# Evaluation of anatomical regions for subcutaneous use of microchips in dairy cows: preliminary results

Letícia Krügner Zanetti[1*], Lívia Ferreira Pinho[2], Mariana Jucá Moraes[2], Gabriela Novais Azevedo[1], Teresa Cristina Alves[3], Alexandre Rossetto Garcia[3]

[1]Centro Universitário Central Paulista (UNICEP), São Carlos, SP, Brasil.
[2]Universidade Federal do Pará (UFPA), Castanhal, PA, Brasil.
[3]Embrapa Pecuária Sudeste (CPPSE), São Carlos, SP, Brasil.
*Bolsista de Iniciação Científica (CNPq) e autor correspondente: letyzanettii@gmail.com

The implementation of precise livestock farming technologies has as a premise the electronic identification of the animals. Currently, some digital devices for internal use also have the function of temperature monitoring, which is important to assess the animal thermal comfort. However, information about its applicability and the criteria of choice is scarce. Thus, the objective of the study was to evaluate four anatomical regions for microchip implantation, considering rectal temperature (RT) as reference. Tree non-lactating cows (7.0 years; live weight 592 kg), ½ Holstein and ½ Jersey, were used. Cows were kept in an integrated crop-livestock-forest system. In each animal, microchips were subcutaneously implanted: in the medial raphe, above the rear udder attachment (Raphe); in the right ear base (Ear); in the tail head (Tail); and in the region of the point of elbow (Elbow). RT and microchips temperatures were measured every one hour from 7:00 am to 5:00 pm during a summer day. Local weather station records were used to calculate the temperature and humidity index (THI). Statistical analysis was performed in Bioestat 5.4 software. The significance level adopted was 5%. The overall mean temperatures were: RT=38.76±0.57°C, tail=38.15±0.69°C, raphe=37.81±0.73°C, ear=37.67±0.98°C, and elbow=37.12±1.0°C. The differences relative to RT were of 0.61°C (tail), 0.95°C (raphe), 1.09°C (ear), and 1.64°C (elbow). There was a positive correlation (P<0.05) between RT and ear (r=0.78), elbow (r=0.84), tail (r=0.88) and raphe (r=0.93) temperatures. THI was not correlate with RT and elbow temperature, but it was positively correlated with raphe (r=0.39), tail (r=0.39), and ear (r=0.39) temperatures. Only the point of elbow showed no correlation with THI. This characteristic may be indicative of interest, as it demonstrates little influence of the microclimate on the tissue temperature recorded by the microchip. Ear temperature correlation with RT was higher than r=0.26, which was previously reported for beef cattle (Giro et al., 2019; J Therm Biol,84:121-128). However, the ear temperature was mostly influenced by microclimate. Tail temperature was the closest to RT and showed higher correlation than r=0.60, previously reported (Vieira et al., 2021; J Therm Biol,100:103052) The raphe region showed the highest correlation with RT, and low correlation with THI. The results indicate that the four regions studied can be used as points for microchip implantation. Although, considering the lower influence of the external environment and the greater relation with the internal body temperature, the raphe and tail head showed greater potential for practical applications. Still, these are anatomical regions of easy access during management procedures in dairy herds.

**Keywords**: transponder, dairy cattle, thermal comfort, animal welfare, precision livestock farming.