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Ixodid ticks infesting cattle and associated risk factors in coastal districts of Odisha

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Abstract
A study was conducted to investigate the tick infestation on cattle in the coastal district of Odisha from February 2016 to January 2017. During the period of study, 1176 out of 2920 cattle population revealed the presence of ixodid tick infestation. The most prominently infested ixodid tick belonged to *Rhipicephalus (Boophilus) microplus* (24.07%), followed by *Hyalomma anatolicum* (5.6%) and *Rhipicephalus sanguineus* (1.7%). The study showed that significant (p<0.05) high proportion of ticks were recorded in young cattle (< 1 year), indigenous cattle and cattle with poor body condition. The females showed higher infestation than males. The udder (35.03%) and inner thighs (27.55%) were the most common tick predilection site. Month wise prevalence study indicated that animals were infested throughout the year with maximum peak during May to August and lowest during November to January.

Keywords: Ixodid tick, cattle, Odisha, predilection site

1. Introduction
Tick and tick borne pathogens affect 80% of the world's cattle population and are widely distributed throughout the world, particularly in the tropics and subtropics [1]. The estimated annual global costs associated with ticks and tick-transmitted pathogens in cattle amounts to between US$ 13.9 billion and US$ 18.7 billion [2],while the cost of management of tick and tick borne diseases in livestock of India is as high as US$ 498.7 million per annum [3, 4]. Moreover, apart from transmission of viral, bacterial and protozoan pathogens, feeding by large numbers of ticks causes reduction in live weight and anaemia among domestic animals, while tick bites also reduce the quality of hides and can cause severe dermatitis [5]. In India different researchers have carried out studies on prevalence of ixodid tick infestation in cattle [6-8]. Tick occurrence and tick loads vary with seasons, geographic location, vegetation type, breed, habitation and age of the animal [9]. There is absence of a systematic survey and the tick fauna is yet to be explored in the region, so the study was conducted to know the prevalence and associated risk factors with regards to ixodid ticks in coastal Odisha. This type of survey will be helpful for optimising the existing control measures against ticks as well as the diseases it transmits.

2. Materials and Methods
A total of 2920 cattle selected randomly from different villages in six districts of coastal Odisha were screened for presence of tick infestation for a period of one year ((February 2016 to January 2017). These regions are in the north eastern and south eastern zone with hot humid to sub humid climate. The average rainfall in this area is about 1568- 1577 mm. The cattle of both sex and varying age groups (< 1 year and >1 year) were included in the present study. The animals were carefully examined over their whole body from skin and various other parts including head, belly, back, udder/scrotum, genital regions, leg and tail. Adult ticks and the ticks in various developmental stages were collected from infested animals by using forceps and put into separate glass bottles containing 70% alcohol with 5% glycerol for preservation and labelled with the following data; date of collection, place of collection, body sites of collection, and breed, sex and age of host. Ticks were processed (boiled in KOH, dehydrated in ascending grades of alcohol, cleared, mounted) and identified under a stereomicroscope using the standard identification keys [10, 11]. Statistical analysis was performed on data by SPSS 13.0 software by applying chi-square test and statistical differences (p<0.01 and p<0.05) between various groups were calculated.

3. Results and Discussion

Out of the total 2920 cattle examined for the presence of ticks, 1176 were found to be infested with varying numbers of tick genera leading to an overall prevalence of 40.27% which is quite similar to reports from Jammu and Haryana [12-13] while reports from some other areas showed a much higher prevalence [14-16]. The inconsistency among these studies could be attributed to a wide range of factors including agroecological, animal health practice, or management difference with in their respective study areas. The commonly encountered tick revealed during the study was *Rhipicephalus (Boophilus) microplus* (24.07%; 703/2920) was most abundant, followed by *Hyalomma* (5.6%; 417/2920), *Rhipicephalus* (1.74%; 51/2920) (Figure 1). The dominance of *Rhipicephalus (Boophilus) sp* corroborates with reports from Punjab, Lucknow Jammu and Mathura [7, 8, 12, 14].

