

Prospecting for bioactive molecules and biological indicator of host resistance to control cattle tick, *Rhipicephalus (Boophilus) microplus* - Gomes C.C.G.¹, Moraes M.C.B.², Borges M.², Borges L.³, Laumann R.², Barioni W.⁴, Wandré M.², Gaspar E.B.¹, Domingues R.¹

1 - Embrapa South Animal Husbandry & Sheep

2 - Embrapa Genetic Resources & Biotechnology

3 - University of Goiânia

4 - Embrapa Cattle Southeast

* poster presenter: claudia@cppsul.embrapa.br

Cattle tick, *Rhipicephalus (Boophilus) microplus*, and tick borne diseases are a major limitation on European breeds production in subtropical regions. The parasitism also limits the expansion of crossbreeding with British breeds and their composites in tropical areas to improve precocity and beef quality of zebu populations. Variation in host response to parasitism within breed has a genetic basis and is a heritable characteristic which enables selection to increase parasite resistance in cattle population. The on-going project, funded by Brazilian Agricultural Research Corporation (Embrapa), addresses questions to find chemical markers for tick resistance and natural tick repellent substances on body odor of Angus breed. Phenotype for tick resistance of sixty naïve heifers was defined by artificial infestation (AI). The estimated mean number of ticks was 245.9 ± 10.41 /animal (ranging from 79.9 to 502). Chemical substances from the skin of each heifer were collected before and after AI by aeration system contained porapak adsorbent and by rubbing pieces of cotton cloth in the back of the animals. Substances were extracted with hexane and samples are under current analysis by gas chromatography-mass spectrometry. Quantitative and qualitative analysis will be correlated to parasite load to define chemical profile of resistant individuals. Preliminary results showed at least two substances in higher concentration in resistant host. The project also includes behavioral tests to define larvae ability to discriminate body odor of resistant/susceptible heifers and comparison of skin resident microbiota on these extreme groups, possibly involved in odor composition. Both bioassays are still under development.

Key-words: chemical markers, repellent, Angus

Embrapa project number: 03.09.01.022.00.00



Prospecting for bioactive molecules and biological indicator of host resistance to control cattle tick, *Rhipicephalus (Boophilus) microplus*



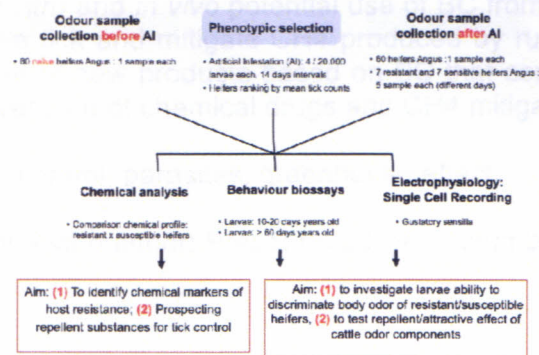
C. C. Gullas Gomes^{1*}, M. C. B. Moraes², M. Borges², L. Borges³, R. Laumann², W. Barioni⁴, M. Wandré², E. B. Gaspar^{1*}, R. Domingues¹
1. Embrapa South Animal Husbandry & Sheep; 2. Embrapa Genetic Resources & Biotechnology; 3. University of Goiânia; 4. Embrapa Cattle Southeast
*postor presenter: claudia.gullas@embrapa.br

INTRODUCTION

The parasitism by cattle tick, *Rhipicephalus (Boophilus) microplus* is a major limitation on European breeds production. It also limits the expansion of crossbreeding with British breeds and their composites in tropical areas to improve precocity and beef quality of zebu populations. Variation in host response to parasitism within breed has a genetic basis and is a heritable characteristic which enables selection to increase parasite resistance in cattle population.

The on-going project addresses questions to find chemical markers for tick resistance and natural tick repellent substances on body odor of Angus breed.

METHODS AND STRATEGY



Phenotype for tick resistance of sixty naïve heifers was defined by artificial infestation (AI). Chemical substances from the skin of each heifer were collected by air entrainment and by rubbing pieces of cotton cloth in the back of the animals. Substances were extracted with hexane and samples are under current analysis by gas chromatography-mass spectrometry. Quantitative and qualitative analysis will be correlated to parasite load to define chemical profile of resistant individuals.

The project also includes behavioral tests to define larvae ability to discriminate body odor of resistant/susceptible heifers and comparison of skin resident microbiota on these extreme groups, possibly involved in odor composition. Samples of skin bacteria were collected from neck and inner hind legs region using swabs. Both bioassays are still under development.



1. Trichotomy and skin cleaning before odor collection



2. Odor collection



Photos: Claudio C. Gullas Gomes

PRELIMINARY RESULTS

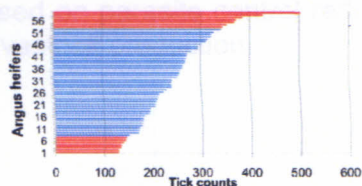


Figure 1. Mean number of ticks carried by the artificially infested Angus heifers.

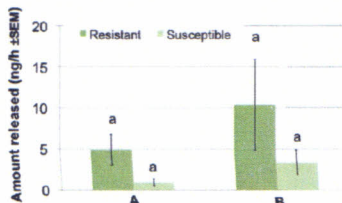


Figure 2. Volatile compounds collected by air entrainment from Angus heifers (5 resistant and 5 susceptible). Different letters on bars indicate significant differences between groups (resistant x susceptible, $P < 0.05$, Mann-Whitney test).

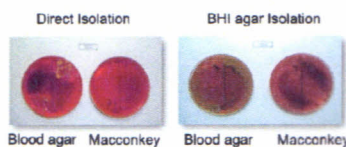


Figure 3. Illustration of skin microbiota isolation of Angus heifers.