Equus and *Palaeolama* Direct ^{14}C Ages at Las Monedas Site, Semiarid North of Chile

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Direct dating of extinct fauna is of key significance for understanding the paleoecological scenario of the Pleistocene-Holocene transition in any region. Besides characterizing coexisting faunas, it is crucial for interpreting extinction rates and climatic implications, and for assessing the availability and diversity of prey during the first peopling of a given area. Despite the frequent detection of extinct faunal bones at Los Vilos (~31° S) along the Pacific coast of South America (Méndez et al. 2004), direct radiometric dating has been stubbornly difficult because of collagen loss (i.e., Méndez and Jackson 2006; Núñez et al. 1994). The only previous local ^{14}C dates were the 9100 ± 300 RCYBP age on mastodon (possibly *Cuvieronius*) obtained at the Quereo site (Paskoff 1971) and the 13,500 ± 65 RCYBP on *Mylodon* sp. at El Membrillo site (Jackson 2003). The former is difficult to link to the limited human evidence at the site, and the latter comes from a surface context where, despite some suggestive associations, wind deflation has severely affected site integrity.

In this paper we present the first direct ^{14}C AMS dates and stable-isotope analyses on *Equus* and *Palaeolama* from the Los Vilos coast and the wider region of central Chile (30° to 34° S). Las Monedas site is located along a small ravine, 2 km from the edge of the sea. Excavations in a 15-m^2 area adjacent to an exposed profile yielded 33 well-preserved bones of extinct fauna in low-energy fine-grained sands (Méndez and Jackson 2006; Méndez et al. 2005–6) (Figure 1). Though three lithic artifacts were recorded within the same stratigraphic unit, their association with the bones remains ambiguous owing

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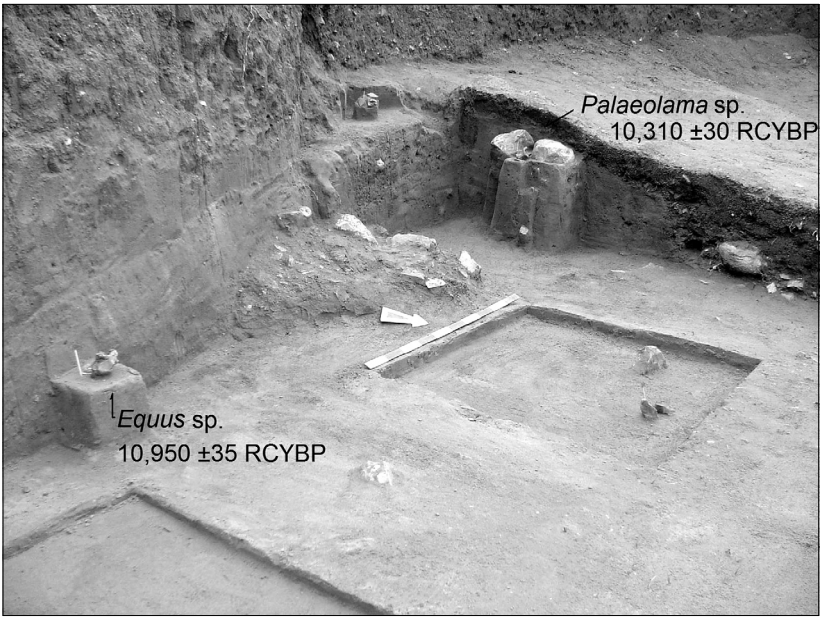

Figure 1. Excavations at Las Monedas showing the dated specimens.

to the complex formation processes in a fluvial environment (Méndez 2010). We selected one sample identified as a thoracic vertebra of *Equus* sp. (unit D4, #33a, depth 330 cm), and one lumbar vertebra of a juvenile *Palaeolama* sp. (unit D6, #18, depth 314 cm) for ^{14}C analyses. Results are presented in Table 1. Both ^{14}C dates are of late-Pleistocene age; however, they are significantly different at 95% level, indicating bones are not contemporaneous and that major rates of sedimentation prevailed. Though both samples, as well as all the rest of the bone assemblage, were identified within the same stratigraphic unit (layer 6), they were located at different depths and could be regarded as secondarily deposited as was previously suggested by Méndez et al. (2005–6; see also Méndez 2010).

