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ROUTLEDGE



THE SWAHILI WORLD

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ANIMALS AND THEIR USES IN THE SWAHILI WORLD

Eréndira M. Quintana Morales and Mary E. Prendergast

Introduction

Past populations inhabiting the Swahili coast – an area stretching from southern Somalia to Mozambique and including offshore islands, the Comoros and Madagascar – encountered a rich and diverse set of animals, many of which were incorporated into their social realm in various forms and can be traced in the archaeological record. Early research on the Swahili coast often neglected faunal remains, focusing instead on material culture, texts and trade locales. However, recent studies demonstrate the power of zooarchaeological data to address key issues in Swahili social organisation, daily practice and ritual life. These show that past coastal and island populations had diverse economic strategies including shellfish gathering, fishing, hunting and animal husbandry, with interactions between foragers and food producers being a common feature of coast and hinterland life. Animals entered the domestic and public spheres as part of daily meals and feasting events, but also as raw materials such as bone, shell and coral transformed into architectural and ornamental items. The exchange of animals and their products connected the Swahili world to mainland Africa and the Indian Ocean sphere, and thus zooarchaeology is key to addressing the questions of trade that dominated early Swahili research. In this chapter we describe the great biodiversity of the Swahili coast, hinterland and islands, we explore diachronic changes in animal uses from the Later Stone Age (LSA) through the medieval era, and we address key themes in Swahili world zooarchaeology.

Environmental background

The Swahili world encompasses many habitats, divisible into zones: the mainland coast and hinterland; offshore islands (Lamu, Zanzibar, Mafia and Kilwa archipelagos); the oceanic Comoros islands; and Madagascar. In all of these, landscapes have been transformed by centuries or millennia of anthropogenic habitat modification and species translocations. Unfortunately, a lack of palaeoecological studies (but see Punwong 2013) means that past vegetational patterns are inferred from zooarchaeological and, rarely, palaeobotanical remains.

Moving down the coast and its hinterland, one sees a dramatic shift from arid southern Somalia and northern Kenya to more humid conditions in southern Kenya and Tanzania, with a return to slightly more arid conditions from Kilwa to Mozambique. Rivers intersect the coast

creating fertile deltas, notably the Tana, Rufuji, Sabaki and Zambezi. The Zanzibar-Inhambane vegetational mosaic, which characterises the Swahili coast, includes mangroves, swamps, thickets and woodlands, all with significant human modification (Burgess and Clarke 2000). Wild mammals are diverse (Figure 32.1), and livestock graze in much of the coastal plain.

By contrast, many offshore islands are relatively barren, with thin soils overlying coral rag. These soils support scrub or thicket, with substantial forest only on Unguja, the largest island in the Zanzibar archipelago. Most islands support browsing goats (*Capra hircus*), while grazing sheep (*Ovis aries*) and cattle (today, mostly crossbreeds of *Bos taurus* and *Bos indicus*) are found mainly on Pemba, which has more abundant grass. Wild fauna tend to be depauperate and small-bodied compared with the mainland (Walsh 2007), with suni and duikers being the main game animals; no island animals are larger than bushpig and leopard, both found only on Unguja. Terrestrial fauna are even less diverse on the distant Comoros islands. Many Comorian taxa were introduced from Madagascar (Walsh 2007), which has unique endemic flora and fauna. In both the Comoros and Madagascar, tenrecs, lemurs, land tortoise and various birds are common, though livestock and marine resources dominate the archaeological sites.

Although terrestrial biodiversity thus varies widely, the Swahili world boasts tremendous marine life. Coral reefs protect inshore seagrass beds, mud flats and mangrove forests, with the largest mangrove expanses in western Madagascar and mainland eastern Africa (Richmond 2011). Reefs fringe the mainland coastlines and are well developed around many of the offshore and oceanic islands (Spalding *et al.* 2001). The intertidal zone is rich with invertebrates, including bivalves and gastropods, such as nerites inhabiting rocky shores, ark clams in sandy mudflats and mangrove whelks. Reef-associated fish (for example, emperors, groupers, parrotfish, jacks) are abundant at both mainland and island sites, underscoring the importance of coral reef resources. Estuary fish, such as mullets, are more frequent in the coastal mainland. Requiem sharks, typically large, fast-swimming predators that visit the reefs, are found in some archaeological sites. Marine mammals are also occasionally recovered, including dugong, which

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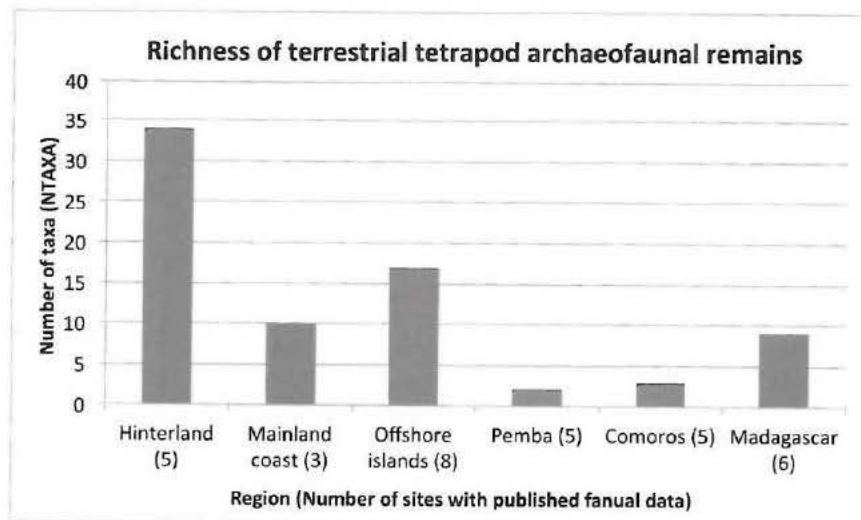


Figure 32.1 Species richness (number of taxa, NTAXA) for tetrapod fauna reported from Swahili sites from EIA to medieval period, by region. Avian and marine taxa are excluded. Richness may be biased by the number of sites studied and the sample size at each site

inhabits shallow coastal waters, and the farther-ranging bottlenose dolphin and pygmy sperm whale. More abundant are the remains of sea turtle, which may have been exploited not only for meat, but also for oil, leather or 'tortoiseshell'.

Sources of information

A longstanding focus on material culture and identification of trade locales means that zooarchaeological data have, until recently, been overlooked in coastal research agendas. As such, subsistence interpretations come mainly from taxonomic lists, often appended to site reports (Table 32.1). These lists vary in their comprehensiveness, quantification methods and use of scientific names. Samples and reference collections are not always described and illustrations are rare. These limitations make it difficult to resolve some of the questions raised below.

Faunal remains have usually been recovered via dry-sieving, commonly with 5 mm mesh that may be inadequate to recover microfauna and some fish remains; however, flotation and/or finer screens have been employed particularly in more recent excavations. There is much scope to improve taphonomic studies, as currently available reports reveal little of site formation processes and culinary practice, which might be inferred from studies of skeletal representation, breakage patterns, and bone surface modifications. Preservation varies widely, with few fauna in the lateritic soils of many Early Iron Age (EIA) sites, complex taphonomic processes in caves, and good preservation in later urban sites. Such differences must be considered when comparing data across sites. Furthermore, non-dietary uses of animals are rarely considered.

