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An Updated Distributional Account of Indian Hover flies (Insecta: Diptera: Syrphidae)

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Abstract
Syrphid flies frequently called as Hover flies established as effectual pollinators of plants. They exhibit a substantial morphological assortment within the family. To comprehend their diversity, a few isolated studies have so far been carried out in eastern and western Himalayas. This current paper includes a complete distributional scenario of Syrphidae recorded from India, an updated checklist consisting of altogether 69 Genera and 355 species along with their distributional array within the country have been reported here, however some species which were reported in earlier literature but due to lack of proper literature documentation they has not been documented in this current and updated checklist, *namely*, *Syrphus agraensis* Nayar & Nayar 1965, *Scavea lunata* (Wiedemann, 1830). In this present investigation the latest synonimisation and sub genus status as well the current nomenclature pattern has been taken into account. This study may find future applications in monitoring the conservational factors that may affect their distribution and/or diversity.

Keywords: Checklist, entomology, distribution, Genus, Species, Syrphidae

1. Introduction
Hoverfly research has undergone a renaissance over the past 20 years which is due to a better realisation and understanding of these ecological, environmental and economic roles and services, vastly improved understanding of basic species taxonomy and application of new techniques for investigating additional characters. The renaissance is also due to the fact that hover flies make excellent subjects for a wide range of studies at various levels.
Syrphid flies are commonly known as hover flies or flower flies. As the name suggests, they are often seen hovering or nectaring at flowers; the adults of many species feed mainly on nectar and pollen while the larvae (maggots) devour on a wide range of food [1]. Some larvae are saprotrophs; others are insectivores and prey mostly on Hemipterans (aphids, adelgids, psyllids), but also on Thysanopterans (Thrips), and other plant-sucking insects [2, 3].
Aphidophagous hoverflies are recognized as important natural enemies of pests, and potential agents for use in biological control of pest species of Hemiptera [4, 5, 6]. Some adult syrphid flies are important pollinators of crop plants [7]. Larvae of hoverflies are often found in stagnant water, adults are ordinarily found near flowering plants, as their prime food sources are nectar and pollen [8]. Some species are found in more unusual locations; for example members of the genus *Volucella* can be found in bumblebee nests while members of *Microdon* are myrmecophiles, found in ant or termite nests, some others can be found in decomposing vegetation [9]. Development of flower fly involves complete metamorphosis including egg, 3 larval stages, puparium and adult [10]. Many flower fly species exhibit Batesian mimicry [11]. The size of hoverflies diverges, depending on the species [12]. Some, like members of the genus *Baccha*, are small, elongate and slender while others, like members of *Criorhina* are large, hairy and brightly coloured. Most of the flies are with spots, stripes, and bands of yellow or brown covering their bodies [13]. With a few exceptions (e.g. syrphid flies of genera *Graptomyza* and *Paragodon*) [14], hoverflies are distinguished from other flies by a spurious vein or *Vena spuria*, located parallel to the fourth longitudinal wing vein [15]. (Figure 1)
Hoverflies are cosmopolitan family found in most biomes, except in deserts and tundra at extremely high altitudes, and in Antarctica [16].Some hoverflies are much specialised in their distributional range, i.e. endemic to particular habitat and or place; whereas some hoverflies have wide range of distribution across several countries [17].

About 6,008 species under 199 genera of syrphid flies belong to 3 subfamilies namely Eristalinae, Microdontinae and Syrphinae are known worldwide [18]. Among them 357 species of 69 genera are currently recorded in India [18]. Among them several species are endemic to India. They are second most important recognized pollinators and help in cross pollination of several plants [19], along with large potency in biological control of aphid pests to prevent economical hazards, and there lies the importance of conserving several species of syrphid fauna especially the endemic ones [20].

First work in India on Syrphidae was initiated by Fabricius [21]. First elaborated papers on Indian Syrphidae were published by Brunetti [2, 3, 7]. Later on, some of the notable works had been carried out by Herve-Bazin [22]. Bhatia [8]. De Silva [4], Coe [13], Nayar [23], Joseph [24, 34], Parui [29, 34], they have also prejudiced several researchers to work on Indian Syrphidae. In the recent past Ghorpade [35, 43], Mengual [44, 46], Dutta [47, 50], Mukherjee [51, 53], Banerjee [54, 56, 59], Mitra [55, 66], have made notable contributions to taxonomy of Indian Syrphidae.

The current study includes the distributional pattern across the different zones of India which includes North, East, South, West and central part of the country. This study also includes current classification scheme as well as distribution and classification cladogram of subfamilies are also highlighted here [68]. The current manuscript includes syrphid fauna collected during survey period as well as syrphid fauna from the National Zoological Survey of India collection for making an updated list of Indian Hoverflies, thereby also depicts a clear picture of distributional pattern of hoverflies across various states of the country.

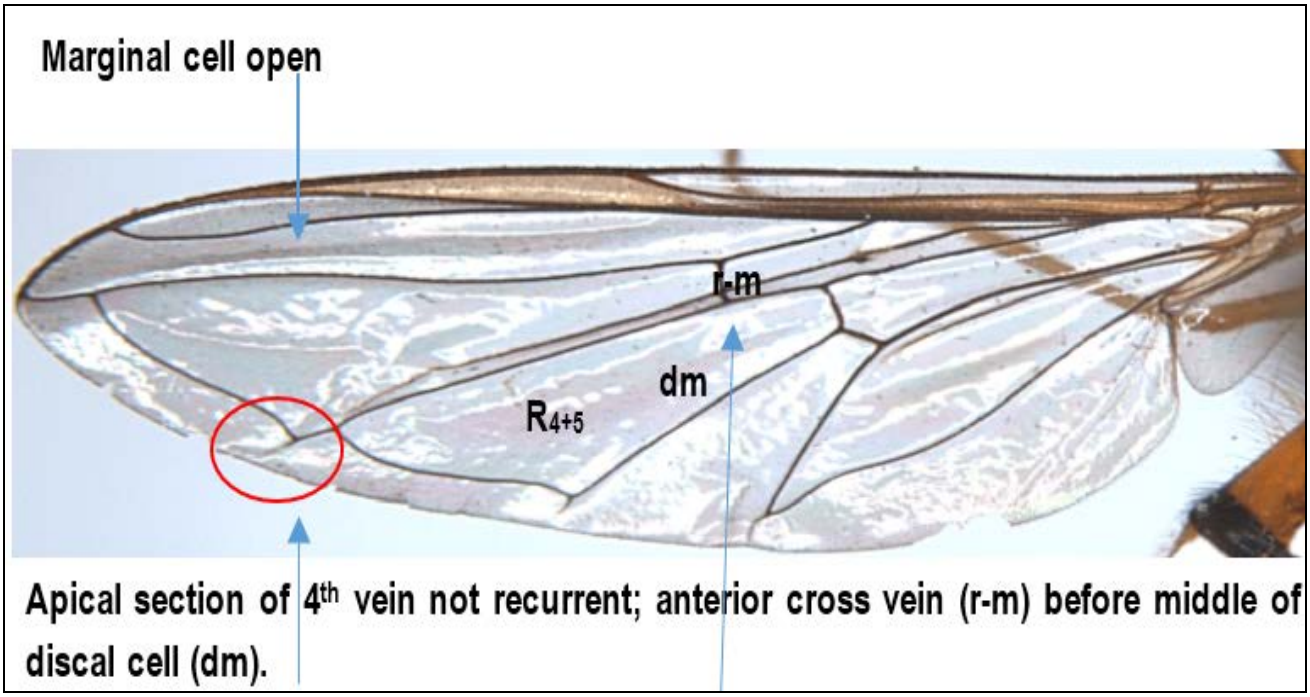

Fig 1: Key identification feature of family Syrphidae

Materials and methods

Recently a five year survey was conducted by Zoological Survey of India (ZSI), this time period includes 2010-2015, this five years in a frame, apart from this we have taken data from National Zoological collection which consists of collection from the year 1916 onwards. So 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 India till date. Collection was done all over India especially on those areas where no detail status survey was done previously for the family of Syrphidae by following the conventional method. Syrphid fauna was collected from the field during day time by using insect sweep nets, using Malaise trap, Pan trap. 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. Current study has included the fauna collected from different survey conducted by Zoological Survey of India as well as fauna reported previously from India from different literature resources.

The present list has been identified, updated and compiled, following the classification scheme from Oriental catalogue and Syrphidae life desk, *Systema Dipterorum*, 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 Dipterorum* (2016), and Catalogue of Life (2016), (Figure 7). All the graphical representations here was made by usung Microsoft Excel 2013. The photo of habitus and insect body parts were taken by using Leica Microscope M205A, where 0.32x Acro lense was used for for Habitus photography and PLANAPO 1.0X lense was used for for the photography of body parts. For field photography purpose we have used Nikon D7000 (Normal and macro lense).

