# PREDILECTION OF TICK INFESTATION ON CATTLE OF PALAKKAD DISTRICT, KERALA STATE, INDIA DURING PRE-MONSOON SEASON

**Abstract**

Tick born diseases are widely distributed throughout the world, which cause a tremendous economic loss in live stock production. Live Stock is an integral part of agricultural production system in India, imparting a significant role in the socio economic life of the people in Kerala. About 60 percent of the total live stock s in Kerala are cows, among which Palakkad district holds the second largest number with apex in milk production in the state. Cattle help to overcome the poverty and unemployment to a great extent in these localities ensuring a regular flow of income to weaker section of population where by improving the health status of rural people. The present study was carried out to determine the preference of tick infestation among cattle from four selected localities of Palakkad district during the mid summer season. The total of 1917 evidently visible ticks of 10 cattle from four different localities were collected; five species comprising three genera were identified. These include Rhipicephalus Sanguineus, R. haemaphysaloides, Boophilus annulatus, B. decoloratus and Haemaphysalis bipinosa. The tick population was abundant throughout the study period with a peak during the month of May. Ticks were widely distributed in different parts of the host body such as head, neck, abdomen, ear, teats, leg and tail. Ticks collected from these regions were separately identified and analyzed for their specificity. Of which neck and abdomen regions were the most infested part of the animal body. The distribution of ticks on teats and Tail was least. To evaluate the rate of tick predation by birds, daily observation of selected animal were done.

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## I. INTRODUCTION

Live Stock is an integral part of agricultural production system in India, imparting a significant role in the socio economic life of the people in Kerala. About 60 percent of the total live stocks in kerala are cows, among which Palakkad district holds the second largest number with apex in milk production in the state via the lion share through the ChitturTaluk. It helps to overcome the poverty and unemployment to a great extent ensuring a regular flow of income to weaker section of population, whereby improving the health status of rural people. Vector and vector borne diseases were the major constraints to the development of viable live stock industries. Among these, tick and tick born diseases were widely distributed throughout the world, which cause a tremendous economic spanking in live stock production (Marcellino *et.al.,* 2011, Biruk *et.al.*2012, Haile *et.al.,* 2012, Wasihun *et.al* 2013, and keesing *et.al.,* 2013). It leads to reduced weight gains, decreased milk production, higher susceptibility for diseases and parasites. Almost all dairy and meat animals in India are suffering from tick infestation and cause significant economic loss. Different tick species are widely distributed in Kerala and reported from different districts of the state (Prakasan and Ramani, 2007). The population dynamics of tick are influenced by climatic changes (Kabir *et.al*., 2011). Tadesse *et.a.l*., (2011) reported the tick species and their preferred site on cattle's body in South Western Ethopia. The prevalence of ticks in relation to age, sex, breed, weight, season of the year and different body parts of the host was studied by Eyo *et.al.,* (2014).

Host resistant and natural enemies also affect the rate of tick population. Birds as predators of tick ixodidae in South Africa were reported by petney *et.al.,* (1993).Therefore, relevant data on the distribution of ticks is essential for the development of effective tick and tick borne disease control strategies. Studying ticks on livestock under their natural condition without any control measure is also useful for understanding the host parasite relationship and variation of tick population in different districts of Kerala .This study was undertaken to reveal the infestation of tick species and their preferred site on cattle body at four selected sites of Palakkad District during pre-monsoon season.

## II. METHODOLOGY

In order to study the mode of infestation of ticks on cattles 10 cows (Sindhi and Jersy average 129 kg-weight with 6 litre milk production) were selected from 4 regions of Palakkad District, Kerala, India. The domesticated cattle sheds of these four localities were chosen in view of the accessibility and permissibility offered by the owners. The four sites selected were Koduvayur (Kd), Kinasseri (Kn), Kamba (Km) and Karipode (Kr), at an average radial distance of 15 Kilometer from Palakkad town. The investigations were carried out from December 2013 to June 2014 with a pilot study of two months. During the five months of actual observation, weekly surveillance on ten cattle was made. They were thoroughly examined for tick infestation. Roughly one hour spends for the assessment of ticks on every cattle. Evidently noticeable infested ticks were collected and preserved in labelled bottles. The body parts from where the ticks collected were recorded. Keen observation on Head, neck, teats, abdomen, ear, leg and tail regions were made. The morphometry of the collected ticks were also done with graph sheet. Proper photographing was made at each occasion using photographic cannon power short A 330015 16 mega pixel camera. Preliminary identification was done with available keys and photographs of specimen. The Identification

