

STUDIES ON MORPHOLOGY AND TAXONOMIC CHARACTERISTICS OF ECTOPARASITES (BED BUGS AND TICKS)

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ABSTRACT

Studies on bedbugs and ticks can reveal the morphological and taxonomical characters of species. This study was based on the analysis of different bedbugs and ticks with respect to the species. Bed bugs and mites samples were collected from Utkal University boy's hostel and Nayapali area respectively. Bed bugs were collected during night time by using forceps whereas ticks were collected during day time from street dogs. After the collection of species there were preserved by using formalin in a plastic box for 24 hours. After preservation the test was examined under stereo zoom microscope. In this present study the ectoparasites *Cimex lectularius*, *Cimex pilosellus*, *Adjunctisoeciacus*, *Boophilusannulatus*, *Rhipicepalus sanguinius*, were respectively examined.

Key words: ectoparasites, bed bugs, ticks, morphology, taxonomy.

INTRODUCTION

Arthropods are the diverse assemblage of invertebrates consisting of nearly 80% of all known animal species and occupying almost every known habitat (Yadav *et al.*, 2017). Arthropods institute the largest phylum in the animal kingdom and yet a relatively small number of species are related to public health by direct or indirect infection (Fritsche *et al.*, 2003). The relationship with humans and animals and ectoparasites infections causes a serious loss in health and economy every year (Yadav *et al.*, 2017). Importance of medical and public health arthropology seems to be rising with worldwide certain arthropods like bed bug (Doggett *et al.*, 2012). Insects and mites are common inhabitants and accidental invaders of food and their presence can have both direct and indirect effect on human health (Hubert *et al.*, 2018).

Bed bugs are type of insects that feed on human blood usually at night (Hildreth *et al.*, 2009). Bed bugs were first mentioned in Germany in the 11th century, in France in 13th century and in England in 1583 (Mullen *et al.*, 2009) though they remained rare in England until 1670. Bed bugs exhibit a behavior called thermo taxis which means that they prefer to be in constant contact with a solid surface. They are photophobic and also fast runners (Service, 1980). Inspection can be challenging as bed bugs will quickly shy away from light source. The mouthparts of bed bugs are especially adapted for piercing skin and sucking blood.

Some arthropods species are belonging to the Class: Arachnida and the Subclass: Arceri known as mites. Most mites are small in size, less than 1 mm in length and it has a simple body plan. Their small size makes them easily overlooked. Mites occupy a wide range of ecological niches. They eat a wide variety of material including living and dead plant and fungal material, lichens and carrion. Some are predatory though no orbited mites are parasitic (Arroyo *et al.*, 2013). They feed on animals, plants and fungi and some are parasites of plants and animals (Jeppson *et al.*, 1975). Being unable to fly, mites need some other means of disposal. Parasitic mites use their hosts to dispose and spread from host to host by direct contact. The majorities are beneficial living in the soil or aqueous environments and assisting in the environments are assisting in the decomposition of decaying organic materials (Jeppson *et al.*, 1975). The majority of mite species are harmless to human and domestic animals but a few species can colonize mammals directly, acting as vectors for disease transmission (Schulze *et al.*, 1994).

MATERIALS AND METHODS

In the present study total number (N=18) of specimen were collected from Utkal University boy's hostel and Nayapali area respectively. They should beproperly placed into a formalin preservation and transported to the laboratory in order to avoid desiccation or microscopy. Stereo zoom had been done in the microscopy, ZSI, Berhampur.

RESULTS AND DISCUSSION

During the present study three species *Cimex lectularius* (Linnaeus, 1758), *Cimex adjunctus* (Barber, 1939) and *Oeciacus vicarius* (Horvath, 191) were observed belonging to two genera *Cimex* and *Oeciacus* (Heteroptera: Cimicidae) and family Cimicidae and 3 species (*Boophilus annulatus*), 1 species (*Rhipicephalus sanguinius*) and 1 species (*Rhipicephalus bursa*) in ticks also observed belonging to the family ixodidae. All species have some identified characters which are discussed below.

