



# Behavioral aspects of Caracu and Red Angus cattle breeds in a pasture with shade and water immersion



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## OBJECTIVE

The shade is an important resource in the extensive production systems in tropical regions. The aim of this study is to understand through behavioral analysis, the preferences of animals for resources for environmental protection.

## INTRODUCTION

In Brazil, one of the factors that most affects the animals performance is the high temperature that is felt in most of the year, so often responsible for cases of heat stress. Until very recently the concerns with the environment were neglected, only recently this aspect has been considered, including issues related to the shading and ways to reduce the thermal discomfort.

The heat tolerance is considered one of the most important adaptive for cattle, and the lack of a thermotolerant races of the biggest barriers productive in several countries (GAUGHAN et al., 2010).

One of the most important adaptive behaviors in a hot environment is to seek shade. Another behaviour or act is water immersion, which facilitates heat loss by conduction and convection. According to Titto et al. (1998), in tropical summer the incident solar radiation at the hottest hours of the day, may become a strong source of stress, reducing the production of cows. In absence of trees, the animals utilize minimal shade available as the shadow of fences, walls, plants or any other object, preferably trying to protect his head. Physical protection from direct solar radiation with shade offers one of the most immediate and cost-effective approaches for enhancing performance and well-being of cattle in hot environments (BLACKSHAW & BLACKSHAW, 1994; GAUGHAN et al., 2010). Shade changes the radiation balance, but does not affect air temperature or humidity.

## MATERIAL AND METHODS

The experiment was conducted in the Biometeorology and Ethology Laboratory of FZEA-USP. Six male of Caracu and Red Angus cattle breeds were used. The animals were submitted to 2 different treatments: availability of artificial shade and water for immersion (A) and availability of water for immersion (B). The artificial shade in A treatment was made with a sheet of polyethylene mesh with 80% filtration, measuring 6x10m (60m<sup>2</sup>), providing shade for all animals at the same time (10m<sup>2</sup> for each animal). A stream near the pastures was taken advantage of for water immersion. Water was diverted from this to two pools within these pastures; each pool was 5m wide, 10m long and 1m deep.

The behavior of the animals was recorded over 12 hours (from 6:00 a.m. to 6:00 p.m.) through instant and continuous collection, with focal sampling method (MARTIN & BATESON, 1986), every 15 minutes. Continuous behaviors have been subdivided into: position (sun, shade and water), posture (standing or lying) and activity (grazing stopped, grazing moving, rumination, displacement and leisure). These records contained the animals involved and time of occurrence.

The data concerning to the time spent in different behaviors and different positions were analyzed by the multifactorial variance (ANOVA-GLM). The fixed factors used were the breed and treatment.



Figure 1. Caracu under the artificial shade



Figure 2. Caracu grazing



Figure 3. Red Angus in the water



Figure 4. Red Angus under the artificial shade

## REFERENCES

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- TITTO, E. A. L. et al. Estudo da tolerância ao calor em touros das raças Marchigiana, Nelore e Simental. *Anais do II Congresso Brasileiro de Biometeorologia*, Goiânia – GO, Brasil, 1998.

## RESULTS AND DISCUSSION

Grazing was the most frequent activity for both races in both treatments (Table 1). In treatment A there were significant differences in grazing and leisure behaviors between the breeds, highlighting the fact that Angus remain almost much time in leisure as in grazing activity, which can be understood as an immediate response to heat stress - reducing the consumption of food.

Table 1. Average time spent by Caracu and Angus in each of the activities in both treatments (percentage values)

	Treatment A		Treatment B	
	Caracu	Angus	Caracu	Angus
Graze	64.6 <sup>c</sup>	44.7 <sup>a</sup>	59.9 <sup>c</sup>	51.5 <sup>b</sup>
Rumination	19.1 <sup>b,c</sup>	18.1 <sup>b</sup>	23.1 <sup>c</sup>	7.9 <sup>a</sup>
Idling	16.2 <sup>a</sup>	37.2 <sup>b</sup>	16.9 <sup>a</sup>	40.7 <sup>b</sup>

Different exponent in line refer significant differences  $p \leq 0.05$

When cattle have access to shade they remain there during the hottest hours of the day, leaving it only when looking for water or at the end of the day. This was observed in the case of Caracu breed, which has preferred shade instead of water (Table 2). On the other hand, the Angus animals preferred water as a mean of heat dissipation. Such differences can be justified by the fact that the exchange of heat conduction that occurs between the animal and the water is faster than the exchange by convection and sweating that occur when the animal is in the shade. This option to remain in the water had an influence on the animal activities.

Table 2. Average time spent by Caracu and Angus in each activity, in the different positions in both treatments (percentage values)

		Treatment A		Treatment B	
		Caracu	Angus	Caracu	Angus
Graze	Sun	97.0 <sup>c</sup>	93.2 <sup>a</sup>	100.0 <sup>c</sup>	99.2 <sup>b</sup>
	Shade	3.0	6.4		
	Water	0.0 <sup>a</sup>	0.3 <sup>a</sup>	0.0 <sup>a</sup>	0.8 <sup>a</sup>
Rumination	Sun	54.7 <sup>b</sup>	29.2 <sup>a</sup>	94.8 <sup>c</sup>	94.7 <sup>a,b</sup>
	Shade	45.3	60.0		
	Water	0.0 <sup>a</sup>	10.8 <sup>a</sup>	5.2 <sup>a</sup>	5.3 <sup>a</sup>
Leisure	Sun	54.2 <sup>a</sup>	39.0 <sup>a,b</sup>	84.1 <sup>b</sup>	45.2 <sup>b</sup>
	Shade	43.2	25.2		
	Water	2.5 <sup>a</sup>	35.8 <sup>b,c</sup>	15.9 <sup>a,b</sup>	54.8 <sup>c</sup>

Different exponent in line refer significant differences  $p \leq 0.05$

## CONCLUSIONS

The Caracu had presented a clear preference for the shade, particularly in the hottest hours. However this was not always observed in Red Angus, who sometimes chose to remain in the water. In hot climates, resources for defense against heat load, as shade and water for immersion can really improve the welfare of the cattle.

The resources available for the animals to cope with high radiant temperatures may interfere with their behavior.

Animals of different breeds dealing with increases in radiant temperatures and with different husbandry have different behaviors.