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Preference traits for Bunaji cattle of nomads along Benue trough in Central Nigeria

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Abstract

A cross sectional study was conducted along Benue trough cutting across two states of Benue and Nasarawa in north-central Nigeria, among Fulani pastoralist, agro-pastoralist and transhumant nomads to determine preference traits in their breeding cows and bulls. One hundred and sixty five Bunaji cattle herd farmers were considered in the study which was carried out in two seasons (dry and rainy seasons). The respondents were pastoralist (26.1%), agro-pastoralist (37.4%) and transhumant nomads (36.5%). Seven specific traits were used for ranking breeding cows and five for breeding bulls. Kruskal-Wallis test was used to determine mean ranks of traits. Preferential traits for breeding bulls were in the order; body conformation 1.46, temperament 2.01, disease resistant 2.46, walkability 2.89 and horn 3.84. While for breeding cows were milk yield 1.62, reproductive efficiency 1.92, body size 2.23, temperament 3.48, fat/butter content 4.28, disease resistant 4.71 and mothering ability 5.63. There were no significant variations on traits preference for breeding cow between the agro-pastoralist/transhumant and pastoralist nomads except for fat/butter content which had more value to the pastoralist nomad. Similarly for the breeding bulls which had disease resistance having higher values to the pastoralist nomads. It was concluded that trait preference in breeding bulls and cows was not influenced ($p>0.05$) by production system. The information generated from this study can help assure that Bunaji breed improvement interventions are consistent with the needs of the intended beneficiaries.

Keywords: Bull traits, cow traits, Fulani cattle, pastoralist, agro-pastoralist

Introduction

Agriculture plays a leading role in the non-oil sector of Nigeria. It supports 63% of the population directly by providing about 28% of the gross domestic product (GDP) from the total exports and 70% non-oil export production (Oladele and Sakagami 2004). Nigeria as an agrarian country, the production of foods and other raw materials is a necessary ingredient for the take-off of all other sectors of the nation's economy. About 70% of the Nigerian total labour force is employed within the agricultural sector. Pastoralists may be described as nomadic, semi-settled (transhumant) or settled (sedentary agro- pastoralists) according to the degree of mobility. The semi-settled pastoralists are at times called transhumant agro pastoralist if they also practice cropping (FAO, 1983). Not all pastoralist societies can be accurately described as following a nomadic or transhumance way of life. As conditions change, pastoralists usually adjust. This can result in a traditionally nomadic society or some families within in it becoming more or less transhumance in their migratory patterns if the opportunity arises. Likewise, a society that prefers a transhumance way of life may be forced by circumstances to change to a nomadic pattern for some or all of its livestock.

Characterisation of the genetic resources, description of the production systems and participatory definition of farmers' selection criteria is the key step in designing

community-based breeding programs (Kosgey *et al.,* 2006). Like other livestock farming practices, a cattle farming is managed by smallholder farmers and pastoralists mainly based on their own experience and knowledge. Identification of the breeding objectives traits in participatory manner is a recommended approach for the sustainable breed improvement programs in the tropics (Sölkner *et al*., 1998; Gizaw *et al*., 2010; Wurzinger *et al*., 2011)

Given the changing environment and the evolution of livestock systems in the sub-humid zone of West Africa, it is important to know which breeds cattle owners keep in herds, how they choose among cattle breeds, what discretion they exercise over the choice of the breeds they hold and the factors affecting their breeding practices and breed preferences. Farmers' knowledge of specific attributes of different breeds can help to focus research on particular traits and identify needs for extension and farmer education. In addition, a better understanding of factors affecting these choices can help to target private and public programmes of breed improvement and to assess the incentives required for *in situ* conservation of endangered breeds.

The breeding goals of livestock keepers are often multifaceted (Bebe *et al*., 2003. Köhler-Rollefson, 2000; Rege *et al*., 2001) and go well beyond high animal productivity. Survival under local ecological conditions is often a primary goal (Köhler-Rollefson, 2000) with risk avoidance often being of paramount importance. Breeding goals are also influenced by sociocultural norms, aesthetic preferences (for example, color and color distribution), religious considerations (white sheep are preferred for the Muslim festival of Tabaski), and behavioral traits such as docility, good maternal ability, the ability to walk long distances, tolerance to water scarcity, and loyalty to the owner (Blench, 1999; McCorkle, 1999; Rege *et al*., 2001). Even religion can influence breeding objectives.

