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# The appearance and spread of cattle--keeping in Saharan North Africa

Recent research has established Saharan North Africa as an early center of domestication, as early if not earlier than the South-Western Asia. The distinguishing feature of animal domestication in North Africa is that cattle – not sheep/goat – were the primary domesticate. The purpose of this paper is to examine one possible explanation for the appearance and spread of this domesticate.

Domesticated cattle first appeared in the Sahara during the Neolithic or Holocene Wet Phase, the last major interval during which climatic conditions permitted extensive human occupation of the Sahara. The beginning of this period has been variously dated from about 16,000 B.P. to between 12,000 and 10,000 B.P. It ended between 3,000 and 4,000 B.P. The earliest cattle remains date to around 9,500 B.P. and persist throughout the remainder of the sequence.

A comparison of palaeoclimatic data and the spacial and temporal distribution of the cattle remains suggests that environmental conditions, in part, could have promoted the appearance and spread of these domesticates. The earliest remains come from the Egyptian Western Desert in the Eastern Sahara and from the Core Area, north of the massifs in the Central Sahara. Environmental conditions in both regions were much more severe than the rest of the Sahara throughout the Holocene Wet Phase. It was only during the second half of the Holocene Wet Phase, when environmental conditions throughout the Sahara were deteriorating, that cattle and cattle-keeping became widespread. The evidence suggests a correlation between the appearance and spread of cattle and cattle-keeping and spatial and temporal variations in the distribution of rainfall and, hence, floral and faunal density and diversity.

Three features characterize the environment of the Sahara today. The first is that the majority of the Sahara can be characterized as a relatively flat peneplain; the most pronounced relief being the massifs in the Central Sahara, such as the Tibesti and the Ahaggar. The area having the least amount of relief is the Eastern Sahara, between Gebel Uweinat, the Gilf Kebir, and the Nile Valley.

The second feature is that rainfall comes primarily from the south in the form of summer monsoons and, secondarily, from local depressions. These depressions, though, only affect the massifs of the Central Sahara and the adjacent lowlands. The distribution and intensity of the rains are controlled by the seasonal movement of the Intertropical Convergence Zone (ITCZ) and air circulation in the upper atmosphere around the massifs. The result is a rainfall gradient that decreases from south to north, from west to east, and from uplands to lowlands. The areas receiving the least amount of rainfall are the Eastern Sahara and the Core Area north of the massifs. The areas receiving the most rainfall are the massifs and the southern edges of the Central Sahara.

The third feature is that the density and diversity of the flora and fauna follow that of the rainfall. Thus, the areas having the highest density and diversity are the massifs and the fringe areas. The areas with the lowest are the Eastern Sahara and the Core Area.

These features not only characterize the environment of the Sahara today but were also the distinguishing features of environments during the Holocene Wet Phase. Thus, the environments of the Holocene Wet Phase did not differ so much in kind as in quantity. Rainfall was more abundant, but it was derived from the same sources as today. The rainfall gradient was still present but was more pronounced as it was more compressed. Floral and faunal density followed that of the rainfall gradients. The areas having the least amount of rainfall were again the Eastern Sahara and the Core Area while the areas having the most were the massifs and the southern fringes.

Geomorphological evidence indicates that the impacts of the Holocene Wet Phase were felt differently in different areas. In the massifs of the Central Sahara, the predominate impacts were increased wadi activity, the formation of the middle and lower terraces, and the appearance of shallow playas. In the lowlands, they were the appearance of playas, particularly around the massifs, and some wadi activity. In the Eastern Sahara, the dominant impacts were the appearance of playas of varying sizes.

Nowhere, though, were climatic conditions stable throughout the Holocene Wet Phase. Sedimentary changes in these same profiles indicate that the Holocene Wet Phase was a period of fluctuating humidity, alternating between more humid and more arid intervals. In the Eastern Sahara, these perturbations resulted in at least four major playa transgressions of varying intensities and durations and separated by shorter periods of recession. However, throughout the sequence here rains came from the south as summer monsoons.

The sequence was a little different in the Central Sahara, particularly in the massifs. Sedimentological differences between the middle and lower terraces in the Ahaggar and Tibesti suggest that the Holocene Wet Phase consisted of two major humid intervals separated by a short but intense arid interval. The first humid period began between 12,000 and 10,000 B.P. and ended between 7,500 and 7,000 B.P. and was

accompanied by the formation of the Middle Terrace in the Ahaggar and Tibesti massifs. Compared with the second humid period, this period was of longer duration and was characterized by a greater amount of rainfall. Rains during this interval were more evenly distributed throughout the year and came from both summer monsoons and local depressions. Runoff from these depressions affected not only the massifs but also the Chad Basin and the Upper Niger River drainage basin.

The second humid interval began around 6,000 B.P. and ended between 4,000 and 3,000 B.P. and was accompanied by the formation of the Lower Terrace. Rains throughout this were more sporadic and torrential, suggesting a rainfall pattern closer to that of today. They were predominately from summer monsoons as rainfall from the local depressions was no longer as pronounced as during preceding period. In short, the major difference between the two intervals is that the local depressions delivered appreciably more rainfall during the first interval than the second. This same difference also distinguished the Central Sahara from the Core Area and the Eastern Sahara, the latter two never having received rains from local depressions. In short, the Core Area and the Eastern Sahara were climatically more stable than the Central Sahara with the result that environmental variability in the first two was not as pronounced.

If the radiocarbon dates for the known cattle remains are compared against this model of Holocene environment, a distinct pattern appears. The temporal and spatial distribution of the remains follow that of increasing aridity. Thus, the earliest remains come from those areas that would have been most arid: the Eastern Sahara and the Core Area. It is only after 6,000 B.P., when environments throughout the Sahara were more uniform and the entire region was experiencing increasing aridity, that cattle-keeping became widespread. Cattle dating after this period are recurrent throughout the Sahara. The spatial and temporal distribution of remains suggest a definite correlation with increasing environmental degradation and the increasingly widespread use of cattle.

There are several problems inherent with this interpretation. The first is that few of the cattle remains have been described in detail so that it is difficult to ascertain definitely their domesticated status. The second is the few number of known remains. However, the data also suggest another intriguing possibility. Assuming that these remains were of domesticated cattle, their spatial distribution suggests a movement from east to west. The earliest remains are those from the Eastern Sahara. If so and extending this distribution even farther east, the data would suggest that cattle-keeping may have originated in the Nile Valley. There is evidence – such as burial practices – that indicates that cattle were particularly important in Late Palaeolithic economies. If such is the case, and cattle-keeping did originate in the Nile Valley, than the reasons for its adaptation there undoubtedly differed from those in the Sahara, given the differences in environment.