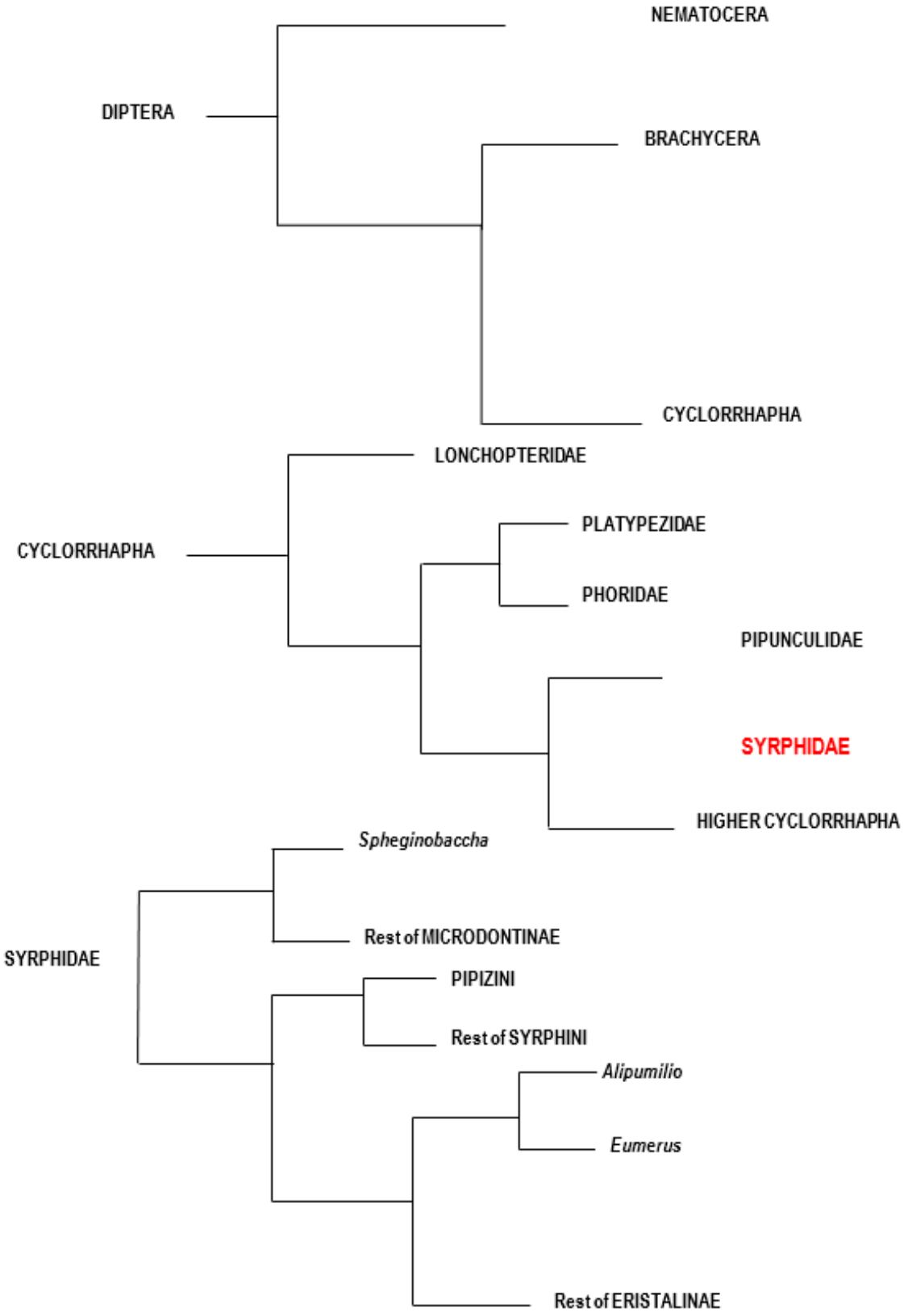

Fig 2: Cladogram of possible relationship between Syrphidae and other families of Diptera [68].

Family Syrphidae
Subfamily Syrphinae

Tribe Syrphini

I. Genus *Allograpta* Osten Sacken, 1875

➢ Subgenus *Allograpta* Osten Sacken, 1875

1. *Allograpta (Allograpta) dravida* Ghorpade, 1994
   Distribution: Karnataka
2. *Allograpta (Allograpta) javana* (Wiedemann, 1824)
   Distribution: Madras, Mysore
3. *Allograpta (Allograpta) maculipleura* (Brunetti, 1913)
   Distribution: Assam, Madras

II. Genus *Asarkina* Macquart, 1842

4. *Asarkina ayyari* Ghorpade, 1994
   Distribution: Himachal Pradesh, Karnataka, Kerala, Tamil Nadu
5. *Asarkina belli* Ghorpade, 1994
   Distribution: Andhra Pradesh, Karnataka

6. *Asarkina bhima* Ghorpade, 1994
   Distribution: Uttarakhand, West Bengal
7. *Asarkina hema* Ghorpade, 1994
   Distribution: Karnataka, Kerala
8. *Asarkina pitamara* Ghorpade, 1994
   Distribution: Karnataka

➢ Subgenus *Asarkina* Macquart, 1842

9. *Asarkina (Asarkina) assimilis* (Macquart, 1846)
   Distribution: Himachal Pradesh
10. *Asarkina (Asarkina) consequens* (Walker, 1857)
    Distribution: India.
11. *Asarkina (Asarkina) ericetorum* (Fabricius, 1781)
    Distribution: Arunachal Pradesh, Assam, Gujarat, Himachal Pradesh Jammu & Kashmir, Kerala, Manipur, Meghalaya, Mizoram, Sikkim, Tamil Nadu, Uttarakhand and West Bengal
12. *Asarkina (Asarkina) porcina* (Coquillett, 1898)
    Distribution: Assam, Meghalaya, Sikkim, Uttarakhand and West Bengal
13. *Asarkina (Asarkina) salviae* (Fabricius, 1794)
    Distribution: India.

III. Genus *Betasyrphus* Matsumura, 1917

14. *Betasyrphus aeneifrons* (Brunetti, 1913)
    Distribution: Assam
15. *Betasyrphus bazini* (Brunetti, 1925)
    Distribution: Bihar, Meghalaya, Shimla, Uttar Pradesh, Uttarakhand and West Bengal
16. *Betasyrphus fletcheri* Ghorpade, 1994
    Distribution: Kerala, Tamil Nadu
17. *Betasyrphus isaaci* (Bhatia, 1933)
    Distribution: Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Jharkhand, Meghalaya, Punjab, Uttar Pradesh, Uttarakhand and West Bengal
18. *Betasyrphus linga* Ghorpade, 1994
    Distribution: Karnataka, Kerala, Tamil Nadu
19. *Betasyrphus serarius* (Wiedemann, 1830)
    Distribution: Arunachal Pradesh, Assam, Bihar, Karnataka, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Uttarakhand and West Bengal.

IV. Genus *Citrogramma* Vockeroth, 1969

20. *Citrogramma amarilla* Mengual, 2012
    Distribution: TamilNadu
21. *Citrogramma chola* Ghorpade, 1994
    Distribution: Karnataka
22. *Citrogramma citrinum* (Brunetti, 1923)
    Distribution: Assam, Karnataka, Meghalaya, West Bengal
23. *Citrogramma clarum* (Herve-Bazin, 1923)
    Distribution: Meghalaya, West Bengal
24. *Citrogramma currani Ghorpade, 2012*
    *Distributio*n: Arunachal Pradesh
25. *Citrogramma flavigena* Wyatt, 1991
    Distribution: Kerala, Karnataka, Tamil Nadu
26. *Citrogramma frederici* Mengual & Ghorpade, 2012
    Distribution: Karnataka
27. *Citrogramma marissa* Mengual, 2012
    Distribution: Arunachal Pradesh

V. Genus *Dasysyrphus* Enderlein, 1938

28. *Dasysyrphus darada* Ghorpade, 1994
    Distribution: *Jammu & Kashmir*
29. *Dasysyrphus orsua* (Walker, 1852)
    Distribution: Himachal Pradesh, Jammu & Kashmir, Uttarakhand, West Bengal
30. *Dasysyrphus pandu* Ghorpade, 1994
    Distribution: Jammu & Kashmir
31. *Dasysyrphus rossi* Ghorpade, 1994
    Distribution: Kerala, Tamilnadu

VI. Genus *Didea* Macquart, 1834

32. *Didea fasciata* Macquart, 1834
    Distribution: Assam
33. *Didea poorva* Ghorpade, 1994
    Distribution: Meghalaya
34. *Didea vockerothi* Ghorpade, 1994
    Distribution: Jammu & Kashmir

VII. Genus *Dideoides* Brunetti, 1908

35. *Dideoides kempi* Brunetti, 1923
    Distribution: Arunachal Pradesh, Assam, Meghalaya, Sikkim & West Bengal
36. *Dideoides ovatus* Brunetti, 1908
    Distribution: Assam, Meghalaya, Sikkim, West Bengal
37. *Dideoides tigerinus* (Bigot, 1885)
    Distribution: Assam, Meghalaya

VIII. Genus *Dideopsis* Matsumura, 1917

38. *Dideopsis aegrota* (Fabricius, 1805)
    Distribution: Arunachal Pradesh, Himachal Pradesh and West Bengal.

IX. Genus *Eupeodes* Osten Sacken, 1877

➢ Subgenus *Macrosyrphus* Matsumura,1917

39. *Eupeodes (Macrosyrphus) confrater* (Wiedemann, 1830)
    Distribution: Andhra Pradesh, Assam, Bihar, Dellhi, Gujrat, Jammu & Kashmir, Meghalaya, Maharashtra, Punjab, Sikkim, TamilNadu, Uttarakhand and West Bengal.

➢ Subgenus *Metasyrphus* Matsumura,1917

40. *Eupeodes (Metasyrphus) bucculatus* (Rondani, 1857)
    Distribution: Himachal Pradesh, Jammu & Kashmir, Punjub and Uttarakhand.
41. *Eupeodes (Metasyrphus) corollae* (Fabricius, 1794)
    Distribution: Chattishgarh, Himachal Pradesh, Jammu & Kashmir, Punjab and West Benga.l
42. *Eupeodes (Metasyrphus) latifasciatus* (Macquart, 1829)
    Distribution: Arunachal Pradesh, Himachal Pradesh, Jammu & Kashmir, West Bengal.
43. *Eupeodes (Metasyrphus) luniger* (Meigen, 1822)
    Distribution: Himachal Pradesh, Punjub.
44. *Eupeodes (Metasyrphus) nuba* (Wiedemann, 1830)
    Distribution: Himachal Pradesh.

X. Genus *Epistrophe* Walker, 1852

45. *Epistrophe carmichaeli* Ghorpade, 1994
    Distribution: West Bengal.

➢ Subgenus *Epistrophe* Walker, 1852

46. *Epistrophe (Epistrophe) aequalis* (Walker, 1852)
    Distribution: Himachal Pradesh, Punjub, Uttarakhand.
47. *Epistrophe (Epistrophe) griseocinctus* (Brunetti, 1923)
    Distribution: Jammu & Kashmir, Uttarakhand, West Bengal.

➢ Subgenus *Epistrophella* Dusek & Laska, 1967

48. *Epistrophe (Epistrophe) shibakawae* (Matsumura, 1917)
    Distribution: West Bengal.

XI. Genus *Episyrphus* Matsumura & Adachi, 1917

➢ Subgenus *Episyrphus* Matsumura & Adachi, 1917

49. *Episyrphus (Episyrphus) balteatus* (De Geer, 1776)
    Distribution: widely distributed through all the states of India.
50. *Episyrphus (Episyrphus) viridaureus* (Wiedemann, 1824)
    Distribution: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Delhi, Gujarat, Himachal Pradesh, Haryana, Kerala, Karnataka, Meghalaya, Maharashtra, Madhya Pradesh, Punjab, Sikkim, Tamil

Nadu, Uttarakhand, Uttar Pradesh, West Bengal.

- Subgenus *Asiobaccha* Violovitsh, 1976

51. *Episyrphus (Asiobaccha) nubilipennis* (Austen, 1893)
Distribution: Assam, Kerala, Karnataka, Meghalaya, Tamil Nadu, West Bengal.

XII. Genus *Eriozona* Schiner, 1860

- Subgenus *Eriozona* Schiner, 1860

52. *Eriozona (Eriozona) analis* Kertesz, 1901
Distribution: Sikkim, Uttarakhand.

- Subgenus *Megasyrphus* Dusek & Laska, 1967

53. *Eriozona (Megasyrphus) himalayensis* Kohli, Kapoor & Gupta,1988
Distribution: Himachal Pradesh.

