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Polycerate sheep in Nigeria

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Abstract
A prospective cross-sectional study was carried out on indigenous flocks of sheep around Maiduguri Metropolis and Jere of Borno State, North-East Nigeria from September 2016 to March 2017 to evaluate the frequency and odds of occurrence of Polycerate sheep in Northern Nigeria. A gross examination of a total of 25,989 sheep of different breeds, ages, weights, and of either sex was implored. A frequency of occurrence was rated at 0.023 with an odd of occurrence of 1:4330.5 was observed. A total of 4 Polycerate sheep were Ouda breeds and 2 Polycerates were Yankasa breeds while scurs were found mostly in the Balami breed. Findings from the study show the existence of indigenous viable and productive breeds of sheep with 3, 4, 5, and more horns in the region. Craniographs show multiple horns originating from the same horn base on the skull on each side and there is evidence of a hard bony core. Campaigns to create awareness of the importance of science and rites, preservation, protection, and genetic sequencing of indigenous polycerates as compared to other polycerates of the world should be organized in the region.

Keywords: Antlers, cornual, Jacob's sheep, piebald, polled, polycerates, scurs, unicorn

Introduction
The legendary creature with one horn is called a "Unicorn" while most animals have a pair of horns, there are also horned animals that were born with 3, 4, 5, 6, 7 and multiple horns due to genetic disorders or abnormal conditions (Bermosa, 2017) [3]. The most distinguishing feature is 4-6 horns (Simmons *et al*. 2009 and Horak *et al*. 2010) [13, 10] where both sexes are always horned, although the males have larger and outstanding horns. Horns are natural pointed calcified projections on the heads of various animals consisting of keratin covering and proteins surrounding a core of a live bone as shown in Fig. 1.
Horns are more particular of antlers which are temporary. In mammals, true horns are found mainly among the ruminant artiodactylsin families: Antilocapridae (pronghorn) and Bovidae (cattle, goats, antelope, etc.).
Horn inheritance studies in sheep have gained considerable attention after a better understanding of Mendel's law as a marker in sheep for genetic investigations. Numerous hypotheses have been generated to explain the possession of horns in the sheep with considerable complexity over the years (Dolling, 2017) [8]. This multi-horned character is genetically attributed to a condition known as "split eyelid".
Originally, all rams had horns protruding from the sheep's noggin and sheep may or may not have horns depending upon their breed, sex and genetics. Sheep breeds may have both sexes horned, in some breeds only the ram and some may possess both horned and polled strains and when neither sex have horns are termed polled or naturally hornless. Partial or undeveloped horns are seen in Fig. 2 (a and b), referred to as "scurs" and while horns are removed in cattle and goats, they are seldom removed in sheep except they pose danger to the animal (Sheep101.info, 2015) [17].
The horns in sheep are hollow, consisting of keratinous sheath underlying a bony core that attaches to the skull and grows throughout its lifetime with peak growth during the first 2-3 years of life (Fig. 1, Fig. 2 a and b, Fig. 3 a and b).

The living horn of a sheep has blood flowing through it and bleeds when cut off or broken and when the sheep dies, the horn interior dries up and becomes hollow (sheep101.info, 2015) [17]. A multi-horned animal is called a "Polycerate", "4-horned sheep", "piebald", "Jacobs Sheep" and "Ragon Daji" meaning "Wild Rams" by the locals in Nigeria. They may have 2 vertical center horns (rostral) that usually extend upwards and outwards and 2 caudal horns growing spirally along the sides of the head and neck (Horak *et al*. 2010) [13]. Fleshy gap between the two pairs of horns is preferable. Scurs refer to partial or deformed horns that are loosely attached to the skull [Fig. 4 (a and b)] this is seldom considered undesirable (JSBA; 2009) [2].

The horns usually appear black but sometimes black and white stripped; In an ideal situation, horns appear smooth, balanced and strongly attached to the skull and grows without impeding the animal's sight or grazing abilities (JSBA, 2009) [2].

