**CULICOIDES CIRCUMSCRIPTUS KIEFFER, 1918 (DIPTERA: CERATOPOGONIDAE), A NEW RECORD FROM WEST BENGAL, INDIA WITH A NOTE ON ITS TAXONOMIC ACCOUNT**

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**ABSTRACT:** The present article is on the new record of *Culicoides circumscriptus* Kieffer, 1918 from West Bengal, India. *Culicoides* is a genus of small biting insects under the family Ceratopogonidae, an established vector of pathogenic diseases to livestock animals, birds and human beings. The concerned species has been suspected as a potential vector of avian malarial parasites in Spain. It was first reported from the Indian state of Karnataka. The present study is the first taxonomic documentation of *C. circumscriptus* from India based on newly recorded species from Paschim Burdwan district in West Bengal. The necessary diagnostic characters for subgenus and species identification with illustrations, references and distribution sites in West Bengal, India and elsewhere have been detailed.

**KEYWORDS:** *Culicoides*, new record, West Bengal, taxonomy.

**INTRODUCTION**

The genus *Culicoides* belonging to family Ceratopogonidae under suborder Nematocera are habitually known as “biting midges” consisting of 1343 species under 31 subgenera worldwide including 64 species under 11 subgenera and 9 species (Unplaced) from India and 49 species under 9 subgenera and 8 species (Unplaced) from West Bengal⁴,⁹-¹³. Female midges are obligatory blood feeders attacking livestock animals, birds and human beings; perilous vectors of pathogens like Blue tongue virus (BTV), Epizootic hemorrhagic disease virus (EHDV), African horse sickness virus (AHSV), etc. causing serious ailments and responsible for spreading infections worldwide⁷. They are mostly prevalent in the warm and tropical countries of the world⁶. *C. circumscriptus* has been found to favor puddles of water contaminated with animal excreta and near wet soil rich in organic matter¹⁴.

About 30 *Culicoides* species worldwide⁶ with 13 species from India⁹ have been reported in the spread of pathogens to man and livestock. *C. circumscriptus* was first reported by Kieffer in 1918 from Tunisia and are predominant in the Palearctic region in the countries like Belgium, Bulgaria, Iran, Israel, Norway, Turkey and rarely from Oriental countries of China and Taiwan¹. ⁴. Recently this insect has been suspected as a potential vector of avian malarial parasites in...
south-west Spain. Archana et al. first reported the species in India while studying seasonal prevalence of Culicoides midges from rural and urban areas of Bangalore, Karnataka, with no evidences earlier or later on C. circumscriptus from India till date. During our two years study, Culicoides circumscriptus Kieffer, 1918 was collected for the first time from cattle shed of Panuria village located in red laterite belt of Ajay river basin, Paschim Burdwan district, West Bengal.

MATERIALS AND METHODS

A. Study Area

Our study is based on the materials collected from Burdwan district in West Bengal. The district is situated between 22°56'N to 23°53'N latitude and 86°48'E to 88°25'E longitude. However, according to Survey of India, 2017, the district has been divided recently into West and East Burdwan districts and from this administrative division it could be understood that our study area concentrates under West Burdwan district. The district is bounded by river Barakar forming the State boundary to the west, river Ajay separates it from Birbhum in the north and river Damodar forms a southern boundary of Burdwan with Purulia. WestBurdwan district is a transitional zone between the Jharkhand plateau in the west and Ganga-Brahmaputra alluvial plain in the north and east. The district has lateritic soil blended with rock fragments, reddish in color, medium to coarse in texture, acidic in reaction, low in nitrogen, calcium, phosphate and other plant nutrients. The forest areas of the district chiefly constitutes of deciduous forest patches mainly of Sal, Mohua and Palash trees. The district experiences warm summers with high temperature and medium rainfall, mild winters with moderate temperature and little rainfall. Average temperature in summer is 30°C while in winter is 20°C with an average rainfall of 150mm. Winter starts from the middle of November till the end of February. March to May is dry summer with tropical cyclones and storms. June to September is wet summer with heavy rainfall, while October and November is autumn.

Insects were collected from cattle farms of Panuria village located in the north western fringe near the river basin of Ajayin West Burdwan district in West Bengal. The distribution sites were geo-referenced by GPS handset GARMIN Oregon 550. A distribution map (Figure 1) of Culicoides in West Bengal based on these locations was created using ARC GIS 10.5 (ESRI, Redlands, CA, USA).