XIII. Genus *Ischiodon* Sack, 1913

54. *Ischiodon scutellaris* (Fabricius, 1805)
Distribution: Andhra Pradesh, Assam, Dellhi, Jammu &Kashmir, Karnataka, Kerala, Meghalaya, Madhya Pradesh, Manipur, Meghalaya, Orissa, Punjab, Tamil Nadu, Tripura, and West Bengal.

XIV. Genus *Leucozona* Schiner, 1860

- Subgenus *Ischyrosyrphus* Bigot, 1882

55. *Leucozona (Ischyrosyrphus) sivae* Bigot, 1882
Distribution: India.

- Subgenus *Leucozona* Schiner, 1860

56. *Leucozona (Leucozona) brunettii* Ghorpade, 1994
Distribution: India.
57. *Leucozona (Leucozona) virendra* Ghorpade, 1994
Distribution: Uttar Pradesh, Uttarakhand.

XV. *Melangyna* Verrall, 1901

- Subgenus *Melangyna* Verrall, 1901

58. *Melangyna (Melangyna) remota* (Brunetti, 1923)
Distribution: Himachal Pradesh, Jammu & Kashmir, Uttarakhand.

XVI. Genus *Meliscaeva* Frey, 1946

59. *Meliscaeva ceylonica* (Keiser, 1958)
Distribution: Tamil Nadu.
60. *Meliscaeva cinctelloides* Ghorpade, 1994
Distribution: Meghalaya, West Bengal.
61. *Meliscaeva darjeelingensis* Datta & Chakraborti, 1986
Distribution: West Bengal.
62. *Meliscaeva kusuma* Ghorpade, 1994
Distribution: West Bengal.
63. *Meliscaeva cinctella* (Zetterstedt, 1843)
Distribution: Himachal Pradesh, West Bengal.
64. *Meliscaeva lefroyi* Ghorpade, 1994
Distribution: Jammu & Kashmir.
65. *Meliscaeva magnifica* Ghorpade, 1994
Distribution: West Bengal.
66. *Meliscaeva mathisi* Ghorpade, 1994
Distribution: Tamil Nadu.
67. *Meliscaeva tribeni* (Nayar, 1968)
Distribution: Himachal Pradesh.

XVII. Genus *Scaeva* Fabricius, 1805

68. *Scaeva albomaculata* (Macquart, 1842)
Distribution: Jammu & Kashmir.
69. *Scaeva latimaculata* (Brunetti, 1923)
Distribution: Himachal Pradesh, Punjab, Rajasthan, Uttar Pradesh.
70. *Scaeva opimius* (Walker, 1852)
Distribution: India.
71. *Scaeva pyrastri* (Linnaeus, 1758)
Distribution: Jammu & Kashmir, Punjab, Uttarakhand.
72. *Scaeva selenitica* (Meigen, 1822)
Distribution: Himachal Pradesh.

XVIII. Genus *Sphaerophoria* Lepeletier & Serville, 1828

73. *Sphaerophoria bengalensis* Macquart, 1842
Distribution: Himachal Pradesh, Punjab, Uttar Pradesh, West Bengal.
74. *Sphaerophoria knutsoni* Ghorpade, 1994
Distribution: Tamil Nadu.
75. *Sphaerophoria ladaskhensis* Ghorpade, 1994
Distribution: Jammu & Kashmir.
76. *Sphaerophoria vockerothi* Joseph, 1970
Distribution: Arunachal Pradesh, Assam, Manipur.

- Subgenus *Knutsonia* Barkalov, 2012

77. *Sphaerophoria (Knutsonia) assamensis* Joseph, 1970
Distribution: Arunachal Pradesh, Assam.
78. *Sphaerophoria (Knutsonia) viridaenea* Brunetti, 1915
Distribution: Himachal Pradesh, Jammu & Kashmir, Uttarakhand.

- Subgenus *Sphaerophoria* Wiedemann, 1830

79. *Sphaerophoria (Sphaerophoria) indiana* Bigot, 1884
Distribution: Himachal Pradesh, West Bengal.
80. *Sphaerophoria (Sphaerophoria) macrogaster* (Thomson, 1869)
Distribution: Maharashtra, Tamil Nadu.
81. *Sphaerophoria (Sphaerophoria) rueppellii* (Wiedemann, 1830)
Distribution: Jammu & Kashmir.
82. *Sphaerophoria (Sphaerophoria scripta) scripta* (Linnaeus, 1758)
Distribution: Kashmir.

XIX. Genus *Syrphus* Fabricius, 1775

83. *Syrphus dalhousiae* Ghorpade, 1994
Distribution: Himachal Pradesh, Jammu & Kashmir, Uttarakhand.
84. *Syrphus howletti* Ghorpade, 1994
Distribution: Jammu & Kashmir.

- Subgenus *Syrphus* Fabricius, 1775

85. *Syrphus (Syrphus) fulvifacies* Brunetti, 1913
Distribution: Himachal Pradesh, Jammu & Kashmir, Uttarakhand.
86. *Syrphus (Syrphus) ribesii* (Linnaeus, 1758)
Distribution: Himachal Pradesh, Jammu & Kashmir, Uttarakhand.
87. *Syrphus (Syrphus) torvus* Osten Sacken, 1875
Distribution: Himachal Pradesh, Jammu & Kashmir, Uttarakhand.
88. *Syrphus (Syrphus) vitripennis* Meigen,1822
Distribution: Himachal Pradesh, Jammu & Kashmir.

XX. Genus *Parasyrphus* Matsumura, 1917

89. *Parasyrphus aeneostoma* (Matsumura, 1917)
Distribution: Jammu & Kashmir.
90. *Parasyrphus kashmiricus* Ghorpade, 1994
Distribution: Jammu & Kashmir.
91. *Parasyrphus thompsoni* Ghorpade, 1994
Distribution: Himachal Pradesh, Jammu & Kashmir, Uttarakhand.

XXI. Genus *Agnisyrphus* Ghorpade, 1994

92. *Agnisyrphus angara* Ghorpade, 1994
Distribution: Uttar Pradesh, Uttarakhand.
93. *Agnisyrphus brunettii* Ghorpade, 2007
Distribution: Arunachal Pradesh, West Bengal.
94. *Agnisyrphus gressitti* Ghorpade, 1994
Distribution: India.

XXII. Genus *Rhinobaccha* De Meijere, 1908

95. *Rhinobaccha krishna* Ghorpade, 1994
Distribution: Kerala, Tamil Nadu.
96. *Rhinobaccha peterseni* Ghorpade, 1994

Distribution: Karnataka, Kerala, Tamil Nadu.

XXIII. Genus *Allobaccha* Curran, 1928

97. *Allobaccha binghami* Ghorpade, 1994
Distribution: Sikkim.

98. *Allobaccha oldroydi* Ghorpade, 1994
Distribution: Kerala.

➢ Subgenus *Allobaccha* Curran, 1928

99. *Allobaccha (Allobaccha) amphithoe* (Walker, 1849)
Distribution: Assam, Kerala, Karnataka, Meghalaya, Manipur, Mizoram, Uttarakhand, West Bengal.

100. *Allobaccha (Allobaccha) apicalis* (Loew, 1858)
Distribution: Andaman & Nicobar Island, Assam, Bihar, Gujrat, Goa, Himachal Pradesh, Kerala, Karnataka, Meghalaya, Mizoram, Tamil Nadu, Uttarakhand, West Bengal.

101. *Allobaccha (Allobaccha) elegans* (Brunetti, 1915)
Distribution: Karnataka, Sikkim, West Bengal.

102. *Allobaccha (Allobaccha) fallax* (Austen, 1893)
Distribution: India.

103. *Allobaccha (Allobaccha) plumbicincta* (Brunetti, 1915)
Distribution: Meghalaya.

104. *Allobaccha (Allobaccha) sapphirina* (Wiedemann, 1830)
Distribution: Gujrat, Karnataka, Maharashtra, Madhya Pradesh. Rajasthan, Tamil Nadu.

105. *Allobaccha (Allobaccha) triangulifera* (Austen, 1893)
Distribution: Sikkim, West Bengal.

XXIV. Genus *Chrysotoxum* Meigen, 1800

106. *Chrysotoxum antiquum* Walker, 1852
Distribution: Himachal Pradesh, Uttarakhand, West Bengal.

107. *Chrysotoxum arcuatum* (Linnaeus, 1758)
Distribution: Bihar.

108. *Chrysotoxum baphyrus* Walker, 1849
Distribution: Himachal Pradesh, Jammu & Kashmir, Karnataka, Maharashtra, Meghalaya, Mizoram, Punjab, Tamil Nadu, Uttar Pradesh and Uttarakhand, West Bengal.

109. *Chrysotoxum convexum* Brunetti, 1915
Distribution: Himachal Pradesh, Jammu & Kashmir, Mizoram, Uttar Pradesh and Uttarakhand.

110. *Chrysotoxum corbetti* Ghorpade, 1994
Distribution: *Uttar Pradesh.*

111. *Chrysotoxum fasciatus* Kohli, Kapoor & Gupta, 1988
Distribution: Arunachal Pradesh, Chandigarh, Himachal Pradesh, Jammu & Kashmir, Karnataka, Meghalaya, Tamil Nadu, Uttarakhand, Uttar Pradesh, West Bengal.

112. *Chrysotoxum fasciolatum* (De Geer, 1776)
Distribution: Jammu & Kashmir, Uttarakhand.

113. *Chrysotoxum intermedium* Meigen, 1822
Distribution: Himachal Pradesh, Jammu & Kashmir.

114. *Chrysotoxum ladakense* Shannon, 1926
Distribution: Kashmir.

115. *Chrysotoxum quadrifasciatum* Brunetti, 1923
Distribution: Assam, Meghalaya.

116. *Chrysotoxum violaceum* Brunetti, 1923
Distribution: West Bengal.

Tribe Bacchini

XXV. Genus *Baccha* Fabricius, 1805

117. *Baccha bistriatus* Kohli, Kapoor & Gupta, 1988
Distribution: Uttar Pradesh.

118. *Baccha maculata* Walker, 1852
Distribution: Himachal Pradesh, Meghalaya, Sikkim, Uttar Pradesh, Uttarakhand, West Bengal.

XXVI. Genus *Melanostoma* Schiner, 1860

119. *Melanostoma orientale* (Wiedemann, 1824)
Distribution: Assam, Bihar, Karnataka, Kerala, Meghalaya, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

120. *Melanostoma univittatum* (Wiedemann, 1824)
Distribution: Assam, Bihar, Himachal Pradesh, Kerala, Karnataka, Meghalaya, Tamil Nadu, Uttarakhand, West Bengal.