Despite these challenges, some reports are available that address not only taxonomic distribution and intrasite differences, but also implications for subsistence strategies, citing relevant ethnographic and ethnological data (Mudida and Horton in press; Mudida and Horton 1996). Indeed, there are a number of ethnographic and ethnohistoric documents on fishing (Grottanelli 1955; Prins 1965), and on foraging practices (reviewed by Walsh 2007), which offer useful interpretive frameworks. Additional information on animals in the Swahili world comes from linguistic data (Blench 2006; Nurse and Hinnebusch 1993), and historical sources ranging from the first-century CE *Periplus of the Erythraean Sea* (Casson 1989) to the fourteenth-century accounts of Ibn Batuta (Freeman-Grenville 1962; Hamdun and King 1998). While the extent to which these distinct lines of evidence coincide with the archaeological record has been extensively discussed (for example, Horton and Middleton 2000), until recently faunal data were largely absent from the debate (Boivin *et al.* 2013). Also recently, shifts in culinary practices such as those demonstrated by Walshaw (2010) for crops, have been considered for animal foods (Boivin *et al.* 2014; Fleisher *et al.* 2015). Faunal data thus are becoming an important source for understanding daily practice and social organisation, as well as geographic and diachronic variation in subsistence.

Diachronic change in subsistence strategies and animal uses

Later Stone Age and Early Iron Age coastal adaptations

Coastal occupation began in the Late Pleistocene, with LSA sites documented on Unguja – at that point still connected to the mainland – and the southern Kenyan hinterland (Chami 2009; Helm *et al.* 2012). Site occupants hunted diverse fauna typical of wooded and mixed environments. Rare fish remains at Kaumbi Cave on Unguja imply early but limited exploitation of offshore coral reefs (Chami 2009; Shipton *et al.* 2016). The appearance of domestic livestock as well as chicken (*Gallus gallus*), domestic dog (*Canis familiaris*), and possibly domestic cat

Table 32.1 Published faunal data from Swahili sites

Approximate date	Site	Region	Reference	Collection method	Total NISP		
					Tetrapod	Fish	Invertebrates
20kya-1st mil CE	Kuumbi Cave	Zanzibar	Chami 2009	NA	3793	(65)	(130)
17kya, 1st-2nd mil CE	Kuumbi Cave	Zanzibar	Shipton <i>et al.</i> in press	3 mm	6667	117	3556*
3000 BCE-1st mil CE	Machaga Cave	Zanzibar	Chami 2001	NA	670	(6)	(1257)
1st mil CE	Mwanampambe Cave	Zanzibar	Chami 2009	NA	59	(2)	(2)
1st mil BCE	Ukunju Cave	Mafia Archipelago	Chami 2004	NA	13	(1)	17 (10)
7th-10th	Ukunju Cave	Mafia Archipelago	Crowther <i>et al.</i> 2014	3 mm/1 mm	22	20 (134)	P
EIA	Juani Primary School	Mafia Archipelago	Chami 2004	NA	82 (90)	12 (15)	124 (6)
4th-6th, 9th-12th	Juani Primary School	Mafia Archipelago	Crowther <i>et al.</i> in press	3 mm/1 mm	94	292	1838*
(1st mil BCE?), 7th/15th	Kinunda Cave	Mafia Archipelago	Chami 2004	NA	13	3 (14)	2 (118)
6th-8th	Fukuchani	Zanzibar	Mudida and Horton in press	5 mm	122	19 (1)	P
7th-10th	Unguja Ukuu	Zanzibar	Mudida and Horton in press	5 mm	254	380 (4)	P
7th/8th	Mpiji	Tanzania	Chami 1994	NA	465	130 (890)	6703
7th/8th	Mgomhani	Kenya hinterland	Helm 2000	4 mm	42		22
8th-12th, 15th-17th	Unguja Ukuu	Zanzibar	Juma 2004	3 mm	1287	(633)	(4)
8th-13th	Pate	Lamu Archipelago	Wilson and Omar 1997	NA	P	P	2187
8th-15th	Shanga	Lamu Archipelago	Mudida and Horton 1996	5 mm	3000	5999	1246
8th-18th	Chibweni	Mozambique	Badenhorst <i>et al.</i> 2011	NA	192	99 (812)	14 (24)
8th/9th	Koungou	Mayotte, Comoros	Allibert and Vénin 1996	NA	P		
8th/10th	Mteza	Kenya hinterland	Helm 2000	4 mm	74	4	63
8th/10th	Chombo	Kenya hinterland	Helm 2000	4 mm	721	9	39
9th-10th	Dembeni	Mayotte, Comoros	Wright <i>et al.</i> 1984	6 mm	101	10 (295)	P
9th-10th	Sima	Ndzuwani, Comoros	Wright <i>et al.</i> 1984	6 mm	21	13 (422)	P
9th-10th	M'bachile	Ngazidja, Comoros	Wright <i>et al.</i> 1984	6 mm	35	5 (195)	P
9th-11th	Bandarikuu	Pemba	Fleisher 2003	5 mm		1	108
9th-14th	Mtambwe Mkuu	Pemba	Mudida and Horton in press	5 mm	310	43 (15)	P
9th-16th	Ras Mkumbuu	Pemba	Mudida and Horton in press	5 mm	302	25 (5)	P
10th-11th	Dembeni	Mayotte, Comoros	Allibert <i>et al.</i> 1989	NA	417	(178)	11
10th-13th	Andaro	S Madagascar	Parker Pearson 2010	NA	176		P
10th-14th	Manda	Lamu Archipelago	Chittick 1984	hand collected	P	P	P
10th-15th	Mahilaka	NW Madagascar	Radimilahy 1998	2 mm	515*	(56)*	68* (41)*
			Radimilahy 2005	NA	78	P	P

9th-10th	Sina	Mayotte, Comoros	Wright <i>et al.</i> 1984	6 mm	101	9	39
9th-10th	M'bachile	Ndzuwani, Comoros	Wright <i>et al.</i> 1984	6 mm	21	10 (295)	P
9th-11th	Bandarikuu	Ngazidja, Comoros	Wright <i>et al.</i> 1984	6 mm	35	13 (422)	P
9th-14th	Mtambwe Mkuu	Pemba	Fleisher 2003	5 mm		5 (195)	P
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10th-15th	Mahilaka	NW Madagascar	Radimilahy 1998	2 mm	515*	(56)*	68* (41)*
10th-16th/17th	Andranosoa	S Madagascar	Rakotozafy and Goodman 2005	NA	78	P	P
11th-13th	Talaky	S Madagascar	Parker Pearson 2010	1 mm		P	P
11th-15th	Sina	Nzwani, Comoros	Wright 1992	6 mm	306	41 (285)	P
11th-15th	Domoni	Nzwani, Comoros	Wright 1992	6 mm	210	19 (126)	P
11th-15th	Chiyaka	Pemba	Fleisher 2003	5 mm	1370	568 (465)	(402)
12th	Kizimkazi	Zanzibar	Van Neer 2001	5 mm	331	1075 (1249)	7155
12th-14th	Amphijohike	S Madagascar	Parker Pearson 2010	5 mm	9906		
12th-14th	Tumbatu	Zanzibar	Mudida and Horton in press	5 mm	924	538 (4)	P
12th-14th	Chansvehela	Tanzania	Chami 1994	NA			88
12th/13th	Kaole Ruins	Tanzania	Chami 2002	NA	581	30 (2085)	P
13th-14th	Nasy Be	NW Madagascar	Dewar and Wright 1993	NA	P	P	P
13th-15th	Rezoky	S Madagascar	Rakotozafy and Goodman 2005	NA	127		
13th-15th	Mduuni	Pemba	Fleisher 2003	5 mm	100	44 (13)	
14th-15th	Kaliwa	Pemba	Fleisher 2003	5 mm	271	2011 (586)	769
14th-16th	Asambakily	S Madagascar	Rakotozafy and Goodman 2005	NA	1		
14th-16th	Songo Mnara	Tanzania	Quintana Morales 2013	2 mm	304 (155)	3274	P
14th-16th	Vumba Kun	Kenya	Quintana Morales 2013	5 mm	548 (251)	1194	P
14th-16th	Kua	Mafia Archipelago	Christie 2011	0.5-3 mm	844	184 (1846)	2227 (337)
14th/15th	Mtsengo	Kenya hinterland	Helm 2000	4 mm	1825	66	17
15th	Belo-sur-Mer	S Madagascar	Rakotozafy and Goodman 2005	NA	1	P	
15th/17th	Mburyuni	Kenya hinterland	Helm 2000	4 mm	997	16	36
(EIA?) and 15th	Male Cave	Ngazidja, Comoros	Chami 2009	NA	18	(1)	(4)

* Data published as MNI; P=present but not quantified; Number in parentheses=count of unidentified remains within category

(*Felis catus*), argued to date to the third to first millennia BCE in some caves, is much debated, and recent research has challenged interpretations of 'Neolithic' contexts (Chami 2004, 2009; cf. Crowther *et al.* 2014; Prendergast *et al.* 2016; Shipton *et al.* 2016).