B. Sample Collection, Preservation and Identification

Sample collection was made using sweep nets in early morning, afternoon and just before sunset for a period of two years from June 2014 to May 2016. The study sites were sampled during three seasons (pre monsoon, monsoon and post monsoon) for 90 man days. After collection, they were shifted to 70% ethanol and preserved in a cool place. In the laboratory, Culicoides species were separated and different parts of the specimen were
mounted on glass slides in phenol-balsam mixture and identified through Leica DFC 295 binocular light microscope with the aid of morphological descriptions of Wirth & Hubert. All the measurements are in micrometers.

RESULTS AND DISCUSSION

I. SYSTEMATIC LIST
Suborder Nematocera
Superfamily Chironomoidea
Family Ceratopogonidae
Subfamily Ceratopogoninae
Tribe Culicoidini
   Genus Culicoides Latreille, 1809
   Subgenus Beltranmyia Vargas, 1953
       Culicoides circumscriptus Kieffer, 1918

II. SYSTEMATIC ACCOUNT

Genus Culicoides Latreille, 1809
   Type species: Culicoides punctatus Latreille 1809 (= Ceratopogon punctatus Meigen 1804)

Subgenus Beltranmyia Vargas, 1953

   Type species: Culicoides crepuscularis Malloch, 1915

Diagnosis. Third segment of the palpus swollen; fourth and fifth segments together over half as long as the third segment. Hindtibial comb with 4 spines, the one nearest the spur longest. Second radial cell of wing dark at the tip. Female usually with two spermathecae, one large. Male genitalia with ninth tergum bearing well-developed, pointed, usually slender, apicolateral processes; parameres usually separate.

Culicoides circumscriptus Kieffer, 1918
   Type locality: Tunisia
Material examined. 1♀, collected from cow shed, 23°49'4.00"N, 86°59'59.81"E, 113m, Panuria, West Burdwan, 12.ix.2016, Coll. S. Hazra; 1♂, collected from cow shed, 23°49'4.00"N, 86°59'59.81"E, 113m, Panuria, West Burdwan, 12.ix.2016, Coll. S. Hazra.

Figure 1. Map showing distribution record of *Culicoides circumscriptus* Kieffer, 1918 from West Burdwan district, West Bengal.
Eyes narrowly separated

A. HEAD

Deep sensory pit half as length of third palpal segment

B. MOUTHPARTS

Hindtibial comb with 4 spines

C. HINDTIBIA

Pale spot on R-M

D. WING

Dark spot extending from costa, behind R-M upto medio-cubital fork

Double pale spots on anal cell

Large pale spot on m_{4} with two pale

E. FEMALE GENITALIA

One oval shaped spermathecae

Deep caudomedian excavation on ninth sternum

Tapering ninth tergum

F (A,B). MALE GENITALIA

Dististyle straight with curved ends

Slender dorsal root of haustyle

Bent arms of parameres

Plate 1. *Culicoides circumscriptus*
**Diagnosis**

Eyes bare and narrowly separated. Third segment of palpus swollen, slightly tapering to base, with deep sensory pit, up to half the length of segment, opening by a large, round pore. A large round pale spot centering on R-M cross vein, containing a dark spot in center just to the distal of cross vein, extending from costa nearly to mediocubitus; a broad post stigmatic pale spot in cell r₅ extending broadly from wing margin to vein M₁; cell m₁ with 2 elongate pale spots, distal one lying at a small distance from wing margin; cell m₂ with 2 elongate pale spots in distal portion, distal one broadly meeting wing margin; cell m₄ with a large pale spot upto wing margin; anal cell with a large, transverse double pale spot in distal portion extending from mediocubitus to wing margin; macrotrichia long and numerous. In female, one, oval spermatheca with short neck. Ninth sternum of male genitalia with broad, deep, caudo median excavation; ninth tergum moderately broad and slightly tapering, with well-separated, long, slender, apicolateral processes; dorsal root of basistyle moderately long and slender; dististyle slender and nearly straight, with bent pointed tip; parameres each with basal arm bent laterally. The pictorial representation has been provided in Plate 1.

**Distribution:** India: West Bengal: West Burdwan: Panuria; Karnataka: Bidar: Kamthana

**Elsewhere:** Belgium, Bulgaria, China, Iran, Israel, Norway, Taiwan, Tunisia, Turkey

**COMMENT:** In the present study, very few distribution records of the species are found due to unfavorable habitat and high temperature with inadequate rainfall in the study area throughout the year. However, unlike to its favorability, the few presence records of *C. circumscriptus* that is evident from the region might be due to its location near the Ajay river basin, which provides a moist environmental condition.

**CONFLICT OF INTEREST**

Authors declare no conflict of interest.

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**REFERENCES**


