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## New records of species of *Metalutzia* (Diptera: Culicidae) from Manipur, India

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### Abstract

Mosquito exploration and survey from Manipur had been taken up for the first time and new record of mosquito had been published and could be expected much as the diversity of the mosquito of the Manipuri is untouched. In this aspect more studies of the different places were carried out. Many larvae of mosquito from breeding ground of Yurembam were brought to the laboratory and reared until the adult emerged. Each life stages were collected and identification was based in the larvae and adult females. This time predacious mosquito, *Lutzia tigrupes* (de Grandpre and de Charmoy, 1901) is being reported in the present study. Report of this predacious mosquito from Manipur is unexpected as this species is exclusively for the Afrotropical region. Four species of the subspecies of *Lutzia* (*Lt.*) are reported but not the *Lt. tigrupes* from India. This could be used to control the other types of mosquito in future studies.

**Keywords:** Manipur, survey, mosquitos, *Lutzia Tigripes*, predacious larvae

### 1. Introduction

The biodiversity of mosquito of Manipur is untouched in ground realities and need more intensive efforts to explore more from hills and valley region. New records are being added and more are yet to named or described into systematic positions. One of the species reported here is the *Lutzia tigrupes*, (de Grandpre and de Charmoy, 1901) one of the five species of the subgenus *Metalutzia*,

*Lutzia* was first established by Frederick Vincent Theobald in 1903 as distinct genus for a Mexican species *Lutzia bigotii* [1]. But latter Tanaka had divided the sub-genera into *Lutzia*, *Metalutzia* and *Insulutzia* [2]. At the moment there are eight extant species under the genus *Lutzia*. They are lone species under *Lutzia shinonagai* [3], two species under subgenus *Lt. allostigma* Howard, Dyar and Knab, *Lt. bigotii* (Bellardi, 1862), and five species under *Metalutzia* Tanaka: *Lt. agranensis* Singh and Prakash 2008, *Lt. fuscana* (Wiedemann, 1820), *Lt. halifaxii* (Theobald, 1903), *Lt. tigrupes* (de Grandpre and de Charmoy, 1901), *Lt. vorax* Edwards [4, 12]. From India according to Tyagi *et al.* [4] reported four species of of subenus *Metalutzia* viz., *Lt. agranensis*, *Lt. fuscana*, *Lt. halifaxii* and *Lt. vorax*. Out of reported 111 mosquito species 83 are *Culicine* mosquitoes under 13 genera [5] but no name mention of *Lutzia* from the mosquito diversity of Manipur.

From Manipur present report of *Lutzia tigrupes* is the first report of this predacious larvae and the future endeavour for the survey and new findings from the region will be very much interesting and exciting. Report of this predacious mosquito from Manipur is unexpected as this species is exclusively for the Afrotropical region. Four species of the subspecies of *Lutzia* (*Lt.*) are reported but not the *Lt. tigrupes* from India. Is this the remnant of the Pangea or any introgression of the local species will be very valuable question to answer for academic as well as the bio-geographic point of view in future.

### 2. Materials and Methods

Larval stages of mosquito were collected from three breeding ground of Urembam, Imphal West during 13<sup>th</sup> April and 21<sup>st</sup> April, 2018. The immature larval stages were reared with appropriate foods in beakers till the emergence of adults and identification of the species were done from larvae and adults of female individuals. The identification keys followed in present studies included: Darsie [1], Lane [6], Bram [7], Tanaka [2], Hopkins [8] for the larval stages and pictorial features described [9].

