



First record of *Tabanus dorsiger* Wiedemann, 1821 (Insecta: Diptera: Tabanidae) from Andaman and Nicobar Islands, India

Koustav Mukherjee, Atanu Naskar* and Dhriti Banerjee

Diptera Section, Zoological Survey of India
M-Block, New Alipore, Kolkata-700053

Abstract

The fly *Tabanus dorsiger* Wiedemann, 1821 belongs to the family Tabanidae, under the infraorder Tabanomorpha and order Diptera, and act as a mechanical vector of various diseases (Maity *et al.*, 2019). While sucking blood from hosts, they transfer numerous pathogens causing vesicular stomatitis, bovine leukosis, anaemia, swine fever, and various species of trypanosomes (Foil, 1989; Krinsky, 1976). “Surra disease” or trypanosomiasis, caused by *Trypanosoma evansi* (Steel) is one of the most important diseases affecting the health and survival of a number of domestic and wild animals worldwide (Veer *et al.*, 2002). The disease has been categorized under list B diseases by the Office International des Epizooties (OIE, 2014). *Tabanus dorsiger* has been suspected as a vector of Surra disease from the Indian states of Punjab, Haryana, Rajasthan, and Himachal Pradesh. Maity *et al.*, 2019 recorded this species from Assam, Bihar, Maharashtra, Odisha, and West Bengal. However, the studies are relatively restricted, and comprehensive surveys and collections are required to determine the presence and abundance of the species in other states. As per best of our knowledge, this species has not been recorded from the Island ecosystem of the Andaman & Nicobars. During a survey in 2022 by the Diptera section in the Andaman and Nicobar Islands, 7 male and 16 female specimens of this species were documented and collected. The first report of this species from this island ecosystem is alarming for the livestock. A detailed study is essential to know the distribution pattern and seasonal abundance of *Tabanus dorsiger* which has been first time recorded from the Andaman and Nicobar Islands, India.

Keywords: Horse fly, Surra disease, Livestock, Island Ecosystem, Taxonomic study

Introduction

Tabanid flies are vectors of over 35 pathogenic agents that affect cattle, horses, and wild animals, like *Trypanosoma evansi*, which causes Surra disease or Trypanosomiasis (Desquesnes *et al.* 2013), equine infectious anaemia virus, *Anaplasma marginale*, and *T. vivax*, as well as the agents of cutaneous anthrax, tularaemia, bovine viral leucosis (Lehane 2005). In India, several illnesses are occasionally transferred to humans (Mackerras *et al.* 2008; Baldacchino *et al.* 2014). The most essential feature responsible for their role as excellent mechanical vectors of diseases is interrupted feeding, which occurs when a tabanid gets dislodged from a host and persistently seeks the closest suitable host to

continue feeding (Mackerras *et al.* 2008). The protozoan parasite *Trypanosoma evansi* is mechanically transferred between wild and domestic animals by tabanids, resulting in severe death and losses in animals in endemic regions. At the same time, because they have piercing and sucking mouthparts and are persistent feeders, they may cause discomfort, loss in milk production and bodyweight in ungulates, resulting in economic loss in the dairy business (Perich *et al.* 1986; Veer 2004). Surra was first reported in camels in the Indian state of Rajasthan by Basu *et al.* (1954). One of the significant causes of the deaths of 11 white tigers in Orissa’s Nandankanan Zoo is an outbreak of Surra disease, which is mostly transmitted by tabanids and muscid flies (Veer *et al.* 2002). Around 4406 species of Tabanidae under

137 genera are found worldwide (Pape and Thompson 2014), out of which 254 species in 14 genera in 3 subfamilies are so far known from India (Veer 2004).

