

Thermal comfort indexes, in the summer, in integrated crop-livestock-forest systems in the Brazilian Cerrado

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Introduction Shade in enough quantity helps pasture-raised animals from tropical regions to reduce the thermal load associated with the direct solar radiation, enhancing its thermal comfort. Thus, in these regions, systems that are able to mitigate heat stress are essential for the sustainability. Our objective was to evaluate some thermal comfort indexes, in the summer, in integrated systems in the Brazilian Cerrado.

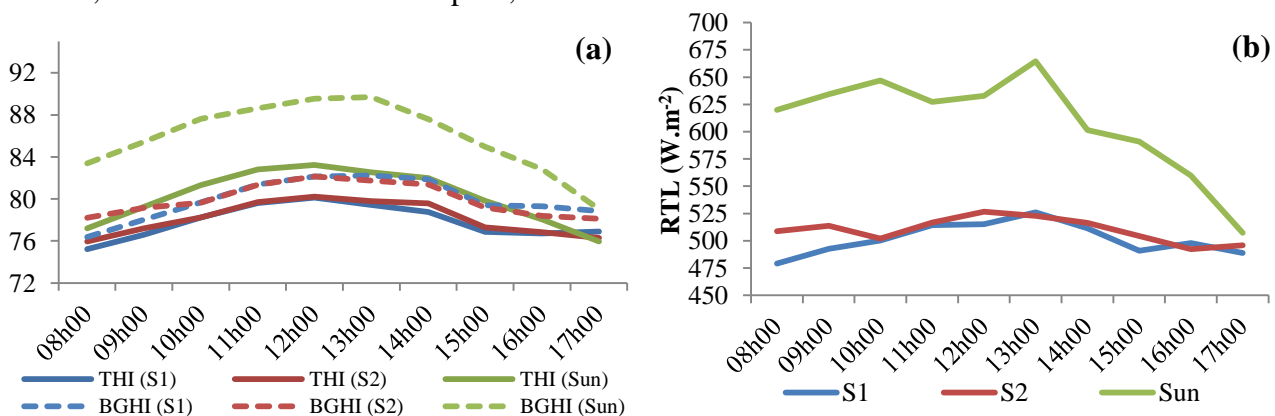
Material and Methods

The experiment was conducted in the summer (january and february, 2015), at Embrapa Beef Cattle, Campo Grande-MS, Brazil (20°27'S, 54°37'W, 530 m asl). The experimental area, with 12 ha, consists of integrated crop-livestock-forest systems with Piatã grass (*Brachiaria brizantha* cv. BRS Piatã), and (1) eucalyptus (*Eucalyptus grandis* x *urophylla*, clone H 13), spacing 22x2 m (227 trees/ha), 26 m high, pruned up to 6 m; (2) scattered Cambará (*Gochnatia polymorpha*) and Cumbaru (*Dipteryx alata*) trees, with five trees/ha. The equations of thermal comfort systems were constructed as Karvatte Junior (2014). For the interpretation of the data it was performed descriptive analysis.

Results and Conclusions

In the shade, there was a reduction of 3.6% in temperature and humidity index (THI), 8.3% in the Black Globe Temperature and Humidity Index (BGHI) and 21.3% in Radiant Thermal Load (RTL), compared to the sun. Presence of trees, despite of the type and arrangement onto the systems, is effective for the mitigation of thermal stress and improves the sustainability of livestock production on tropical pastures.

Fig.1. THI (a) and RTL (b) in integrated systems with eucalyptus (S1), native trees (S2), or under the sun, from 08h00 a.m. to 05h00 p.m., in Brazilian Cerrado.



References cited

Karvatte Junior (2014) master's thesis; Silva RG (2006) Eng. Agríc. 26:268-281.

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