Zoometric Breed Analysis and Isotopic Paleodietary Reconstruction of the Maya Dog

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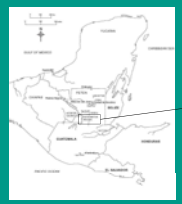
Drawing of Tlalchichi Dog from Códice Florentino (Valadez,1999)


Drawing of Mesoamerican Common Dog by Hernandez, from Allen (1920)

Abstract

Dogs are among the most common of animals in faunal assemblages at Maya sites (Wing, 1976; Clutton-Brock & Hammond, 1994; Schwartz, 1999). In order to better understand ancient Maya dog importance, dog remains from eleven Maya sites ranging in date from the Preclassic (2350 BP) through the Postclassic (977 BP) were analyzed. Three methods were used: bone morphology and metrics, stable isotope bone chemistry, and mortuary treatment.
Morphometric analysis revealed that three breeds were present at the sites, the Mesoamerican Common Dog, the Short-nosed Dog, and the *Tlalchichi* or Floor Dog using breed definitions from Valadez (1998) and Clutton-Brock & Hammond (1994). Isotopic studies of archaeological dog bones from Maya sites in this study and others (White, 2004; Gerry, 1993) suggest that some individuals were fed maize dominated diets while others were not, indicating ritual feeding and fattening of dogs for sacrifice as described by Hernandez (Allen,1920) and suggested by White (2004).



Maps indicating locations of sites (Emery, 2009; 2010)

Methods

Canis lupus familiaris remains were selected from eleven Maya site assemblages identified and curated in the FLMNH Environmental Archaeology collections. Remains ranged in date from the Preclassic through to the Postclassic. All measurements followed Von Driesch (1976). Long bone length was used to estimate dog stature using equations from Koudelka,1885 (cited from Harcourt,1974). Dog weight was calculated using equations derived from allometry by Wing (1978). The estimates for size were obtained only from mature individuals as indicated by long bones with fused epiphyses and mandibles with non-deciduous teeth. Fragmented long bone lengths were derived using allometry (Alpak,2004). Breed of the dog was then determined using the classification scheme derived by Valadez (1999). Those specimens for which breed was identifiable were then split into four context types and then further into time periods. Context types included two ritual contexts: 1. mortuary treatments including ritual and non-ritual dog burials and 2. dog remains recovered in human burials, in caves, or in feasting deposits. Two non-ritual context types were also included: 1. dog remains found in living floors or within trash middens of residential complexes.

A total of 19 specimens were then selected to represent each time period, each site, and each provenience type for isotopic analysis. Extraction of bone collagen and apatite fractions followed techniques specified by (Ambrose,2003). In order to insure collagen was unaltered by diagenesis C/N ratios were analyzed prior to analysis of $^{13}C/^{12}C$ and $^{15}N/^{14}N$. All stable isotope values are expressed in parts per mil (‰) as:

$$\delta = [(R_{sample}/R_{sample})-1] \times 1{,}000$$

where R is the heaver to the lighter isotope. Ratios were analyzed using the isotopic baseline for the Maya area established by White et al. (2001).

Results

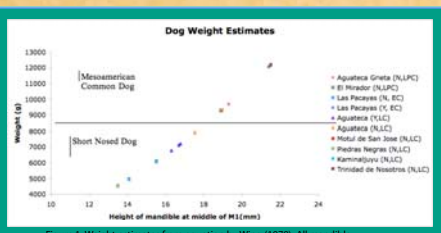


Figure 1: Weight estimates from equation by Wing (1978). All mandible specimens fall within Mesoamerican Common dog and Short-nosed dog range (Clutton-Brock & Hammond, 1994).

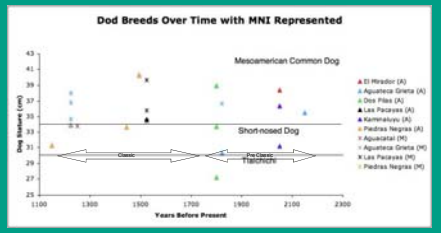


Figure 2: Dog height estimated from equations by Koudelka,1885 (cited from Harcourt,1974). Dog breed based on classification scheme by Valadez (1999). An (A) indicates allometrically derived bone length and an (M) means bone length was directly measured.


