Journal of Anthropological Archaeology 40 (2015) 89–108

Contents lists available at ScienceDirect

Journal of Anthropological Archaeology

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

Is it agriculture yet? Intensified maize-use at 1000 cal BC in the Soconusco and Mesoamerica

Robert M. Rosenswig [a,*], Amber M. VanDerwarker [b], Brendan J. Culleton [c], Douglas J. Kennett [c]

[a] University at Albany – SUNY, United States
[b] University of California, Santa Barbara, United States
[c] Pennsylvania State University, United States

ARTICLE INFO

Article history:
Received 25 August 2014
Revision received 27 May 2015

Keywords:
Maize
Agriculture
Food production
Intensification
Macrobotanical analysis
Mesoamerica
Soconusco

ABSTRACT

The development of food production in Mesoamerica was a complex and protracted process. We argue that while maize had been cultivated for many millennia, this cereal grain assumed a markedly more important role in the political economy of the Soconusco (and elsewhere in Mexico, Guatemala and Belize) only after 1000 cal BC. Macrobotanical data from the long-occupied village of Cuauhtémoc document low-level maize production from 1900 to 1400 cal BC with a significant increase during the final centuries of the site's occupation after 1000 cal BC. Botanical evidence of increased maize consumption at this time occurred with evidence for changing groundstone use, intensified exploitation of dog and deer as well as iconography linking maize with rulership. This was also when monumental architecture was first built to mark a regional hierarchy of political centers. Changes evident in the Soconusco at 1000 cal BC parallel transformations in both highland and lowland regions of Mesoamerica when ceramic-using villagers expanded into new environments, farther away from the permanent water sources favored by Late Archaic and Early Formative peoples. We interpret the changes evident at 1000 cal BC in terms of both proximate historical factors as well as ultimate adaptive causes to produce a fuller understanding of changing Mesoamerican food production practices.

1. Introduction

Middle America is unique among the centers of agriculture because plants (e.g., maize [*Zea mays*], squash [*Curcurbita argyrosperma*], pumpkin [*Cucurbita pepo*], common bean [*Phaseolus vulgaris*], and chile [*Capsicum annuum*]) were the primary domesticates (Piperno and Smith, 2012). Dog (*Canis familaris*, Leonard et al., 2002) and turkey (*Meleagris gallopavo*, Speller et al., 2010) were the only significant animal domesticates and played a minor role in the diet (Bellwood, 2005: 146; Piperno and Pearsall, 1998). The achievements of Mesoamerican[1] civilizations were thus created without pack animals or livestock. Another difference from Old World centers of food production is that the founding populations of Mesoamerica brought domesticated dogs and (possibly) bottle gourds (*Lagenaria siceraria*) with them from Asia (Erickson et al., 2005) and within a few millennium of their arrival, by 8000 cal BC, peoples inhabiting Middle America had domesticated pumpkins (Smith, 1997) and by 6700 cal BC maize was also domesticated (Piperno et al., 2009; Ranere et al., 2009). The adaptation to what we now call Mesoamerica was one of low-level food production from a very early point (Smith, 2001).

Domesticated plants are increasingly documented in Middle America during the Archaic period. There is evidence of maize use between 7000 and 4000 cal BC in both the highlands (Flannery, 1986; Piperno and Flannery, 2001; Piperno et al., 2009) and lowlands (Kennett et al., 2010; Neff et al., 2006; Pohl et al., 2007; Pope et al., 2001; Rosenswig et al., 2014). The Early and Middle Archaic periods represent a time when local environments were more intensively occupied by humans and herald what Flannery (1969, 1986; see also Zeder, 2012: 258–259) defined as a broad spectrum revolution. Considerably more evidence of Middle American peoples is known from the Late Archaic period (4000–1900 cal BC), and higher population levels, coupled with increased sedentism, are important factors in why these two millennia are better known (Kennett, 2012; Piperno

* Corresponding author at: Department of Anthropology, AS 237, University at Albany – SUNY, 1400 Washington Ave., Albany, NY 12222, United States.
E-mail address: rrosenswig@albany.edu (R.M. Rosenswig).

