



IJREB

ISSN 2321-743X

International Journal of Research in  
**Engineering and Bioscience**

Volume 2 Issue 6 (Pages 79- 85)

Journal home page: [www.ijreb.org](http://www.ijreb.org)

## **A SURVEY OF SEASONAL OCCURRENCE OF HOVERFLIES (DIPTERA: SYRPHIDAE) IN GORAKHPUR, U.P., INDIA**

**Raina N. Samuel and I. J. Dass**

Department of Zoology, St. Andrew's College, Gorakhpur- 273001, U. P. India

### **ABSTRACT**

Adult syrphids are frequent flower visitors and pollinators of major significance. Larvae of subfamily Syrphinae are predacious and feed on soft-bodied aphididae which are considered to be the most important family of crop pests on a world scale. Syrphids are potentially good bioindicators as they inhabit wide range of habitat. This faunistic study of Gorakhpur Syrphidae presents 9 genera viz. *Ischiodon scutellaris* (Fabricius), *Syrphus* Sp., *Eupeodes (Metasyrphus)* Sp., *Episyrphus balteatus* (De Geer), *Allograpta* Sp., *Sphaerophoria* Sp., *Betasyrphus* Sp., *Helophilus* Sp. and *Eristalinus* Sp.

**KEYWORDS:** syrphids, pollinators, Syrphidae.

## INTRODUCTION

Adults of the family Syrphidae, commonly called flower or hover flies, are rather conspicuous members of the terrestrial ecosystem. Their size ranges from 4 mm to over 25 mm and their coloration from bright yellow or orange to dull dark black or gray with a few iridescent forms. Many syrphid flies are Batesian mimics of stinging Hymenoptera. Flower flies, as their name implies, are abundant on flowers, which are used as mating sites and energy sources. Only the microdontines are not found associated with flowers, but rather with their ant hosts.

The economic importance of flower flies is great. Adults are pollinators of major significance. In some agroecosystems (orchards), they out-perform native bees in pollinating crops (Thompson, 1998). Larvae of the subfamily Syrphinae are predacious and feed on soft-bodied aphididae which are considered to be the most important family of crop pests on a world scale (Van Enden, 1972).

Syrphidae represents one of the largest families of Diptera. Their widespread distribution, availability of excellent taxonomic keys for species identification and differences in environmental requirements of larvae are features that promote Syrphidae as potentially good bioindicators.

Flower flies (Insecta, Diptera: Syrphidae), a large world-wide group of

some 6,000 known species, placed into some 300 distinctive groups (Thompson 2010). The last revision of the Syrphidae species-groups was done more than 60 years ago (Hull 1949). Three subfamilies are currently recognized (Eristalinae, Microdontinae and Syrphinae).

Bigot (1892) published a catalogue of the oriental Diptera, in which he listed the Indian syrphid flies. Keiser (1958) published notes on 56 species belonging to 18 genera of subfamily Eristalinae from Ceylon. Coe (1964) identified 127 species alongwith 28 new ones under 29 genera from Nepal. Patel (1969) described diagnostic characters of 13 species of syrphids from Gujrat (India). Vockeroth (1969) revised 37 genera of the tribe Syrphini of the world, giving their descriptions distribution and synonymy. Knutson *et al.* (1975) published the synonymic catalogue, which included 771 species under 84 genera from the Oriental region. Ghorpade (1979) studied 13 species under five genera of the tribe Eristalini from India. Kapoor and Kohli (1985) collected and identified 260 species under 63 genera and eight tribes from India. Datta and Chakraborti (1985, 1986a,b) identified 68 species of the family Syrphidae from various parts of India. Agarwal (1987) described nine species of aphidophagus syrphids from the Northeast India. Kumar and Kapoor (1992) collected and identified 29 species giving descriptions

of the four new ones of the tribe Syrphini from the East Punjab (India).

This paper presents, preliminary faunistic list of Syrphid fauna of Gorakhpur and includes 9 genera which is sampling of the more abundant species that hover in this area.

Diagnostic characteristics of syrphids are as follows: With a few exceptions, hoverflies are distinguished from other flies by a spurious vein, located parallel to the fourth longitudinal wing vein. Eyes holoptic (touching above the antennae) in males, dichoptic in females (moderately or broadly separated), but in some species, narrowly or broadly separated in males; and usually bare, but in some species with short sparse or dense hairs; Eyes usually unicolorous, but in some species with dark spots or markings. Vertex flat or slightly depressed; Ocellar triangle prominent with three ocelli. Legs usually slender and simple but sometimes (in males) femur and/or tibia swollen; tibia, tarsus flattened or dilated; hind coxa or trochanter sometimes with a minute spur or spines. Abdomen varying in shape, usually oval to suboval, elongate or petiolate in some genera but never with bristles. The male genitalia are almost always asymmetrical, usually twisted to the right.

