

## Internal Temperature of Girolando (Holstein×Gir) heifers in integrated crop, livestock (ICLS) and forestry (ICLFS) systems

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Heat stress has an important role for livestock production, especially for dairy cattle because of its effect on milk production. The objective of this work was to evaluate the internal temperature (IT) of Girolando heifers in integrated crop, livestock (ICLS) and forestry (ICLFS) systems. Trial was carried out at experimental field of Embrapa Rondônia, Porto Velho, Rondônia, Brazil. Experimental period was from September to November of 2015. Eight 25 month-old Girolando ( $\frac{3}{4}$ Holstein  $\times$   $\frac{1}{4}$ Gir) heifers with  $262.5 \pm 85.6$  kg of live weight (LW) were randomly distributed between two homogeneous groups submitted to pastures cultivated with *Brachiaria brizanta* cv. Xaraés under intermittent management for maintain forage dry mater availability above 15% of LW. The pasture of ICLFS was shaded by seven tiers of eucalyptus (*Eucalyptus grandis*) trees using 3x3 m of planting distance. The experimental design was a 2x2 crossover with two systems (ICLS and ICLFS) and two 30-day evaluation periods. Internal temperatures were taken in intervals of 10 minutes during 48 hours using iButton Temperature Datalogger adapted inter-vaginal disposals. Concomitantly, the ambient temperature and relative humidity data were taken from datalogger-thermohygrometers adapted in PVC shelters placed in the center of each experimental area. The THI values were estimated by Kibler's equation:  $1.8Ta - (1 - RH)(Ta - 14.3) + 32$ ; where Ta is the ambient temperature in °C, RH is the relative humidity as a fraction of the unit. Variance analysis was performed by MIXED procedure of SAS and means were compared by Tukey test at 5% of significance level. Heifers from ICLS had higher IT ( $39.4571 \pm 0.1033$  °C) than those from ICLFS ( $39.3846 \pm 0.1033$  °C;  $P < 0.05$ ), which should be explained by the differences ( $Pr = 0.0226$ ) between THI values of ICLS and ICLFS:  $79.0489 \pm 0.3123$  and  $78.9797 \pm 0.3123$ , respectively. Means of IT observed in both systems are slightly out of the thermoneutral zone (38-39 °C) and THI values are higher than 72, the limit in which milk production is affected by heat stress. Girolando heifers have lower internal temperature grazing pasture shaded by eucalyptus.

**Key Words:** dairy production, crossbreed cows, heat, thermoregulation

**Acknowledgements:** The authors thanks National Counsel of Technological and Scientific Development (CNPq) (Brazil) for financial support of this project (Grant n. 459130/2014-5)