www.jmscr.igmpublication.org
Impact Factor (SJIF): 6.379
Index Copernicus Value: 79.54
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v6i8.13

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

First report of drain fly, *Telmatoscopus albipunctata* (Vaillant, 1972) (Diptera: Psychodidae): causative agent of a rare urinary myiasis from India

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Abstract
Telmatoscopus albipunctatus, is a medically important insect, distributed throughout moist environments that may potentially cause myiasis.
Urinary myiasis and other sites of infestation including the intestine, nasal passages, lung and skin have been reported. This is the first case report of an Indian patient infected with T. albipunctatus in the Paramilitary setup.
The 40 year male Paramilitary Force serving personnel reported to the laboratory of CAPFs' Composite Hospital, BSF, Kadamtala, Darjeeling, India on 11/02/2018 with complaints of passage of some blackish motile objects in urine. Subsequently, these specimen were sent to the diptera section of Zoological Survey of India, Kolkata, India, where it was identified as that of T. albipunctatus.

Case Presentation

The 40 year old male, a permanent resident of the Indian state of Bihar, professionally posted in the State of Tripura in North Eastern region of India since the last 3 years, with a brief stint in Chattisgarh (central India), reported to the laboratory of CAPFs' Composite Hospital, BSF, Kadamtala, Darjeeling, India (latitude: 26.7029986; longitude: 88.3724741; altitude: 128 m), with right sided lower abdominal pain radiating from the loin to the groin accompanied by painful burning sensation during micturition.

Relevent investigations were found to be within normal physiological limits. All the indices of the urine test conducted were normal except for presences of RBCs (8 to 10/HPF).

The symptoms were relieved by oral administration of fluroquinolone group of drugs.

Previous episodes occured in July 2017, October 2017 and recently in Jan 2018.

On 11/02/2018 he passed a bolus of blackish motile objects in urine. He picked up three specimens in Formalin and brought them to the laboratory for evaluation.

The parasites had a approx length of about 1 cm. The larvae were dark brown, slender and hairy. The two terminals were thinner than the body. The head of the larva was cone shaped and had chewing mouth parts. There were several protuberances on the tails, and radial long hairs extended from each protuberance.

Subsequently the specimens were sent to the Diptera Section, Zoological Survey of India, Kolkata, India for identification.

The specimens were certified as the larvae of Telmatoscopus albipunctatus, and thus indicating the route to proper medication and treatment.

Materials and Methods

(i) Collection and preservation techniques

The fourth stage larvae of Telmatoscopus albipunctata (Vaillant, 1972) (Diptera: Psychodidae)[1] was recovered from one of the patient presenting with the symptom of ureteric colic. 3 larval samples were obtained and submitted to the Diptera section, Zoological Survey of India, Kolkata. Specimen was placed on a glass slide wit a drop of normal saline, cover slip placed and observed under the microscope (Barretto and Coutinho, 1940).[2] 1 specimen was preserved in the collection of National Zoological collection, ZSI.

(ii) *Identification and taxonomic studies*

Diptera structurally comprises the most highly specialised members of the class Insecta. The specimen of species *Telmatoscopus albipunctata* (Vaillant, 1972) under family Psychodidae was identified following the classification scheme of Lewis, 1978, using Leica EZ4 stereo microscope and Leica stereo-iso microscope M205A fitted with camera and Leica software 3.0 for photographing.

(iii) *Area from where the patient was diagnosed*

The larvae was reported from urine of a CAPF personal who is a permanent resident of the Indian state of Bihar and was posted in the State of Tripura. He is presently posted at Kadamtala (latitude: 26.7029986; longitude: 88.3724741; altitude: 128 m). District of Darjeeling in the Indian State of West Bengal.

Results

(i) *Classification* (according to classificatory scheme of Lewis, 1978).[3]

The species was first named as *Psychoda albipunctata* (Willistone, 1893), while originally described. Later the name was changed to *Clogmia albipunctata* (Enderlein, 1937) by Enderlein. The accepted name of this species was assigned by Vaillant later in 1972 as *Telmatoscopus albipunctata* (Vaillant, 1972). At present, the species is classified as follows.

Order: Diptera
Suborder: Nematocera
Family: Psychodidae
Subfamily: Psychodinae
Genus: *Telmatoscopus* Eaton, 1904
Species: *Telmatoscopus albipunctata* (Vaillant, 1972)

(ii) *Distribution*

The species is reported across several geographical range such as Neotropical, Palearctic, Afrotropical, Oriental and Australian Oceania region. The type specimen of this species was long back described from Cuba, Havana and deposited in United States National Museum (USNM) by the then author Willistone in 1893. This species is originally distributed in tropics (Kvifte, 2016), but their occurrence is also reported throughout the World (Jezek et al., 2012; Kvifte et al., 2016; Ciliberti et al., 2017), mainly from contaminated fruits and vegetables (Boumanas, 2009).[4][5][6] However this is the first record of the species from India, causing a rare form of Urinary Myiasis.

