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A species of ceratopogonidae, Genus *Bezzia* from Manipur

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Abstract

No-see-ums are biting midges of small size and difficult to spot belongs to the family Ceratogononodae. Their main feed comprised of blood of humans and animals. But the species of four genera attacked mammals. Both medically and veterinary these insects are very important of many diseases like *Oropouche* fever, manonellosis or *Leishmaniasis*. The records of over 4000 species from 78 genera of this family are cosmopolitan. There are over 4, 000 species in 78 genera worldwide for this family. The literature survey from Manipur on this family is not found. A survey of the insect was performed during 2019-2020 from different parts of the aquatic habitats like lake, pond and river. The larvae of the insect were captured and reared to obtain the full life cycle. The distinguishing morphological features of the larvae in the present study were presence of collar, epipharynx and anal bristles and they move quickly between the wet plant parts in their habitats with serpent like quick movement. The pupae were having prominent terminal processes in both the sexes. Adults were small with distinct black patches on the wings. The tentative identification of the species is *Bezzia galesa*. Their identities, diversity and control measures will be useful in preventing the diseases from such common insect for general population as well as the academic point.

Keywords: Ceratopogonidae, species, *Bezzia galesa*, manipur, disease vector

Introduction

No-see-ums are biting midges of small to tiny flies and difficult to spot as the name. They are belongs to family Ceratogononodae. Their main feed comprised of blood of humans and animals leaving itchy bite marks as any other blood sucking insects as known from local peoples. Due to their feeding habits they are regarded as potent vectors like Culicoides that transmit *Oropouche* fever (virus) and manonellosis (filarial nematodes of the Genus Mansonella) ^[1] *Leishmania* parasites ^[2].

The number of extant species so far is 6267 and 283 fossils from all over the world from 78 genera ^[3]. The fossil record of Ceratopogonidae dates back to the Early Cretaceous with findings in the Purbeck limestone of Great Britain (142 Ma) ^[4]. Studies on the family and identification of the insects from Manipuri are lacking and need a thorough study to prevent any unwanted incidences to general peoples and increase the biodiversity assessments of the insects. In present study the occurrence of *Bezzia galesa*, Spinelli is reporting from Manipur for the first time. The larval features, pupal characteristics and adult males are described.

Materials and Methods

The study materials were collected from three sites: CSIR complex, Lamphelpat; Waithou pat and Senapati Bazar riverside during field visits from March, 2019 to October, 2020. The larvae were collected along with some of the water and bring back to laboratory. The larvae were mostly associated and live among the roots of Bushy pond weed, Hydrilla and water hyacinth. As they were active serpent movement, they were capture with bottle and taken out the root and grass to collect only the larvae. All life stages of the insects were taken snaps using the dissecting microscope and some parts from the Opt scope compound microscope with attached digital microscope.

Results and Discussion

Taxonomic background (according to

<https://www.its.gov/> [5])

- Kingdom Animalia (Animals)
- Phylum Arthropoda (Arthropods)
- Subphylum Hexapoda (Hexapods)
- Class Insecta (Insects)
- Order Diptera (Flies)
- Infraorder Culicomorpha (Mosquitoes and Midges)
- Family Ceratopogonidae (Biting Midges)
- Subfamily Ceratopogoninae
- Tribe Palpomyiini
- Genus *Bezzia*

Explanation of Names [6]

Ceratopogon: Greek *keratos* 'horn' + *pogon* 'beard' (A reference to hairy male antennae?)

Explanation of Names

Named for Mario Bezzia

Size

Generally 1 to 3 mm

Bezzia galesa Spinelli

According to Spinelli *et al* 2006 [7], the description of the species as follows

Diagnosis. *Bezzia* in both male and female adults have a bunch of setae in the inter-ocular space and lack ventral spines on fore femur, and the spermathecae necks of the female are very elongate. Pupa: the only species of Neotropical *Bezzia* with respiratory organ unilobed with 50-60 apical pores, 3 dorsal apotomal sensilla and 2 clypeal/labral sensilla. Larva: the only species of *Bezzia* without scopae, hypopharynx ventral comb rounded and bearing 6-7 teeth, dorsal comb elongate, and palatal bar triangular. The present study also in accordance with Spinelli *et al.* [7] in all life stages (Fig. 1-2) Most striking features of the species that is quite different from the Indian species is the presence of terminal processes nearly straight, tip moderately curved mesad, base wide, extreme tip pointed, darkish; length 0.42-0.49 mm, width 0.160-0.176 mm.

The Genus *Bezzia*, worldwide in distribution, was reviewed

for the Neotropical region in a series of papers by Spinelli and Wirth, who described and/or recorded 44 species. Further three species were subsequently described by Dippolito *et al* 1995 [8], Spinelli and Ronderos 2009 [9] and Spinelli *et al.* [10], arising to 47 the number of species that inhabit the Neotropics. The majority of them were described from adults, with only the following five known also from larvae and pupae: *B. blantoni* Spinelli et Wirth, *B. glabra* (Coquillett), *B. nobilis* (Winnertz), *B. roldani* Spinelli et Wirth and *B. ventanensis* Spinelli. During a recent entomological survey in the vicinities of Esquel in north western Argentinean Patagonia, a new species of *Bezzia* was collected, which is herein described in all stages [7]. The present specimens are hence tentatively described as *Bezzia galesa* Spinelli on the basis of the typical terminal process of the pupa (Fig. 1 F and G).