[1] Mesoamerica is used in this paper to describe a cultural area. This culture area cannot really be said to have emerged prior to 1400 cal BC when Olmec style iconography demonstrates long distance contact (see Pool, 2007; Rosenswig, 2010). Thus defined, the borders of Mesoamerica shifted over time. The geographic zone that consists of the southern part of modern day Mexico and the northern part of Central America is referred to as Middle America.

http://dx.doi.org/10.1016/j.jaa.2015.06.002
0278-4165/

and Pearsall, 1998; Rosenswig, 2015). More people at longer-occupied sites provide a more substantial archaeological record. Ascertaining whether the apparent Late Archaic increase in food production is real or simply the result of increased overall population (and if the two are linked) is a difficult task. However, it is clear that most of the domesticated plant species upon which later Mesoamerican societies depended were brought under cultivation during the Archaic period. It is equally clear that these food sources were initially integrated into foraging subsistence strategies and did not dramatically alter the lives of Archaic-period peoples. The origins of food production was therefore not simply a matter of altering plant and animal physiology but, more importantly, the cultural purposes to which new food sources were put.

The earliest ceramic-using villagers in Middle America are documented during the course of the second millennium BC. The beginning of village life was less coordinated than once thought and the region witnessed a mosaic of differently adapted peoples, with some using ceramics and others not (Clark and Cheetham, 2002; Rosenswig, 2011, in press). Even more people inhabited Middle America during this millennium than ever before, and they consumed maize from cobs of increasing size (Blake, 2006; Evans, 2013: 89–90; Kennett et al., 2006). The years from 1900 to 1000 cal BC, or what Mesoamerican archaeologists call the Early Formative period, correspond to increased food production compared to earlier peoples in the region. However, villagers consumed a similar range of domesticates as their pre-1900 cal BC ancestors and contemporary neighbors who maintained a more mobile adaptation (Arnold, 2000, 2009; Clark and Gosser, 1995; Kennett et al., 2006; Killion, 2013; Lesure, 2011; Rosenswig, 2006a,b). It has long been proposed that manioc or other root crops could have provided a significant source of carbohydrates (e.g., Bronson, 1966; Coe, 1961; Lowe, 1967: 59, 128; Lowe, 1975: 10–14; see also Clark et al., 2007, 2010). This is a likely possibility, especially given the importance of manioc as a staple crop during the Classic period (Sheets et al., 2011, 2012) and its documentation at some Formative (Hather and Hammond, 1994) and Archaic period (Pohl et al., 1996; Rosenswig et al., 2014) sites in the Maya area. Further, Cyphers et al. (2013; see also Cyphers and Zurita-Noguera, 2012) propose that manioc was the primary source of cultivated carbohydrates for the inhabitants of San Lorenzo during the polity's late Early Formative period florescence. Many domesticated plants were cultivated during the Early Formative period but maize had not yet assumed the importance it later did as a staple crop. Intensified maize cultivation therefore may have been the result of early social complexity rather than its cause (Blake et al., 1992a; Smalley and Blake, 2003; VanDerwarker, 2006).

The Middle Formative period (1000–400 cal BC) was when many of the hallmarks of Mesoamerican civilization are first documented (Pool, 2007: 220–242). Population levels in multiple regions clearly increased, and large conical pyramid mounds were constructed for the first time (e.g., Diehl, 1981; Inomata et al., 2013; Love, 1999a: 144–148). Numerous authors working in both the lowland Soconusco and Gulf Coast regions argue that an increased level of maize production also began at this time (Arnold, 2000, 2009; Blake, 2006: 67; Blake et al., 1995: 179–180; Blake et al., 1992a; Blake and Neff, 2011; Cyphers and Zurita-Noguera, 2012; Clark and Pye, 2000; Clark et al., 2007, 2010; Clark and Knoll, 2005: 289; Killion, 2008, 2013; Love, 1999b, 2007; Love and Guernsey, 2011; Rosenswig, 2006a, 2012a; VanDerwarker, 2006; VanDerwarker and Kruger, 2012). This was also when new forms of social differentiation were documented at the household level in the Soconusco (Love, 1991; Love and Guernsey, 2011; Rosenswig, 2012a,b and see Lesure and Blake, 2002).

