

OCCURRENCE OF A POSSIBLE DWARFISM IN BUFFALOES: A CASE REPORT

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ABSTRACT

The detection and control of congenital diseases are important to maintain productive and reproductive indexes. Dwarfism is characterized by fetal incomplete or malformation. The present report states a possible dwarfism in buffaloes. The calf presented a low birth weight and a slow weight gain. The animal had also an asymmetric skull and deformed members, especially the hind legs. The calf died at eight months of age. Investigations of reproductive historical of parents were done and hypotheses to explain the event were presented.

Keywords: *Bubalus bubalis*, buffaloes, low weight, deformed calf, mutation

INTRODUCTION

The buffalo population, in Brazil, is about 1.3 million heads, being the eleventh country in world ranking (FAOSTAT, 2018, data from 2016). Buffalo products have a good acceptance in the market. One of the reasons is the requirement of consumers for healthy and good quality products. Buffalo dairy and meat products add value in comparison to cattle products due to the

biochemical and/or physical properties.

In dairy and beef production, animal performance is often affected by hereditary and congenital diseases. Reports of unusual events are important to generate tools and better understanding of the species and their production.

Dwarfism in animals is characterized by fetal incomplete or malformation. Although several congenital diseases have been described in buffaloes such as malformation of skull, gastrointestinal tract, skeletal muscles and sex development (Albarella *et al.*, 2017); dwarfism in buffaloes has not been reported so far.

Genetic dwarfism is classified as a hereditary anomaly caused by alteration(s) of the genetic material. In cattle, especially in beef breeds, it is one of the most common genetic disorders and it might be caused by several mutations. The main characteristics are: small stature, abnormal endochondral ossification, skull and members malformations mainly associated to abortions, stillbirths or calf death (Latter *et al.*, 2006; Whitlock *et al.*, 2008). SNPs or indels are the main mutations identified in genes *RFNII*, *ACAN*, *EVC2* and *PRKG2* associated to dwarfism in many cattle breeds (Cavanagh *et al.*, 2007; Koltjes *et al.*, 2009; Murgiano *et al.*, 2014; Sartelet *et al.*, 2012). Moreover, there are also some errors

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occurring during meiosis/mitosis (Yadav *et al.*, 1991) associated to the genetic disease.

Environmental dwarfism is the interaction of biological and/or chemical agents that are able to alter and interfere in embryogenesis and fetal development. Potential causes are drugs that are able to cross the placental barrier, infectious diseases, ingestion of toxic plants or heavy metals and dam nutritional deficit (Dantas *et al.*, 2010).

CASE REPORT

The present report aims to present the case of a possible dwarfism in buffaloes occurred in the farm of the Unidade de Pesquisa e Desenvolvimento, Instituto de Zootecnia in Registro-SP, Brazil.

The calf presented a low birth weight and a slow weight gain (Table 1). The animal had also an asymmetric skull and deformed members, especially the hind legs. The animal died at nine months of age. Unfortunately, it was not possible to take a picture of the animal nor to collect biological material for genetic investigation.

In Table 1, the weight of the deformed animal was reported at different ages as well as the weights of a contemporary calf (with same age and under the same environment). It can be clearly observed the reduced monthly weight gain of the deformed calf in comparison to the other one.

Herd vaccination followed the recommended protocol: foot-and-mouth disease, rage and symptomatic carbuncle. Before calving, the dam was vaccinated against salmonellosis, rotavirus and coronavirus. The administration of ivermectin was done after and before calving for dam, and for calf after birth.

Reproductive records have shown that the dam had two abortions in previous breeding

seasons (2014 and 2015). In the second breeding, the sire was the same of the malformed calf. So, the malformed calf is the unique product of the dam. After this calving, the dam was slaughtered.

DISCUSSION

One of the hypothesis to explain the deformed calf is genetic dwarfism. The buffalo calf phenotypes (light birth weight, slow growth and deformed skull and members) is similar to one of the dwarfism types in cattle (Startelet *et al.*, 2012).

Reproductive performance of dam and sire must be taken into account in a case of possible genetic disorder. The sire was born in 2004. It is a extensively mated bull and there is no report of descendants with similar phenotype. Moreover, it presents a low inbreeding coefficient (2.59%) (Personal communication: Bernardes, O.). The dam had two previous abortions. The last aborted fetus was product of a mating with the same sire above reported. If it was a genetic cause, the mutation might be recessive and with a low allelic frequency. It might be hypothesized that the mutation was occasioned by crossing-over in germ cells of one of the parents, being the dam the main suspect. The fact the sire had a great number of normal descendants reduces the chance of it being the carrier.

The birth of light calves was recorded in a private farm. The occurrence of 42 calves born with less than 25 kg (microsomy) in 6,546 calving was reported. Some of the calves had standard growth, whereas some, did not. Some breeders also reported spontaneous abortions in the final third gestation period in buffaloes without an apparent cause and good fetal development (Personal communication: Bernardes, O.).

Table 1. Month weight records of the malformed calf (A) and a contemporary calf (B).

Date (A)	Weight (A)	Date (B)	Weight (B)
Dec/06/16*	18 kg	Dec/07/16*	36 kg
Dec/27/16	28 kg	Dec/27/16	50kg
Jan/31/17	35 kg	Jan/31/17	55 kg
Mar/02/17	34 kg	Mar/02/17	60 kg
Mar/28/17	43 kg	Mar/28/17	66 kg
Apr/25/17	42 kg	Apr/25/17	76 kg
May/30/17	46 kg	May/30/17	87 kg
Jun/27/17	56 kg	Jun/27/17	106 kg
Jul/31/17	59 kg	Jul/31/17	120 kg
Aug/29/17	56 kg	Aug/29/17	138 kg
Sep/26/17	56 kg	Sep/26/17	158 kg
Sep/30/17**	-	Oct/31/17	178 kg

*Birth, **Death

There are also other diagnosis hypotheses such as accidental ingestion of toxic plants or mycotic agents (Corbellini *et al.*, 2003), infectious diseases caused by bacteria or viruses (Junqueira and Alfieri, 2006) or protozoa (Junqueira and Alfieri, 2006). The fact that it was caused by one these environmental agents tend to be discarded because the animals of the herd were under the same nutritional and sanitary conditions and did not present similar phenotypes.

The contact of breeders with professionals and researchers are necessary to obtain precise diagnoses. The case report is interesting in order to be compared to similar occurrences and to be better studied and comprehended. (Even that causes were not totally understood and just some hypotheses have been raised).

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