 

of ticks was done with the help of expert Acarologists. For evaluating the predatory mechanism of birds on infested ticks of cattle, daily two hours of observation on morning with a selected cow was done. Type of birds and their particular mechanism of food collection with number of tick collected were keenly noted.

## III. RESULTS

The mode of infestation of ticks on different body parts of the cattle from various locality of Palakkad during the entire period of study shows striking results. The population fluctuation and the predation by birds were also recorded.

1. **Tick Species from Various Locations:** A total of 1917 ticks of 10 study animals from 4 sites show three genera comprising five species. These includes *Rhipicephalus sanguineus, Rhipicephalus haemaphysaloides, Haemaphysalis bipinosa, Boophilus annulatus* and *Boophilus decoloratus*.

2. **Population Dynamics during the Season:** The tick infestation is significantly higher in dry season i.e May (Table 1). The total percentage of tick infestation in May is 29% followed by March 22%; The months of April and June showed 17% tick infestation. The least tick infestation was found in February (Table 1 & Fig. 1)

**Table 1: Tick Infestation at Various Localities during Pre-Monsoon Season**

| Location | Number Of Cows Selected | Total Number Of Ticks Per Month | | | | | Total | Percentage |
|---|---|---|---|---|---|---|---|---|
| | | Feb | March | April | May | June | | |
| Kd | 2 | 94 | 116 | 105 | 163 | 87 | 565 | 29 |
| Kn | 2 | 22 | 36 | 28 | 53 | 24 | 163 | 9 |
| Km | 3 | 59 | 97 | 69 | 139 | 84 | 448 | 23 |
| Kr | 3 | 111 | 165 | 129 | 213 | 123 | 741 | 39 |
| TOTAL | 10 | 286 | 414 | 331 | 568 | 318 | 1917 | 100 |

Kd :Koduvayur, Kn: Kinassery, Km: Kamba, Kr : Karippode

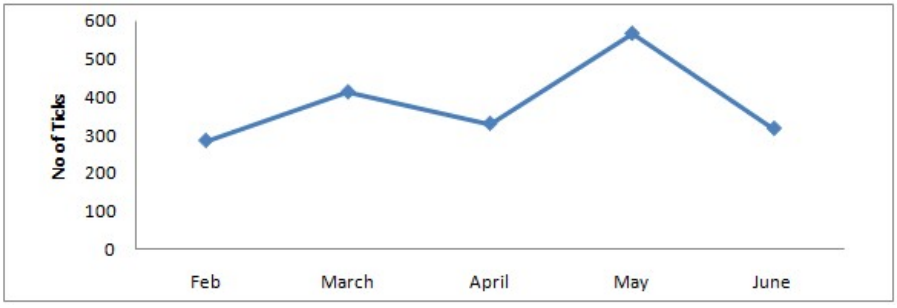


**Figure 1:** Population Dynamics of Ticks during the Season

 

3. **Preference of Tick on Different Body of Parts of Cattle At Various Localities:** Ticks were widely distributed in different parts of the host body such as head, neck, teats, ear, abdomen, leg and tail, of which neck and abdomen regions were most infested part of animal body. The total percentage of ticks encountered in neck and abdomen were 45% and 22% respectively. It was followed by leg (13%), ear (8%), head (7%), teats (4%) and tail (1%). The distribution of ticks on teats and tail was least. (Table 2 & Fig. 2)