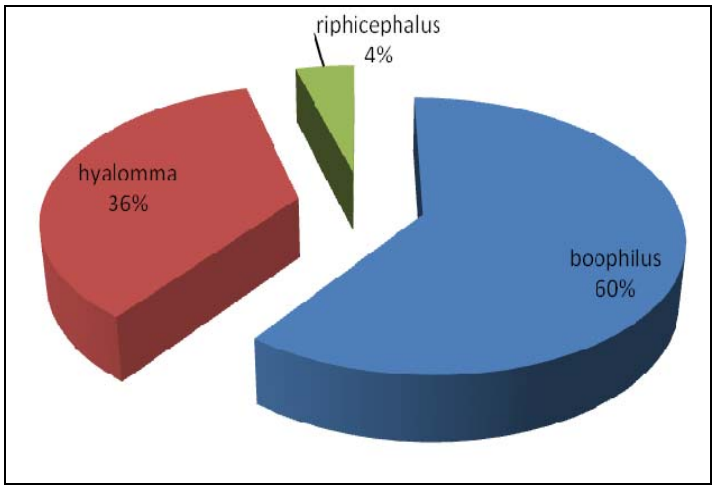

Fig 1: Genus wise percentage infestation of ixodid ticks in cattle

The higher tick loads ($p<0.05$) observed in the younger cattle (less than 1 year) is in agreement with earlier studies [7, 12, 16] which may be attributed to lesser application of managemental practices like grooming and acaricide application in case of young animals in comparision to adults. But reports elsewhere [17] have revealed higher infestation in adults which may be imputed to outdoor management and movement of adult animals in search of food and water as compared to younger animals so the exposure opportunity is higher [18]. Our study confirmed that, animals with poor body condition showed significantly ($p<0.05$) higher tick infestation than cattle with normal body condition (Table 1). This may be due to the fact that poorly conditioned animals had low resistant to tick infestation and lack enough body capacity to build resistance whereas animals with good body condition showed reasonable combat to the infestation [19].

Table 1: Prevalence of ticks with regards to associated risk factors

Category	Number of cattle examined	No of cattle infected with ticks	Prevalence%
Male	1024	356	34.76
female	1896	820	43.24
$\chi 2$ (p value)	-	0.8	-
crossbred	1923	801	41.65
indigenous	997	375	37.61
$\chi 2$ (p value)	-	0.013*	-
normal	2014	783	38.87
ill body condition	906	393	43.37
$\chi 2$ (p value)	-	0.02*	-
Less than 1 year	1003	431	42.97
more than 1 year	1917	745	38.86
$\chi 2$ (p value)	-	0.031*	-
Total	2920	1176	40.27

Highly significant** ($p<0.01$); Significant*($p<0.05$); Nonsignificant ($p>0.05$)

Breed was found to be a significant risk factor ($p<0.05$) since our findings showed that tick infestation was higher in crossbreds as compared to indigenous animal. It has been reported that tick resistance is an inherited trait in Bos indicus cattle [20] and indigenous cattle are more resistant to tick infestation than European breeds [21]. The data relating to sex wise prevalence showed higher prevalence in females than males though of no statistical significance as seen in earlier survey [17, 22], which could be due to hormonal stress of milch animal [23] However few reports [7, 16, 21] contradicts our findings by reporting more prevalence in males attributing it to more interest and care taken by farmer for milch animals.

The data with regards to tick predilection site on host body revealed that udder (35.03%) is the highest infested site of tick infestation, followed by inner thighs (27.55%), perineum (8.58%), neck (8.41%), legs (7.73%), ear (7.05%), belly (5.69%) and tail (3.48%) in cattle which supports the earlier studies [24]. The higher tick infestations on the external genitalia and udder could also be ascribed to the fact that ticks prefer warm, moist and hidden sites with a good vascular supply and thin skin [25].

