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EFFECT OF PATERNAL EXPOSURE TO HIGH TEMPERATURE-HUMIDITY INDEX ON SUBSEQUENT IN VITRO EMBRYO MORPHOKINETICS IN BOS TAURUS

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BACKGROUND-AIM
Bulls exposed to high temperature-humidity index (THI) experience adverse effects on sperm quality and in vitro embryo production (IVEP) outcomes. However, detailed information about the influence of paternal high-THI exposure on in vitro embryo morphokinetics is missing. The aim of this study was to evaluate the effect of bull exposure to high THI on the subsequent in vitro embryo morphokinetics by means of time-lapse image monitoring (TLM).
METHODS
Twelve ejaculates from six mature Simmental bulls that were exposed to high (n=6) and low (n=6) THI during the epididymal maturation phase were used for IVEP. Briefly, 96 in vitro matured cumulus-oocyte complexes retrieved from slaughterhouse ovaries were inseminated with high (n=48) and low (n=48) THI sperm samples during six IVEP sessions. A total of 73 fertilized embryos were cultured in vitro (IVC) in a micro well group culture dish (Vitrolife, Denmark) and monitored with a TLM system (PrimoVision, Vitrolife, Denmark). Images were recorded every 10 minutes until day 9 of IVC. Insemination time was considered as time 0 and used to calculate the developmental events. The time of first (T1) and second (T2) cleavage, last cleavage before entering the lag-phase (T9), cleavage resumption after lag phase (RCl), length of lag-phase (LP), start time of blastocyst expansion (tSB) and time of hatching (tHB) were recorded.
RESULTS
Both groups of embryos were similar regarding T1, T2, T9, RCl, LP and tHB (P>0.05). However, the in vitro derived embryos from bulls exposed to high-THI presented a faster blastocyst expansion (P<0.05) when compared to low-THI (159 ± 11 and 169 ± 21, respectively).
CONCLUSIONS
Our results described for the first time the effect of paternal high-THI exposure on the morphokinetic parameters of in vitro produced bovine embryos and suggest a relationship between paternal high-THI exposure and the time of blastocyst expansion.

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THERMAL COMFORT AND THERMOGRAPHIC SCROTAL GRADIENTS OF BULLS RAISED ON SHADED TROPICAL PASTURES: PRELIMINARY RESULTS

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BACKGROUND-AIM
This study aimed to evaluate the thermal comfort and the scrotal temperature gradients of bulls of two breeds raised on natural shaded tropical pastures.
METHODS
Nelore (NEL, n=16; Bos indicus; 30 months; 478kg) and Canchim bulls (CAN, n=16; 5/8 Bos taurus x 3/8 Bos indicus; 32 months; 488kg) were raised on pastures with a 20% shaded area (Eucalyptus urograndis) in São Carlos, Brazil (21°57S, 47°50'W). Monthly, respiratory rate (RR, breaths/min), rectal temperature (RT, oC), and infrared thermographic scrotal surface patterns were evaluated (Testo 890-2), during the day´s greatest thermal challenge period (11:00 am to 2:30 pm). Thermal gradients (oC) were determined by the difference between the RT and the temperatures of the scrotum (G1), spermatic cord (G2), proximal testicular pole (G3), distal testicular pole (G4), tail of epididymis (G5), and between the temperatures of both testicular poles (G6). The data comprised the period from April to June (Mean air temperature: 20.2oC; relative humidity: 69.2%; THI: 66.8). Means were compared by ANOVA and Tukey´s post-hoc test.
RESULTS
The RR (34.1±1.1 vs 34.5±1.6) and RT (39.37±0.08 vs 39.43±0.07) of NEL and CAN did not differ and were within the physiological range, indicating no thermal stress. NEL and CAN bulls did not differ regarding G1 (5.75±0.14 vs 5.70±0.18), G3 (5.07±0.15 vs 4.70±0.16), G4 (6.64±0.12 vs 6.96±0.19) and G5 (8.14±0.18 vs 8.72±0.26). However, NEL bulls presented higher G2 (3.78±0.18 vs 3.18±0.17, P<0.05) probably due to the longer and narrower testes and a greater number of scrotal sweat glands, which benefit both sensible heat and latent heat transfers. CAN bulls presented higher G6 (2.26 ± 0.14 vs 1.57 ± 0.12, P <0.01) probably because of the volume of scrotal sweat glands, that increases from the proximal to the distal testicular poles both in Bos taurus and their crossbreeds.
CONCLUSIONS
Shaded pastures promoted thermal comfort to Nelore and Canchim bulls. Despite the breed, thermal gradients particularities of the spermatic cord and the testicular poles indicated that these anatomical regions play a critical role in scrotal thermoregulation. The use of infrared thermography may be an interesting complementary tool to the breeding soundness evaluation of zebu and composite bulls. (FAPESP Process 2019/04528-6).