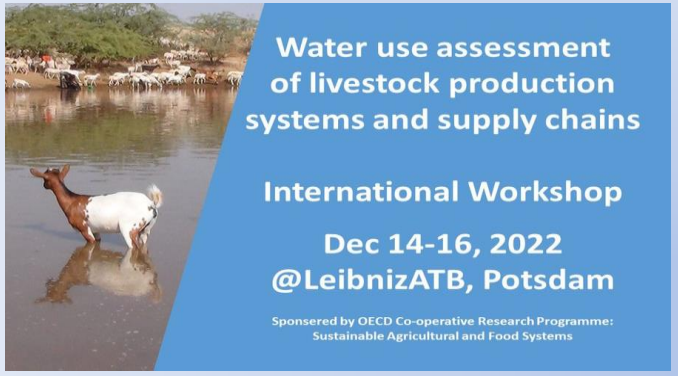


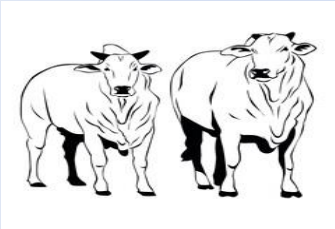
CONSUMPTION, PRODUCTIVITY AND COST: THREE DIMENSIONS OF WATER AND THEIR RELATIONSHIP WITH THE SUPPLY OF ARTIFICIAL SHADING FOR BEEF CATTLE IN FEEDLOTS

Taisla I. Novelli, Bianca F. Bium, Carlos H. C. Biffi, Maria E. Picharillo, Natália S. de Souza, Sérgio R. de Medeiros, Julio Cesar P. Palhares, Luciane S. Martello

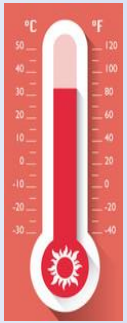
Embrapa
Southeast Livestock

FZEA USP
Ciência e inovação da fazenda à mesa

INTRODUCTION



From 2000 to 2018, the number of confined cattle in Brazil increased by 64.6% (ABIEC, 2020).



Considering the predictions of global warming, livestock will suffer impacts on their physiological and behavioral aspects, and thus on the need to have enough water to consume.

It is important to understand the relationship between water consumption and aspects of animal welfare.

OBJECTIVE

This study aimed to evaluate the impact of a welfare practice (artificial shading) in the water intake and water productivity and the relationships between these indicators with animal performance and water cost in a cattle feedlot system.

MATERIAL AND METHODS

- The experiment was conducted at Embrapa Southeast Livestock, in Sao Carlos, Brazil.
- The average temperature was 23 ◦C. The maximum temperature was 35.5 ◦C and the minimum 12.4 ◦C.
- Study used a population of 47 Nelore bulls (Bos taurus indicus).
- Animals were divided into two groups, with shade (GS) and without shade (GWS)
- They were housed in four collective pens, each one equipped with a drinker and two feed bunks per pen.

MATERIAL AND METHODS

- ✓ The shading structure was dimensioned considering reference values of 6 m2 per animal (Brown-Brandl et al., 2013; Eirich et al., 2015).
- ✓ The shade material consists of a thermo reflective aluminized mesh.
- ✓ The manufacturer guarantees 78–83% shade.




MATERIAL AND METHODS

- ✓ Water productivity (WP) of feedlot cattle was calculated according to the "*Water use in livestock production systems and supply chain*" guideline (FAO, 2019).

- ✓ As water input considered only the water consumed by animal drinking

- ✓ The WP was calculated in three reference units: [kg live weight (LW) m-3], [kg carcass weight (CW) m-3], and [kcal of boneless meat m-3]

- ✓ Water cost was calculated following the Guidelines of the Piracicaba, Capivari, and Jundiai River Basin.

RESULTS ANS DISCUSSION

Average for total water intake (WI), total dry matter intake (DMI), inicial live weight (ILW), final live weight (FLW), average daily gain (ADG), carcass weight (CW), water productivity from carcass weight (WPCW), water productivity from live weight (WPLW).

Variables	Treatments				*p* value
	Without Shade		Shade		
WI, m^3 $animal^{-1}$	3.25	$\pm 0.13^a$	2.98	$\pm 0.08^b$	0.0769**
DMI, ton $animal^{-1}$	0.85	$\pm 0.02^a$	0.84	$\pm 0.02^a$	0.6928
ILW, kg $animal^{-1}$	448.26	$\pm 3.46^a$	451.58	$\pm 3.39^a$	0.4966
FLW, kg $animal^{-1}$	584.83	$\pm 5.11^a$	595.96	$\pm 5.01^a$	0.1269
ADG, kg $animal^{-1}$	1.47	$\pm 0.05^a$	1.55	$\pm 0.05^a$	0.2687
CW, kg $animal^{-1}$	336.76	$\pm 3.35^a$	341.00	$\pm 3.28^a$	0.3709
WP_{CW}, kg CW m^{-3}	106.34	$\pm 3.11^b$	115.98	$\pm 3.04^a$	0.0317*
WP_{LW}, kg LW m^{-3}	184.76	$\pm 5.48^b$	202.79	$\pm 5.36^a$	0.0231*

a,b Rows with differing superscripts are significantly different. *Significant differences at probability P < 0.05 level. **Significant differences at probability P < 0.1 level.