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**3. Results**

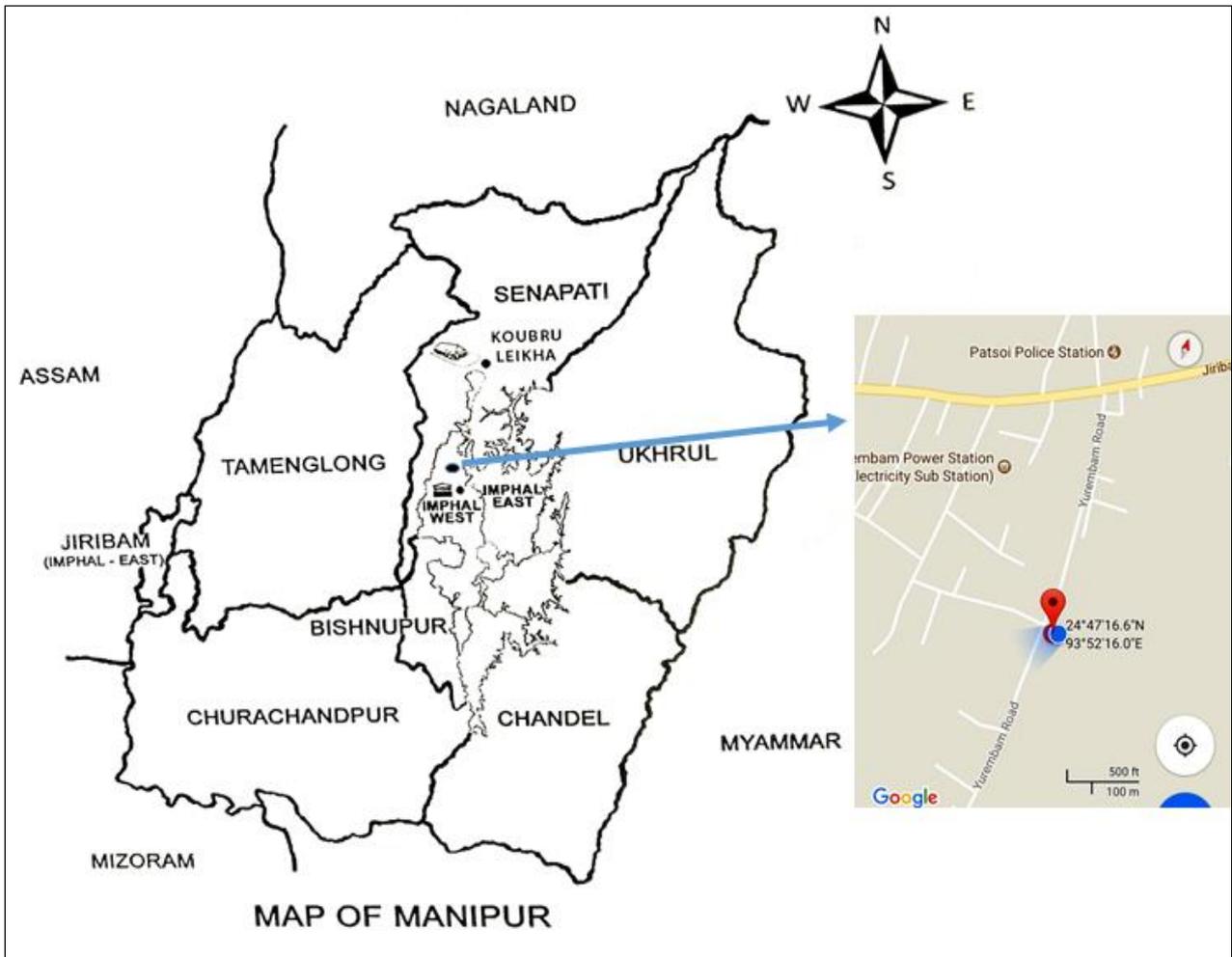
According to Lane [6], Bram [7], Tanaka [2], Hopkins [8] the keys for identification of the species of the *Lutzia* (*Lt*)

1. Siphon index 3.0 or greater, setae shorter than width of siphon at point of attachment (subgenus *Lutzia*) ..... 2  
 -Siphon index 2.0 or less, setae much longer than width of siphon at point of attachment (Old World species) ..... 3
2. (1). Pecten confined to basal 0.4 of siphon, usually 1 1 or more ..... *allostigma*  
 -Pecten extending to 0.7 length of siphon usually 10 or fewer.....*bigoti*
3. (1). Pecten closely spaced, confined to middle 0.3 of siphon; with 18-20 comb scales (sub-genus *Insulahitzia*) shinonagai  
 -Pecten more widely spaced, extending to near apex of siphon, with more than 30 comb scales (subgenus *Metalutzia*) ..... 4
4. (3). Siphon with 10 or more pecten spines ..... *tigripes*  
 -Siphon with 9 or fewer pecten spines..... *fusca*,