Cimex lectularius

Material Examined: 05exs. CUTM, Campus, Odisha, In-11829



Fig. 1 Dorsal view of *Cimex lectularius*



Fig. 2 Ventral view of *Cimex lectularius*

Inter ocular space about four times wide as eye, antennae long, rostrum reaching level of apices of front coxae, broadly expanded pronotum, longest bristles at sides of pronotum, discal bristles shorter, scutellum with numerous scattered bristles on posterior half, hemelytral pads half as wide as long, abdominal region clothed with rows of bristles, the last row of bristles on each tergite exceeding edge, sometimes by as much as their length, Paramere as long as basal width of genital segment and evenly curved.

Oeciacus vacarius

Material Examined: 04exs. CUTM, Campus, Odisha, In-11834



Fig.3 Dorsal view of *Oeciacus vacarius*



Fig.4 Ventral view of *Oeciacus vacarius*

Body large and darker in colour, pronotal margins and hemelytral pads pale in colour, surface of abdominal tergites transversely rugose, pronotum long as wide, long bristles present at the sides of pronotum, mesonotal length as width ratio 1:2, hemelytral pads less than twice as wide, discal bristles about as long as those on pronotal region, abdomen have bristles very long, legs stout, ratio of length to width of hind femora 1:3, paramere reaching the length of left side of genital segment.

Cimex adjunctus

Material Examined: 04exs. CUTM, Campus, Odisha, In-11838



Fig. 5 Dorsal view of *Cimex adjunctus*



Fig. 6 Ventral view of *Cimex adjunctus*

Inter ocular space about five times as wide as an eye, antennae long, rostrum reaching about to middle of prosternum, longest bristles present at the sides of prosternum that is much longer than width of an eye, discal

bristles also much longer than distance between bristles, hemelytral pads over as wide as long, abdominal region clothed with rows of fine long bristles, the longest

bristles present near hind legs, hind leg stout, hind femora more than two times as long as wide, bristles of hind tibiae nearly as long as thickness of tibiae.

Boophilus annulatus

Material Examined: 03exs. CUTM, Campus, Odisha, In-11832



Fig.5 Dorsal view of *Boophilus annulatus*.



Fig.6 Ventral view of *Boophilusannulatus*

Small body and dark in colour, width of body is larger than bed bugs, broad capitulum with rounded lateral margin, males bear elongated pointed anal and adanal shields, the eye is difficult to see and festoons are absent.

Rhipicephalus sanguinius

Material Examined: 01exs. CUTM, Campus, Odisha, In-11865



Fig.7 Dorsal view of *R. sanguinius*.



Fig.8 Ventral view of *R. sanguiniu*

Reddish brown colour, elongated body shape, hexagonal basis of capituli, do not have ornamentation on their backs, Found in warmer climates.

Rhipicephalus bursa

Material Examined: 01exs. CUTM, Campus, Odisha, In-11833



Fig.9 Dorsal view of *R. bursa*



Fig.10 Ventral view of *R. bursa*

Basis capituli lateral angles are sharp, Porose areas are oval and close together, Palps are short, Scapular groove is shallow, Interstitial punctations are medium- large and dense, Scutum is dark, Unfed females can measure between 4.2mm-4.5mm in length, Engorged females can measure up to 10mm.

CONCLUSION

The present study revealed that there are various types of bed bugs and ticks are present in Utkal University campus and Nayapalli area respectively and also some new species are found which is rare. This study may helpful in determining the clinical pathology as well as presence of disturbances in our habitat.

ACKNOWLEDGEMENT

The author would like to express their thanks to Zoology Department, School of Applied Sciences, CUTM, Bhubaneswar as well as EBRC, ZSI, Berhampur for providing facilities for carried out present research work.

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