

The diversity in dairy cattle reticuloruminal temperature: Exploring the influence of temperature humidity index

Dairy Up P6: Future Systems

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Delivery Organisations



Partner Organisations



Background

Heat stress is a national issue for the Australian dairy industry

- Primarily pastured based system exposes animals to variable climate
- Substantial impact on milk production and resultant producer income

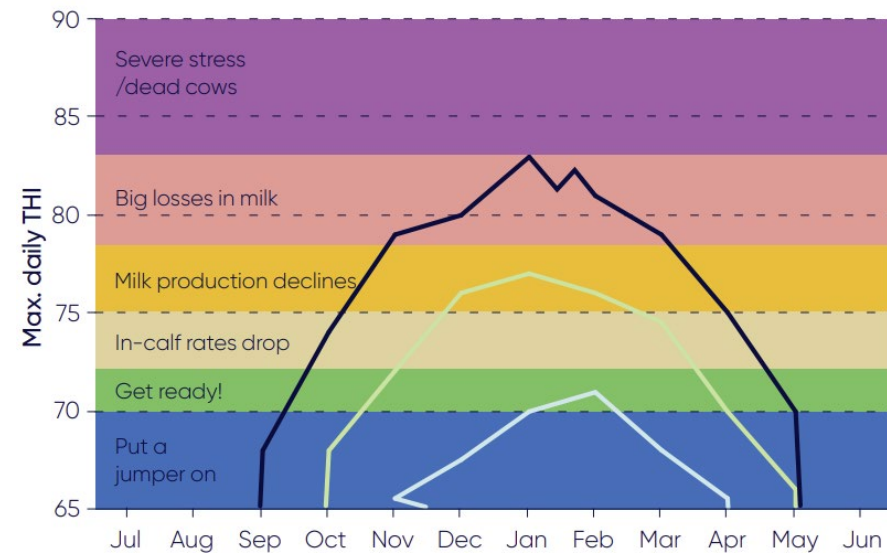
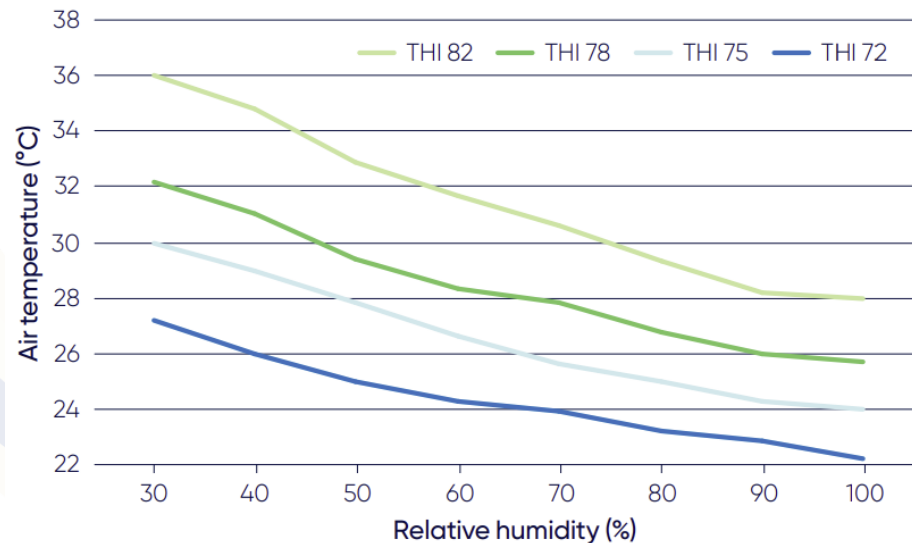
Sensor derived technology enables individual animal monitoring

- Reticulorumen boluses for core body temperature monitoring
- Must account for the influence of drinking events

Objective: *Investigate the interplay between temperature humidity index (THI) and core body temperature for pasture-based dairy cattle*

Temperature Humidity Index (THI)

- THI allows for the combinative effects of climate conditions, such as temperature and humidity, to be assessed
- Disagreement in literature as to the THI threshold for a dairy cow's thermal comfort zone
- THI provides an assessment of climate conditions and often results in amelioration applied at a herd level

