

DISTRIBUTIONAL SCENARIO OF HOVER FLIES (DIPTERA: SYRPHIDAE) FROM THE STATE OF WEST BENGAL

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ABSTRACT: This study altogether includes 96 species of hover flies under 40 genera of 3 subfamilies. Our study further includes 4 species of hoverflies that are *Chrysotoxum quadrifasciatum* Brunetti, 1923; *Eristalinus (Eristalinus) tabanoides* (Jaenicke, 1867); *Lycastrialbipes* Walker, 1857 and *Eumerus aurifrons* (Wiedemann, 1824) which are reported for the first time from the state of West Bengal. Their taxonomic keys and detailed diagnostic accounts, as well as the distributional scenario, have been discussed here with latest updation of nomenclature pattern.

KEY WORDS: Taxonomy, Diptera, Syrphidae, hover flies, new record, distribution, West Bengal

Hover flies are one of the most beneficial groups of flies which are categorized under brachyceran suborder of order Diptera and family Syrphidae (Brunetti, 1907). Syrphidae are always better documented for being a competent pollinator (Brunetti, 1923).

Syrphids can be distinguished by the presence of a unique false vein or Vena Spuria in between 3rd and 4th vein of their wing (Bugg, 2008). Apart from this, they can be recognized by the presence of body shape, colour pattern and the way of moving (Ghorpade, 1994). Moreover, hover flies form the largest and commonest group in mimics in the Palaearctic (Van Steenis et al., 2012) with up to 25% of species involved in mimicking innumerable diverse models as a part of their defence mechanism (Reuters, 2013).

Another particular attribute of hover flies is the great diversity of form, feeding mode and place of development in their larvae (Bhatia et al., 1933). Hover flies also acts as a biological monitor (De Silva, 1961) for environmental change. Syrphids are the second most important recognized pollinators and help in cross pollination (Mengual, 2012) of several plants, along with large potency in biological control of aphid pests to prevent economic hazards (Parui et al., 2002). Even then they are being properly harnessed either for pollination services or for bio control services, For all these reasons of scientific interests, environmental services, and economic welfare, hover flies are worthy of our attention.

Around 6000 hoverfly species in 180 genera are known globally (Pape & Thompson, 2017). With 355 species among them are currently described from India (Sengupta et al., 2016). Among the six zoogeographical regions, the north temperate Palaearctic (at generic level) & Neotropics (at species level) has shown the maximum diversity in this faunal distribution whereas Afro Tropical & Australian region is low in diversity in term of both genera and species level.

Because of such a wide distribution, the distributional scenario of family Syrphidae always needs an updation to track its current position in diversity hierarchy. In order to investigate the distributional account as well as to find out

the appearance of new discoveries from this family, we have carried out our survey in different localities of West Bengal. It has been chosen as the study area because of its vastness. Besides this, West Bengal being first in agricultural crop production in our country has always played a pivotal role in crop cultivation. Which is known to produce approximately 23.4 percent of total crop production of the country (De Silva, 1961). Still, there are no updated compiled records on the availability of this crop friendly flies from this state (Chaudhuri & Chattopadhyay, 1997).

The current study includes an updated distributional account of hoverflies from the state of West Bengal along with its current nomenclature, generic sub generic pattern (Pape & Thompson, 2016). Currently, 70 species under 34 genera are documented from West Bengal (Pape & Thompson, 2017) including our study as well as literature sources. This updated account includes four new records from this state also, among which several species are endemic to India (Sengupta et al., 2016).

In West Bengal Cultivation of aphidophagous hoverflies as natural bio controller as well as pollinators on the commercial basis is being neglected for long (Knutson et al., 1975). So it is important to properly investigate, harbour and conserve this group of pollinators especially the endemic ones (Thompson, 1969).

