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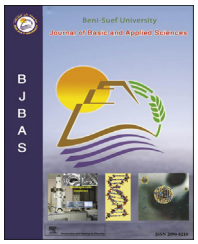

Studies on prevalence, risk indicators and control options for tick infestation in ruminants

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ABSTRACT

An epidemiological study was conducted at Benisuef district to determine the current situation and associated determinants of tick infestations in ruminants and to assess the efficacy of three different types of insecticides against tick infestation under field conditions. Total of (1082) animals of different species (540 cattle, 230 buffaloes, 108 of each sheep & goats and 96 camels) were selected randomly and examined carefully for tick infestation. About (30.1%) of total observed animals were found tick infested with highest rate in cattle (60.5%) followed by goats (25.9%), buffaloes (17.8%), sheep (14.8%) while no tick infestation recorded in camels. The most prevalent tick's species affecting ruminants was *Boophilus annulatus* (26.5%) followed by *Hyalomma anatolicum* (6.1%) then *Rhipicephalus turanicus* (3.4%). Regarding the associated risk factors, tick infestation was found statistically significant ($P < 0.05$), as the highest infestation rates were recorded in Friesian cow's breed (77.5%), older ages, >3 years (78.8%) followed by at age, ≤2 months (57.8%) and during summer months were found highly significant ($P < 0.01$) in cattle (76.5%) followed by goats and sheep (33.3% & 22.9% resp.,) comparing with results in winter. The preferred sites of ticks' attachment to infested animals were udders and external genitalia (70.7% of each) then Neck & chest (63.0% of each), inner thighs (61.1%), perineum (41.7%), ears (14.6%), around eyes (11.7%). The obtained results revealed that poor husbandry practices of small holder farmers be a determinant making the animals more prone to tick infestation in this district. Improving the hygienic conditions associated with treatment of infested cattle with Ivermectin (0.2 mg/kg b.wt, S/C) and spraying of Deltamethrin (1%) for surrounding environment twice every 14 days are recommended for control of tick infestation under field condition.

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1. Introduction

Ticks are economically the most important pests of cattle and other domestic species in tropical and subtropical countries (Jongejan and Uilenberg, 1994). More than 80% of the world cattle population is infested with ticks (FAO, 1984), which cause harm to animals through blood loss, general stress and irritation, depression of immune function, damages to hides and skins (Ghosh et al., 2007). Although, economic losses due to ticks are mainly due to the diseases which they transmit (Garcia, 2003), financial losses associated with nagging irritation and depreciation of the value of skins and hides (up to 20–30%) are also significant (Biswas, 2003). Further, with the changing environmental conditions due to global warming, the epidemiology of the tick infestations and vectorial potential of the ticks are likely to change and failure to control tick infestations is considered a major factor limiting the sustainable livestock production world-wide and especially in tropical country like Egypt (Kabir et al.. 2011).

Susceptibility and Resistance of animals to tick infestation have been influenced by several factors including; species, age, sex, season, breed, photoperiod and management. Chemical application of acaricide is still the most widely used way of control, although there are reports of tick resisting to many active principles in different countries (Martins et al., 1995) that are applied by dipping, spraying or pour-on which is considered as one of the best methods.

The current tick control strategies aim to reduce ticks numbers to acceptable levels, to prevent production loss, minimize chemical residue risks, and reduce the reliance on chemicals by utilizing control with alternative treatments for different herd group's (Ghosh et al., 2007).

In Egypt, ticks are the most important of all ectoparasits. The economic loss incurred when they infest livestock particularly, cattle are enormous. In spite of the aforementioned prevailing situation and the presence of a number of problems due to ticks in Egypt, there is paucity of well-documented information on the occurrence of ticks in the study area and insufficient to develop a proactive program for ticks' control at both smallholder and cattle farm levels (Asmaa, 2012). Therefore, this study was designed with the objectives of determining the prevalence of ticks, assessing the risk factors of tick infestation in the study animals and recommending best tick control options in the area.

2. Materials and methods

2.1. Study area and period

A cross sectional study was carried out during the period from the beginning of November (2012) to September (2013) in Beni-Suef district. Study area is located at Latitude (30.13) degrees north, Longitude (31.40) degrees east, and rises above the sea level by (46) meters. Generally, it characterized by two distinctive seasons; summer (May to October) and winter (November to February) Egyptian Metrological Authority (2012).

2.2. Sampling technique

A total of (1082) animals of different species (540 cattle, 230 buffaloes, 108 each of sheep &goats and 96 camels) were selected randomly from small holders of cattle irrespective of their age, sex, breed and examined for the presence of ticks infestation and most likely associated risk factors in animal population according to method adopted by (Thrusfield, 2005).

2.3. Collection and preservation of samples

The selected animals of different species were properly casted then clinically inspected for tick infestation, half body tick counts were made for each animals then adult ticks were collected from different body sites (ears, around eyes, etc.) and transferred separately in universal bottles containing (70%) ethyl alcohol then dispatched to parasitological lab of Animal Health Research Institute for further identification of tick specimens. Required information like date of collections, place of collection, body site of collection, species and breed of host were recorded.

2.4. Identification of tick species

The ticks genus and species were identified under stereo microscope in the laboratory and the half body tick counts were doubled to obtain whole body tick burden according to (Keiser, 1987; Walker et al., 2003).

Prevalence (P) was estimated according to (Thrusfield, 1995) using formula

$$P = \frac{\text{No. of infested cases during specified period}}{\text{Population at risk during that specified time period}} \times 100$$

3. Evaluation trial of the efficacy of three different types of acaricides on cow's tick infestation

3.1. Study area and animals

A seventy days study was carried out on (1080 Friesian cattle in a private farm at Benisuef district. A farm selection criterion was based on a previous history of tick infestation, existing of potential risk indicators and insecticidal resistance. All cows in the herd were qualitatively examined for tick infestation then eighty animals from those found positive were selected and allocated randomly into four equal treatment groups (I, II, III and IV). All groups were isolated apart from each other while the remaining cows in the herd ($n = 28$) was kept as control group without any treatment during experimental period. The tick infestation & distribution were determined quantitatively in all examined groups before study as method described by (Sajid et al., 2009).

3.2. Insecticides used

Three commercial insecticides were tested against cow's tick infestation as recommended by manufacturers

1. **Diazinon** (60 % EC), diluted with distilled water,