Month wise prevalence study indicated that animals were infested throughout the year with maximum peak during May to August after which there was a declining trend and lowest during November to January (Figure 2) which is in agreement with earlier reports from Uttarakhand and Peshawar [19, 26].

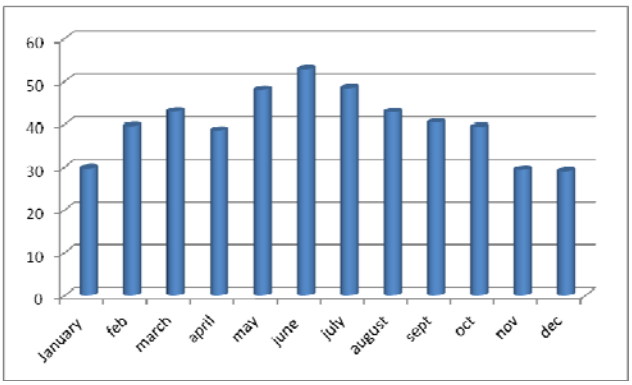

Fig 2: Month wise tick prevalence percentage

The higher prevalence of ticks during these periods suggests that humidity seems to be a microclimatic factor that influences the infestation rate [6] while during cold weather due to unfavourable condition for survival, the tick passes the winters as engorged females, nymph, larva and unfed adults by hiding in cracks and crevices [27] leading to lower rate of prevalence.

4. Conclusion

As per our present study, it was clearly shown that cattle population in Odisha are considerably burdened with tick parasites leading to a risk of contracting tick-borne diseases. The hot and humid climate of the state provides a conducive environment for the development and propagation of ticks. Moreover, poor animal husbandry practices may be a deterrent in the tick control strategies and programmes. Therefore adoption of adequate sanitary practices as well as proper application of acaricide could help in the tick control under field conditions.

