

A NEW PERSPECTIVE ON THE ORIGIN OF NGUNI CATTLE



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“**STUDENT:** DR. EINSTEIN, AREN'T THESE THE
SAME QUESTIONS AS LAST YEAR'S FINAL EXAM

Earlier studies postulated that modern domesticated cattle are descendants from a common wild ancestor, known as the auroch (*Bos taurus primigenius*), which is now extinct (Epstein, 1971). However, research based on mitochondrial DNA (DNA that is passed down from maternal lineage), suggested that hump-less taurine (*Bos taurus*) and humped zebu cattle (*Bos indicus*) originated from two independent domestication events from

Bos primigenius and *Bos namadicus*, respectively (McKay *et al.*, 2008; Kantaten *et al.*, 2009; Decker *et al.*, 2014). However, other research established a third theory, or a third domestication event (Payne, 1970; Grigson, 1991).

The current African cattle originated from three different sources. Firstly, the domestication from Asia along the Nile Valley and onwards through Egypt.

The second domestication event emanated through the “horn” of Africa or from the East Coast towards and through Madagascar.

The third theory stated that a domestication event took place within the African continent. Therefore, the centre of origin of the primitive Sanga cattle was most likely, East Africa (Figure 1).

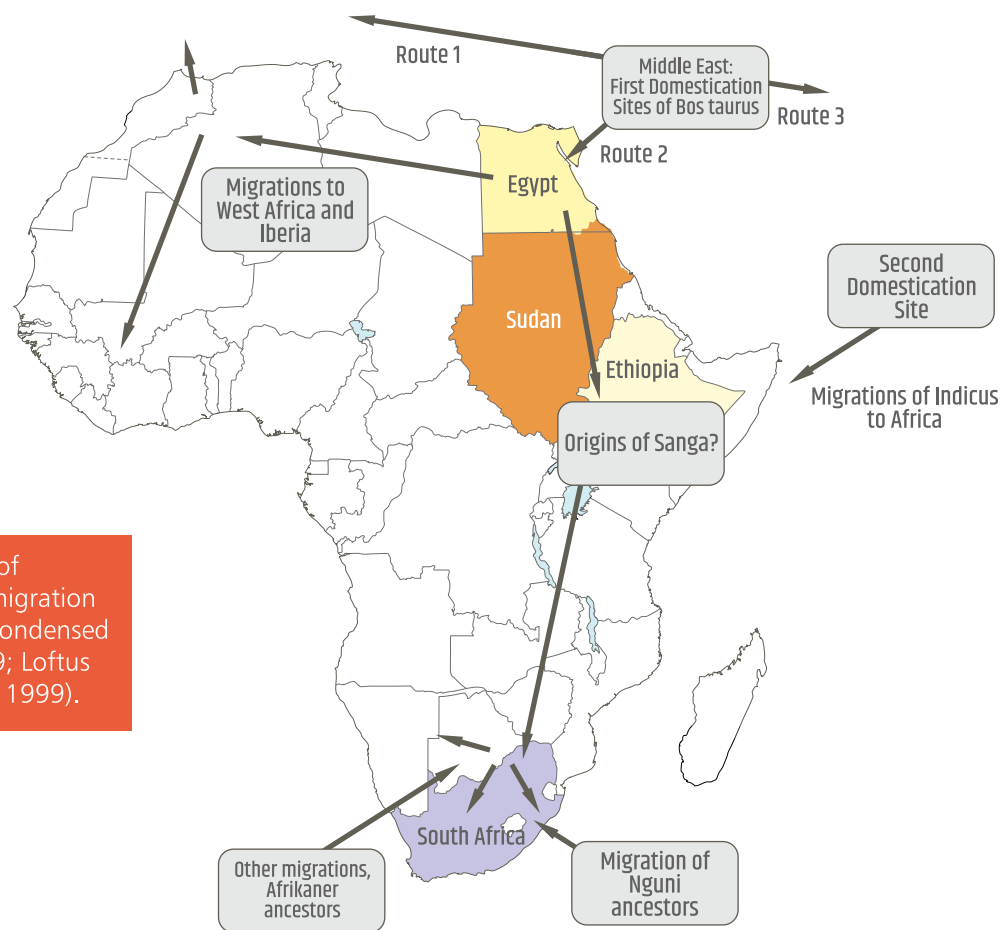


Figure 1: Schematic representation of postulated domestication sites and migration routes of bovines through Africa, a condensed excerpt of current data (Brown, 1959; Loftus *et al.*, 1994; Bradley & Cunningham, 1999).

EINSTEIN: YES, BUT THIS YEAR THE ANSWERS ARE DIFFERENT

Ancient people migrated through Africa from Egypt and as they traded along the east coast of Africa from India, new strains of cattle were developed (Curson, 1936). Today, African cattle can be classified into three major groups: African *B. taurus*, *B. indicus* and Sanga types (African hump-less *Bos taurus* x humped *Bos indicus*) (Rege, 1999). African taurine cattle are widely distributed throughout west and central Africa and are divided into longhorn (*B. taurus longifrons*) and shorthorn (*B. taurus brachyceros*).

Indicine cattle are mainly found in the eastern and dry parts of West Africa, while the Sanga breeds are mainly found in eastern and southern Africa.

Studies on the Y chromosome and DNA studies suggest that zebu introgression on the African continent was primarily through males (Bradley *et al.*, 1994; Hanotte *et al.*, 2002; Porto-Neto *et al.*, 2013).