In the rest of the paper we focus on changes occurring at 1000 cal BC in the Soconusco region and present new macrobotanical and dating evidence from the Cuauhtémoc site. We then review other lines of evidence for increased maize use and argue that these local patterns are part of larger regional transformations. In some areas there was an increase in political complexity at 1000 cal BC while in other areas this time corresponded to an expansion of sedentary villages into new environments. Both were important changes in adaptation, and local developments were the result of local historical circumstances. However, despite local changes in the Soconusco, we conclude that 1000 cal BC marks a threshold when maize assumed the importance it held for later Mesoamerican peoples as a staple crop. The political economy and political ambitions of local leaders provided the proximate cause of intensified maize production. However, the ultimate cause of adaptive changes at 1000 cal BC was the long-term result of slowly increasing maize ear size combined with wetter and more stable environmental conditions. The fact that changes occurred across so much of Middle America at the same time precludes local historical processes from fully explaining why the transformation occurred. However, the different uses to which increased maize production were put necessitates accounting for local historical processes to understand what occurred in each region. We conclude that consideration of both ultimate and proximate causes that integrate adaptation, environment and political economy provides a more accurate reconstruction of complex developments such as the origins of agriculture (e.g., Robb, 2013; Rosenswig, 2012a, 2015). We return to a fuller discussion of ultimate and proximate causation of this paper, following the presentation of data from the broader Soconusco region and Cuauhtémoc site specifically.

2. The Soconusco region

The Soconusco region consists of linear estuary, coastal plain and piedmont environments below the southern Sierra Madre (Fig. 1). This relatively small region contains a number of extremely rich ecosystems that are closely packed together, resulting in one of the most productive environments in Mesoamerica (Coe and Flannery, 1967: 9–15; Kennett et al., 2006; Lowe et al., 1982: 55–62). As Blake and Neff (2011: 47) relate: "Local residents often remark that the countryside is so productive that one would have to be a fool to go hungry." Middle and Late Archaic period inhabitants of the estuaries are comparatively well documented (Kennett et al., 2010; Voorhies, 2004; Voorhies et al., 2002). These preceramic peoples altered the local environment and cultivated maize (Kennett et al., 2010; Neff et al., 2006), but left a light imprint, and thus archaeologists have been unable to conclusively locate hypothesized permanent inland settlements (Kennett et al., 2006; Voorhies, 2004).[2] This lack of known inland sites is partly due to the high sedimentation rate and the burial of sites dating to all time periods on this actively prograding coastal plain (Voorhies and Kennett, 1995).

The Soconusco has one of the most complete records of initial Early Formative period (1900–1400 cal BC) occupation in Middle America. Early ceramics (Barra phase, 1900–1700 cal BC) and precocious political hierarchy (Locona phase, 1700–1500 cal BC) are well known from Paso de la Amada and other Mazatán zone sites (Blake, 2011; Clark, 2004; Clark and Blake, 1994) among

[2] Recent explorations by Hodgson and Clark (2012) have encountered additional Archaic period shell mounds. Clark and Hodgson (n.d.) propose that these shell mounds were purposefully built monumental architecture and so represent permanent centers of Archaic-period society. We await publication of data to substantiate the claim that these shell mounds were not specialized resource extraction locales as others have proposed (Kennett et al., 2006; Lesure and Wake, 2011; Voorhies, 2004).