

# Scratching behaviour of dairy heifers in agrivoltaic systems with different configurations

Leonardo T. Miranda<sup>1,\*</sup>, Karolini T. De-Sousa<sup>1,\*</sup>, Elen K. Sartori,<sup>2</sup> Taynara de O. Cezario<sup>1</sup>, Julian D. Cifuentes<sup>1</sup>, Maria J. Hötzel<sup>2</sup>, Matheus Deniz<sup>1</sup>

<sup>1</sup> Grupo de Estudos em Bovinos Leiteiros, FMVZ – Unesp, Brazil; <sup>2</sup> Laboratório de Etologia Aplicada e Bem-Estar Animal, UFSC, Brazil; \* Presenting author.

## INTRODUCTION & AIM



### Scratching behaviour:

- Natural
- High motivation
- Pleasure
- Coat cleaning

In natural environments, cows scratch themselves against trees.

In livestock systems, suitable resources should be provided to enable cows to express this natural scratching behaviour.

The aim of this study was to evaluate the scratching behavior of dairy heifers in agrivoltaic system with different configuration in a tropical climate.

## METHOD

**21 dairy heifers**  
550 ± 55 days old  
247 ± 37 kg

**Observation of scratching events**  
12 consecutive days, 9h – 16h  
July – August 2025 - Brazil

Crossover design, three groups of 7/ heifers/ group

### Two agrivoltaic system:

**AGRIhor:** panel structures supported by 10 poles per paddock, creating a longer, narrower shaded area (24 m × 1 m)

**AGRIver:** panel structures supported by 5 poles, creating a compact, wider shaded area (12 m × 2 m)



Figure 1. Image of the agrivoltaic systems ( AGRIhor and AGRIver).

### Analysis

#### - Generalized Linear Mixed Model

- Agrivoltaic system and hours as fixed effect
- Days and groups as random effects
- Poisson family

## CONCLUSION

The configuration of the agrivoltaic systems influenced the heifers' scratching behavior. The horizontal configuration, with more poles than the vertical configuration, provided more space and may have contributed to the heifers engaging more in scratching behavior.

## RESULTS

100% of the heifers scratched themselves in both agrivoltaic systems

No consistent preference pattern between treatments was observed

- Some heifers scratched more in AGRIhor
- Others heifers scratched in AGRIver more frequently

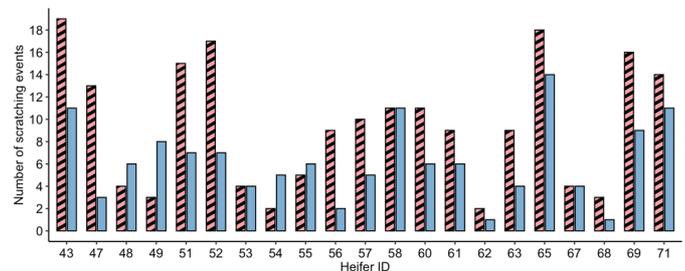


Figure 3. Frequency of scratching events performed by each heifer on the horizontal (AGRIhor) and vertical (AGRIver) agrivoltaic system. Bars in light pink with stripes represent the AGRIhor, whereas solid light blue bars represent the AGRIver.

Scratching behavior was 33% higher in AGRIhor - 193 vs. 131 events; p = 0.01

No hourly effect within systems, p > 0.05

Regardless, of system, peak time was at 11:00–11:59 h - 81 events; p = 0.002

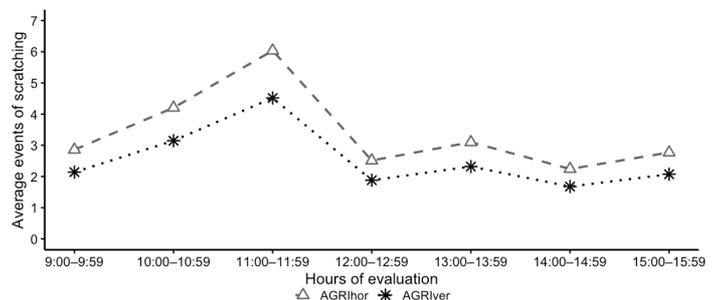


Figure 3. Average events of scratching behaviour (N of events/ group/ hour) during hours of evaluation (9h – 15:59h) by pasture system. AGRIhor: agrivoltaic system with horizontally arranged photovoltaic panels, and AGRIver: agrivoltaic system with vertically positioned panels.

## ACKNOWLEDGEMENTS