



## A Taxonomic Account of Hover Flies (Insecta: Diptera: Syrphidae) with 2 New Records from Mid Hill Zone of Himachal Pradesh, India

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### Abstract

38 species of hover flies (Insecta: Diptera: Syrphidae) under 22 genera and 2 subfamilies has been reported from the Mid hill zone of Himachal Pradesh which includes a long stretch of elevational range varying from 651 to 1800 meters. 2 species namely *Scavea pyrastris* (Linnaeus, 1758) and *Eristalinus (Eristalinus) polychromata* (Fabricius, 1787) are reported for the first time from this Mid Hill zone as well as from the state of Himachal Pradesh. Their taxonomic keys and detail diagnosis of the reported species has been discussed along with the distributional pattern of these species along the Mid Hill Zone of Himachal Pradesh, India.

**Keywords:** Taxonomy, Hover flies, Syrphidae, New Record, Mid Hill zone, Himachal Pradesh.

### Introduction

With a wide global distributional range and much wider list of known species (6,000 species under 300 groups approximately) Hover flies (Insecta: Diptera: Syrphidae) are one of the largest member of pollination network worldwide (Evenhuis & Pape 2019). With a series of variability in terms of body sizes, habitat preferences, feeding habits, larval morphology, mimicry patterns (Thompson & Vockeroth, 1982), almost all adult syrphids are identified based upon the the presence of spurious vein or false vein between the 3<sup>rd</sup> and 4<sup>th</sup> vein of the wing (Vockeroth, 1992).

Syrphidae being one of the predominant insects group in higher elevational landscape especially in mountainous ecosystem has

always proved their efficiency as emerging leader of pollination (Ssymanck *et al*, 2008). This fact is also supported by the hypothesis that the first liner hymenopterans tend to lose their pollination proficiency after a particular elevational range (Potts *et al*, 2013; Joshi & Bhat, 2015), this fact is eventually expected to be worsen in future days with changing climatic conditions globally. (Lebuhn *et al*, 2013). These indicating towards a crisis in pollination network in higher elevational landscape in upcoming future eventually leading to a food crisis globally (Norman *et al*, 2008). Thus it has become urgent to develop a better knowledge of the pollinators in such eco system. Our present study area thus expanding through an wide elevational range of from 651 mt (2,136 feet) to the range of

1800 mt (5,906 feet) from the western Himalayan landscape of Himachal Pradesh. This elevation zone is more commonly categorised as the Mid hill zone based upon their agro climatic parameters. In the present study a brief synopsis on the taxonomy of the family is given along with its distributional pattern in the mid hill zone of Himachal Pradesh.

**Material and Methods**

**A. Study area:**

According to the Department of Agriculture, Himachal Pradesh the agro climatic condition has divided the whole state of Himachal Pradesh into 4 zones namely Shivalik hill zones, mid hill zones, high hill zone and cold and dry zone. Our present work is associated with the study areas from mid hill zones of

Himachal Pradesh. Our current study area includes the portion from Sirmour, Solan, Shimla, Mandi, Kullu, Kangra and of Pangi range of Chamba districts. Elevation of this zone ranges in approximately from 651 mt to the 1,800 meters range of greater Himalaya in this state. This zone comprises about 32% of total geographical area of the State and 37% of the total cultivated area of the total state. Such higher percentage of cultivated land from this region indicates towards its higher importance in term of agricultural values. The sub humid climatic condition of this area has accelerated the percentile of agricultural contribution from this agro climatic zone of Himachal Pradesh. Further this zone has very good potential in terms of production of both cash crops and temperate vegetables.

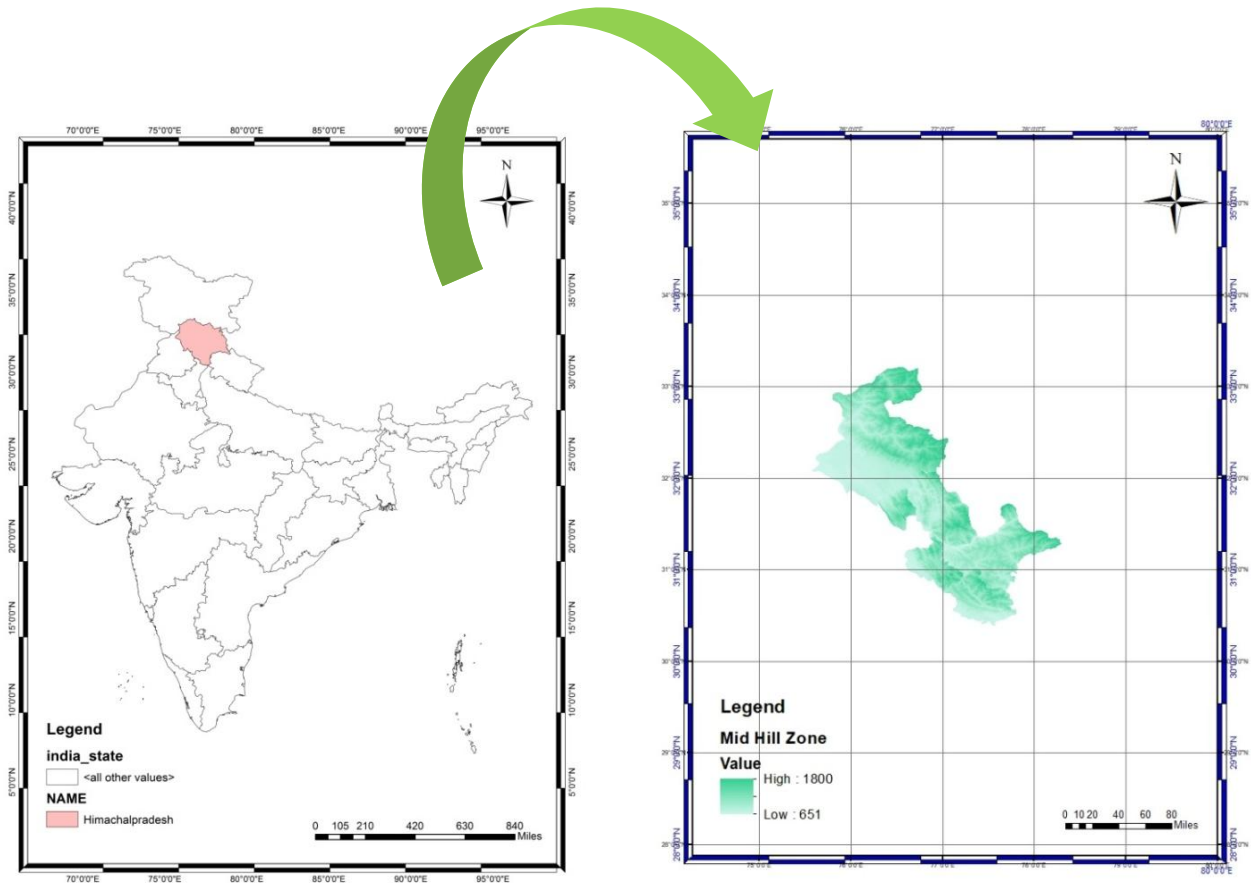


Figure 1A-1B: 3D Map showing 1A: State of Himachal Pradesh, 1B: Mid Hill zone as a part of Agro climatic zonation of the state.

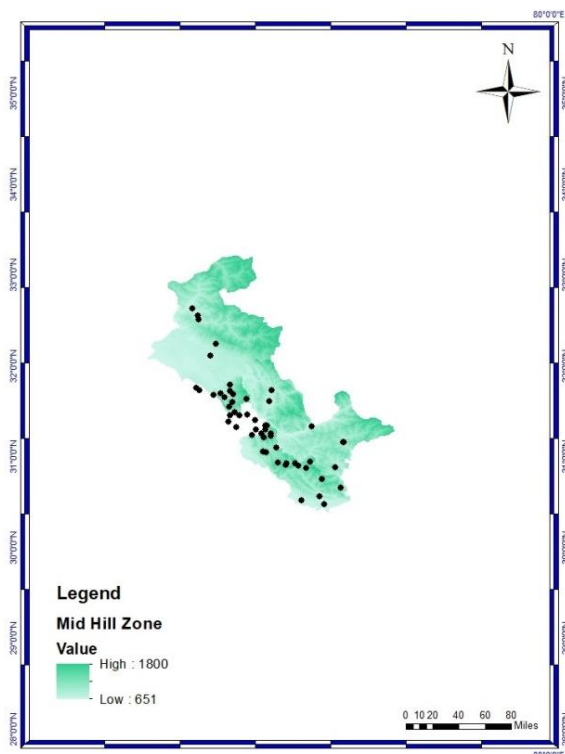


Figure 2: DEM Map showing species richness from mid hill zone from the state of Himachal Pradesh.

#### B. Collection method:

For the purpose of collection of hover flies, a 2 year long survey (2018-2019) has been conducted in this mid hill zone of Himachal Pradesh. Hoverflies were collected from the field during day time by using insect sweep nets, different type of traps like malaise trap, pan trap and UV light traps were used for collecting syrphid fauna. The collected samples are narcotized by using ethyl acetate and stored for further study in insect envelopes in the field. The specimens were later carried back to the laboratory, mounted on insect pins, labelled using the collection site information and stored in insect cabinets for further identification.

#### C. Identification of specimens:

Identification of the adults was done by following the keys of Teskey (1982), Miranda (2013), Vockeroth (1992) and Brunetti (1907,1908, 1913, 1923) keeping in mind the recent nomenclatural changes (Pape and Thompson, 2018). Same has been used to construct taxonomic keys. All terminology while describing morphology has followed the recent pattern (Vockeroth *et al.* 1987). All the

identified specimens were deposited in the designated repository of National Zoological Collection, Diptera section, Zoological Survey of India, Kolkata.

#### D. Technical procedure:

The Digital Elevation Model (DEM) map of study area is generated by using ARC GIS software version 10.1. Microsoft Excel version 2013 has been used here for generation of graphs.

### Results and Discussion

Altogether 38 species of hoverflies under 22 genera and 2 sub families have been reported from our study area. Among which 2 species namely 2 species namely *Scavea pyrastris* (Linnaeus, 1758) and *Eristalinus (Eristalinus) polychromata* (Fabricius, 1787) are reported for the first time from this Mid Hill zone as well as from the state of Himachal Pradesh. Detailed systematic account along with taxonomic key has been discussed. Distribution pattern of all syrphid species has been discussed in detail.