Clear evidence for domestic animals comes only at the end of the EIA in the sixth century CE, or later in the Middle Iron Age (MIA; seventh–tenth centuries CE), with earlier EIA sites plagued by poor preservation and/or dating problems. For example, at Kwale in southern Kenya no fauna were preserved (Soper 1967), while at nearby Mgombani, caprines, cattle and chicken are associated with EIA material culture but at a seventh-century date (Helm *et al.* 2012). While EIA sites have been documented along the Tanzanian coast and islands (for example, Chami 1994; Chami and Msemiwa 1997), few report faunal remains, with the exception of Juani Primary School (Mafia), which shows the first clear evidence of extensive marine exploitation, but no unambiguous evidence of livestock (Chami 2004; Crowther *et al.* in press). Thus the arrival and nature of early herding on the coast and islands, and the relationships among food producers, foragers and the marine environment during the EIA, remain poorly understood. However, the implications are tremendous, given debate on Swahili origins and the influence of Southern Cushitic and Bantu language speakers on the coast, who are traditionally associated with pastoralist and farming economies, respectively (Helm 2000; Horton and Middleton 2000). Research on this topic is hampered by the persistence of divisions – even at contemporaneous sites – between 'LSA foragers' and 'EIA agro-pastoralists' that tend to conflate material culture, subsistence, and social and linguistic identities.

Another contested topic is the earliest occupation of Madagascar and Holocene-era extinctions of endemic taxa. Putative cut marks on bones of extinct hippopotamus and lemur date to the third and first millennia BCE respectively, without associated archaeological finds (Gommery *et al.* 2011; Pérez *et al.* 2003). Recent arguments for a foraging occupation by 2000 BCE, long before the arrival of MIA farmers in the mid-first millennium CE, are based primarily on lithic technology and associated OSL dates (Dewar *et al.* 2013). In the Comoros, lithic technology and EIA ceramics have been reported (Chami 2009), raising the possibility of a pre-MIA occupation. Further research will surely shed light on the timing and nature of early occupations in Madagascar and Comoros and the impacts on animal populations.

Subsistence strategies in early coastal towns during the Middle Iron Age (seventh to tenth centuries CE)

By the mid to late first-millennium, coastal and island towns stretching from Lamu to Mozambique – such as Manda, Shanga, Tumbe, Unguja Ukuu and Chibuene – are well established and show clear evidence for food production, as well as reliance on wild and marine resources (Table 32.1). In the Comoros, many 'Dembeni Phase' sites – Sima, Dembeni, M'Bachile and Koungou – similarly show a reliance on domestic and marine resources. Throughout the coast and islands, livestock are mainly caprines (when distinguished, usually goat), except on Pemba and Mayotte, where cattle dominate. However, there are some open-air MIA settlements that have very little evidence of herding, for example Fukuchani on Unguja (Mudida and Horton in press), and the contemporaneous coastal and hinterland sites of Mpiji (Chami 1994) and Chombo and Mteza (Helm 2000). MIA-era cave deposits on Unguja and in the hinterland also have almost exclusively wild fauna (Chami 2009; Helm *et al.* 2012; Prendergast *et al.* 2016). Whether these assemblages represent foraging populations in contact with food producers and/or special-purpose sites used by food producers remains a topic for exploration.

At many late first-millennium coastal and island towns, such as Shanga, Mpiji, Chibuene, and Unguja Ukuu, fishing was a major economic activity. In the Comoros, the sites of Sima,

M'Bachile and Dembeni. In fact, detailed taxonomic samples of fewer than 100 during this period from many of these coastal towns may be inflated by the importance of thousands of numbers of marine fish (Helm 2000) indicating

The presence of shellfish is well documented. However, large quantities of shellfish from the millennium at Mpiji, the shore. At Pate, where these are only Shanga there are large *Murex* shells, although common of the limit (2010), and these are or other symbolic value species found at archaeological sites are regarded as a hardy mangrove whelk, ma

Animals in t

The turn of the millennium changes such as trade from a viewpoint, which becomes visible impact on food (2015) and Boivin *et al.* trapping declines, with in the hinterland, with (Helm 2000). Domestic household food in urban the cats that likely produce (et al. 2011; Juma 2000) dance in this period in good grazing areas to changing preferences might speculate that climate allowed for demands, including respect to the use of might have been to produce crossbreeds relatively disease-resistant zooarchaeological or might also have led

M'bachile and Dembeni have large proportions of fish remains, many not identified to taxon. In fact, detailed taxonomic data on fish remains is sparse for this period, with most sites reporting samples of fewer than 100 identified fish remains. From the data available it is evident that during this period fishers targeted a wide range of inshore and especially reef-associated fish. Many of these coastal and island sites also have high numbers of sea turtle remains: while numbers may be inflated by fragmentation and distinctiveness of the carapace, this might also reflect the importance of turtle secondary products to a burgeoning trade economy. In contrast, small numbers of marine fish and shellfish at the contemporaneous site of Chombo in southern Kenya (Helm 2000) indicate that hinterland populations relied less heavily on marine resources.

The presence of shellfish is noted at most sites, although invertebrates often remain unanalysed. However, large samples of identified marine bivalves and gastropods from the late first millennium at Mpiji, Pate and Shanga demonstrate the importance of shellfish gathering along the shore. At Pate, the mangrove whelk dominates the assemblage, as is the case at Mpiji, where these are only surpassed in number by crown conchs, found in sand and seagrass flats. At Shanga there are large numbers of sandy/seagrass-living *Strombus* shells and rocky/reef-dwelling *Murex* shells, although cowries dominate the sample. Interestingly, cowries are among the most common of the limited marine invertebrates reported at hinterland sites (Helm 2000; Walz 2010), and these are not known as good food resources, but rather may have had decorative or other symbolic value (see discussion below on non-dietary uses). The majority of shellfish species found at archaeological sites, nonetheless, are suitable for eating, although today they are regarded as a hardship food (Fleisher 2003; Msemwa 1994), and some species, such as the mangrove whelk, may also have served as fishing bait (Christie 2011; Radimilahy 1998).

