

ABSTRACT

Bioassay of 15 to 35 acaricides by the filter paper technique on 2 to 3 week-old unfed larvae of 13 Caribbean strains of Boophilus microplus revealed strain-specific differences in their susceptibility. Carbamates were most toxic followed by organophosphates, formamidines and chlorinated hydrocarbons; the susceptibility of these strains ranged within 93 fold for carbamates, 316 fold for organophosphates and over 3,000 fold for chlorinated hydrocarbons. Seven strains possessed 31 to 227 fold resistance to lindane while 6 others had 0.06 to 11.2 fold tolerance. Resistance to crotoxyphos and dicrotophos in 2 strains were about 67 fold. The comparative susceptibility of larvae of 3 livestock ticks to 15 acaricides was Anocentor nitens > Boophilus microplus > Amblyomma cajennense. The toxicity of 24 acaricides to engorged B. microplus ranged about 300 fold. The variation in the efficacy of several chemicals for larval and adult stages was significant. Effective residues of chlorfenvinphos and amitraz on cattle persisted 2 days longer than those of ethion, dioxathion and coumaphos. In the greenhouse, the half life of 0.1% tetrachlorvinphos, carbaryl, crotoxyphos, dioxathion, coumaphos and allyxycarb ranged from 7 to 17 days. Those of lindane, naled, fenitrothion, diazinon and propoxur were between 2.5 and 6.3 days. Exposure of larvae to acaricide-treated pastures showed that 250 g/ha dioxathion had a high residual toxicity for 11 days, whereas carbaryl and tetrachlorvinphos at 500 g/ha were less potent. Application of sub-lethal doses (SLDs) (0.25 to 10 µg/tick) of 10 acaricides to engorged females inhibited oviposition and embryogenesis. SLDs of chlordimeform, carbaryl and fenitrothion affected protein levels, the incorporation of glycine-Cl¹⁴ into the ovaries and the electrophoretic pattern of haemolymph and ovarian proteins. Enzymatic studies revealed the predominance of a sensitive cholinesterase system in 3 Jamaican strains of Boophilus. Preliminary observations on the biology of B. microplus indicated a direct relationship between precipitation and larval population density and longevity.