#### List of Taxa

Suborder Brachycera Macquart, 1834

clade Eremoneura Lameere, 1906

clade Aschiza Becher, 1882

super family Syrphoidea Latreille, 1802

Family SYRPHIDAE Latreille, 1802

Subfamily SYRPHINAE Latreille, 1802

Tribe **Syrphini** Latreille, 1802

I. Genus **Asarkina** Macquart, 1842

Subgenus **Asarkina** Macquart, 1842

1. *Asarkina(Asarkina)ericetorum* (Fabricius, 1781)

II. Genus **Dasysyrphus** Enderlein, 1938

2. *Dasysyrphus orsua* (Walker, 1852)

III. Genus **Episyrphus** Matsumura & Adachi, 1917

Subgenus **Episyrphus** Matsumura & Adachi, 1917

3. *Episyrphus*(*Episyrphus*)*balteatus* (De Geer, 1776)
- IV. Genus ***Eupeodes*** OstenSacken, 1877
- Subgenus *Macrosyrphus* Matsumura, 1917
4. *Eupeodes* (*Macrosyrphus*) *confrater* (Wiedemann, 1830)
- Subgenus ***Metasyrphus*** Matsumura, 1917
5. *Eupeodes*(*Metasyrphus*)*latifasciatus* (Macquart, 1829)
- V. Genus ***Ischiodon*** Sack, 1913
6. *Ischiodon* *scutellaris* (Fabricius, 1805)
- VI. Genus ***Meliscaeva*** Frey, 1946
7. *Meliscaeva* *cinctella* (Zetterstedt, 1843)
- VII. Genus ***Scaeva*** Fabricius, 1805
8. *Scaeva* *selenitica* (Meigen, 1822)
9. *Scaeva* *pyrastri* (Linnaeus, 1758)\*\*
- Subgenus ***Sphaerophoria*** Wiedemann, 1830
10. *Sphaerophoria*(*Sphaerophoria*)*indiana* Bigot, 1884
- Subgenus ***Knutsonia*** Barkalov, 2012
11. *Sphaerophoria* (*Knutsonia*)*viridaenea* Brunetti, 1915
- VIII. Genus ***Syrphus*** Fabricius, 1775
- Subgenus ***Syrphus*** Fabricius, 1775
12. *Syrphus*(*Syrphus*)*fulvifacies* Brunetti, 1913
- IX. Genus ***Chrysotoxum*** Meigen, 1800
13. *Chrysotoxum* *convexam* Brunetti, 1915
14. *Chrysotoxum* *violaceum* Brunetti, 1923
- Tribe **Bacchini** Bigot, 1883
- X. Genus ***Baccha*** Fabricius, 1805
15. *Baccha* *maculata* Walker, 1852
- XI. Genus ***Melanostoma*** Schiner, 1860
16. *Melanostoma* *orientale* (Wiedemann, 1824)
- Tribe **Paragini** Glumac, 1961
- XII. Genus ***Paragus*** Latreille, 1804
- Subgenus ***Paragus*** Latreille, 1804
17. *Paragus*(*Paragus*)*serratus* (Fabricius, 1805)
- Subfamily ERISTALINAE
- Tribe **Rhingiini**
- XIII. Genus ***Cheilosia*** Meigen, 1822
18. *Cheilosia* *nigroaenea* Brunetti, 1915
- Tribe **Volucellini** Newman, 1834
- XIV. Genus ***Volucella*** Geoffroy, 1762
19. *Volucella* *ruficauda* Brunetti, 1907
- XV. Genus ***Sphiximorpha*** Rondani, 1850
20. *Sphiximorpha* *triangulifera* (Brunetti, 1913)
- Tribe **Eristalini** Newman, 1834
- XVI. Genus ***Eristalinus*** Rondani, 1845
21. *Eristalinus* (*Eristalinus*) *arvorum* (Fabricius, 1787)
22. *Eristalinus* (*Eristalinus*)*megacephalus* (Rossi, 1794)
23. *Eristalinus* (*Eristalinus*) *polychromata* (Brunetti, 1923)\*\*
24. *Eristalinus* (*Eristalinus*) *tabanoides* (Jaenicke, 1867)
25. *Eristalinus*(*Eristalinus*)*quinquestriatus* (Fabricius, 1794)
- Subgenus ***Eristalodes*** Mik, 1897
26. *Eristalinus* (*Eristalodes*)*taeniops* (Wiedemann, 1818)
27. *Eristalinus* (*Eristalodes*) *paria* (Bigot, 1880)
- XVII. Genus ***Eristalis*** Latreille, 1804
- Subgenus ***Eoseristalis*** Kanervo, 1938
28. *Eristalis*(*Eoseristalis*) *albibasis* Bigot, 1880

29. *Eristalis (Eoseristalis) arbustorum* (Linnaeus, 1758)
30. *Eristalis (Eoseristalis) cerealis* Fabricius, 1805
31. *Eristalis (Eoseristalis) himalayensis* Brunetti, 1908
- Subgenus ***Eristalis*** Latreille, 1804
32. *Eristalis (Eristalis) tenax* (Linnaeus, 1758)
- XVIII. Genus ***Mallota*** Meigen, 1822
- Subgenus ***Mallota*** Meigen, 1822
33. *Mallota (Mallota) orientalis* Wiedemann, 1824
- XIX. Genus ***Mesembrius*** Rondani, 1857
- Subgenus ***Mesembrius*** Rondani, 1857
34. *Mesembrius (Mesembrius) bengalensis* (Wiedemann, 1819)
- XX. Genus ***Lycastris*** Walker, 1857
35. *Lycastris flavohirta* Brunetti, 1907
- XXI. Genus ***Syritta*** Lepelletier & Serville, 1828
36. *Syritta indica* (Wiedemann, 1824)
37. *Syritta pipiens* (Linnaeus, 1758)
- XXII. Genus ***Xylota*** Meigen, 1822
- Subgenus ***Xylota*** Meigen, 1822
38. *Xylota (Xylota) nursei* Brunetti, 1923

\*\* : new record from state

**Family Syrphidae** (New Records from the state of Himachal Pradesh has been demarcated with asterisk)

### Systematic account

Tribe **Syrphini** Latreille, 1802

- I. Genus ***Asarkina*** Macquart, 1842

Subgenus ***Asarkina*** Macquart, 1842

1. *Asarkina (Asarkina) ericetorum* (Fabricius, 1781)

1781. *Syrphus ericetorum* Fabricius, *Spec. Insect.*, 2: 425.

**Type-locality:** Africa aequinoctial.

**Material examined:** 1♂ Shilwara, Sirmour district, 1292 mt, 30°44'56.43"N, 77°29'51.14"E, 16.iv.17, coll: J. Sengupta, 2♂♂ 2♀♀ Jagatpur, Sirmour district, 900 mt, 30°28'13.55"N, 77°31'22.30"E, 16.iv.17, coll: J. Sengupta, 1♂ Dewni, Sirmour district, 900 mt, 30°30'43.49"N, 77°16'9.74"E, 16.iv.17, coll: J. Sengupta, 1♀ Chakmoh Berthin roadside, Hamirpur district, 842 mt, 31°26'49.71"N, 76°35'17.87"E, 03.ii.16, coll: J. Sengupta, 2♀♀ Chabutar village, Hamirpur district, 774 mt, 31°41'10.2"N, 76°31'16.7"E, 02.ii.16, coll: J. Sengupta, 2♀♀ Kanti Mishwa, Sirmour district, 1467 mt, 30°36'43.78"N, 77°38'47.37"E, 16.iv.17, coll: J. Sengupta, 1♂ Nei Neti, Sirmour district, 1323 mt, 30°53'53.17"N, 77°14'14.05"E, 16.iv.17, coll: J. Sengupta, 1♂ Bhanat, Sirmour district, 1672 mt, 30°52'2.62"N, 77°19'14.00"E, 16.iv.17, coll: J. Sengupta, 1♂ Matiana, Sirmour district, 1184 mt, 30°39'13.49"N, 77°42'4.88"E, 16.iv.17, coll: J. Sengupta, 2♀♀ Batyana, Hamirpur district, 784 mt, 31°29'4.49"N, 76°31'50.78"E, 03.ii.16, coll: J. Sengupta.

**Distribution:** Himachal Pradesh, Arunachal Pradesh, Assam, Chandigarh, Gujarat, Jammu & Kashmir, Manipur, Meghalaya, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, West Bengal.

**Elsewhere:** Afrotropical Region (Africa), Australasian Region (Australia, New Guinea), Neo tropical Region (Formosa), Oriental Region (Nepal, Srilanka, S-E Asia).

- II. Genus ***Dasysyrphus*** Enderlein, 1938

2. *Dasysyrphus orsua* (Walker, 1852)

1852. *Syrphus orsua* Walker, *Insecta. Saund.* 1:231

**Type-locality:** East Indies.

**Material examined:** 1♀2♂♂ Renuka lake, Sirmour district, 672 mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J. Sengupta, 2♀♀ Dadahu Sirmour district, 651 mt, 30°33'46.2456"N, 77°28'12.7086"E, 16.iv.17, coll: J. Sengupta.

**Distribution:** India: Himachal Pradesh, Jammu & Kashmir, Uttarakhand, West Bengal.

**Elsewhere:** Oriental Region (Nepal, Sri Lanka, Sumatra.)

III. Genus *Episyrphus* Matsumura & Adachi, 1917

Subgenus *Episyrphus* Matsumura & Adachi, 1917

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

1776. *Musca balteata* De Geer, *Mem. Pour. serv. Hist. Ins.* 6:116

**Type locality:** Sweden.

**Material examined:** 4♂♂, Bhowen, Chamba district, 2200 mt; 32°29'55.60"N, 76°5'27.40"E, 15.iv.17, coll: J.Sengupta, 6♂♂, 3♀♀ Renuka Lake, Sirmour district, 650mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J.Sengupta, 2♂♂, Renuka Lake, Sirmour district, 672mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J.Sengupta, 4♂♂, 3♀♀ Dadahu, Sirmour district, 651mt, 30°33'46.2"N, 77°28'12.7"E, 15.iv.17, coll: J.Sengupta, 3♀♀ 2♂♂ Renuka lake, Sirmour district, 672 mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J. Sengupta, 4♀♀ Dadahu Sirmour district, 651 mt, 30°33'46.2456"N, 77°28'12.7086"E, 15.iv.17, coll: J. Sengupta, 11♂♂ 4♀♀ Bergaon, Solan district, 1452 mt, 30°54'16.1"N, 77°5'48.2"E, 18.iv.17, coll: J. Sengupta, 9♀♀ Solan district, 4♂♂ Bergaon, Solan district, 1454mt, 30°55'14.2"N, 77°06'18.1"E, 18.iv.17, coll: J. Sengupta, 2♀♀ 3♂♂ Bhagshung, Kangra district, 1755 mt, 32°14'23.1"N, 76°19'41.3"E, 5.vii.15, coll: J. Sengupta, 2♀♀ Palampur, Kangra district, 1220 mt, 32°6'39.09"N, 76°16'8.7"E, 5.vii.15, coll: J. Sengupta, 2♂♂ Bhagshung, Kangra district, 1755 mt, 32°14'23.1"N, 76°19'41.3"E, 5.vii.15, coll: J. Sengupta, 2♀♀ Palampur, Kangra district, 1220 mt, 32°6'39.09"N, 76°16'8.7"E, 5.vii.15, coll: J. Sengupta, 8♂♂ Chabutar Village, Hamirpur district, 774 mt, 31°41'10.2"N, 76°31'16.7"E, 2.ii.16, coll: J. Sengupta, 5♂♂ Karsai, Hamirpur district, 744 mt, 31°32'49.80"N, 76°28'30.83"E, 3.ii.16, coll: J. Sengupta, 5♂♂ Galore, Hamirpur district, 720mt, 31°38'56.54"N, 76°25'10.53"E, 3.ii.16, coll: J sengupta, 1♂ Manman, Bilaspur district, 847 mt, 31°17'55.87"N, 76°45'55.77"E, 2.ii.16, coll:

