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Multi-stage dispersal of Southwest Asian domestic livestock and the path of pastoralism in the Middle Nile Valley

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ABSTRACT

Herding was the most suitable form of food production that Middle Nilotic populations relied on for a long time before crop cultivation. When domestic livestock reached the Middle Nile Valley, in present Sudan's Upper Nubia, which is some 1500 km upstream of the Nile Delta, their domestication process had long been accomplished elsewhere. As the slow and gradual process of wild animal taming did not regard the populations living there, the shift from foraging to the adoption of food production could have – theoretically and technically – been immediate. Some early Pastoral Neolithic sites in the Middle Nile Valley have been interpreted as the evidence of such an abrupt change, indicating an almost total replacement of previous wild species by domestic livestock in the faunal composition of their subsistence economies. However, new radiocarbon dates, archaeozoological evidence, and archaeological investigations on Pre-Pastoral and Pastoral settlement systems have shown that, even in this region, the switch from foraging to pastoralism followed a lengthy multi-stage path, rather than a geographically progressing, systematic diffusion. This paper proposes a non-consecutive multi-stage adoption of livestock rearing, including: (1) Contemporary settlements of hunter-gatherers and herders in the same areas; (2) Hunter-gatherers adopting a few domestic animals with no visible cultural changes; (3) Early herders of a few domestic animals with some, but not all, visible cultural changes; and (4) Full nomadic pastoralists.

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1. Introduction

In Southwest Asia, it took at least one thousand years, until the end of the 8th millennium BC, before morphological changes of managed animals became visible in the archaeological record (e.g., Zeder, 2011). Here, multiple degrees of pastoralism with various combinations of domestic and free-living resources have been commonly recognized. Berger and Guilaine (2009) define the spread of the Neolithic throughout the Mediterranean as an 'arhythmic' transition with irregular cultural borders; several other authors converge on a similar interpretation. For example, Bar-Yosef (2009) describes the 'mutual relationships' existing between contemporary foragers and farmers in the southern Levant and the Anatolian plateau. According to him, Levantine farmers reached the Nile Delta in Egypt by sea, but it seems also plausible that the more mobile settlers, who abandoned the large Late Pre-Pottery Neolithic B (PPNB) villages in the southern Levant and formed small sites and hamlets during the Pottery Neolithic, pushed forward as far as North Africa. Goring-Morris and Belfer-Cohen (2011) describe three existing options in the Levant during the initial Neolithic process: full-time agriculturalists, hunter-gatherers, and intermediate 'forager-farmers.' Betts (2008) reports on the 'hunter-herder-forager lifestyle' throughout the Pre-Pottery Neolithic (PPN) in North Arabia, where sheep and goats were exploited for meat and made up half of the carnivore diet side by side with wild animals. Finally, according to Zeder (2011), the multiple degrees of pastoralism were part of a slow path of 'human niche construction' or 'ecosystem engineering' (Smith, 2007a,b), which involved: (a) a systematic engagement by humans in transforming the natural environment, and (b) a designed selection of local plants and animals during their domestication process.

Interestingly, African herders took about the same amount of time, that is, ca. one thousand years, and went through a lengthy process, before becoming skilled pastoralists, even though they adopted already domesticated species and did it at a later time. This gradual integration of domestic food resources indicates that a process of experimentation and acculturation was necessary in any

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case, implying that incipient herders needed to familiarize themselves with the predictability and reliability that domestic food resources could potentially offer. During this period of adjustment, not all potential advantages of domestic animals were seemingly desirable other than being a 'walking larder' (Clutton-Brock, 1989) or a 'food reserve on the hoof' (Marshall and Hildebrand, 2002), and may not have been exploited. Consequently, multiple degrees of herding with coexisting domestic and wild resources are becoming also evident to in Northeast Africa.

In spite of what has been said above, the early and middle Holocene cultural complexes from the Middle and Upper Nile Valley are often represented as contiguous, juxtaposed chronological sequences (cf., e.g., Krzyzaniak, 1991; Salvatori and Usai, 2008; Gatto, 2012). They assume a mechanical evolution implying that the social groups naturally opted for food production once domesticates became locally available. However, new archaeological data tell a different story.

This paper explores the multi-stage dispersal of Southwest Asian domestic livestock in Northeast Africa and the path of herding from incipient economic supplement to full-fledged nomadic pastoralism and focuses on the adoption of herding in the Middle Nile Valley, in present Sudan's Upper Nubia, and its surroundings, notably Lower Nubia and Egypt. It then proposes four scenarios with regard to a non-consecutive multi-stage adoption of livestock herding:

1) Contemporary settlements of hunter-gatherers and herders in the same areas;
2) Hunter-gatherers adopting a few domestic animals with no visible cultural changes;
3) Early herders of a few domestic animals with some, but not all, visible cultural changes;
4) Full nomadic pastoralists.

As a case study, this paper presents the results of recent excavations at three stratified sites, 8-B-10C, 8-B-76, and 8-B-81, at Sai Island in northern Upper Nubia (Fig. 1), which provided well-dated sequences of late foraging settlements, belonging to the local cultural complex called 'Khartoum Variant' (Shiner, 1968b), and early pastoral occupations, locally called 'Abkan' (Shiner, 1968a). These sites, with their chronologies, settlement organizations, and material cultures, present clear demonstrations of Scenarios 1 and 3.

