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Prospects for biological control of cattle fever ticks by natural enemies along the Texas-Mexico border

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Cattle fever ticks (CFT), *Rhipicephalus microplus* and *Rhipicephalus annulatus* are vectors of babesiosis which can be lethal to cattle and causes significant production losses. These ticks are not native to the U.S. and have been eradicated but are endemic to Mexico and continue to re-invade the U.S. along the Texas-Mexico border. Resistance to acaricides, presence of wildlife hosts such as nilgai antelope and white tailed deer along with exotic vegetation along the international border that favors survival of cattle fever ticks are challenging the continued success of the cattle fever tick eradication program. Classical biological control uses naturally occurring species of living organisms as antagonists to reduce pest populations. Augmenting populations of existing antagonists or importing exotic antagonists to reduce the density of a pest population is required to achieve this goal. For the control of cattle ticks, candidate methods include ants, predatory mites, chickens, parasitoid wasp, *Bacillus thuringiensis,* entomopathogenic nematodes and oxpeckers. Biological control using specialist parasitoids, predators and/or nematodes from the native ranges of CFT is not a stand-alone strategy but could complement existing strategies such as acaricides and vaccines in the transboundary region between Mexico and Texas. It could thus reduce invasion pressure from Mexico and may be the only method for CFT control on wild hosts such as white tailed deer and exotic nilgai, which have become important for the spread ticks in the region. Work is in progress on means to discover and evaluate natural enemies of CFT needed to investigate the potential for classical biological control. These methods must be able to detect parasitism and predation on all life stages (eggs, larvae, nymphs, adults) of CFT, both on and off the host animal. Here we discuss the challenges in identification of candidate biological control agents and develop methods to be used in foreign exploration in the native ranges of CFT.

Biography

Nirbhay Kumar Singh is an Assistant Professor, Veterinary Parasitology, GADVASU, Ludhiana and he has completed his PhD in 2012. He is currently a Visiting Scientist to USDA-ARS, Cattle Fever Tick Research Laboratory, Edinburg, TX under the Raman Post Doctoral Fellowship by University Grants Commission, New Delhi, India. He has contributed significantly in the areas of acaricide resistance status and its underlying biochemical and molecular mechanisms and development of herbal acaricide. Besides 34 accession numbers obtained from Genbank, NCBI, he has published 103 research articles in national and international journals, 33 extension articles, authored one book along with 10 laboratory manuals.

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