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A preliminary survey for hard ticks (Acari: Ixodidae) diversity on the livestock in Akola District, Maharashtra. (India)

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Abstract
Hard ticks (Acari: Ixodidae) are ectroparasitic feeders on blood, they carry and transmit a wide range of diseases of veterinary importance. Akola district of Maharashtra, from India, has a wide range of livestock which faces a problem of infestation from hard tick and other parasites. We surveyed and reported diversity of these hard ticks infesting major livestock from different localities in Akola district, in the year 2013. 255 livestock, consisting of 71 cattle, 45 buffaloes, 86 goats, and 53 sheep of all 7 talukas of the district were searched and total 590 adult ticks belonging to six species were sampled and were identified at species levels. All the ticks, belonging to three genera: Hyalomma (Bont-legged ticks), Rhipicephalus (Brown ticks) and Haemaphysalis. The species of ticks documented from Akola district were, *Hyalomma anatolicum anatolicum, Hyalomma marginatum isaaci, Hyalomma hussaini, Rhipicephalus boophilus micropilus, Rhipicephalus haemaphysaloides,, and Haemaphysalis bispinosa.*
Key words: *Acari, Ixodidae, Akola, Diversity, Livestock*

Introduction:
All ticks are ectoparasitic obligatory feeders of blood. They are sanguivorous on vertebrate host: mammals' birds and reptiles. Along with spiders, Ticks included in class Arachnida in phylum Arthropoda (Soulsby, 1982). They belong to subclass Acari which consists of many orders of mites and one order of tick, the Ixodida. Though there are three families of ticks but two are important for domestic animals (Sonenshine, 2014). Family Argasidae contains the important genera Argas, Ornithodoros, and Otobius. These genera are known as soft ticks. The family Ixodidae comprised of 13 genera and approximately 650 species (Sonenshine, 2014). It contains the important genera Amblyomma, Dermacentor, Haemaphysalis, Hyalomma, Ixodes, Margaropus, and Rhipicephalus. These genera are known as hard ticks because their outer surfaces have hard plates. Also, the important boophilid ticks, formerly of the genus Boophilus, are now classified as a subgenus within the genus Rhipicephalus (Tailor, 2007). Within these genera, more than100 species are reported to infest domestic animals. Some of these species also feed on humans (Tailor, 2007). Boophilid ticks, a subgenus within Rhipicephalus ticks, commonly known as cattle ticks or blue ticks, have a highly characteristic morphology and one-host lifecycle causing direct parasitic losses and by transmission of microbe. Hyalomma genus contains many species of hard ticks important to domestic animals in hot dry regions in India, Africa, Mediterranean basin, and the Middle East. Genus Haemaphysalis found in Asia, Europe, Africa, and Australia. They affect cattle, sheep, goats, horses, camels, dogs, cats, and humans, as well as large range of wild mammals, birds and reptiles. Being obligate parasites ticks infest almost all sorts of livestock affecting greatly their health by blood sucking and transmitting diseases like babesiosis, theileriosis, anaplasmosis etc (Jongejan and Uilenberg, 2004). An estimated annual loss of USS 500000 is reported alone from low quality hides and skin in eastern Ethopia (Desalegn *et al.,* 2015) on account of tick ifestation. Since beginning of 20th century few experts studied ticks from different parts of India (Sharif, 1928 :Sen, 1938 : Dhanda and Rao 1964: Varma and Mahadevan 1970 : Kumar, *et al.,* 2002 : Patel *et al.,* 2013 : Singh and Rath 2013) and reported 109 species. Out of these 28 species of ticks reported to documented from Maharashtra by Sherif (1928): Sen, (1938) : Srivastava and Wattal, 1973: Mishra, *et al.,* (1977) : Raote, (1983) : Shahardar, (1988) : Varghese and Dhanda 1995).
Ticks as an obligatory ectoparasite of livestock, have high medical and veterinary importance, distributed all over the world. But their occurrence and prevalence differ greatly from region to region depending on various factors. In the present study a preliminary survey of tick is presented on the diversity and prevalence of ticks' species infesting major livestock in Akola district of Vidarbha region from Maharashtra. Study like this is locally important the studied district is a home for about 134481 goats, 49455 buffaloes, and 15467 exotic cross, and 269343 indigenous breed of cattle, (Govt livestock census report, 2012).

Materials and Methods.

Study Area:
The district of Akola lies in the western parts of the Vidarbha region of Maharashtra State and is surrounded by Amravati district in the north and north-east, Yeotmal in the south-east, Washim in the south and Buldhana in the west. The district lies between 19 º- 51' and 21º - 16' latitude and 76 º - 38' and 77 º - 44' longitude. Though a large section of rural population depends on agriculture many of them also depend on livestock as additional livelihood. Thus these livestock plays an important role in the people`s economy in the district.