MATERIALS AND METHODS

a. Study area: Different Parts of West Bengal consist of different geographical topology, riverine plain land in the southern area with its northern fringes, the foothills of Himalaya and southern fringes of Bay of Bengal. Due to its typical topographical location, it experiences a tropical kind of climate. The geographical location of West Bengal is 23 degree North latitude and 88 degree East longitude. The wide temperature gradient, substantive vegetation cover, diverse flora, livestock, and innumerable ecological niches make the habitats diversified.

b. Sampling method: A 3 years long survey was conducted in different districts and different bio geographic zone of West Bengal from March, 2014 to March 2016. Adult syrphid fauna was collected from the field during day time by using insect sweep nets, using Malaise trap, Pan trap following the methods of Weems, 1953 later modified by Thompson, 2008. The collected samples are narcotized by using ethyl acetate and stored for further study in special drying insect envelopes in the field. The specimens were later carried back to the laboratory, mounted on insect pins and stored in insect cabinets for further identification procedure.

c. Identification of the collected specimen: The present list has been identified, updated and compiled, following the classification scheme from Oriental catalogue and Syrphidae life desk, Systema Dipteroorum, Catalog of Life, incorporating the data of the Fauna of British India (1923), the State Fauna Series of Zoological Survey of India (2006), Zoological Record (2013) and currently available literature, keeping in mind the recent nomenclatural changes in the Systema Dipteroorum(2017), and Catalogue of Life (2017).

d. Technical details: The photo of habitus were taken by using Leica Microscope M205A, with the 0.32x macro lens. The 3D Map was made using DIVA GIS Software version 7.5.0. The graphs were prepared using Microsoft Excel 2016.

e. Compilation method: Factually our study embraces all of the collection of hoverflies that have been deposited in the NZSI collection from last 100 years. This comprises both the deposited materials as well as previous survey materials, we have also incorporated the literature sources here to create a comprehensive

list of all hoverflies species existing from the State till date. The collection was done all over the state especially in those areas where no detail status survey was done previously for the family of Syrphidae.

RESULTS

96 species of hover flies under 40 genera over 3 subfamilies have been reported here. A detailed systematic account of the newly reported species from the state was described (Mcalpine, 1987) according to current systematics and nomenclature pattern. (Pape & Thompson, 2017) along with their distribution pattern.

Order DIPTERA(Linnaeus, 1758)
Suborder BRACHYCERA Macquart, 1834
Clade ASCHIZA Becher, 1882
Superfamily SYRPHOIDEA Latreille, 1802
Family SYRPHIDAE Latreille, 1802

Systematic list of taxa (new records from the state is marked with double asterisk)

Subfamily Syrphinae

Tribe Syrphini

Genus *Allograpta* Osten Sacken, 1875

Subgenus *Allograpta* Osten Sacken, 1875

1. *Allograpta javana* (Wiedemann, 1824)

Genus *Asarkina* Macquart, 1842

Subgenus *Asarkina* Macquart, 1842

2. *Asarkina ericetorum* (Fabricius, 1781)

Genus *Betasyrphus* Matsumura, 1917

3. *Betasyrphus serarius* (Wiedemann, 1830)

Genus *Dasysyrphus* Enderlein, 1938

4. *Dasysyrphus orsua* (Walker, 1852)

Genus *Dideopsis* Matsumura, 1917

5. *Dideopsis aegrota* (Fabricius, 1805)

Genus *Eupeodes* Osten Sacken, 1877

Subgenus *Macrosyrphus* Matsumura, 1917

6. *Eupeodes confrater* (Wiedemann, 1830)

Subgenus *Metasyrphus* Matsumura, 1917

7. *Eupeodes corollae* (Fabricius, 1794)

Genus *Epistrophe* Walker, 1852

Subgenus *Epistrophe* Walker, 1852

8. *Epistrophe carmichaeli* Ghorpade, 1994

9. *Epistrophe griseocinctus* (Brunetti, 1923)

Subgenus *Epistrophella* Dusek & Laska, 1967

10. *Epistrophe shibakawae* (Matsumura, 1917)

Genus *Episyrphus* Matsumura & Adachi, 1917

Subgenus *Episyrphus* Matsumura & Adachi, 1917

11. *Episyrphus balteatus* (De Geer, 1776)

Genus *Ischiodon* Sack, 1913

12. *Ischiodon scutellaris* (Fabricius, 1805)

Genus *Meliscaeva* Frey, 1946

13. *Meliscaeva cinctelloides* Ghorpade, 1994

14. *Meliscaeva darjeelingensis* Datta & Chakraborti, 1986

15. *Meliscaeva kusuma* Ghorpade, 1994

16. *Meliscaeva cinctella* (Zetterstedt, 1843)