Animals in the Swahili urban world (eleventh to fifteenth centuries CE)

The turn of the millennium saw a rise in large urban centres along the coastline, linked to other changes such as trade intensification, increased social stratification and a more intently maritime viewpoint, which become defining features of Swahili society. This social reorganisation has a visible impact on food choices and consumption practices, as recently discussed by Fleisher *et al.* (2015) and Boivin *et al.* (2014). On the coast and offshore islands, evidence for hunting and trapping declines, with a majority of sites having only marine and domestic fauna (Figure 32.2); in the hinterland, wild resources remain significant but decline in relation to domestic ones (Helm 2000). Domesticates now include not only livestock, but also chicken, which is a typical household food in urban environments. Commensal species such as black rats (*Rattus rattus*), and the cats that likely pursued them, also appear in Swahili urban sites (for example, Badenhorst *et al.* 2011; Juma 2004; Mudida and Horton 1996). Among livestock, cattle increase in abundance in this period (Figure 32.3); however, this is primarily due to the presence of new sites in good grazing areas such as Pemba (Fleisher 2003; Mudida and Horton in press), rather than to changing preferences at formerly caprine-dominated sites (but see Helm 2000). In fact, we might speculate that Pemba was settled more intensively at this time precisely because its wetter climate allowed for better grazing. A focus on cattle could have been prompted by new social demands, including feasting, an issue discussed by Fleisher (2010) and Walshaw (2010) with respect to the use of large open bowls and increased rice consumption. Such increased demand might have been met by the introduction of zebu cattle, which together with local taurines produce crossbreeds that are able to thrive and produce milk on less water, and which are relatively disease-resistant (Marshall 1989). However, this remains conjectural in the absence of zooarchaeological or genetic data confirming the date of arrival of zebu. Vegetation clearance might also have led to better grazing for Unguja, and could be linked to the observed decline

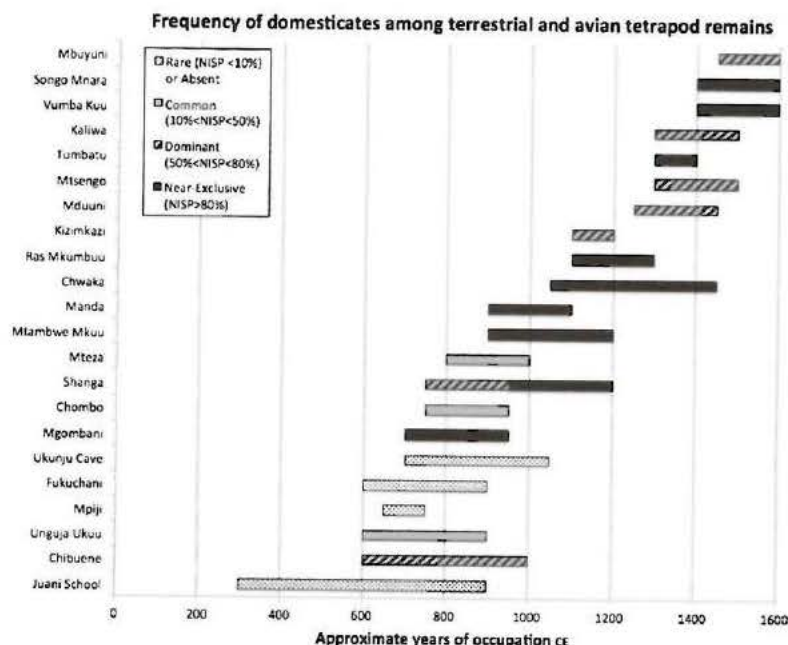


Figure 32.2 Frequency of domesticates among terrestrial and avian tetrapod remains at Swahili sites, excluding Comoros and Madagascar. NISP data include all identified terrestrial and avian tetrapods, and exclude marine animals and fauna not identified to taxon (for example, 'small mammal'). See Table 32.1 for site references

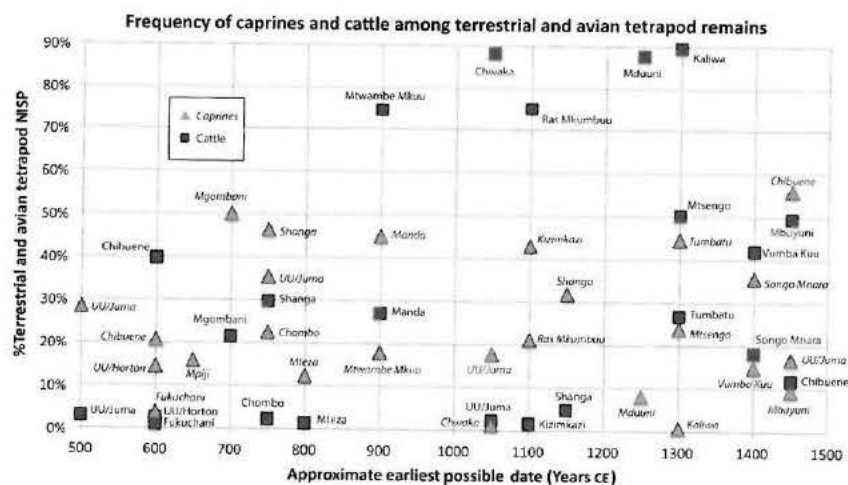


Figure 32.3 Relative abundance of caprines and cattle at Swahili sites, excluding Comoros and Madagascar. NISP data include all identified terrestrial and avian tetrapods, and exclude marine animals and fauna not identified to taxon (for example, 'small mammal'). Where data could be separated by phase, the site appears multiple times; this applies to Chibuene, Shanga and Unguja Ukuu. See Table 32.1 for site references

in consumption of food from local palaeoecological evidence of sheep and goat; however, by the fifteenth century, according to some, might trace this development.

On the Comoros, second-millennium CE sites with cattle – including zebu – are rare (2010; Radimilahy 1999). Even minimal, with occasional evidence, important, particularly at the Malagasy coastal towns. In the Comoros, it appears that

Fishing and shellfishing were important to African coastal settlements, compared with other regions. As to the vast majority at Kizimkazi, and the village at sites with available evidence, decreases into the second millennium. Mtsengo and Mbuyuni also include some freshwater shells found 150 km from the coast.

The focus on coastal sites in the second millennium; however, sites that have higher frequencies of domesticates (Figure 32.4). Ethnographic evidence pulling a baited fishing line, predators beyond the importance of domesticates (Mudida 1993; Mudida and Omukotu 2011). occupation levels, around 1000 CE (Badenhorst *et al.* 2011). In later periods, socioeconomic hierarchy and economic power required for domestic practice (Quintana Melus 2011). this region (Nakamura 2011). Mnara retrieved higher frequencies from mud-thatch houses of high status respectively (Quintana Melus 2011). faunal analysis (for example, within settlements can be used to trace political interactions and



Figure 32.3. Frequency of fish and fish bone remains at Swahili sites, 1400–1600 AD. (Note: This figure is a simplified representation of the data shown in the original image.)



Figure 32.4. Distribution of shark remains in the Comoros and Madagascar, 1400–1500 AD. (Note: This figure is a simplified representation of the data shown in the original image.)

in consumption of forest-dwelling wild taxa; yet this too is speculative, given the paucity of local palaeoecological data. Finally, it is impossible on present data to examine changing ratios of sheep and goat; however, sheep were an important part of coastal social exchanges by the fifteenth century, according to Vasco de Gama (Freeman-Grenville 1962), and future research might trace this development back in time, perhaps using biomolecular techniques.

On the Comoros, similar shifts in livestock are imperceptible due to small sample sizes for second-millennium contexts. However, on Madagascar there are many early to mid-second-millennium sites with faunal records that demonstrate the importance of both caprines and cattle – including zebu – to the domestic economy (Dewar and Wright 1993; Parker Pearson 2010; Radimilahy 1998; Rakotozafy and Goodman 2005). Reliance on wild resources is minimal, with occasional lemur, tenrec, tortoise and bird remains. Marine resources remain important, particularly at seasonal fishing camps along the coastline, such as Talaky. At the Malagasy coastal town of Mahilaka, the presence of fish is noted along with a small number of pearl oysters, oysters and mangrove whelk. Based on the small samples of identified fish in the Comoros, it appears that a focus on reef fishing continues in this area.