Methodology:

This study was carried out, in the year 2013 in the district of Akola. The study commenced with a survey of all the talukas (Akola, Akot, Balapur, Barshi-Takli, Murtijapur, Patur, and Telhara,) of the district and information about the owners and their livestock, was collected. With the permission of the owner, frequent visits were made to some randomly selected localities/herds and all animals present were physically examined for their health status and tick attacks if any. Number of ticks infesting the host was counted and was pulled carefully out of the skin, put separately in glass vials containing 70% alcohol and 5% glycerol with proper labeling. Local Veterinary health centers were also visited and ticks were collected from different livestock. A total number of 594 hard ticks were collected from total 255 livestock, including goats, sheep, cattle and buffaloes. All are brought to Research laboratory, of Department of Zoology, Shri Shivaji College Akola. Identification was made under a stereomicroscope on the basis of shape of scutum, leg color, body, coxae one and ventral plates, with the help of the available standard keys. The identified ticks were photographed and the specimens are deposited with the departmental museum.

Results and Discussion.

The present study reported a survey of diversity of the tick infesting major livestock in Akola district of Vidarbha region in Maharashtra, India, in the year 2013. A total of 255 livestock, consisting of 71 cattle, 45 buffaloes, 86 goats, and 53 sheep were searched from all the seven talukas of the district and 143 were found infested with ticks. As depicted in the table.1 total 594 adult' ticks, belonging to 6 species from three genera of Ixodid ticks were collected. The preferred predilection sites. of attachment of ticks to host were ears, axilla, groin, genital areas, perineum, udder, anal and peri-anal, abdomen, neck, shoulder, belly, flanks, back, upper legs, dewlap and hindquarters.

In our survey we reported prevalence of three genera: Hyalomma (Bont-legged ticks), Rhipicephalus (Brown ticks) and Haemaphysalis, it is in accordance with that of Srivastava and Wattal (1973) who reported similar genera of ticks from, eastern Vidarbha region of Maharashtra. In our survey these genera are represented by six species of tick (Table.1: Photo Plate.1), which are *Hyalomma anatolicum anatolicum, Hyalomma marginatum issaaci, Hyalomma hussaini, Rhipicephalus boophilus micropilus, Rhipicephalus haemaphysaloides, and Haemaphysalis bispinosa.* Prevalence of these species from different parts of Maharashtra is also reported by Varghese and Dhanda (1995) in their documented 21 species of ticks on domestic animals.

Out of 71 cattle searched, 59 were positive for Ixodid ticks. In all, 6 Ixodid species, comprising 414 adult ticks, were collected from positive cattle.

Among 45 buffaloes we found 29 positive for ticks attack. Total 85 adult ticks were collected form 29 buffaloes.All studied six species of tick are found to infest both cattle and buffaloes. In cattle the order of prevalence was *Rhipicephalus Boophilus micropilus, Hyalomma a. anatolicum, Haemaphysalis bispinosa and Rhipicephalus haemaphysaloides,Hyalomma hussaini and Hyalomma marginatum isaaci,* In buffaloes the order of abundance was *Rhipicephalus Boophilus micropilus, Hyalomma a. anatolicum, Haemaphysalis bispinosa and Rhipicephalus haemaphysaloides,. Hyalomma marginatum isaaci and Hyalomma hussaini* (Table.1). In our report the infestation rate of cattle was (83.04 %) and that of buffaloes was (64.44 %). However in an earlier report, from Maharashtra Varghese and Dhanda in 1995 found that infestation rate for buffalo in Maharashtra was 42.6% and that of cattle was 75.5%. The lower rate of infestation on buffaloes in our report might be due to more care and regular cleanliness by the owners. In contrast to our reports, Chhillar *et al.,* (2014) reported lower infestation of both cattle and buffaloes, (cattle 55% and buffaloes 42%) from Haryana which is might be due to climatic conditions, in the northern India. Even after the treatment of acaricides, Jawale *et al.,* (2012) reported that in Nashik district of Maharashtra 62% cattle, shows tick infestation.

As depicted in Table.1, total, 53 sheep were searched in Akola district, and out of which 27 were positive for ticks and out of 86 searched goats, 28 were positive. In all 46 and 45adults, ticks, belonging to four species of ticks, were found on sheep and goats respectively. Out of them, *Haemaphysalis bispinosa, and Rhipicephalus haemaphysaloides* are most dominant ticks on both goats and sheep, while the prevalence of *Hyalomma a. anatolicum and Hyalomma hussaini* is quite lower. The findings are in accordance with that of Diyes and Rajakaruna. (2015) who too reported that the dominant genera ticks infesting the small livestock like goats are, *Haemaphysalis, and Rhipicephalus* from the nearby island of Srilanka and it was the, *Haemaphysalis bispinosa,* which second most dominant species attacking goats. *Soundararajan et al., (2014) shows that H. bispinosa parasitize more goats like mammals than any other domesticated animal in the state of Tamilnadu, and that it is widely distributed. In the present study too H. bispinosa was the most prevalent species on the goats of Akola district* .We reported that the tick infestation of sheep is 50.94 % and that of goats, is 32.55 % which is much comparable with that of Varghese and Dhanda (1995) who too reported 53 .90 % infestation of Sheep and 36.20 % infestation in goats, from the same state of Maharashtra. Here we also reported that all the studied livestock, infested by all the identified species of ticks in Akola district, Which is due to the fact that, in many areas cattle, buffaloes, goats and sheep, are usually kept together in vicinity of each other, even they use common grazing grounds. So the ingesting ticks adapted for to multi host parasitism.