17. *Meliscaeva magnifica* Ghorpade, 1994

Genus *Sphaerophoria* Lepeletier & Serville, 1828

Subgenus *Sphaerophoria* Lepeletier & Serville, 1828

18. *Sphaerophoria bengalensis* Macquart, 1842

Subgenus *Knutsonia* Barkalov, 2012

19. *Sphaerophoria viridaenea* Brunetti, 1915

Subgenus *Sphaerophoria* Wiedemann, 1830

20. *Sphaerophoria indiana* Bigot, 1884

Genus *Syrphus* Fabricius, 1775

Subgenus *Syrphus* Fabricius, 1775

21. *Syrphus fulvifacies* Brunetti, 1913

Genus *Allobaccha* Curran, 1928

Subgenus *Allobaccha* Curran, 1928

22. *Allobaccha elegans* (Brunetti, 1915)

23. *Allobaccha triangulifera* (Austen, 1893)

Genus *Chrysotoxum* Meigen, 1803

24. *Chrysotoxum quadrifasciatum* Brunetti, 1923**

25. *Chrysotoxum violaceum* Brunetti, 1923

Tribe Bacchini

Genus *Baccha* Fabricius, 1805

26. *Baccha maculata* Walker, 1852

Genus *Melanostoma* Schiner, 1860

27. *Melanostoma orientale* (Wiedemann, 1824)

Tribe Paragini

Genus *Paragus* Latreille, 1804

Subgenus *Paragus* Latreille, 1804

28. *Paragus serratus* (Fabricius, 1805)

Subgenus *Pandasyopthalmus* Stuckenberg, 1954

29. *Paragus atratus* Meijere, 1906

30. *Paragus politus* Wiedemann, 1830

Subfamily Microdontinae

Tribe Microdontini

Genus *Microdon* Meigen, 1803

Subgenus *Microdon* Meigen, 1803

31. *Microdon metallicus* de Meijere, 1904

32. *Microdon ruficaudus* Brunetti, 1907

33. *Microdon stilboides* Walker, 1849

Subgenus *Pseudomicrodon* Hull, 1937

34. *Microdon auricinctus* Brunetti, 1908

Tribe Spheginobacchini

Genus *Spheginobaccha* Meijere, 1908

35. *Spheginobaccha macropoda* (Bigot, 1884)

Subfamily Eristalinae

Tribe Brachyopini

Genus *Sphegina* Meigen, 1822Subgenus *Sphegina* Meigen, 182236. *Sphegina asciiformis* Brunetti, 1915Subgenus *Asiosphegina* Stackelberg, 197437. *Sphegina bispinosa* Brunetti, 191538. *Sphegina javana* de Meijere, 1914

Tribe Rhingiini

Genus *Cheilosia* Meigen, 182239. *Cheilosia hirticincta* Brunetti, 1915Genus *Rhingia* Scopoli, 1763Subgenus *Rhingia* Scopoli, 176340. *Rhingia angusticincta* Brunetti, 190841. *Rhingia binotata* Brunetti, 190842. *Rhingia cincta* de Meijere, 190443. *Rhingia laticincta* Brunetti, 1907

Tribe Volucellini

Genus *Graptomyza* Wiedemann, 182044. *Graptomyza nigripes* Brunetti, 191345. *Graptomyza tinctovittata* Brunetti, 1915Genus *Volucella* Geoffroy, 176246. *Volucella basalis* Brunetti, 190747. *Volucella ursine* de Meijere, 1904

Tribe Ceriodini

Genus *Ceriana* Rafinesque, 181548. *Ceriana ornatifrons* (Brunetti, 1915)Genus *Monoceromyia* Shannon, 192249. *Monoceromyia trinotata* (de Meijere, 1904)Genus *Sphiximorpha* Rondani, 185050. *Sphiximorpha triangulifera* (Brunetti, 1913)