J sengupta, 1♀ Kharkari, Bilaspur district, , 709mt, 31°19'5.32"N, 76°32'53.81"E, 2.ii.16, coll: J sengupta, 1♂ Lahri, Bilaspur district, , 833mt, 31°22'55.78"N, 76°27'46.79"E, 2.ii.16, coll: J Sengupta, 1♀ Jahri, Bilaspur district, 791mt, 31°27'28.32"N, 76°40'38.41"E, 2.ii.16, coll: J sengupta, 1♂ Nalti, Bilaspur district, 722 mt, 31°23'55.89"N, 76°45'22.52"E, 2.ii.16, coll: J sengupta, 1♀ Guloti, Bilaspur district, 771mt, 31°27'13.59"N, 76°28'44.88"E, 2.ii.16, coll: J sengupta, 1♂ Khauoo, Shimla district, 1739 mt, 30°52'54.33"N, 77°38'17.49"E, 20.iv.17, coll: J. Sengupta, 1♂ Manman, Bilaspur district, 847 mt, 31°17'55.87"N, 76°45'55.77"E, 8.ii.16, coll: J sengupta, 1♂ Jahri, Bilaspur district, , 791 mt, 31°27'28.32"N, 76°40'38.41"E, 2.ii.16, coll: J sengupta, 2♂♂ Guloli, Bilaspur district, , 771 mt, 31°27'13.59"N, 76°28'44.88"E, 2.ii.16, coll: J sengupta, 3♂♂ Majher, Bilaspur district, 1001 mt, 31°15'0.33"N, 76°49'54.74"E, 4.ii.16, coll: J sengupta, 4♂♂ Kharkhari, Bilaspur district, , 709 mt, 31°19'5.32"N, 76°32'53.81"E, 8.ii.16, coll: J sengupta, 2♂♂ Kharal, Kullu district, 1852mt, 31°57'36.43"N, 77° 8'13.57"E, 7.ii.16, coll: J. Sengupta, 4♀♀ Hathol, Hamirpur district, 670mt, 31°41'35.55"N, 76°22'30.77"E, 4.ii.16, coll: J. Sengupta, 4♀♀ Kajoti, Hamirpur district, 752mt, 31°47'20.67"N, 76°28'47.87"E, 4.ii.16, coll: J. Sengupta, 2♀♀ Shishamati, Kullu district, 1248 mt, 31°57'51.93"N, 77° 6'19.69"E, 7.ii.16, coll: J. Sengupta, 3♂♂ Mohal, Kullu district, 1205 mt, 31°54'56.73"N, 77° 7'1.58"E, 7.ii.16, coll: J. Sengupta, 1♀ Kullu, Kullu district, 1230 mt, 31°57'28.26"N, 77° 6'34.05"E, 7.ii.16, coll: J. Sengupta, 3♂♂ Sarvari, Kullu district, 1202 mt, 31°57'37.15"N, 77° 6'47.23"E, 7.ii.16, coll: J. Sengupta, 1♂ Dhalpur, Kullu district, 1212 mt, 31°57'16.37"N, 77° 6'42.68"E, 7.ii.16, coll: J. Sengupta, 2♂♂ Gharakhar, Kullu district, 1436 mt, 31°57'35.61"N, 77° 7'24.66"E, 7.ii.16, coll: J. Sengupta,

**Distribution:** Himachal Pradesh, Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Sikkim, Tamil Nadu, Tripura, Uttarakhand, West Bengal.

**Elsewhere:** Australasian Region (Australia), Oriental Region (Widely distributed), Palearctic Region (England).

- IV. Genus **Eupeodes** OstenSacken, 1877

Subgenus *Macrosyrphus* Matsumura, 1917

4. *Eupeodes (Macrosyrphus) confrater* (Wiedemann, 1830)

1830, *Syrphus confrater* Wiedemann, Auss. Zweifl. Theil. Schulz, Hamm. 12: 684

**Type-locality:** China

**Material examined:** 2♀♀2♂♂ Bhagshung, Kangra district, 1755 mt, 32°14'23.1"N, 76°19'41.3"E, 5.vii.15, coll: J. Sengupta

**Distribution:** India: Himachal Pradesh, Arunachal Pradesh, Assam, Bihar, Delhi, Gujarat,

Jammu & Kashmir, Karnataka, Manipur, Meghalaya, Punjab, Sikkim, Tamil Nadu, Uttarakhand, West Bengal.

**Elsewhere:** Australasian Region (Australia, New Guinea), Oriental Region (Afghanistan, Nepal, Pakistan, Sri Lanka, Sumatra), Palaeartic Region (China).

Subgenus *Metasyrphus* Matsumura, 1917

5. *Eupeodes (Metasyrphus) latifasciatus* (Macquart, 1829)

1829. *Syrphus latifasciatus* Macquart, Sns. Dipt. N. Fr. 4:94 (242).

**Type locality:** France.

**Material examined:** 1♂ Khauoo, Shimla district, 1739 mt, 30°52'54.33"N 77°38'17.49"E, 20.iv.17, coll: J. Sengupta, 1♂ Bhagshung, Kangra district, 1755 mt, 32°14'23.1"N, 76°19'41.3"E, 5.vii.15, coll: J. Sengupta

**Distribution:** India: Himachal Pradesh, Arunachal Pradesh, Jammu & Kashmir, Nagaland, Uttarakhand.

**Elsewhere:** Australasian Region (Australia), Oriental Region (Widely distributed), Palearctic Region (England, USA).

- V. Genus **Ischiodon** Sack, 1913

6. *Ischiodon scutellaris* (Fabricius, 1805)

1805. *Scaeva scutellaris* Fabricius, Syst. Antliat. 252.

**Type-locality:** Tranquebar, India.

**Material examined:** 1♀ Dadahu Sirmour district, 651 mt, 30°33'46.2456"N, 77°28'12.7086"E, 16.iv.17, coll: J. Sengupta, 3♀♀ Chachhi, Solan district, 890 mt, 31° 2'40.15"N, 76°52'37.85"E, 18.iv.17, coll: J. Sengupta, 3♂♂ Kahnani, Solan district, 775 mt, 31° 3'20.87"N, 76°50'41.11"E, 18.iv.17, coll: J. Sengupta, 2♀♀ Ghiana, Solan district, 881 mt, 31°13'31.82"N, 76°55'45.83"E, 18.iv.17, coll: J. Sengupta, 1♀ Bhanera, Solan district, 953 mt, 31°38'0.65"N, 76°39'43.42"E, 4.ii.16, coll: J. Sengupta, 4♀♀ Hathol, Hamirpur district, 670mt, 31°41'35.55"N, 76°22'30.77"E, 4.ii.16, coll: J. Sengupta, 4♀♀ Kajoti, Hamirpur district, 752mt, 31°47'20.67"N, 76°28'47.87"E, 4.ii.16, coll: J. Sengupta, 2♀♀ Renuka lake, Sirmour district, 672 mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J. Sengupta.

**Distribution:** Himachal Pradesh, Andhra Pradesh, Assam, Chandigarh, Delhi, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Manipur, Meghalaya, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand and West Bengal.

**Elsewhere:** Australasian Region (Australia, Pacific island), Oriental Region (Indonesia, Java), Palaeartic Region (Japan).

- VI. Genus **Meliscaeva** Frey, 1946

7. *Meliscaeva cinctella* (Zetterstedt, 1843)

1843, *Scaeva cinctella* Zetterstedt, Dipt. Scand. 1:742

**Type-locality:** Sweden. Ostergotland

**Material examined:** 2♂♂ Majher, Bilaspur district, 1001 mt, 31°15'0.33"N, 76°49'54.74"E, 4.ii.16, coll: J. Sengupta

**Distribution:** India: Himachal Pradesh, Meghalaya, Sikkim, West Bengal

**Elsewhere:** Oriental Region (Nepal), Palaeartic Region (China, Europe, USA).

VII. Genus **Scaeva** Fabricius, 18058. *Scaeva selenitica* (Meigen, 1822)

1822. *Syrphus selenticus* Meigen, *Syst. Baschr. Europ. Zweifl. Insekt.*2:121.

**Type-locality:** Europe.

**Material examined:** 3♀♀ Chamor, Shimla district, 1714 mt, 31°19'44.61"N, 77°22'48.18"E, 19.iv.17, coll: J. Sengupta,

**Distribution:** India: Himachal Pradesh, Arunachal Pradesh, Delhi, Meghalaya Sikkim, Uttarakhand, Uttar Pradesh.

**Elsewhere:** Palearctic Region (Alaska, China, Europe, France, Germany, Greenland, USA), Oriental Region (Japan).

9. *Scaeva pyrastris* (Linnaeus, 1758)\*\*

1758. *Musca pyrastris* Linnaeus, *Syst. Nat.*10(1):594

**Type-locality:** Sweden.

**Material examined:** 2♀♀ Bergaon, Solan district, 1454mt, 30°55'14.2"N, 77°06'18.1"E, 18.iv.17, coll: J. Sengupta, 1♂ Khauoo, Shimla district, 1739 mt, 30°52'54.33"N, 77°38'17.49"E, 20.iv.17, coll: J. Sengupta

**Distribution:** India: Arunachal Pradesh, Delhi, Himachal Pradesh, Meghalaya and Uttar Pradesh.

**Elsewhere:** Palearctic Region (Alaska, Europe, France, Greenland, USA), Oriental Region (Japan).

Subgenus **Sphaerophoria** Wiedemann, 1830

10. *Sphaerophoria*(*Sphaerophoria*) *indiana* Bigot, 1884

1884. *Sphaerophoria indiana* Bigot, *Annls. Soc. ent. Fr.* (6) 4: 99

**Type-locality:** "Indes".

**Material examined:** 1♂ Renuka Lake, Sirmour district, 650mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J. Sengupta, 2♂♂ Bhagshung, Kangra district, 1755 mt, 32°14'23.1"N, 76°19'41.3"E, 5.vii.15, coll: J. Sengupta, 2♀♀ Dadahu Sirmour district, 651 mt, 30°33'46.2456"N, 77°28'12.7086"E, 16.iv.17, coll: J. Sengupta, 1♀ 2♂♂ Bhagshung, Kangra district, 1755 mt, 32°14'23.1"N, 76°19'41.3"E, 5.vii.15, coll: J. Sengupta, 3♀♀

Palampur, Kangra district, 1220 mt, 32°6'39.09"N, 76°16'8.7"E, 5.vii.15, coll: J. Sengupta, 5♀♀ Palampur, Kangra district, 1220 mt, 32°6'39.09"N, 76°16'8.7"E, 5.vii.15, coll: J. Sengupta, 1♂ Manman, Bilaspur district, 847 mt, 31°17'55.87"N, 76°45'55.77"E, 8.ii.16, coll: J. Sengupta, 4♂♂ Kharkhari, Bilaspur district, 709 mt, 31°19'5.32"N, 76°32'53.81"E, 8.ii.16, coll: J. Sengupta, 2♂♂ Manman, Bilaspur district, 833 mt, 31°22'55.78"N, 76°27'46.79"E, 8.ii.16, coll: J. Sengupta, 2♂♂ Majher, Bilaspur district, 1001 mt, 31°15'0.33"N, 76°49'54.74"E, 4.ii.16, coll: J. Sengupta, 2♂♂ 3♀♀ Bergaon, Solan district, 1452 mt, 30°54'16.1"N, 77°5'48.2"E, 18.iv.17, coll: J. Sengupta, 2♀♀ 3♂♂ Bergaon, Solan district, 1454mt, 30°55'14.2"N, 77°06'18.1"E, 18.iv.17, coll: J. Sengupta, 1♀ 2♂♂ Renuka lake, Sirmour district, 672 mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J. Sengupta,

**Distribution:** India: Himachal Pradesh, Arunachal Pradesh, Assam, Bihar, Delhi, Jammu & Kashmir, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Punjab, Sikkim, Tripura, Uttarakhand, Uttar Pradesh, West Bengal.