The Andaman-Nicobar group of islands is considered to be a remarkable storehouse of biodiversity. It should come as no surprise that the Islands exhibit biodiversity of amazing range within a small geographic area given that it is located between two major biodiversity hotspots, the Indo-Burma region, and the Sundaland region, displaying faunal traits of both with high endemism. Furthermore, there has been an increase in human population and settlement in the islands, with a 10.17% increase trend according to Aadhar UIDAI, 2018, along with an increase in livestock population, modernization of animal husbandry practices, and a significant annual influx of tourists. This puts the island ecosystem at risk of various disease outbreaks, particularly arthropod-borne diseases due to its tropical location. Furthermore, because of the islands' geographical isolation, it is more difficult for mainland diseases to penetrate the islands; nonetheless, once infected, islanders are far more likely to have significantly more severe symptoms for a given disease than mainlanders. As per Mitra *et al* 2010, 11 species of Tabanidae have been recorded from the islands. The present paper deals with the first report of *Tabanus dorsiger*

from the Andaman & Nicobar Islands taking the species count to 12, which is significant as *Trypanosoma* has now one more potential vector for its transmission in the Islands.

Materials and Methods

During a survey of Diptera fauna in the Andaman Islands (Fig 1) organised by the Diptera Section of Zoological Survey of India from 7th September to 26th September 2022, 7 male and 16 female specimens of *Tabanus dorsiger* were collected. The collection was performed by sweep netting and preserved in 70% alcohol. The collected insects were transported to the laboratory, sorted, and pinned. Identification of adults was done with keys of Thomas (2011) and Stone (1975) and descriptions by Ricardo (1911) and Stone (1975), keeping in mind the nomenclatural changes in the Systema Dipterorum (2013) and Catalogue of Life (2014). Classification scheme of Burger and Thompson (1981) was followed with morphology and terminology adapted from McAlpine *et al.*, (1989). All the specimens were deposited with the designated repository of National Zoological Collection, Diptera Section, Zoological Survey of India, Kolkata. The photographs were taken in Leica Stereo zoom Microscope M205A.

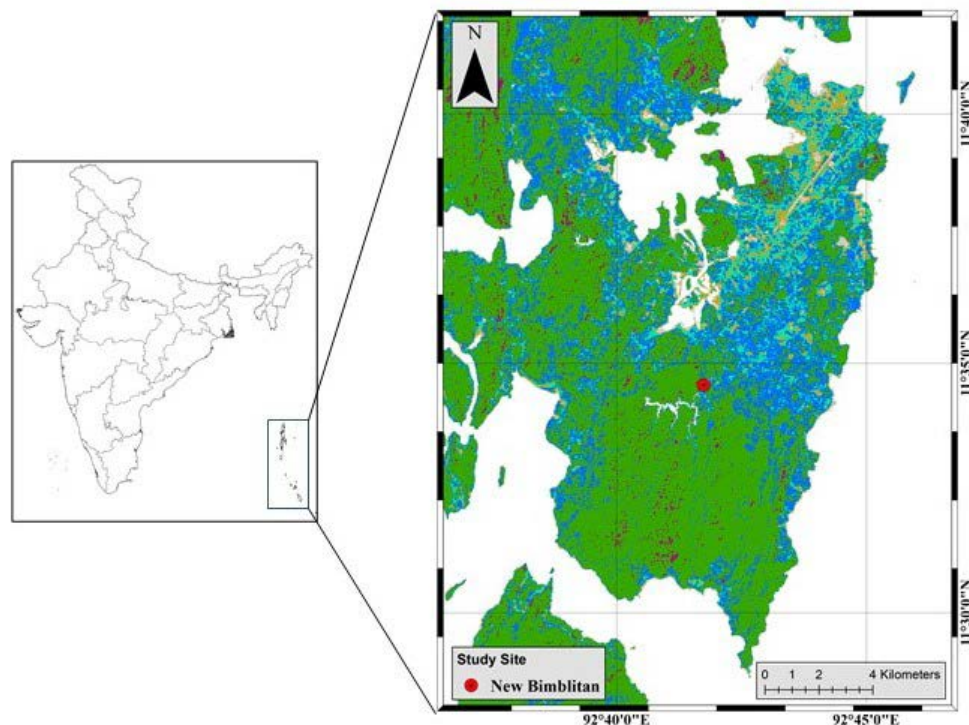


Fig 1: Map of the collection site

Results

Order Diptera Linnaeus, 1758

Suborder Brachycera Zetterstedt, 1842

Family Tabanidae Latreille, 1802

Genus *Tabanus* Linnaeus, 1758

Tabanus dorsiger Wiedemann (1821)

