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Introduction to the special issue - Turkey husbandry and domestication: Recent scientific advances

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ABSTRACT

The turkey (*Meleagris gallopavo*) is unique in being the only major vertebrate animal domesticated in ancient North/Central America. Despite its unique status, its history of use, management, and domestication has received relatively little attention in comparison to other domesticated animals. The history of turkey management and domestication is thus a large gap in our knowledge of animal husbandry, and how and why animal domestication developed in ancient North/Central America. This introductory article presents background on the history of turkey husbandry and domestication research to contextualize the collected papers presented in this special issue of the *Journal of Archaeological Science: Reports*. The contribution of each paper is discussed in regards to past and current research trends, and how they articulate with likely directions for future research.

1. Introduction

Through the process of animal domestication, humans assumed increasing control over animal resources and fundamentally altered how they interacted with and impacted their environment. The topic of animal domestication is therefore of crucial importance to understanding past human societies and evolving human-animal relationships. Although animal domestication has always been a major focus of zooarchaeological research, the topic has received increasing attention in recent years due at least in part to advancements in the field of archaeogenetics (e.g., Almathen et al., 2016; Frantz et al., 2016; Kadowaki et al., 2016; Larson et al., 2012; Kimura et al., 2011; Miao et al., 2013; Xiang et al., 2014).

Animal domestication independently emerged on several continents during prehistoric times, but only a single vertebrate animal – the turkey (*Meleagris gallopavo*), was domesticated in ancient North America (i.e., the combined North and Central American sub-continents). We know relatively little about turkey domestication in comparison to what we know about the domestication of other animals, and still less about the unique context and process of North American animal domestication. Recent research indicates that the history of turkey husbandry (i.e., management, care or breeding) may have been highly complex including multiple locations of domestication, ongoing use of wild turkeys alongside domesticated flocks, potential breeding between wild and domestic populations, and a diversity of management or husbandry techniques (Corona-M., 2013a, 2013b; McCaffery et al., 2014; Munro, 2011; Speller et al., 2010; Thornton and Emery, 2015). The history of turkey management and domestication in North America is thus a large gap in our knowledge of animal husbandry, a subject that relates to important aspects of subsistence systems, animal meanings, and human-environment interactions in the ancient Americas.

The collection of papers in this special issue of the *Journal of Archaeological Science: Reports* represents recent advances in our understanding of turkey husbandry and domestication in the archaeological record. Initial versions of many of the papers were presented in an organized session entitled “Recent Advances in Understanding Past Turkey Husbandry and Use” at the 2014 International Council for Archaeozoology (ICAZ) meeting in San Rafael, Argentina. The collected papers focus not just on turkey domestication, which by many definitions includes selective breeding (Vigne, 2011; Zeder, 2006), but also on the broader concept of turkey management, provisioning, and rearing, which we refer to as animal husbandry. Multiple papers address turkey husbandry in Mesoamerica and the American Southwest (this volume: Conrad et al.; Emery et al.; Fothergill; Götz et al.; Jones et al.; Lapham et al., Manin et al.; Martinez and Corona-M.; Speller and Yang; Thornton et al.), the two currently identified independent origin centers of turkey domestication (Speller et al., 2010). Other papers in the collection present novel data from much less well-researched areas including Southeastern and Northeastern North America (Morris et al., this volume; Peres and Ledford, this volume) and the Caribbean (Reitz et al., this volume). Methodologically, the authors employ a suite of tools including genetics, stable isotopes, osteometrics, paleopathology, scanning electron microscopy, and modern ethnography. The collected papers' methodological and geographic breadth expands the

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scope of previous turkey domestication research and contributes novel perspectives on the history, process and practice of turkey husbandry.

One of the major goals of producing this special issue is to promote greater collaboration and communication between researchers studying turkey husbandry and domestication in various cultural areas. We have thus decided to organize the papers topically and methodologically rather than geographically, with the caveat that many of the papers employ multiple methodological approaches and address various aspects of turkey husbandry. This organization allows for greater comparison of approaches to unraveling the history of turkey domestication across the species' natural and anthropogenic range. We also present a summary of the papers according to geographic area and methodological approach to illustrate additional connections among papers that may not be reflected in the articles' running order (Table 1).

2. Turkey taxonomy and geographic distribution

Domestic and wild turkeys are both classified as *Meleagris gallopavo*. Ornithologists refer to the bird in its undomesticated form as the Wild Turkey. When capitalized, this common name conforms to ornithological classification and nomenclature, which uses standardized common names (indicated by capitalization) in addition to binomial nomenclature (genus and species). This common name, however, is problematic for archaeologists who often need to refer to the species in both its wild and domestic forms, and who may want to refer to the species without having to definitively classify where individuals fall on the wild-to-domesticated continuum. To avoid confusion, some contributing authors have elected to refer to this species by its scientific name, or by other widely recognized names such as “common turkey”.