XXVII. Genus *Platycheirus* Lepeletier & Serville, 1828

121. *Platycheirus cryophilus* Nielsen, 2007
Distribution: *Kashmir.*

➢ Subgenus *Platycheirus* Lepeletier & Serville, 1828

122. *Platycheirus (Platycheirus) albimanus* Fabricius, 1781
Distribution: Himachal Pradesh, Jammu & Kashmir, West Bengal.

123. *Platycheirus (Platycheirus) ambiguus* (Fallen, 1817)
Distribution: Himachal Pradesh, Jammu & Kashmir.

124. *Platycheirus (Platycheirus) angustatus* (Zetterstedt, 1843)
Distribution: Jammu & Kashmir.

125. *Platycheirus (Platycheirus) himalayensis* Brunetti, 1915
Distribution: Uttar Pradesh, Uttarakhand.

➢ Subgenus *Pseudoplatychirus* Doesburg, 1955

126. *Platycheirus (Pseudoplatychirus) peteri* (Doesburg, 1955)
Distribution: Jammu & Kashmir.

➢ Subgenus *Pachysphyria* Enderlein, 1938

127. *Platycheirus (Pachysphyria) kashmiricus* Nielsen, 2004
Distribution: Kashmir.

XXVIII. Genus *Tuberculanostoma* Fluke, 1943

128. *Tuberculanostoma solitarium* Doesburg, 1955
Distribution: Jammu & Kashmir.

XXIX. Genus *Xanthandrus* Verrall, 1901

129. *Xanthandrus garhwalensis* (Kohli, Kapoor & Gupta, 1988) Distribution: Uttar Pradesh, Uttarakhand.

➢ Subgenus *Xanthandrus* Verrall, 1901

130. *Xanthandrus* (*Xanthandrus*) *indicus* Curran, 1933
Distribution: Madhya Pradesh, Uttarakhand.

Tribe Paragini

XXX. Genus *Paragus* Latreille, 1804

131. *Paragus femoratus* Kohli, Kapoor & Gupta, 1988
Distribution: *Assam, Uttar Pradesh, Uttarakhand.*

➢ Subgenus *Paragus* Latreille, 1804

132. *Paragus (Paragus) ambalaensis* Sodhi & Singh, 1991
Distribution: Haryana.

133. *Paragus (Paragus) annandalei* Ghorpade, 1992
Distribution: Himachal PradeshJammu &Kashmir, Uttarakhand.

134. *Paragus (Paragus) auritus* Stuckenberg, 1954
Distribution: Andhra Pradesh, Karnataka, Orissa, Tamil Nadu, West Bengal.

135. *Paragus (Paragus) bicolor* (Fabricius, 1794)
Distribution: Jammu & Kashmir.

136. *Paragus (Paragus) crenulatus* Thomson, 1869
Distribution: Assam, Bihar, Kerala, Karnataka, Maharashtra, Tamil Nadu, Tripura, West Bengal.

137. *Paragus (Paragus) quadrifasciatus* Meigen, 1822
Distribution: Jammu & Kashmir.

138. *Paragus (Paragus) serratus* (Fabricius, 1805)
Distribution: Assam, Bihar, Delhi, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Punjab, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

139. *Paragus (Paragus) yerburiensis* Stuckenberg, 1954
Distribution: Andhra Pradesh, Bihar, Delhi, Kerala,

Karnataka, Madhya Pradesh, Orissa, Tamil Nadu, Uttarakhand, Uttar Pradesh, West Bengal.

- Subgenus *Pandasyopthalmus* Stuckenberg, 1954

140. *Paragus (Pandasyopthalmus) politus* Wiedemann, 1830
Distribution: Assam, Himachal Pradesh, Jammu &Kashmir, Meghalaya, Punjab, Sikkim, Uttarakhand, West Bengal.
141. *Paragus (Pandasyopthalmus) rufocincta* (Brunetti, 1908)
Distribution: Himachal Pradesh, Jammu &Kashmir, Kerala, Karnataka, Meghalaya,
Punjab, Tamil Nadu, West Bengal); Nepal; Burma; Sri Lanka.
142. *Paragus (Pandasyopthalmus) tibialis* (Fallen, 1817)
Distribution: Himachal Pradesh.
Tribe Pipizini

XXXI. Genus *Heringia* Rondani, 1856

143. *Heringia cyanea* (Brunetti, 1915)
Distribution: Sikkim.
Subfamily Microdontinae
Tribe Microdontini

XXXII. Genus *Microdon* Meigen, 1803

- Subgenus *Indascia* Keiser, 1958

144. *Microdon (Indascia) brachystoma* (Wiedemann, 1824)
Distribution: India.

- Subgenus *Microdon* Meigen, 1803

145. *Microdon (Microdon) annandalei* Brunetti, 1907
Distribution: Assam, Himachal Pradesh, Meghalaya.
146. *Microdon (Microdon) apidiformis* Brunetti, 1924
Distribution: Assam, Meghalaya.
147. *Microdon* (*Microdon*) *bellus* Brunetti, 1923
Distribution: Uttarakhand, Uttar Pradesh.
148. *Microdon* (*Microdon*) *xanthogramma*Brunetti, 1908
Distribution: Arunachal Pradesh, Assam.
149. *Microdon* (*Microdon*) *carbonarius* Brunetti, 1923
Distribution: Assam, Meghalaya.
150. *Microdon* (*Microdon*) *contractus* Brunetti, 1923
Distribution: Gujarat, Maharashtra.
151. *Microdon* (*Microdon*) *conveniens* Brunetti, 1923
Distribution: Assam.
152. *Microdon* (*Microdon*) *flavipes* Brunetti, 1908
Distribution: Meghalaya.
153. *Microdon* (*Microdon*) *metallicus de* Meijere, 1904
Distribution: West Bengal.
154. *Microdon* (*Microdon*) *ruficaudus* Brunetti, 1907
Distribution: West Bengal.
155. *Microdon* (*Microdon*) *squamipennis* Brunetti, 1923
Distribution: Assam, Meghalaya.
156. *Microdon* (*Microdon*) *stilboides* Walker, 1849
Distribution: West Bengal.
157. *Microdon* (*Microdon*) *unicolor* Brunetti, 1915
Distribution: Orissa.

- Subgenus *Pseudomicrodon* Hull, 1937

158. *Microdon (Pseudomicrodon) auricinctus* Brunetti, 1908
Distribution: West Bengal.

XXXIII. Genus *Paramixogaster* Brunetti, 1923

159. *Paramixogaster vespiformis* (Brunetti, 1913)
Distribution: Assam.
Tribe Spheginobacchini

XXXIV. Genus *Spheginobaccha* Meijere, 1908

160. *Spheginobaccha chillcotti* Thompson, 1974
Distribution: Uttarakhand.
161. *Spheginobaccha macropoda* (Bigot, 1884)
Distribution: Uttarakhand, West Bengal.
Subfamily Eristalinae
Tribe Brachyopini

XXXV. Genus *Myolepta* Newman, 1838

- Subgenus *Myolepta* Newman, 1838

162. *Myolepta* (*Myolepta*) *himalayana* Brunetti, 1915
Distribution: Himachal Pradesh.

XXXVI. Genus *Orthonevra* Macquart, 1829

163. *Orthonevra aenethorax* Kohli, Kapoor & Gupta, 1988
Distribution: Himachal Pradesh, Jammu & Kashmir.
164. *Orthonevra indica* (Brunetti, 1915)
Distribution: Himachal Pradesh, Punjab.
165. *Orthonevra kozlovi* (Stackelberg, 1952)
Distribution: Jammu & Kashmir.
166. *Orthonevra nobilis* (Fallen, 1817)
Distribution: Jammu & Kashmir.

XXXVII. Genus *Sphegina* Meigen, 1822

- Subgenus *Sphegina* Meigen, 1822

167. *Sphegina (Sphegina) asciiformis* Brunetti, 1915
Distribution: West Bengal.
168. *Sphegina (Sphegina) guptai* Mutin, 1998
Distribution: Himachal Pradesh.
169. *Sphegina (Sphegina) kumaoniensis* Mutin, 1998
Distribution: Uttar Pradesh, Uttrakhand.
170. *Sphegina (Sphegina) tricoloripes* Brunetti, 1915
Distribution: Himachal Pradesh, Uttarakhand, Uttar Pradesh.

- Subgenus *Asiosphegina* Stackelberg, 1974

171. *Sphegina (Asiosphegina) bispinosa* Brunetti, 1915
Distribution: Arunachal Pradesh, Assam, Uttarakhand, Uttar Pradesh, West Bengal.
172. *Sphegina (Asiosphegina) javana* de Meijere, 1914
Distribution: West Bengal.
173. *Sphegina (Asiosphegina) tristriata* Brunetti, 1913
Distribution: Arunachal Pradesh, Assam.
Tribe Rhingiini

XXXVIII. Genus *Cheilosia* Meigen, 1822

174. *Cheilosia apicalis* Brunetti, 1913
Distribution: Arunachal Pradesh, Assam.
175. *Cheilosia corydon* (Harris, 1780)
Distribution: Uttarakhand, Uttar Pradesh.
176. *Cheilosia himalayensis* (Brunetti, 1915)
Distribution: Uttar Pradesh.
177. *Cheilosia hirticincta* Brunetti, 1915
Distribution: West Bengal.
178. *Cheilosia kalatopensis* Nayar, 1968
Distribution: Himachal Pradesh, Punjub.
179. *Cheilosia nigroaenea* Brunetti, 1915
Distribution: Himachal Pradesh.
180. *Cheilosia pilipes* (Bigot, 1884)
Distribution: India.
181. *Cheilosia plumbiventris* Brunetti, 1915
Distribution: Himachal Pradesh.
182. *Cheilosia songarea* (Becker, 1894)
Distribution: Jammu & Kashmir.

XXXIX. Genus *Endoiasimyia* Bigot, 1882

183. *Endoiasimyia indiana* Bigot, 1882
Distribution: Uttarakhand.

XL. Genus *Ferdinandea* Rondani, 1844

184. *Ferdinandea isabella* Hull, 1942
Distribution: Kashmir.
185. *Ferdinandea longifacies* Coe, 1964
Distribution: Arunachal Pradesh, Uttarakhand.
186. *Ferdinandea montana* Hull, 1942
Distribution: Jammu &Kashmir.

