LETTER

Pre-Columbian chickens, dates, isotopes, and mtDNA

Recently Gongora *et al*. (1) stated that their analyses of chicken mtDNA and potential offsets for dietary marine carbon cast doubt on "claims for pre-Columbian chickens" in the Americas. We present additional data supporting the interpretation of Storey *et al*. (2) showing that evidence for pre-Columbian chickens at the site of El Arenal, Chile, is secure.

Gongora *et al*. (1) analyzed mtDNA of modern chickens only. They gave no consideration to the fact that both European and prehistoric Pacific chickens are ultimately Asian-derived and thus may be expected to share lineages. European stocks were further influenced by the 19th-century import of Chinese chickens to develop commercial and show breeds (3). The authors also imply that the Indian/Asian/European mtDNA signature identified in our ancient Pacific and Chilean samples would not have been available for dispersal to the prehistoric Pacific. This is refuted by linguistic, archaeological, and ethnohistoric evidence (4).

Ultimately, the question rests on the antiquity of the El Arenal chickens. We have directly dated and sequenced two additional chicken bones from the site, which is not a shell midden as claimed (1). Stable isotope determinations ($\delta\ ^{13}C$, $\delta\ ^{15}N$, and $\delta\ ^{34}S$) further confirm a terrestrial dietary signature; thus, no marine calibration of the dates is required (Table 1). All dates obtained from the site are securely pre-Columbian (even at 2σ), consistent with the stratigraphic and artifactual evidence. Therefore, the most parsimonious explanation continues to be that chickens were first introduced to South America by Polynesian voyagers as part of a well-documented eastward expansion.

Table 1. Radiocarbon and isotope data for archaeological chicken bones and associated thermoluminescence dates obtained from pottery from the El Arenal-1 site in Chile

Sample no.	Lab no.	Material	Date	Calibrated age (2σ)	$\delta\ ^{13}C$, ‰	$\delta\ ^{15}N$, ‰	$\delta\ ^{34}S$, ‰	P, Gy	D, Gy/year
CHLARA001	NZA 26115	Chicken bone	622 ± 35 BP	AD 1304–1424	−20.9	ND	ND		
CHLARA003	NZA 28271	Chicken bone	510 ± 30 BP	AD 1427–1459	−19.85	2.6	2.16		
CHLARA004	NZA 28272	Chicken bone	506 ± 30 BP	AD 1426–1457	−19.45	3.5	ND		
EA1-001	UCTL 1617	Pottery	650 ± 65 BP	AD 1285–1415				1.14 ± 0.11	1.76×10^{-3}
EA1-002	UCTL 1618	Pottery	610 ± 55 BP	AD 1335–1445				0.96 ± 0.11	1.58×10^{-3}

All ^{14}C dates were calibrated with CALIB (5) by using the Southern Hemisphere atmospheric curve (6). P, Paleodose; D, dose rate.

***Alice A. Storey*[a,1], *Daniel Quiroz*[b], *José Miguel Ramírez*[c], *Nancy Beavan-Athfield*[d], *David J. Addison*[e], *Richard Walter*[f], *Terry Hunt*[g], *J. Stephen Athens*[h], *Leon Huynen*[i], *and Elizabeth A. Matisoo-Smith*[a,1]**

[a]*Department of Anthropology and Allan Wilson Centre for Molecular Ecology and Evolution, University of Auckland, Private Bag 92019, Auckland, New Zealand;* [b]*Dirección de Bibliotecas, Archivos y Museos-Proyecto Fondecyt, 1020272, Santiago, Chile;* [c]*Universidad de Valparaíso, Proyecto Dipuv-Reg No. 26/2005, Valparaíso, Chile;* [d]*Rafter Radiocarbon/GNS Science, P.O. Box 31 312, Gracefield, Lower Hutt, New Zealand;* [e]*Institute of Samoan Studies, American Samoa Community College, Pago Pago, AS 96799;* [f]*Department of Anthropology, University of Otago, Second Floor, Sir John Richardson Building, Castle Street, P.O. Box 56, Dunedin, New Zealand;* [g]*Department of Anthropology, University of Hawai'i-Manoa, 2424 Maile Way, Honolulu, HI 96882;* [h]*International Archaeological Research Institute, 2081 Young Street, Honolulu, HI 96826-2231; and* [i]*Institute of Molecular Biosciences and Allan Wilson Centre for Molecular Ecology and Evolution, Massey University, Albany 0632, Auckland, New Zealand*

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[1]To whom correspondence may be addressed. E-mail: asto062@aucklanduni.ac.nz or e.matisoo-smith@auckland.ac.nz.