Tribe Eristalini

Genus *Eristalinus* Rondani, 1845Subgenus *Eristalinus* Rondani, 184551. *Eristalinus arvorum* (Fabricius, 1787)52. *Eristalinus megacephalus* (Rossi, 1794)53. *Eristalinus obliquus* (Wiedemann, 1824)54. *Eristalinus polychromata* (Brunetti, 1923)55. *Eristalinus quinquestriatus* (Fabricius, 1794)56. *Eristalinus tabanoides* (Jaennicke, 1867)**Subgenus *Eristalodes* Mik, 189757. *Eristalinus paria* (Bigot, 1880)58. *Eristalinus taeniops* (Wiedemann, 1818)Subgenus *Merodonoides* Curran, 193159. *Eristalinus multifarius* (Walker, 1852)Genus *Eristalis* Latreille, 1804Subgenus *Eoseristalis* Kanervo, 193860. *Eristalis arbustorum* (Linnaeus, 1758)

61. *Eristalis cerealis* Fabricius, 1805
62. *Eristalis himalayensis* Brunetti, 1908
Subgenus *Eristalis* Latreille, 1804
63. *Eristalis tenax* (Linnaeus, 1758)

- Genus *Kertesziomyia* Shiraki, 1930
Subgenus *Kertesziomyia* Shiraki, 1930
64. *Kertesziomyia cyanea* (Brunetti, 1913)
Subgenus *Pseuderistalis* Shiraki, 1930
65. *Kertesziomyia nigra* (Wiedemann, 1824)

- Genus *Phytomia* Guerin-Meneville, 1833
Subgenus *Phytomia* Guerin-Meneville, 1833
66. *Phytomia argyrocephala* (Macquart, 1842)
67. *Phytomia errans* (Fabricius, 1787)
68. *Phytomia zonata* (Fabricius, 1787)
Subgenus *Dolichomerus* Macquart, 1850
69. *Phytomia crassa* (Fabricius, 1787)

- Genus *Mallota* Meigen, 1822
Subgenus *Mallota* Meigen, 1822
70. *Mallota curvigaster* (Macquart, 1842)
71. *Mallota orientalis* (Wiedemann, 1824)
72. *Mallota rufipes* Brunetti, 1913
73. *Mallota varicolor* (Walker, 1856)

- Genus *Mesembrius* Rondani, 1857
Subgenus *Mesembrius* Rondani, 1857
74. *Mesembrius bengalensis* (Wiedemann, 1819)
75. *Mesembrius quadrivittatus* (Wiedemann, 1819)
76. *Mesembrius tuberculatus* (Brunetti, 1907)
77. *Mesembrius vestitus* (Wiedemann, 1821)

- Genus *Pararctophila* Herve-Bazin, 1914
78. *Pararctophila bengalensis* Kohli, Kapoor & Gupta, 1988

Tribe Merodontini

- Genus *Eumerus* Meigen, 1822
79. *Eumerus aeneithorax* Brunetti, 1915
80. *Eumerus aurifrons* (Wiedemann, 1824)**
81. *Eumerus halictoides* Brunetti, 1915
82. *Eumerus pulcherrimus* Brunetti, 1915
83. *Eumerus rufoscutellatus* Brunetti, 1913

Tribe Milesini

- Genus *Lycastris* Walker, 1857
84. *Lycastris albipes* Walker, 1857**
85. *Lycastris austeni* Brunetti, 1923
86. *Lycastris flavohirta* Brunetti, 1907

- Genus *Milesia* Latreille, 1804
87. *Milesia balteata* Kertész, 1901
88. *Milesia brunneonigra* Hippa, 1990
89. *Milesia ferruginosa* Brunetti, 1913
90. *Milesia illustris* Hippa, 1990
91. *Milesia semifulvade* Meijere, 1904
92. *Milesia variegata* Brunetti, 1908

Genus *Syritta* Lepeletier & Serville, 1828

93. *Syritta indica* (Wiedemann, 1824)

94. *Syritta orientalis* Macquart, 1842

Genus *Chalcosyrphus* Curran, 1925

Subgenus *Syrittoxylota* Hippa, 1978

95. *Chalcosyrphus annulatus* (Brunetti, 1913)

Genus *Xylota* Meigen, 1822

Subgenus *Brachypalpoides* Hippa, 1978

96. *Xylota cupreiventris* Brunetti, 1923

Diagnostic account of four new records from the family Syrphidae

Subfamily Syrphinae

Tribe Syrphini

Genus *Chrysotoxum* Meigen, 1803

1803. *Chrysotoxum* Meigen, zweifl. Insekt. Mag. Insekt., 2: 275

Type species: *Musca bicincta* Linnaeus

Diagnosis: Antenna elongate, sometimes longer than head; first flagellomere at least three times as long as wide; scape and pedicel often longer than wide. Abdomen strongly convex dorsally, strongly marinated, usually with poster lateral angles of tergites projecting.

