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A Survey of Bovine Mummified Foetus and Foetal Wastage at Bodija Abattoir in Ibadan Nigeria

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Abstract: A survey was carried out to determine the incidence of bovine mummified foetus and foetal wastage at Bodija central abattoir Ibadan from the slaughtered pregnant cows. During the survey, a total of 391,440 heads of cattle were slaughtered within January 2012 to December 2014 and 156,576 which represent 40% were cow. A total of 156,576 uteri were examined and 58,528 representing 35% were gravid uteri. It was discovered that a large number of slaughtered cows in this abattoir were pregnant and mummified foetus were discovered in some of them; this gave the opportunity to investigate the incidence of mummified foetus among the pregnant cows and to determine the amount of foetal wastage. The result shows 58,528 foetal wastage out of which 1332 which represent 2.28% were mummified foetus. It was concluded that more stringent measures should be taken against the butchers slaughtering pregnant cows and selling out of the productive groups of cows to the butchers should be discouraged. Government should come to the aid of the livestock farmers financially in order to reduce the economic loss been faced by the farmers through their selling out of the productive cows. Also, causal agents of the mummified foetus should be promptly eradicated.

Key words: Abattoir, bovine, foetus, mummified, slaughtered, wastage

INTRODUCTION

A farm economy depends upon a calf per cow per year. Mummified foetus is a reproductive disorder which is responsible for farm economic loss by extending the inter-calving period as well as foetal loss. The incidence of mummified foetus in cattle is low and sporadic but it may be higher in some herds (Noakes *et al.*, 2011). In cattle, foetal mummification occurs with an incidence of 0.13-1.8% (Arthur *et al.*, 2011). In Nigeria, there is no accurate account of the incidence of mummified foetus in cow but it occurs sporadically throughout the country. Meat from cattle slaughtered at the various abattoirs in Nigeria constitutes the largest source of animal proteins for Nigerian populace, there is however a disturbing trend in the bid to provide meat for consumption of the human populace and, this involves the slaughtering of pregnant animals which is unethical (FAO, 2006; Muhammad *et al.*, 2008).

The destruction of foetus as a result of slaughtering pregnant animals is forbidden by law in nearly all the countries of the world (Economic Commission for Africa, 1988). Despite the existence of the law, previous researchers have shown the occurrence of slaughtering pregnant animals in different countries of the world and these reports have shown some very disturbing figures which pose a serious threat to the efforts of meeting the dietary protein requirements of many developing countries like Nigeria. These foetuses are discovered

during routing post-mortem meat inspection and are totally condemned by the meat inspection officers at the abattoir.

A study conducted at the Faisalabad abattoir revealed 11.65, 8.61, 21.28 and 19.22% in buffaloes, cattle, sheep and goats, respectively for frequency of pregnant animals slaughtered (Sheldon and Dobson, 2003; Lefebvre *et al.*, 2009). Tchoumboue (1984) reported that 16% of slaughtered cattle in Yaounde abattoir in Cameroun were pregnant while Ndi *et al.* (1993) reported an average of 22.1% female pregnant cattle in Bamenda and as much as 45% in Yaounde. A similar situation was also reported by Al-Dahash and David (1977).

Hamman *et al.* (1997) reported that a more accurate picture of foetal wastage would perhaps be observed if retrograde flushing of embryo was performed immediately from the uteri to recover pre-implanted and implanted embryos. A 2.6% rate of slaughtered pregnant cattle was reported in Enugu (Wosu, 1988), while 0.32% was reportedly slaughtered at the Doma abattoir (Idahor *et al.*, 2009). A similar trend has also been reported in Gombe State (Muhammad *et al.*, 2007; Maigandi *et al.*, 2008), Bauchi and Jos (Sanusi *et al.*, 2006), while Abdulkadir *et al.* (2008) reported an incidence rate of 3.9% for slaughtered pregnant animals in Makurdi abattoir Benue State from 1997-2002. Ataija and Uko

(1994) found out that 24.6% of female camel slaughtered for meat in Sokoto in 1992 were pregnant. Oyekunle *et al.* (1992) reported that between 14 and 20% of cows slaughtered in Abeokuta and Ijebu-Igbo abattoir from 1984 to 1989 were pregnant. As bad as it is, the scenario of slaughtering pregnant cow provides an ample opportunity to carry out an abattoir survey of bovine mummified foetus.