**Elsewhere:** Oriental Region (Bhutan, Myanmar, Nepal, Srilanka, Pakistan), Palearctic Region (Japan, Korea).

Subgenus **Knutsonia** Barkalov, 2012

11. *Sphaerophoria* (*Knutsonia*) *viridaenea* Brunetti, 1915

1915, *Sphaerophoria viridaenea*, *Rec. Indian Mus.*11: 201-256

**Type-locality:** Himachal Pradesh: Shimla

**Material examined:** 2♂♂ 4♀♀ Hathol, Hamirpur district, 670mt, 31°41'35.55"N, 76°22'30.77"E, 4.ii.16, coll: J. Sengupta, 4♀♀ Kajoti, Hamirpur district, 752mt, 31°47'20.67"N, 76°28'47.87"E, 4.ii.16, coll: J. Sengupta, 4♀♀ Salouni, Hamirpur district, 791mt, 31°35'49.16"N, 76°30'48.02"E, 4.ii.16, coll: J. Sengupta,

**Distribution:** India: Himachal Pradesh, Jammu & Kashmir, Maharashtra, Mizoram, Punjab, Sikkim, Uttarakhand, West Bengal.



**Elsewhere:** Oriental Region (Afghanistan, Pakistan, Nepal).

VIII. Genus **Syrphus** Fabricius, 1775

Subgenus **Syrphus** Fabricius, 1775

12. *Syrphus*(*Syrphus*) *fulvifacies* Brunetti, 1913

1913. *Syrphus fulvifacies* Brunetti; *Rec.Ind. Mus.*;8:161.

**Type-locality:** Routung, NE Frontier, Assam, India.

**Material examined:** 4♀♀ Palampur, Kangra district, 1220 mt, 32°6'39.09"N, 76°16'8.7"E, 5.vii.15, coll: J. Sengupta, 4♀♀ Sahoo River side, Mandi district, 930 mt, 32°33'12.1062"N, 72°7'32.9088"E, 24.iv.18, coll: J. Sengupta, 4♀♀ 5♂♂ Bergaon, Solan district, 1454mt, 30°55'14.2"N, 77°06'18.1"E, 18.iv.17, coll: J. Sengupta,

**Distribution:** India: Assam, Arunachal Pradesh, Himachal Pradesh and Kashmir.

**Elsewhere:** China, Java, Nepal and Philippines.

IX. Genus **Chrysotoxum** Meigen, 1800

13. *Chrysotoxum convexum* Brunetti, 1915

1915. *Chrysotoxum convexum* Brunetti, *Rec. Indian Mus.* 11: 249

**Type-locality:** Andarban, Garhwal (India: Uttarakhand).

**Material examined:** 6♂♂5♀♀ Bergaon, Solan district, 1452 mt, 30°54'16.1"N, 77°5'48.2"E, 18.iv.17, coll: J. Sengupta, 1♂1♀ Priunjal, Chamba district, 1712 mt, 32°30'17.18"N, 76°8'29.19"E, 18.iv.17, coll: J. Sengupta,

**Distribution:** India: Himachal Pradesh, Mizoram, Uttar Pradesh and Uttarakhand.

**Elsewhere:** Oriental Region (Pakistan), Palearctic Region (China).

14. *Chrysotoxum violaceum* Brunetti, 1923

1923. *Chrysotoxum violaceum* Brunetti, *Fauna. Br. India.*3:302

**Type-locality:** Darjeeling, India.

**Material examined:** 2♂♂ 2♀♀ Samot, Solan district, 1115mt, 31° 5'43.20"N, 76°59'30.17"E, 18.iv.17, coll: J. Sengupta,

**Distribution:** India: Himachal Pradesh, West Bengal.

**Elsewhere:** Nil.

Tribe **Bacchini** Bigot, 1883

X. Genus **Baccha** Fabricius, 1805

15. *Baccha maculata* Walker, 1852

1852. *Baccha maculata* Walker, *Insecta Saundersiana.*1: 223.

**Type-locality:** East Indies.

**Material examined:** 2♂♂ Guloli, Bilaspur district, 771 mt, 31°27'13.59"N, 76°28'44.88"E, 2.ii.16, coll: J. Sengupta, 2♀♀ Renuka lake, Sirmour district, 672 mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J. Sengupta, 1♂ Jahri, Bilaspur district, 791mt, 31°27'28.32"N, 76°40'38.41"E, 2.ii.16, coll: JSengupta,

**Distribution:** India: Himachal Pradesh, Assam, Himachal Pradesh, Uttar Pradesh, West Bengal.

**Elsewhere:** Indo-Australian Region (Malaya, Philippines), Oriental Region (Borneo, Japan, Java, Kalimantan, Korea, Nepal, Sumatra, Taiwan), Palearctic Region (Russia).

XI. Genus **Melanostoma** Schiner, 1860

16. *Melanostoma orientale* (Wiedemann, 1824)

1824. *Syrphus orientale* Wiedemann. *Analecta.Ent.* 36.

**Type-locality:** "Ind. Or."

**Material examined:** 1♀, Bhowen, Chamba district, 2121 mt, 31°31 '8"N, 77°47'46"E, 16.iv.17, coll: J.Sengupta, 4♀♀, 3♂♂, Rampur power project, Kinnaur district, 970 mt, 31°23'38"N, 77°36'2"E, 14.iv.18, coll: J.Sengupta, 1♀, Wangtoo, Kinnaur district, 1580 mt, 31°33'48"N, 77°59 '30"E, 14.iv.18, coll: J.Sengupta, 1♂ Renuka Lake, Sirmour district, 650mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J.Sengupta. 3♂♂3♀♀ Bergaon, Solan district, 1452 mt, 30°54'16.1"N, 77°5'48.2"E, 18.iv.17, coll: J.

Sengupta 2♂ Guloli, Bilaspur district, , 771 mt, 31°27'13.59"N,76°28'44.88"E,2.ii.16,coll: J sengupta, 4♀♀ Hathol, Hamirpur district, 670mt, 31°41'35.55"N, 76°22'30.77"E, 4.ii.16, coll: J. Sengupta,4♀♀ Kajoti, Hamirpur district, 752mt, 31°47'20.67"N, 76°28'47.87"E, 4.ii.16, coll: J. Sengupta, 8♀♀3♂♂ Renuka lake, Sirmour district, 672 mt, 32°33'12.1"N, 76°7'32.9"E,15.iv.17, coll: J. Sengupta, 5♂♂9♀♀ Nurchok, Mandi district, 784 mt, 31°36'30.6792"N, 76°54'55.1808"E, 15.iv.18, coll: J. Sengupta,4♀♀ Palampur, Kangra district, 1220 mt, 32°6'39.09"N, 76°16'8.7"E,5.vii.15, coll: J. Sengupta,1♀ Chabutar Village, Hamirpur district, 774 mt, 31°41'10.2"N, 76°31'16.7"E, 2.ii.16, coll: J. Sengupta,4♀Hathol, Hamirpur district, 670mt, 31°41'35.55"N, 76°22'30.77"E, 3.ii.16, coll: J. Sengupta,1♂ Bahli, Shimla district, 1634 mt, 31°9'17.81"N, 77°43'47.08"E,, 20.iv.17, coll: J. Sengupta, 1♂ Jahri, Bilaspur district, , 791 mt, 31°27'28.32"N, 76°40'38.41"E,2.ii.16,coll: J sengupta,

**Distribution:** India: Assam, Arunachal Pradesh, Himachal Pradesh, J & K, Karnataka, Meghalaya, Sikkim, T.N, Tripura, Uttar Pradesh, and West Bengal.

**Elsewhere:** Oriental Region (Bhutan, Nepal, Pakistan, Sri Lanka)

Tribe **Paragini** Glumac, 1961

XII. Genus **Paragus** Latreille, 1804

Subgenus **Paragus** Latreille, 1804

17. *Paragus* (*Paragus*) *serratus* (Fabricius, 1805)

1805. *Mulio serratus* Fabricius, *Syst. Antliat.*3:186

**Type locality:** Tamil Nadu: Tharangambadi, India.

**Material examined:** 2♂♂ Amroh, Hamirpur district, 764 mt, 31°43'8.71"N, 76°28'45.82"E, 4.ii.16, coll: J. Sengupta,5♀♀ Suhin, Una district, 701 mt, 31°45'18.46"N, 76°6'47.29"E, 12.ii.16, coll: J. Sengupta, 2♂♂ Bhanera, Hamirpur district, 953 mt, 31°38'0.65"N, 76°39'43.42"E, 4.ii.16, coll: J. Sengupta,

**Distribution:** India: **Himachal Pradesh**, Assam, Bihar, Delhi, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh,

Maharashtra, Manipur, Meghalaya, Orissa, Punjab, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal)

**Distribution:** Elsewhere: Oriental Region (Africa, Borneo, Java, Nepal, Pakistan, Papuya, Sri Lanka)

Subfamily ERISTALINAE

Tribe **Rhingiini**

XIII. Genus **Cheilosia** Meigen, 1822

18. *Cheilosia nigroaenea* Brunetti, 1915

1915. *Chilosia nigroaenea* Brunetti, *Rec.Indian Mus*, 11:204

**Type locality:** India, Matiana & Simla.

**Material examined:** 6♀♀4♂♂ Dariaghat, Solan district,931 mt, 31°15'17.50"N, 76°55'42.90"E, 18.iv.17, coll:J.Sengupta, 3♀♀2♂♂ Sultej river side, Solan district,1018 mt, 31°20'27.49"N, 76°53'26.63"E, 18.iv.17, coll: J. Sengupta

**Distribution:** India: **Himachal Pradesh** and Uttar Pradesh.

**Elsewhere:** Oriental Region (Nepal)

Tribe **Volucellini** Newman, 1834

XIV. Genus **Volucella** Geoffroy, 1762

19. *Volucella ruficauda* Brunetti, 1907

1907. *Volucella ruficauda* Brunetti, *Rec. Indian Mus.*1: pl. xi, fig.13; 1908

**Type-locality:** Sikkim, India.

**Material examined:** 2♀♀, Choling garden, Kinnaur district, 1780 mt, 31°30'60"N, 78°9'9"E,13.iv.18, coll: J.Sengupta,1♀,Tapri garden side, Kinnaur district, 1600 mt,31°32'5"N, 78°1'8"E, 13.iv.18, coll: J.Sengupta, 2♀♀, Shong Thong, Kinnaur district,1910 mt, 31°31'8"N, 78°16'13"E, 13.iv.18, coll: J.Sengupta, 4♂♂ Chhob, Solan district, 1311mt, 30°55'38.28"N, 77°11'52.38"E, 18.iv.17, coll: J. Sengupta.

