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Prevalence of Ixodid Ticks in Cattle Population of Indore, Madhya Pradesh

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Abstract

A survey study was conducted to evaluate the prevalence of ixodid ticks in cattle population of Indore, Madhya Pradesh. Every month, ticks were collected from 9511 cattle belonging to randomly selected 5 villages of each tehsil, *viz*. Indore, Mhow, Depalpur, Sanwer and Hatod. The current study revealed an overall tick prevalence of 58.87% with significantly high prevalence of *Rhipicephalus* (*Boophilus*) *microplus* (42.89%) than *Hyalomma anatolicum anatolicum* (11.82%) and mixed infestation (4.16%). Season-wise, significantly high prevalence was recorded in monsoon (71.08%) than summer (62.28%) and winter (52.12%). Amongst the various age groups, significantly high tick infestation was encountered in 1-3 year-old (78.63%) than >3 year-old (56.79%) and <1 year-old cattle (52.92%). Sex-wise, significantly high tick infestation was documented in males (66.01%) than their female (58.06%) counterparts. Tehsil-wise, significantly high prevalence was evident in Mhow tehsil (69.12%) as compared to Indore (61.40%), Depalpur (57.27%), Sanwer (55.28%) and Hatod (50.14%) tehsils.

Key Words : Cattle, Ixodid ticks, Indore, Prevalence

Introduction

Ticks are the most important pests of cattle in tropical and subtropical countries and more than 80% of world's cattle population is infested with ticks. A single engorged female tick is responsible for daily loss of 0.5 to 2 ml of blood, 8.9 ml of milk and 1 g of body weight. The negative impact of ticks in cattle industry is a combination of direct and indirect effects. Direct effects on production include skin damage from tick bites (Biswas, 2003; Jongejan and Uilenberg, 2004), blood loss, toxicity from the bites, reduced weight gain and milk production (Sajid *et al*., 2007). Indirect effects are related to the transmission of tick borne diseases like babesiosis and anaplasmosis (Rodríguez-Vivas*et al*.,2004). Two genera of ticks, *viz. Rhipicephalus* (*Boophilus*) *microplus* and *Hyalomma anatolicum anatolicum* are widely prevalent and are considered as economically important ixodid ticks infesting dairy animals in India (Ghosh *et al*., 2007). AlthoughSharma *et al.* (2011) and Katuri *et al.* (2013) reported ixodid ticks from Jabalpur, the literature pertaining to the prevalence of ixodid ticks from Malwa region is lacking and hencethe present study was carried out to assess the prevalence of ixodid ticks in cattle of Indore district.

Materials and methods

Study area

A total of 9511 cattle were screened for tick infestation from 5 tehsils of Indore district, *viz*. Indore, Mhow, Depalpur, Sanwer and Hatod. A questionnaire was prepared to record the detailslike season, age,sex and tehsil of the screened animals.Cattle of both the sexes and of different age groups, *viz*. <1 year, 1-3 years and >3 years were examined for tick infestation and each tick infested animal was considered as one sample.

Collection of tick samples

Ticks were collected manually from cattle without damaging their mouth parts and were searched by passing hand through animal's coat and were transferred to collection vials numbered with the serial no. of the questionnaire containing the detailed information about the source of the collected sample.In order to pass air in test tubes,mouths of the test tubes were closed by muslin cloth and were tied with rubber bands. Collected samples were transported tolaboratory for their identification using the standard keys described by (Soulsby, 1982).The generated data on prevalence of ixodid ticks were analysed by employing Chi-square test.

Results and Discussion

The data pertaining to season, age, sex and tehsil-wise prevalence of ixodid ticks in cattle of Indore district is depicted in Table 01.

