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REGIONE AUTONOMA DELLA SARDEGNA

TECH CARE — Integrating innovative TECHnologies along the value Chain to improve small ruminant welfARE management

ASSOCIAZIONE PER LA SCIENZA E LE PRODUZIONI ANIMALI — ANIMAL SCIENCE AND PRODUCTION ASSOCIATION

THI as an alert tool for decline in milk production in grazing Sarda sheep

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Objective:

To investigate the relationship between the Temperature Humidity Index (THI) and milk yield in Sarda dairy ewes in order to identify threshold values that could serve as early warning indicators for production drops during lactation.

Materials and methods:

24 Sarda dairy ewes

6 hours pasture/day

Supplementation

April - June 2023 - 2024

Trial period

Measurements:

Milk yield (kg/ewe*day)

Temperature and humidity (weather station 400 m from pasture)

$THI_{NRC\ (1971)} = 0,8 * T + (RH/100) * (T-14,41) + 46,4$

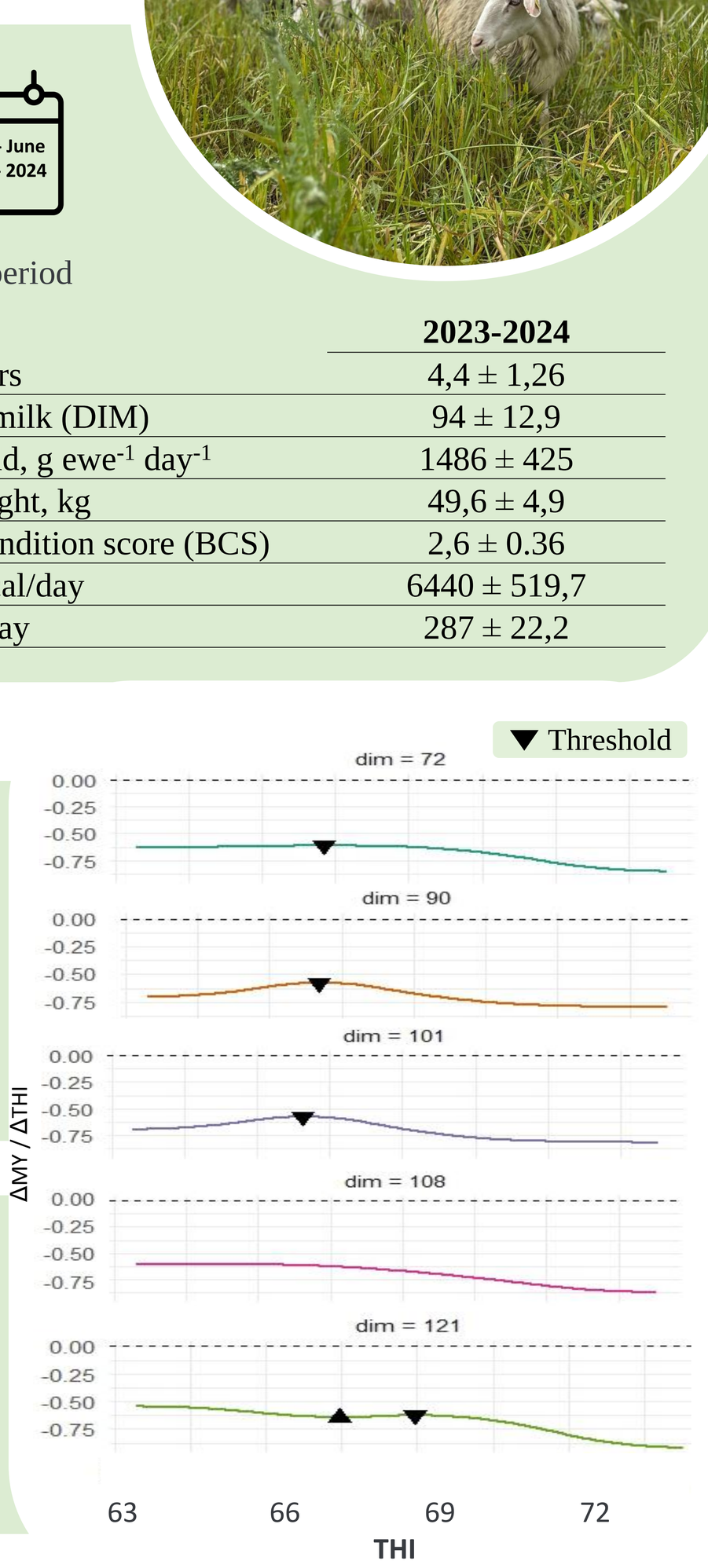
Individual metabolizable energy (MEI) and protein intake (MPI) were estimated using the SRNS model (Tedeschi et al., 2010) and individual pasture intake was derived using the equation proposed by Molle et al. (2022)

	2023-2024
Age, years	4,4 ± 1,26
Days in milk (DIM)	94 ± 12,9
Milk yield, g ewe^{-1} day^{-1}	1486 ± 425
Live weight, kg	49,6 ± 4,9
Body Condition score (BCS)	2,6 ± 0.36
MEI, Mcal/day	6440 ± 519,7
MPI, g/day	287 ± 22,2

Data Analysis:

Milk yield was modeled using a Generalized Additive Model (GAM), a flexible regression approach that captures non-linear relationships between predictors and the response variable through smooth functions, with milk yield as dependent variable, BCS, DIM, MEI and MPI as fixed effects and animal as random effect

The first derivative was computed to estimate the effect of THI on milk yield.



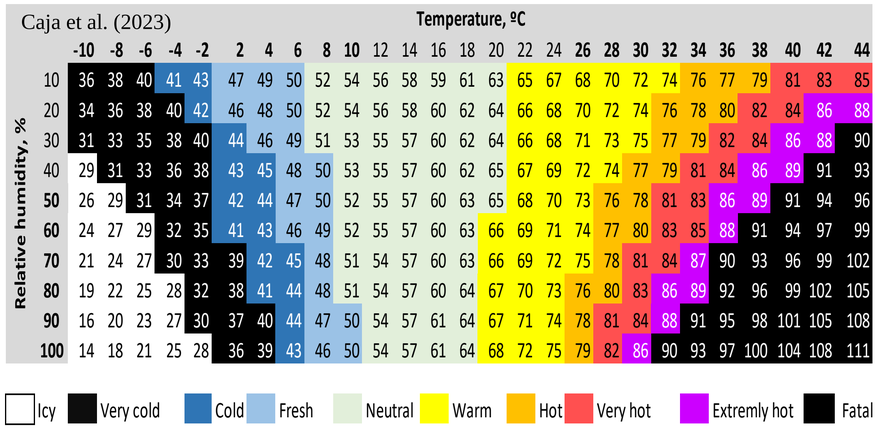
Results:

The model achieved an adjusted R^2 of 0.93 ($p < 0,001$) and explained 95.2% of the total deviance.

This approach allowed the identification of THI values at which milk production began to decline significantly. Importantly, threshold values were found to vary depending on the DIM considered.

Conclusion:

THI thresholds associated with milk yield decline align with those reported by Caja et al. (2023). Preliminary results suggest that critical THI values increase with advancing lactation stages. Further investigation is needed to confirm these stage-specific thresholds.



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