Acaricide susceptibility of *Amblyomma variegatum* (Acari: Ixodidae) from Puerto Rico and Guadeloupe

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ABSTRACT


Base-line data on acaricide susceptibility of larvae and of larvae and nymphs of the tropical bont tick, *Amblyomma variegatum* (Fabricius), from Puerto Rico and Guadeloupe were collected on 14 and six compounds, respectively. Nymphs 7–8 weeks old from Puerto Rico and Guadeloupe, and larvae 3–4 weeks old from Guadeloupe, were exposed for 24 or 48 h to residues of acetone dilutions of technical-grade or commercial formulations of acaricides on disposable glass pipettes. Effectiveness of the acaricides in killing nymphs (LC\textsubscript{50}) from Guadeloupe and Puerto Rico ranged from 0.0001% for deltamethrin\textsuperscript{2} to 0.269% for malathion. For Puerto Rico, the susceptibility to toxaphene and amitraz, but not to dioxathion, increased with increasing age of nymphs. Nymphs from Guadeloupe were 9.5 times more susceptible to chlorpyrifos than nymphs from Puerto Rico. The susceptibility of larvae from Guadeloupe to acaricides tested ranged from LC\textsubscript{50} 0.000012% for deltamethrin to 0.0141% for ethion. There was no evidence of development of acaricide resistance in ticks from Guadeloupe or Puerto Rico.

INTRODUCTION

The tropical bont tick, *Amblyomma variegatum* (Fabricius), is a serious ectoparasite of livestock in the Caribbean. It is a vector of *Cowdria ruminantium* Cowdry, the causative agent of heartwater, and is associated with the

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infection of *Dermatophilus congolensis* van Sacegem, an acute bacterial skin disease of livestock. Mortality in exotic breeds of cattle (*Bos taurus*) may be as high as 50% when these animals are imported into heartwater endemic areas (Barré and Garris, 1990). Mortality of up to 80% can be expected from acute infection of *D. congolensis* in susceptible livestock exposed to this disease (Barré and Garris, 1990). Therefore, the potential spread of this tick to other islands and to the North American continent represents a significant threat to livestock production in these areas (Barré et al., 1987).

The technology needed to successfully eradicate *A. variegatum* from a given island is available (Barré and Garris, 1990), and successful eradication programs have been carried out on St. Croix, U.S. Virgin Islands (Hourrigan et al., 1969) and Puerto Rico (Garris et al., 1989). This technology involves the efficient delivery of an effective acaricide to all domestic hosts. In the eradication program on Puerto Rico, acaricides were applied to animals at 2-week intervals for 18 months (Garris et al., 1989). The primary goal of this eradication technique was to prevent adult ticks from mating on the host and, thus, prevent the production of offspring (Garris et al., 1989; Barré and Garris, 1990).

Development of a regional eradication program based on the use of acaricides for control of tropical bont ticks on livestock has been the subject of much debate in recent years (Barré et al., 1987; Barré and Garris, 1990). Of concern in long-term control or eradication programs is the development of acaricide resistance in ticks (Wharton and Roulston, 1970; Knipling, 1979). Base-line information is needed on susceptibility of the tropical bont tick to acaricides commonly used in the Caribbean. Reported here are results of laboratory studies on the susceptibility of nymphs of the tropical bont tick from Puerto Rico, and larvae and nymphs from Guadeloupe, to 14 and six common acaricides, respectively. Also reported are results of laboratory studies on the susceptibility of aging nymphs to three acaricides, and on the lack of development of acaricide resistance to ethion in populations of *A. variegatum* on Guadeloupe.

MATERIALS AND METHODS

Ticks

Ticks used in tests were obtained from colonies established from adult female tropical bont ticks collected from cattle in 1981 (Garris, 1984) and 1982 (Barré, N., unpub. data) for Puerto Rico and Guadeloupe, respectively. In Guadeloupe, all stages of ticks were fed on goats and in Puerto Rico, larvae were fed on rabbits and nymphs and adults were fed on goats (Garris, 1984). Until used in acaricide tests, ticks were maintained in the laboratory in