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Susceptibility status of Spinose ear tick, *Otobius megnini* (Acari: Argasidae) to selected acaricides

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The spinose ear tick, *Otobius megnini* is a one-host, nidicolous soft tick whose larvae and nymphs parasitize a wide range of domesticated animals and occasionally humans. In Sri Lanka, *O. megnini* has been reported only from Nuwara Eliya causing otoacariasis in horses and humans. The larval activity of this tick increases during warmer and dryer months. Although *O. megnini* infestation is a major constrain in stabled racehorses in Nuwara Eliya, use of acaricides has never been practiced as a control measure. The present study was carried out to assess the susceptibility of *O. megnini* larvae to DDT (organochlorine), malathion (organophosphate), permethrin and flumethrin (pyrethroids). Engorged nymphs were collected from 14 thoroughbred stabled horses from the racecourse in Nuwara Eliya and were allowed to moult into adults at 28± 2°C and 80% RH under laboratory conditions. Eggs from 100 mating pairs were mixed and placed in perforated Eppendorf® tubes (150 eggs each) until hatched out. Resistance status of larvae was assessed according to Larval Packet Test (LPT) as recommended by the Food and Agriculture Organization (FAO). Larvae were exposed to a series of different acaricide concentrations. The technical grade acaricide was dissolved in a mixture of olive oil and acetone (1:2) and serially diluted to produce the 7-10 test dosages between 0.00001 and 10 % W/V. For each dilution, a larval packet was made and approximately 150 larvae (14-21 days old) were inserted into it. After a 24 hour exposure, live ticks were counted and percentage of larval mortality was plotted against log-transformed acaricide concentration. Susceptibility of the larvae and resistance discriminating dosages (RDD) were determined according to FAO and World Health Organization (WHO) guidelines. The LC_{50} values (% W/V) for malathion, flumethrin, permethrin and DDT were 0.0106%, 0.0003%, 0.0077% and 0.1239%, respectively and the resistance percentages were 2.9%, 0.1%, 5.4% and 13.8%, respectively. Flumethrin was the most effective acaricide against *O. megnini* since the tick population was susceptible to flumethrin according to the RDD given for Australian strains of *R. microplus*. The population of *O. megnini* showed possible presence of resistance to malathion and permethrin. Percentage mortality against DDT was 86.2% indicating a very high level of resistance. Although DDT has hardly been used as an acaricide in Sri Lanka, its extensive use in antimalarial programs in the country during early 1950s to 1977 might have exposed Sri Lankan tick populations to DDT causing resistance development. Alternatively, ticks may have acquired cross-resistance to DDT after being exposed to other insecticides. Resistance to malathion and DDT was heterogeneous (Chi-square test; $\chi^2 = 28.1$ and $\chi^2 = 51.5$, respectively; $p<0.05$). The study reveals an emerging resistance to permethrin and malathion perhaps due to the exposure of tick population to environmental insecticide contaminations.

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