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Taxonomic studies on cibarial sensilla and genitalic structures of *Culex* (*Oculeomyia*) *bitaeniorhychus* Giles

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Abstract
Culex (*Oculeomyia*) *bitaeniorhynchus* Giles is an important vector mosquito species which is responsible for the spread of Japanese Encephalitis. Taxonomic studies have been conducted on cibarial sensilla and genitalic structure of this species for the first time. New taxonomic attributes have been discovered on cibarium of the present species with the aid of scanning electron microscope (SEM).

Keywords: SEM, species and cibarium

Introduction
The identification of the species, *Culex* (*Oculeomyia*) *bitaeniorhynchus* Giles is quite difficult because of shedding of its scales during the collection surveys. This species is widely distributed throughout the Oriental region, within Southeast Asia and recorded from Thailand, S. Vietnam, Malaysia, Singapore, Indonesia, Philippines, Hainan (China), Hong Kong and southern Ryukyus. Various taxonomists like Sinton and Covell (1927); Barraud and Covell (1928); Christophers and Puri (1931) and Barraud (1934) have already studied this species from different regions of globe. However, none of these workers have studied the cibarial attributes. New taxonomic attributes have come to light. These new attributes can be incorporated in the diagnosis of present species. The earlier records on genitalia structures are line drawings. But the photography of the species specific characters has been done for the first time.

Materials and Methods
During recent surveys, the present species *bitaeniorhynchus* were collected from resting sites from various localities of the Punjab. The collected species was identified with keys provided by Barraud (1934); Bram (1967) and Sirivanakarn (1976) and by comparison with identified collection lying in the Department of Zoology, Punjabi University, Patiala. For scanning electron microscopic studies, the standard methods given by Lee and Craig (1983) have been followed in the present studies.

Material examined
Talwara: (Hajipur) 4.VIII.2012, 2♀♀, 1♂; **Mansa**: 21.VIII.2012, 1♂; (Bhikhi) 19.8.12, 1♂; **Faridkot**: (Tibiyaan) 1.X.2012, 1♀, 1♂; (Narayangarh) 1.X.2012, 3♀♀, 2♂♂.

Results and Discussions
The taxonomic detail of the studied adult male and female species is given below: (Fig. 1-9)

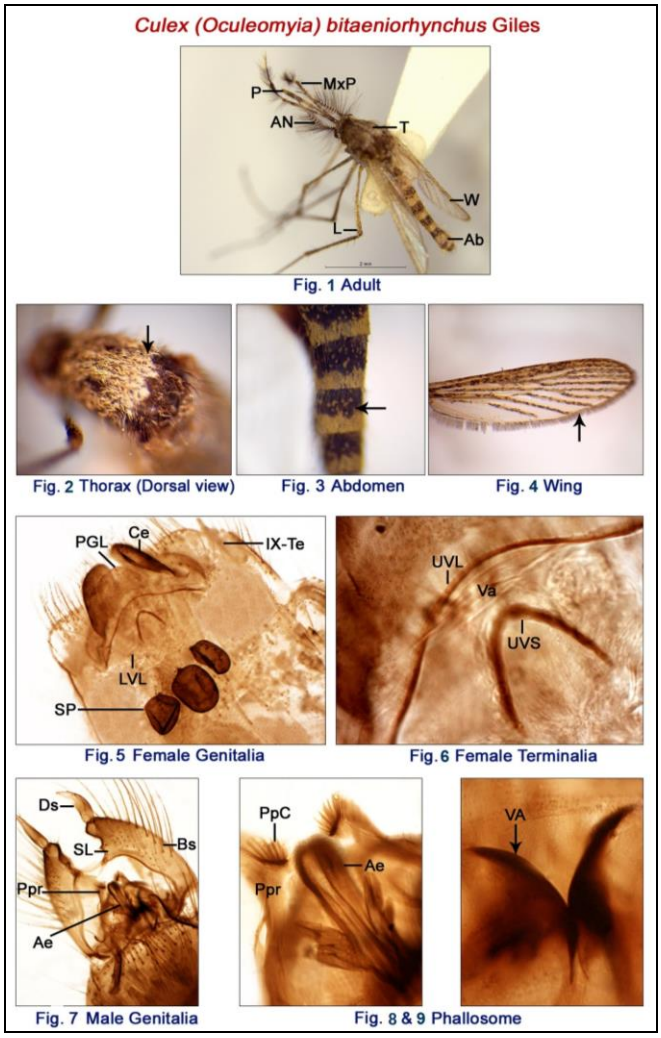

Fig 1-9

Female
Head: Proboscis thick with distinct median creamy ring, also

speckled with pale scales in between the base and median band; palpi dark scaled, with distal pale scales, reaching one fourth to one fifth of proboscis length; vertex covered with creamy, pale golden, upright forked curved scales, broad dull pale appressed scales laterally; occipital margin fringed with pale golden curved and narrow scales; antennae pilose and dark; clypeus bare.

Thorax: Scutal integument dark, with golden brown to ocherous narrow scales; prescutellar area furnished with dark narrow scales predominantly; anterior and posterior pronotal lobe laden with yellowish scales; pleuron marked with pale scaled patch; scutellum covered with light golden hair like scales and three lobes marked with dark broader curved scales; lower mesepimeral bristles absent; upper mesepimeron with 8-10 setae.