The most remarkable multi-horned sheep are: Jacob's sheep (piebald) (Fig. 2a and b), Manx Loaghtan, Hebridean, Navajo-churro, Icelandic sheep, Finnish Landrace, Damara and West African Dwarf and Blood lines of Painted Desert, Texas Dall, Black Hawaiian, Desert sand and Corsican sheep has displayed more than two (2) horns (Polycerates) (UHHSA, 2017) [18].

Horn presence is controlled by 3 genes:

I. Gene (P) – Dominant Polled
II. Gene (p) – Sex linked for non-polled
III. Gene (p') – Horns in both Rams and Ewes

The male sex hormones play important roles in horn development and rare genes allow some sheep to have multiple horns (sheep101.com; 2015) [17].

Rare, weird and bizarre sheep breeds are names of multi-horned breeds of sheep. These breeds may have 2-6 or more horns (Figs: 3(a and b), 5, 6(a and b), 7(a and b), 8(a and b), and 9(a and b) and are multi-colored with white and black or brown usually kept for wool, meat and hides. People pets, novelty high social status keep these animals as pets, ornamental animals and guard sheep mimicking guard dogs to protect farm property from vandals or theft and protects other livestock from predators Perrier; 2007 [14, 11].

Heirloom breed are referred to sheep that are natural or have survived with little human selection Haines; 2007 [11] they originated from an African breed of sheep, although its exact origin remains unclear. History has it that a limited amount of circumstantial evidence from the historical records lends support a related theory that these polycerates are descendants of the fat-tailed sheep, another breed from Mesopotamia (Chessa *et al*., 2009) [5].

Records has it that fat- tailed sheep are found in the Sumerian cities of ancient Uruk (3,000 B.C.) and Ur (2,400 B.C.) as evident on stone vessels and mosaics. Another early reference to this breed is found in the Book of Leviticus where an animal sacrifice is described which include the tail - fat sheep. (AJSR; 2006, JSBA; 2009) [15, 2].

Polycerate sheep may have followed the expansion of human civilization through North-Africa, Sicily, Spain and eventually England. Spotted Polycerates sheep were documented in England by the mid-17th century and became wide spread a century later. Despite little evidence from historical record, a recent genetic analysis has provided compelling evidence supporting a direct link between Jacob's sheep and certain unimproved breeds in South West, Asia and Africa other than British breeds (Chessa *et al*., 2009) [5].

Polycerates are typically hardy, low-maintenance animals with naturally high resistance to parasites and hoof-associated conditions (JSBA, 2009) [2]. They do not show much-flocking behavior and can be skittish if wild but become tame and make good pets with daily handling. They thrive in extremes of heat and cold and have good or excellent foraging capabilities but need good shelters (Simmons *et al*., 2009) [10]. They secure adequate nutrition with minimal to no supplementation even in the presence of suboptimal soil conditions (Simmons *et al*. 2009) [10].

Polycerates may or may not be considered a deficiency since multiple horns occur in some parts of the world dated back to 3,000 B.C. and affected animals live a normal life and the deficiency is put to use in some parts of the globe. Disrupted genetics, congenital or hereditary processes, recessive autosomal alleles, teratogens, endocrinological disturbances or deficiency may be alleged to its occurrence.

Whether or not the preponderance of multiple horns is a congenital orthopaedic deficiency phenotype in indigenous breeds of sheep (Ouda, Yankasa, West African dwarf, and Balami) in the Sahel is over emphasized and has an imprecise origin owing to the illicit trans-border trade and non-specific migration of nomads that graze through the grass lands of Africa.

To date, there is no information as to identification, frequency and odds of occurrence, hence the need for a comprehensive data bank and a reporting system for multiple horned sheep in the Sahel.

Animals serve various purposes including defending themselves from predators and fighting members of their own species (horn fighting) for territory, dominance or mating priority (Wilson, 1980) [20]. Horns are often present in males but in some species, females too may possess horns. It has been stated by researchers that taller species living in the open are more visible from longer distances and more likely to benefit from horns to defend themselves against predators.

