



# Predicting tick resistance in cattle

Cattle ticks represent an annual loss of approximately US\$ 22-30 billion dollars to the cattle industry worldwide.

Cattle ticks are external parasites that negatively affect animal health and produce a significant economic loss for beef and dairy industries.



*Bos indicus* cattle are known to be highly resistant to the cattle tick, whereas *Bos taurus* cattle are more susceptible. Crossbred cattle (*B. indicus* x *B. taurus*) exhibit a higher level of within-breed variability.

Tick counting and scoring is the only available method to classify tick-susceptible from tick-resistant animals. However, this is a time-consuming task with high risk of injury for the observer.

Biomarker-based methods for assisted selection of resistant cattle are a promising alternative to achieve long-term control of ticks.

## What is a biomarker?



A biomarker (short for biological marker) is a measurable signature of a particular biological state or condition.

These biomarkers can be detected in blood and other tissues.

By harnessing the power of genomic information, we can identify the key molecules that are differentially expressed in resistant and susceptible animals.

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and Food Innovation (QAAFI)

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CRICOS Provider Number 00025B

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Queensland  
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QAAFI is a research institute at The University of Queensland supported by the Queensland Government via the Queensland Department of Agriculture and Fisheries.

# A new approach in the identification of cattle with high host resistance to ticks

Since the cow's genome was sequenced back in 2007, our knowledge about the genetic mechanisms behind some of the most important productivity traits has increased rapidly. However, the mechanisms underlying host resistance to ticks are still relatively unknown.

High-throughput technologies such as RNA-Sequencing provide the opportunity to capture information about the expression of genes in an organism. Computational algorithms are implemented to detect genes that are expressed differentially across animals of high and low tick resistance. These biological signatures are potential candidate biomarkers of tick resistance requiring further validation in large cattle populations.

## Help to find the next biomarker of tick resistance

If you are interested in supporting the validation of biomarkers discovered in this project or have further questions, please don't hesitate in contacting us. Donation of freshly-collected blood samples from cattle with known tick counts/scores is highly encouraged.

## Researcher Profile


### Emily Mantilla Valdivieso


Emily is a third-year PhD student with QAAFI's Centre for Animal Science at The University of Queensland.

She is part of a multidisciplinary research team with expertise in bioinformatics, genetics, parasitology, and immunology. Her doctoral research is on investigating host biomarkers associated with cattle tick resistance.

She is originally from Quito-Ecuador and received her Bachelor of Biotechnology (Hons I) from the University of Queensland. She is an advocate for girl's and women's participation in science, technology, engineering and mathematics (STEM) and co-created the podcast "ILLUMINATA" which highlights the stories of women in agriculture to inspire the next generation of agricultural scientists.



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