



## Full Length Research Article

# ECTO-PARASITOLOGICAL SURVEY OF RODENT IN KIMIN, ARUNACHAL PRADESH (INDIA).

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### ABSTRACT

Rodents play a significant role in the transmission of many disease-causing pathogens to humans. They attract and harbor a wide range of ectoparasites such as mites, fleas, lice, and ticks. Each of these parasites may itself carry pathogens such as the plague bacteria transmitted by the flea, or the typhus-causing bacteria transmitted by lice and fleas. These rodents with their ectoparasites causing diseases such as plague, leptospirosis, salmonellosis, rat-bite fever, leishmaniasis, Chagas' disease, Omsk hemorrhagic fever, murine typhus and Lassa fever, Crimean Congo Hemorrhagic Fever. In the north-eastern hill region of India rodent outbreaks have been recorded since time immemorial. Present study was an attempt to see the prevalence of rodent and their ectoparasite in Kimin, Arunachal Pradesh (India). Rodents were trapped and ectoparasites were extracted, processed & identified. A total of 40 rodent traps were laid in and outside houses. The overall traps positivity rate was recorded as 20.0 per cent. A total of eight rodents were trapped with 37.5% male and 62.5% female. *Rattus rattus* (Linn.) was found in human residential premises while house mouse, *Mus musculus* (Linn.) was found inside houses. *R. rattus* was the prevalent species with 87.5% and *M. musculus* was 12.5%. After examination of rodent ear, 35 mesostigmatid mites (*Laelaps* sp.) were retrieved and no flea (vector of plague), lice and trombiculid mite chigger (*L. deliense*) (vector of scrub typhus) could be recovered. The overall infestation rate of ectoparasites was recorded as 25 per cent. Though in the present study only two species of rodent were trapped and no ectoparasite responsible for plague and scrub typhus was collected but further studies are required to investigate the presence of *Yersinia pestis*, and *Orientia tsutsugamushi* infection to assess its risks to human health.

**Key words:** *Rattus Rattus*, *Mus Musculus*, *Laelaps*, Kimin, Arunachal Pradesh.

### INTRODUCTION

Rodents are the most prolific mammals found throughout the world. This group includes rats, mice, bandicoots, hamsters, voles, gerbils, squirrels, porcupines, jerboas and birch mice, dormice and bamboo rats. Rodents by their nature and design, make excellent "vehicles" for harboring and rapidly transporting diseases to human being mainly plague and scrub typhus. In addition, rodent can also transmit Leptospirosis, Salmonellosis, rat-bite fever, Chagas' disease, Omsk hemorrhagic fever, Murine typhus, and Lassa fever etc., which are non vector borne (Bell *et al.*, 1988). Rodents can act as reservoirs of a number of human diseases and as hosts for arthropod vectors such as fleas, mites and ticks. Rodents can carry several parasites and diseases at the same time. In the north-eastern hill region of India rodent outbreaks have been recorded since time immemorial. In this region rodents are one of the most important pests due to availability of congenial habitat in the vast forest areas.

This pest not only damages the standing crops but also largely the stored grains particularly rice, which is the most important food grain of the region (Sarangi *et al.*, 2009).

### MATERIALS AND METHODS

#### Study area

Present study was an attempt to see the prevalence of rodent and their ectoparasite in Kimin, Arunachal Pradesh (India). Kimin is a City in Kimin Tehsil in Papum Pare District of Arunachal Pradesh State, India. It is located 29 KM towards East from District head quarters Yupia. The latitude 27.14 and longitude 93.61 are the geocoordinate of the Kimin. Arunachal Pradesh is the largest state among all the North eastern states of India with an area of 83,743 sq. km. located in the Eastern Himalaya. The state also has various topographical zones experienced different climates in the different parts with tropical, subtropical and alpine forests (Kumawat *et al.*, 2013).

#### Rodent trapping, processing and ectoparasite identification

In the present study rodents were collected using live traps. The traps were set at pre-selected sites.

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**Table 1. Prevalence of rodent and their ectoparasite in Kimin, Arunachal Pradesh (India)**

Trap laid	Rodent species Collected	Mesostigmatid mite (number)	Infestation Rate (Per cent)
40	Rattus rattus (M)	-	25
	Rattus rattus (M)	-	
	Rattus rattus (M)	-	
	Rattus rattus (F)	<i>Laelaps</i> spp. (10)	
	Rattus rattus (F)	<i>Laelaps</i> spp. (25)	
	Rattus rattus (F)	-	
	Rattus rattus (F)	-	
	Mus musculus (F)	-	
M-Male, F-Female			

Next morning caught rodents were brought back to the laboratory, where all rodents were anaesthetized, and identified. Ectoparasites on the body of animal were extracted. Ear and nasal canals were examined for chiggers. All extracted ectoparasites were preserved in 70% alcohol for further processing. All ectoparasites were later mounted in Hoyer's medium for identification using the standard method described earlier by Kumar *et al.*, (1997). Mounted slides were then incubated at 40°C for a week and identified under microscope.

## RESULTS AND DISCUSSION

During the investigation a total of 40 rodent traps were laid in and outside houses. The overall traps positivity rate was recorded as 20.0 per cent. A total of eight rodents were trapped with 37.5% male and 62.5% female. *Rattus rattus* (Linn.) was found in human residential premises while house mouse, *Mus musculus* (Linn.) was found inside houses. *R. rattus* was the prevalent species with 87.5% and *M. musculus* was 12.5%. As mentioned above, in Arunachal Pradesh there are three types of forest *i.e.* tropical, subtropical and alpine experienced with different climate. Such type of environment is favorable for multiplication of rats, squirrels and porcupines. Zoological Survey of India published faunal document including rodents from Arunachal Pradesh (De *et al.*, 2006).

Collected rodents were examined thoroughly and all the possible attempts were made to retrieve ectoparasite. As a result of ear examination of the rodents, 35 mesostigmatid mites (*Laelaps* sp.) were retrieved and no flea (vector of plague), lice and trombiculid mite chigger (*L. deliense*) (vector of scrub typhus) could be recovered. Two *R. rattus* collected from human residential premises were found infested with *Laelaps* mite. The overall infestation rate of ectoparasites was recorded as 25 per cent. In neighboring state Meghalaya first case of scrub typhus was reported in the year 2005. After that state surveillance unit of Integrated Disease Surveillance Project (IDSP) reported 395 cases and 19 deaths during 2005 to 2011.

Sharma in 2013 in scrub typhus affected areas of Shillong, Meghalaya, (India) collected 43 rodents, and 28 fleas with trap positivity rate 24.8 per cent, and flea index 1.44 while chigger index was calculated as 1.80. Rodent species collected were *Suncus murinus*, *R. rattus*, *Bandicota indica* and *M. musculus* while ectoparasite collected were *Xenopsylla cheopis*, *Leptotrombidium deliense*, *Laelaps* spp., *Schoengastiaella ligula* and Lice. In last few years case of scrub typhus has been detected in North East India.

Gupta *et al.*, (2012), Gurung *et al.*, (2013) reported scrub typhus outbreak in the tiny Himalayan state of Sikkim which confirmed the presence of different species of rodents and their ectoparasites in North East Indian states. Though in the present study only two species of rodent were trapped and no ectoparasite responsible for plague and scrub typhus was collected but further studies are required to investigate the presence of *Yersinia pestis*, and *Orientia tsutsugamushi* infection to assess its risks to human health.

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