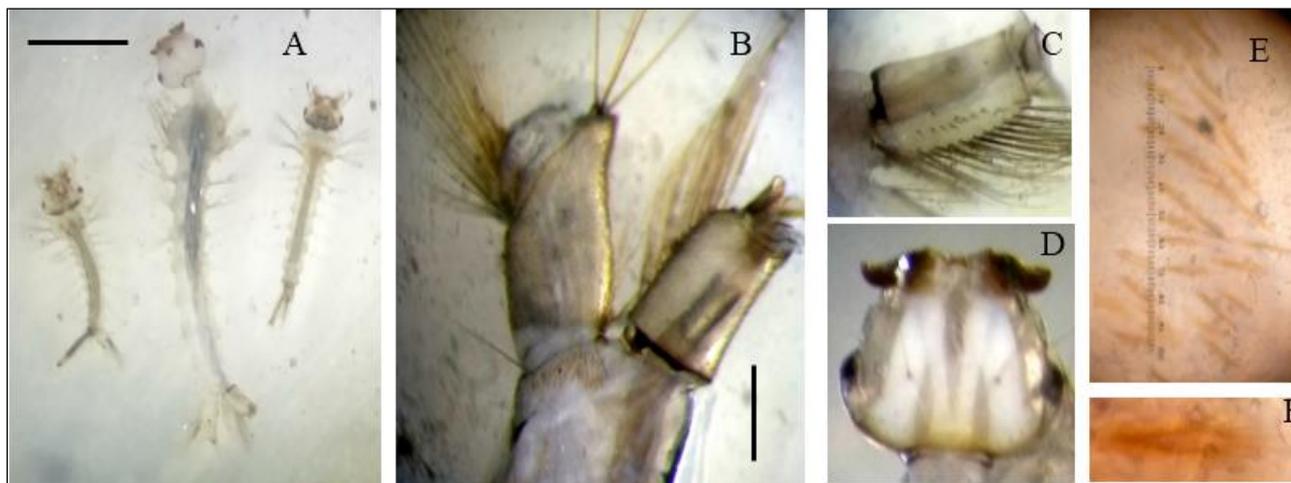
*halifaxii, vorax*

The larvae were about 0.9 cm or 9 mm twice the size of the *Culex* species (fig.2 A) showed the 2.0 (1mm/0.5mm) siphon index, setae much longer than width of siphon (fig. 2 B), pecten teeth more widely spaced, extending to near apex of siphon (fig.2 C), with 32 scale combs (fig. 2E) and individual scales (fig. 2F). The head of larva has two reddish pointed bands and one opposite to the middle (fig. 2D). According to pictorial keys<sup>9</sup> the saddle complete, extending dorsally much further than ventrally, siphon short posteroventral hair tufts and pecten along its entire length, pronotal lobes and scutellum with narrow scales, fore-and mid-femora and tibiae with anterior patches of pale scales. The adult female had quite similar features as that of the *Culex* (fig. 3). The peculiar feature was the wing venation-Cross vein  $r_m$  (radiomedial vein) at nearly same level as base of vein  $M_{3+4}$  (fig. 3E) as compare to *Culex* species (fig. 3F).

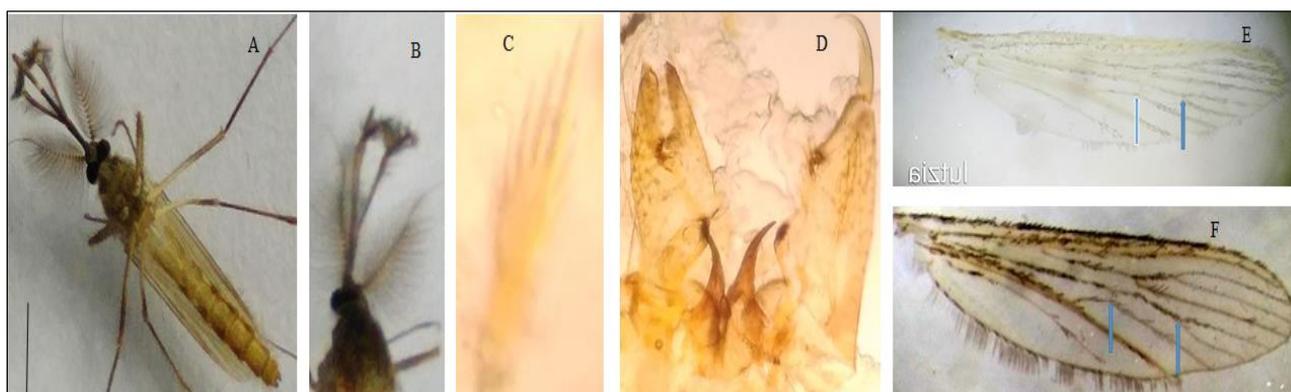
Again according to another keys for the *Lutzia tigripes*: Siphon as long as or shorter than segment X; pecten extending to apex of siphon; lateral palatal brushes thin and strongly developed for grasping. From above, the identity of the larvae and adult in the present studies was *Lutzia tigripes*.



**Fig 1:** The map of Manipur, showing the exact location of the collection of site of Yurembam of Imphal West (inset the position).