**Distribution:** India: **Himachal Pradesh**, Sikkim.

**Elsewhere:** Nil.

XV. Genus **Sphiximorpha** Rondani, 1850

20. *Sphiximorpha triangulifera* (Brunetti, 1913)

1913. *Ceria triangulifera* Brunetti, *Rec. Indian Mus.*9: 273

**Type locality:** Darjeeling District, India.

**Material examined:** 2♀♀, Choling garden, Kinnaur district, 1780 mt, 31°30'60"N, 78°9'E, 13.iv.18, coll: J.Sengupta, 1♀, Tapri garden side, Kinnaur district, 1600 mt, 31°32'5"N, 78°1'8"E, 13.iv.18, coll: J.Sengupta, 2♀♀, Shong Thong, Kinnaur district, 1910 mt, 31°31'8"N, 78°16'13"E, 13.iv.18, coll: J.Sengupta, 4♂ Chhob, Solan district, 1311mt, 30°55'38.28"N, 77°11'52.38"E, 18.iv.17, coll: J. Sengupta,

**Distribution:** India: **Himachal Pradesh**, West Bengal

**Elsewhere:** NIL.

Tribe **Eristalini** Newman, 1834

XVI. Genus **Eristalinus** Rondani, 1845

21. *Eristalinus (Eristalinus) arvorum* (Fabricius, 1787)

1787. *Syrphus arvorum* Fabricius, *Mantissa insectorum.* 2(2): 335

**Type-locality:** India. Tamil Nadu: Tharangambadi.

**Material examined:** 1♀ Bhanera, Solan district, 953 mt, 31°38'0.65"N, 76°39'43.42"E, 4.ii.16, coll: J. Sengupta, 2♀♀ Bergaon, Solan district, 1454mt, 30°55'14.2"N, 77°06'18.1"E, 18.iv.17, coll: J. Sengupta, 4♀♀ Palampur, Kangra district, 1220 mt, 32°6'39.09"N, 76°16'8.7"E, 5.vii.15, coll: J. Sengupta, 3♀♀ Salouni, Hamirpur district, 791 mt, 31°35'49.16"N, 76°30'48.02"E, 3.ii.16, coll: J. Sengupta, 4♀♀ Hathol, Hamirpur district, 670mt, 31°41'35.55"N, 76°22'30.77"E, 4.ii.16, coll: J. Sengupta, 4♀♀ Kajoti, Hamirpur district, 752mt, 31°47'20.67"N, 76°28'47.87"E, 4.ii.16, coll: J. Sengupta.

**Distribution:** India: **Himachal Pradesh**, Tamil Nadu, West Bengal.

**Elsewhere:** Afro tropical region (Seychelles), Australasian region (Australia), Palearctic Region (China, Japan)

22. *Eristalinus (Eristalinus) megacephalus* (Rossi, 1794)

1794. *Syrphus megacephalus* Rossi, *Mantissa insect.* 2:3

**Type-locality:** Italy. Toscana.

**Material examined:** 1♂ Bergaon, Solan district, 1452 mt, 30°54'16.1"N, 77°5'48.2"E, 18.iv.17, coll: J. Sengupta, 1♀ Chabutar village, Hamirpur district, 774 mt, 31°41'10.2"N, 76°31'16.7"E, 02.ii.16, coll: J. Sengupta.

**Distribution:** India: **Himachal Pradesh**, Andhra Pradesh, Bihar, Gujarat, Jammu & Kashmir, Karnataka, Kerala, Maharashtra, Meghalaya, Orissa, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand, West Bengal

**Elsewhere:** Indo Australian region (Singapore), Oriental Region (Afghanistan, BuruNepal, Pakistan, Sri Lanka), Palearctic Region (China, Japan).

23. *Eristalinus (Eristalinus) polychromata* (Brunetti, 1923)\*\*

1923. *Eristalis polychromata* Brunetti, *Fauna of British India.*3: 180

**Type locality:** India: Kolkata.

**Material examined:** 1♂ Chabutar Village, Hamirpur district, 774 mt, 31°41'10.2"N, 76°31'16.7"E, 2.ii.16, coll: J. Sengupta, 1♀ Ghiana, Solan district, 881 mt, 31°13'31.82"N, 76°55'45.83"E, 18.iv.17, coll: J. Sengupta, 4♀♀ Hathol, Hamirpur district, 670mt, 31°41'35.55"N, 76°22'30.77"E, 4.ii.16, coll: J. Sengupta, 4♀♀ Kajoti, Hamirpur district, 752mt, 31°47'20.67"N, 76°28'47.87"E, 4.ii.16, coll: J. Sengupta,

**Distribution:** India: **Himachal Pradesh**, West Bengal

**Elsewhere:** Nil.

24. *Eristalinus (Eristalinus) tabanoides* (Jaenicke, 1867)

1867. *Eristalis tabanoides* Jaenicke, *Neu. exot. Dipt. Abh. Ges.*6: 402

**Type-locality:** Eritrea.

**Material examined:** 10♀♀, Parla, Una district, 647 mt, 31°27'15.00"N, 76°24'10.98"E, 04.ii.16, coll: J.Sengupta, 3♂♂ Nurchok, Mandi district, 784mt, 31°36'30.6"N, 76°54'55.1"E, 26.iv.18, coll: J. Sengupta,

3♂♂1♀ Bergaon, Solan district, 1452 mt, 30°54'16.1"N, 77°5'48.2"E, 18.iv.17, coll: J. Sengupta.

**Distribution:** India: Himachal Pradesh, Delhi.

**Elsewhere:** Afro tropical region (Eritrea, Djibouti), Palearctic region (Egypt, Tunisia).

25. *Eristalinus* (*Eristalinus*)  
*quinquestriatus* (Fabricius, 1794)

1794. *Syrphus quinquestriatus* Fabricius, *Ent. syst.*4: 289

**Type-locality:** Tamil Nadu: Tharangambadi.

**Material examined:** 10♀♀, Parla, Una district, 647 mt, 31°27'15.00"N, 76°24'10.98"E, 04.ii.16, coll: J.Sengupta, 3♂♂ Nurchok, Mandi district, 784mt, 31°36'30.6"N, 76°54'55.1"E, 26.iv.18, coll: J. Sengupta, 3♂ 1♀ Bergaon, Solan district, 1452 mt, 30°54'16.1"N, 77°5'48.2"E, 18.iv.17, coll: J. Sengupta.

**Distribution:** India: Himachal Pradesh, Arunachal Pradesh, Assam, Bihar, Karnataka, Kerala, Madhya Pradesh, Nagaland, Orissa, Tripura, Uttar Pradesh, Uttarakhand and West Bengal.

**Elsewhere:** Oriental Region (Buru, China, Indonesia, Japan)

Subgenus *Eristalodes* Mik, 1897

26. *Eristalinus* (*Eristalodes*) *taeniops*  
(Wiedemann, 1818)

1818. *Eristalis taeniops* Wiedemann, *Zool. Mag.*1(2): 42

**Type-locality:** South Africa. Cape.

**Material examined:** 2♀♀ Dadahu Sirmour district, 651 mt, 30°33'46.2456"N, 77°28'12.7086"E, 16.iv.17, coll: J. Sengupta, 2♀♀ Ghiana, Solan district, 881 mt, 31°13'31.82"N, 76°55'45.83"E, 18.iv.17, coll: J. Sengupta, 6♀♀ Swarghat, Solan district, 816mt, 31°13'57.29"N, 76°43'27.25"E, 18.iv.17, coll: J. Sengupta, 8♀♀ Renuka lake, Sirmour district, 672 mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J. Sengupta.

**Distribution:** India: Himachal Pradesh, Arunachal Pradesh, Chandigarh, Jammu & Kashmir Karnataka, Manipur, Meghalaya, Mizoram, Sikkim, Tamil Nadu, Uttarakhand, Uttar Pradesh, West Bengal.

**Elsewhere:** Afro Tropical Region (Africa), Oriental Region (Afghanistan, Nepal, Pakistan, Sri Lanka, Taiwan), Indo-Australian Region (Java, Moluccas), Palearctic Region (Europe, USA)

27. *Eristalinus* (*Eristalodes*) *paria* (Bigot, 1880)

1880. *Eristalomyia paria* Bigot, *Ann. Soc. Ent. Fr. ser.* 5(10): 218

**Type-locality:** Sri Lanka.

**Material examined:** 1♀ Chabutar village, Hamirpur district, 774 mt, 31°41'10.2"N, 76°31'16.7"E, 01.ii.16, coll: J.Sengupta, 1♂ Palampur, Kangra district, 1220 mt, 32°6'39.09"N, 76°16'8.7"E, 5.vii.15, coll: J. Sengupta, 1♀ Bhagshung, Kangra district, 1755 mt, 32°14'23.1"N, 76°19'41.3"E, 5.vii.15, coll: J. Sengupta, 2♀♀ Chabutar village, Hamirpur district, 774 mt, 31°41'10.2"N, 76°31'16.7"E, 02.ii.16, coll: J. Sengupta, 2♂♂ Nurchok, Mandi district, 784 mt, 31°36'30.6792"N, 76°54'55.1808"E, 25.iv.18, coll: J. Sengupta, 3♂♂ Bhagpur, Mandi district, 855 mt, 31°17'37.6866"N, 76°52'14.3574"E, 23.iv.18, coll: J. Sengupta, 3♂♂3♀♀ Borapani, Solan district, 1524 mt, 30°55'23.8"N, 77°06'19.6"E, 18.iv.18, coll: J. Sengupta, 2♂♂ Bergaon, Solan district, 1454 mt, 30°55'14.2"N, 77°06'18.1"E, 18.iv.17, coll: J. Sengupta,

**Distribution:** India: Himachal Pradesh, Arunachal Pradesh, Chandigarh, Jammu & Kashmir, Karnataka, Manipur, Meghalaya, Mizoram, Sikkim, Tamil Nadu, Uttarakhand, Uttar Pradesh, West Bengal.

**Elsewhere:** Oriental Region (Sri Lanka, Taiwan), Indo-Australian Region (Java, Moluccas), Palearctic Region (China)

XVII. Genus *Eristalis* Latreille, 1804

Subgenus *Eoseristalis* Kanervo, 1938

28. *Eristalis* (*Eoseristalis*) *albibasis* Bigot, 1880

1880. *Eristalis albibasis* Bigot, *Annls Soc. Ent Fr.* (5) 10: 215.

**Type-locality:** "Indostan"

**Material examined:** 2♂♂ Khauoo, Shimla district, 1739 mt, 30°52'54.33"N, 77°38'17.49"E, 20.iv.17, coll: J. Sengupta.

**Distribution:** India: **Himachal Pradesh.**

**Elsewhere:** Palearctic region (China).

29. *Eristalis (Eoseristalis) arbustorum* (Linnaeus, 1758)

1758. *Musca arbustorum* Linnaeus, *Syst. Nat. Ed. 10*: 591.

**Type-locality:** Sweden.

**Material examined:** 1♂ Bhagshung, Kangra district, 1755 mt, 32°14'23.1"N, 76°19'41.3"E, 5.vii.15, coll: J. Sengupta, 2♀♀ Palampur, Kangra district, 1220 mt, 32°6'39.09"N, 76°16'8.7"E, 5.vii.15, coll: J. Sengupta, 1♂ Bhagshung, Kangra district, 1755 mt, 32°14'23.1"N, 76°19'41.3"E, 5.vii.15, coll: J. Sengupta,

**Distribution:** India: **Himachal Pradesh,** Arunachal Pradesh, Jammu & Kashmir, Meghalaya, Sikkim, West Bengal.

**Elsewhere:** Afrotropical Region (Africa), Palaearctic Region (Canada, China, Europe, Japan, Siberia, USA), Oriental Region (Afghanistan, Pakistan).

30. *Eristalis (Eoseristalis) cerealis* Fabricius, 1805

1805. *Eoseristalis cerealis* Fabricius, *Syst. Antliat. 14*: 232.