Females are vulnerable to predators due to their large size or open savannah like habitat and are more likely to bear horns than small or camouflaged species. In addition, horns may be used to unearth food or strip bark from trees during mating and courting to impress the female and lure her into his territory. Some animals with true horns use them for cooling. The blood vessels in the bony core allow the horns to function as a cooling structure.

In southeast China, horns serve as a hammer with cleaver for cut fish. Mounted head or horns can be displayed as trophies or decorative objects, some cultures use horns as sound instrument or vessels for drinking (Chusid, 2009) [6]. Powder horns fitted with lids and carrying straps are used to carry gunpowder. Shoehorns and antelope horns are used in traditional Chinese medicine. Horn may be used as a material in tools, furniture, thermoplastic, horn bows, glue, scales, grips, or handles for knives and other weapons, handle scales of guns, buttons and decoration, among other uses.

The aim of this research, therefore, is to evaluate, access, Investigate and determine the odds and frequency of occurrence, clinical significance, and progression and determine comprehensive data assimilation and reporting system of multi-horned sheep in indigenous breeds of sheep in the Sahel.

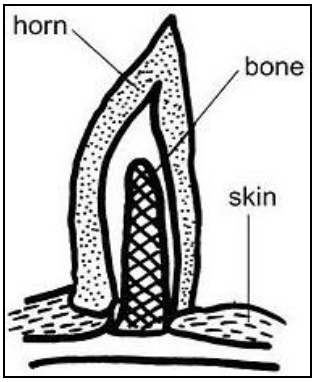

Fig 1: Cross section of a Horn

Fig 2 (a and b): Jacobs Sheep (Piebald's) with four horns.

Materials and Method

Study Area

A prospective cross-sectional study was carried out on indigenous flocks of sheep around Maiduguri Metropolis and Jere area of Borno State, North-East Nigeria from September 2016 through March 2017.

The Maiduguri central cattle market, Molai animal market, University farm, and farms within the Staff quarters were visited and so also are markets at Bullumkuttu and tashan Bama. Farms were also visited at Musari, Shagari Low-cost, Low-cost B, Federal Low-cost, Bolori, Zajeri, Umrari, Wulari, Ngomari, Pompomari, Jiddari Polo, Damboa Road, Customs Area, Abbaganaram, Gamboru, Moduganari, Areas around Giwa Barracks, Fori, Gwange area, Ruwan zafi, Kwanan yobe, Dikwa Low-cost.

Sampling

The study is to identify and establish/ascertain the frequency and odds of occurrence of polycerates among indigenous sheep in Maiduguri and Jere amongst others using a simple random sampling method. A total number of 25,989 Sheep of various breeds, age and sex were investigated and recorded.

Gross examinations of the animals were implored as well as radiographic/Craniographs were taken.

Results

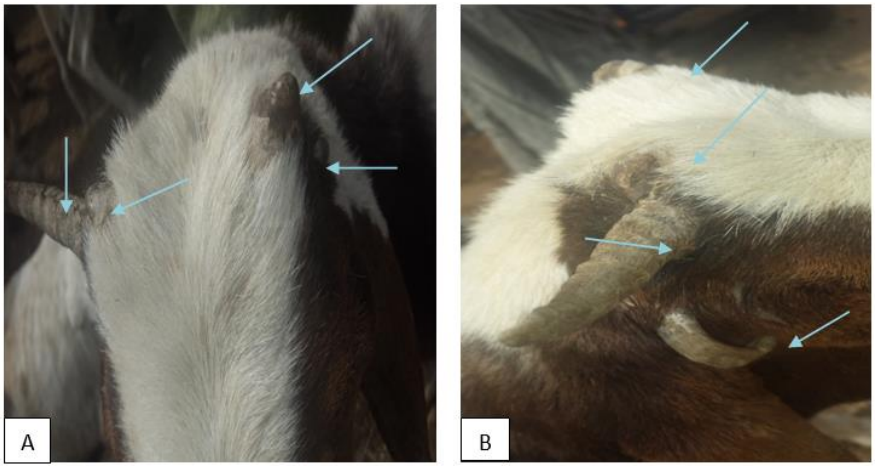

Fig 3A: Arrows showing two (2) horns on the left and 3b showing three (3) horns on the right