The option of settled lifestyle of the Fulani pastoralists in the Benue trough in north-central region of Nigeria was largely informed by the suitability of the ecological condition of the region. One of the conditions that made the region of the country habitable for cattle rearing was the drastic reduction in the incidence of tsetse fly (*Glossina spp*) infestation- a vector of the cattle disease known as trypanosomoses or sleeping sickness, in the region. The reduced incidence of tsetse flies was brought about by considerable transformation of the region for continuous and expanded land clearing for agriculture and human habitation; and the emerging incidence and severity of bush burning, thus providing good grazing ground for their animals.

The pastoralist cattle have remained integral animal genetic resources of Nigeria, thus the need to develop sustained approach in conservation of the breeds. This can be enhanced through developing an improvement programme that is anchored on their preference. Therefore, the objective of the study was to assess pastoralist traits of preference for breeding bull and cows in white Fulani Bunaji cattle in their herd along the Benue trough.

Materials and methods

Study location

The study was conducted in the Benue trough covering two states of Benue and Nasarawa. These states lie within the north central zone of Nigeria, extending roughly from latitude 60 50'N to 90 30'N of the Equator and longitude 70 30'E to 100 00'E of the Prime Meridian. The Benue trough runs through the valley of Adamawa plateau to

the confluent at a joint between the Niger and Benue trough which is the major water ways of the mainland that finally empty in the Atlantic ocean through the delta. The trough is an agricultural rich zone and provides year round water for pastoralists and has constantly being a zone of conflict between pastoralist and crop farmers. The zone has about 4.5 million inhabitants. The study was carried out in two seasons: dry season between November to March and rainy season between May and September 2013 and 2014. This area is largely located in the savannah zone of Nigeria with its northern edge lying on the border of the Sahel and its southern edge lying on the border of the rain forest of Nigeria. It is an ecological transition zone between the arid north and the moist south with temperature fluctuating between 18°C – 37°C in the year and rainfall of 1000mm to 1500mm annually (Areola *et al*., 1999). Nasarawa and Benue States are located in the Niger-Benue trough.

One hundred and sixty five pastoral nomads were the main respondent for the study, they were divided into pastoralist who keep only livestock and always move to the area during dry season for grazing, agro-pastoralist who keep livestock and also cultivate crops and remain in the zone, and transhumance nomads who are permanent settlers and keep only livestock. They were selected based on the disposition to respond to questions using their local heads (Ardo). The communities considered for the study include pastoralist settlement around Mbagwen communities in Guma and Makurdi Local government areas and while in Nasarawa state pastoralist settlements in Lafia, Obi, Keana and Doma Local government areas were used.

Data and information collection

The study focused on farmers' preference traits on Bunaji cattle only as almost all of them keep more than one type of animal breed which include sheep, goats and donkey. The cattle population is predominantly white Fulani Bunaji with few other breeds like Bororo. Preferential traits data for breeding cows and bulls among the pastoral nomads were collected using a structured questionnaire administered at two seasons, dry season, November to March and rainy season, May to September of 2013 to 2014. The traits evaluated for cow include milk yield, fertility , body size, temperament, fat/butter content in milk, disease resistant and mothering ability, while for bulls include body conformation temperament, walkability, horn structure and disease resistance.

Data analysis

Data from the questionnaires were coded and recorded into the spreadsheets for statistical analysis. The nine preferential traits of each Bunaji cattle were ranked using Kruskal-Wallis test SPSS 2004.

Results and discussion

Production system and distribution of respondent in the study location are presented in Table 1.Majority of the farmers (37.5 %) were nomadic pastoralist who did not permanently stay in the area characterised by little or no agriculture and by high mobility of people and animals in search of grazing and water. About 36.4% were transhumant pastoralist, who were based on more or less regular seasonal migrations from a permanent homestead within the study zone and the least were the agro-pastoralist 26.1 %, who were permanent settlers in the area and also grow crops. In all, 62.5% of the pastoralist settle in this zone and were agro-pastoralist/transhumance which is an indication that the area was suitable for grazing their animal and also support other livelihood, thus transformation from

pastoralist nomads to agro pastoralist. The reason could also be that the cattle herders could not achieve self-sufficiency through livestock production alone and therefore as a response they tended to diversify to crop production so as to provide a variety of food for their families. Also, the continuous conflict between cattle rearers and farmers and declining grazing area may also necessitate the current reduction of mobility of the herders. This was similarly noted by Liyama (2006) and Adewumi *et al*. (2009). Under the extensive system of pure pastoralism, animals are raised on pastures and there is no integration between cropping and livestock activities. Meat is the major output, milk is produced for home consumption and Zebu is the only breed raised. The system is represented at the northern fringe of the sub-humid corridor. Semi-intensive livestock production takes place in the mixed crop-livestock systems where animals are raised on pastures and crop residues, with meat, manure and draught power as major outputs. Although Zebu cattle herds predominate, pure trypano-tolerant and crossbred cattle are also reared. Both the extensive and semi-intensive systems provide over 80% of the aggregate output from livestock processes in the region. More recently the potential for livestock production has improved significantly in the sub-humid zone due to a reduction in *tse-tse* fly challenge. Emerging intensive livestock production systems contribute 10-20% to aggregate output and involve dairy (milk for sale) and animal fattening in the inner cities and peri-urban centres. Crossbred cattle and exotic breeds are increasingly brought into these systems.