Tabanus ochrophilus Lutz, 1914

Tabanus secundus Walker, 1848

Tabanus triceps Thunberg, 1827

1821. *Tabanus dorsiger* Wiedemann, Diptera Exotica, Kiliae, pp. 43-50, 101.

Type locality: Brazil.

Material examined: 7♂ 16♀: 11°34'17.184" N, 92°41'42.504" E: India, Andaman & Nicobar Islands, South Andaman, New Bimblitan, 78 m, 9.ix.2022, Coll. K.Mukherjee [NZSI].

Diagnosis (Fig 2; Fig 3): Adult fly is usually larger (14-16 mm in length) than the other two trivittate flies, *Tabanus striatus* and *Tabanus tenens*. Fore head slightly divergent above, frontal callus narrowly separated from eye margins and median callus spindle-shaped and narrowly joined to dorsal extension of frontal callus. Abdomen trivittate, mid dorsal stripe complete and broad on tergum II, sub lateral pale stripes noticeably step-like; venter uniform with grey tomentum and light pilose. Fore femur and fore tibia are uniformly orange to brown in colour but are darkened apically. Thoracic stripes are distinct. The male has a yellow tinted costal cell on the wing.

Distribution: India (West Bengal: East Midnapore, Hooghly; S 24 Paraganas; Orissa)

Elsewhere: Mexico to Argentina, Trinidad

Remarks: This species was previously known to us as *Tabanus triceps* Thunberg, 1827, later the species was synonymised as *Tabanus dorsiger* Wiedemann, 1821 due to basically same character of callus in fore head and abdominal pattern with step like sub lateral stripes in both species. This species is recorded for the first time from Andaman & Nicobar Islands.