Fig 4: (A and B) Arrows showing bilateral scurs in a Balami breed

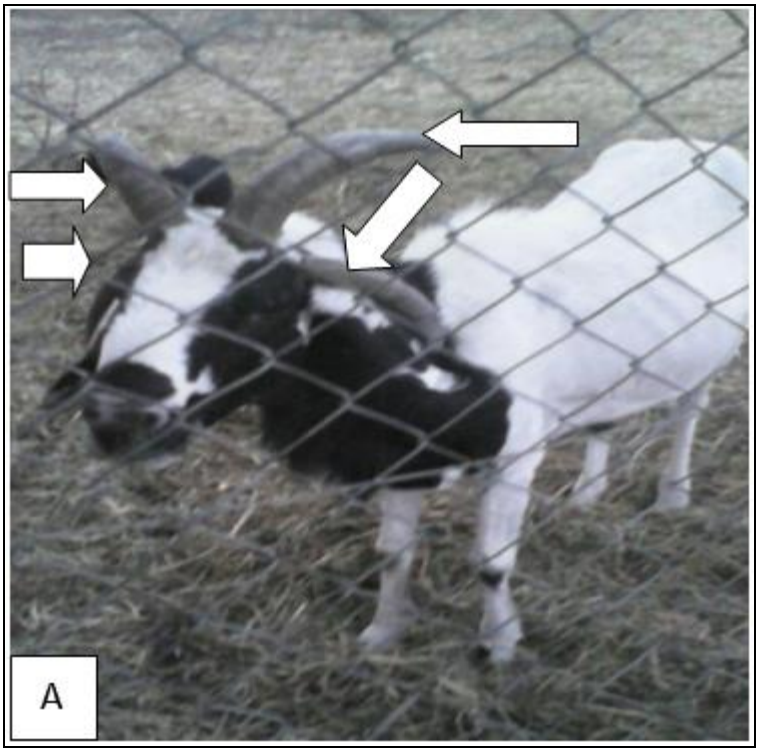

Fig 5a: Four (4) horns in Yankasa breed

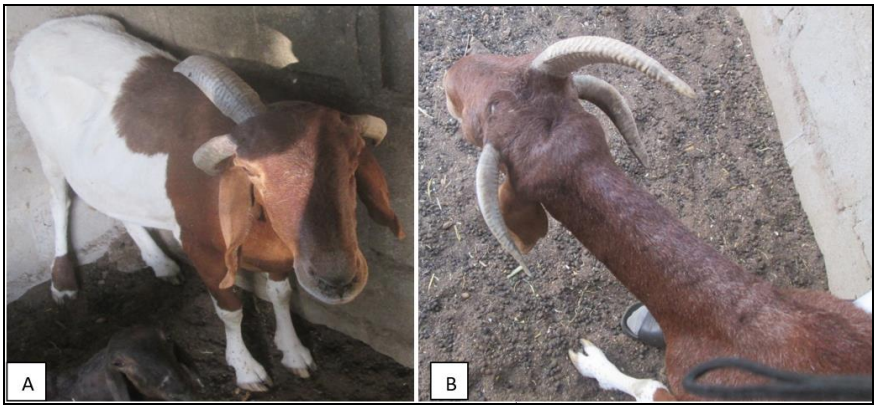

Fig 6: A and B showing three (3) horns in Ouda Breed

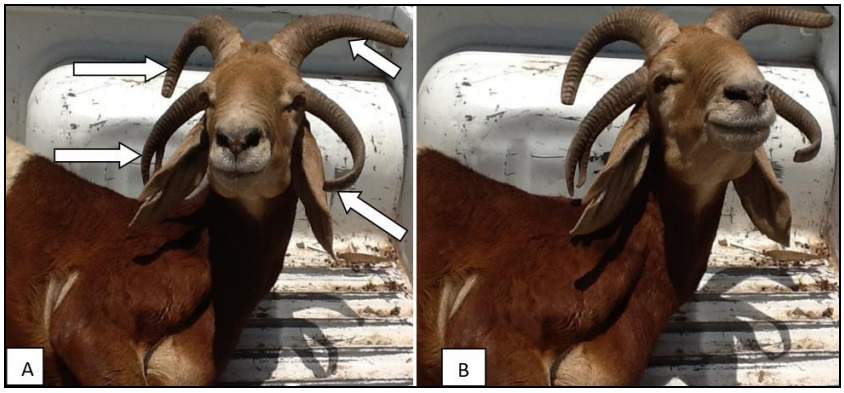

Fig 7: A and B showing four (4) horns in Ouda Breed

Fig 8: A and B showing Four horns in Yankasa breed

Fig 9: A, B and C show Ouda breed with four (4) horns

$$\frac{x}{y} \times \frac{100}{1} = Frequency\ of\ Occurrence$$

Where,
X=Number of incidences= 6
Y= Sample size= 25,989

$$6\ /25{,}989 \times \frac{100}{1} = 0.02308$$

So, the Frequency of occurrence is 0.02308

$$\frac{b}{a} = c{:}d = Odds\ of\ Occurrence$$

Where,
So, odds of occurrence =
a = 6
b = 25, 989 – 6 = 25,983
So, 25, 983/6= 4,330.5
Odds = 1: 4,330.5
a= number of successes
b= sample size minus incidence
c= ratio of incidence
d= ratio of non-occurrence

Discussion

In this study, the multi-horned rams were found to be synonymous to "Ragon Daji" among locals meaning "Wild Rams" and are kept behind markets as they are superstitiously believed to bring bad sales to the markets in and around Northern Nigeria.

The study further revealed that there are also horned animals that were born with 3, 4 and 5 or more horns due to genetic disorders or abnormal conditions as reported by Bermosa; 2017 [3]. The most distinguishing feature is 3-5 horns which correspond with the reports of Simmons *et al*. 2009 and Horak *et al*. 2010 [13, 10]. Both sexes are seldom horned but the males have larger and most impressive horns as reported by.