Table 1: Production system and distribution of respondents

Production system	Location	Number of respondent	%age
Agro pastoralist	Nasarawa	32	
	Benue	11	26.1
Nomadic pastoralist	Nasarawa	46	
	Benue	16	37.5
Transhumant pastoralist	Nasarawa	42	
	Benue	18	36.4
Total		**165**	**100**

Trait preference by the Fulani pastoralist and agro-pastoralist for breeding cow in the Benue trough is shown in Table 2. Milk yield and reproductive efficiency were recorded as the most important traits in a breeding cow in all the production system with slight variation on fat/butter which recorded equal importance in the pastoralist. The importance of milk production to pastoralist is central because of its role to their feeding and earning. While reproductive efficiency is also core for any livestock enterprise, similar finding was reported by Tada *et al.* (2013) for Nguni cattle. Similar preferences for these traits were reported for Sheko breed (Takele, 2005) and for other local breeds of pastoral and agro-pastoral production systems in Oromia Regional State of Ethiopia (Workneh and Rowlands, 2004). High preference for milk yield is common in many traditional African cattle owners, who keep cattle primarily for milk and secondarily to accumulate stock as a form of investment (de Leeuw and Wilson, 1987).

Mothering ability and disease resistance were least in the rank of importance to the production systems This is contrary to the findings of Minjauw and McLeod (2003) and Roessler *et al*. (2008) who reported the trait been ranked high and this was because they had experience with cattle production

and know that unproductive and diseased animals are a liability to the enterprise.

Table 3 presents the rank scores for trait preference in breeding bull among pastoralist and agro-pastoralist. Body conformation and temperament ranked high and most preferred traits among breeding bulls. Since Bunaji cattle are dual purpose cattle both serving for milk and beef, thus the bulls are bred mostly for beef production. This might have necessitated the choice of body conformation in selecting breeding bulls. The body conformation is used to evaluate the nutritional status of beef cattle across seasons (Ndlovu *et al*., 2009; Nqeno *et al*., 2010). Walkability and horn type ranked least important in selecting breeding bulls in all the production system. Horns have little or no economic value except as instrument for fighting.

Table 2: Mean rank score of preferred traits for cow by production system

Trait	Overall mean	Agropast/Transh	Nomadic pastoralist	Significant
Milk yield	1.62 (1)	1.32 (1)	1.29 (1)	ns
Repro. Efficiency	1.92 (2)	1.48 (2)	1.32 (2)	ns
Body size	2.23 (3)	2.14 (3)	2.24 (3)	ns
Temperament	3.48 (4)	3.31 (4)	3.22 (4)	ns
Fat/butter	4.28 (5)	3.96 (5)	1.32 (2)	*
Disease resistant	4.71 (6)	4.32 (6)	4.21 (5)	ns
Mothering ability	5.13 (7)	5.11 (7)	5.23 (6)	ns

The lowest the rank (mean rank score) of a trait the greater is its preference . Significant level *= p<0.05, ns = not significant p>0.05

Table 3: Mean rank score of preferred traits for bulls by production system

Trait	Overall mean	Agropas/Transhum	Nomadic pastoralist	Significant
Body conformation	1.46 (1)	1.23 (1)	1.26 (1)	ns
Temperament	2.01 (2)	1.96 (2)	2.31 (2)	ns
Disease resistant	2.48 (3)	2.42 (3)	1.84 (2)	*
Walkability	2.89 (4)	2.84 (4)	2.75 (4)	ns
Horn	3.84 (5)	4.32 (5)	4.98 (5)	ns

The lowest the rank (mean rank score) of a trait the greater is its preference . Significant level *= p<0.05, ns = not significant p>0.05

Conclusion

The study showed that Fulani cattle rearers of Benue and Nasarawa states have specific traits of interest for keeping breeding male and female cattle in the herd, which could be dependent on agro-ecological location and social support. The pastoralist and agro pastoralist farmers preferred milk production, reproductive efficiency and body size as the most important traits for their breeding cows. With this information, a desirable improvement programme that will address the need of the livestock keeper can be achieved.

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