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The organization of stingless beekeeping (Meliponiculture) at Mayapán, Yucatan, Mexico

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A B S T R A C T

This article presents evidence for the importance of traditional stingless beekeeping (meliponiculture) at the Postclassic period (CE 1150–1450) Maya political capital of Mayapán, Yucatan, Mexico, with a particular focus on the domestic and public contexts of this practice and its association with metallurgy and *balché* production. The spatial and social distribution of beekeeping activities throughout the city refines scholarly understanding of an integrated and functionally complex Maya agro-urban cityscape. Beekeeping activities are identified through the distribution of small limestone disks, interpreted as the covers for traditional hollow log hives, which were widely distributed throughout the Mayapán's urban landscape. High concentrations of limestone disks at the outlying ceremonial/administrative center of Itzmal Ch'en and also at an elite palace group, may indicate concentrated honey production for crafting fermented honey wine, *balché*. Limestone disks are also widely distributed at other contexts such as temples and halls of the site's monumental center as well as secondary elite and commoner house groups. Limestone disks are regularly recovered (although not exclusively) in association with metallurgical ceramics, suggesting that meliponiculture and lost-wax metallurgy were often practiced by the same households. Honey and wax production was a complex undertaking, involving by-products essential for other industries that were not solely produced for commercial exchange. Instead, these activities were frequently embedded into symbolically charged consumption spheres and specialized artisanal practices.

1. Introduction

When the Spanish arrived in the northern Yucatan, one of the most predominant agrarian practices was the breeding and handling of indigenous stingless bees. Most of what we know about Pre-Columbian beekeeping derives from ethnohistoric sources and ethnographic studies of traditional Maya communities (Villanueva-Gutiérrez et al., 2013). In particular, sources such as Diego de Landa's Relación de las Cosas de Yucatán (Tozzer, 1941) attest to the widespread practice of meliponiculture in northern Yucatan at the Contact period, due to the significance of honey and beeswax to commercial exchange and tributary demands. New evidence from over 20 years of archaeological research at Mayapán, the primary political capital of northern Yucatan during the Postclassic period (CE 1150–1450), reveals that meliponiculture was a significant Pre-Columbian industry. Small limestone disks are numerous in certain contexts at this pre-modern urban city; they match descriptions of traditional beehive covers used during the Colonial period and beyond. The discovery of these disks raises numerous questions about the organization of meliponiculture at Mayapán. To what extent was this practice broadly spatially and socially distributed, and to what extent was this activity conditioned by socioeconomic factors, urban gardening, and/or industries relying on honey and wax products?

The findings presented in this study suggest that meliponiculture took place at a variety of scales, activity contexts, and degrees of specialization. We argue that intensified beekeeping is particularly associated with two complementary productive industries: *balché* (honey wine with hallucinogenic properties), and metallurgical production, through the use of beeswax to make casting models in the lost-wax casting process. Both of these products require the deployment of specialized knowledge, including fermentation for ceremonious events (*balché*) and technical knowledge (lost-wax metallurgy). The practice of beekeeping in the same spaces as the other two industries would constitute a form of *multicraft production*: "The concurrent practice of multiple crafts by different individuals or groups … in the same space or in a series of adjacent spaces" (Shimada, 2007: 5; see also Hirth, 2009:4). However, beekeeping was also a small-scale household productive activity, practiced independently and autonomously by many urban households at Mayapán. Similarly, small-scale craft production for other industries across the city existed alongside loci characterized by larger debris quantities indicative of surplus production (Masson et al., 2016). These findings contradict ethnographically-derived

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models of beekeeping as a practice that was concentrated in small villages and rural areas. Instead, our findings suggest that beekeeping was a critical component of Mayapán's agro-urban economy.

2. Agrarian production and models of Maya urbanism

The degree to which agrarian practices such as beekeeping were integrated into ancient Maya cities touches on long-standing debates about the unplanned, low-density nature of Maya cities, and the integration of agrarian activity and craft production activities. Many scholars have traditionally conceptualized farming and associated activities as both autonomous and redundant, centered predominantly on villages and rural areas. This view of agrarian activity derives in part from segmentary state models of sociopolitical organization, in which urban centers were supported by a set of redundant, almost clone-like, towns and villages with each community serving as a mirror image of its parent center or polity from which it separated years before (Ball and Taschek, 1991; Fox, 1977; Sanders and Webster, 1988; Taschek and Ball, 1999; after Southall, 1988). These models also posit societies supported by a subsistence economy and swidden agriculture (Fox, 1987: 17). Recent studies have also argued for a "dualistic economies" approach, in which agrarian activities were the purview of farmers living in dispersed farmsteads, among their agricultural terraces (Robin, 2013: 120), or in small, autonomous farming villages, that were only minimally integrated with urban economies (Scarborough and Valdez Jr., 2010: 212).

An alternative perspective frames Maya cities as 'agro-urban landscapes' (Isendahl, 2012) characterized by land-use strategies which interspersed agronomic production with other urban activities. This perspective is part of a growing consideration of low-density cities (Fletcher, 2012) as characteristic of many ancient agrarian-based states, which have also been characterized as 'green cities' (Graham, 1999), 'garden cities' (Chase and Chase, 1998; Dahlin et al., 2005; Dunning et al., 1998) and 'forest gardens' (Ford and Nigh, 2009). Such models also commonly posit highly articulated and integrated economies for the ancient Maya, in which general purpose monies served as standards of exchange for agrarian products, including foodstuffs, within and between regions (Masson and Freidel, 2012: 459, 2013; Freidel et al., 2016).

