

Microclimate and feeding behavior of beef cattle in integrated crop-livestock-forest systems with *Brachiaria brizantha*¹

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Among the many benefits of the integrated crop-livestock-forest systems (ILPF), particular attention must be drive to the more comfortable environmental due to the presence of the trees in the system and consequent shading in the understory. In bovines, thermal stress causes from physiological changes to behavioral patterns changes. Thus, assessment of changes in feeding behavior associate with microclimatic indices can be used to infer the state of thermal stress of animals. This study aimed to evaluate the thermal comfort and diurnal feeding behavior of Nelore heifers kept in two environments with different tree species and arrangements. The treatments are: (i) ILPF-1 with *Eucalyptus urograndis* arranged 22 m x 2 m (227 trees ha⁻¹) integrated with *Brachiaria brizantha* cv. BRS Piatã, and, (ii) ILPF-2 with *Gochnatia polymorpha* and *Dypterix alata* (5 trees scattered ha⁻¹) integrated with *Brachiaria brizantha* cv. BRS Piatã. The experimental period was from January to March 2016, with assessments on two consecutive days each month, from 6:00 am to 6:00 pm. It was held instant visual observation of behavioral activities (grazing, rumination and other activities), and the location (sun or shade), at 10 minute intervals. The climatic data (temperature, humidity and solar radiation) were collected every hour. There was 74.62% interception of solar radiation in ILPF-1 and 71.02% in ILPF-2, resulting in milder temperatures in the shade. This reflected in more comfortable microclimatic in both systems, as indicated by the Globe and Humidity Temperature Index (ITGU): 82 in the shade and 87 in the sun, in ILPF-1, and 83 in the shade and 87 in the sun, in ILPF-2. The presence of trees in the system changed the thermal condition from "emergency" (in the sun) to dangerous (in the shade), according to the classification of the National Weather Service (1976). Among all activities observed, the animals in ILPF-1 system spent more time grazing (37% of the time in the sun and 32% in the shade). In ILPF-2, the time grazing was lower, with predominance of activity in the sun (52%) compared to the shade (3%), probably due to the restricted shade available in this system. The presence of shadow in livestock systems improves the microclimate. However, this can not be considered the only factor that influences the animal behavior. Other parameters directly related to the shading use behavior as availability and quality of forage, shaded area and animal performance must be considered, especially in integrated system.

Keywords: agroforestry, ambience, animal welfare, grazing, indexes, thermal comfort

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