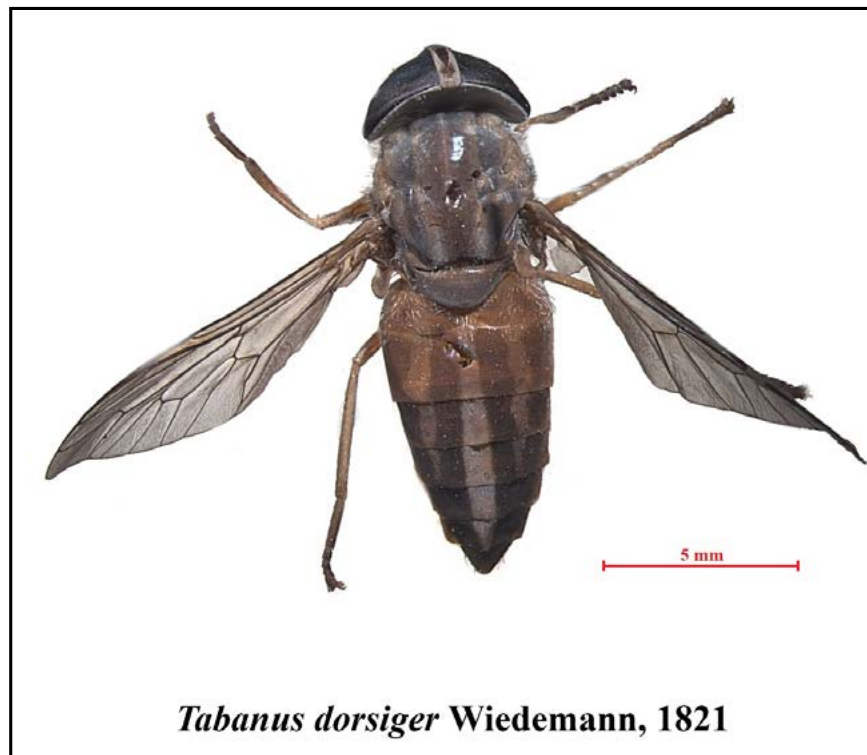


Fig 2: Dorsal view of habitus of *Tabanus dorsiger* Wiedemann, 1821

Discussion

This report adds *Tabanus dorsiger* Wiedemann, 1821 to the list of 11 existing species from the Andaman & Nicobar Islands namely, *Chrysops fasciatus* Wiedemann, 1821; *Tabanus (Tabanus) andamanicus* (Bigot, 1892); *Tabanus andamanensis* Kapoor, Grewal & Sharma, 1991; *Tabanus brunnipennis* Ricardo, 1911; *Tabanus diversifrons* Ricardo, 1911; *Tabanus immanis* Wiedemann, 1828; *Tabanus indianus* Ricardo, 1911; *Tabanus leucohirtus* Ricardo, 1909

; *Tabanus nicobarensis* Schiner, 1868; *Tabanus siamensis* Ricardo, 1911

; *Tabanus (Tabanus) striatus* Fabricus, 1787, taking the tabanid species count in the Islands to 12. Since this was a chance encounter with the species with all 23 specimens collected from a single sampling site, a directed approach to know its distribution pattern, seasonal preference & host preference must be conducted in future to access its potential risk to the people and livestock inhabiting the Islands.