Mummification of bovine foetus is an uncommon condition with an incidence of less than 2% (Mahajan and Sharma, 2002). Foetal mummification has been reported in several species including sheep (Hailat *et al.*, 1997), goat (Tutt, 1997), dog (Arthur *et al.*, 2011; Perumal and Srivastava, 2011) and cat (Planellas *et al.*, 2012) but it is more common in cattle. Breed and previous occurrence seem to be risk factors with a higher incidence in Guernsey and Jersey cattle and a higher risk of about 30% recurrence in cows that had similar experience in previous gestation (Manokaran *et al.*, 2011). In cattle, foetal mummification occurs between the third and eight months of gestation without concomitant luteolysis of the corpus luteum and opening of the cervix. Foetal mummification associated with persistent corpus luteum is observed mainly in cattle and goats, both species being dependent on progesterone produced by the corpus luteum for the maintenance of pregnancy (Chanem *et al.*, 2006). In cattle however, the placenta is capable of producing sufficient progesterone to maintain pregnancy between days 150 and 200 of gestation (Murugavel *et al.*, 2009; Manokaran *et al.*, 2011). After the death of the foetus, the amniotic and allantoic fluids are reabsorbed, dehydrating the foetal tissues and annex membranes. The immature non keratinized skin of the foetus may contribute to the mummification process by allowing a faster loss of body water (Sutradhar *et al.*, 2010; Kumaresan *et al.*, 2013).

Several potential causes of this condition have been proposed, these include; Bovine viral diarrhea, leptospirosis and fungi infections (Johanson *et al.*, 2001; Noakes *et al.*, 2011), mechanical factors such as compression or torsion of the umbilical cord or both (Mahajan and Sharma, 2002; Lefebvre *et al.*, 2009), uterine torsion (Araujo *et al.*, 2006), defective placentation (Murugavel *et al.*, 2009), genetic abnormalities (Lefebvre *et al.*, 2009), abnormal hormonal profile and chromosomal abnormalities (Noakes *et al.*, 2011; Yilmaz *et al.*, 2011). However, a definitive aetiology is rarely determined because of tissue degeneration and autolysis. The mummification process usually renders worthless the analysis of bacteria, viruses, biopsies and chromosomes (Sutradhar *et al.*, 2010; Yilmaz *et al.*, 2011). Chanem *et al.* (2006) reported that when DNA from mummified foetus was extracted in a study, two out of ten were carriers (heterozygous) of the autosomal recessive gene for deficiency of uridine mono-phosphate synthase which is known to contribute to embryonic and foetal mortality in cattle (Noakes *et al.*, 2011).

Diagnosis is generally uncomplicated. Transrectal palpation and ultrasonographic examination determines that the mummified foetus has the appearance of a compact, firm and immobile mass without placental fluid or placentomas. The general physical examination of the dam appears normal except for some rare cases in which a decrease in milk production and loss of weight have been observed (Araujo *et al.*, 2006; Kumaresan *et al.*, 2013).

Two types of mummification have been encountered in domestic animals; the haematic and papyraceous type. While the former is seen only in cattle, the papyraceous type occur in all species of animals (Lefebvre *et al.*, 2009). The incidence of mummification has been reported to be as high as 5% (Hornday, 1947), but generally less than 2% (Barth, 1986).

MATERIALS AND METHODS

The survey was carried out in Oyo State government owned Bodija central abattoir in Ibadan which is located at a distance of 3Km away from the University of Ibadan, Nigeria. Ibadan the capital of Oyo State is between latitude 7° and 47° north and longitude 3° east while the central abattoir lies between latitude 7° north and longitude 3° east. It is one of the largest and best organized abattoir in Nigeria and receives cattle from various parts of Nigeria especially the northern Nigeria and even from other countries in West Africa sub-region including Niger, Chad, Burkina Faso and Mali. Although the abattoir has the daily maximum handling capacity of about 1000 heads of cattle, it presently operate with the slaughter of about 1000 heads of cattle daily.