Fishing and shellfish gathering also remain important, although to varying degrees, at eastern African coastal settlements, despite increased food production. The relative frequency of fish compared with other vertebrates is variable among settlements, ranging from around one-third to the vast majority at the towns of Mduuni, Chwaka, Tumbatu, Vumba Kuu, Songo Mnara and Kizimkazi, and the village of Kaliwa. Shellfish gathering persists as an important activity, although at sites with available diachronic data, Shanga and Pate, the frequency of invertebrate remains decreases into the second millennium. Fish continue to be rare in hinterland sites, as seen at Mtsengo and Mbuyuni (Helm 2000), where taxa mirror those exploited on the nearby coast, but also include some freshwater species. Further south at Gonja Maore, numerous pierced marine shells found 150 km from the coast (Walz 2010) indicate ties between coastal and inland peoples.

The focus on coastal inshore fishing, particularly around coral reefs, continues into the second millennium; however, a tendency to venture farther from shore is visible at several towns that have higher frequencies of shark remains than those recorded for the first millennium (Figure 32.4). Ethnohistorical records document the use of large-mesh *jarife* nets and trolling – pulling a baited fishing line through the water – to target these often large, fast-swimming predators beyond the reefs (Prins 1965, Quintana and Horton 2014). At Shanga the rising importance of domestic animals overlaps with an increased exploitation of shark (Horton and Mudida 1993; Mudida and Horton 1996) and the presence of more deep-water taxa (McClanahan and Omukotu 2011). A similar pattern occurs at Chibuene, with more shark remains in the late occupation levels, around the fourteenth century, than in the first-millennium occupation levels (Badenhorst *et al.* 2011). The high percentage of shark at the EIA occupation at Juani is associated with the earliest evidence of sustained use of marine resources in the region (Crowther *et al.* in press). In later periods, shark remains are especially abundant at larger towns with evidence of socioeconomic hierarchy, hinting at a possible connection between shark fishing and the economic power required to invest in more expensive equipment and a larger crew for this fishing practice (Quintana Morales and Horton 2014), a dynamic seen in recent fishing populations in this region (Nakamura 2011). Furthermore, systematic excavations across the town of Songo Mnara retrieved higher numbers of shark and large-sized fish in deposits from coral houses than from mud-thatch houses, which are associated with higher and lower levels of socio-economic status respectively (Quintana Morales 2013). There is limited comparative data on intra-site faunal analysis (for example, Christie 2011), but further research on the distribution of resources within settlements can provide a more nuanced picture of animals' roles in past daily social and political interactions among inhabitants.

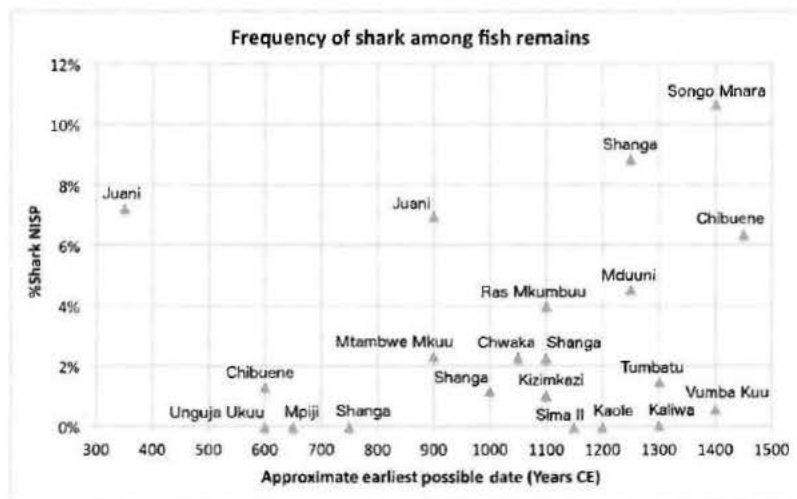


Figure 32.4 Relative abundance of shark remains at Swahili sites. Excludes samples with fewer than 25 NISP. Where data could be separated by phase, the site appears multiple times; this applies to Chibuene, Shanga and Juani. See Table 32.1 for site references.

Themes in Swahili zooarchaeology: areas for further research

Subsistence technologies

Recent studies of Swahili technology focus on ceramics and their implications for food preparation, consumption and social relations (for example, Fleisher 2010; Walshaw 2010; Wynne-Jones 2007). However, we can infer that a number of perishable procurement technologies are absent from the archaeological record and thus from discourse on human-animal interactions. Most of the terrestrial game found at Swahili coast sites are <10 kg and could have been trapped by combining excavated pits with wood- or fibre-based items. Fortunately, there are some ethnographic analogues that can inspire thinking about archaeologically invisible technologies. For example, Ingrams (1931) describes the use of pit-traps, wooden traps and snares on Unguja, where Williams *et al.* (1996) also record more recent use of palm-fibre nets. For marine turtles and mammals, spears were likely used, as attested by a pierced sea turtle bone from Unguja Ukuu (Prendergast and Quintana Morales unpublished data). Similarly, for Swahili fishers many factors would have determined the choice of gear, including fish size, local habitats and fisher's skill. Ethnoarchaeological and ethnohistorical records for the region document recent use of basket traps, weirs, nets, lines and spears, among other gears (Glaeser 1997; Grottanelli 1955; Prins 1965; Quintana Morales 2013). Fishing lines and hooks are well suited to capture bottom-dwelling carnivorous fish like groupers, emperors and snappers. Baited traps attract small to medium-sized herbivores, including parrotfish and rabbitfish, whereas spears target larger individuals of these species. Fishing nets are generally less selective. Many of these tools are made of perishable materials; however, a small number of fishing tools, mainly iron hooks, have been recovered at several sites on the coast, offshore islands and Madagascar (Chami 1994; Fleisher 2003; Fleisher and LaViolette 2013; Horton 1996; Parker Pearson 2010; Radimilahy 1998).

Although zooarchaeo animal products were materials, and symbol literally, in the very water coral, *Porites* sp. and blocks for mosque into walls and burned occurrence, ornament sites (for example, Ch ambergris, 'tortoisesh century CE (Casson 19 species *Monetaria mon trade in the eighteenth colonial coastal and hi it is not clear if they graphic (Donley 1987) demonstrate animals' s*

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Non-dietary uses of animals

Although zooarchaeological discourse has focused largely on food provisioning, animals and animal products were critical to other areas of Swahili life; for example, as trade goods, raw materials, and symbolic and ritual tokens. An important animal resource that is embedded, literally, in the very structure of Swahili architecture is coral. The non-branching, shallow-water coral, *Porites* sp., was extracted from the sea and moulded into intricately carved pieces and blocks for mosques and houses (Horton 1996). Fossil coral rocks (coral rag) were built into walls and burned to produce lime for mortar and plaster. On a smaller scale in size and occurrence, ornaments such as bone, shell and ivory beads have been excavated from Swahili sites (for example, Chittick 1984; Horton 1996; Juma 2004). Traded animal products, such as ambergris, 'tortoiseshell' and ivory, are mentioned in travellers' logs from as early as the first century CE (Casson 1989; Freeman-Grenville 1962). Cowries, in particular the Indian Ocean species *Monetaria moneta*, circulated widely as currency across Africa at the height of the slave trade in the eighteenth century (Hogendorn and Johnson 2003). Evidence of cowries at pre-colonial coastal and hinterland sites demonstrates the importance of these objects for trade, but it is not clear if they were used as money. Archaeological (Wynne-Jones 2013) and ethnographic (Donley 1987) examples of animal offerings in the foundations of Swahili houses further demonstrate animals' symbolic value.