#### **STUDY AREA AND METHOD**

The study was conducted in Gorakhpur, Uttar Pradesh (The district of

Gorakhpur lies between Lat. 26°13'N and 27°29'N and Long. 83°05'E and 83°56'E) between October, 2011 to March, 2012. This paper encompasses syrphid genera collected from 10 acre lush green college campus located in the heart of the city. The flowering season in this part of the country starts in the month of November and lasts up to April, reaching a peak in March.

In the present investigation traditional methods were employed for the collection of syrphids; hand nets and yellow water traps were used for the adults and immature stages were collected by inspecting the aphid infested plants.

#### **RESULTS AND DISCUSSION**

Syrphids first appeared in the month of November and remained active till the mid of April. The climate during the period of study fluctuated a great deal, the months of October and November are moderately warm, sunny and almost not at all windy during these two months the adult syrphids were collected from the garden and sampled. The months of December and January were quite cold and the last week of December and first three weeks of January the weather was bit hostile for the adult syrphids, but immature stages were abundantly present amidst the prey colonies. They were collected and brought in the laboratory and reared up to maturity and then identified.

List of syrphids collected is given in table. 1 and identified as per the identification

keys given by Vockeroth (1969).

**Table 1. List of syrphids collected**

S.N.	Syrphid	Sub Family	Larval feeding Habit
1.	<i>Episyrphus balteatus (De Geer)</i>	Syrphinae	aphidophagous
2.	<i>Syrphus Sp.</i>	Syrphinae	aphidophagous
3.	<i>Betasyrphus Sp.</i>	Syrphinae	aphidophagous
4.	<i>Ischiodon scutellaris (Fabricius)</i>	Syrphinae	aphidophagous
5.	<i>Eupeodes (Metasyrphus) Sp.</i>	Syrphinae	aphidophagous
6.	<i>Allograpta Sp.</i>	Syrphinae	aphidophagous
7.	<i>Sphaerophoria Sp.</i>	Syrphinae	aphidophagous
8.	<i>Helophilus Sp.</i>	Eristalinae	Saprophagous
9.	<i>Eristalinus Sp.</i>	Eristalinae	Saprophagous

### Subfamily Syrphinae

The larvae of this Subfamily are primarily aphid predators. Adults have bare humeri (postpronotal lobes), though these are often hidden by the concave posterior of their close fitting heads.

*Episyrphus balteatus* (De Geer) (Plate – 1. i) is a Batesian mimic ( harmless but closely resembling a dangerous or distasteful model ) in this case having the appearance of a solitary wasp. It is just one of a large number of hoverflies (family Syrphidae) with narrow bodies, and with abdomens barred with black and yellow – though in this case the yellow tends towards orange.

*Syrphus Sp.* (Plate – 1. ii) Small to medium sized, robust species with mesonotum yellowish- or greyish-pollinose laterally and tergites with transverse yellow fasciae or pairs of maculae. Eye usually bare, rarely sparsely or densely pilose. Scutum shining or subshining, aeneous to black,

sometimes with faint, dark, narrow median and submedian vittae; sides of scutum and all of pleura usually slightly but distinctly yellowish- or greenish-grey pollinose.

*Betasyrphus Sp.* (Plate – 1.iii) have face densely gray pollinose; eye densely and uniformly pilose; scutum black, with at most a poorly defined dull yellow pollinose lateral vitta; katepisternal pile patches separated posteriorly; abdomen margined; metasternum bare; metaepisternum bare; abdominal maculae yellow or grayish, always very densely pollinose

*Ischiodon scutellaris (Fabricius)* (Plate – 1. iv) Face in lateral view not receding below to oral cavity. Eyes glabrous. Antenna with segment 3 only twice as long as broad. Abdomen flat or slightly convex dorsally; slightly, but distinctly margined on tergites 2 to 5. Lateral mesonotal margin bright yellow, distinctly demarcated from dark dorsum. Lower lobe of squama bare

above. Anterior flat portion of mesopleuron bare, with only microscopic hairs and not with long hairs. Metasternum bare. Sternopleural hair patches separated posteriorly. Abdominal tip in ventral view symmetrical in female, asymmetrical in male.

