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Another unique river: A consideration of some of the characteristics of the trunk tributaries of the Nile River in northwestern Ethiopia in relationship to their aquatic food resources

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ABSTRACT

Aquatic food resources are important components of many modern human hunter-gatherer diets and yet evidence attesting to the widespread exploitation of this food type appears rather late in the archaeological record. While there are times when, for example, the capture of fish and shellfish requires sophisticated technology, there are other cases when the exact ecological attributes of an individual species and the particulars of its environment make it possible for these foods to be incorporated into the human diet with little or no tool use and only a minimal time investment. In order to better understand the full set of variables that are considered in these sorts of foraging decisions, it is necessary to detail the attributes of each particular aquatic environment. We discuss here some of the characteristics of the trunk tributaries of the Nile and Blue Rivers in the Horn of Africa. Unlike typical perennial rivers, these 'temporary' rivers flow only during a brief but intense wet season; during the much longer dry season, the rivers are reduced to a series of increasingly disconnected waterholes, and the abundant and diverse fish and mollusk populations are trapped in ever smaller evaporating pools. The local human population today utilizes a number of diverse capture methods that range from simple to complex, and vary according to the size and depth of the waterhole and the time of the year. When we view the particular characteristics of an individual river system, we find that each river is 'unique' in its individual attributes. The Horn of Africa is believed to be along the route that modern humans followed on their migration out of Africa, and it is likely that the riverine-based foraging behaviors of these populations accompanied our species on its movement into the rest of the Old World.

Introduction

At some point in the past hominins began to more frequently include aquatic food resources in their diet (Stewart, 1989), and this behavior may have offered important nutritional benefits that extended beyond simple caloric considerations (Broadhurst et al., 1998; Arts et al., 2009). Although the utilization of fish and shellfish from both freshwater and marine environments is well-documented among hunter-gatherer groups (see Stewart, 1989), evidence for the utilization of aquatic animals as food items in the hominin fossil record has proven difficult and sometimes somewhat controversial to substantiate (Yellen et al., 1995; Joordens et al., 2009). Much of this fossil record is preserved in alluvial sedimentological settings, and because the depositional processes that produce these sequences can transport and co-mix terrestrial and aquatic vertebrate and invertebrate remains, it is often challenging to prove that hominins were the sole agent responsible for

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collecting and exploiting the aquatic remains (see McBrearty and Brooks, 2000). In those cases where aquatic animals were clearly transported by hominins into a terrestrial setting, for example, as is the case for some caves or rock shelters, the circumstantial evidence for their incorporation into the diet and/or use as tools is much stronger (Marean et al., 2007; Henshilwood et al., 2011; Klein and Steele, 2013). Evidence for post-mortem processing, as documented by cut or percussion marks, has proven to be essential for substantiating the incorporation of vertebrate remains into the hominin diet (see Bunn, 1981; Potts and Shipman, 1981). However, fish and shellfish remains may or may not readily preserve evidence of tool processing (Stewart, 1994; Willis et al., 2008; Braun et al., 2010; Willis and Boehm, 2014), so the absence of these marks does not necessarily mean that the items were not processed by humans.

The question of when aquatic animal remains were first included in the hominin diet has often been tied to the degree of technological innovation witnessed in the archaeological record. Clearly, collecting and processing shellfish does not necessarily require sophisticated tools. Shells can be collected by hand, a hammerstone can easily crack open a shell, a tactic also practiced by Burmese long-tailed macaques (Gumert and Malaivijitnond, 2012) and something that was easily within the behavioral range of early tool-using hominins. Once the shell is opened, the muscles can be removed with a simple stone flake, a piece of the broken shell itself, or the fingers or teeth. However, successful and repetitive foraging in the marine intertidal zone probably required knowledge of high and low tides in order to permit the efficient exploitation of these food resources in a more predictable manner (Marean, 2010; and see; Peacock, 2013). Close study of the biology of the shellfish taxa including availability, water depth, and ecological preferences (e.g., rocky or sandy shoreline, shore profiles) along with the taphonomy of the fossils has offered important information about why particular marine species were collected and how site placement was related to resource availability (Jerardino and Marean, 2010).