**Table 2: Tick Infestation on Different Body Parts of Cattle at Various Localities of Palakkad District**

| Body Parts | Koduvayur | Kinassery | Kamba | Karipode | Total |
|---|---|---|---|---|---|
| Head | 38 | 1 | 27 | 65 | 131 |
| Neck | 252 | 84 | 207 | 323 | 866 |
| Teats | 33 | 0 | 14 | 36 | 83 |
| Ear | 47 | 3 | 30 | 72 | 152 |
| Abdomen | 117 | 29 | 118 | 153 | 417 |
| Leg | 73 | 46 | 50 | 82 | 251 |
| Tail | 5 | 0 | 2 | 10 | 17 |

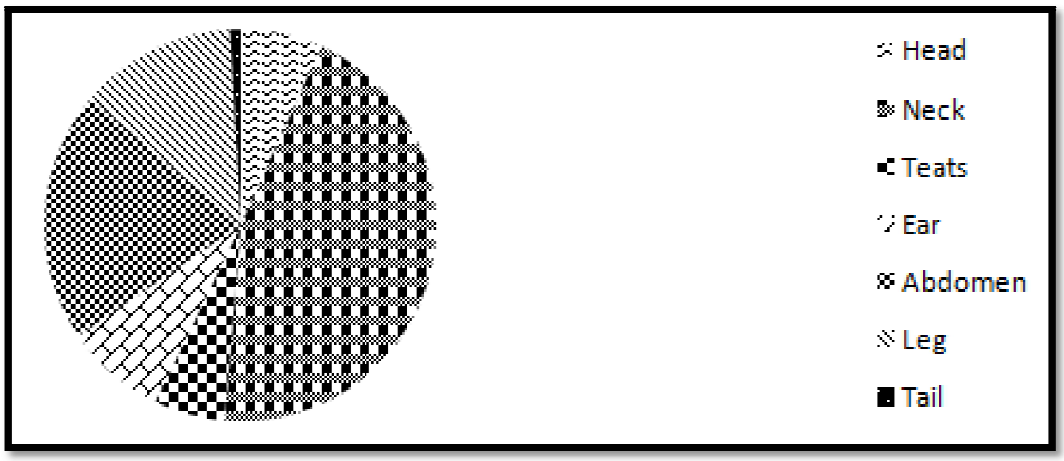


**Figure 2:** Tick Infestation on Different Body Parts of Cattle at Various Localities.

4. **Biological Contol by Birds:** Crow (*corvus splendens*) and cattle egret *(Bubulcus ibis)* visited the cattle for the collection of ticks as their food. The cattle egret collected more number(68.5) of ticks (Table 3). So egrets play an important role in the predation of ticks on cattle. The crow collected about 31.5% of the total share. Almost two pecks were needed for the collection of one tick from the cattle.

**C: CROW, E: EGRET**

**Table: 3 Rate of Tick Predation by Birds**

| Total Number | MARCH | | APRIL | | MAY | | JUNE | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| | C | E | C | E | C | E | C | E | |
| **Days of Visit** | 7 | 7 | 18 | 14 | 7 | 19 | 4 | 9 | 85 |
| **Collected Ticks** | 15 | 14 | 47 | 50 | 17 | 92 | 10 | 38 | 283 |

