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An investigation on first outbreak of Kyasanur forest disease in Wayanad district of Kerala

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Abstract

As a new challenge to health scenario of Kerala, an outbreak of Kyasanur Forest Disease was reported from Wayanad and Malappuram districts of Kerala, India from January to March 2015. A study on tick vectors of Wayanad district confirmed the presence of larval and nymphal *Haemaphysalis spinigera*, the chief vector of KFD in the forest pastures of Pulppally area. But in other sites viz Kalpetta and Mananthavady its prevalence was found to be low. Presence of tick species like *Haemaphysalis bispinosa*, *Haemaphysalis spinigera*, *Amblyomma integrum*. and *Boophilus(Rhipicephalus) annulatus*. was also noticed from the host animals surveyed.

Keywords: Kyasanur Forest Disease, Ixodid ticks, Ectoparasite, *Haemaphysalis* Kyasanur Forest Disease (KFD)

1. Introduction

Kyasanur Forest Disease (KFD), also referred to as monkey fever is an infectious bleeding disease in monkey and human caused by a highly pathogenic virus called KFD virus. It is an acute prostrating febrile illness, transmitted by infective ticks, especially, *Haemaphysalis spinigera*. Later KFD viruses also reported from sixteen other species of ticks. Rodents, Shrews, Monkeys and birds upon tick bite become reservoir for this virus. This disease was first reported from the Shimoga district of Karnataka, India in March 1955. Common targets of the virus among monkeys are langur (*Semnopithecus entellus*) and bonnet monkey (*Macaca radiata*).

The demonstration of various species of ticks in the transmission of KFD was made by various authors [1-4]. During January to May 2015, several monkey deaths followed by eleven cases of KFD were reported from the villages near Pulppally in the Wayanad Wildlife Sanctuary. As many as 58 affected cases were reported from the same area (IDSP Disease alert and outbreak report 2015). The affected villagers are poor and under privileged persons. The presence of *Haemaphysalis spinigera*, a human infesting Ixodid tick and the most common vector of KFD, was reported for the first time in Wayanad by [5]. Though the outbreak is restricted to particular region of district now, the proximity of human settlements and forest area of the district is a concern. This paper discusses the various parameters that led to the rapid spread of the disease in the study area along with a study on their vectors in the context of increased outbreak of tick borne diseases.

Methods of study

Study was carried out in Pulppally, Kalpetta and Mananthavady of Wayanad district for a period of three months from January to May 2014 to investigate about the chief tick vectors of KFD and outbreak of tick borne diseases in the district.

In the course of the study, tick parasites were collected from forest patches by flag dragging methods [6]. Domestic animals grazing in the forest pastures were examined to establish the identity of tick species ectoparasitic on them. The vectors were collected from the area in which KFD virus is known to be active, as evidenced by human cases and dead monkeys. A detailed taxonomic analysis of tick species recovered was carried out using the keys provided by Trapido H 1964, Sen P 1938 [7, 8].

Results and Discussion

The present study enabled to recover the various developmental stages of different species of ticks (Table 1) from most of the observed sites. All the species recovered during the study were recognized as members of family Ixodidae.

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The species recovered includes *Haemaphysalis bispinosa*, *Haemaphysalis spinigera*, *Amblyomma integrum*. and *Boophilus (Rhipicephalus) sp.* *H. bispinosa* was identified as common species in most of the observed host.

The ticks collected from the forest vegetation of study area indicated high prevalence of larval and nymphal *Haemaphysalis spinigera*, one of the known vectors of KFD. But in no instance adults of this tick species were recovered from forest vegetation or from forest grazing domestic animals. KFD was first reported from few villagers involved in cleaning to prevent the forest fire. A survey on tick parasites on domestic animals grazing in the forest field revealed increased prevalence of *H. bispinosa*, *Boophilus (Rhipicephalus) annulatus* and *Amblyomma integrum*.

During the present study, no adult ticks were recovered from forest pastures. In no instance large host animal including domestic animals were found to be infected. It indicates that adult ticks are not significant vectors. The large proportion of *H. spinigera* in the vegetation is probably an indication of their general abundance in the forest area.

The chance of spreading KFD in districts near frontier areas of

Wayanad is high because of large population of monkeys which is the major host of KFD, co-habitation of man-tick-monkey and availability of different vertebrate hosts to maintain tick population.

An analysis of ecological condition in Wayanad district revealed that many conditions are similar to Kyasanur village area of Karnataka when this disease was reported for the first time which includes human colonisation in forest area, deep encroachment, closed forest, similar kind of vegetation, high humidity which cause tick abundance, relatively fertile bottom terrain, divergent forest ecology, forest area intermingled with cultivated land and cattle grazing area, deforestation and new-land use practices

High prevalence of larval ticks was found in the March-April months under dry leaves of forest vegetation. But larval population was found declining followed by increased occurrence of nymphal ticks in the following months. The present study warranted an urgent attention on changing ecology and vector profile of the prime focus of this disease as it may lead to establish the disease in newer area, never reported before.

Table 1: Tick parasitic stages recovered from forest pastures of selected site in Wayanad

Tick species	Location of collection								
	Kalpetta			Pulppally			Mananthavady		
	No. of larvae	No. of nymphs	No. of adults	No. of larvae	No. of nymphs	No. of adults	No. of larvae	No. of nymphs	No. of adults
<i>Haemaphysalis spinigera</i>	0	0	0	72	12	0	4	2	0
<i>Haemaphysalis bispinosa</i>	38	62	41	42	67	53	73	64	42
<i>Amblyomma integrum</i>	0	0	0	4	17	16	0	0	0
<i>Boophilus (Rhipicephalus)</i>	4	7	3	0	0	0	0	0	0

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