Stable-isotope results are as yet quite limited and should be regarded as part of an initiating program for building a database for understanding the isotopic ecology of extinct mammalian taxa. Results for the largest extant artiodactyl *Lama guanicoe* (C3 feeder) in central Chile have mean values of -19.47‰ (sd: 0.58) for δ^{13}C col and of 4.97‰ (sd: 0.9) for δ^{15}N (Falabella et al. 2007), and are similar to those obtained for our *Equus* sp. sample.

Table 1. Radiocarbon and isotopic data presented in this paper. Dates were 2σ calibrated with OxCal 4.1 (Bronk Ramsey 2009) using IntCal 09.

Lab. code	Species	Skeletal element	^{14}C age, RCYBP	Age, CALYBP	$\delta^{13}C_{col}$	$\delta^{13}C_{ap}$	$\delta^{15}N_{col}$
UGAMS 7605	*Equus* sp.	Thoracic vertebra	10,950 ± 35	12,951–12,655	-16.3‰	-13.9‰	5.5‰
UGAMS 7606	*Palaeolama* sp.	Lumbar vertebra	10,310 ± 30	12,377–11,983	-24.4‰	-12.7‰	0.6‰

Material tested is bone collagen; ap = apatite, col = collagen

At Los Vilos there is consistent evidence supporting *Equus* sp. processing at 13,100 CALYBP at the Quebrada Santa Julia campsite (Jackson et al. 2007). However, despite the high frequency of *Palaeolama* sp. evidence (López 2007) and the simultaneous occurrence with local human occupations, there is as yet no evidence that humans consumed them. This raises several questions. Were all Pleistocene faunas equally represented in the diets of early inhabitants? And if not, what were the causes for this selectivity?

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References Cited

Bronk Ramsey, C. 2009 Bayesian Analysis of Radiocarbon Dates. *Radiocarbon* 51(1):337–60.

Falabella F., M. Planella, E. Aspillaga, L. Sanhueza, and R. Tykot 2007 Dieta en sociedades alfareras de Chile Central: Aporte de análisis de isótopos estables. *Chungara Revista de Antropología Chilena* 39:5–27.

Jackson, D. 2003 Evaluating Evidence of Cultural Associations of Mylodon in the Semiarid Region of Chile. In *Where the South Winds Blow*, edited by L. Miotti, M. Salemme, and N. Flegenheimer, pp. 77–81. Center for the Study of the First Americans, Texas A&M University, College Station.

Jackson, D., C. Méndez, R. Seguel, A. Maldonado, and G. Vargas 2007 Initial Occupation of the Pacific Coast of Chile during Late Pleistocene Times. *Current Anthropology* 48(5):725–31.

López, P. 2007 Tafonomía de los Mamíferos Extintos del Pleistoceno Tardío de la Costa Meridional del Semiárido de Chile (IV Región-32° Latitud S). Alcances Culturales y Paleoecológicos. *Chungara Revista de Antropología Chilena* 39(1):69–86.

Méndez, C. 2010 Tecnología Lítica En El Poblamiento Pleistoceno Terminal Del Centro De Chile Organización, Gestos y Saberes. Unpublished PhD dissertation, Universidad Católica del Norte, San Pedro de Atacama.

Méndez, C., and D. Jackson 2006 Preliminary Results of the Excavations at Late Pleistocene Site of Las Monedas, Semiarid Coast of Chile. *Current Research in the Pleistocene* 23:67–69.

Méndez, C., D. Jackson, and R. Seguel 2004 Narrowing the Spatial Range of Megafaunal Distributions on the Semiarid Coast of Chile. *Current Research in the Pleistocene* 21:109–10.

Méndez, C., D. Jackson, P. López, and D. Jackson 2005–6 Tan Lejos, Tan Cerca: de Sitios Paleoindios y Depósitos Secundarios. Intervenciones Arqueológicas en el Nivel II del Yacimiento Pleistocénico "Las Monedas". *Revista Chilena de Antropología* 18:135–53.

Núñez, L., J. Varela, R. Casamiquela, and C. Villagrán 1994 Reconstrucción Multidisciplinaria de la Ocupación Prehistórica de Quereo, Centro de Chile. *Latin American Antiquity* 5:99–118.

Paskoff, R. 1971 Edad Radiométrica del Mastodonte de Los Vilos: 9100 ± 300 años B.P. *Noticiario Mensual del Museo Nacional de Historia Natural* 15(177):11.