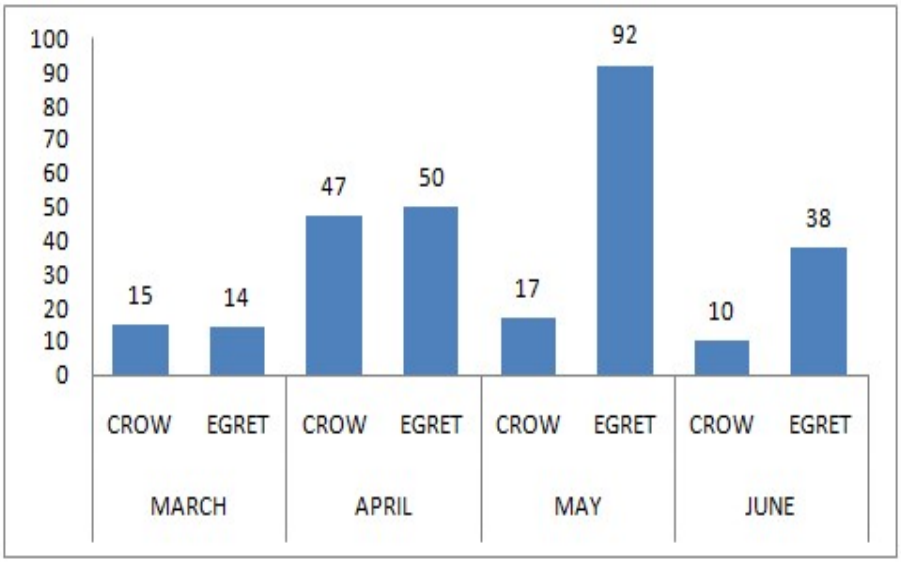


**Figure 3:** Total No. of Ticks Collected by Birds

## IV. DISCUSSION

The present study revealed that the major genera of ticks infesting cattle in 4 sites of Palakkad district belong to *Rhipicephalus sanguineus, R. haemaphysaloides, Boophilus decoloratus, B. annulatus* and *Haemaphysalis bipinosa*. Reports of similar composition for majority of these species were indicated by previous studies by Abebe *et.al* (2010). Prakasan and Ramani (2007) reported the above tick species in different districts of Kerala. Tsai *et.al* (2011) pointed out *Rhipicephalus haemaphysaloides* founds only on dairy cows in Taiwan.

Ticks were widely distributed on the different parts on cattle's body such as head, neck, teats, abdomen, ear, leg and tail etc. The present study showed the neck region with the

 

highest number of ticks observed. Tadese *et.al* (2011) supported this from South Western Ethiopia. The reports of Kabir *et.al* (2011) and Nibret *et.al* (2012) disagree with the above results. They reported that groin was the mostly affected part of animal body and face and neck was the least with the observation of Ethiopia. Wasihun *et.al* (2013) also reclaimed that the favourable predilection site of *B. decoloratus* was leg, tail, head and perineum. Eyo *et.al* (2014) and Bedass *et.al* (2014) reported the ticks were widely distributed in different parts of the host body such as leg, udder/scrotum, mammary gland, abdomen, neck, tail, perineum, dewlap and ear etc. A variety of factors such as host density, interaction between tick species, time and season and inaccessibility for grooming determine the attachment site of ticks.

Seasons significantly affected tick infestation rate in cattle. Maximum infestation was recorded in May (30%) and 22% in March (dry season). The temperature ranges between $37^0$C to $40^0$C during these seasons. This explains the association of an enhanced tick's activity with increased hotness and dampness of the environment. Kabir *et.al* (2011) and Eyo *et.al* (2014) reported that prevalence of tick infestation was significantly higher in dry season (32.16%) than in wet season (11.72%) in Ethiopia and Nigeria respectively. These results disagrees with Nibret *et.al* (2012).They reported that the smallest number of ticks per cattle was observed during the driest month, where as the highest was recorded in the wettest month.

Numerous birds feed ticks. In the present study cattle egret and crow were the common birds that consumed ticks. The best known diligent tick feeders are cattle egrets *(Bubulcus ibis)*. They reached near the cattle at the time of grazing. Among the crow and cattle egret, Egret is the best biological control agent for the removal of ticks from cattle. Petney *et.al* (1993) reported that cattle egret actively involved in the removal of ticks from cattles in South Africa. There were numerous investigations on tick consumption of several bird species. The stomach content of oxpeckers was found that they actually eat large amounts of ticks, if they lived in contact with animals heavily infected with ticks.

From these it can be inferred that control mechanism for tick infestation needs thorough observation of the region specific climatic conditions together with preference for each species on different body sites of the cattle. These can clearly be a fruitful and effective management of cattle through which the industry may be progressed. Grazing of domesticated cattle improve the reduction of infestation through biological control strategies with local bird population.

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