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Embryonic mortality in buffalo naturally mated

D. Vecchio[1], R. Di Palo[1], L. Zicarelli[1], C. Grassi[1], A. Cammarano[1], M.J. D'Occhio[2], G. Campanile[1]

[1] Department of Scienze Zootecniche ed Ispezione degli Alimenti, Faculty of Veterinary Medicine, Via F. Delpino 1, 80137 Napoli, Italy

[2] School of Animal Studies, Faculty of Natural Resources, Agriculture and Veterinary Science, University of Queensland, Gatton Campus, Queensland, Australia

Corresponding author: D. Vecchio. Department of Scienze Zootecniche ed Ispezione degli Alimenti, Faculty of Veterinary Medicine, Via F. Delpino 1, 80137 Napoli, Italy - Tel. 081 2536069 - Fax: 081 292981 - Email: d.vecchio@unina.it

ABSTRACT: The aim of this work was to evaluate the incidence of embryonic mortality in three different period of year in buffaloes naturally mated. The trial was carried out in a buffalo farm located in Caserta province between 2000-2006. In this period were registered natural insemination on 200 buffaloes. Pregnancy diagnosis was carried out on Day 30, confirmed on Day 45 and every 15th days until 90 days after natural mating. Buffaloes that were pregnant on Day 30 but not on Day 45 or Day 90 were considered to have undergone embryonic (EM) or fetal mortality (FM) respectively. EM and FM were 8.8% and 13.4% respectively throughout the experimental period. A high incidence ($P<0.01$) of FM was found in the transitional period (December-March) than in other months of the year. The incidence of embryonic mortality was significantly ($P<0.01$) higher between 28-60 days of gestation and lower after 71 day of gestation. The higher fetal mortality found in this study could be due the lower serum levels of progesterone normally found in transitional period in buffalo cows.

Key words: Embryonic mortality, Stage of gestation, Conception months, Natural insemination.

INTRODUCTION - Embryonic/fetal loss occurs throughout pregnancy in cattle; however, it is concentrated mainly in the first forty days after breeding, in the embryonic phase of pregnancy, before the embryo becomes a fetus. Approximately 30% and 40% of the embryonic losses occur by day 7 and by days 8-17 of pregnancy respectively (Thatcher et al., 1994). Pregnancy wastage decreases in severity as pregnancy advances, and fetal loss (after day 42) is generally less than 10% (Vasconcelos et al., 1997).

Embryonic mortality is one of the main causes of the decline in fertility that occurs in buffaloes during periods of increasing daylight length (out sexual breeding season). The incidence of embryonic mortality has been reported to be approximately 7% in decreasing daylight length (Baruselli et al., 1997) and 45% with increasing daylight length (Campanile et al., 2005). Embryonic mortality in buffaloes mated by AI in mid-winter appears to occur later (Day 25-40) than in cattle. Buffaloes may require exogenous hormone treatments that induce elevated P_4 over the entire period from initial development to embryonic attachment.

Gametes quality is one of the factor that increase embryo mortality in domestic animals. Oocyte quality, as judged by the capacity to result in embryonic development and pregnancy, may be reduced in buffaloes during the anoestrous period when daylight length increases (Campanile et al., 2005). The aim of this work was to evaluate the incidence of embryonic mortality in three different period of year in buffaloes naturally mated.

MATERIAL AND METHODS - The trial was carried out in a buffalo farm located in Caserta province between 2000-2006. In this period natural inseminations on 200 buffaloes, in which the oestrus were registered by a pedometer system (AFIMILK), were recorded. The animals were maintained in open yards that allowed 15 m^2 for each animal. A total mixed ration consisting of 50-55 % forage and 45–50 % concentrate, containing 0.90 MFU/kg of dry matter (DM) and 15% crude protein / DM was fed daily in a group pen situation.
Thirty days after natural insemination buffaloes underwent trans-rectal ultrasonography to assess embryonic development. Ultrasonography was conducted with an Aloka SSD-500 unit equipped with a 5.0 MHz linear array probe (Aloka CO., Tokyo, Japan) and was carried out by the same experienced operator. Pregnancy diagnosis was confirmed on Day 45, using ultrasonography, and every 15^{th} days until 90 days after natural mating. Buffaloes that were pregnant on Day 30 but not on Day 45 or Day 90 were considered to have undergone embryonic (EM) or fetal mortality (FM) respectively. In order to verify the differences among the incidences of embryo mortality between the different years or conception period (December-March, April-July, August-November) were used Chi square test. Differences in intercalving period between period, years and buffaloes that had embryonic or fetal mortality were tested by ANOVA .

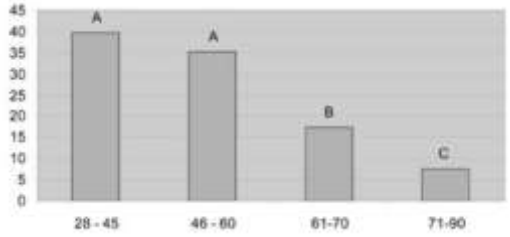
RESULTS AND CONCLUSIONS - No differences were found on the pregnant rate (average 75%) and intercalving period (499 ± 25 days) between the years. Obviously, buffaloes that showed fetal mortality (FM) employed respectively 46 and 161 day more than EM and buffaloes in which no embryo or fetal mortality was registered. Independently from the conception period the 8.8% and the 13.4% of the buffaloes that were mated throughout the year showed respectively EM and FM. No differences emerged between the incidence of EM in the conception period (table 1), while a high incidence ($P<0.01$) of FM was found (table 1) in which daylight length increase (transitional period: December-March). Calving parity and milk yield did not affect embryo or fetal mortality. Incidence of embryonic mortality was higher between 28-60 days of gestation and lower after 71 days (Figure 1). This result is different from that reported in cattle (Silke et al., 2002), in which the embryonic loss rate was similar during gestation stage. In this study the incidence of embryonic mortality observed in the transitional period was similar to that reported from Di Palo et al. (2005) in farms characterized by a low incidence of EM and from Baruselli et al. (1997) in a decreasing daylight length period and lower than that observed in a previous study conducted in the same time of year (Campanile et al., 2005). The differences with the latter may be due to several factors affecting embryonic mortality in buffalo cows: stage of pregnancy diagnosis (25 days vs. 30 days), natural vs. artificial insemination and other factors that influence maternal recognition of pregnancy. FM found in this study was similar than that reported in cattle (Vasconcelos et al., 1997). Starbuck et al. (2004) report that the concentrations of progesterone at 5 week of gestation, twin ovulation, body condition, age and service sire are associated with late embryonic and early fetal mortality in dairy cattle. Progesterone might play an important role in either

Table 1. Incidence of embryo (EM) and fetal (FM) mortality during the periods.

	EM %	FM %
December-March	9.1	16.6 [a]
April-July	7.0	10.9 [b]
August-November	10.8	11.2 [ab]
Total	8.8	13.4

a vs. b = P<0.05.

Figure 1. Embryonic loss rate during stage of gestation.



the process of placentation or maintenance of the embryo during placental attachment (Starbuck et al., 2004). The higher fetal mortality found in this study could be due the lower serum levels of progesterone normally found in transitional period in buffalo cows (Campanile et al., 1989). The maintenance of pregnancy in buffaloes requires a reduction of progesterone decrease normally found in buffalo that had embryonic mortality (Campanile et al., 2007). The transitional period (December-March) is a critical period for embryonic development and maternal recognition of pregnancy.

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