Agro-urban landscape models posit that food consumed in the city was, to the extent possible, produced in the city, in the residential areas surrounding the civic-ceremonial core (Isendahl, 2012: 1123). Archaeologists are increasingly focusing on the identification, mapping, and paleobotanical analysis of various open spaces within ancient Mesoamerican cities (Dahlin et al., 2010). However, premodern cities of Mayapán's size cannot be characterized as self-sufficient for their subsistence needs, and supplementation via trade was an ongoing concern (e.g. Freidel and Shaw, 2000; Masson and Freidel, 2012). In addition to public spaces such as plazas, palatial gardens and parks, many urban open spaces are best classified as home gardens or kitchen gardens, associated with the activities of particular residential groups (Killion, 1992; Sheets, 1992; Stark, 2014). The distinctive urban settlement pattern of northern Yucatan, including Mayapán, in which urban houselots are clearly defined by walls, known locally as *albarradas* (Brown, 1999; Bullard, 1952, 1954; Smith, 1962; see also Batun Alpuche, 2009: 95; Hare et al., 2014b: 190) also allows for the identification of households and immediately adjacent garden spaces; in modern Yucatecan villages, the household yard spaces defined by *albarrada* walls also contain gardens (Goñi, 1998: 91–102). Some *albarrada* enclosures also demarcate nonresidential spaces; these have been interpreted as agrarian spaces associated with beekeeping (Batun Alpuche, 2009), animal husbandry (Masson et al., 2014: 248), infield agriculture (Masson et al., 2014: 250) or arboriculture (Masson et al., 2014: 247). The kitchen orchards/gardens identified in Pre-Columbian Maya sites are often identified as spatially distinct from larger-scale cultivation of staple crops in *milpas*, with species that served a variety of uses, including tree crops and other food production species, medicinal plants, flowering plants, fiber production (agave and/or cotton), and exchange (McAnany, 1995: 77). The unique preservation of the village of Cerén enabled the identification of numerous species that were cultivated in its household gardens: guava (*Psidium guajava),* guayaba *(Posoqueria latifolia),* nance (*Byrsonima crassifolia*), cacao (*Theobroma cacao*), chiles (*Capsicum annuum L.*), malanga (*Xanthosoma sagittifolium*), avocado (*Persea americana Mill.*), calabash (*Crescentia alata*) and agave (*Agave americana*); individual household gardens were cultivated with a high degree of biodiversity, and symbiotic species were intentionally intercropped (Farahani et al., 2017: 981; Sheets et al., 2012: 264).

While beekeeping is not commonly a central focus in studies of Maya subsistence, it has been considered particularly for sites in eastern coastal Yucatan (Goñi, 1998; Pérez Rivas, 1994; Silva and Hernandez, 1991), Cozumel Island (Batun Alpuche, 2009; Freidel, 1976; Hamblin, 1984; Sabloff and Freidel, 1975: 398; Sierra Sosa, 1991; Wallace, 1978; Crane and Graham, 1985) and Belize (Crane, 1992; Garber, 1981: 67–8; Hammond, 1975; Sidrys, 1983; Walker, 1990), in areas with ethnohistoric and ethnographic accounts of its practice. These previous findings provide regional context for the scale and organization of meliponiculture at various ancient cities and towns in the Maya area (see discussion below).

While little is known about beekeeping in conjunction with Pre-Columbian Maya urbanism, the socioeconomic organization of meliponiculture as a productive activity also remains poorly understood. As noted previously, many scholars have suggested that agrarian activities were practiced redundantly and autonomously, with few considerations of specialized agrarian activities. However, Batun has suggested that farmers on Cozumel Island created diversified, specialized production zones that maximized the capacity of particular microenvironmental contexts (Batun Alpuche, 2009: 267). Within this framework, he posits that beekeeping was practiced autonomously in tandem with *milpa* farming and gardening. This activity would have been complementary to the cultivation of large orchard-gardens and the cultivation of honey-flowering plant species and corn (the latter feeds the bees in the dry season; Chemas and Rico-Gray, 1991). Similarly, the use of particular microenvironmental zones may also have been specialized with regard to the cultivation of particular high-value crops. For example, the use of *rejolladas* (dry or semi-dry sinkholes) and cenotes may have been advantageous for the production of cacao in northern Yucatan, as their rich organic soils and microclimatic conditions may have provided optimal conditions for cacao cultivation (Kepecs and Boucher, 1996).

Meliponiculture could also have been a specialized productive activity (Costin, 1991) that was organized similarly to craft production, either with regard to utilitarian crafts or high-value luxury crafts. Some craft items required highly specialized ritual or technical knowledge, restricted (at Mayapán) to highly-skilled specialists, and evidence of their production is often spatially restricted to elite residences or particular workshops (e.g. Inomata, 2001; Masson et al., 2016). Specialized artisanal contexts have been identified archaeologically at Otumba workshops (Charlton et al., 1991), in evidence for scribal activities (Inomata and Stiver, 1998) and at loci for effigy incense burner production (Masson et al., in press). A similar pattern of artisanal production has been argued for crafts requiring botanical raw materials, such as the preparation of orchard glues (Berdan et al., 2009). However, the majority of productive activities in ancient Mesoamerican cities appear to have been practiced on an intermittent, part-time basis, by a broad socioeconomic continuum of urban residents (Hester and Shafer, 1984; Hirth, 2009; Masson et al., 2016). In the case of basic crafts such as lithic production, ordinary pottery production, cloth production, and shell ornament production, part-time specialist households are identified through high volumes of debris relative to a continuous backdrop of lower quantities of debris (Masson et al., 2016: 8).