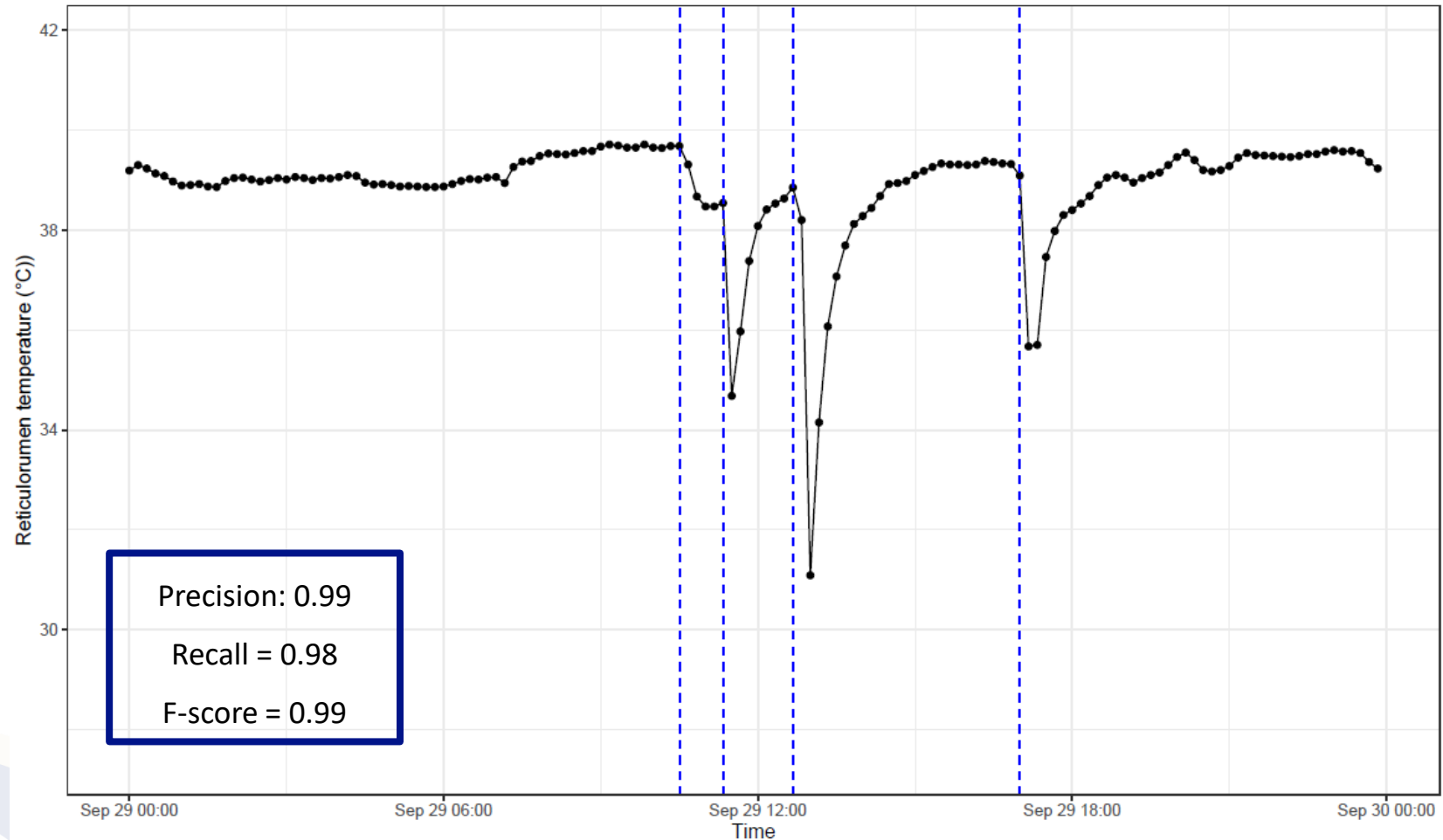


Source:
Cool Cows,
Dairy
Australia

*Noting reference is
made to the Southern
Hemisphere

Drinking event detection

Developed and validated a drinking event detection algorithm. Examined the change in temperature between consecutive observations to define boundaries for a drinking event.