It is also important to note that all African cattle carry taurine mitochondrial DNA, indicating that there are no pure zebu cattle (*B. indicus*) on the African continent (Mwai *et al.*, 2015).

The Sanga group of cattle possess a cervico-thoracic hump (Figure 2) which is likely derived from admixture between the thoracic-humped Zebu (Figure 3) and hump-less African *B. taurus* cattle (Epstein, 1971; Hanotte *et al.*, 2002).



Figure 2: Sanga cattle such as the Nguni with a cervico-thoracic hump



Figure 3: Indicine cattle such as the Brahman with a fatty thoracic hump (Brahman Cattle Breeders' Society)

An important observation is that Sanga cattle from southern Africa, south of the trypanosomiasis belt (Figure 4), share the metacentric Y-chromosome in common with that of *B. taurus*, whereas Sanga cattle, currently found north of the trypanosomiasis belt, share the acrocentric Y-chromosome in common with the Zebu (*B. indicus*) types (Meyer, 1984). The Zebu is susceptible to trypanosomiasis (Murry *et al.*, 1982) distributed by the tsetse fly and it postulated that the zebu-like genotypes were eliminated from the population as the cattle migrated south.

“**KNOWLEDGE IS HAVING
THE RIGHT ANSWER
INTELLIGENCE IS ASKING
THE RIGHT QUESTION**”

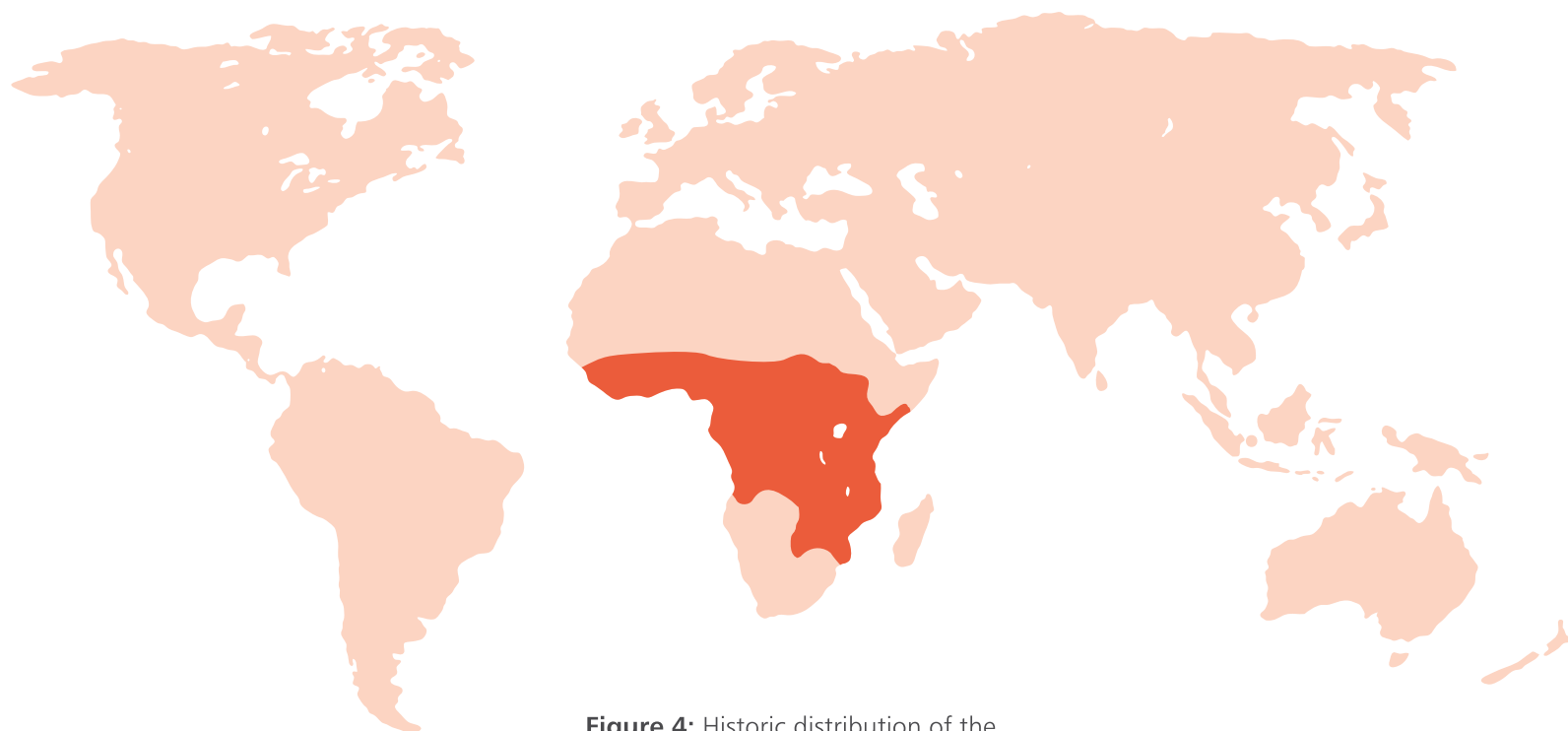


Figure 4: Historic distribution of the tsetse fly in Africa (FAO, 1999)

A recent study by Makina *et al.* (2016) confirmed that there is very little evidence of *B. indicus* in the modern day Nguni and that the little influence that does exist can be ascribed to recent introgression of *B. indicus* into the Nguni, that occurred in the communal areas before the breed was “formalized”. The modern day southern African Sanga cattle can be described as taurine tropical adapted genotypes, which make them unique. ■

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