**Fig 2:** A-The two larvae of *Culex* and large *Lutzia tigripes* at the centre, B-the anal portion of the *Lt. tigripes* showing saddle, siphon and ventral brush, C-the siphon and pecten teeth extending near to the apex of the siphon, D- the dorsal view of the head region of the larvae three pointed bands, E- the comb scales numbers in 32 and F-enlarge view of single scale. Bar represents 0.5 mm.



**Fig 2:** A-The adult male of *Lutzia tigripes* : B-Lateral view of mouth parts showing slightly curved downward proboscis, C-the mouth part focusing on palp, D-Dorsal female genital view, E-Wings which has cross vein r m at nearly same level as base of M<sub>3+4</sub> (arrowed) as compare to the wings of F- *Culex* species. Bar represents 0.5 mm.

#### 4. Discussion

Base on the available data there are 111 species of mosquitos 83 species are *Culicine* under 13 genera from Manipur<sup>5</sup> in which seven species are new reports from the state. The present reports of the *Lutzia* species from the state is first of its kind.

The genus *Lutzia* Theobald is a small genus with only seven or eight species (Wikipedia). It was originally described as a genus but reduced to a subgenus of *Culex*. Now it is elevated again to generic rank by Tanaka<sup>3</sup>. He also created three new subgenera, i.e. *Metalutzia* Tanaka for the Asian, African and Australasian species, the monotypic subgenus *Insulalutzia* Tanaka for *Lt. shinonagai* Tanaka, Mizusawa and Saugstad, while the subgenus *Lutzia* Theobald applies to the two Neotropical species. He likewise removed *Lt. vorax* (Edwards) from synonymy with *Lt. halifaxii* Theobald. All these changes were based on the morphology of the pupa<sup>[1]</sup>. From India, according to Tyagi *et al.*<sup>[4]</sup> reported four species of subgenus *Metalutzia* viz., *Lt. agranensis*, *Lt. fuscana*, *Lt. halifaxii* and *Lt. vorax*. *Lt. fuscana* has been reported from Kolkata<sup>10</sup> and Rajasthan<sup>[11]</sup>. Genus *Lutzia* includes two species in the Neotropical Region (subgenus *Lutzia*), four in Asia and the Australasian Region (subgenus *Metalutzia*), one in the Afrotropical Region (subgenus *Metalutzia*) and one in

the Ogasawara Islands of Japan (subgenus *Insulalutzia*)<sup>[12]</sup>.

The main species demarcating keys in the genus *Lutzia* is the number of pecten teeth and comb scale-Pecten more widely spaced, extending to near apex of siphon, with more than 30 comb scales (subgenus *Metalutzia*). *Lutzia* larvae are distinguished from the larvae of other genera by the following characteristics: mouthparts modified for predation, lateral palatal brushes with about 40 stout and strongly pectinate filaments; siphon short, with pecten extending to or near apex (except subgenus *Insulalutzia*); saddle complete, dorsal surface strongly extended caudad making segment X appear long and pointed<sup>1</sup>. Siphon with 10 or more pecten spines. The present larva has fairly spaced pecten teeth with ten teeth and number of comb scale is 32. Hence there is no doubt that the larvae in present is *Lt. tigripes*.

Pupae have all or most of setae 1-9-CT single and seta 9-VIII inserted distinctly cephalad of the caudo-lateral angle of the tergum, about 0.7 from the anterior margin<sup>1</sup>. But in present study the pupae could not be included due unavailability. So, the studies present does not involved the pupal studies however the identification.

Report of this predacious mosquito from Manipur is unexpected as this species is exclusively for the Afrotropical

region. Four species of the subspecies of *Lutzia* (*Lt.*) are reported but not the *Lt. tigripes* from India. Is this the remnant of the Pangea or any introgression of the local species will be very valuable question to answer for academic as well as the bio-geographic point of view in future.

Further studies on the larvae and adult mosquitoes of the subgenera *Metalutzia* from more study sites and through molecular as well as cytogenetic studies will be more concrete evidenced of the occurrence of the predacious mosquito from Manipur. In future controlling of the virus borne mosquito could be attempted studies through thorough bionomic studies of the species.

## 5. Conclusion

The occurrence of *Lt. tigripes* from Manipur, India is an unexpected but might be remnant of the Pangea and in future this species could be used to control the pathogenic vectors at specific sites. Further studies on the larvae and adult mosquitoes of this species *Lt. tigripes* from more study sites and through molecular as well as cytogenetic studies will be more concrete to clarify the taxonomic status of the predacious mosquito from Manipur.

## 6. Acknowledgement

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