Method

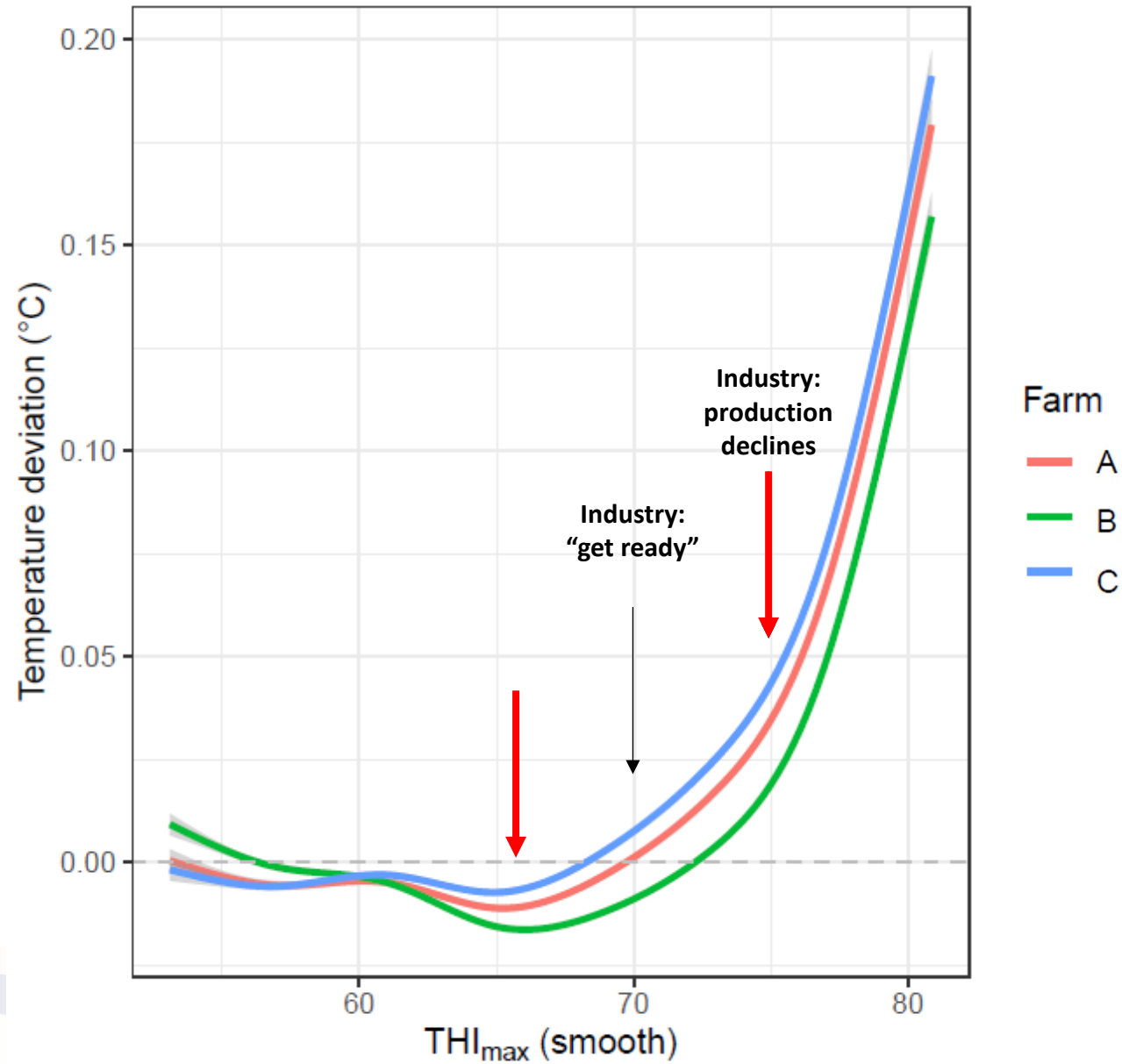


- Historical data collection from three Australian pasture-based farms using smaXtec boluses
- Measurement frequency: 10 minutes
- Dimensions: 105 x 305 mm, ~210g
- Key metrics: reticulorumen temperature, rumination, activity level
- Bureau of Meteorology (BOM) data interpolated from nearest weather stations