Yellow marker indicates location of mandible height at middle of M1 measurement taken with teeth intact (Wing 1978)


Yellow marker indicates location of long bone greatest length measurement (Von den Driesch 1976)


Yellow marker indicates location of mandible height at middle of M1 measurement taken without teeth intact (Wing 1978)

Figures 3-5: Display Mean $\Delta\ \delta\ ^{13}C$ vs. $\delta\ ^{15}N$ (Ambrose & Norr,1993)

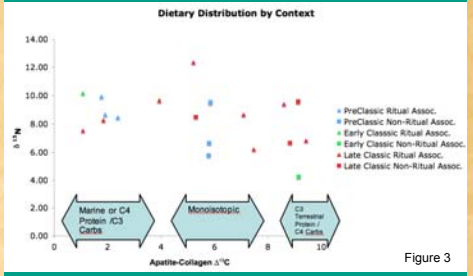


Figure 3

Figure 3: There is a clear separation shown in the data here between Preclassic and Early Classic ritual values and non-ritual values. Samples found in ritual context (represented here by triangles) have C4 protein values this means that they are consuming large amounts of maize. Samples from non-ritual context during this time and consuming more terrestrial protein. Late Classic ritual remains are more varied, while non-ritual Late Classic remains indicate the same trend as in early periods of less maize and terrestrial protein consumption.

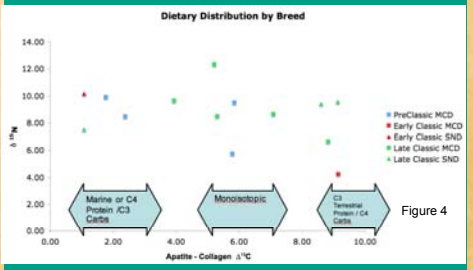


Figure 4

Figure 4: This graph displays values for those samples which breed was established. Here no trend is verifiable due to the small number of Short-nosed dogs represented in the sample.

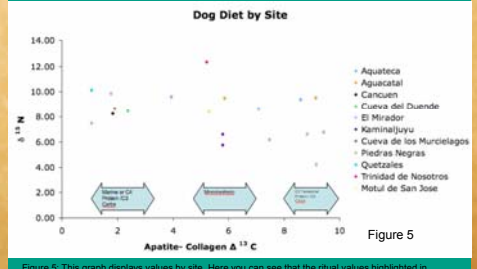


Figure 5

Figure 5: This graph displays values by site. Here you can see that the ritual values highlighted in Figure 3 are from multiple sites and do not represent a local dietary pattern.

Conclusions

The findings of this study confirm the importance of *Canis lupus familiaris* in ancient Maya culture. The presence of both the Mesoamerican Common dog and Short Nosed dog also confirms Valadez's (2007) findings. However the anomalous presence of the Tlalchichi dog at Cueva de Rio Murcielagos at the Dos Pilas site is contradictory to his findings, this dog may in fact be a non local trade item. The role of dogs as guardians and hunting companions (Gerry, 1993) perhaps explain the value of none ritual dogs having consumed more terrestrial protein. Dog remains recovered from ritual contexts were found to have a more maize-rich diet than dogs found in non-ritual deposits (with the exception of Late Classic sites). This confirms dietary differences between ritually used dogs and those used in non-ritual ways (such as food or hunting companions). Overall this study found that there was an increase in the types of breeds at sites as well as an increase in the number of dogs found in ritual contexts over time. This increase in ritual dog use may be driven by an increased need for domesticated meat during the Classic (White, 2004) as well as a increase in social stratification and elite use of ceremonial centers for competitive feasting (Emery, 2008). Future studies should be done to confirm this elite dominance of dog remains by looking at faunal assemblages from ritual and non-ritual contexts at lower class residences.

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