(iii) *Bionomics*

Flies of this family of Psychodidae undergo complete metamorphosis with all the life cycle stages like egg, larvae, pupae and adult (Theuret and Gery, 2014).[7] The life cycle usually starts when adult female lay eggs on wet decomposed organic matter. Eggs usually take 3-4 days to hatch. Larvae are divided into four stages and last for about 18-20 days prior to pupation. Adults emerge after 5-6 days of pupation. It will take usually 27-30 days to complete the whole life cycle (Jimenez-Guri et al., 2014).[8] Temperature, humidity and several other environmental variables may play a lead role in dictating their different life cycle stages (Garcia-Solache et al., 2010).[9]

(iv) ***Habits & habitats***

Adult flies of this species are usually grey in colour, small in appearance (slightly smaller than grain of rice}. They hop as they are weak fliers.

Larvae can feed on wet leaves and organic matter. They usually feed on bacterial slime from decomposed organic material. For such reason they may serve as bio-cleaner for sewage treatment (Marshall, 2012).[10]

Their natural habitat is mangroves, where larvae can flourish on aquatic, semi-aquatic, decomposing matter and several other microhabitats of forest surface. Several other such kind of microhabitats like urban sewage system also provide prospect for them to thrive on.[11]

(v) ***Disease causing ability and medical importance***

These flies of family Psychodidae are widely known for their opportunistic disease causing capabilities, including causative agents of myiasis. They served as opportunistic agents, where larvae usually are reported to develop inside the body of mammals. They usually enter the human body via urinary, nasal and intestinal tract. However Myiasis is usually caused by accidental ingestion of eggs or early stage larvae in contaminated food materials or larvae may enter the body through the urino-genital tract from open defecation areas or urinals.[12][13][14][15][16]

Fig 1.larvae of *Telmatoscopus albipunctata*

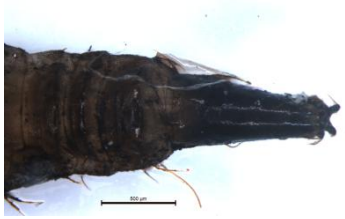

Fig 2 Oral end of larvae of *Telmatoscopus albipunctata*

Fig 3 Aboral end of larvae of *Telmatoscopus albipunctata*

Discussion

The larvae recovered from the patient presented with Urinary myiasis belong to family Psychodidae. The larvae were identified as the fourth instar larval stage after comparing all the morphological characters from several literatures (Smart, 1943; Lewis, 1978).[17] First probable case of Nasal Myiasis, caused from this Psychodid species of *Telmatoscopus albipunctata* (Vaillant, 1972) was reported in 1970 (Nevill et al., 1970). The disease of Nasopharyngeal Myiasis in human was reported as earlier as 1976 in a UK journal (Mohammed and Smith, 1976). There was a case report of intestinal myiasis caused by larvae of this species in Taiwanese man (Tu et al., 2007). Followed by these, there were two successive case reports of Myiasis in hospitals in Germany, where they established this species of Psychodidae as the mechanical vectors of bacterial pathogen (Faulde and Speisberger, 2012; 2013).[18][19] Probably the first case of Urinary myiasis caused from this Psychodid fly, was reported in human from Egypt (El-Bardy et al., 2014). Latest report of Intestinal Myiasis caused by this larvae of *Telmatoscopus albipunctata* (Vaillant, 1972) was recorded a Malaysian patient (Mokhtar et al., 2016).

The present case of Urinary myiasis is the first report from India, caused by the fourth instar larval stage of this Psychodid fly. Probably the patient got infected from his spouse (as reported by the patient), who used to defecate in the open ground at night in their home town. The patient complained of lower abdominal colicy pain and reported ‘clumps of black creepy creatures coming out through his urine’. Some of those were sent to the Diptera section of Zoological Survey of India

where they were identified as the fourth instar larvae of *Telmatoscopus albipunctata* (Vaillant, 1972). This is a very rare variety of urinary myiasis with a parasitic infestation of this Psychodid species, confirmed after identification of this fourth instar larvae of about 1.5 cm. length with macrotrichae and denticles. The patient was subsequently treated with oral administration of fluroquinolone group of drugs.

The use of high dose of Caffeine is also a favoured treatment which may cause high mortality of these Psychodid flies by disrupting the development of brain and sex organ of these insects (Sehgal et al., 1977).[20]

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