Being obligatory haemotophagous ectoparasite of veterinary importance, result in the present survey of tick from Akola district becomes increasingly significant and will definitely prove helpful in promoting control measures of tick and tick-borne disease among the local livestock.

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Table: 1. Diversity of ticks infesting livestock in Akola district

Tick species / Livestock	Goats 86 searched 28 positive	Sheep 53 searched 27 positive	cattle 71 searched 59 positive	Buffaloes 45 searched 29 positive
Hyalomma anatolicum anatolicum,	00	06	99	33
Hyalomma marginatum isaaci,	07	00	05	06
Hyalomma hussaini	12	02	07	04
Rhipicephalus-boophilus micropilus,	00	00	209	24
Rhipicephalus. haemaphysaloides	20	15	30	08
Haemaphysalis bispinosa	10	19	64	10

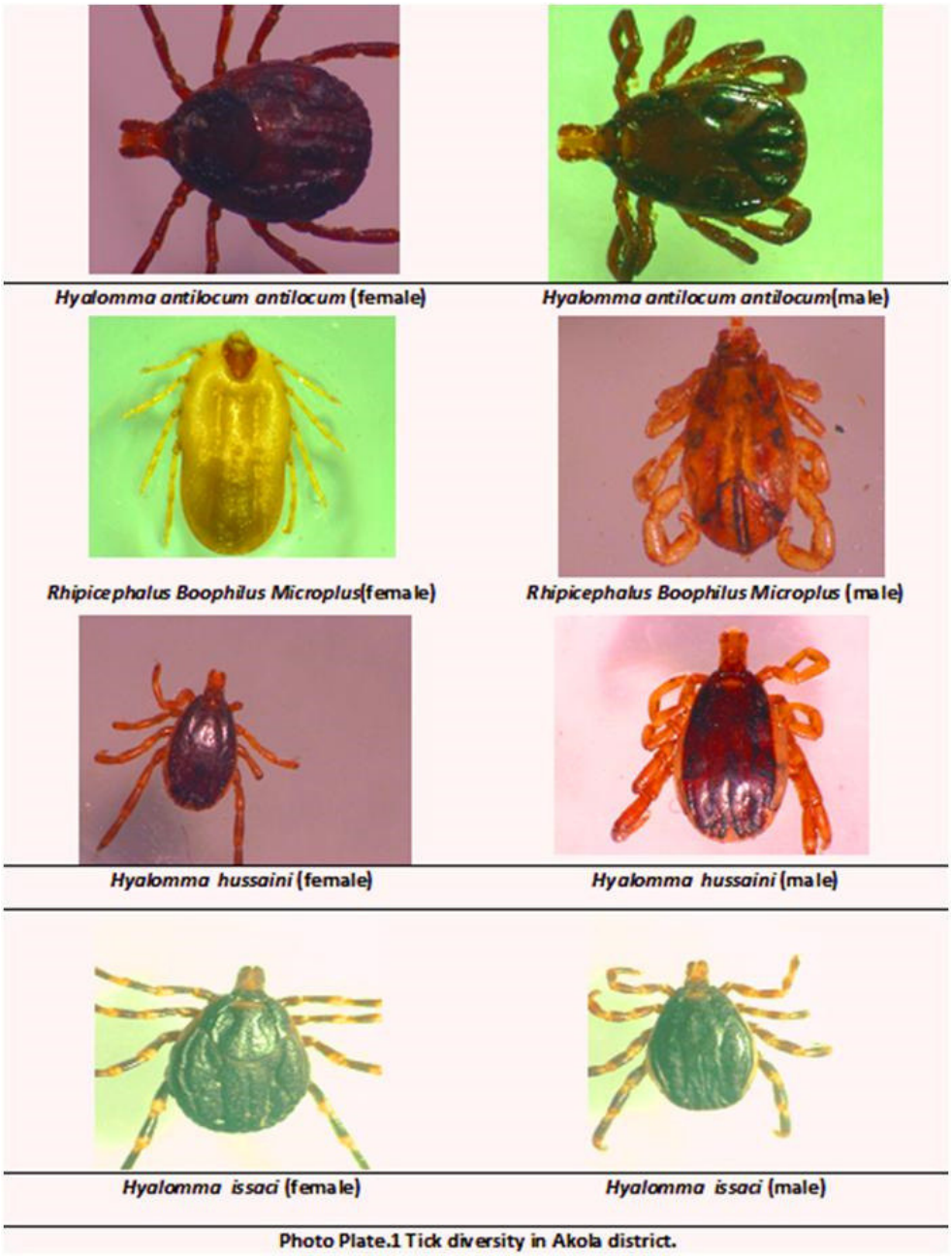

Photo Plate.1 Tick diversity in Akola district.

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