

## Abstracts - 35th Annual Meeting of the Brazilian Embryo Technology Society (SBTE) OPU-IVF and ET

## Environmental thermal variation on the embryo production of Nellore cows

Talitha Rocha Ferraz<sup>2</sup>, Daniele Gomes Araújo<sup>2</sup>, Eliane Vianna da Costa e Silva<sup>2,4</sup>, Gustavo Guerino Macedo<sup>2,4</sup>, Izadora Santana de Souza<sup>2</sup>, Ériklis Nogueira<sup>3,4</sup>, Paola Moretti Rueda<sup>2,4</sup>, Urbano Gomes Pinto de Abreu<sup>3,4</sup>, Breno Fernandes Barreto Sampaio<sup>2,4</sup>

<sup>2</sup> FAMEZ/UFMS - Faculty of Veterinary Medicine and Animal Science, Federal University of Mato Grosso do Sul State (Av. Sen. Filinto Muller, 2443, CEP: 79070-900, Campo Grande, MS, Brazil. ), <sup>3</sup> Embrapa Pantanal - Embrapa Pantanal (- Rua 21 de Setembro, 1880 - Bairro Nossa Senhora de Fátima Caixa Postal 109 - Corumbá, MS- Brasil - 79320-900), <sup>4</sup> GERA - Group for studies in animal reproduction of Mato Grosso do Sul State (Animal Reproduction Laboratory)

## Resumo

This study verified the effect of environmental variation on embryo viability and the quality of Nelore cow embryo donors. An embryo production database was got data from 10 years of cows (n= 564) subjected to a traditional superovulation (SOV) FSH-based protocol. The SOV was performed with 4 consecutive days of decreasing doses of FSH. Uterus were flushed 7 days after insemination (n= 1856 embryo recoveries). The quantity and quality of the embryos per flush were registered and the viability rate (VR) calculated. The air humidity and temperature month (tm) were used to calculate the temperature and humidity index (THI): 4 days of SOV(THIsov); 2 days of artificial insemination (THIai); 2 days post AI referring to early embryo development (THIemb); 12 days of the entire embryo transfer protocol (THIet); and THI for each month (THIm). The multiple linear regressions considered VR, VV, total embryos, and the climatic variables for the rainy and dry period. THIsov, THIai, THIemb and THIet did not influence the embryo quantity and quality (P>0.05). The total number of embryos and VR fluctuated based on the tm (TTemb=-5.6087+2.1864xtm-0.0522xtm<sup>2</sup>; VR=-92.372+12.341xtm-0.2554xtm<sup>2</sup>; respectively). TTemb and VR were positively impacted by tm when it ranged from 17 to 27 °C (TTemb=16.65±0.50; VR=53.13±2.75%), than under 17 oC (13.41±1.32; 26.34±10.39%; respectively) or above 27 oC presented (11.19±2.20; 33.24±5.52%, respectively). Also, these characteristics were affected by THIm (TTemb= -145.9+4.8137xTHIm-0.0354xTHIm<sup>2</sup>; VR=-683.2+20.682xTHIm-0.1444xTHIm<sup>2</sup>, respectively; p<0.05). THI values from 64 to 74 resulted in higher embryo viability (TTemb =17.29±0.35; VR= 54.27±2.53%) than under 64 (13.93±1.75; 29.44±9.67%; respectively) or above 74 (11.34±2.76; 34.05±8.82%, respectively. The THI values decreased VR and viable embryos become even worst. These results were very interesting for Nelore cows: The Low temperature activates the endocrine mechanisms for induced thermogenesis, via the hyothalamic-pituitary-thyroid axis. There is also release of adrenaline from the adrenal glands. This process increases overall cellular oxidation and carbohydrate utilization by increasing blood glucose concentration (Silva and Campos Maia, Principles of animal biometeorology, 3:75-106, 2000). 2000). Oocytes from Nellore females suffer from heat and cold stress, impairing embryonic development (Melo-Sterza and Poehland, Int. J. Molec. Sci., 22:3421, 2021). Oocytes from donors of the Pantaneira breed, it's a breed adapted to the tropics, show signs of cold stress as HSP70 were recruited when environment temperatures were below 23 oC (Sousa-Cáceres et al., Theriogenology,130:103-10,2019). Therefore, Nelore embryo donors demonstrate better response to an embryo transfer program (more embryos produced and VR) when the air temperature ranges from 17 to 27 °C and the THI ranges from 64 to 74.

Keywords: beef cattle, environment, thermic stress, embryo transfer, fertility