The Genus is represented by 281 world species including 14 Indian species namely: *B. analis* Kieffer, 1913, *B. armatipes* Kieffer, 1910, *B. bengalensis* Kieffer, 1913, *B. calcuttensis* Kieffer, 1913, *B. expedita* Sinha et Das Gupta, 2003, *B. flavescens* Kieffer, 1913, *B. fortigenitalis* Sinha et Das Gupta, 2003, *B. glaucivena* Sinha et Das Gupta, 2003, *B. kempfi* Kieffer, 1913, *B. monothea* Sinha et Das Gupta, 2003, *B. papillistyla* Sinha et Das Gupta, 2003, *B. propriostyla* Sinha et Das Gupta, 2003, *B. trispinosa* Kieffer, 1911, and *B. turbipes* Sinha et Das Gupta, 2003 [11]. But the occurrence of *Bezzia galesa* from Manipur (present) study sum up to 15 species of the Genus from India. But the taxonomic position could be ascertained through cytogenetic or molecular studies in future.

Bezzia glesia is seem to be quite resemblance with *Bezzia ventanensis*, *B. roldani* and *B. blantoni* (according to Spinelli *et al.* 2013) [7]. The pupa and fourth instar larvae of *B. roldani* and *B. blantoni* were fully described through observations carried out with SEM by Ronderos *et al.* [12] and Ronderos and Spinelli [13], respectively. But the species found in Manipur is quite different from these species and future works should be the comparative studies of the four.

As these insects are harsh biter, it would be wise to keep away as much as possible and avoid any contact in order protect ourselves from diseases or any other parasites.

In future works, the comparative studies on the Indian and Manipur species will give much clear picture.

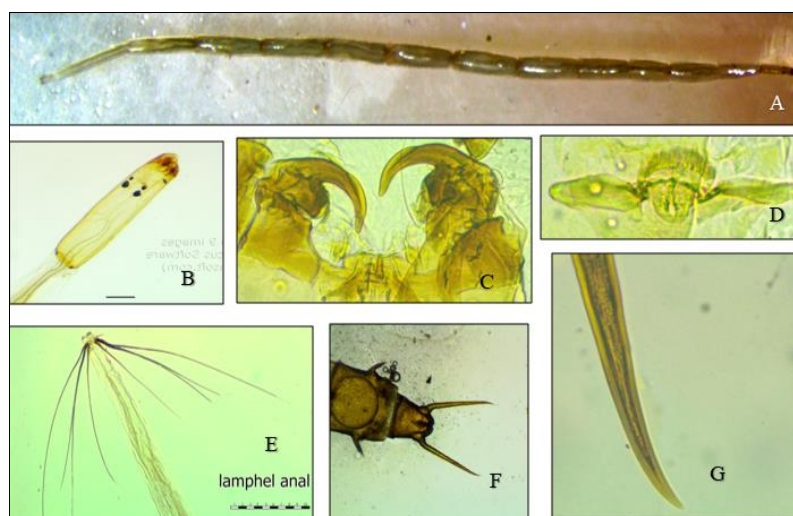


Fig 1: The immature stage of *Bezzia galesa*: A) Whole larva, B) Head region, C) Mandible, D) Epipharynx, E) Caudal segment and 8 setae, F) Posterior region of the pupa with two distinct terminal processes and G) Smooth apex region of the terminal process of pupa. The bar represents 5 micrometer

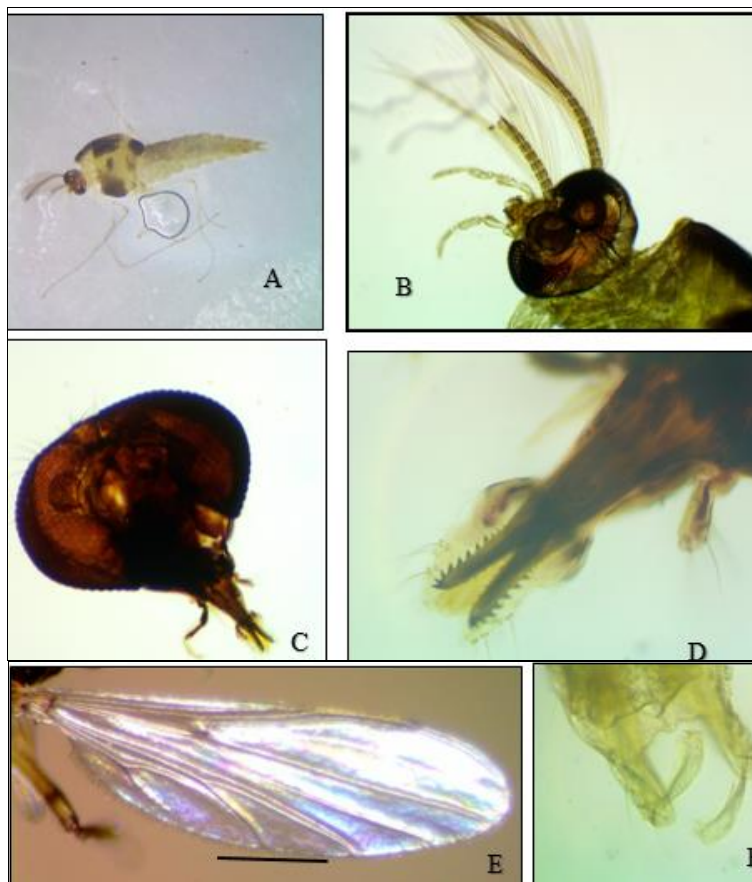


Fig 2: The adult male of *Bezzia galesa*: A) lateral view of the adult, B) Head region and antenna, C) Eyes and mouth parts, D) proboscis, E) Wing and venation of the adult, F) Gonostylus of male adult. The bar represents 5 micrometer

Conclusion

Despite their medically and veterinary importance, the species of the family Ceratopogonidae are not studied so far. The species of *Bezzia* from Manipur reported here is unique in the sense that the other species of this Genus found elsewhere in India is different from the present study and need thorough study for biodiversity assessment and comparative studies in future.

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