Peters et al. (1) raise several questions about early chicken domestication in northern China (2), including the claim that the climate would have been unsuitable for red jungle fowl. However, northern China was much warmer and more humid with much more extensive forest coverage during the early Holocene, as shown by the presence of buffalo bones (3) at Nanzhuangtou and macaque remains at Cishan (4), providing potential habitat for wild jungle fowl. We would also like to note that, in contrast to the claim by Peters et al., the data in reference 2 of ref. 1 indicate warmer conditions already during the early Holocene.

Peters et al. also argue that, based on the thermal age calculations, DNA of early Holocene age should have a mean read length of between 23 bp and 31 bp and, therefore, amplification of the obtained fragments would be impossible. However, they overlook that mean read length is severalfold shorter than the longest fragments that can be amplified by PCR. We would also like to note that Larson et al. (5) report amplification of 179 bp from up to 9,000-y-old pig remains from Henan, Wuyang County, substantially south from the sites where the Neolithic chicken bones were obtained.

Next, Peters et al. question the chicken bones on the bottom right of figure 1B of our paper (2). We are surprised to see that Peters et al. claim to be able to identify the bones as “clearly canids, and likely dogs” (1) based on low-resolution pictures used for illustrative purpose. A careful comparative reassessment excludes the possibility that the bones are of mammalian origin and confirms that they are most likely chicken bones, although, due to their worn state, this assignment cannot be made with 100% confidence. As these bones did not yield any chicken sequences, their identity has, in any case, no bearing on the conclusions drawn in ref. 1. However, in contrast to the claim by Peters et al., Gallus bones were identified at both Nanzhuangtou and Cishan sites, as shown in the excavation reports (3, 4). As individual bones are difficult to assign to pheasant or chicken with confidence based on morphology alone, we used the cytochrome c oxidase subunit I amplification to clarify their taxonomic identity.

In addition, Peters et al. pointedly highlight that both Nanzhuangtou and Cishan possess later cultural deposits. There indeed exist post-Neolithic deposits in both sites; however, the bones from Nanzhuangtou were excavated in 1986 and 1987, from squares with no post-Neolithic deposits. In contrast, bones used from Cishan were all unearthed in 1997, again from squares with no post-Neolithic deposits. More importantly, the direct radiocarbon dating confirms the early Neolithic ages of the investigated bones (10,465–10,430 B.P. for Nanzhuangtou and 7,960–7,845 B.P. for Cishan).

Finally, Peters et al. also point out the improper incorporation of primer in DNA sequences. However, based on reanalysis of the data after removing primer sequences, we still find that the up to ~10,000-y-old Gallus bones from Nanzhuangtou and Cishan are the remains of a population ancestral to at least some of modern chicken mtDNA diversity (6).

ACKNOWLEDGMENTS. We thank Dr. Yulan Dong (College of Veterinary Medicine in China Agricultural University) for reassessment of the morphological identification of the bones from figure 1B of ref. 2.

Hai Xiang①, Jianqiang Gao②, Baoquan Yu③, Michael Hofreiter④,①, and Xingbo Zhao①,①
①National Engineering Laboratory for Animal Breeding, Ministry of Agricultural Key Laboratory of Animal Genetics, Breeding and Reproduction, College of Animal Science and Technology, China Agricultural University, Beijing 100193, China; ②Hebei Provincial Institute of Cultural Relic, Shijiazhuang 050031, China; ③Xushui County Office for Preservation of Ancient Monuments, Xushui 072550, China; ④Institute for Biochemistry and Biology, Faculty of Mathematics and Natural Sciences, University of Potsdam, 14476 Potsdam, Germany; and ①Department of Biology, University of York, York YO10 5DD, United Kingdom


Author contributions: H.X., J.G., B.Y., M.H., and X.Z. wrote the paper.

The authors declare no conflict of interest.

To whom correspondence may be addressed. Email: zhwbqcau.edu.cn or michi@palaeo.eu.