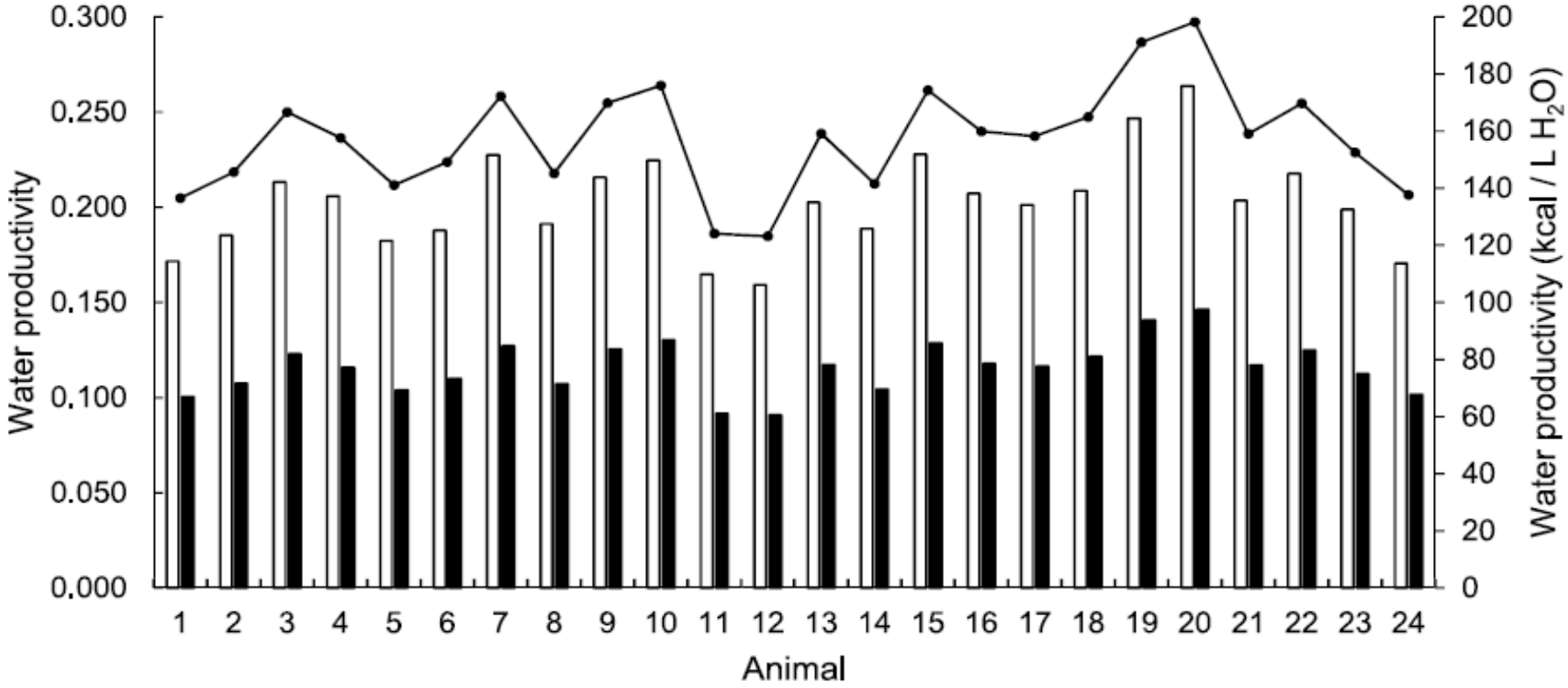
RESULTS ANS DISCUSSION

Water productivity of animals **Under Shade**.

White bars mean water productivity in kg live weight. L-1.

Black bars mean water productivity in kg carcass weight. L-1.