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6. References

1. FAO. Tick-borne diseases control Rome 1984; 1.
2. De Castro JJ, James AD, Minjauw B, DiGiulio G, Permin A, Pegram RG, et al. Long-term studies on the economic impact of ticks on Sanga cattle in Zambia. Experimental and Applied Acarology. 1997; 21:3-19.
3. Minjauw B, McLeod A. Tick-borne diseases and poverty. Theimpact of ticks and tick-borne diseases on the livelihood ofsmall scale and marginal livestock owners in India and eastern and southern Africa. Research report, DFID Animal Health Programme, Centre for Tropical Veterinary Medicine, University of Edinburgh, UK, 2003, 59-60.
4. Ghosh S, Bansal GC, Gupta SC, Ray DD, Khan MQ, Irshad H et al. Status of tick distribution in Bangladesh, India and Paki-stan. Parasitology Research. 2007; 101:207-16.
5. Urquhart GM. Veterinary parasitology. 2nd ed. Backwell Science Ltd, 1996, 175-182.
6. Vatsya S, Yadav CL, Kumar RR, Garg R. Prevalence of ixodid ticks on bovines in foothills of Uttarkhand state: A preliminary report. Indian Journal of Animal Sciences. 2008; 48(1):40-42.
7. Singh NK, Rath SS. Epidemiology of ixodid ticks in cattle population of various agroclimatic zones of Punjab, India. Asian Pacific Journal of Tropical Medicine 2013; 6(12):947-951.
8. Kaur D, Jaiswal K, Mishra S. Studies on Prevalence of Ixodid Ticks Infesting Cattle and Their Control by Plant Extracts. Journal of Pharmacy and Biological Sciences. 2015; 10(6):01-11.
9. Mtshali MS, De Waal DT, Mbati PA. A sero epidemiologicalsurvey of blood parasites in cattle in the northeastern Free State. South Africa. Onderstepoort Journal of Veterinary Research. 2004; 71:67-75.
10. Walker AR, Bouattour A, Camicas JL, Estrada Pena A, Horak IG, Latif AA et al. Ticks of domestic animals in Africa: a guide to identification of species. Bioscience Reports 2003, 1-221.
11. Sen SK, Fletcher TB. Veterinary entomology and acarology for India, 1st edn. Indian Council of Agricultural Research, New Delhi 1962, 432-484.
12. Khajuria V, Godara R, Yadav A, Katoch R. Prevalence of ixodid ticks in dairy animals of Jammu region. Journal of Parasitic Diseases. 2015; 39(3):418-421.
13. Chhillar S, Chhilar JS, Kaur H. Investigations on Some Hard Ticks (Acari: Ixodidae) Infesting Domestic Buffalo and Cattle from Haryana, India. Journal of Entomology and Zoology Studies. 2014; 2(4):99-104.
14. Patel G, Shanker D, Jaiswal AK, Sudan V, Verma SK. Prevalence and seasonal variation in ixodid ticks on cattle of Mathura district, Uttar Pradesh**.** Journal of Parasitic Diseases. 2013; 37(2):173-176.
15. Haque M, Singh NK, Rath SS, Ghosh S. Epidemiology and seasonal dynamics of Ixodid ticks of dairy animals of Punjab state, India. Indian Journal of Animal Sciences. 2011; 81(7):661-664.
16. Mandloi UK, Jayraw AK, Haque M, Jamra N. Prevalence of ixodid ticks in cattle population of Indore, Madhya Pradesh. The Indian Journal of Veterinary Sciences & Biotechnology. 2016; 12(2):62-65.
17. El-Gohary F, Shokier K El- Bably M. Prevalence and Risk Determinants of Ixodid Tick Infestation of Cattle in Beni- suef Governorate, Egypt. Annals of Veterinary and Animal Science. 2016; 3(1):42-56.
18. Pawlos W, Derese D. Study on prevalence and identification of ticks in Humbo district, Southern Nations Nationalities and People's Region (SNNPR), Ethiopia. Journal of Veterinary Medicine and Animal Health. 2013; 5(3):73-80.
19. Manan A, Khan, Z, Ahmed B, Abdullah. Prevalence and identification of ixodid tick genera in frontier region Peshawar Journal of Agricultural and Biological Sciences. 2007; 2:21-25.
20. Jongejan F, Uilenberg G. The global importance of ticks. Parasitology. 2004; 129:1-12.
21. Sajid MS, Iqbala Z, Khan MN, Ghulam M, Khan KM. Prevalence and associated risk factors for bovine tick infestation in two districts of lower Punjab, Pakistan. Preventive Veterinary Medicine. 2009; 92(4):386-391.
22. Kabir MB, Mondal MMH, Eliyas M, Mannan MA, Hashem MA, Debnath NC. *et al*. An epidemiological survey on investigation of tick infestation in cattle at Chittagong District, Bangladesh. African Journal of

Microbiology Research. 2011; 5:346-352.
23. Sutherst RW, Kerr JD, Maywald GF. Effect of season and nutrition on the resistance of cattle to the tick *Boophilus microplus*. Australuan Journal of Agricultural Research. 1983; 34:329-339.
24. Asmaa NM, ElBably MA, Shokier KA. Studies on prevalence, risk indicators and control options for tick infestation in ruminants. Beni-Suef University Journal of Basic and Applied Sciences. 2014; 3(1):68-73.
25. Muchenje V, Dzama K, Chimonyo M, Raats JG, Strydom PE. Tick susceptibility and its effects on growth performance and carcass characteristics of Nguni, Bonsmara and Angus steers raised on natural pasture. Animal. 2008; 2:298-304.
26. Das SS. Prevalence of ixodid tick infestation on farm animals in Pantnagar tarai of Uttar Pradesh. Journal of Parasiology and Applied Animal Biology. 1994; 3:71-73.
27. Chaudhuri RP. Description of the immature stages of *Hyalomma kumari* and redescription of the adults with notes on its hosts and distribution. Parasitology. 1969; 60:43-53.