

Tracing demographic histories through time using ancient DNA in Chilean Fuego-Patagonia

Christina M. Balentine^{1,2}, Marta Alfonso-Durruty³, Austin W. Reynolds⁴, Miguel Vilar^{5,6}, Flavia Morello⁷, Manuel San Román⁷, Lauren C. Springs⁸, And Deborah A. Bolnick^{2,9}

¹Department of Integrative Biology, University of Texas at Austin, ²Department of Anthropology, University of Connecticut, ³Department of Sociology, Anthropology, and Social Work, Kansas State University, ⁴Department of Anthropology, Baylor University, ⁵Department of Anthropology, University of Maryland, ⁶National Geographic Society, ⁷Instituto de la Patagonia, Universidad de Magallanes, ⁸Department of Anthropology, University of Texas at Austin, ⁹Institute for Systems Genomics, University of Connecticut

Historically, hunter-gatherers living east and west of the Andean foothills of southern South America (Fuego-Patagonia) practiced different subsistence strategies. To the east, the wide open and relatively dry *pampas* presented a climate ideal for Terrestrial hunter-gatherers who depended on terrestrial animals (e.g., *Lama guanicoe*). In contrast, Marine hunter-gatherers who lived on islands in the western archipelago, a colder and wetter environment, mainly subsisted on marine resources (e.g., seals and shellfish). Archaeological evidence dates Terrestrial hunter-gatherers' presence in Fuego-Patagonia to at least ~10,500 BP, whereas Marine hunter-gatherers' presence dates to ~6,500 BP and is associated with highly specialized tools that have only been observed in the archaeological record after this time. Genetic analyses of some ancient Fuegian-Patagonians have supported the hypothesis that Marine hunter-gatherers migrated into the region after Terrestrial hunter-gatherers, around 6,500 BP (7,500 calBP), while analyses of other individuals suggest that Marine hunter-gatherers descended from the earlier Terrestrial hunter-gatherer groups.

Here, we test these hypotheses by analyzing newly collected genome-wide data from n=46 ancient Chilean Fuegian-Patagonian individuals belonging to Marine, Terrestrial, and Mixed-economy archaeological sites dating to 6,895–304 calBP. We explored basic population structure among these hunter-gatherer groups using PCA and ADMIXTURE. We calculated π , pairwise-FST, and f -statistics, and developed demographic simulations to further examine genetic relationships among the groups. The results of this study shed light on local demographic patterns of ancient southern South American groups, which in turn provides more insight into broader population histories of South America.

This study was funded by FONDECYT (Chile), National Geographic Society, National Science Foundation, and Wenner-Gren Foundation. C. M. Balentine is supported by an NSF Graduate Research Fellowship.