



UNIVERSITY OF LIFE SCIENCES
"KING MIHAI I" FROM Timisoara
**Multidisciplinary Conference on
Sustainable Development**
15 – 16 May 2025



Infrared thermographic assessment of cold stress and growth performance in Romanian Spotted and Romanian Brown calves

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• Introduction

- Thermal stress impacts productivity, reproductive efficiency, health and welfare in cattle.
- Infrared thermography (IRT) is an innovative, non-invasive technique that safely visualizes thermal profiles.
- The aim of this study was to test the ability of Romanian Spotted (RS) and Romanian Brown (RB) calves to adapt to cold thermal stress.

• Material and method

- 20 calves (10 RS - Romanian Spotted and 10 RB - Romanian Brown) were evaluated.
- The body temperature measured at the nasal region (BTN) and at the lacrimal caruncle of the eye in the orbital region (BTE), as well as the average daily gain (ADG), in relation to environmental temperature (ET) and experimental groups were collected.
- Thermal images were collected twice daily from 0.5 to 2 meters, using a FlirOne mobile infrared camera.
- Comparisons were performed using one-way ANOVA, with the categorical factor being the calves' breed.

• Results and discussions

- No significant differences ($p > 0.05$) were observed for BTN ($23.24 \pm 3.14^\circ\text{C}$ vs. $24.3 \pm 2.86^\circ\text{C}$ for RS and RB) or BTE ($33.4 \pm 2.44^\circ\text{C}$ vs. $33.9 \pm 2.97^\circ\text{C}$ for RS and RB).
- No significant difference was recorded for ADG according to the calves' breed (0.818 vs. 0.784 kg/day for RS and RB, $p > 0.05$).
- Environmental temperature significantly influenced ADG in both breeds, with a value of ADG of 8.84% from January to February compared to February to March (35.15%, $p \leq 0.001$).

Means (\pm SE) for average daily gain (kg/day) in Romanian Spotted (RS) and Romanian Brown (RB) dairy calves during the cold stress period

Breed	Mean	SE	Coef. Var. (%)	Min.	Max.
RS	0.818 ^a	0.11	18	0.631	1.112
RB	0.784 ^a	0.09	20	0.584	1.054

Column with different superscript differs significantly at $p \leq 0.05$

Means (\pm SE) for orbital and nasal IRT data ($^\circ\text{C}$) during the experimental period of cold weather exposure

IRT	Breed	Mean	SE	Coef. Var. (%)	Min.	Max.
Orbital (BTE)	RS	33.40 ^a	2.44	16	31.19	34.68
	RB	33.90 ^a	2.97	17	31.4	35.11
Nasal (BTN)	RS	23.24 ^a	3.14	14.7	20.1	25.26
	RB	24.30 ^a	2.86	19.4	21.13	26.44

Column with different superscript differs significantly at $p \leq 0.05$



IRT reading at the nasal region (BTN) and orbital region (BTE) in the dairy calf during experiment

• Conclusions

- In conclusion, both breeds included in the study possess comparable abilities to adapt to their environment.

Acknowledgement: This study was supported throughout the Sectorial Project ADER 7.1.9/2019, funded by the Romanian Ministry of Agriculture and Rural Development