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Early hunters and herders of northern Ethiopia: The fauna from Danei Kawlos

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ABSTRACT: It is generally agreed that Ethiopia is one of the world's primary centers of prehistoric plant domestication. It is also known that domestic fauna (cattle and domestic caprines) were brought in from outside. Unfortunately, very few Holocene archaeological sequences have been excavated in the Horn. Even fewer sites have yielded domestic fauna dating to > 3000 years ago. The excavations at the site Danei Kawlos in northern Ethiopia provide new Holocene archaeological sequences for Northern Ethiopia and document the presence of cattle, sheep and goat with a direct date of 3358 ± 47 BP on a *Bos* molar. We discuss here the zooarchaeological data from the site.

Key words /phrases: Danei Kawlos; domestication, fauna, Tigrai, Ethiopia

INTRODUCTION

It is generally agreed that Ethiopia is one of the world's primary center of prehistoric plant domestication (e.g., Vavilov, 1951). Indigenous Ethiopian plant domesticates include, among others, *teff* (*Eragrostis tef*), *noog (Guizotia abyssinica),*finger millet *(Eleucine coracana), enset(Ensete ventricosum), chat (Catha edulis)* and coffee *(Coffea arabica)*. These play an important role in contemporary Ethiopia's food producing systems (Westphal, 1975), and without doubt, these must have played an important role in prehistory.

Domestic cattle and sheep and goats have also played an important role in pastoral and farming systems over the long term, but were brought to the region from northeastern Africa or Arabia. However, we know very little about the processes involved, and the relative timing of the appearance of domestic livestock. It has generally been assumed that cattle herders moved into Eritrea and Ethiopia from northern Sudan, where they first appeared 5000 years ago (see review in Edwards [2007] and Lesur *et al*., [2014a]). However given the short distance from the coast of Africa to Yemen, it is also possible that cattle and sheep and goats were introduced to the Horn of Africa from the Arabian Peninsula (Lesur *et al*., 2014a). This could have occurred before 5000 BP.

Unfortunately, very few Holocene archaeological sequences have been excavated in the Horn (Fig.1). Even fewer sites have yielded domestic fauna dating to > 3000 years ago. The excavations at Danei Kawlos near Abiy Adi in Tigrai provide new Holocene archaeological sequences for Northern Ethiopia. We report here on zooarchaeological data from the site.

Brief Background

Danei Kawlos is a rock shelter located in northern Ethiopia near the modern town of Abiy Adi, a few km from the rock art bearing rock shelters of Mihdar Abur and Tselim Ba'ati. It measures 14 x 8 meters. Five 1 x 1 meter units were excavated, 3 to bedrock, circa 145cm below surface. The substrate was sandy throughout the sequence. Five Cultural Stratigraphic Units were discerned. The site was dug in 5cm pits and dry sieved though 2mm mesh. This allowed excellent recovery of small faunal specimens.

Given the sandy nature of the substrate and the general issue of bioturbation in rock shelter deposits, obtaining direct dates was a priority of our research. At Danei Kawlos it was possible to obtain a direct apatite date on a *Bos*

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lower third premolar from 130-135 cm below surface in stratigraphic Layer 5. This date is 3358 ± 47 (A-0214). A conventional charcoal date on this layer (95-100 cm below surface) fits with this at 3380 ± 160 (GX-27745). An AMS date on a small charcoal sample came out at 1,103 ± 41 and is almost certainly intrusive.

