Journal of Anthropological Archaeology 36 (2014) 110–129

Contents lists available at ScienceDirect

Journal of Anthropological Archaeology

journal homepage: www.elsevier.com/locate/jaa

Small scale camelid husbandry on the north coast of Peru (Virú Valley): Insight from stable isotope analysis

Paul Szpak [a,*], Jean-François Millaire [a], Christine D. White [a], Fred J. Longstaffe [b]

[a] Department of Anthropology, The University of Western Ontario, London, ON N6A 5C2, Canada
[b] Department of Earth Sciences, The University of Western Ontario, London, ON N6A 5B7, Canada

ARTICLE INFO

Article history:
Received 10 August 2013
Revision received 9 August 2014
Available online 16 September 2014

Keywords:
Stable isotopes
Isotopic variation
Camelids
Human–animal interactions
Animal management
Animal husbandry
Peru
Zooarchaeology

ABSTRACT

This study presents carbon and nitrogen isotopic compositions for bone collagen and serially sampled hair from a large collection of South American camelids from two Early Intermediate Period (c. 200 BC to AD 800) sites (Huaca Gallinazo and Huaca Santa Clara) in the Virú Valley (north coast of Peru). The isotopic compositions of these camelids are consistent with plant isotopic compositions from coastal and low altitude settings, but not from high altitude environments, suggesting that at least some of these animals were raised locally. We present several methodological approaches with respect to the treatment of isotopic data from archaeological contexts, outlining quantitative approaches that can provide considerable insight into isotopic variation (within groups, within individuals, between groups, between individuals), as well as temporal variation in isotopic compositions in incrementally growing tissues. We contend that focusing explicitly on variation in animal life histories has the greatest potential with respect to better understanding human–animal interactions in the past. The results demonstrate a large amount of isotopic variability among individuals and an inconsistent amount of within-individual variation, with no consistent shift in the diet leading up to the time of death for a group of animals from a single ritual event. This result suggests that camelid husbandry in the Virú Valley was a small-scale activity, with groups of camelids being managed by families or other small social units. Animals were likely kept primarily in close association to human habitation sites and provided with a diverse array of fodder. These prolonged interactions, occurring at a limited spatial scale, would have allowed a high degree of mutual familiarity to develop between humans and animals. Isotopic compositions for late Middle Horizon (c. AD 1100) sacrificed llamas from Huaca Santa Clara are consistent with Early Intermediate Period camelids, suggesting temporal stability in this small-scale camelid management strategy on the coast, which was fundamentally different from camelid herding in the pastures of the Andean highlands. Isotopic analysis of prehistoric livestock has great potential with respect to better understanding animal husbandry practices and human–animal interactions in the broadest sense because the data provide insight into the ways in which animals lived, rather than the manner in which they died. The variation-centered methodologies outlined in this paper provide a framework with which to approach some of these issues, highlighting the significance of understanding variability in livestock life histories.

1. Introduction

The interaction between humans and non-human animals is a topic of immense importance in anthropology. Shipman (2010) has proposed that the manner in which humans interact with other animals (the 'animal connection') can be placed alongside tool making, symbolism, and language as behaviors that define humans as a species. Until very recently, anthropologists and archaeologists have viewed animals primarily through two lenses: subsistence and symbolism (Mullin, 1999; Shanklin, 1985). In recent years, there has been increased interest in the study of human–animal interactions that attempt to move beyond the symbolic importance of animals wherein they are passive reflections of human society (that animals are good to think with, following Lévi-Strauss, 1962), and instead sees animals as active agents that are *part of* human society (Knight, 2005) — in other words, that animals are good to live with (following Haraway, 2008). As part of this turn in human–animal studies, there has been a call to move away from strictly anthropocentric studies of animals, and towards what Kohn (2007, p. 4) has called an "anthropology of life", one that is

* Corresponding author. Present address: Department of Anthropology, University of British Columbia, Vancouver, BC V6T 1Z1, Canada.
E-mail address: paul.szpak@gmail.com (P. Szpak).

http://dx.doi.org/10.1016/j.jaa.2014.08.005
0278-4165/

explicitly concerned with human entanglements with other living beings, how they interact with, shape, and are shaped by one another, within larger cultural, economic, and political contexts (Kirksey and Helmreich, 2010).

An important aspect of human–animal studies relates to scale. Most focus on various aggregations of animals (herds, entire species, or other folk/taxonomic classifications), although several authors have highlighted the importance of accounting for the lived experiences of *individual* animals (Alger and Alger, 2003; Argent, 2010; Bear, 2011). The recognition of the very individualized nature of human–animal relationships has primarily been discussed within the context of companion (Haraway, 2003, 2006, 2008; Power, 2008) and working animals (Hart, 2005; Lawrence, 1985). These approaches have not been extensively applied to livestock (but see Abbink, 2003; Dwyer and Minnegal, 2005). Regarding livestock, however, Knight (2005, p. 5) points out that "a preoccupation with the outcome of the relationship (slaughter for meat) is apt to conceal the protracted relationship of nurturance and care that precedes it." Traditional zooarchaeological research tends to emphasize this aspect of human–animal relationships: slaughter, butchery, and the incorporation of the carcass into the archaeological record. These activities represent a very limited number of interactions that occur within the context of a much larger and more complex relationship between humans and livestock. This is not to suggest that the economic role of animals be discounted, but it must be recognized that there may be a significant ontological distinction between a living animal and an animal carcass, whereby the treatment of the latter does not necessarily reflect the human–animal inter-subjectivity prior to the animal's death (Herva and Salmi, 2010). If the ultimate goal of zooarchaeological research is to better understand the interactions between humans and other animal species (Reitz and Wing, 2008), and we accept the premise that the best manner in which to do so for agropastoral societies is to focus on lived interactions between humans and animals (Knight, 2012), a focus on slaughter, butchery, and carcass disposal falls short. It is, however, not sufficient to simply layer theoretical perspectives concerning human–animal interactions atop data that do not speak directly to these issues. Instead, methodologies that provide insight into the interactions between *living* animals and humans are necessary to complement traditional lines of evidence and begin to move beyond the study of the roles of animals in prehistoric subsistence economies (economic reductionism) and their discursive representations (symbolic reductionism) to one that focuses on the nature of lived interspecies entanglements.