Chrysotoxum quadrifasciatum Brunetti, 1923 (Fig. 1A)

1923. *Chrysotoxum quadrifasciatum* Brunetti, Fauna. Br. India, 3: 300

= *Chrysotoxum rotundatum* Herve-Bazin, 1923

Type locality: Assam, Khasi hills, India.

Material examined: 1♀, Upumfatak, Darjeeling district, 2256 m, 27°00'10.9" N, 88°13'14.1" E, 08.vi.14, coll: D Banerjee.

Diagnosis: **Head:** Frons, vertex, and antennae shining black, a pair of large, oval, grey dust spots contiguous with eye margins, face brownish orange in colour with wide black median stripes. Proboscis dark brown. **Thorax:** Dorsum shining black with yellowish scutellum, pubescence of thorax brownish yellow in colour, venter black. **Abdomen:** Blackish, 2nd and 3rd each with a pair of transverse linear orange spots forming a slight arch just behind abdominal margin. **Leg:** Upto tip of tarsi brownish orange in color, femora more or less blackish. **Wing:** Yellowish-grey with 2nd vein having brownish or yellow suffusions.

Distribution: India: West Bengal, Assam, Meghalaya.

Elsewhere: Laos.

Subfamily Eristalinae

Tribe Eristalini

Genus *Eristalinus* Rondani, 1845

1845. *Eristalinus* Rondani, Nuovi Ann. Sci. Nat. Bologna, 2 (2): 453

Type Species: *Musca sepulchralis* Linnaeus

Diagnosis: Head as broad as the thorax, thorax with yellowish brown scutellum, Abdomen yellow to orange in coloration. Legs simple orange to black in coloration. 3rd vein distinctly looped downward, marginal cell closed.

Subgenus *Eristalinus* Rondani, 1845

Eristalinus tabanoides (Jaennicke, 1867) (Fig. 1B)

1867. *Eristalis tabanoides* Jaennicke, Neu.exot. Dipteren. Abh. Senckenb. Ges., 6: 402

=*Eristalis punctifer* Walker, 1871

Type locality: Eritrea.

Material examined: 4♀♀3♂♂ Sukhiapokhari, Darjeeling district, 1928 m, 26°59'54.9" N, 88°10'01.9" E, 11.vi.14, coll: A.Naskar.

Diagnosis: **Head:** Not produced below eyes, later bare and spotted throughout. Frons and face dusted with pale yellowish grey concolorous pubescence. **Thorax:** Wholly ash grey, the presence of four shining black stripes on dorsum, scutellum dull orange in colour with brownish yellow pubescence. **Abdomen:** Mainly blackish, 1st segment whitish while 2nd more or less yellowish, abdominal pubescence ground in colour. **Leg:** Blackish with whitish pubescence. **Wing:** Mainly colorless, stigma with a brownish black dot at each end, halteres orange in color.

Distribution: India (West Bengal, Delhi).

Elsewhere: Eritrea, Djibouti, Tunisia, Egypt.

Tribe Milesiini

Genus *Lycastris* Walker, 1857

1857. *Lycastris* Walker, Trans. Ent. Soc. Lond., 4: 155

Type Species: *Lycastris albipes* Walker

Diagnosis: Head flattened in front, slightly, wider than thorax. Eyes bare, separated on the vertex. Thorax sub quadrate, semi-circular scutellum; both densely pubescent. Legs rather long and strong, simple, moderately pubescent. Wings with a distinguished venation.

Lycastris albipes Walker, 1857 (Fig. 1C)

1857. *Lycastris albipes* Walker, Trans. Ent. Soc. Lond., 4: 155

=*Xiphopheromyia glossata* Bigot, 1892

Type locality: Hindostan.