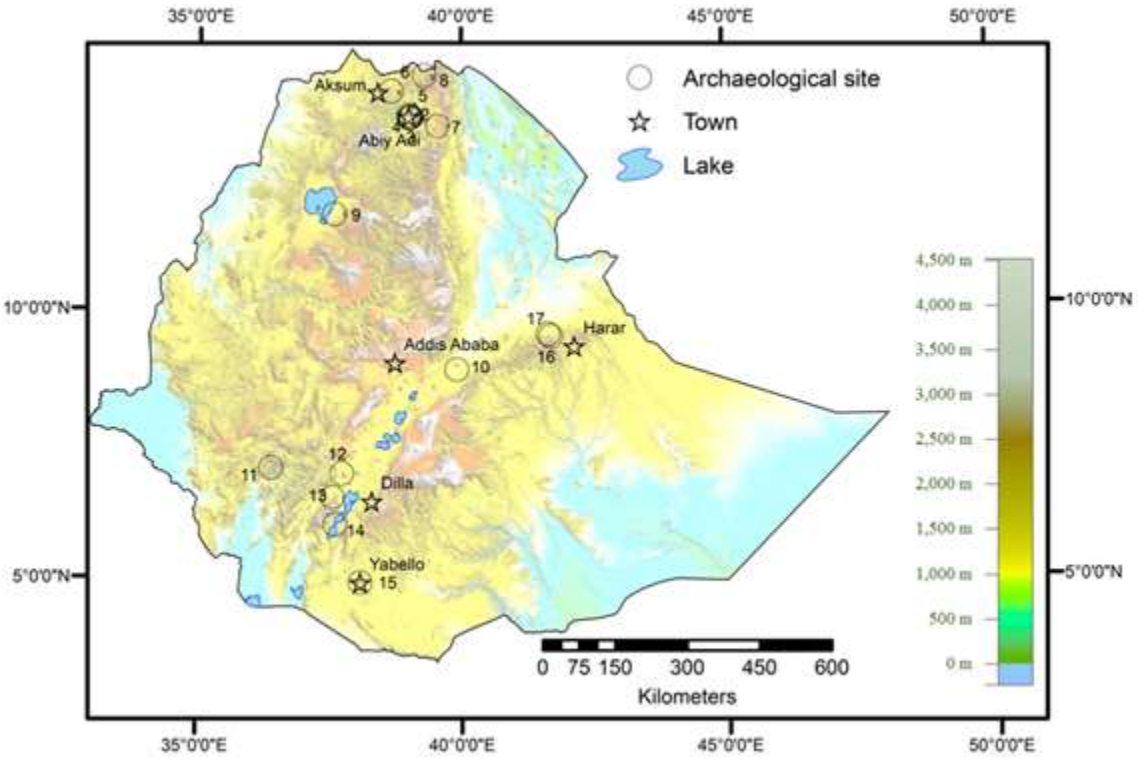

Figure 1:-Map showing modern towns and archaeological sites mentioned in the text and represented here in numbers (1=Dabo Zellelew; 2= Mihdar Abur; 3=Tselim Ba'ati; 4=Danei Kawlos; 5=Ba'ati Ataro; 6=Gobedra; 7=Quiha; 8=Mezbir; 9=Lalibela/Natchebiet; 10=Lake Beseka; 11=Koka/Kumali; 12=Mochena Borago; 13=Mota/Tuwatey; 14=Mome Gongolo 1 and 2; 15=Yabello; 16=Laga Oda; 17=Goda Buticha).

METHODS

Following methods developed for the study of African faunas (Gifford *et al*., 1980; Marshall 1990), all identifiable specimens were individually bagged, labeled, sorted, and identified. All such specimens were given zooarchaeological catalog numbers. Minimally identifiable specimens, such as rib shaft fragments, cranial, axial, or long bone shaft fragments were left bagged in groups by provenience category under one catalog number. The same procedure was followed for non-identifiable specimens.

Specimens were initially sorted by body part and subsequently by taxon. All identifications were made by reference to comparative material housed in the National Museum in Addis Ababa or, for those specimens that were not available, by reference to identification manuals such as Walker (1985) and Schmid (1972). Levels of identification used vary from class, Mammalia, orders such as Artiodactyla or Carnivora, genera such as bovid or suid to more specific tribal or species level distinctions. In some cases, as is common in African zooarchaeology, size classes were also used. In general, because of lack of comparative material, identifications were cautious.