The technology required to catch fish is generally presumed to be more involved than what is required to gather shellfish. What generally comes to mind are nets, spears, hooks and lines, and in some cases boats and rafts, but in the example of some marine fish, Henshilwood et al. (2001) suggest that some species may have been caught or speared in near-shore inlets or collected when upwellings of cold water create 'wash-ups.' It is also possible that fish were occasionally trapped in natural pools along rocky shorelines during tidal retreats and then collected by hand. Goodwin (1946) and Avery (1975) discuss the use of human-made tidal fish traps ('viskraals,' 'vywers,' or 'visvywers') in the intertidal zone along the South African coast (and see Wadley, 2010), similar to traps in the Gilbert Islands (Drew, 1945), but the ancient African tidal traps appear to be quite young in age (Avery, 1975). It seems possible that naturally occurring rocky pools along the shore could have served as a model for the construction of the simple low rock walls that form these tidal fish traps.

The potential for opportunistic early marine fishing behaviors is also mirrored in what is believed to be some of the earliest evidence for the exploitation of freshwater fish. Stewart (1994) discusses the occurrences of fish remains at Olduvai and ascribes likely procurement behaviors in both rivers and lakes to the capture of fish during spawning at the beginning of the wet season, and to strandings during the dry season. Some species, for example, of the genus *Clarias* spawn in shallow water in low lying floodplains adjacent to streams at the beginning of the wet season during overbank flood events (see Greenwood, 1955). Stewart summarizes data from numerous Nile River sites and reports that "over 90% of the fish remains derive from *Clarias* the catfish, and in over 50% of the sites *Clarias* remains comprise 99–100% of the totals" (1994: 233), probably collected during early wet season spawning on the floodplain. Other African sites also demonstrate high percentages

Table 1
Fish Species of the Trunk Tributaries (+present; −absent) (from Tewabe, 2008, with* supplemented by team capture).

	Guang R.	Gendwuha R.	Shinfa R.	Ayime R.	Order	Family
Alestes baremoze	−	−	+	+	Cypriniformes	Characidae
Brycinus macrolepidotus	+	+	−	+	Cypriniformes	Characidae
Brycinus nurse	−	−	+	+	Cypriniformes	Characidae
Hydrocynus forskahlii	+	+	+	+	Cypriniformes	Characidae
Citharinus latus	−	−	−	+	Cypriniformes	Citharinidae
Labeo niloticus	+	−	+	+	Cypriniformes	Cyprinidae
Labeo forskalii	+	+	+	+	Cypriniformes	Cyprinidae
Labeobarbus intermedius	+	+	+	+	Cypriniformes	Cyprinidae
Labeobarbus nedgia	+	+	+	+	Cypriniformes	Cyprinidae
Labeobarbus bynni	+	+	+	+	Cypriniformes	Cyprinidae
Labeobarbus degeni	+	+	+	+	Cypriniformes	Cyprinidae
Labeobarbus crassbarbis	+	+	+	−	Cypriniformes	Cyprinidae
Mormyrus kannume	+	+	+	−	Mormyriformes	Mormyridae
Mormyrus caschive	−	−	+	−	Mormyriformes	Mormyridae
Mormyrus hasselquistii	+	+	−	−	Mormyriformes	Mormyridae
*Marcusenius cyprinoides**	−	−	+	−	Mormyriformes	Mormyridae
*Hyperopisus bebe**	−	−	+	−	Mormyriformes	Mormyridae
Heterotis niloticus	−	−	−	+	Osteoglossiformes	Osteoglossidae
Lates niloticus	−	−	−	+	Perciformes	Centropomidae
Oreochromis niloticus	+	+	+	+	Perciformes	Cichlidae
Auchenoglanis biscutatus	−	−	+	+	Siluriformes	Bagridae
Bagrus docmak	+	+	+	+	Siluriformes	Bagridae
Bagrus bajad	+	+	+	−	Siluriformes	Bagridae
Clarias gariepinus	−	+	+	+	Siluriformes	Clariidae
Heterobranchus longifilis	+	−	+	+	Siluriformes	Clariidae
Malapterurus electricus	+	−	−	−	Siluriformes	Malaoteruridae
Synodontis schall	+	+	+	+	Siluriformes	Mochokidae
Synodontis serratus	+	+	+	+	Siluriformes	Mochokidae
Schilbe intermedius	−	−	+	−	Siluriformes	Schilbeidae
Total species	**18**	**16**	**23**	**20**		