Wings: scales on the veins vary in color from entirely dark to predominantly yellow or black ones intermixed with golden scales producing variable degree of speckling; halter knob furnished with yellowish pale scales.

Legs: The speckling in legs varies from totally dark to light, moderately to heavily speckled with pale yellowish scales; fore femora having pale stripe ventrally and speckled dorsally; all tibiae dark scaled; tarsal claws of each leg similar, equal and untoothed.

Abdomen: Tergum-I covered with large median posterior patch of ochreous scales; terga II-VIII with broad pale yellow apical bands, not reaching to lateral margins, large basolateral white spots diagonally opposed to apical bands; dark scaled area heavily speckled with light scales; sterna II-VII furnished with narrow apical bands with scattered pale scales; sternum-VIII with lateral pale scaled patches.

Genitalia: Cerci short, scoop shaped with blunt tip; postgenital lobe with some minute setae and rounded apically; tergum-IX relatively short with subapical setae; insula with median 10-13 setae; vaginal sclerite V-shaped; spermatothecae three in number.

Male:-Male differs from females in following aspects: Palpi longer than proboscis, covering about one fifth to one eighth of band beyond the middle; antennae plumose; tarsal claws of foreleg and mid leg unequal.

Genitalia: Basistyle sub cylinder, tapered beyond the subapical lobe with many minute setae; subapical lobe with two black rod; dististyle appendages are inconspicuous; paraproct well sclerotized with many spines at crown and elongated with lateral arms; basal lateral arm poorly developed and small; posterolateral margin of cercal sclerite bearing 2-3 setae; phallosome much longer; aedeagal sclerite larger than the lateral plate.

Cibarial studies
(Fig. 10-14)
The structure of the cibarium is highly complex. There is no cibarial teeth present on the posterior end of cibarium. Results obtained with SEM from the examination of five female specimens are given below:

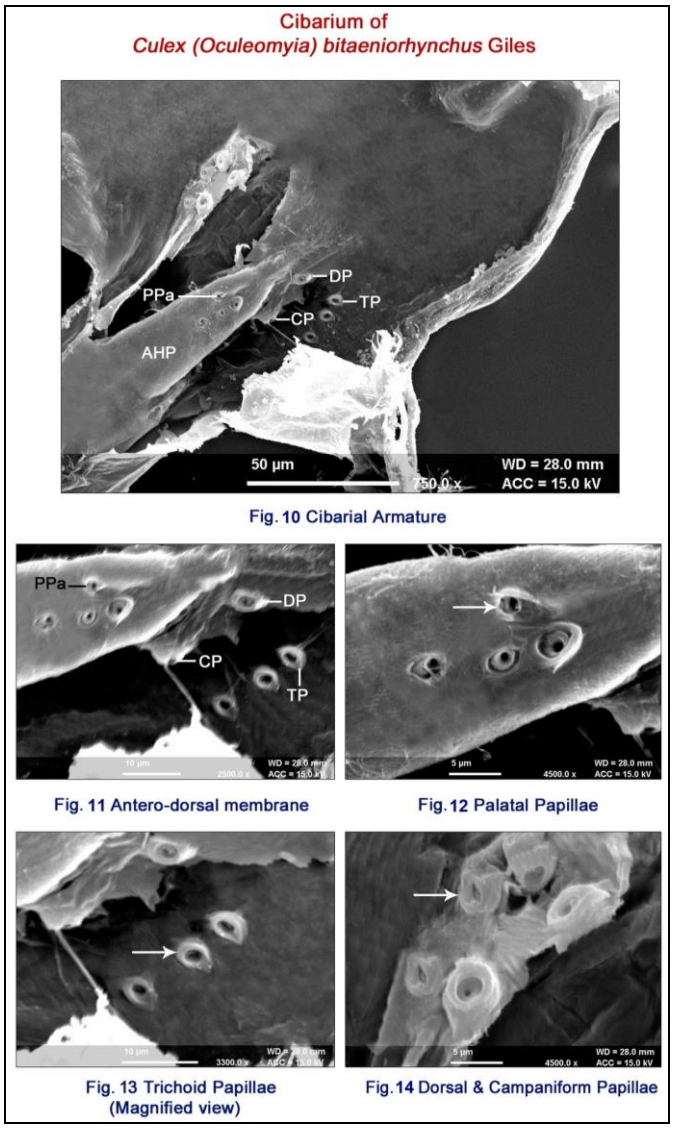

Fig 10-14

Cibarium: The length of cibarium is twice than its width and anterior hard palate approximately one third length of cibarium.

Cibarial sense organs
Palatal papillae: Deep sunken type, 4 in number (3 closely packed in single group forming a triangle and one is slightly apart) on anterior dorsal hard palate.

Dorsal papillae: These are located on the membranous dorsal wall of cibarium. In the studied species, the number is 2.

Campaniform papillae: These papillae were found in almost all mosquito species. But there number is species specific. In the present species, the number of campaniform papillae is 2 (one on each side of the posterior half of the hard palate).

Trichoid Papillae: These are socketed type, located lateral to

campaniform papillae on anterior membranous dorsal wall of cibarium. These show linear and symmetrical arrangement and 6 in number (3 on both sides of hard palate).

Ventral papillae: No ventral papilla has been seen in the present studies.

SEM of cibarium proves to be of value in taxonomy of Culicine mosquitoes. Even these new additional attributes can be used for discrimination of species complex or sibling species.

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