XLI. Genus *Rhingia* Scopoli, 1763

- Subgenus *Rhingia* Scopoli, 1763

187. *Rhingia (Rhingia) angusticincta* Brunetti, 1908
Distribution: Himachal Pradesh, West Bengal.
188. *Rhingia (Rhingia) binotata* Brunetti, 1908
Distribution: Arunachal Pradesh, West Bengal.
189. *Rhingia (Rhingia) cincta de* Meijere, 1904
Distribution: Meghalaya, West Bengal.
190. *Rhingia (Rhingia) laticincta* Brunetti, 1907
Distribution: Himachal Pradesh, Punjub, Uttarakhand, West Bengal.
191. *Rhingia (Rhingia) semicinerea* Brunetti, 1923
Distribution: Uttarakhand, Uttar Pradesh.
192. *Rhingia (Rhingia) sexmaculata* Brunetti, 1913
Distribution: Assam.
193. *Rhingia (Rhingia) siwalikensis* Nayar, 1968
Distribution: Himachal Pradesh.

Tribe Volucellini

XLII. Genus *Graptomyza* Wiedemann, 1820
194. *Graptomyza angustimarginata* Brunetti, 1923
Distribution: Assam, Meghalaya.
195. *Graptomyza brevirostris* Wiedemann, 1820
Distribution: Arunachal Pradesh, Chandigarh, Jammu &Kashmir, Punjub, Tamil Nadu.
196. *Graptomyza flavonotata* Brunetti, 1917
Distribution: Himachal Pradesh.
197. *Graptomyza hardyi* Greene, 1949
Distribution: Assam.
198. *Graptomyza longirostris* Wiedemann, 1820
Distribution: Assam.
199. *Graptomyza nigripes* Brunetti, 1913
Distribution: Assam, Meghalaya, Sikkim, West Bengal.
200. *Graptomyza sexnotata* Brunetti, 1908
Distribution: Assam, Meghalaya, Sikkim.
201. *Graptomyza tinctovittata* Brunetti, 1915
Distribution: West Bengal.
202. *Graptomyza ventralis* Wiedemann, 1830
Distribution: Arunachal Pradesh, Assam.

XLIII. Genus *Volucella* Geoffroy, 1762
203. *Volucella basalis* Brunetti, 1907
Distribution: Sikkim, West Bengal.
204. *Volucella discolor* Brunetti, 1908
Distribution: Assam.
205. *Volucella flavoscutella* Sack, 1928
Distribution: Uttarakhand, Uttar Pradesh.
206. *Volucella lividiventris* Brunetti, 1908
Distribution: Sikkim.
207. *Volucella peleterii* Macquart, 1834
Distribution: Assam.
208. *Volucella pellucens* (Linnaeus, 1758)
Distribution: Jammu & Kashmir, Uttarakhand.
209. *Volucella ruficauda* Brunetti, 1907
Distribution: Jammu & Kashmir, Sikkim.
210. *Volucella trifasciata* Wiedemann, 1830
Distribution: Meghalaya, Sikkim.
211. *Volucella ursina* de Meijere, 1904
Distribution: West Bengal.
212. *Volucella varipila* Coe, 1964
Distribution: Jammu & Kashmir.

Tribe Callicerini

XLIV. Genus *Callicera* Panzer, 1809
213. *Callicera christiani* Ghorpade, 1982
Distribution: Himachal Pradesh.
214. *Callicera robusta* Coe, 1964
Distribution: Uttar Pradesh, Uttarakhand.

Tribe Ceriodini

XLV. Genus *Ceriana* Rafinesque, 1815
215. *Ceriana brevis* (Brunetti, 1923)
Distribution: Bihar, Kashmir.
216. *Ceriana compacta* (Brunetti, 1907)
Distribution: Uttar Pradesh, Uttarakhand.
217. *Ceriana dimidiatipennis* (Brunetti, 1923)
Distribution: Jammu & Kashmir.
218. *Ceriana ornatifrons* (Brunetti, 1915)
Distribution: West Bengal.

XLVI. Genus *Monoceromyia* Shannon, 1922
219. *Monoceromyia crux* (Brunetti, 1915)
Distribution: *Uttar Pradesh, Uttarakhand.*
220. *Monoceromyia eumenioides* (Saunders, 1842)
Distribution: *Bihar, Maharastra, Orissa, Tamil Nadu, West Bengal.*
221. *Monoceromyia fenestrata* (Brunetti, 1923)
Distribution: *Sikkim.*
222. *Monoceromyia flavipennis* (de Meijere, 1908)
Distribution: India.
223. *Monoceromyia himalayensis* (de Meijere, 1908)
Distribution: *Sikkim.*
224. *Monoceromyia javana* (Wiedemann, 1824)
Distribution: *Arunachal Pradesh, Assam, Karnataka, West Bengal.*
225. *Monoceromyia multipunctata* (Hull, 1941)
Distribution: *Himachal Pradesh.*
226. *Monoceromyia obscura* (Brunetti, 1907)
Distribution: *Sikkim.*
227. *Monoceromyia patricia* (Brunetti, 1923)
Distribution: India.
228. *Monoceromyia polistoides* (Brunetti, 1923)
Distribution: *Himachal Pradesh.*
229. *Monoceromyia tredecimpunctata* (Brunetti, 1923)
Distribution: *Assam.*
230. *Monoceromyia trinotata* (de Meijere, 1904)
Distribution: *West Bengal.*

XLVII. Genus *Sphiximorpha* Rondani, 1850
231. *Sphiximorpha fruhstorferi* (de Meijere, 1908)
Distribution: Sikkim.
232. *Sphiximorpha fulvescens* (Brunetti, 1915)
Distribution: Uttar Pradesh.
233. *Sphiximorpha triangulifera* (Brunetti, 1913)
Distribution: West Bengal.

Tribe Eristalini

XLVIII. Genus *Eristalinus* Rondani, 1845

- Subgenus *Eristalinus* Rondani,1845

234. *Eristalinus (Eristalinus) aeneus* (Scopoli, 1763)
Distribution: Chandigarh, Dellhi, Gujrat, Punjub, Uttarakhand, Uttar Pradesh.
235. *Eristalinus (Eristalinus) arvorum* (Fabricius, 1787)
Distribution: Tamil Nadu.
236. *Eristalinus (Eristalinus) aurulans* (Wiedemann, 1824)
Distribution: Kerala.
237. *Eristalinus (Eristalinus) haileyburyi* (Nayar, 1968)
Distribution: Uttar Pradesh.
238. *Eristalinus (Eristalinus) lalitai* (Nayar, 1968)
Distribution: Uttar Pradesh.
239. *Eristalinus (Eristalinus) megacephalus* (Rossi, 1794)
Distribution: Dellhi, Punjub, West Bengal.
240. *Eristalinus (Eristalinus) obliquus* (Wiedemann, 1824)
Distribution: West Bengal.
241. *Eristalinus (Eristalinus) polychromata* (Brunetti, 1923)
Distribution: West Bengal.
242. *Eristalinus (Eristalinus) quadristriatus* (Macquart, 1846)
Distribution: India.

243. *Eristalinus (Eristalinus) quinquestriatus* (Fabricius, 1794)
Distribution: Tamil Nadu.
244. *Eristalinus (Eristalinus) sepulchralis* (Linnaeus, 1758)
Distribution: Arunachal Pradesh, Jammu & Kashmir.
245. *Eristalinus (Eristalinus) tabanoides* (Jaennicke, 1867)
Distribution: Dellhi.
246. *Eristalinus (Eristalinus) tarsalis* (Macquart, 1855)
Distribution: India.

- Subgenus *Eristalodes*Mik, 1897

247. *Eristalinus (Eristalodes) paria* (Bigot, 1880)
Distribution: Chandigarh, Himachal Pradesh, Karnataka, Tamil Nadu, Uttarakhand, Uttar Pradesh, West Bengal.
248. *Eristalinus (Eristalodes) taeniops* (Wiedemann, 1818)
Distribution: India.

- Subgenus *Merodonoides* Curran, 1931

249. *Eristalinus (Merodonoides) multifarius* (Walker, 1852)
Distribution: Gujrat, Hariyana, Karnataka, Meghalaya, Maddhya Pradesh, Rajasthan, Tamil Nadu.

XLIX. Genus *Eristalis* Latreille, 1804

- Subgenus *Eoseristalis* Kanervo, 1938

250. *Eristalis (Eoseristalis) albibasis* Bigot, 1880
Distribution: Himachal Pradesh.
251. *Eristalis (Eoseristalis) angustimarginalis* Brunetii, 1923
Distribution: Assam, Meghalaya.
252. *Eristalis (Eoseristalis) arbustorum* (Linnaeus, 1758)
Distribution: Jammu & Kashmir.
253. *Eristalis (Eoseristalis) brevifacies* Coe, 1964
Distribution: Arunachal Pradesh, Assam Jammu & Kashmir, Uttarakhand.
254. *Eristalis (Eoseristalis) cerealis* Fabricius, 1805
Distribution: Tamil Nadu, West Bengal.
255. *Eristalis (Eoseristalis) curvipes* Schiner, 1868
Distribution: India.
256. *Eristalis (Eoseristalis) himalayensis* Brunetti, 1908
Distribution: West Bengal.
257. *Eristalis (Eoseristalis) intricarioides* Brunetti, 1923
Distribution: Sikkim.
258. *Eristalis (Eoseristalis) suturalis* Brunetti, 1923
Distribution: Assam.

- Subgenus *Eristalis* Latreille, 1804

259. *Eristalis (Eristalis) tenax* (Linnaeus, 1758)
Distribution: Chandigarh, Himachal Pradesh, Jammu & Kashmir, Punjub, Uttarakhand.

L. Genus *Kertesziomyia* Shiraki, 1930

- Subgenus *Kertesziomyia* Shiraki, 1930

260. *Kertesziomyia (Kertesziomyia) cyanea* (Brunetti, 1913)
Distribution: West Bengal.

- Subgenus *Pseuderistalis* Shiraki, 1930

261. *Kertesziomyia (Pseuderistalis) fascipennis* (Thompson, 1975)
Distribution: *Assam.*
262. *Kertesziomyia (Pseuderistalis) nigra* (Wiedemann, 1824)
Distribution: West Bengal.

LI. Genus *Phytomia* Guerin-Meneville, 1833

- Subgenus *Phytomia* Guerin-Meneville, 1833

263. *Phytomia (Phytomia) aesymnus* (Walker, 1849)
Distribution: India.
264. *Phytomia (Phytomia) argyrocephala* (Macquart, 1842)
Distribution: Andhra Pradesh, Bihar, Gujrat, Kerala, Karnataka, Madhya Pradesh, Tamil Nadu, West Bengal.
265. *Phytomia (Phytomia) chrysopyga* (Wiedemann, 1819)
Distribution: Assam, Meghalaya, Sikkim.
266. *Phytomia (Phytomia) errans* (Fabricius, 1787)
Distribution: Andhra Pradesh, Arunachal Pradesh, Bihar, Kerala, Karnataka, Meghalaya, Tamil Nadu, West Bengal.
267. *Phytomia (Phytomia) zonata* (Fabricius, 1787)
Distribution: Assam, Meghalaya, Sikkim, Tamil Nadu, Uttarakhand, West Bengal.