Material examined: 1♀, Rock Island, Darjeeling district, 511 m, 27°00'29.8"N, 88°48'07.0" E, 17.v.2015, coll: J. Sengupta.

Diagnosis: **Head:** Eyes bare, contiguous for a very short space. **Thorax:** From yellowish grey to black in colour, scutellum covered with dense and rather long bright yellow pubescence. **Abdomen:** Blackish in colour with aeneous, cupreous or deep blue tinge on its dorsal surface. Anterior margin of the 2nd segment in the form of elongated V shaped spots. Venter blackish with pale yellow or whitish pubescence. **Leg:** Anterior portion yellow, hind femora wholly black, legs covered with bright yellow to whitish pubescence. **Wing:** Grey in colour, a little brownish suffusion along the cross vein in the middle of the wing. Halteres slightly yellowish grey in color.

Distribution: India (West Bengal, Himachal Pradesh, Uttarakhand).

Elsewhere: Oriental region.

Tribe Merodontini

Genus *Eumerus* Meigen, 1822

1822. *Eumerus* Meigen, zweifl. ugeligen. Insekten. Dritter Theil. Schulz., 10: 202

Type Species: *Syrphus tricolor* Fabricius

Diagnosis: M₁ vein of wing strongly biangulate, with an external spur; the apical portion of M₁ forming on its outer side an acute angle with R₄₊₅. Hind femur greatly enlarged, with anteroventral and poster ventral row of spines near apex. Eye haired.

Eumerus aurifrons (Wiedemann, 1824)(Fig. 1D)1824. *Eumerus aurifrons* Wiedemann, *Analecta. ent.*, 1: 32

Type locality: Ind Orient region.

Material examined: 1♀, Chachanpur, Bankura district, 110 m, 23°17' 54.9" N, 86° 53' 55.3" E, 28.ii.16, Coll: J. Sengupta.

Diagnosis: **Head:** Eyes slightly but distinctly separated, vertical triangle elongated, ocellar space covered with dark brown pubescence. **Thorax:** Both thorax and scutellum shiningly aeneous, the presence of 2 widely separated narrow and grey longitudinal stripes from anterior margin to well beyond the suture. **Abdomen:** Shining blue black in colour, 2nd segment with large yellow spots while 3rd and 4th each with a pair of narrow slightly curved greyish spots. Venter mainly yellowish in color. **Leg:** Mainly black, anterior femora rather broadly and hind femora narrowly orange. Pubescence of legs mainly yellowish in colour. **Wing:** Clear with normal syrphid venation, halteres yellowish to orange in colour.

Distribution: India: West Bengal.

Elsewhere: Hawaii, Indonesia, Philippines.