Since most abattoir slaughters are done early in the morning in Nigeria due to lack of good storage facilities and good preservation systems, the abattoir appears congested in the morning a situation that makes it seem incapable of handling the number currently slaughtered on daily basis. The abattoir receives animals from wide geographical areas of West Africa and it provides meat to a cosmopolitan population of the city of Ibadan the largest city in West Africa south of Sahara.

The choice of the abattoir as a point of data collection is therefore considered representative for monitoring animal disease incidences and patterns that represent an average Nigerian abattoir.

Data collection: Foetuses discovered during routine post-mortem meat inspection were considered by the meat inspection officers at the abattoir and collected at a location within the abattoir. It is at this location that data were collated for abattoir records and through the effort of the meat inspection officers and Veterinary officers of the Oyo State Department of Veterinary services, proper records were made and genuine data generated. Daily visits were made to the abattoir by the researchers.

RESULTS

Table 1 shows that there was an increase in the number of slaughtered cattle between January 2013 to December 2014 than that recorded in January 2012 to December 2012, with the increase glaring in January 2013 to December 2013. This may be as a result of economic hardship that prevailed around that period. Perhaps farmers need money to send their children to school and to meet some other domestic needs. During the same period, 59,304 (42.25%) and 52,172 (40%) of the female animal were slaughtered, respectively. The number of foetus discovered during the period (Fig. 1) was 28,148 (47.46%) and 14,120 (27.06%) respectively for January 2013 to December 2014. But the number of foetuses discovered were higher between January 2012 to December 2013.

The Table 1 also showed a sharp rise in the slaughtering of pregnant cows with high record of foetal wastage in January 2013 to December 2013 in which 28,148 (47.46%) foetuses were discovered followed by January 2012 to December 2012 in which 16,260 (36.05%) foetuses were discovered. They both also recorded the highest number of mummified foetuses (Fig. 2) of 704 (2.5%) and 374 (2.3%), respectively.

More cattle were slaughtered during the dry season as shown in Table 2. About 254,436 (65%) for the period of January 2012 to December 2014 as against the rainy season figure of 137,004 (35%). The dry season is characterized by drought and hunger which exposed the animals to poor nutrition, diseases and in order to forestall losses due to natural death or diseases, farmers prefer to sell their animals during this period.

In Table 3, the breed of the slaughtered cattle was observed. The significant breed differences recorded among male and female cattle could be due to the predominant breeds in the area of purchase. It was observed that the crosses of 130,000 (33.2%) were slaughtered followed by Adamawa gudali of 72,000 (18.4%) while Rahaji was 58320(14.9%).

Generally, it could be seen that the total number of animals slaughtered followed the pattern of animals prevalent in the areas of purchase. This finding agrees with the report of Wosu (1988) who reported that animals that predominant in a place are usually slaughtered most than those that are scarce or imported to the area.

Table 4 shows the different age groups of the cattle slaughtered and was supposed to follow the pattern of farmers selling out the old and unproductive animals as compared to younger and most productive animals in their herds in line with Garba *et al.* (1992). But it was discovered in this study that the productive ones were even been put for sale and this may be due to financial status of the livestock farmers.

In Table 5, the number of female foetuses condemned by slaughtering pregnant cows was 32,784 from January

Table 1: Foetal wastage at Bodija central abattoir Ibadan between January 2012 to December 2014

Parameters	Jan 2012 to Dec 2012	Jan 2013 to Dec 2013	Jan 2014 to Dec 2014
Total cattle slaughtered	120,650	140,360	130,430
Total cows slaughtered	45,100	59,304	52,172
Cows slaughtered (%)	37.38	42.25	40.00
No of foetus discovered	16,260	28,148	14,120
Foetus discovered (%)	36.05	47.46	27.06
No of mummified foetus	374	704	254
Mummified foetus (%)	2.3	2.5	1.8

2012 to December 2014 while the male figure was 25,744. The average percentage sex ratio was 37.64: 55.67 and this is of great economic loss to the livestock industry in Nigeria.

