ECOPATHOLOGIAL APPROACH OF BUFFALO CALVES MORBIDITY AND MORTALITY IN AMAZON REGION, BRAZIL

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ABSTRACT

Data from disease and death occurrences carried out during 20 years period (1981 - 2001) were used to identify the interrelationship between management practices and buffalo calf morbidity and mortality. Logistic regression was used for analysis of the variables: place of birth, colostrum feeding, navel treatment, calf housing, helminth control, dam parity, dam health status calving supervision, vaccines administration and time of separation from dam. This analysis indicated that the seven first variables are significantly associated with the morbidity and mortality of buffalo calves. Population attributable fraction estimates demonstrated the importance of these practices in preventing early the occurrences. This is the first ecophatological study of buffalo in the Brazil.

Key words: buffalo calf mortality, ecopathology, risk factors

INTRODUCTION

Ecopathology is one branch of epidemiology whose the principal purpose is the study of the relationship between the environment and the animal pathologies. Their principal objective is the identification of the risk factors that determine the apparition of the health imbalances for to establish measures that aim at modifying the conditions under which diseases appear. Complex, multifactorial diseases are of most concern in ecophatological investigations (7).

Data collection, processing and analysis are similar to those of other epidemiological studies. The difference in the case of ecopathology is that the final product of a study is most often a profile of circumstances characteristic of individuals or groups found to be diseases *versus* those of normal health status. The method emphasizes the development of profiles of combinations of variables found to be characteristic of groups of individuals or farms in different relative health states (8).

The ecopathological approach to risk factors associated with calf morbidity and mortality has been frequently reported in several studies on cattle (6, 9, 10, 12) whereas, very few reports are available on buffaloes. Therefore, the objective of the present study was to use ecopathological methods to identify the risk factors for buffalo calves morbidity and mortality in Amazon farms.

MATERIAL AND METHODS

Disease and death occurrences data of 1744 buffalo calves were recorded during 20 years (1981–2001) at three buffalo experimental farms of Embrapa Amazônia Oriental (Brazilian Agricultural Research Organization) located in differents Amazon regions: Belém region (616 calves), Marajó island (287 calves), and low Amazon River (841 calves). The breakdown of these data was broadly similar to that found in private dairy farms. Mortality and morbidity between at birth and 180 days were calculated among all calves born. Abortion and stillbirths were excluded from analyses. To quantify the effects of risk factors, logistic regression models were run at the herd level as dependent variable. The variables include: place of birth (reference: birthing paddock; non birthing paddock), calving surpevision (reference: with assistance; without assistance), colostrum feeding (reference: with nursing; without nursing), navel treatment (reference: no treatment; treated), calf housing (reference: higienic; unhygienic), helminth control (reference: yes; no), administration of vaccines (reference: yes; no), dam parity (reference: 1st calf; 2nd or more calf), dam health status (reference: good; bad), time of separation from dam (reference: 6 months; no separation). Backward selection of variables was based on the likelihood radio statistic. Odds-ratios (OR) issued from final logistic regression model were derived into relative risks according to (2). From the multiple

logistic regression model, OR with 95% confidence limits were computed. Estimation of the importance of key variables in the population attributable fractions (PAF) was computed using the multivariable method described by (1). No variables ere forced into the model, and no interactions were tested.

RESULTS AND DISCUSSION

The buffalo calves morbidity and mortality rates in three Amazon regions are presented in Table 1.

Table 1 - Calf morbidity and mortality percentage in three differents Amazon regions (1981-2001)

AGE (month)	BELEM REGION		MARAJO ISLAND		low Amazon River	
	MORBIDITY	Mortality	MORBIDITY	Mortality	*Morbidity*	Mortality
0 – 1	3.0	1.0	4.8	1.0	5.4	2.6
1 – 3	7.3	2.5	7.5	4.5	9.8	6.4
3 – 6	5.6	1.2	4.3	2.0	6.3	2.6

In all regions, high morbidity and mortality rate were seen in buffaloes with age between 1 at 3 months whereas morbidity is mainly due to diarrhea. This finding agree with the conclusions of (4). According to (5), the very high occurrences in this age group could be attributed to pathological effects realized by gastrointestinal parasitoses, principally by *Neoascaris (Toxocara) vitulorum.*

Seven variables were significantly associated with the morbidity and mortality of buffaloes calves: place of birth; colostrum feeding; navel treatment; calf housing; helminth control; dam parity, and dam health status. Three were non-significantly associated: calving surpevision; administration of vaccines; and time of separation from dam (Table 2).

Table 2 - Risk factors increasing significantly the morbidity and mortality of buffalo calves with 1 at 180 days of age.

Variables	REFERENCE	RELATIVE RISK	PAF (%)
PLACE OF BIRTH	*Non birthing paddock*	2.57	32.1
Colostrum feeding	Without nursing	6.25	72.8
NAVEL TREATMENT	NO TREATMENT	4.31	66.2
Calf housing	Unhygienic	5.11	46.8
Helminth control	No	12.9	98.4
Dam parity	1st calf	2.59	26.0
Dam health status	bad	2.76	45.4

Similar results also reported in studies of management and neonatal bovine losses associations (3, 11, 12). In this study helminth control was a greatest risk factor of buffalo calves losses. A possible reason for this was the *Neoascaris vitulorum* infestation, considered for unknown reason, more lethal to buffalo than to cattle calves.

Population attributable fraction (PAF) is interpreted as proportion of death preventable if the effect of a factor of interest is removed (13). Thus, the factors with a high population attributable fraction calculated in this study (colostrum feeding, navel treatment, helminth control) have both a strong effect and a high priority in the prevention of unweaned buffalo losses. The relative risks detected for each variable/ reference suggest that their activity relationships that are not cause absolute but

rather express failure of management practices. All of these activity appear to be technically possible and economically practicable.

There are no reports in the national literature concerning the association of buffalo calves morbidity and mortality and risk factors. Results of this study suggest that the problem of losses in buffalo calves during the first 6 months following birth is due to the little known on the existence of risk factors associated with management procedures of these animals in Amazon buffalo farming. It is clear that the appropriate management practices (colostrum feeding, navel treatment, helminth control) can influence on the morbidity and mortality rate of buffalo calves.

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