The domestic turkey's wild progenitor naturally ranges throughout much of central and northern Mexico and the southern and eastern United States (Fig. 1). There are six currently recognized subspecies of *Meleagris gallopavo,* including *M. g. gallopavo, M. g. mexicana, M. g., intermedia, M. g. merriami, M. g. silvestris,* and *M. g. osceola*. Genetic analysis confirms that the Southern Mexican subspecies (*M. g. gallopavo*) gave rise to the domestic turkeys bred and raised throughout the world today due to documented 16th Century exchanges between Europe and the Americas (Corona-, 2013b; Monteagudo et al., 2013; Schorger, 1966; Speller et al., 2010). Genetic evidence also supports independent pre-Columbian domestication of at least one other subspecies of wild turkey in the American Southwest (Speller et al., 2010). Domestic turkeys from the American Southwest, however, do not contribute to the genetic stock of modern domestic turkeys (Monteagudo et al., 2013; Speller et al., 2010). To date, potential management or rearing of wild *M. gallopavo* in other regions outside the recognized domestication centers of Central Mexico and the American Southwest has not been widely investigated. This topic, however, is the focus of two papers in this volume (Morris et al., this volume; Peres and Ledford, this volume).

The smaller-bodied and more brightly colored Ocellated Turkey (*Meleagris ocellata*) is the only other extant member of the family Meleagridae. This tropical species ranges throughout Mexico's Yucatan Peninsula and into northern Belize and Guatemala (Fig. 1). Although the species is not thought to have been domesticated (i.e., subjected to prolonged directed selection), some researchers suggest that Ocellated Turkeys were captively-reared and managed by some ancient Maya populations (Hamblin, 1984; Masson and Peraza Lope, 2008; Pohl and Feldman, 1982; Pollock and Ray, 1957). Two articles within this special issue address the possibility of Ocellated Turkey husbandry based on new evidence (Thornton et al., this volume; Martinez and Corona, this volume). Although the natural geographic ranges of *M. gallopavo* and *M. ocellata* do not overlap, these two species were brought into coexistence through human mediated diffusion and exchange during pre-Columbian times (Martinez and Corona-M., this volume; Thornton et al., 2012). Mesoamerican zooarchaeologists therefore have the challenge of distinguishing between the two osteologically similar species of turkey, both of which may have been managed or reared by prehistoric populations.

3. Previous and recent advances towards documenting turkey husbandry and domestication

Recent reviews emphasize that animal domestication is a prolonged process of human-animal interaction that results in a continuum of states from wild to fully domestic (Zeder, 2006). Along this continuum are various levels of human control over a species' movement, diet and reproduction ranging from taming and confinement to directed breeding. Over time, this relationship may result in morphological and genetic changes within a species, but these changes typically appear at different points throughout the domestication process (Zeder, 2006). In some cases, genetic and morphological changes do not occur at all. This is especially true early in the domestication process, or when there is ongoing breeding between wild and captive populations of a species. Despite these limitations, identification of direct morphological and genetic markers of domestication is a major goal of many animal domestication studies.

Previous morphological and osteometric analyses of turkeys in the American Southwest have been unable to distinguish between wild and domestic forms of *M. gallopavo* in the archaeological record (Badenhorst et al., 2012; Breitburg, 1988; McKusick, 1986, 2001). Similar analyses have not yet been conducted in Mesoamerica so the potential for this line of evidence is currently unknown. Genetic markers for Mesoamerican domestic turkeys are also unknown, although some distinctions are now possible among turkeys in the American Southwest. Speller et al. (2010) identified two major mitochondrial DNA haplogroups within Southwestern archaeological turkeys. The most common haplogroup (referred to as H1) has low genetic diversity, and is genetically distinct from both wild and domestic Mesoamerican turkeys, and from wild turkeys of the Merriam's subspecies (*M. g. merriami*), which are native to the region. Speller et al. (2010) thus suggest that the H1 haplogroup represents a population of managed/domesticated turkeys introduced to the Southwest from outside the region, while the other major haplogroup (H2) corresponds to local wild turkeys. A recent paper by Lipe et al. (2016), however,

Table 1
Contributed special issues papers organized by geographic region and methodological approach.

	Mesoamerica	American Southwest	Northeastern North America	Southeastern North America	Caribbean
DNA	Thornton et al.	Jones et al.; Speller & Yang			Reitz et al.
Stable isotopes	Thornton et al.	Conrad et al.; Jones et al.	Morris et al.		Reitz et al.
Demographics &/or abundance	Lapham et al.; Manin et al.	Conrad et al.; Fothergill; Speller & Yang		Peres & Ledford	
Eggshell analysis (SEM)	Lapham et al.	Conrad et al.			
Morphology and osteometrics	Emery et al.; Manin et al. Martinez & Corona	Fothergill		Peres & Ledford	
Species or sub-species identification	Emery et al.; Martinez & Corona; Thornton et al.				Reitz et al.
Paleopathology		Fothergill			
Modern ethnography	Götz et al.				

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