

Study of mechanisms of resistance to fipronil in field populations of *Boophilus microplus* (Acari Ixodidae)

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Nowadays, the main obstacle to the control of the cattle tick (*Boophilus microplus*) is the resistance to acaricides. The metabolic resistance to fipronil in tick populations from Brazil and Uruguay was assessed through larval immersion test (LIT) and adult immersion test (AIT) with synergists. A susceptible (Mozo) and a resistant strain (RFSan) and another three resistant field populations (JRRS, DUR, QUE) were exposed to fipronil and enzymatic inhibitors of esterases (triphenylphosphate-TPP: 0.01%), cytochrome P450 monooxygenases (P450) (piperonyl butoxide-PBO: 0.01%) and glutathione S-transferases (GST) (diethylmaleate-DEM: 0.05%). The control group was exposed only to fipronil. In adults of the RFSan (resistance ratio – RR=3.9), the resistance to fipronil was not suppressed due the addition of DEM or PBO. Nevertheless, synergism studies with larvae of the same strain revealed the involvement of P450 and esterases, with synergism ratios (SR) of 3.3 and 2.5 for PBO and TPP, respectively. Neither the LIT, nor the AIT confirmed the metabolic detoxification mediated by GST in the RFSan strain. With the field isolates, no synergism of DEM or TPP was observed with DUR (RR=2.1) and QUE (RR=87.7). However, for JRRS (RR=3.5) synergism with TPP was observed (SR=2.9). Possibly, the increase of esterase activity can be associated to the presence of resistant individuals to pyrethroids and organophosphates. All the populations tested were resistant to both acaricides, so the increment of the enzymatic detoxification activity for some pesticide could affect the efficacy of another pesticide, characterizing cross-resistance. Although the addition of PBO has enhanced fipronil toxicity against some resistant populations, the metabolic resistance do not appears to be the major mechanism of resistance to fipronil in the cattle tick.

Factors associated with *Amblyomma variegatum* presence in farms in Nevis and determination of high risks TBT areas

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Tropical Bont Tick (TBT), *Amblyomma variegatum*, is an invasive tick species of ruminants present in 10 Caribbean islands. TBT and the associated disease dermatophilosis, have been a challenge to livestock development in Nevis, Northern West Indies, for the past 30 years. After the end of a regional eradication program, active surveillance and control was conducted by veterinary services between 2007 and 2009. However, prevalence of dermatophilosis increased with some areas more infested, highlighting the need to determine the factors associated with TBT presence on farms. A case-control study was conducted to identify (1) the risk factors associated with the occurrence of the TBT on Nevis; and (2) the areas at high risk of tick persistence. Cases were selected as farms with clinical signs consistent with dermatophilosis and confirmed to have TBT present between 2007-2009. Control farms, without evidence of TBT presence or dermatophilosis cases during same period, were selected from a regularly maintained list of all active farms on the island, and matched to the cases based on parish. A questionnaire was administered to all cases and controls, which collected information on control practices, awareness level to ticks issues, etc. Univariable and multivariable logistic regression performed to explore the relationship between measured variables and the presence of TBT. Risk factors related to TBT include farmer attitudes toward TBT control and species hold on the farms. After many years of unsuccessfully employing various strategies for the control and eradication for TBT and dermatophilosis, the Veterinary Authority in Nevis anticipate using the results of this study as the scientific foundation for a more sustainable, targeted approach to the control of this pest.