We recorded the presence of cut marks, gnaw marks, burning, root action or weathering for individual specimens. Detailed study of the location of these marks was not undertaken however. Measurements were taken on all complete specimens and on all complete long bone ends, following the recommendations of von den Driesch (1976). All specimens were counted. Number of identifiable specimen or NISP is the unit of quantification used here. The sample sizes for any one unit were not large enough to warrant calculation of minimum numbers of individuals (MNI).

RESULTS

A total of 1697 faunal specimens were studied (Table 1; Figs 2 and 3) with cattle and caprines present in all stratigraphic layers. The fauna is well-preserved but highly fragmentary. The bulk of the specimens occur in the lower two stratigraphic layers (layers 4 and 5). This fauna is associated with obsidian and chert lithics with a high proportion of scrapers and backed pieces. Ceramics in Layer 4 and 5 were burnished and slipped. Most of the decorated sherds, with closely spaced, parallel or zigzag line motifs, occurred in level 5.

Table 1. Species Representation at Kawlos.

	Cattle	Caprine	Hyrax	Hare	Suid	cf. Fish	Reptile	Porcupine	Rodents	cf. Rodent	Human	Primate	Mollusc	Not well identified	CSU Total
Stratigraphic layer 1	3	1	1						5					76	86
Stratigraphic layer 2	2	1	1				1		4					181	190
Stratigraphic layer 3	1	1					3		8	1				124	138
Stratigraphic layer 4	2	1	4	1					37	3			1	295	344
Stratigraphic layer 5	4	1	8	4	4	1		2	116	27	1	1	10	760	939
Total	12	5	14	5	4	1	4	2	170	31	1	1	11	1436	1697

Nine hundred and thirty nine faunal specimens were studied from Layer 5, many were identifiable to size class, but only 179 or 19% of the assemblage were identifiable to tribe or genus (Table 1; Figs. 2 and 3). This sample is dominated by rodents (143/179 or 79.9%), including porcupine some with cut marks. Hyrax are also present in small but significant numbers (8/179 or 4.5%). Even smaller numbers of hare (4 or 2.2%) and wild suid (4 or 2.2%) are present. Domestic cattle (4 or 2.2%) and possibly caprines (1 or 0.5%) are represented. One human specimen and one primate as well as one fish specimen were found. A small number of mollusks (10/179 or 5.6%) are also present.

Three hundred and forty-four specimens were studied from Layer 4, 49 or 14.2% of which were identifiable beyond size class. Just as in unit five, rodents dominate (40/49 or about 81.6%), hyrax (4/49 or 8.1%) and hare (1/49 or 2.1%) are present, as are cattle (2/49 or 4%) and caprines (1/49 or 2.1%).

The samples from Stratigraphic Layers 3, 2, and 1 are small, but the taxonomic representation is very similar.

