

SAMPLE ARTICLE

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DETECTION OF MULTI-ACARICIDE RESISTANCE IN *RHIPICEPHALUS (BOOPHILUS) MICROPLUS* (ACARI: IXODIDAE)

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ABSTRACT: Engorged females of *Rhipicephalus (Boophilus) microplus* (Canestrini 1888) (Acari: Ixodidae) were collected from Jalandhar district, Punjab and acaricide resistance status was assessed by adult immersion test against various class of acaricides viz. organophosphates (malathion), synthetic pyrethroids (cypermethrin, deltamethrin and fenvalerate) and formamidines (amitraz). The regression graph of probit mortality of ticks plotted against log values of progressively

Key words: Multi-acaricide resistance, *Rhipicephalus (Boophilus) microplus*, Punjab.

INTRODUCTION

Rhipicephalus (Boophilus) microplus (Canestrini 1888) (Acari: Ixodidae), is the major economic threat to the cattle industry in many parts of the world, both directly by physical effects upon infested animals and indirectly through the diseases caused by protozoan parasites transmitted by this tick species. In India, the annual control cost of ticks and tick-borne diseases has been estimated at 498.7 million US\$ (Minjauw and McLeod 2003, Morgan *et al.* 2007).

MATERIALS AND METHODS

Acaricides

Technical grade amitraz, cypermethrin, deltamethrin, fenvalerate and malathion (Accu Standard® Inc. U.S.A)

Bioassays

Adult immersion test was conducted according to the method of Sharma *et al.* (2012) with minor modifications. Briefly, the engorged females of *R. (B.) microplus* were immersed

Statistical Analysis

Dose response data were analyzed by probit method (Finney 1962) using Graph Pad Prism 4 software. This analysis included probit transformation of percentage mortality and natural logarithm

RESULTS AND DISCUSSION

The *R. (B.) microplus* population in this study showed resistance to all acaricides evaluated except cypermethrin and fenvalerate. The tested population showed different resistance ratios to various acaricides and highest RR₉₅ of 14.92 was recorded against deltamethrin. The slope.....

CONCLUSION

The present study reports for the first time a *R. (B.) microplus* population in Punjab with different levels of resistance to SP, OP and amitraz. The uncontrolled use of these

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Khangembam R, Singh H, Jyoti, Rath SS, Singh NK *et al.* (2018) Effect of synergists on ivermectin resistance in field populations of *Rhipicephalus (Boophilus) microplus* from Punjab districts, India. *Ticks Tick-Borne Dis* 9: 682-686.

Table 1. Results of adult immersion test to various acaricides performed on *R. (B.) microplus*.

Acaricide	Slope ± SE (95% CL)	R ²	LC ₅₀ (ppm) (95% CL)	LC ₉₅ (ppm) (95% CL)	^a RR ₅₀	^b RR ₉₅
Amitraz	2.67 ± 0.84 (0.004 to 5.35)	0.772	628.4 (592.8-666.1)	1972.7 (1738.1-2239.01)	3.81	4.04
Cypermethrin	2.39 ± 0.48 (0.86 to 3.92)	0.891	37.83 (35.02-40.85)	183.07 (153.84-217.85)	0.27	0.52
Deltamethrin	1.66 ± 0.54 (-0.08 to 3.41)	0.753	45.57 (40.32-51.49)	441.56 (342.29-569.61)	3.40	14.92
Fenvalerate	3.30 ± 0.52 (1.64 to 4.95)	0.930	142.67 (132.22-153.94)	585.04 (500.46-683.91)	0.12	0.26
Malathion	3.69 ± 0.31 (2.67 to 4.71)	0.978	3436.7 (3251.4-3632.6)	9555.0 (8208.8-11122.1)	1.24	1.86

^aRR₅₀: LC₅₀ of tick stain/LC₅₀ of susceptible strain.

^bRR₉₅: LC₉₅ of tick strain/LC₉₅ of susceptible strain.

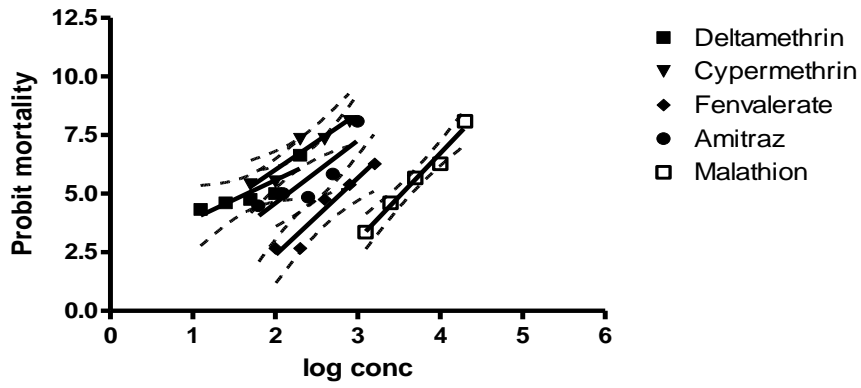


Fig. 1. Dose-mortality curve of *R. (B.) microplus* against various acaricides.

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