The study also revealed that polycerates have 2 vertical center horns (rostral) that usually extends upwards and outwards and 2 caudal side horns which grow spirally along the head and neck as which corresponds with Horak *et al.*, 2010 [13]. There are gaps between the two pairs of horns and are firmly rooted with partial or deformed horns that are partially attached to the skull known as "scurs" that are not usual but considered undesirable which corresponds with the report of JSBA, 2009 [2]. Radiographs also confirmed the origins of the central bony core in the horns to be from the same base. Studies typified horns as black but may be black and white alternated, the horns are smooth and balanced, strongly attached to the skull and grow in a way that does not impede the animal's sight or grazing abilities.

Polycerate sheep occurrence may or may not be considered as a deficiency in any way since multiple horns occur in some parts of the world as dated back since 3,000 B.C. and affected animals live a normal life and the deficiency put to use in some parts of the globe. Bauchi, Gombe and Kano States in Northern Nigeria reported similar cases over the years past.

Conclusion

It was concluded that's

- The frequency of occurrence of polycerates sheep in the Sahel is 0.0231 and the Odds of occurrence is 1: 4330.5 and occur more in the Ouda breeds followed by 'Yankasa breeds
- Scurs occur most in Balami breeds

Recommendations

- In-depth research is needed to ascertain the origin of polycerates in the Sahel and their genetic relationship with other world breeds.
- The Anatomy of the Cornual nerves (innervation) and anaesthetics landmarks to be blocked during Dehorning in polycerates should be investigated.
- The legitimacy of polycerates to welfare, rites, culture and traditions be clarified in the Sahel and Africa at large.

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