**Type-locality:** China.

**Material examined:** 1♂ Renuka Lake, Sirmour district, 650mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J. Sengupta, 1♂ Renuka Lake, Sirmour district, 672mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J. Sengupta, 1♂ Chabutar Village, Hamirpur district, 649mt, 31°41'10.2"N, 76°41'14.8"E, 02.ii.16, coll: J. Sengupta, 4♀♀7♂♂ Jamli, Bilaspur district, , 685mt, 30°33'46.2456"N, 77°28'12.7086"E, 15.iv.17, coll: J. Sengupta, 5♂♂ Chabutar Village, Hamirpur district, 684 mt, 31°41'10.2"N, 76°41'14.8"E, 2.ii.16, coll: J. Sengupta, 4♀♀ Chabutar Village, Hamirpur district, 774 mt, 31°41'10.2"N, 76°31'16.7"E, 1.ii.16, coll: J. Sengupta, 2♀♀

Dadahu Sirmour district, 651 mt, 30°33'46.2456"N, 77°28'12.7086"E, 16.iv.17, coll: J. Sengupta, 3♂♂ Bahli, Shimla district, 1634 mt, 31° 9'17.81"N, 77°43'47.08"E, 20.iv.17, coll: J. Sengupta, 1♂ Manman, Bilaspur district, , 847 mt, 31°17'55.87"N, 76°45'55.77"E, 8.ii.16, coll: J. Sengupta, 6♂♂ Nurchok, Mandi district, 784 mt, 31°36'30.6792"N, 76°54'55.1808"E, 15.iv.18, coll: J. Sengupta, 3♀ Mandi, Mandi district, 1023 mt, 31°43'51.5"N, 76°56'30.4"E, 24.iv.18, coll: J. Sengupta, 6♀♀ Bergaon, Solan district, 1454mt, 30°55'14.2"N, 77°06'18.1"E, 18.iv.17, coll: J. Sengupta, 2♀♀ Bergaon, Solan district, 1452 mt, 30°54'16.1"N, 77°5'48.2"E, 18.iv.17, coll: J. Sengupta, 1♀ Ghiana, Solan district, 881 mt, 31°13'31.82"N, 76°55'45.83"E, 18.iv.17, coll: J. Sengupta, 6♀♀ Swarghat, Solan district, 816mt, 31°13'57.29"N, 76°43'27.25"E, 18.iv.17, coll: J. Sengupta, 8♀♀ Renuka lake, Sirmour district, 672 mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J. Sengupta, 1♂ Dhalpur, Kullu district, 1212 mt, 31°57'16.37"N, 77° 6'42.68"E, 7.ii.16, coll: J. Sengupta, 2♂♂ Gharakhar, Kullu district, 1436mt, 31°57'35.61"N, 77° 7'24.66"E, 7.ii.16, coll: J. Sengupta, 4♂♂ Kharkhari, Bilaspur district, 709 mt, 31°19'5.32"N, 76°32'53.81"E, 8.ii.16, coll: J. Sengupta, 2♂♂ Majher, Bilaspur district, 1001 mt, 31°15'0.33"N, 76°49'54.74"E, 4.ii.16, coll: J. Sengupta, 2♀♀ Shishamati, Kullu district, 1248 mt, 31°57'51.93"N, 77° 6'19.69"E, 4.ii.16, coll: J. Sengupta, 1♀ Mohal, Kullu district, 1205 mt, 31°54'56.73"N, 77° 7'1.58"E, 4.ii.16, coll: J. Sengupta, 1♀ Kullu, Kullu district, 1230 mt, 31°57'28.26"N, 77°6'34.05"E, 5.vii.15, coll: J. Sengupta, 3♂♂ Sarvari, Kullu district, 1202 mt, 31°57'37.15"N, 77°6'47.23"E, 7.ii.16, coll: J. Sengupta, 1♀ Chabutar Village, Hamirpur district, 774 mt, 31°41'10.2"N, 76°31'16.7"E, 2.ii.16, coll: J. Sengupta, 6♀♀7♂♂ Rajnagar Lake, Kangra district, 933 mt, 32°37'26.5548"N, 76°3'49.8522"E, 5.vii.15, coll: J. Sengupta.

**Distribution:** India: **Himachal Pradesh,** Arunachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tamil Nadu, Uttarakhand, West Bengal.

**Elsewhere:** Oriental region (Myanmar, Nepal), Palearctic region (China, Japan, Russia)

31. *Eristalis (Eoseristalis) himalayensis*  
Brunetti, 1908

1908. *Eristalis himalayensis* Brunetti, *Rec. Indian Mus.* 2: 70

**Type-locality:** "Indostan"

**Material examined:** 2♂♂ Gharakhar, Kullu district, 1436 mt, 31°57'35.61"N, 77°7'24.66"E, 7.ii.16, coll: J. Sengupta, 2♂♂ 2♀♀ Khauoo, Shimla district, 1739 mt, 30°52'54.33"N, 77°38'17.49"E, 19.iv.17, coll: J. Sengupta, 3♂♂ Nurchook, Mandi district, 785 mt, 31°36'30.6"N, 76°54'55.1"E, 26.iv.18, coll: J. Sengupta.

**Distribution:** India: Himachal Pradesh, Arunachal Pradesh, Jammu & Kashmir, Sikkim, Uttar Pradesh, Uttarakhand, West Bengal

**Elsewhere:** Oriental Region (China, Java, Myanmar, Nepal Sri Lanka). Indo-Australian Region (Malaya, Philippines, Sumatra, Sumbawa.)

Subgenus *Eristalis* Latreille, 1804

32. *Eristalis (Eristalis) tenax* (Linnaeus, 1758)

1758, *Musca tenax* Linnaeus, *syst. Nat.* 10 (1): 591.

**Type-locality:** Europe

**Material examined:** 1♀ Sarahan village panchayet area, Kinnaur district, 1710 mt, 31°31'39"N, 77°47'16"E, 13.iv.18, coll: J. Sengupta, 1♀ Renuka Lake, Sirmour district, 650 mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J. Sengupta, 3♀♀ Khajjiar, Chamba district, 1809 mt, 32°33'20.8"N, 76°3'56.09"E, 04.vii.15, coll: J. Sengupta, 1♂2♀♀ Chachhi, Solan district, 890 mt, 31°2'40.15"N, 76°52'37.85"E, 18.iv.17, coll: J. Sengupta, 3♂♂2♀♀ Kahnani, Solan district, 775 mt, 31°3'20.87"N, 76°50'41.11"E, 18.iv.17, coll: J. Sengupta, 1♂ Ghiana, Solan district, 881 mt, 31°13'31.82"N, 76°55'45.83"E, 18.iv.17, coll: J. Sengupta, 5♂♂ 7♀♀ D.P.F. SAGAN, Solan district, 1005 mt, 31°20'5.09"N, 76°52'21.71"E, 18.iv.17, coll: J. Sengupta, 7♂♂4♀♀ Bergaon, Solan district, 1452 mt, 30°54'16.1"N, 77°5'48.2"E, 18.iv.17, coll: J. Sengupta, 3♀♀ Bergaon, Solan district, 1452 mt, 30°54'16.1"N, 77°5'48.2"E, 18.iv.17,

coll: J. Sengupta, 2♂♂1♀ Chachhi, Solan district, 890 mt, 31°2'40.15"N, 76°52'37.85"E, 18.iv.17, coll: J. Sengupta, 2♂♂3♀♀ Kahnani, Solan district, 775 mt, 31°3'20.87"N, 76°50'41.11"E, 18.iv.17, coll: J. Sengupta, 1♀ Ghiana, Solan district, 881 mt, 31°13'31.82"N, 76°55'45.83"E, 18.iv.17, coll: J. Sengupta, 6♀♀ Bergaon, Solan district, 1452 mt, 30°54'16.1"N, 77°5'48.2"E, 18.iv.17, coll: J. Sengupta, 7♂♂7♀♀ Bergaon, Solan district, 1454 mt, 30°54'16.1"N, 77°5'48.2"E, 18.iv.17, coll: J. Sengupta, 1♂3♀♀ Chamor, Solan district, 1714 mt, 31°19'44.61"N, 77°22'48.18"E, 19.iv.17, coll: J. Sengupta, 15♂♂22♀♀ Palampur, Kangra district, 1220 mt, 32°6'39.09"N, 76°16'8.7"E, 5.vii.15, coll: J. Sengupta, 2♀♀ Bhagshung, Kangra district, 1755 mt, 32°14'23.1"N, 76°19'41.3"E, 5.vii.15, coll: J. Sengupta, 6♂♂9♀♀ Palampur, Kangra district, 1220 mt, 32°6'39.09"N, 76°16'8.7"E, 5.vii.15, coll: J. Sengupta, 5♂♂12♀♀ Chabutur Village, Hamirpur district, 774 mt, 31°41'10.2"N, 76°31'16.7"E, 2.ii.16, coll: J. Sengupta, 1♀ Binjimandi, Mandi district, 1023 mt, 31°43'51.5"N, 76°56'30.4"E, 27.iv.18, coll: J. Sengupta, 1♀ Mandi, Mandi district, 1023 mt, 31°43'51.5"N, 76°56'30.4"E, 24.iv.18, coll: J. Sengupta, 4♀♀ Sahoo River side, Mandi district, 930 mt, 32°33'12.1062"N, 72°7'32.9088"E, 24.iv.18, coll: J. Sengupta, 5♂♂ Nurchook, Mandi district, 784 mt, 31°36'30.6792"N, 76°54'55.1808"E, 15.iv.18, coll: J. Sengupta, 5♂♂ Bhagpur, Mandi district, 855 mt, 31°17'37.6866"N, 76°52'14.3574"E, 14.iv.18, coll: J. Sengupta, 4♀♀ 5♂♂ Bergaon, Solan district, 1454 mt, 30°55'14.2"N, 77°06'18.1"E, 18.iv.17, coll: J. Sengupta, 3♂♂ Khauoo, Shimla district, 1739 mt, 30°52'54.33"N, 77°38'17.49"E, 20.iv.17, coll: J. Sengupta, 2♂♂ Majher, Bilaspur district, 1001 mt, 31°15'0.33"N, 76°49'54.74"E, 4.ii.16, coll: J. Sengupta, 2♀♀ Shishamati, Kullu district, 1248 mt, 31°57'51.93"N, 77°6'19.69"E, 4.ii.16, coll: J. Sengupta, 3♂♂ Mohal, Kullu district, 1205 mt, 31°54'56.73"N, 77°7'1.58"E, 4.ii.16, coll: J. Sengupta, 3♂♂ Sarvari, Kullu district, 1202 mt, 31°57'37.15"N, 77°6'47.23"E, 7.ii.16, coll: J. Sengupta, 1♂ Dhalpur, Kullu district, 1212 mt, 31°57'16.37"N, 77°6'42.68"E, 7.ii.16, coll: J.

Sengupta, 2♂♂ Gharakhar, Kullu district, 1436mt, 31°57'35.61"N, 77°7'24.66"E, 7.ii.16, coll: J. Sengupta, 1♀ Renuka lake, Sirmour district, 672 mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J. Sengupta, 3♂♂ Bergaon, Solan district, 1452 mt, 30°54'16.1"N, 77°5'48.2"E, 18.iv.17, coll: J. Sengupta.

**Distribution:** India: Himachal Pradesh, Arunachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Uttarakhand, West Bengal.

