



PRACTICE ABSTRACT 9

Breeding as tool to adapt for climate change. The cattle options

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WP3:
Re-Breeding livestock for resilience

Cattle Resilience and Re-Livestock

Climate change threatens the sustainability of **cattle production** in many regions. Changing the genetic potential of animals to improve resilience to changing environments dominated by **high temperatures** can be accomplished with **breeding management**. However, identifying what animals are tolerant to heat is not obvious. **Re-Livestock** project, is assessing tolerance to **heat stress** using a combination of traditional indicators such as **production** and physiological measures together with innovative measures such as **mid infrared (MIR) spectra, behaviour of animals, and metabolomic profiles** in cattle

MIR Spectra Distinguish Heat Stress and Tolerance

MIR spectra obtained from milk recording in summer vs. other periods showed potential to discriminate both the heat stress periods and the tolerant (cows that showed higher RR) vs. susceptible (showing lower RR) dairy cows.

Investigating Heat Tolerance in Cattle Breeds

In order to investigate the biological mechanisms behind **heat tolerance** experiments with feed lot calves from a local beef breed (**Avileña-Negra, ANI**) and **Holstein (HOL)** lactating cows are being carried out. In the first heat waves of July 2023, respiration rate (RR) was measured to evaluate if existing variability in RR allows us to identify tolerant and susceptible animals. This year, the procedure will be repeated and blood samples of tolerant and susceptible animals will be obtained during summer and then under comfort temperatures in autumn.



ANI Cattle's Heat Tolerance vs HOL Cows

First analyses evaluating the **heat stress** impact on the productivity of **ANI cattle** in Spain showed only a **moderate effect** of **high temperatures** on **weaning weights** and **reproductive parameters**. For the physiological measure of RR, ANI calves showed similar values to the Holstein cows under mild heat stress conditions. These results would indicate a higher tolerance to heat for the local beef breed compared to the highly selected HOL dairy cows.



Figure 1 & 2 . Respiratory rate observations in the two breeds.