- Subgenus *Dolichomerus* Macquart, 1850

268. *Phytomia (Dolichomerus) crassa* (Fabricius, 1787)
Distribution: Andhra Pradesh, Assam, Goa, Karnataka, Jharkhand, Kerala, Karnataka, Meghalaya, Maharastra, Madhya Pradesh, Sikkim, Tamil Nadu,Uttarakhand West Bengal.

LII. Genus *Mallota* Meigen, 1822

- Subgenus *Mallota* Meigen, 1822

269. *Mallota (Mallota) curvigaster* (Macquart, 1842)
Distribution: Bihar, Rajasthan, West Bengal.
270. *Mallota (Mallota) orientalis*(Wiedemann, 1824)
Distribution: Sikkim, West Bengal.
271. *Mallota (Mallota) rufipes* Brunetti, 1913
Distribution: West Bengal.
272. *Mallota (Mallota) varicolor* (Walker, 1856)
Distribution: Meghalaya, West Bengal.
273. *Mallota (Mallota) vilis* (Wiedemann, 1830)
Distribution: India.

LIII. Genus *Mesembrius* Rondani, 1857

- Subgenus *Mesembrius* Rondani, 1857

274. *Mesembrius (Mesembrius) bengalensis* (Wiedemann, 1819)
Distribution: Andhra Pradesh, Assam, Bihar, Chandigarh, Gujrat, Karnataka, Punjub, Tamil Nadu, West Bengal.
275. *Mesembrius (Mesembrius) brunetti* (Sodhi & Singh, 1991)
Distribution: India.
276. *Mesembrius (Mesembrius) quadrivittatus* (Wiedemann, 1819)
Distribution: Andhra Pradesh, Bihar, Chandigarh, Gujrat, Karnataka, Madhya Pradesh, Orissa, Tamil Nadu, West Bengal.
277. *Mesembrius (Mesembrius) sharpi* (Kohli, Kapoor & Gupta, 1988)
Distribution: Uttarakhand.
278. *Mesembrius (Mesembrius) tuberculatus* (Brunetti, 1907)
Distribution: West Bengal.
279. *Mesembrius (Mesembrius) vestitus* (Wiedemann, 1821)
Distribution: Assam, West Bengal.

LIV. Genus *Pararctophila* Herve-Bazin, 1914

280. *Pararctophila bengalensis* Kohli, Kapoor & Gupta, 1988
Distribution: West Bengal.
281. *Pararctophila oberthuri* Herve-Bazin, 1914
Distribution: India.

LV. Genus *Pseudovolucella* Shiraki, 1930

282. *Pseudovolucella eristaloides* Brunetti, 1913
Distribution: *Assam.*
283. *Pseudovolucella himalayensis* Brunetti, 1907
Distribution: Sikkim.
284. *Pseudovolucella hingstoni* Coe, 1964
Distribution: Sikkim.
Tribe Merodontini

LVI. Genus *Azpeytia* Walker, 1865

285. *Azpeytia bifascia* Brunetti, 1907
Distribution: Assam.

LVII. Genus *Eumerus* Meigen, 1822

286. *Eumerus aeneithorax* Brunetti, 1915
Distribution: Himachal Pradesh

287. *Eumerus albifrons* Walker, 1852
Distribution: Madras.
288. *Eumerus ammophilus* Paramonov, 1926
Distribution: Jammu & Kashmir.
289. *Eumerus argentipes* Walker, 1861
Distribution: Assam.
290. *Eumerus aurifrons* (Wiedemann, 1824)
Distribution: Bihar, Jammu & Kashmir., Karnataka, Maharastra, Punjub, Tamilnadu, West Bengal.
291. *Eumerus halictoides* Brunetti, 1915
Distribution: Himachal Pradesh, West Bengal.
292. *Eumerus kashmerensis* Kohli, Kapoor & Gupta, 1988
Distribution: Kashmir.
293. *Eumerus nepalensis* Brunetti, 1908
Distribution: Himachal Pradesh, Jammu & Kashmir.
294. *Eumerus nicobarensis* Schiner, 1868
Distribution: Andaman & Nicobar Island.
295. *Eumerus perpensus* Brunetti, 1917
Distribution: Himachal Pradesh.
296. *Eumerus perplexus* Brunetti, 1917
Distribution: Himachal Pradesh.
297. *Eumerus pulcherrimus* Brunetti, 1915
Distribution: West Bengal.
298. *Eumerus pulverulentus* Brunetti, 1923
Distribution: Kashmir, Rajasthan.
299. *Eumerus quadrinotatus* Doesburg, 1955
Distribution: Jammu & Kashmir.
300. *Eumerus rufoscutellatus* Brunetti, 1913
Distribution: West Bengal.
301. *Eumerus sexvittatus* Brunetti, 1915
Distribution: Uttar Pradesh.

LVIII. Genus *Merodon* Meigen, 1803
302. *Merodon albifasciatus* Macquart, 1842
Distribution: India.

Tribe Milesiini

LIX. Genus *Blera* Billberg, 1820
303. *Blera himalaya* Thompson, 2000
Distribution: India.

LX. Genus *Criorhina* Meigen, 1822
304. *Criorhina bomboides* Hull, 1944
Distribution: Assam.
305. *Criorhina crioarctos* Hull, 1944
Distribution: Arunachal Pradesh.
306. *Criorhina excavata* Curran, 1929
Distribution: Uttar Pradesh.
307. *Criorhina imitator* Brunetti, 1915
Distribution: Kashmir, Uttar Pradesh.
308. *Criorhina pallidipes* Curran, 1929
Distribution: Uttar Pradesh.
309. *Criorhina pallipilosa* Hull, 1944
Distribution: Kashmir.
310. *Criorhina rubropilosa* Hull, 1950
Distribution: Kashmir.
311. *Criorhina simioides* (Brunetti, 1908)
Distribution: India.
312. *Criorhina spinitarsis* Curran, 1929
Distribution: Uttar Pradesh.
313. *Criorhina tripilosa* Coe, 1964
Distribution: Uttar Pradesh.
314. *Criorhina vivida* Brunetti, 1923
Distribution: Kashmir.

LXI. Genus *Lycastris* Walker, 1857
315. *Lycastris albipes* Walker, 1857
Distribution: Himachal Pradesh, Uttarakhand.
316. *Lycastris austeni* Brunetti, 1923
Distribution: West Bengal.
317. *Lycastris flavohirta* Brunetti, 1907
Distribution*:* Himachal Pradesh, West Bengal.
318. *Lycastris griseipennis* Coe, 1964
Distribution: Assam.

LXII. Genus *Matsumyia* Shiraki, 1949
319. *Matsumyia dentata* (Brunetti, 1908)
Distribution: Himachal Pradesh.

LXIII. Genus *Milesia* Latreille, 1804
320. *Milesia balteata* Kertesz, 1901
Distribution: Assam, Sikkim.
321. *Milesia brunneonigra* Hippa, 1990
Distribution: West Bengal.
322. *Milesia caesarea* Hippa, 1990
Distribution: Tamil Nadu.
323. *Milesia cinnamomea* Hippa, 1990
Distribution: Karnataka.
324. *Milesia cretosa* Hippa, 1990
Distribution: Meghalaya.
325. *Milesia ferruginosa* Brunetti, 1913
Distribution: West Bengal.
326. *Milesia illustris* Hippa, 1990
Distribution: West Bengal.
327. *Milesia mima* Hippa, 1990
Distribution: Tamil Nadu.
328. *Milesia semifulva* de Meijere, 1904
Distribution: Assam, West Bengal.
329. *Milesia sexmaculata* Brunetti, 1915
Distribution: Kerala.
330. *Milesia variegata* Brunetti, 1908
Distribution: Assam, Sikkim.
331. *Milesia verticalis* Brunetti, 1923
Distribution: Assam.

LXIV. Genus *Temnostoma* Lepeletier & Serville, 1828
332. *Temnostoma nigrimanus* Brunetti, 1915
Distribution: Uttar Pradesh.

LXV. Genus *Calcaretropidia* Keiser, 1971
333. *Calcaretropidia triangulifera* (Keiser, 1958)
Distribution: India.

LXVI. Genus Syritta Lepeletier & Serville, 1828
334. *Syritta christiani* (Sodhi & Singh, 1991)
Distribution: Uttar Pradesh.
335. *Syritta fasciata* (Wiedemann, 1830)
Distribution: Gujrat, Uttarakhand.
336. *Syritta indica* (Wiedemann, 1824)
Distribution: Madras, Pondicherry, West Bengal.
337. *Syritta orientalis* Macquart, 1842
Distribution: Tamil Nadu.
338. *Syritta pipiens* (Linnaeus, 1758)
Distribution: Himachal Pradesh, Jammu & Kashmir, Punjub, Uttarakhand.
339. *Syritta proximata* Lyneborg & Barkemeyer, 2005
Distribution: Karnataka.
340. *Syritta stylata* Lyneborg & Barkemeyer, 2005
Distribution: Kerala, Karnataka, Madhya Padesh, Tamilnadu.

LXVII. Genus *Chalcosyrphus* Curran, 1925

- Subgenus *Syrittoxylota* Hippa, 1978

341. *Chalcosyrphus (Syrittoxylota) annulatus* (Brunetti, 1913)
Distribution: West Bengal.

- Subgenus *Xylotina* Hippa, 1978

342.*Chalcosyrphus (Xylotina) ornata* (Brunetti, 1915)
Distribution: Uttar Pradesh.

- Subgenus *Cheiroxylota* Hull, 1949

343.*Chalcosyrphus (Cheiroxylota) dimidiata* (Brunetti, 1923)

Distribution: Uttarakhand.

LXVIII. Genus *Xylota* Meigen, 1822

- Subgenus *Brachypalpoides* Hippa, 1978

344. *Xylota (Brachypalpoides) cupreiventris* Brunetti, 1923
Distribution: West Bengal.
345. *Xylota (Brachypalpoides) discolor* (Hippa, 1985)
Distribution: Nagaland.
346. *Xylota (Brachypalpoides) dives* (Brunetti, 1908)
Distribution: Nagaland.
347. *Xylota (Brachypalpoides) plumipes* (Hippa, 1985)
Distribution: Assam.