2. Multiple degrees of livestock herding

2.1. Northeast Africa

To-date, we still do not know when exactly animals started to be herded in Northeast Africa; we also do not know for sure if the African cattle, which had an indigenous ancestor, the aurochs, was domesticated in Northeast Africa before Asian cattle and caprines were imported from Southwest Asia. Domestic sheep and goat had no wild indigenous ancestors in Africa and were entirely introduced in Africa from Southwest Asia. Various hypotheses exist on the connecting routes between Southwest Asia and Africa; they could have involved multiple, both maritime and terrestrial, passages, including the Mediterranean and Red Sea coastlines (Wengrow et al., 2014), the Sinai Peninsula (Rosen, 2008), the Nile Delta (Bar-Yosef, 2009), and/or possibly others.

Genetics proved two major centers of cattle domestication, one in Southwest Asia for taurine cattle (*Bos taurus*) and the other in the northern Indian subcontinent for humped indicine cattle (*Bos indicus*) (Gifford-Gonzalez and Hanotte, 2011; Stock and Gifford-Gonzalez, 2013). Only *Bos taurus* reached Africa in the ancient

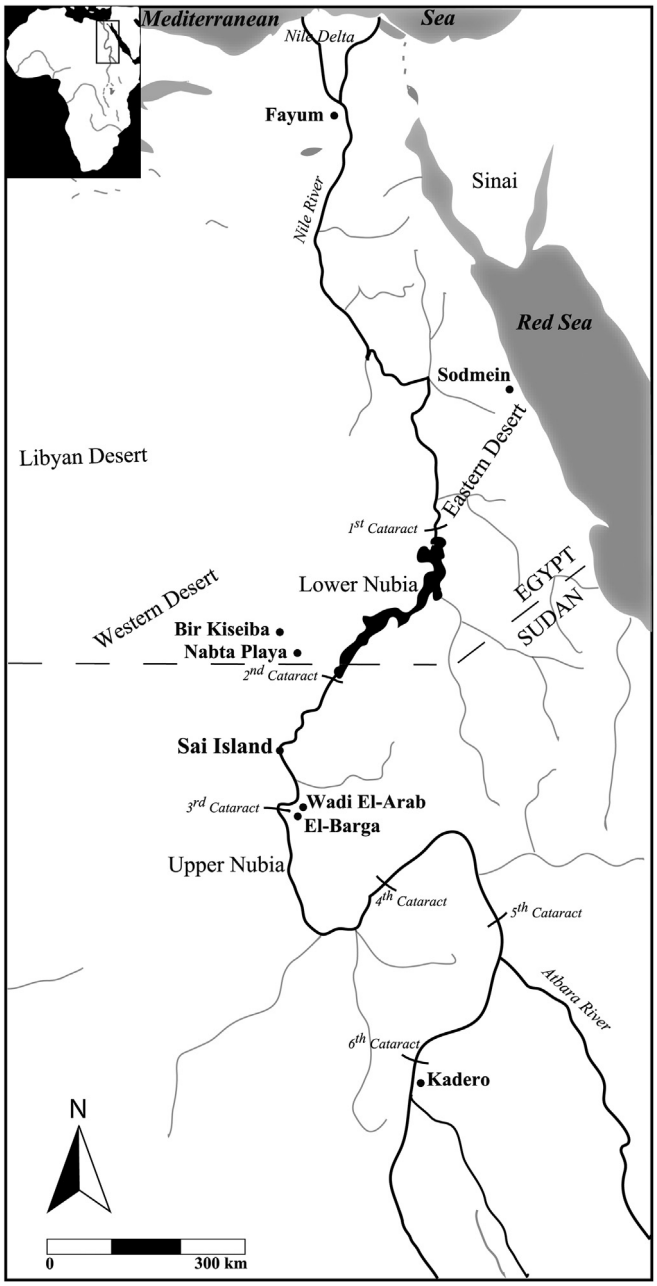

Fig. 1. Map of the Nile Valley and adjacent regions with sites cited in the text.

past as *Bos indicus* was probably introduced in Sudan only during the Meroitic period (3rd century BC-3rd century AD) (Chaix, 2011).

An independent African domestication may have occurred from indigenous wild aurochs (*Bos primigenius africanus*) in southwestern Egypt based on genetic data and ecological reasons of 'putative' domestic cattle from Nabta Playa, in the Egyptian Western Desert (Fig. 1), dating from around 8000 BC (e.g., Gautier, 1984, 2001; Wendorf et al., 2001; Jordeczka et al., 2013; but see; Pérez-Pardal et al., 2010; Gifford-Gonzalez and Hanotte, 2011, 2013; Marshall and Weissbrod, 2011; Muigai and Hanotte, 2013). While independent domestication is questioned, Y-DNA suggests male-introgression of African wild aurochs to domestic cattle (Gifford-Gonzalez and Hanotte, 2013). Another early date of domestic cattle at 7200 BC had been suggested for the bone remains from the site of Wadi El-Arab, near Kerma in Upper Nubia (northern Sudan)

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