

ANTHROPOLOGY

Response to comment on “Evidence of prehistoric human activity in the Falkland Islands”

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Hamley *et al.* previously presented multiple lines of evidence that people were present in the Falkland Islands before Europeans and may have brought the now-extinct canid, *Dusicyon australis*. Stable isotope data reported by Clark *et al.* indicate that *D. australis* had a high-trophic, marine diet that terrestrialized following European arrival. This is consistent with our hypothesis of a human mutualism.

Clark *et al.* (1) challenge our recent (2) hypothesis of a possible mutualism between humans and *Dusicyon australis* [the Falkland Islands wolf (FIW) or “warrah”] by comparing the stable isotope values of our prehistoric samples to their historic dataset. In their important paper, Clark *et al.* (3) analyzed historic *D. australis* stable isotope ratios and, with our permission, compared them to our prehistoric samples [citing an “in prep” draft of what became (2)]. We agree that their historic data present important information about the possibility of a human mutualism but disagree with their interpretation of the data in (1).

In our work (2), we reported $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ ratios obtained from subfossil *D. australis* tooth collagen to identify dietary preference in three prehistoric individuals (3396–3752, 236–500, and 264–511 cal BP). Our results suggest that prehistoric *D. australis* had a diet of marine animals from higher trophic levels, including top predators such as pinnipeds. In contrast, Clark *et al.* (3) reported a dataset from historic fur samples dating between 1837 and 1877 CE, during a time when introduced terrestrial food sources such as sheep were abundant.

Although we neglected to cite their important study (partly because of the close timing of our publications), the inclusion of their study would not have changed our conclusions. As Clark *et al.* (3) note in their paper, our prehistoric samples are more enriched in both $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ than their historic samples. The authors themselves noted this difference, stating that (emphasis ours) “consistent with a shift towards a lower trophic level, more terrestrial diet by the mid-19th century, $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ in FIW hair was lower than in pre-human era FIW bone and tooth remains from West Falkland.”

Our interpretation of these two datasets is actually in agreement with Clark *et al.* (3): Our combined data suggest a dietary niche shift

during the historic period, although the mechanism for this remains unknown. *D. australis*’ diet may have become more terrestrial during the historic period because of more terrestrial resources (e.g., through livestock introduction), fewer marine resources (e.g., as populations became feral or marine scavenging declined because of a reduction in carcass availability), or both.

Together, our two papers are complementary, indicating that people may have played a role in the origin of the warrah. We are in agreement with Clark *et al.* (1) that dietary evidence alone is insufficient to determine the origins of *D. australis*, which is how we framed this discussion in our paper (2): “While the warrah may have been a selective coastal scavenger, their enriched $\delta^{15}\text{N}$ values could also have resulted from a mutualism with humans...” We further stated that “while the dietary isotopic signatures of the warrah samples do not unequivocally prove human introduction, neither do they rule out a mutualism with people” (emphasis added).

We feel that the work produced by Clark *et al.* (3) to understand the ecological niches of canids (past and present) in the Falklands is invaluable for addressing conservation efforts in the Falklands and beyond. Our independent evidence of a pre-European anthropogenic signature (2) challenges the conclusion by Clark *et al.* (3) that the isotopic data from our ancient FIW bone and tooth remains come from a “prehuman era,” and as new information emerges, we look forward to the refinement of these hypotheses.

REFERENCES AND NOTES

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3. T. J. Clark, B. Vick, J. Newton, I. Marengo, E. D. Wakefield, A wolf in fox’s clothing? Using stable isotopes to quantify ecological replacement. *Conserv. Lett.* **14**, e12791 (2021).

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