Difficulties arise in archaeological contexts, however, where human–animal interactions cannot be observed directly, and the basis for interpretation necessarily starts with the remains of the animal carcass and the context associated with its disposal. To circumvent this problem, we must look to indirect evidence or 'traces' to better understand animal lives (for a modern, non-isotopic example see Hinchliffe et al., 2005). Stable isotope analysis of animal tissues is one of several techniques that provide insight into various aspects of animal life histories. Because certain tissues (teeth, hair, nail, whisker) grow at discrete intervals or continuously, diachronic isotopic analyses of these tissues can provide high-resolution life histories of individuals, reflecting temporal shifts in diet, residence, and potentially health (Balasse et al., 2001; Knudson et al., 2007; White et al., 2009). Within the context of bioarchaeology, most analyses have been concerned with issues at the population or regional level, but a more detailed understanding of larger social processes may be reached through a concerted focus on individuals as well as populations (Knudson and Stojanowski, 2008). The same logic applies in zooarchaeological studies that seek to better understand the interactions between humans and domestic animals, and it is important to recognize that relationships formed between humans and animals may take on a very individualized nature (Alger and Alger, 2003; Argent, 2010; Haraway, 2003, 2006, 2008; Power, 2008). Somewhat analogously, there has been a recent trend in ecological research to recognize the importance of variation at the individual level (e.g. foraging specializations), which has been addressed via isotopic analysis in a number of studies (Cherel et al., 2007; Matich et al., 2011; Newsome et al., 2009; Szpak et al., 2012c). This has led to the development of several interpretive techniques, which have not been employed in archaeological contexts but can be used to assess and compare variation both between and within groups and/or individuals (e.g. Jackson et al., 2011; Layman et al., 2007; Martínez del Rio et al., 2009). In the context of social zooarchaeology (Marciniak, 2005; Oma and Hedeager, 2010; Russell, 2012) these techniques have tremendous potential because, provided that samples sizes are robust, they offer a tangible means with which to reconstruct the nature of and variation in how *individual* animals lived and how their lives were shaped by the humans with whom their lives were entangled. There has been some recognition of individual variation in companion animals in archaeological contexts, with a number of studies examining the differential treatment of dogs in mortuary contexts (e.g. Byrd et al., 2013; Losey et al., 2011; Prummel, 2006). A number of studies have examined the importance of livestock, particularly in ritual and mortuary settings (Goepfert, 2012; Russell and During, 2006; Salmi et al., 2011), although this research tends to be largely qualitative and focused on symbolic aspects of animals (but see Whittle, 2003). Relatively little attention has been paid to the importance and meaning of individual variation in livestock lifeways in archaeological contexts and what this might mean in terms of human–animal interactions (but see deFrance (2010) for a paleopathological example).

2. South American camelids

The South American camelids (hereafter simply camelids) include two domestic (llama and alpaca) and two wild species (vicuña and guanaco). The differentiation of camelid species on the basis of postcranial skeletal morphology is very difficult; accordingly, throughout this paper, discussion focuses generally on 'camelids', except in cases where dental and/or soft tissue preservation allow for the assignation of individual animals to a particular species (Wheeler et al., 1995).

It is widely recognized that camelids were of tremendous economic, social, political, and ritual significance to various groups throughout the prehispanic Andes (Bonavia, 2008). Views of camelids and camelid herding in the region have been largely shaped by ethnographic and ethnohistoric accounts of camelid pastoralism, which have been limited to high altitude pasturelands (e.g. Flores-Ochoa, 1979; Murra, 1965; Tomka, 1992). The introduction of European domesticates (e.g. cattle, sheep, pig, donkey) beginning in the sixteenth century drastically reduced the geographic range and number of camelids in the Andes (Bonavia, 2008) and several authors have suggested that camelids were herded in a much wider variety of environments prior to the arrival of the Spanish (Dufour et al., 2014; Goepfert, 2012; Goepfert et al., 2013; Thornton et al., 2011), including the arid coastal region of northern Peru (Shimada and Shimada, 1985). Many questions remain, however, regarding the nature of camelid herding outside of the high altitude zones of the Andes.

Traditional accounts of camelid husbandry in the Andean region have discussed fairly large herds that graze on high altitude pasturelands in the *puna* (3800–4800 masl) or high sierra (2500–3800 masl) (Flannery et al., 1989; Flores-Ochoa, 1979). Today, herds are of mixed composition, typically consisting of alpacas, sheep, goats, and in some cases cattle (at lower altitudes). Herding