Animals and exchange

Many of the abovementioned traded animal products were moved from the continental interior to the coast and islands before moving onward to the Indian Ocean interaction sphere. Later sites and ethnohistoric data suggest that foragers played a key role, particularly in exchanges involving ivory or rhinoceros horn (Kusimba 2003). Future research may use faunal data to illuminate these connections between inland, hinterland and coastal communities. These ties have traditionally been less emphasised than those between the coast and the maritime world, with the exceptions usually focused on material culture (for example, Abungu and Mutoro 1993; Helm 2000; Kusimba 1999; Wright 2005).

While eastern Africa provided key animal products to an expanding Old World trade, a number of Asian animals were also introduced to the continent, with significant impacts (Boivin *et al.* 2013). Two introduced taxa already discussed, zebu cattle and chicken, have made important contributions to mobile pastoralist and village household economies, respectively. Commensals including black rat and house mouse (*Mus musculus*) were also introduced, and their potentially negative impacts on endemic vegetation and fauna, and the spread of disease, are areas ripe for research. Finally, cats, while northeast African and Asian in origin, may have been first introduced to the coast via ships, where they would have served as pest control.

Due to the difficulty of distinguishing zebu and taurine cattle bones, and the paucity of microfaunal data, little can be said about some of these introductions from published datasets, though zebu are reported from the hinterland and Zanzibar in the early second-millennium (Helm 2000; Van Neer 2001), and slightly earlier on Madagascar (Radimilahy 1998; Rakatozafy and Goodman 2005). Camels (*Camelus dromedarius*) also appear in the early second millennium (Chittick 1984; Mudida and Horton in press; Mudida and Horton 1996; Wilson and Omar 1997) and might, like increased rice consumption (Walshaw 2010), indicate shifting cultural identities on the coast and an orientation toward the maritime world. It is notable that camels, despite their advantages in arid climates, never gained traction beyond the coast and a handful



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of inland areas, likely due to their incompatibility with the interests and cultural traditions of cattle pastoralists (Marshall 2000); by contrast, taurine-indicine cattle crossbreeds are widespread, given their advantages noted earlier. Investigations on the inland dispersals of zebu and chicken could ultimately shed important light on Swahili coast-interior relationships.

Conclusion

A growing body of zooarchaeological data provides evidence of the myriad ways in which animals were integrated into the Swahili world. Whether in the form of worked raw materials, as trade goods or regular meals, animals and their products were essential to the economies of Swahili towns and villages, the daily lives of their inhabitants, and the regional and global networks in which they operated. Through the interaction of coastal and hinterland populations, marine shells travelled far inland while rhinoceros horn and elephant ivory reached the coastlines to be traded, along with marine turtle shell, across the Indian Ocean. Other animals, like cats and black rats, likely arrived to the coast aboard the ships of overseas traders. The earliest coastal populations subsisted on local wild fauna, hunting small terrestrial game, fishing at nearby reefs and collecting shellfish along the shoreline. While marine resource use prevailed alongside food production, the capture of wild terrestrial animals diminished over time. Livestock herding occurred from at least the sixth century CE, followed by the integration of chickens as large urban centres emerged along the coastlines. Important shifts in animal-based food subsistence practices are connected to the changing social arena between the first and second millennia CE. With growing urbanisation, intensified trade and increased social stratification, among other key changes, terrestrial economies became more focused on domesticated animals and marine exploitation expanded farther from shore. It is our hope that this brief summary of animal uses in the Swahili world demonstrates the value of the study of faunal archaeological material and provides impetus for further studies in this area.

References

- Abungu, G. and Mutoro, H. 1993. 'Coast-interior settlements and social relations in the Kenya coastal hinterland'. In *The Archaeology of Africa: Food, Metals and Towns*, edited by T. Shaw, P. Sinclair, B. Andah and A. Okpoko, 694–704. London: Routledge.
- Allibert, C., Argant, A. and Argant, J. 1989. 'Le site de Dembeni (Mayotte, Archipel des Comores), Mission 1984'. *Etudes Océan Indien* 11: 63–172.
- Allibert, C. and Verin, P. 1996. 'The early pre-Islamic history of the Comores Islands: links with Madagascar and Africa'. In *The Indian Ocean in Antiquity*, edited by J. Reade, 417–38. London: Kegan Paul.
- Badenhorst, S., Sinclair, P., Ekblom, A. and Plug, I. 2011. 'Faunal remains from Chibucue, an Iron Age coastal trading station in Central Mozambique'. *Southern African Humanities* 23 (1): 1–15.
- Blench, R. 2006. *Archaeology, Language, and the African Past*. Lanham: AltaMira Press.
- Boivin, N., Crowther, A., Helm, R. and Fuller, D. Q. 2013. 'East Africa and Madagascar in the Indian Ocean world'. *Journal of World Prehistory* 26 (3): 213–81, doi:10.1007/s10963-013-9067-4.
- Boivin, N., Crowther, A., Prendergast, M. E. and Fuller, D. Q. 2014. 'Indian Ocean food globalisation and Africa'. *African Archaeological Review* 1–35, doi:10.1007/s10437-014-9173-4.
- Burgess, N. D. and Clarke, G. P. (Eds) 2000. *Coastal Forests of Eastern Africa*. Gland, Switzerland: IUCN Forest Conservation Programme.
- Casson, L. 1989. *The Periplus Maris Erythraei*. Princeton; Guildford: Princeton University Press.
- Chami, F. A. 1994. *The Tanzanian Coast in the First Millennium AD: An Archaeology of the Iron-Working, Farming Communities*. Vol. 7. Uppsala: Societas Archaeologica Upsaliensis.
- Chami, F. A. 2001. 'The archaeology of the Rufiji region since 1987 to 2000: coastal and interior dynamics from AD 00 to 500'. In *People, Contacts and the Environment in the African Past*, edited by F. A. Chami, G. Pwiti and C. Radimilahy, 7–20. Dar es Salaam: University of Dar es Salaam Press.

- Chami, F. A. 2002. 'The ...
F. A. Chami and G. Pwiti
Chami, F. A. 2004. 'The ar
Reports and Views, Stud
73–101. Dar es Salaam:
Chami, F. A. 2009. *Zanzib*
Publishing.
- Chami, F. A. and Msemwa
Anthropology 38 (4): 673
Chittick, N. H. 1984. *Man*
Eastern Africa.
- Christie, A. 2011. 'Explo
Tanzania: an archaeology
Crowther, A., Faulkner, P.
2016. 'Coastal subsiste
African prehistory'. *Jou*
16.1188334.
- Crowther, A., Horton, M.
et al. 2014. 'Iron Age
dence from Ukunju C
70X.2013.878104.
- Dewar, R. E. and Wright
7 (4): 417–66, doi:10.1
Dewar, R. E., Radimilahy
and foraging in northe
Academy of Sciences U.S.
- Donley, L. W. 1987. 'Life
assemblages'. *African A*
- Fleisher, J. B. 2003. 'Vie
regional systems, AD 8
Fleisher, J. 2010. 'Rituals
700–1500'. *Journal of I*
- Fleisher, J. and LaViolette
AD 600–950'. *Antiquit*
- Fleisher, J. B., Lane, P., L
did the Swahili becom
Freeman-Grenville, G. S.
Nineteenth Century, O
- Glaeser, H. 1997. 'Fisher
decline and protection
Gommery, D., Ramanivo
on subfossil hippopot
10 (4): 271–8.
- Grottanelli, V. L. 1955.
dell'Oltregiuba. Roma:
Hamdun, S. and King, N.
Helm, R. M. 2000. 'Con
the central and south
Helm, R. M., Crowther
culture, interaction an
Archaeological Research
- Hogendorn, J. and John
University Press.
- Horton, M. 1996. *Shang*
London: British Instit
Horton, M. and Middle
Malden: Blackwell Pu