Fig 3: A. Lateral view of head with antennae and mouth parts



Fig 3: B. Dorsal view of head with antennae

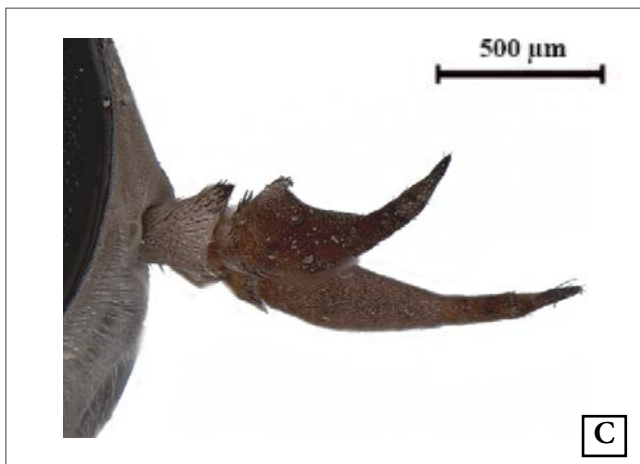


Fig 3: C. Enlarged lateral view of antennae



Fig 3: D. Ventral view of leg

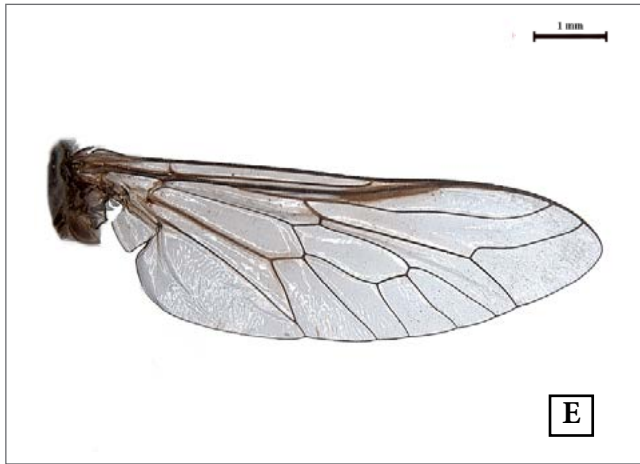


Fig 3: E. Dorsal view of wing



Fig 3: F. Dorsal view of abdomen

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References

- Baldacchino, F., Porciani, A., Bernard, C. and Jay-Robert, P. 2014. Spatial and temporal distribution of Tabanidae in the Pyrenees Mountains: the influence of altitude and landscape structure. *Bulletin of entomological research*, 104(1): 1-11.
- Basu, B.C., Balarama, M. and Sen, G. 1954. Field Studies on the Bionomics of Tabanus Flies with a View to work out Control Measures. *Indian Journal of Entomology*, 16(pt. 1).
- Bisby, F., Roskov, Y., Culham, A., Orrell, T., Nicolson, D., Paglinawan, L., Bailly, N., Appeltans, W., Kirk, P., Bourgoign, T. and Baillargeon, G. 2012. Species 2000 & ITIS Catalogue of Life, 2012 Annual Checklist.
- Burger, J.F. and Thompson, F.C. 1981. The *Tabanus striatus* complex (Diptera: Tabanidae): a revision of some oriental horse fly vectors of surra. *Proceedings of the Entomological Society of Washington*.
- Desquesnes, M., Holzmüller, P., Lai, D.H., Dargantes, A., Lun, Z.R. and Jittaplapong, S. 2013. *Trypanosoma evansi* and surra: a review and perspectives on origin, history, distribution, taxonomy, morphology, hosts, and pathogenic effects. *BioMed research international*, 2013.
- Foil, L.D. 1989. Tabanids as vectors of disease agents. *Parasitology today*, 5(3): 88-96.
- Krinsky, W.L. 1976. Animal disease agents transmitted by horse flies and deer flies (Diptera: Tabanidae). *Journal of medical Entomology*, 13(3): 225-275.
- Lehane, M.J. 2005. The biology of blood-sucking in insects. Cambridge University Press.
- Mackerras, I.M., Spratt, D.M. and Yeates, D.K. 2008. Revision of the horse fly genera *Lissimas* and *Cydistomyia* (Diptera: Tabanidae: Diachlorini) of Australia. *Zootaxa*, 1886(1): 1-80.

- Maity, A., Naskar, A. and Banerjee, D. 2019. Diversity of Horse Flies (Insecta: Diptera: Tabanidae) from Different Geo-Climatic Regions of West Bengal, Occasional Paper No., 398 (Published by the Director, Zoological Survey of India, Kolkata)
- McAlpine, J.F. 1989. Phylogeny and classification of the Muscomorpha. *Manual of Nearctic Diptera* 3: 1397-1518.
- Mitra, B., Banerjee, D. and Parui, P. 2010. Diversity and distribution of true flies (Insecta: Diptera) in the Andaman and Nicobar Islands. *Recent Trends in Biodiversity of Andaman & Nicobar Islands* (Ed. Ramakrishna, Raghunathan C. & Sivaperuman C.), *Zoological Survey of India, Kolkata*: 467-493.
- Pape, T. and Evenhuis, N.L. 2015. Systema Dipteroorum, Version 1.5. 67 records, 2013.
- Perich, M.J., Wright, R.E. and Lusby, K.S. 1986. Impact of horse flies (Diptera: Tabanidae) on beef cattle. *Journal of economic entomology*, 79(1): 128-131.
- Stone A. 1975. Family Tabanidae. In: Delfinado MD and Hardy DE, editors. A catalogue of the Diptera of the oriental region. Vol. 2. Honolulu: University Press of Hawaii; p. 43-81
- Ricardo, G., 1911. A revision of the species of *Tabanus* from the Oriental region, including notes on species from surrounding countries. *Records of the Zoological Survey of India*, 4(6): 111-255.
- Thomas, A.W. 2011. Tabanidae of Canada, east of the Rocky Mountains 2: a photographic key to the genera and species of Tabaninae (Diptera: Tabanidae). *Canadian Journal of Arthropod Identification*, 13(10.3752).
- Veer, V., Parashar, B.D. and Prakash, S. 2002. Tabanid and muscoid haematophagous flies, vectors of trypanosomiasis or surra disease in wild animals and livestock in Nandankanan Biological Park, Bhubaneswar (Orissa, India). *Current science*, 82(5): 500-503.
- Veer, V. 2004. Tabanidae flies (Diptera) from the Indian subregion. *Annals of Forestry*, 12(2): 301-447.