- Subgenus *Xylota* Meigen, 1822

348. *Xylota (Xylota) auronitens* Brunetti, 1908
Distribution: Assam.
349. *Xylota (Xylota) bistriata* Brunetti, 1915
Distribution: Kerala.
350. *Xylota (Xylota) carbonaria* Brunetti, 1923
Distribution: Tamil Nadu.
351. *Xylota (Xylota) cuprina* Bigot, 1885
Distribution: Himachal Pradesh.
352. *Xylota (Xylota) nursei* Brunetti, 1923
Distribution: Himachal Pradesh.
353. *Xylota (Xylota) penicillata* Brunetti, 1923
Distribution: Meghalaya

LXIX. Genus Palumbia Rondani, 1865

- Subgenus Korinchia Edwards, 1919

354. Palumbia (Korinchia) fasciatus (Macquart, 1834)
Distribution: India
355. Palumbia (Korinchia) rufa (Herve-Bazin, 1922)
Distribution: Madras.

The main objective of this article was to prerpare an updated checklist [68-69], including the latest synonimisation and sub genus status as well the current nomenclature pattern which has not been done till now The analysis throughout India divulges that family Syrphidae is extensively distributed all over the country in spite of that different landscape and topographical pattern at different fragments of the country. Their high degree of resource utilisation capability and survival rate has made them to acquire large scale of habitats. Our present check list includes 355 species of Hover flies along 69 genera across the India. According to the cladogram (Figure 2) we have depicted the evolutionary relationship of this family with the other families of order Diptera. Among the 3 subfamilies of family Syrphidae the Eristalinae subfamily has shown the maximum amount of distribution while the subfamily Microdontinae has shown the limited distribution in term of available species across India (Figure 3), whereas among the 14 tribes the tribe Syrpini has shown the maximum abundance (Figure 4).

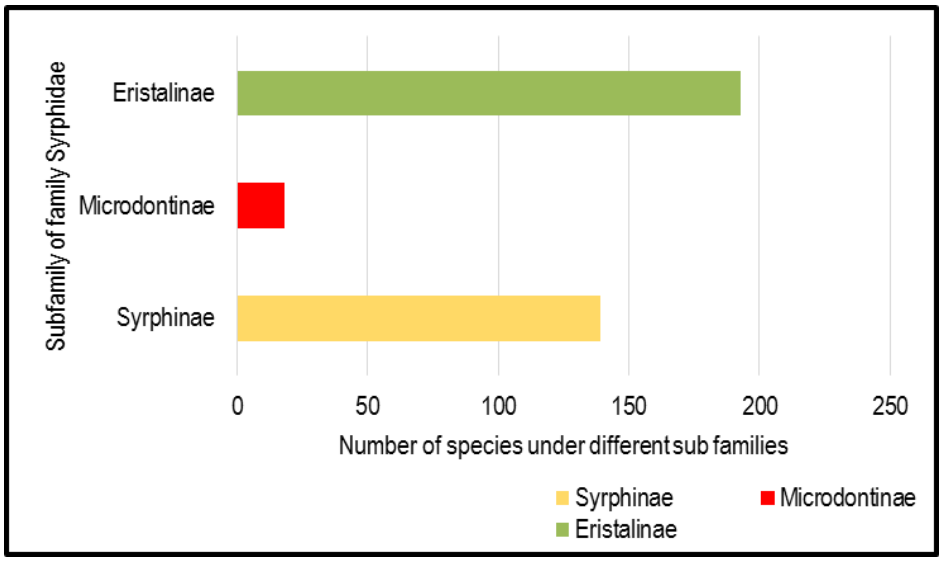

Fig 3: Distributional pattern of the subfamilies across India

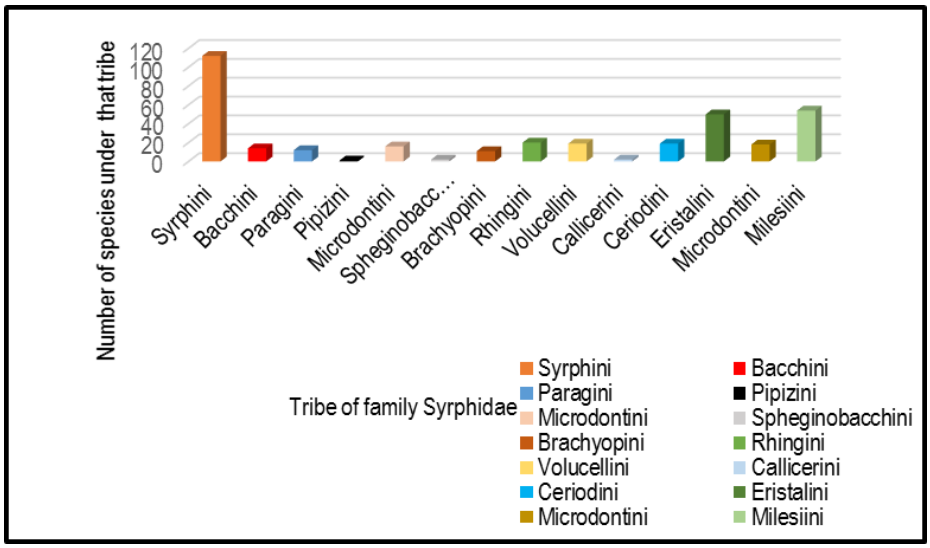

Fig 4: Distributional pattern of the tribes across India

Hover flies are widely distributed throughout India among which the eastern region has shown the maximum abundance of Hover flies while western part of India has shown the minimum (Figure 5) Among the States West Bengal has shown the maximum abundance of Hover flies while Goa has shown the minimum distributional abundance (Figure 6). Among the 69 genera *Eristalinus* Rondani, 1845 has shown maximum dominance while *Azpeytia* Walker, 1865 has shown the minimum occurance (Figure 7)

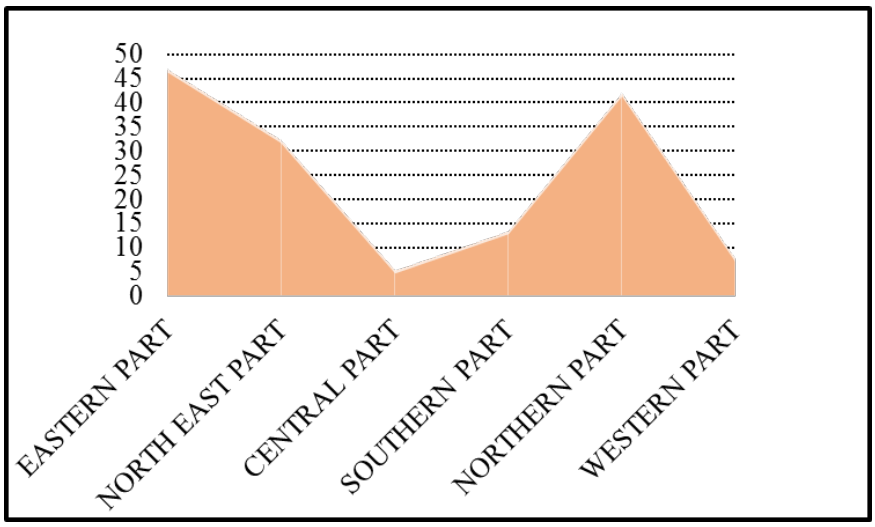

Fig 5: Percentile representation of Hover flies across different parts of India

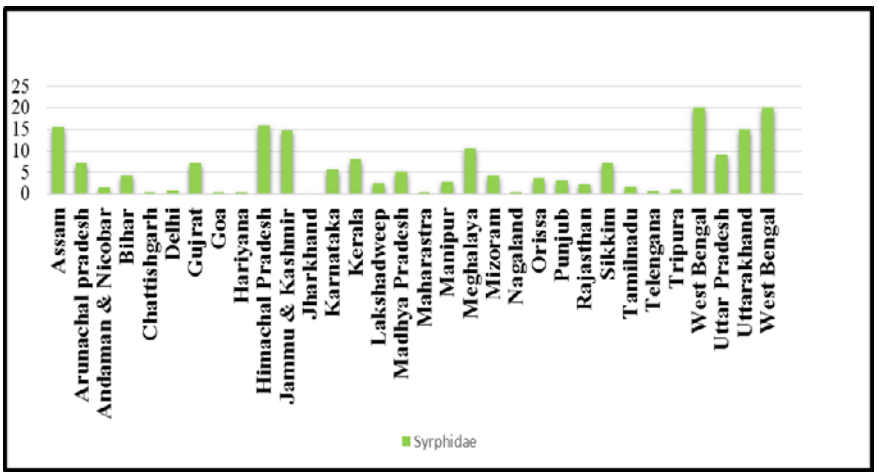

Fig 6: Distributional pattern of Family Syrphidae across the various States and Union territories of India

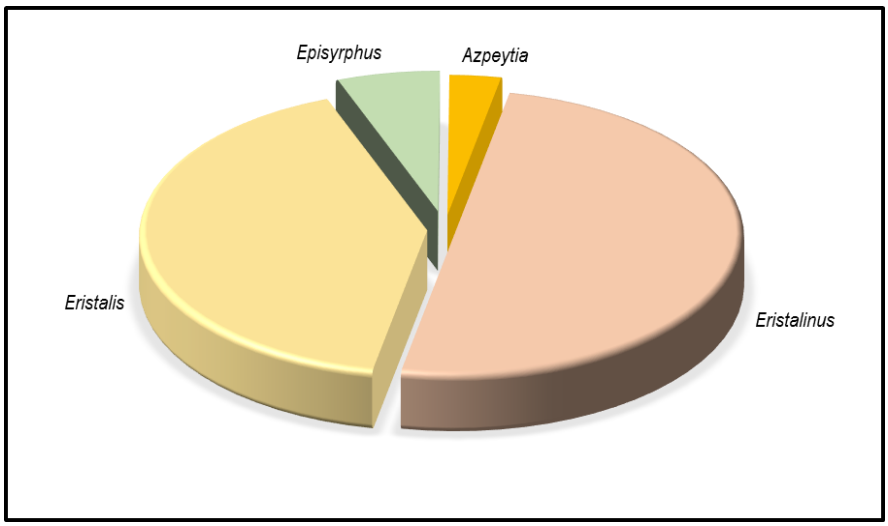

Fig 7: Percentile representation of the highest and rare occurring genus in India

However it has been found that some species have shown restricted pattern of distribution due to their restricted choices of resources and climatic parameters while some species has shown wide distribution for their greater resource utilisation capacity and advanced rate of adaptability. There are 2 species which were reported in earlier literature[66] but due to

lack of proper literature documentation they have not been documented in this current and updated checklist, namely, *Syrphus agraensis* Nayar & Nayar 1965, *Scavea lunata* (Wiedemann, 1830). The uniqueness of the current study lies in the fact that the study includes the latest nomenclature pattern and sub genus status under the family Syrphidae which is the first ever reported work in this family of Indian Hoverflies. This study also highlights their classification based on the present systematics and classification scheme. This study is a complete one regarding the distributional pattern of syrphid fauna.