- Chami, F. A. 2002. 'The excavation of Kaole Ruins'. In *Southern Africa in the Swahili World*, edited by F. A. Chami and G. Pwiti, 25–49. Dar es Salaam: University of Dar es Salaam Press.
- Chami, F. A. 2004. 'The archaeology of the Mafia Archipelago, Tanzania'. In *African Archaeology Networks: Reports and Views, Studies in the African Past 4*, edited by F. Chami, G. Pwiti and C. Radimilahy, 73–101. Dar es Salaam: University of Dar es Salaam Press.
- Chami, F. A. 2009. *Zanzibar and the Swahili Coast from c. 30,000 Years Ago*. Dar es Salaam: E&D Vision Publishing.
- Chami, F. A. and Msemwa, P. J. 1997. 'A new look at culture and trade on the Azanian coast'. *Current Anthropology* 38 (4): 673–7.
- Chittick, N. H. 1984. *Manda: Excavations at an Island Port on the Kenya Coast*. Nairobi: British Institute in Eastern Africa.
- Christie, A. 2011. 'Exploring the social context of maritime exploitation in the Mafia Archipelago, Tanzania: an archaeological perspective'. PhD diss., University of York.
- Crowther, A., Faulkner, P., Prendergast, M. E., Quintana Morales, E., Horton, M. C., Wilmsen, E., et al. 2016. 'Coastal subsistence, maritime trade, and the colonization of small offshore islands in eastern African prehistory'. *Journal of Island and Coastal Archaeology* 11 (2): 211–37, doi:10.1080/15564894.2016.1188334.
- Crowther, A., Horton, M., Kotarba-Morley, A., Prendergast, M. E., Quintana Morales, E., Wood, M., et al. 2014. 'Iron Age agriculture, fishing and trade in the Mafia Archipelago, Tanzania: new evidence from Ukunju Cave'. *Azania: Archaeological Research in Africa* 49 (1): 21–44, doi:10.1080/0067270X.2013.878104.
- Dewar, R. E. and Wright, H. T. 1993. 'The culture history of Madagascar'. *Journal of World Prehistory* 7 (4): 417–66, doi:10.1007/BF00997802.
- Dewar, R. E., Radimilahy, C., Wright, H. T., Jacobs, Z., Kelly, G. O. and Berna, F. 2013. 'Stone tools and foraging in northern Madagascar challenge Holocene extinction models'. *Proceedings of the National Academy of Sciences USA* 110: 12583–8.
- Donley, L. W. 1987. 'Life in the Swahili town house reveals the symbolic meaning of spaces and artefact assemblages'. *African Archaeological Review* 5 (1): 181–92, doi:10.1007/BF01117092.
- Fleisher, J. B. 2003. 'Viewing stonetowns from the countryside: an archaeological approach to Swahili regional systems, AD 800–1500'. PhD diss., University of Virginia.
- Fleisher, J. 2010. 'Rituals of consumption and the politics of feasting on the eastern African coast, AD 700–1500'. *Journal of World Prehistory* 23 (4): 195–217, doi:10.1007/s10963-010-9041-3.
- Fleisher, J. and LaViolette, A. 2013. 'The early Swahili trade village of Tumbi, Pemba Island, Tanzania, AD 600–950'. *Antiquity* 87: 1151–68.
- Fleisher, J. B., Lane, P., LaViolette, A., Horton, M., Pollard, E., Quintana Morales, E., et al. 2015. 'When did the Swahili become maritime?'. *American Anthropologist* 117 (1): 100–15, doi:10.1111/aman.12171.
- Freeman-Grenville, G. S. P. 1962. *The East African Coast: Select Documents from the First to the Earlier Nineteenth Century*. Oxford: Clarendon Press.
- Glacel, H. 1997. 'Fishers, parks, and power: the socio-environmental dimensions of marine resource decline and protection on the Kenya Coast'. PhD diss., University of Wisconsin.
- Gommery, D., Ramanivosoa, B. and Faure, M. 2011. 'Oldest evidence of human activities in Madagascar on subfossil hippopotamus bones from Anjoihibe (Mahajanga Province)'. *Comptes Rendus Palevol*, 10 (4): 271–8.
- Grottanelli, V. L. 1955. *Pescatori dell'Oceano Indiano; saggio etnologico preliminare sui Bagini, Bantu costieri dell'Oltregiuba*. Roma: Cremonese.
- Hamdun, S. and King, N. 1998. *Ibu Battuta in Black Africa*. Princeton: Markus Wiener.
- Helm, R. M. 2000. 'Conflicting histories: the archaeology of the iron-working, farming communities in the central and southern coast region of Kenya'. PhD diss., University of Bristol.
- Helm, R. M., Crowther, A., Shipton, C., Tengeza, A., Fuller, D. and Boivin, N. 2012. 'Exploring agriculture, interaction and trade on the eastern African littoral: preliminary results from Kenya'. *Azania: Archaeological Research in Africa* 47 (1): 39–63, doi:10.1080/0067270X.2011.647947.
- Hogendorn, J. and Johnson, M. 2003. *The Shell Money of the Slave Trade*. Cambridge: Cambridge University Press.
- Horton, M. 1996. *Shanga: The Archaeology of a Muslim Trading Community on the Coast of East Africa*. London: British Institute in Eastern Africa.
- Horton, M. and Middleton, J. 2000. *The Swahili: The Social Landscape of a Mercantile Society*. Oxford: Malden: Blackwell Publishers.