DISCUSSION

This study shows an indiscriminate sale of animals by farmers for slaughter regardless of age and gravid conditions which resulted into economic loss for the affected livestock farmers. The sale of young and productive animals for slaughter may be due to a very harsh financial embarrassment of the farmer which he must address at all cost. Pregnant cows have better body condition score (BCS) than the non-pregnant and many farmers and butchers could detect the pregnancy before slaughter, however, the need for money to solve problems overwhelmed the value of the foetus. Another reason for this could be cattle theft by some nomads who at night steal cattle and put them on sale to unsuspecting butchers.

An important factor contributing to the increased slaughter of pregnant cows in Nigeria is the poor enforcement of the existing livestock legislations, although government regulations discourage the slaughter of pregnant cows, however, the structure of the formal cattle marketing and slaughtering systems have flaws limiting their applications, for example some trade cattle shunt Veterinary checks due to tax enforcement. Other possible contributing factor to the high rate of slaughtering pregnant cows is the season of the year as recorded in Table 2. Dry season (November to March) in which 254,436 (65%) of total cattle were slaughtered. The female slaughtered figure during this period was 104,906 (67%) and foetuses recovered were 36,717 (62.73%), while mummified foetuses recovered were 918 (68.92%) of the total foetus discovered during the study.

Disease eradication schemes, economic factors such as the calf price, the cash flow of an individual farm and nutritional factors such as unavailability of pastures are other reasons for slaughtering pregnant cows at the abattoirs and all these contributed to the economic loss to the livestock farmers and also a decreased production of animal protein to the populace.

Table 2: Cattle slaughtered and fetuses recovered during different seasons of the year between January 2012 and December 2014

Parameters	- Rainy season -	---- Dry season ----	Total
	April to October	November to March	
Total cattle slaughtered (TCS%)	137,004 (35%)	254,436 (65%)	391,440
Total female slaughtered (TFS%)	51,670 (37.71%)	104,906 (67%)	156,576
Total fetuses discovered (TFD%)	21,811 (42.21%)	36,717 (62.7%)	58,528
Total mummified foetus	414 (31.08%)	918 (68.92%)	1332

Table 3: Breeds of slaughtered cattle at Bodija Central Abattoir Ibadan from January 2012 to December 2014

Parameters	Breed N (%)	MS	FS	FW	MF (%)
Adamawa gudali	72,000 (18.4)	41,544	30,456	12,128	333 (25)
Bunaji	63,120 (16.1)	38,870	24,250	10,000	133 (10)
Rahaji	58,320 (14.9)	37,760	20,560	8,200	133 (10)
Sokoto gudali	68,000 (17.4)	36,690	31,310	13,200	200 (15)
Crosses	130,000 (33.2)	80,000	50,000	15,000	533 (40)

N: Number of observations (cattle slaughtered), MS: Male animal slaughtered, FS: Female animal slaughtered and FW: Foetal wastage while MF: Mummified foetus



Fig. 1: Photograph of a wasted foetus as seen in the abattoir

Foetal mummification is an uncommon condition in most domestic species of animals, while often seen in multiparous and polytocous species like swine, it is also observed in monotochous species. When there is no foetal signs for the onset of parturition, the corpus luteum is retained and the pregnancy is maintained for an unpredictable time (Drost, 2007; Jana and Ghosh, 2014). The low prevalence of the condition may help explain the scarcity of information in the literature. To further complicate the study of this phenomenon, the physiological mechanisms that maintain pregnancy vary between species, implying different pathways for the condition. The condition is often only diagnosed when the cow is examined because of the prolonged gestation period (Arthur *et al.*, 2011; Drost, 2007). In this study,

