TOPIC: Arthropod-borne diseases of veterinary importance

APPROACH: Vector control and surveillance

In-vitro tests for the biocontrol of *Rhipicephalus microplus* with entomopathogenic fungi in Uruguay

Keywords: *in-vitro* tests; biocontrol; *Rhipicephalus microplus;* entomopathogenic fungi.

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The common cattle tick, *Rhipicephalus microplus*, generates millionaire losses in the livestock industry worldwide (US$18 billion/year). In addition to its direct pathogenic effects, as anemia and low production, it´s also the vector of *Babesia bigemina, B.bovis* and *Anaplasma marginale*, agents that cause babesiosis and anaplasmosis, which often leads to the death of animals. Control with chemical products has been difficult in recent decades due to the development of resistance, residues in animal products and subproducts and environmental contamination. In Uruguay, acaricide resistance is widely dispersed, and multi-resistant populations have been diagnosed complicating its control, therefore, alternative methods are being thought. One alternative is the use of entomopathogenic fungi as biological controllers. Prior to *in-vivo* trials, *in-vitro* efficacy bioassays should be performed. The objectives of this work were to study the *in-vitro* efficacy of four strains of entomopathogenic fungi so they can be used as controllers against *R. microplus*. The strains selected were two of *Metarhizium anisopliae* (Ma2411, Ma2118) and two of *Beauveria bassiana* (BG, Bb2121) belonging to the fungal collection of the University of the Republic. Pure cultures were performed and replicated to prepare final suspensions diluted in 0,02% Tween 80 at a concentration of $1x10^8$spores/ml. Viability and germination was assessed in potatoe dextrose agar (PDA) plates. Engorged female ticks obtained from susceptible strain (Mozo) of *R. microplus* were used. Dead or non-viable ticks were discarded. Healthy ticks were disinfected with 0.3% chlorinated water and distributed in homogeneous groups of 10 ticks, in terms of weight and size. The treatments were applied by immersion in 20ml of suspension for one minute, then were incubated at 27ºC and 80% humidity. The control group was immersed in 0,02% Tween 80. All treatments were performed in triplicate. On days 7 and 14 the egg mass was weighed and on day 50 larval hatching was evaluated. Reproductive efficiency (RE, calculated as RE = (gr of eggs / gr of teleogins) * % larval hatch) of the treatment and control groups was calculated and subsequently the percentage of efficiency (%Ef={(RE control - RE treated) / RE control} x 100). With the results obtained so far (%Ef Ma2411=28; %Ef Ma2118=13; %Ef BG=8,5; %Ef Bb2121=22), we can suggest that although the use of this fungal strains was not highly efficient for the control of *R. microplus* when applied individually, they can nevertheless be part of an integrated pest management plan. Although these organisms cannot be considered for an eradication plan for *R. microplus*, they can be effective biocontrollers if applied in combination with other control strategies. To increase the efficacy of these strains, the simultaneous use with different acaricides is proposed. Even though these preliminary results are promising, further studies are requiered.