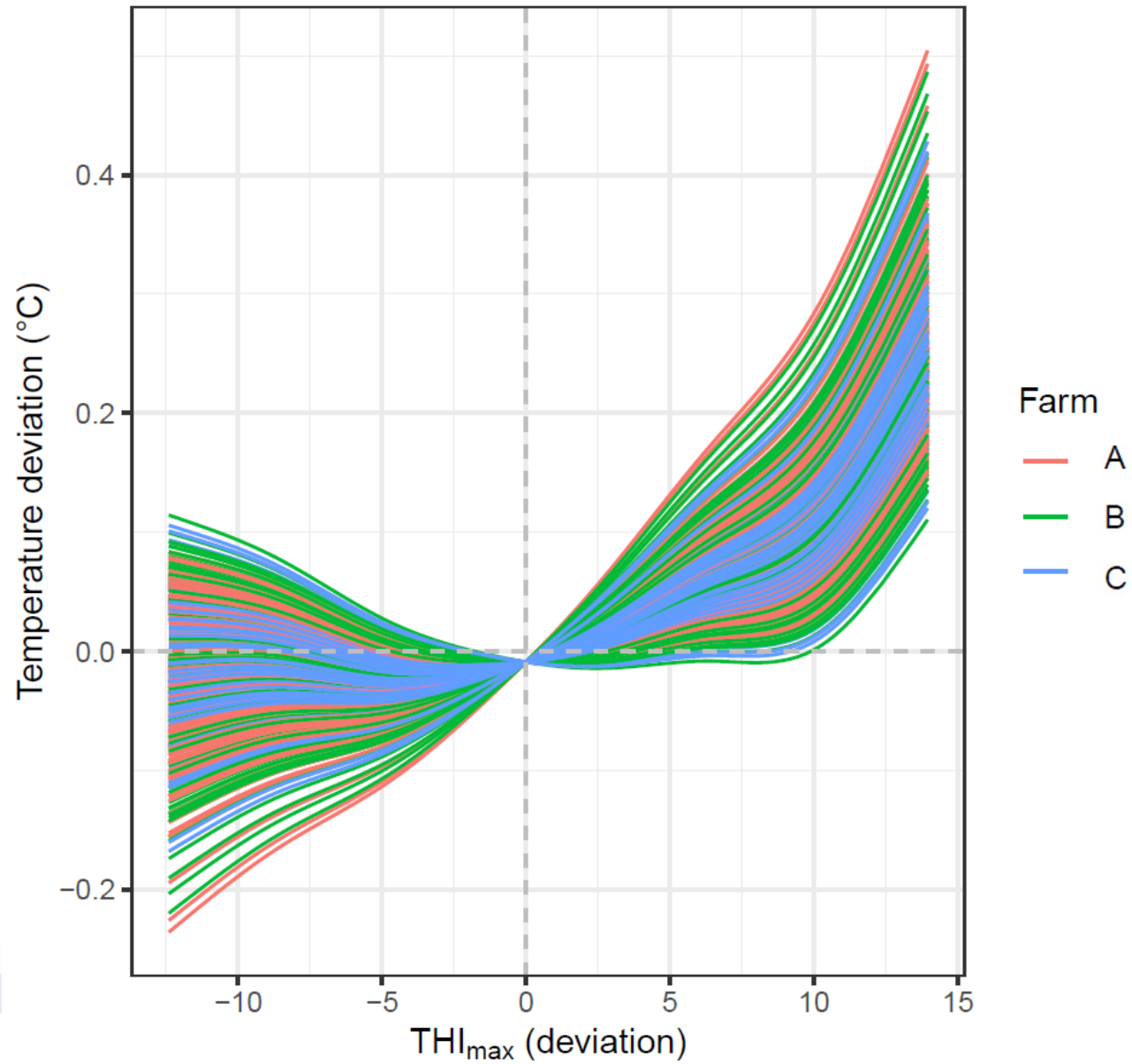
	Farm A	Farm B	Farm C
Start date	June 2021	March 2019	March 2019
Active animals	659	426	344



How does core body temperature respond to THI?



What is the variation in response for individual animals?



Key messages

- Reticulorumen temperature is impacted at THI 67
- Impact markedly increases at THI 75
- Method (sensors) revealing impacts at lower THI levels than industry
- Variability between animals confirmed. [Trait for genetic selection?](#)

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Questions?

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