bovine foetal mummification was observed after the first trimester of gestation, specifically most of the mummified fetuses were between fourth to eighth month of gestation (Roberts, 1986), suggesting that the death of the foetus were after ossification of foetal bones which generally leads to foetal mummification in the absence of bacterial infection concurrent with or causing the death of the foetus (Robinson *et al.*, 2003). In most samples collected, the uteri contracted on the fetuses, placental fluids got absorbed and foetal membranes becomes shriveled and dried. The subsequent absorption of the amniotic and allantoic fluids resulted in shriveled parchment-like foetal membranes resulting in papyraceous mummification, while in some other mummified fetuses examined,



Fig. 2: Photograph of mummified foetus as seen in the abattoir

Table 4: Age of slaughtered cattle at Bodija Central Abattoir Ibadan between January 2012 to December 2014

Age	N	MS	FS
1.5-2.0 years	102,110	58,624	43,486
2.5-3.0 years	120,000	60,140	59,860
3.5-4.0 years	110,210	59,680	50,530
>4.0 years	59,120	56,420	2,700

N: Number of observations (cattle slaughtered), MS: Male animal slaughtered while FS: Female animal slaughtered

Table 5: Male to female ratio of discovered foetuses from January 2012 to December 2014

Periods	Male foetus	Female foetus	%	Sex ratio
Jan 2012-Dec 2012	7,260	9,000	44.65	55.35
Jan 2013-Dec 2013	12,064	16,084	22.80	57.14
Jan 2014-Dec 2014	6,420	7,700	45.47	54.53
Total	25,744	32,784	37.64	55.67

there were viscous chocolate coloured deposit on the foetal membranes in haematic mummification. Also in this study, 333 (25%) mummified foetuses were found in Adamawa gudali breed, 133 (10%) were found in Bunaji, 133 (10%) were found in Rahaji, 200 (15%) in Sokoto gudali while 533 (40%) were found in crosses. It was observed that the foetal placenta had lower number of cotyledons in the pregnant horn than the values found in normal pregnant horn suggesting the reason for mummification. The result of this study observed the incidence of mummified foetus to be 2.28% which is higher than the 2% found by Barth (1986) and Arthur *et al.* (2011) and lower than the 5% observed by Hornday (1947). Reason for these differences may be due to geographical locations, breed differences and the management practice.

In comparing the observed incidence rate of 2.28% with that of other animal species, horses incidence rate was reported by Tengelsen *et al.* (1997) to be 0.007% which is lower than the observed value in this study. The incidence of foetal mummification in swine varies in literature reports. An incidence rate of 3.45% was reported in Brazilian swine herds, (Borges *et al.*, 2005). Similar result of 3.9% has been reported in French herds (LeCozler *et al.*, 2002). Other studies reported values of between 1.9 and 5.7% (Schneider *et al.*, 2012) and 6.8% gilts (Van de Lande and Van Rens, 2003). An overall incidence of 1.5% is probably accurate (Dial *et al.*, 1992). This variation in incidence rate estimates may be associated with differences between the studies in how meticulously the placenta was examined and farrowing monitored, if the overall incidence rate of 1.5% is considered for pigs and then the incidence rate observed in this study will be higher than that of pigs. In dogs, there are no accurate figures for incidence rate, although it is assumed to be very low while the incidence rate in cats is unknown and presumed to be low.

Conclusion: In conclusion, slaughtering of pregnant cows is an economic disaster to the livestock sector, which needs to be discouraged. More stringent measure should be taken against the butcher that slaughter pregnant cow, also preslaughter inspection should specifically be directed towards identification of pregnant cows so as to prevent the butchers from slaughtering such a cow. To prevent the occurrence of mummified foetus which also contributed immensely to the economic loss of livestock farmers, measures should

be taken to guide against those identified causes; the infectious diseases that results into mummification of foetus should be promptly eradicated. The selling out of productive animals by livestock farmers to the butchers should also be stopped; to this, government is advised to come to the aid of the livestock farmers financially in whatever form government may want to call it.

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