Solid line means water productivity in kcal boneless meat. L-1



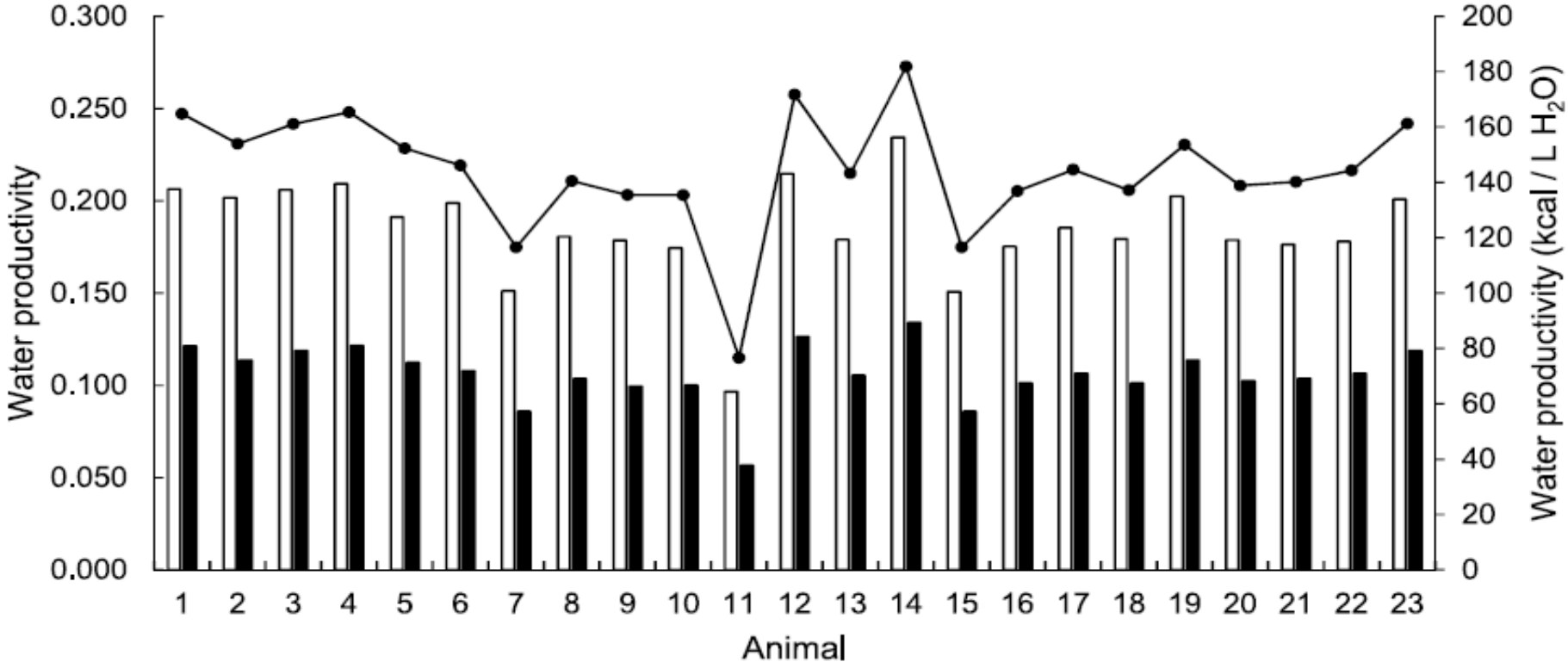
RESULTS ANS DISCUSSION

Water productivity of animals **Without Shade**.

White bars mean water productivity in kg live weight. L-1.

Black bars mean water productivity in kg carcass weight. L-1.

Solid line means water productivity in kcal boneless meat. L-1



RESULTS ANS DISCUSSION

The water-saving quantities would be significant if all animals confined in 2020 in Brazil had been produced under shade, 9.4% for live and 7.3% for carcass weights.

Considering water savings provided by the use of shade, it would represent the consumption of 38 for feedlots with 500 animals and up to 1,518 for feedlots with 20,000 animals.

The payment for water consumption ranged from US$ 7.50 to US$ 299.80 under shade and from US$ 8.08 to US$ 322.86 without shade. The amount saved by using the shade ranged from US$ 0.60 to US$ 23.00.

The value of the water bill will have a negligible impact on the cost of production and, therefore, would not fulfill the function of payment for water to promote better water productivity.

RESULTS ANS DISCUSSION

We should promote economic evaluation and consider the water costs in the cost of production. Only with this approach will we know if water pricing is effective at improving water productivity.

If we consider the value of the investment to make the shadow structure, the savings for the payment of water would not justify the investment.

CONCLUSIONS

The welfare practice (artificial shading) reduced the daily water intake of cattle in the feedlot and improved the water productivity.

The availability of water productivity information and its relation with best practices will contribute to creating programs and policies for livestock water management and help farmers and watershed committees to make decisions to produce more products per drop of water.

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Consumption, productivity and cost: Three dimensions of water and their relationship with the supply of artificial shading for beef cattle in feedlots

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THANK YOU

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