DISCUSSION

Altogether 96 species of hoverflies under 40 genera and 3 subfamilies have been reported (including both survey data and literature sources) from different study sites across the different bio geographic zone of West Bengal during our 3 year-long survey period (March 2014 to March 2016). Among them 4 species of hover flies namely *Chrysotoxum quadrifasciatum* Brunetti, 1923; *Eristalinus (Eristalinus) tabanoides* (Jaenicke, 1867); *Lycastris albipes* Walker, 1857 and *Eumerus aurifrons* (Wiedemann, 1824) under 4 genera and 2 sub families have been reported from the first time from the state of West Bengal. Among all this species 1 species *Chalcosyrphus (Syrittoxylota) annulatus* (Brunetti, 1913) shows endemism to the mountain region of West Bengal. The GIS distribution map of West Bengal has shown the collection sites of the newly reported species from this state. Few species are rarely distributed along the state while most of the species have shown more or less wide distribution pattern across the state. Among different geographic zones of West Bengal, the Rarh plain region has shown the least species richness in terms of a number of species availability from that region. While Mountain region has shown the highest species richness. Apart from this, this region has shown a remarkable higher percentile of type species location of the family Syrphidae. Among the species, one species namely *Episyrphus (Episyrphus) balteatus* (De Geer, 1776) is most widely spread throughout the state and it has shown cosmopolitan distribution. Most surprisingly West Bengal comprises only 2.7% area of India but it represents 27.04 % of total syrphid species available from the country which is quite significant. A further detailed study in different zones of this state is required to depict a clearer picture. Moreover, this is the first ever compiled list of recent time depicting the currently available species list from the state of West Bengal following the latest nomenclature pattern which may help other researchers in their study regarding this charismatic hoverflies.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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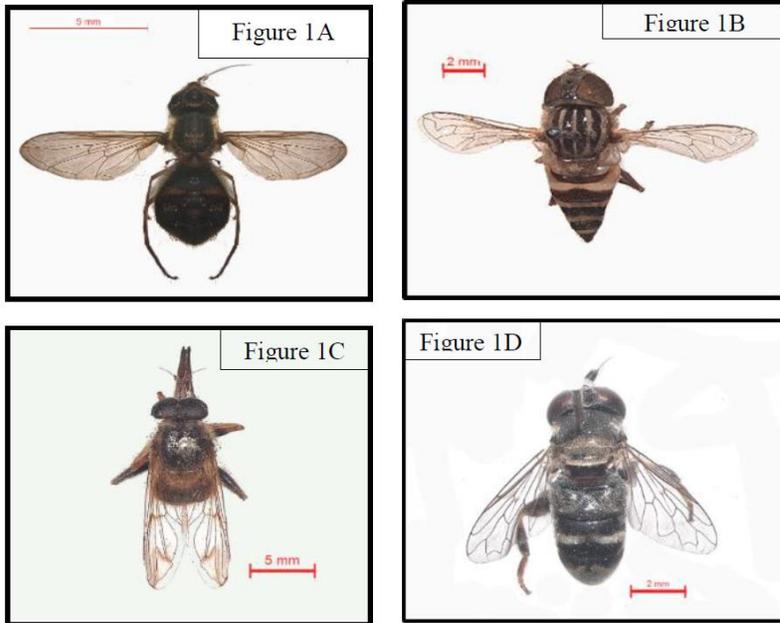
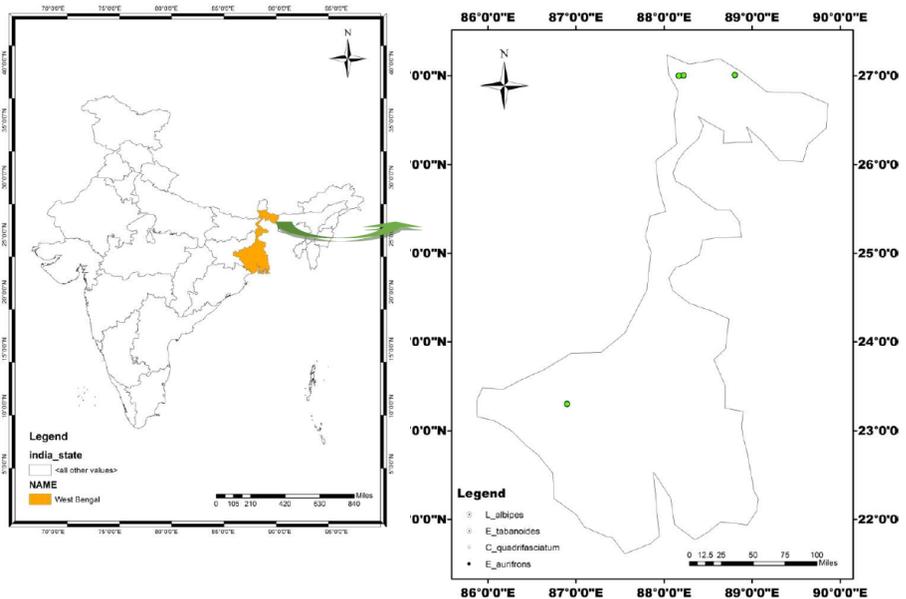


Plate 1. Figures 1A-1D: 1A-Habitus of *Chrysotoxum quadrifasciatum* Brunetti, 1923, 1B-Habitus of *Eristalinus (Eristalinus) tabanoides* (Jaenicke, 1867), 1C-Habitus of *Lycastris albipes* Walker, 1857, 1D-Habitus of *Eumerus aurifrons* (Wiedemann, 1824).



Map 1a-1b: Gis Map of India; Gis Map of West Bengal indicating the collection location of 4 newly reported species of hover flies from the state.