Preagricultural commensal niches for the house mouse and origins of human sedentism
Lior Weissbrod, Fiona Marshall, François Valla, Hamoudi Khalaily, Guy Bar-Oz, Jean-Christophe Auffray, Jean-Denis Vigne, Thomas Cucchi

To cite this version:

HAL Id: mnhn-02363763
https://hal-mnhn.archives-ouvertes.fr/mnhn-02363763
Submitted on 14 Nov 2019

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
In their letter, Dekel et al. (1) comment on our recent findings on the origin of house mice (Mus musculus domesticus) 15,000 y ago, ecological impacts of the first settled hunter-gatherers, and insights that this study provides on early domestication processes (2). They maintain that mice were parasitic with humans rather than commensal, and attracted by refuse and feeding opportunities in nomadic and sedentary hunter-gatherer settlements. Dekel et al. (1) contrast “negative” interactions with mice with the benefit that hunter-gatherers obtained from early interactions with wolves and wild boar. These arguments do not conform to empirical results from our study on mice (2), recent research on wild boar domestication (3), or theoretical expectations regarding commensal and preagricultural human/animal interactions (4–6).

We do not argue for mutualism and domestication. The question of whether house mice were commensal with humans or parasitic is an interesting issue. However, Schwarz (7) argued that parasitism is not an appropriate description of human/mouse relations because mice do not depend on human hosts for their existence. Neither do the negative effects of mice (food consumption and disease transmission) involve direct impacts, sensu stricto. Our record on Levantine mouse (2) offers rare empirical archaeological evidence demonstrating both positive and negative ecological effects on wild populations, which complies with formal definitions of commensalism in ecological theory (6, 8). We demonstrate absolute population shifts in mice with oscillations in mobility among Levantine hunter-gatherers preceding intensive Neolithic cultivation (ca. 15,000–11,500 B.P.).

Still, current thinking on questions of animal domestication goes considerably farther than matching of species with categories of human/animal interaction. Niche construction paradigms examine intentional and unintentional cultural influences and the evolutionary trajectories of species that share human environments (4, 5, 9), providing a framework for understanding the mutable nature of commensal and mutualistic relationships characteristic of domestication (10). Our results demonstrate that early forager sedentism and its increasing ecological impact on ancient landscapes triggered new forms of interaction with species such as mice. It is likely that changing settlement habitats influenced wolves and wild boar, but in different ways. It was not merely the availability of “human waste” that provided a triggering mechanism for incipient domestication (1). It was rather the changing settlement ecology due to longer term and more intensive human occupation, as compellingly proposed by Edgar Anderson’s dump-heap hypothesis (4). The influence of the built environment on intraspecies and interspecies social interactions and predation and the variable role of human intentionality was culturally significant. Our study of mice binds these strands of theory together, establishing that early sedentism marked a significant turning point in human ecological interactions, ushering in an era of steadily increasing anthropogenic ecosystem transformation and changing human/animal relations.


Zinman Institute of Archaeology, University of Haifa, Mount Carmel, Haifa 31995, Israel; Anthropology Department, Washington University in St. Louis, St. Louis, MO 63130; Archéologies et Sciences de l’Antiquité, CNRS-UMR 7041, Université de Paris Nanterre, 92023 Nanterre, France; Israel Antiquités Authority, Jerusalem 91004, Israel; Institut des Sciences de l’Evolution, Université Montpellier 2, CNRS UMR5554, 34095 Montpellier, France; CNRS UMR 7209 Archéozoologie, Archéobotanique: Sociétés, Pratiques et Environnements, Museum National d’Histoire Naturelle, 75005 Paris, France; and Archaeology Department, University of Aberdeen, Aberdeen AB24 3JF, United Kingdom

Author contributions: L.W. and T.C. designed research; L.W. and T.C. performed research; L.W. and T.C. analyzed data; and L.W., F.B.M., F.R.V., H.K., G.B.-O., J.-C.A., J.-D.V., and T.C. wrote the paper.

The authors declare no conflict of interest.

1To whom correspondence may be addressed. Email: lweissbr@research.haifa.ac.il or cucchi@mnhn.fr.