INTERRELATIONSHIP AMONG ENVIRONMENTAL, PHYSIOLOGICAL AND MANAGEMENT FACTORS, COOLING TREATMENT, BETA HYDROXYBUTYRATE AND SERUM PROGESTERONE AT INSEMINATION WITH CONCEPTION RATE OF WATER BUFFALO *(Bubalus bubalis)*

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ABSTRACT

A study was carried out from January 2001 to March 2003, at Melsiripura and Nikaweratiya National Livestock Development Board farms, to assess the relationship among thermal environment, physiological indices, circulating hormones, metabolites and management at the time of insemination with conception rate (CR) of water buffalo *(Bubalus bubalis)*.

A total of 226 breedable buffalo cows at 90 - 300 days postpartum (DPP) and belonging to Nili-Ravi, Surti breeds and their crosses were used for this study. All the cows were artificially inseminated (AI) with deep frozen semen of the same bull following oestrous induction by administering of progesterone releasing intra vaginal device (PRID) and prostaglandin ($PGF_{2\alpha}$) and detection of heat signs. At the time of insemination, individual rectal temperature (RT), vaginal temperature (VT), pulse rate (PR), respiration rate (RR), heat sign score (HSS), body condition score (BCS) of each cow, the time of AI and the time lapse between fist detection of heat signs to insemination were recorded. In addition, the environmental temperature (ET) and relative humidity (RH) at the time of insemination was also recorded. A representative sample of 102 cows was randomly selected for application of cooling treatment (sprinkling of 10 L water / cow for 10 min at –1hr, 0 hr, and +1 hr post insemination). Data on age, parity, date of last calving, test day milk yield (MY) of each cow and information on the experience of the inseminator were documented. Blood samples were obtained at insemination from each cow to quantify circulating D-3- hydroxybutyrate (BHB) and progesterone. Conception was assessed by per rectal palpation at 90 days and 120 days post insemination.

Mean ET, RH and temperature humidity index (THI) at inseminations (n=226) were 28.4 ± 2.3 ^{o} C, 75.6 ± 2.5 % and 79.6 ± 2.7, respectively. ET was negatively ($p<0.05$) correlated to RH, but was positively ($r= 0.88$, $p<0.05$) correlated with THI. RR was inversely ($p<0.05$) related to RH. VT and RT were positively ($r= 0.55$, $p<0.05$) correlated, while VT was 0.4 ± 0.22 ^{o} C higher than RT. Test day MY was negatively ($p<0.05$) correlated with ET, THI and age of the animal.

Over all mean CR was 55.38 %. Lower ($p<0.05$) CR was resulted from inseminations performed when ET > 29.0 ^{0} C, THI > 81.4, RT > 38.0 ^{0} C and VT >38.0 ^{0} C. Cooling treatment significantly ($p<0.05$) reduced RT and VT at insemination and improved CR, but did not affect circulating BHB, progesterone, intensity of heat symptoms or MY. Negative trend between CR and BHB suggested importance of energy nutrition of cows for improving CR. Cows that were <150 DPP, those inseminated within 8-16 hours of first detection of heat, and the cows with more intense heat signs at insemination had superior ($p<0.05$) CR. Blood serum progesterone varied among cows in association with the reproductive status, while CR varied between inseminators.

These results suggest that the CR of water buffalo cow is adversely affected under hot thermal environmental condition and poor energy nutrition. Cooling at insemination to reduce RT and VT below 38^{0} C, inseminating the cows having low BHB, high intensity of heat signs, at <150 DPP, within 8-16 hours of first detection heat by a skilful technician can improve CR in water buffalo.

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