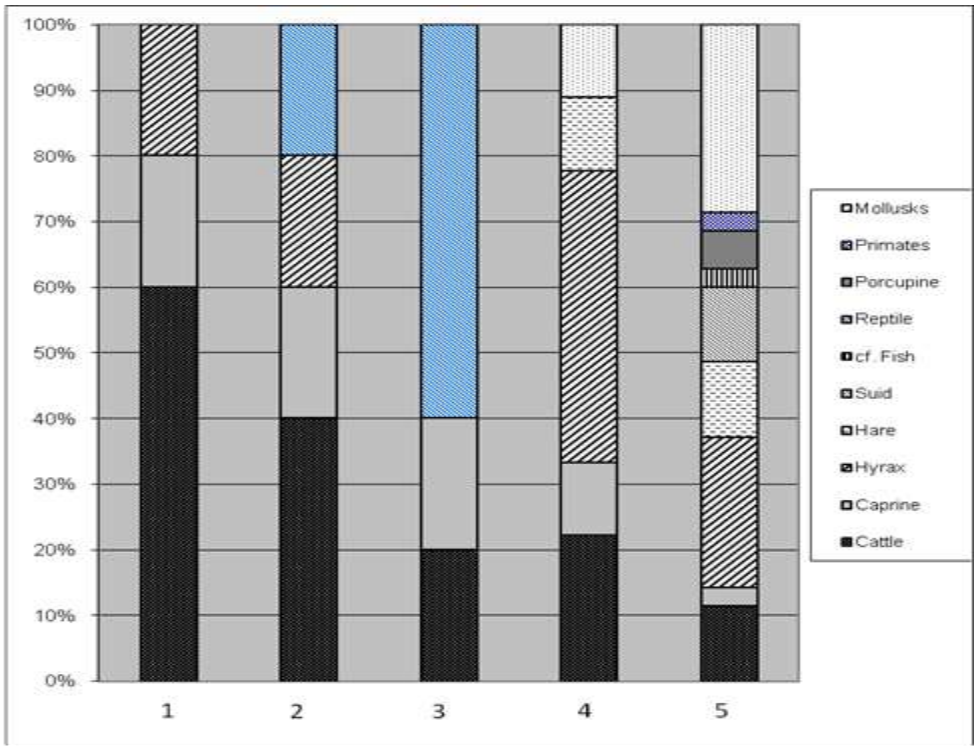

Figure 2:- Selected Species Representation at Danei Kawlos (numbers at the bottom of each column represent cultural stratigraphic layers).

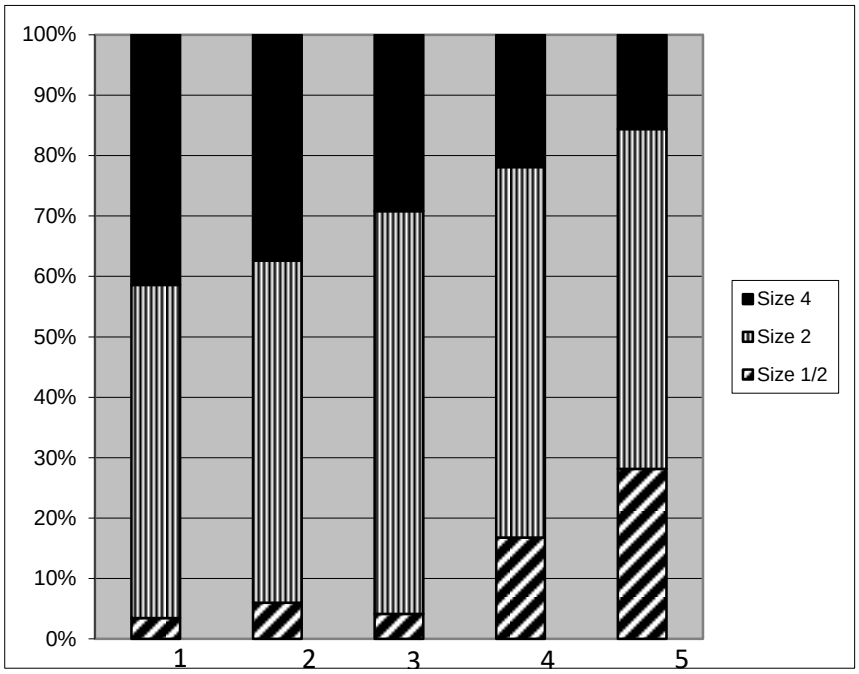

Figure 3:- Size Class Representation at Danei Kawlos (numbers at the bottom of each column represent cultural stratigraphic layers).

DISCUSSION

The faunas from Danei Kawlos are important as the first sizable excavated and systematically analyzed faunal assemblages from long Holocene sequences in northern Ethiopia and provided the earliest direct date for the presence of cattle in the region. These findings have interesting implications for the timing and paleoclimatic context of the appearance of early herding in northern Ethiopia.

The inhabitants of Danei Kawlos relied quite heavily on small wild animals. The lack of large wild mammals was unexpected and differs in patterns of the use of wild fauna from sites dating to similar periods in Southern Ethiopia at Yabello (Girma 2001), in Djibouti (Lesur *et al*., 2014a), in the Sudan (Fattovich *et al*., 1984) and in Kenya (Marshall 2000). This may relate to the intensity of land use in the Abiy Adi area, however, little is known about this at this time.