The future scope of these study remains in understanding their genomics and DNA profiling and correlating it with their distributions across India. The distributional scenario throughout the country may indicate towards the gap area of the research related to this flies (Figure 8-9) which suggests the requirement of more extensive surveys particularly in the western and southern part of the India (Figure 10).

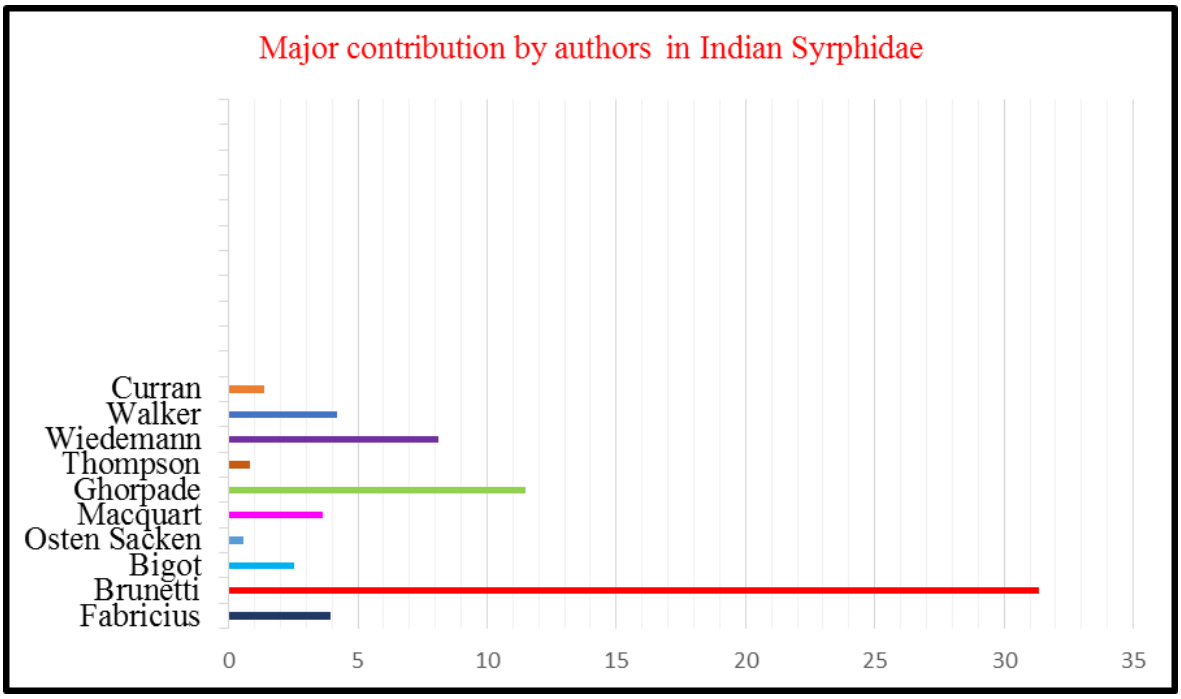

Fig 8: Scenario of the author's major contribution in the arena of Indian Hoverflies

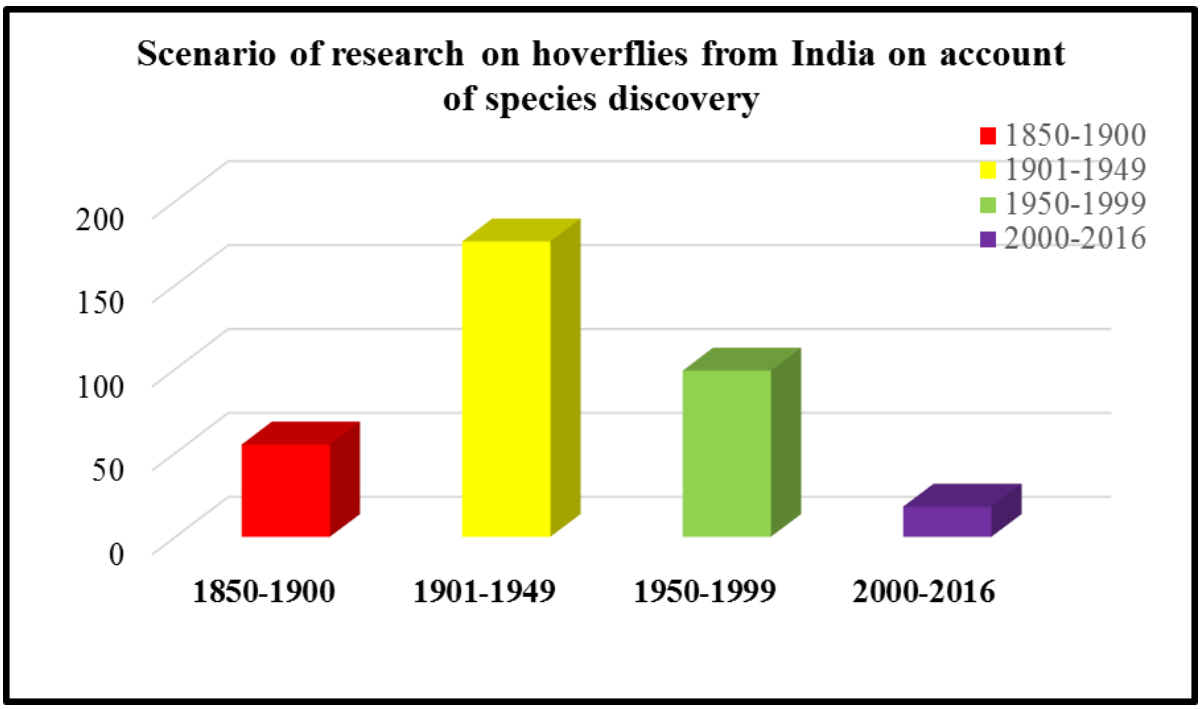

Fig 9: Scenario of research on hoverflies from India on account of species discovery

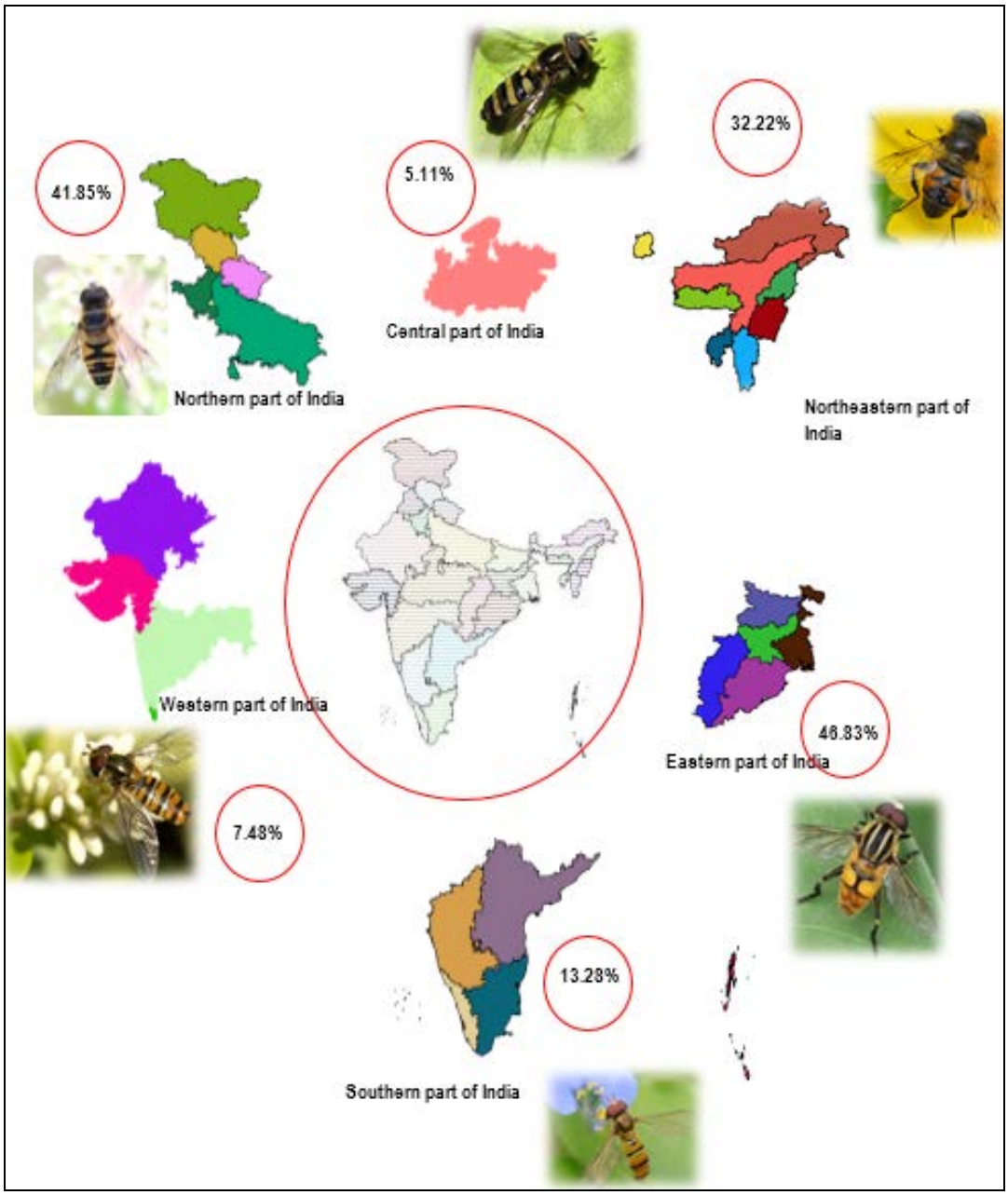

Fig 10: Distributional scenario of Hover flies across India

Hover flies plays a pivotal role of biological monitors for environmental change [10]. For all these reasons of popular and scientific interests, environmental services and economic welfare, hover flies are worthy of our attention. Although great advances have been made, much remains unknown. This is not only includes discovering new species or finding species in previously unknown sites: it includes natural history, biology, ecology, molecular phylogeny and evolution, because many details concerning their life cycles, breeding sites, larval stages, habits, behaviour patterns, preferences, tolerances and population trends are lacking. The potential for new discoveries is high, adding to the list of features making hoverflies attractive, important and fascinating to study. Nonetheless, across the globe it is difficult not to be concerned about the levels of change to hover fly habitats and for the losses and extinctions that such changes threaten. On the other hand, we are optimistic about ongoing progress in research and the acquisition of new knowledge on hoverflies because as we know only too well, once acquainted with hover flies, as no one can resist the lure of this curiously energetic little insects, so richly endowed in colors, beneficial qualities, survival mechanisms and biological phenomena. The future scope of this study lies in understanding the impact of environmental change on the distribution and diversity of the Syrphid flies.

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