

**THEMATIC SECTION: 36th ANNUAL MEETING OF THE BRAZILIAN EMBRYO TECHNOLOGY SOCIETY (SBTE)
EMBRYOLOGY, DEVELOPMENTAL BIOLOGY, AND PHYSIOLOGY OF REPRODUCTION**

Effects of an early weaning system on growth and reproductive characteristics of Nelore heifers during rearing

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We aimed to evaluate the effects of early weaning (150 days vs. 240 days) of Nelore calves during two consecutive generations on the second-generation heifers' body growth and reproductive characteristics. For this study, 34 heifers born in 2021 were subjected to the effects of either early weaning (n=16) or conventional weaning (n=18) during their fetal programming (weaning of the previous generation when they were in the uterus) and were also subjected to the same weaning regime in 2022. Thus, the effects of early weaning during the gestational period and calf-rearing period were analyzed. From 90 days of age until weaning (150 days or 240 days), a *creep-feeding* was provided. From weaning to 16 months, the heifers received a protein-energy supplement (10g/kg of body weight; BW). Calves were weighed at birth, 5 and 8 months. At 14-16 months, heifers were subjected to a puberty induction protocol (150mg of intramuscular long-acting progesterone) and timed- insemination (TAI) protocol. From 12 to 18 months, all heifers were evaluated every 28±3 days for BW, body condition score (BCS; scale 1 to 9), average daily weight gain (ADG), rump fat thickness (RFT), reproductive tract score (RTS; 1-5), ovary score (1-5), dominant follicle (DF) size and blood perfusion on the day of TAI, and puberty and pregnancy rates. Data were analyzed using the MIXED or FREQ procedures of SAS. For BW, a significant (P<0.0001) interaction between treatment and time indicated that conventional-weaned heifers were heavier from 8 to 13 months and 15 to 16 months compared to early-weaned heifers; whereas no difference between groups was observed at 5, 14, and 18 months. For ADG, an interaction of treatment and time (P<0.0001), indicated that conventional-weaned heifers gained more weight between 5 and 8 months; whereas, early-weaned heifers had a higher daily weight gain between 12 and 14 months. For BCS, there was only a time effect (P<0.0001), indicating an increase over time. For RFT, an interaction between treatment and time indicated that conventional-weaned heifers tended (P<0.07) to have greater rump thickness compared to early-weaned heifers at 13 months. The weaning strategy did not affect RTS and ovary score, but a time effect (P<0.0001) reflected an increase in these endpoints over time. The DF diameter two days before TAI (overall mean: 10.5±0.4 mm) and at TAI (overall mean: 12.7±0.5 mm), blood perfusion of the DF at TAI (overall mean: 21.5±2.4%), and puberty (overall: 38.2%) and pregnancy rates (overall: 55.9%) did not differ (P>0.1) between weaning groups. In conclusion, precocious heifers born in the early weaning system and receiving a quality of nutrition can overcome the reduced BW gain from 5 to 8 months of age due to lack of suckling compared to heifers in the conventional weaning system, and present comparable body and reproductive development and performance in their first breeding season.

Acknowledgments: Biogenesis Bagó and FAPESP (2017/18937-0).