Danei Kawlos is situated very close to the sites of Mihdar Abur, Tselim Ba'ati and Dabo Zellelew. Of these Dabo Zellelew, an open air site, yielded lithic artifacts similar to the lowest layers of Danei Kawlos, but dates for this site are lacking. The sites of Mihdar Abur and Tselim Ba'ati are rock shelters but have rocky surfaces and cannot be excavated. However, they do contain rock art that mostly represents the earliest stage of rock art tradition of the Horn (Agazi 1997a, b; 2001) that is hypothesized to date to the mid-Holocene (Brandt and Carder 1987).

It is, therefore, possible that use of the landscape was already quite intensive by the time that the site was occupied and that large mammals were scarce for this reason. This line of reasoning fits with the presence of domestic stock at the site and the increasing dependence on small mammals. The presence of a wide spectrum of small wild animals is intriguing and it could also be that large wild animals were scarce due to aridity. There is nothing in the sediments or artifacts to suggest high rainfall, and the fauna would be compatible with fairly arid conditions. In the absence of information on paleoclimate, or settlement patterns, it is difficult to fully understand the significance of the reliance on small wild mammals. Paleoclimatic reconstructions for Ethiopia by Gasse and others (Gasse 1977; Gasse and Street 1978), based on diatoms, isotopes, pollen, and levels of Rift Valley lakes show gradually increasing aridity from circa 6000BP, with many oscillations. A particularly arid phase occurs circa 3,500BP. The dates from Stratigraphic Unit 5, Danei Kawlos suggest occupation around 3,300BP, close to this arid phase.

The presence of domestic cattle from the base of the sequence at Danei Kawlos is also intriguing. The direct date of 3358± 47 BP on a Bos lower third premolar from 130-135cm below surface in Stratigraphic Layer 5, together with the charcoal date for this level of 3380 ± 160 BP provide one of the first secure contexts for the presence of early domestic stock in the Horn of Africa. These data provide a setting against which to view older dates for early domestic stock in the region.

The dates from Danei Kawlos are early and especially secure due to direct dating but fit with the estimated range of dates for domestic cattle or sheep and goat or chicken from other sites with sequences that range between 4000-3000 BP. Also located in the northern Ethiopian highlands (Fig. 1), Gobedra stratum 2A, preserves a probable domestic cow, with a bone collagen date of a little younger than 3000 BP (Phillipson 1977). At the site of Mezbir, domestic chicken bones have been directly AMS dated to 819-755 BC or around 3000 BP (Woldekiros and D'Andrea 2017). At Lake Beseka, in the Rift Valley in central Ethiopia, cattle are thought to occur at FEJX 3 c. 3500 BP. There is no direct date on these remains but they are associated with aridity and low lake levels characteristic of the period (Brandt 1982). Similar dates for cattle are found at the site of Laga Oda in eastern Ethiopia (Clark and Prince 1978). At Yabello, in southern Ethiopia, cattle remains have been found in levels thought to date to 4100 BP. Stratigraphic interpretation was complex at this site, however, and direct dates are lacking (Girma 2001).

Other Ethiopian archaeological sites did not yield domestic animals or have very late dates for domestic faunas. The absence of domestic fauna in the Holocene layers of Mochena

Borago is striking, as noted by Lesur (Lesur *et al*., 2007) as well as Goda Buticha (Zelalem *et al*., 2014), and Mome Gongolo 1 and 2 (Lesur *et al*., 2014b). Similarly, there is no report of the recovery of fauna in the contemporaneous layers of Porc Epic (Clark and Williamson 1984) in eastern Ethiopia or Haroruna (Bachechi 2005) in south central Ethiopia. At Lalibela and Natchebiet caves in northwestern Ethiopia legumes and chickpeas in association with sheep or goat and possible domesticated cattle are dated to no earlier than 2500 BP (Dombrowski, 1970, 1971). Recent investigations at the sites of Koka and Kumali in Keffa have yielded domestic fauna dating to around 2000 BP (Hildebrand *et al*., 2010). Contemporaneous domestic animals have been recovered also from Akirsa (Poisbaud 2002). The domestic cattle and sheep or goat at Mota cave in the Gamo highlands date to only around 1700-1600 years ago (Arthur *et al*., 2019). These recent dates for domestic stock revealed by recent research in much of Ethiopia contrast with the presence of rock art containing mainly depictions of cattle (see Agazi [1997c, 2018, 2020]) in the region that is hypothesized to date to at least the mid-Holocene (Brandt and Carder, 1987).

