recovered from 80 earth-wall pits. One or two whole skeletons of pigs have also been found beneath the millet in some of these pits. Based upon the volume of the carbonized remains, it is estimated that the quantity of foxtail millet would have been over 50,000 kg when it was stored.

The second discovery comes from the site of Taosi 陶寺 in Xiangfen 襄汾, Shanxi 山西 Province. The Taosi assemblage is dated to about 4,000 BP. The dietary analysis was carried out on human and pig bones found from the site. The carbon isotopes in these bones reveal that both humans and pigs consumed a large quantity of C<sub>4</sub> plants. Since foxtail millet is a C<sub>4</sub> plant, it can be inferred that both humans and pigs in the assemblage consumed it; or to be more precise, human beings consumed foxtail millet, and the pigs probably were fed with both chaff and millet.

We believe that the origin of pig domestication in Neolithic China could only happen under four conditions. Firstly, the meat gathered by traditional hunting could not meet basic subsistence requirements, so that new approaches for acquiring meat resources had to be developed. The second prerequisite is a certain quantity of wild pigs and new-born baby pigs living near human settlements, making it possible to catch this species for husbandry. The third is the successful cultivation of certain cereals from planting to harvesting; this not only gave people more confidence in plant domestication, but also encouraged them to domesticate certain animal species. The last condition was a surplus from cereal farming, allowing the feeding of animals with the byproduct of cereals.

## **III. Discussion**

We have found wild boar remains from those early Neolithic sites, such as Xianrendong Site, the Diaotonghuan Site, the Yuchanyan Site, and the Nanzhuangtou Site. Wild pigs are also found in the later phase sites of Jiahu and Cishan. Apparently, these wild pigs were hunted around the sites. This evidence would meet with the second precondition. More than fifty thousand kilograms of foxtail millet remains found in Cishan clearly demonstrates that the output of cereal farming had reached the advanced level. This should meet the third precondition. Furthermore, the large quantity of foxtail millet might not merely be stored for food. Because the whole skeletons of dogs and pigs have also been found beneath the foxtail millet, the remains may be related to sacrificial rites. This may suggest that pigs and millet have served not only as food resources, but also as offerings. This argument could meet the fourth precondition. After all, current archaeological evidence can hardly demonstrate the first precondition. If prehistoric inhabitants could hunt enough meat resources during a day or even faster, then there is no reason for them to develop new productive methods by keeping and feeding animals. This might suggest that the meat gathered by hunting did not meet demands at that time. It may indirectly meet the first precondition.

Based on the result of isotopic analysis of the pig remains from the Taosi Site indicates that pigs were in fact fed on millet, I would argue that humans might initially have attracted wild boars by providing them food, which is probably the most crucial step in the successful domestication of pigs.

On the other hand, one of the reasons why animal

domestication postdates farming in prehistoric China could be that such surplus was not possible at the initial stage of farming, and only feasible when farming had reached quite an advanced level.

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