**Elsewhere:** Australasian Region (Australia, New Zealand), Indo-Australian Region (Hawaii), Palaeartic Region (China, Japan), Oriental Region (Afghanistan, Myanmar, Pakistan, Sri Lanka).

XVIII. Genus *Mallota* Meigen, 1822

Subgenus *Mallota* Meigen, 1822

33. *Mallota* (*Mallota*) *orientalis*  
Wiedemann, 1824

1842. *Imatisma orientalis* Macquart, *Dipt. Exot.* 2(2):69

**Type-locality:** Indonesia. Java.

**Material examined:** 2♂♂ Bergaon, Solan district, 1452 mt, 30°54'16.1"N, 77°5'48.2"E, 18.iv.17, coll: J. Sengupta, 3♂♂ 1♀ kamthan Kalan, Solan district, 949 mt, 30°55'58.53"N, 77° 0'52.41"E, 18.iv.17, coll: J. Sengupta,

**Distribution:** India: Himachal Pradesh, Sikkim, West Bengal.

**Elsewhere:** Oriental region (Taiwan, Java, Laos)

XIX. Genus *Mesembrius* Rondani, 1857

Subgenus *Mesembrius* Rondani, 1857

34. *Mesembrius* (*Mesembrius*)  
*bengalensis* (Wiedemann, 1819)

1819. *Eristalis bengalensis* Wiedemann, *Zool. Mag. (Wied)* 1: 16.

**Type-locality:** Bengal, India

**Material examined:** 1♂ Renuka Lake, Sirmour district, 650mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J.Sengupta, 1♀ Renuka lake, Sirmour district, 672 mt,

32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J. Sengupta, 5♀, Bhanera, Hamirpur, Himachal Pradesh, India 953mt, 31°38'0.65"N, 76°39'43.42"E, 4.ii. 2016, coll: J. Sengupta, 3♂♂ Batyana, Hamirpur, Himachal Pradesh, India, 784 mt, 31°29'4.49"N, 76°31'50.78"E, 4. ii.2016, 2♂♂ Karsai, Hamirpur, Himachal Pradesh, India 744mt, 31°32'49.80"N, 76°28'30.83"E, 2.iv.2016

**Distribution:** India: Himachal Pradesh, West Bengal.

**Elsewhere:** Australasian Region (Australia, New Guinea)

XX. Genus *Lycastris* Walker, 1857

35. *Lycastris flavohirta* Brunetti, 1907

1907, *Lycastris flavohirta* Brunetti, 1907 *Rec. Indian Mus.*1: 379-380

**Type-locality:** India, West Bengal, Darjeeling

**Material examined:** 2♂♂ Bahli, Shimla district, 1634 mt, 31° 9'17.81"N, 77°43'47.08"E, 20.iv.17, coll: J. Sengupta.

**Distribution:** India: Himachal Pradesh, West Bengal

**Elsewhere:** Oriental Region (Nepal)

XXI. Genus *Syrirta* Lepeletier & Serville, 1828

36. *Syrirta indica* (Wiedemann, 1824)

1884. *Syrirta rufifacies* Bigot, *Ann. Soc. Ent. Fr. Ser.* 6, 3: 535-560.

=*Syrirta femorata* Sack, 1913

=*Syrirta rufifacies* Bigot, 1884

**Type-locality:** East Indies.

**Material examined:** 1♀ Sohari, Una district, 677 mt, 31°40'37.94"N, 76°18'0.91"E, 12.ii.16, coll: J. Sengupta.

**Distribution:** India: Himachal Pradesh, Assam, Bihar, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Puducherry, Tamil Nadu, Uttarakhand, West Bengal.

**Elsewhere:** Oriental Region (Nepal, Sri Lanka)

37. *Syrirta pipiens* (Linnaeus, 1758)

1758. *Musca pipiens* Linnaeus, *Syst.Nat.* 10:594.

**Type-locality:** Europe

**Material examined:** 4♀♀ Sarahan, Kinnaur district, 1280 mt, 31°30'53"N, 77°44'56"E, 13.iv.18, coll: J.Sengupta, 2♂♂, 1♀ Sangra, Kinnaur district, 1450 mt, 31°33'16"N, 77°55'7"E, 13.iv.18, coll: J. Sengupta, 2♂♂ Bahli, Shimla district, 1634 mt, 31° 9'17.81"N, 77°43'47.08"E, 19.iv.17, coll: J. Sengupta, 2♂♂ Palampur, Kangra district, 1220 mt, 32°6'39.09"N, 76°16'8.7"E, 5.vii.15, coll: J. Sengupta, 1♀ Renuka lake, Sirmour district, 672 mt, 32°33'12.1"N, 76°7'32.9"E, 15.iv.17, coll: J. Sengupta.

**Distribution:** India: **Himachal Pradesh**, Jammu & Kashmir, Uttarakhand, Uttar Pradesh and West Bengal.

**Elsewhere:** Nearctic Region (California & Florida), Neotropical region (British Columbia, Mexico), Oriental Region (Afghanistan, Nepal, Pakistan), Palearctic Region (USA)

XXII. Genus **Xylota** Meigen, 1822

Subgenus **Xylota** Meigen, 1822

38. *Xylota (Xylota) nursei* Brunetti, 1923

1923. *Xylota nursei* Brunetti. *Fauna.Br. India*; 3:240.

**Type-locality:** Shimla, India

**Material examined:** 1♂ Khauoo, Shimla district, 1739 mt, 30°52'54.33"N, 77°38'17.49"E, 20.iv.17, coll: J. Sengupta, 2♀♀ Bergaon, Solan district, 1454mt, 30°55'14.2"N, 77°06'18.1"E, 18.iv.17, coll: J. Sengupta, 2♀♀ Palampur, Kangra district, 1220 mt, 32°6'39.09"N, 76°16'8.7"E, 5.vii.15, coll: J. Sengupta, 2♂♂ Chabutar Village, Hamirpur district, 774 mt, 31°41'10.2"N, 76°31'16.7"E, 2.ii.16, coll: J. Sengupta.

**Distribution:** India: **Himachal Pradesh**, West Bengal.

**Elsewhere:** Nil.

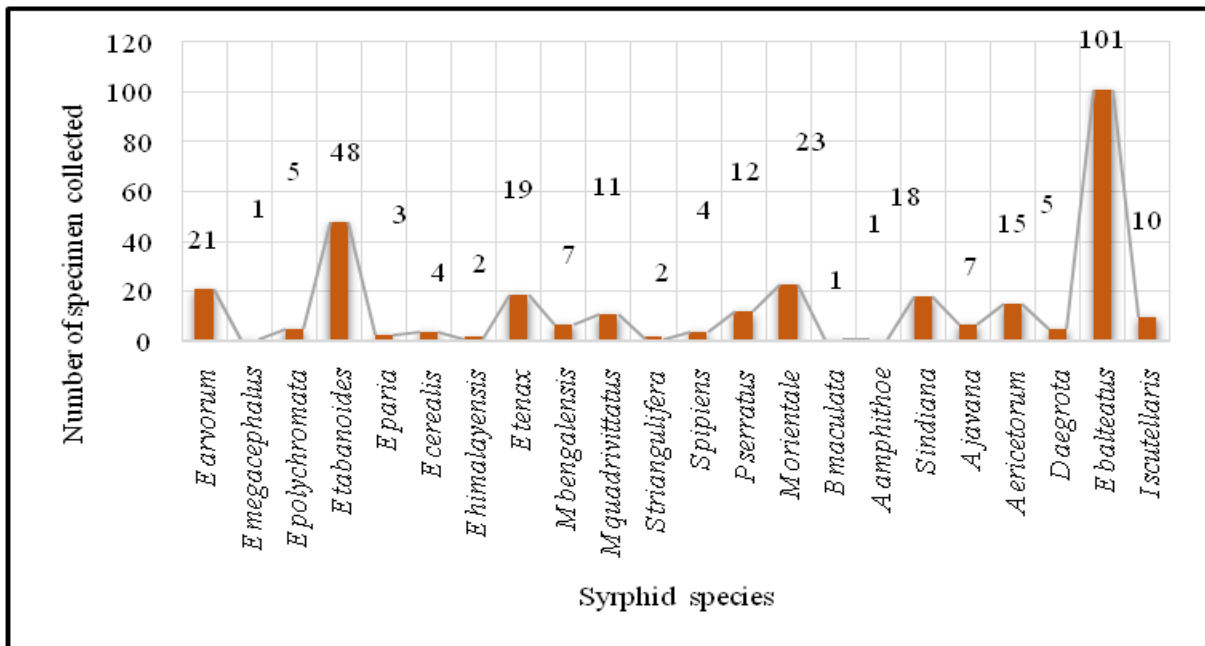


Figure 3: Abundance status of syrphid species from Mid hill Zone, Himachal Pradesh

**Discussion**

Altogether 38 species of hoverflies under 22 genera and 2 sub families have been reported from our study area. Among which 2 species namely *Scavea pyrastris* (Linnaeus, 1758) and *Eristalinus (Eristalinus) polychromata*

(Fabricius, 1787) has been reported from the first time from this mid hill zone as well as from the state of Himachal Pradesh. Elevation wise this zone represents the longest elevational span of the state. Therefore eventually the diversity of hoverflies are also quite high from



this zone. Among the reported 38 species, 7 species found to be widely distributed throughout the year while 5 species found to be endemic from the state as well as from India. Such higher percentile of endemism represents the significance of this zone from

biodiversity aspect. Further studies on pollinating hoverflies I at seasonal and periodic interval will give a clear cut scenario of the taxonomic aspects of these flies from this zone.

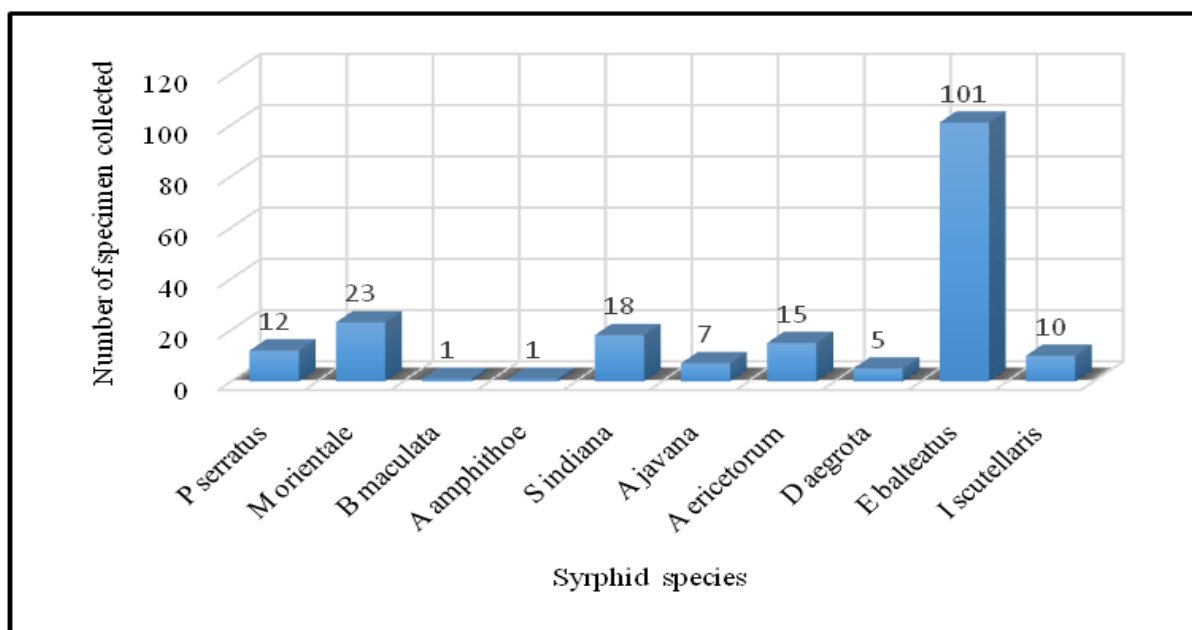


Figure 4: Abundance status of species belonging to Syrphinae subfamily from Mid hill Zone, Himachal Pradesh