Archaeological evidence in neighboring Sudan provides indirect but important information bearing on the introduction of cattle and the Neolithic of northern Ethiopia. Fieldwork in eastern Sudan has yielded evidence for the "herding" of cattle and sheep and goats by the 6th-5th millennium BP (Fattovich, 1988), followed by the possible addition of sorghum cultivation at Gash Group sites by ca. 5000 to 3500 BP (Fattovich *et al*., 1984; Sadr 1991). Contact between eastern Sudan and the highlands of northern Ethiopia is inferred from the ceramics and obsidian artifacts recovered from Kassala Phase sites in Eastern Sudan dating from the middle of the 6th to the end of the 4th millennium BP. Indeed, Fattovich and his colleagues go on to state that "by the 2nd millennium BC there was considerable contact between the eastern area of the Atbai Tradition and Ethiopia (Fattovich *et al*., 1984:185).

A Sudanese origin for early cattle and sheep and goats in northern Ethiopia moving with people or via exchange and trade contacts from the Khartoum Nile and sites like Kadero and then via the sites of the Butana phase of the southern Atbai, therefore, seems probable. This hypothesis would be supported by dates for the earliest cattle or sheep and goat in Ethiopian sites falling within the last 4500 years. But if the dates for the earliest domestic stock date to 5000 BP or older, then we would have to consider an Arabian or Near-Eastern origin for domestic stock in the Horn of Africa. It is ultimately likely that both eastern and western routes and diverse small scale social processes played a role in introduction of cattle and sheep and goat to northern Ethiopia but more fine-grained data and direct dates will be needed to parse relationships between pastoral influences, trade and exchange and the reach of ancient states on specific places and periods.

CONCLUSION

Taken together the fauna from sites in the Horn of Africa now suggests a relatively late appearance of cattle, in the fourth millennium BP, and possibly slow introduction of domestic stock to Horn of Africa. Disease challenges for cattle outside of their wild range posed by the epizootical threats of wild herbivores and the wildlife-livestock disease interface may have slowed the spread of cattle in the highland Horn just as suggested for much of Africa by Gifford-Gonzalez (2000, 2017). The elevational extremes and woodlands of northern Ethiopia may also have resulted in a slow spread of early herders to the Horn (Marshall and Hildebrand 2002). Throughout Africa, early herders moved preferentially into high productivity grasslands below 3500 masl (Marshall and Hildebrand 2002; Marshall *et al*., 2018). Moreover, ecological stress related to climate may have compounded herder choices as livestock appears in the Horn of Africa 4000-3500 BP during a particularly arid period when grazing, though better than the lowlands, would have been difficult. It is also possible that in the south, resilient hunter-gatherer societies who were geographically isolated from the Nile and Red Sea networks of trade and exchange provided social resistance to the spread of herding ways of life.

Dates ranging between 4000 and 3500 BP are consistent with a Sudanese origin from the Khartoum Nile and sites like Kadero, via the sites of the Butana phase of the southern Atbai. There may have been repeated small pulses of movement of cattle and people into the Horn during the 4thmillennium BP, perhaps in response to drought conditions in the lowlands**.** There is currently no evidence for a South Arabian origin for the cattle of the Horn. More well preserved and carefully studied archaeological sequences, as well as direct dates on early domestic stock, are needed to test the hypotheses of late and African origins for domestic cattle in the Horn.

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