Table 1: Prevalence of ixodid ticks in cattle of Indore district

			B microplus	*H. anatolicum*	
Monsoon	1155	821(71.08%)	598(51.77%)	161(13.94%)	62(5.37%)
Winter	4196	2187 (52.12%)	1632 (38.90%)	422 (10.06%)	133 (3.17%)
Summer	4160	2591 (62.28%)	1849 (44.45%)	541 (13.00%)	201 (4.83%)
χ2 value	-	170.92**	68.694**	23.094**	19.24**
<1year	1266	670(52.92%)	523(41.31%)	104(8.21%)	43(4.00%)
1-3 years	1128	887(78.63%)	619(54.87%)	166(14.72%)	102(9.04%)
>3 year	7117	4042(56.79%)	2937(41.27%)	854(12.00%)	251(3.53%)
χ2 value		213.151**	75.097**	25.089**	76.392**
Male	965	637(66.01%)	423(43.83%)	149(15.44%)	65(6.73%)
Female	8546	4962(58.06%)	3656(42.78%)	975(11.41%)	331(3.87%)
χ2 value		22.622**	0.393 NS	13.524**	17.807**
				82%)	

NS- Non significant, **<0.01; Figures in parentheses are percentage of positive animals

The present investigation documented 2 species of ixodid ticks,*viz.R.* (*B.*) *microplus* and *H. a. anatolicum* in cattle of Indore district with an overall prevalence of 58.87% recording significantly high prevalenceof *R.* (*B.*) *microplus* (42.89%) than *H. a. anatolicum* (11.82%) and mixed infestation (4.16%). The ixodid ticks, *viz.R.* (*B.*) *microplus* and *H. a. anatolicum* documented in cattle population of Indore district is in line with the findings of various workers from different parts of the country (Haque *et al*., 2011; Sharma *et al*., 2011; Katuri *et al*., 2013; Patel *et al*., 2013 and Singh and Rath, 2013). As per the findings of the present investigation, *R.* (*B.*) *microplus* emerged as a predominant tick species when compared with *H. a. anatolicum* which might be due to its easier survival as whole life is being spent on the body of the same host being a one host tickwhich is in agreement with the findings of Rajendran and Hafeez (2003).

Season-wise, significantly high prevalence was recorded in monsoon (71.08%) followed by summer (62.28%) and winter (52.12%) indicating overall high prevalence in monsoon as compared to summer and winter, which is in consonance with the findings of several workers (Thakur *et al*., 2007; Vatsya *et al*., 2008; Haque *et al*., 2011; Patel *et al*., 2013 and Singh and Rath, 2013).The higher tick infestation during rainy season followed by summer and winter experienced in the present survey might be due to hot and humid environmental conditions prevailing in the monsoon season which are most conducive for growth and development of various life cycle stages of ticks. Whereas, the cold and dry conditions of the winter are not favourable for the survival of ticks and hence ticks pass the winter as engorged females, nymphs, larvae and unfed adults by hiding into cracks and crevices resulting into lower level of infection during winter season.

Amongst the various age groups, significantly high tick infestation (78.63%)was encountered in 1-3 year-old followed by 56.79% in >3 year-old and 52.92% in <1 year-old cattle indicating overall high infestation in young animals. High susceptibility of young cattle than adults was also evidenced by Kabir *et al*. (2011), Patel *et al*. (2013), Singh and Rath (2013) and Eyo *et al*. (2014). As per Manan *et al*. (2007), age of the animal plays role in the infestation pattern of tick species. Further, the low tick infestation in adult animals could be due to resistance acquired owing to repeated exposure from early life. Sex-wise, significantly high tick infestation (66.01%) was documented in males as compared to females (58.06%), demonstrating high tick infestation in male animals as compared to their female counterparts which is in consonance with the findings of Thakur *et al*. (2007), Singh and Rath (2013), Eyo *et al*. (2014) and Werede and Afera (2014). High tick infestation in male animals as compared to their female counterparts recorded in the current study is attributable to the fact that, proper care of milch animals (female cattle) is being taken owing to their productivity while their male counterparts are neglected and their proper care is not taken and hence acaricides are very rarely used in case of male animals.

Tehsil-wise, significantly high prevalence was recorded in Mhow tehsil (69.12%) when compared with Indore (61.40%), Depalpur (57.27%), Sanwer (55.28%) and Hatod (50.14%) tehsils of Indore district. The tehsil-wise variation experienced in the present survey is in agreement with the findings of Haque*et al*. (2011) and Singh and Rath (2013) who also recorded place to place variation while studying the prevalence of ixodid ticks from different regions of Punjab. As per Singh and Rath (2013), the prevalence of ticks in an area is influenced by its micro as well as macro-climate which is attributable to the place to place variation.

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Conflict of Interest: All authors declare no conflict of interest.

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