Use of Pheromones, Active Surveillance and Treated Cattle to Prevent the Establishment of the Tropical Bont Tick in Puerto Rico and the Americas

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Abstract: The Tropical Bont Tick (TBT), Amblyomma variegatum, was introduced to the Caribbean in the mid-1700s. Since it has spread throughout the Caribbean dispersed by cattle egrets (Bubulcus ibis). Tropical Bont Ticks vector many pathogens to livestock and humans. However, only the livestock diseases heartwater, Ehrlichia (Cowdria) ruminantium, and dermatophilosis, Dermatophilus congolensis, are associated with TBT in the Caribbean. African tick bite fever (Rickettsia africae) is widespread in Caribbean TBT but human cases are rare. The Caribbean Amblyomma Programme (CAP) was an effort led by the Food and Agricultural Organization to eradicate TBTs from participating islands. This 10-year effort successfully eradicated TBT from many islands. However, most are reinfested since its termination. Pheromone technology has been developed to aid in TBT control. Although not part of the CAP treatment scheme, this research established that pheromones in combination with pesticide greatly improves treatment efficiencies. Additionally, pheromone combined with CO₂ traps greatly improves active surveillance success. St. Croix has a history of TBT outbreaks. Passive surveillance detected outbreaks in 2016 and in May of 2021. Surveillance efforts are underway to determine the extent of TBT on St Croix. Puerto Rico is the next island in the archipelago and is at a greater risk of re-infestation due to active outbreaks in St Croix. Tropical Bont Ticks were last detected in Puerto Rico in the 1980s. The infestation started on the small Puerto Rican island of Vieques, the closest landmass to St Croix, and spread to the main island through cattle movements. This infestation was eradicated with the help of the Tropical Cattle Tick (TCT), Rhipicephalus (Boophilus) microplus, eradication program. At the time, large percentages of Puerto Rican cattle were treated for ticks along with the necessary material and manpower mobilized for the effort. Therefore, a shift of focus from the TCT to TBT prevented its establishment in Puerto Rico. Currently, no large-scale treatment of TCTs occurs in Puerto Rico. Therefore, the risk of TBT establishment is now greater than it was in the 1980s. From Puerto Rico, the risk of TBT movement to the American continent increases significantly. The establishment of TBTs in the Americas would cause \$1.2 billion USD in losses to the livestock industry per year. The USDA Agricultural Research Service recently worked with the USDA Animal Health Inspection Service and the Puerto Rican Department of Agriculture to modernize the management of the TCT. This modernized program uses safer pesticides and has successfully been used to eradicate pesticide-susceptible and resistant ticks throughout the island. The objective of this work is to prevent the infestation of Puerto Rico by TBTs by combining the current TCT management efforts with TBT surveillance in Viegues. The combined effort is designed to eradicate TCT from Vieques while using the treated cattle as trap animals for TBT using pheromone impregnated tail tags attached to treated animals. Additionally, active surveillance using CO₂-baited traps combined with pheromone will be used to actively survey the environment for free-living TBT. Knowledge gained will inform TBT control efforts in St. Croix. Keywords : Amblyomma variegatum, caribbean, eradication, Rhipicephalus (boophilus) microplus, pheromone Conference Title: ICVPE 2022: International Conference on Veterinary Parasitology and Entomology **Conference Location :** Copenhagen, Denmark

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