- Horton, M. and Mudida, N. 1993. 'Exploitation of marine resources: evidence for the origin of the Swahili communities of East Africa'. In *Archaeology of Africa: Food, Metals, and Towns*, edited by T. Shaw, P. Sinclair, B. Andah and A. Okpoko, 673–93. London; New York: Routledge.
- Ingraham, W. H. 1931. *Zanzibar: Its History and Its People*. London: Cass.
- Juma, A. 2004. *Unguja Ukuu on Zanzibar: An Archaeological Study of Early Urbanism*. Uppsala: Uppsala University.
- Kusinba, C. M. 1999. *The Rise and Fall of Swahili States*. Walnut Creek: AltaMira Press.
- Kusinba, S. B. 2003. *African Foragers: Environment, Technology, Interactions*. Walnut Creek: AltaMira Press.
- Marshall, F. 1989. 'Rethinking the role of *Bos indicus* in sub-Saharan Africa'. *Current Anthropology* 30: 235–40.
- Marshall, F. 2000. 'The origins and spread of domestic animals in East Africa'. In *Origins and Development of African Livestock: Archaeology, Genetics, Linguistics and Ethnography*, edited by R. Blench and K. C. MacDonald, 191–221. London: UCL Press.
- McClanahan, T. R. and Omukoto, J. O. 2011. 'Comparison of modern and historical fish catches (AD 750–1400) to inform goals for marine protected areas and sustainable fisheries'. *Conservation Biology* 25 (5): 945–55, doi:10.1111/j.1523-1739.2011.01694.x.
- Msemwa, P. J. 1994. 'An ethnoarchaeological study on shellfish collecting in a complex urban setting'. PhD diss., Brown University.
- Mudida, N. and Horton, M. 1996. 'Subsistence at Shanga: the faunal record'. In *Shanga: The Archaeology of a Muslim Trading Community on the Coast of East Africa*, by Mark Horton, 378–93. London: British Institute in Eastern Africa.
- Mudida, N. and Horton, M. in press. 'Subsistence and the faunal record'. In *Zanzibar and Pemba: The Archaeology of an Indian Ocean Archipelago*. London: British Institute in Eastern Africa.
- Nakamura, R. 2011. 'Multi-ethnic coexistence in Kilwa Island, Tanzania'. *Shima: The International Journal of Research into Island Cultures* 5 (1): 44–68.
- Nurse, D. and Hinnebusch, T. J. 1993. *Swahili and Sabaki abakii and Sabak Thoma*. Berkeley: University of California Press.
- Parker Pearson, M. (Ed.) 2010. *Pastoralists, Warriors and Colonists: The Archaeology of Southern Madagascar*. BAR International Series 2139. Oxford: Archaeopress.
- Perez, V., Burney, D. A., Godfrey, L. R. and Nowak-Kemp, M. 2003. 'Box 4: butchered sloth lemurs'. In Godfrey, L. and Jungers, W. 'The extinct sloth lemurs of Madagascar'. *Evolutionary Anthropology* 12: 252–63.
- Prendergast, M. E., Rouby, H., Punwong, P., Marchant, R., Crowther, A., Kourampas, N., et al. 2016. 'Continental island formation and the archaeology of defaunation on Zanzibar, Eastern Africa'. *PLoS ONE* 11 (2): e0149565.
- Prins, A. H. J. 1965. *Sailing from Lamu: A Study of Maritime Culture in Islamic East Africa*. Assen: Van Gorcum.
- Punwong, P. 2013. 'Holocene mangrove dynamics and sea level changes: records from the Tanzanian coast'. PhD diss., University of York.
- Quintana Morales, E. M. 2013. 'Reconstructing Swahili foodways: the archaeology of fishing and fish consumption in coastal East Africa, AD 500–1500'. PhD diss., University of Bristol.
- Quintana Morales, E. M. and Horton, M. 2014. 'Fishing and fish consumption in the Swahili communities of East Africa, 700–1400 CE'. In *Human Exploitation of Aquatic Landscapes* special issue, edited by R. Fernandes and J. Meadows. *Internet Archaeology* 37, doi:10.11141/ia.37.3.
- Radimilahy, C. 1998. *Mahilaka: An Archaeological Investigation of an Early Town in Northwestern Madagascar*. Uppsala: Uppsala University.
- Rakotozafy, L. M. A. and Goodman, S. M. 2005. 'Contribution à l'étude zooarchéologique de la région du Sud-ouest et extrême Sud de Madagascar sur la base des collections de l'ICMAA de l'Université d'Antananarivo'. *TALOHA*, 14–15. Available online at: <http://www.taloha.info>. <http://www.taloha.info/document.php?id=181>.
- Richmond, M. D. (Ed.) 2011. *A Field Guide to the Seashores of Eastern Africa and the Western Indian Ocean Islands*. Dar es Salaam: Sida, WIOMSA.
- Shipton, C., Crowther, A., Kourampas, N., Prendergast, M. E., Horton, M., Douka, K., et al. 2016. 'Reinvestigation of Kuumbi Cave, Zanzibar, reveals Later Stone Age coastal habitation, early Holocene abandonment, and Iron Age reoccupation'. *Azania: Archaeological Research in Africa* 51 (2): 197–233, doi:10.1080/0067270X.2016.117330.

- Soper, R. 1967. 'Kwale: an 00672706709511437.
- Spalding, M. D., Ravilious, California Press. Available online at: <http://www.spalding.org>.
- Van Neer, W. 2001. 'Animals in East Africa: New South International Colloquium'. Available online at: <http://www.vanneer.org>.
- Walshaw, S. 2010. 'Convulsions AD 700–1500'. *World Archaeology* 42 (1): 1–15.
- Walsh, M. T. 2007. 'Islamic Indian Ocean'. *Azania: Archaeological Research in Africa* 42 (1): 1–15.
- Walz, J. R. 2010. 'Route 500–1900 CE'. PhD diss., University of York.
- Williams, A., Mwinyi, A. (Cephalophus adersi), moschatus moschatus).
- Wilson, T. H. and Omar, Wright, D. 2005. 'New p from Tsavo National I
- Wright, H. T. 1992. 'E Archipelago in the XI
- Wright, H. T., Sinopoli, S. M. 1984. 'Early sea Azania 19: 13–59, doi:10.1080/00672708408914373.
- Wynne-Jones, S. 2007. 'coastal landscape'. *Jou*
- Wynne-Jones, S. 2013. 'Anthropological Archae

- Soper, R. 1967. 'Kwale: an Early Iron Age site in south-eastern Kenya'. *Azania* 2 (1): 1–17, doi:10.1080/00672706709511437.
- Spalding, M. D., Ravilious, C. and Green, E. P. 2001. *World Atlas of Coral Reefs*. Berkeley: University of California Press. Available online at: <http://archive.org/details/worldatlasofcora01spal>.
- Van Neer, W. 2001. 'Animal remains from the medieval site of Kizimkazi Dimbani, Zanzibar'. In *Islam in East Africa: New Sources: Archives, Manuscripts and Written Historical Sources, Oral History, Archaeology: International Colloquium, Rome, 2–4 December 1999*, edited by B. S. Amoretti, 385–407. Rome: Herder. Available online at: <https://lirias.kuleuven.be/handle/123456789/209388>.
- Walshaw, S. 2010. 'Converting to rice: urbanization, Islamization and crops on Pemba Island, Tanzania, AD 700–1500'. *World Archaeology* 42 (1): 137–54, doi:10.1080/00438240903430399.
- Walsh, M. T. 2007. 'Island subsistence: hunting, trapping and the translocation of wildlife in the western Indian Ocean'. *Azania: Archaeological Research in Africa* 42 (1): 83–113, doi:10.1080/00672700709480452.
- Walz, J. R. 2010. 'Route to a regional past: an archaeology of the lower Pangani (Ruvu) basin, Tanzania, 500–1900 CE'. PhD diss., University of Florida.
- Williams, A., Mwinyi, A. A. and Ali, S. J. 1996. *A Population Survey of the Mui-antelope – Ader's duiker (Cephalophus adersi), Zanzibar blue duiker (Cephalophus monticola sundevalli), Suni (Neotragus moschatus moschatus) – of Unguja, Zanzibar*. Zanzibar: Commission for Natural Resources.
- Wilson, T. H. and Omar, A. L. 1997. 'Archaeological investigations at Pate'. *Azania* 32: 31–76.
- Wright, D. 2005. 'New perspectives on early regional interaction networks of East African trade: a view from Tsavo National Park, Kenya'. *African Archaeological Review* 22 (3): 111–40.
- Wright, H. T. 1992. 'Early Islam, oceanic trade and town development on Nzwani: the Comorian Archipelago in the XIth–XVth centuries AD'. *Azania* 27 (1): 81–128, doi:10.1080/00672709209511432.
- Wright, H. T., Sinopoli, C., Wojnarowski, L., Hoffman, E. S., Scott, S. L., Redding, R. W. and Goodman, S. M. 1984. 'Early seafarers of the Comoro Islands: the Dembeni Phase of the IXth–Xth centuries AD'. *Azania* 19: 13–59, doi:10.1080/00672708409511327.
- Wynne-Jones, S. 2007. 'It's what you do with it that counts: performed identities in the East African coastal landscape'. *Journal of Social Archaeology* 7 (3): 325–45, doi:10.1177/1469605307081392.
- Wynne-Jones, S. 2013. 'The public life of the Swahili stonchouse, 14th–15th centuries AD'. *Journal of Anthropological Archaeology* 32 (4): 759–73, doi:10.1016/j.jaa.2013.05.003.