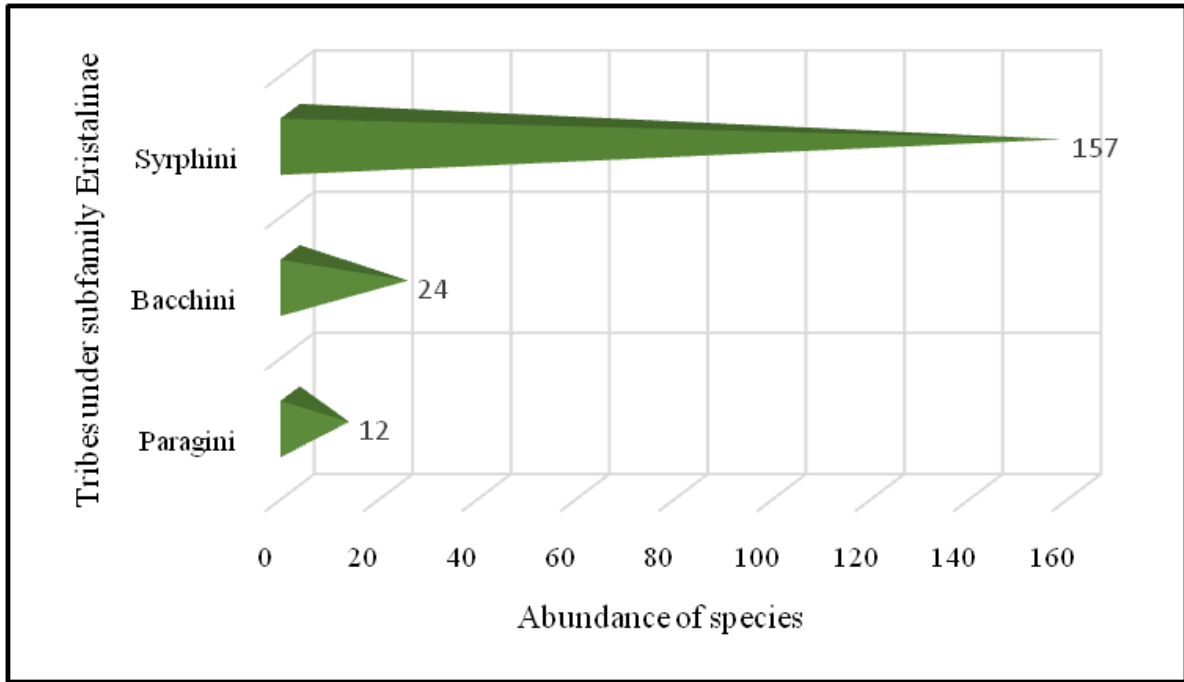


Figure 5: Abundance status of different tribes under Syrphinae subfamily from Mid hill zone, Himachal Pradesh

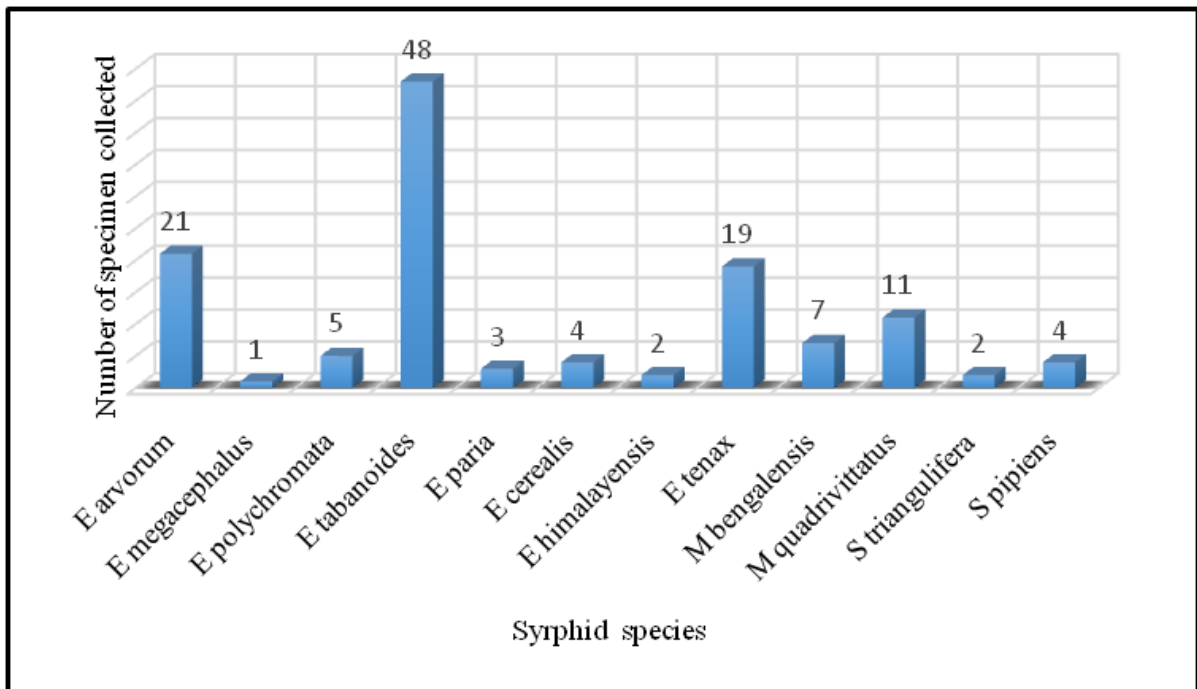


Figure 6: Abundance status of species belonging to Eristalinae subfamily from Mid hill Zone, Himachal Pradesh

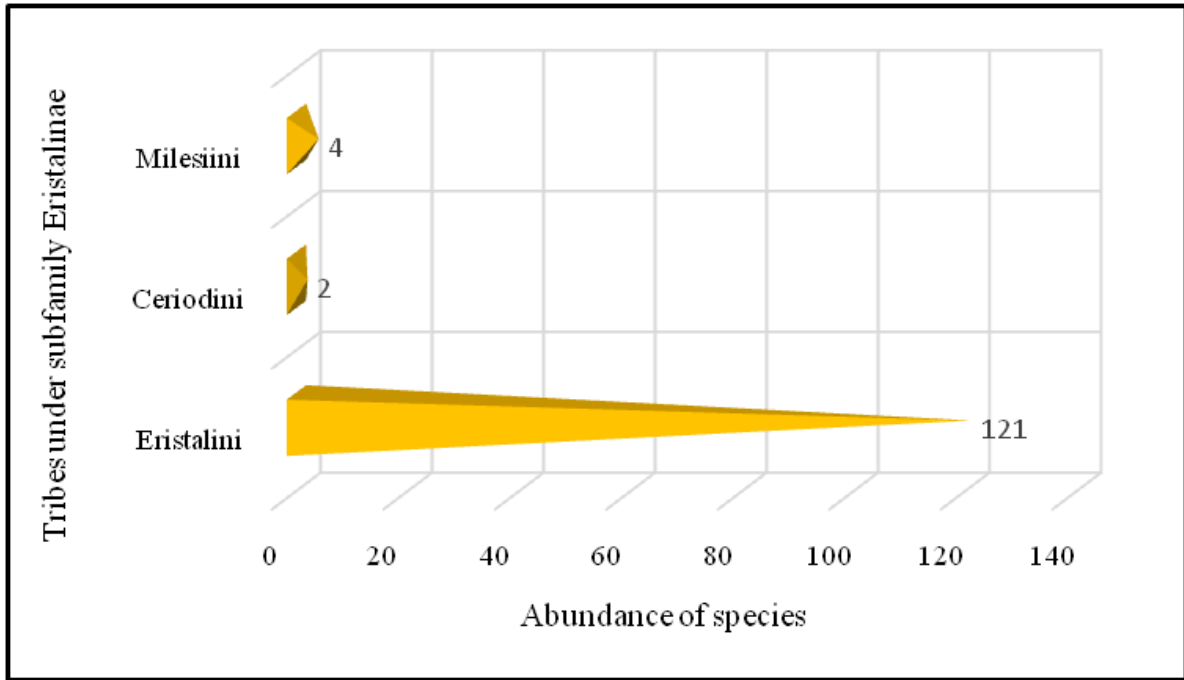


Figure 7: Abundance status of different tribes under Eristalinae subfamily from Mid hill Zone, Himachal Pradesh

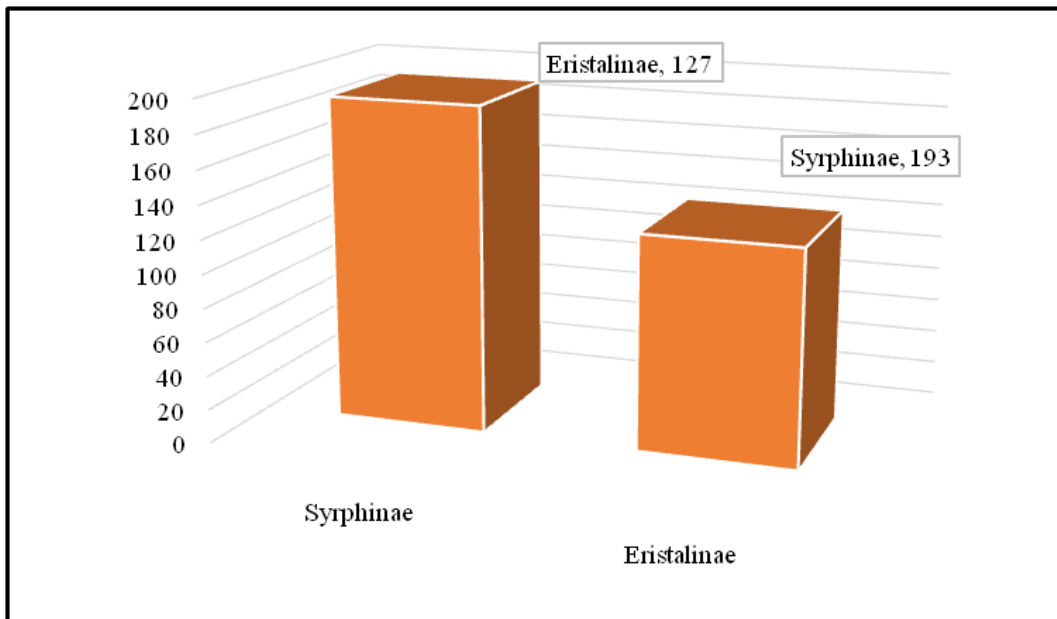


Figure 8: Comparative account of Abundance status of two subfamilies from Mid hill Zone, Himachal Pradesh

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### Conflicts of Interest

The authors declare that the research was conducted in the absence of any commercial or economic associations that could be construed as a potential conflict of interest

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