*Eupeodes (Metasyrphus) Sp.* (Plate – 1. v) has face entirely yellow or with brown to black medial vitta; metasternum pilose; vein R4+5 nearly straight; and male genitalia small, scarcely apparent from above.

*Allograpta Sp.* (Plate – 1. vi) This may be recognized by the generic characters - yellow thoracic stripes and abdominal crossbands; on the fourth and fifth segments, four longitudinal, oblique, yellow stripes or spots; and yellow face lacking a complete median stripe. Eyes of the male are holoptic, those of the female dichoptic.

*Sphaerophoria Sp.* (Plate – 1. vii) Face much more produced than frons; wings immaculate, apart from yellowish stigma; abdomen narrow, elongated or clubbed, in males often longer than wings.

#### **Subfamily – Eristalinae**

A distinct group of generally common species having a cup-shaped vein at the apex of the wing and black setulae at the base of the hind femur.

*Helophilus Sp.* (Plate – 1. viii) Wing length 6.5-13 mm. Medium-sized to large

black or black and yellow flies. Occur in various situations. The "rat-tailed" larvae are found in accumulations of foul or stagnant water, also in liquid animal-manure, and in moist decaying sewage.

*Eristalinus* sp. (Plate – 1. ix) have very distinctive eye marking in the form of spots or banding, though these features may fade on some preserved specimens. Most are stout flies, and are nimble flyers, as compared to other hoverfly species.

#### **CONCLUSION**

The hoverflies are important member of terrestrial ecosystems and play an important role in bio-control and pollination. Very recently syrphids are being looked upon as potentially good bioindicators. Thus a knowledge of seasonal occurrence of different syrphid flies would be of great importance for making effective bio-control strategies and using them as index of environmental health.

#### **REFERENCES**

- Agarwal, B.K., 1987. Some aphidophagous syrphids and their natural food range from North-east India. *J. Aphidology*, 1: 18–22.
- Bigot, J.M.F., 1892. Catalogue of Diptera of Oriental region. *J. Asiatic Soc. Bengal.*, 2: 228–36.
- Coe, R.L., 1964. Identifications of syrphids from Ceylon. *Proc. R. Ent. Soc. London*, (B) 26: 13–21.
- Datta, M. and M. Chakarborti, 1985. Insecta: Diptera in fauna of Namdapha:

- Arunchal Pradesh. *Rec. Zool. Surv. India*, 82: 231–52.
- Datta, M. and M. Chakarborti, 1986a. New records of Syrphidae from Darjeeling (West Bengal) and Sikkim, India with description of *Meliscaeva darjeelingensis* sp. Nov. (Diptera). *Opuse. Zool. Flumin*, 6: 1–19.
- Datta, M. and M. Chakarborti, 1986b. On collection of flower flies (Diptera: Syrphidae) from South India. *Rec. Zool. Surv. India*, 83: 53–67.
- Ghorpade, K.D., 1979. *A Review of Oriental Syrphidae. Proc Workshop on Advances in Insect Taxonomy*, 1–106. Delhi.
- Hull, F. M. 1949 The Morphology and inter-relationships of genera of syrphid flies, recent and fossil. *Transactions of Zoological Society* 26:257 – 408 doi:10.1111/j.1096-3642.1949.tb00224.x
- Kapoor, V.C. and V.K. Kohli, 1985. Zoogeography of Indian Syrphidae (Diptera). *J. Ent. Res.*, 9: 223–34.
- Keiser, H.P., 1958. Taxonomy of Eristalinae of Ceylon. *Entomologist's Mon. Mag.*, 89: 20–35.
- Knutson, I.V., F.C. Thompson and J.R. Vockeroth, 1975. Family Syrphidae: A catalogue of the Oriental Region, 2: 307–374.
- Kumar, A. and V.C. Kapoor, 1992. Collection and identification of hover flies of East Punjab (India). *J. Insect Sci.*, 5: 68–76.
- Okuno, T., 1967. Population studies of aphidophagous syrphids in the cotton fields in Nagasaki University. *Sci. Bull.*, 13: 11–22.
- Patel, J.R., 1969. Syrphids of Gujrat and their hymenopterous parasites. *Indian J. Entomol.*, 31: 86–90.
- Telford, H.S., 1970. *Eristalis* (Diptera) from America, North of Mexico. *Ann. Ent. Soc. America*, 85: 1201–9.
- Thompson, F. C. Rotheray, G. 1998 Family Syrphidae. Pp. 81-139. In Papp, L. Darvas, B. (Eds), *Contributions to a manual of Palaearctic Diptera (with special reference to flies of economic importance)*. Vol. 3, Higher Brachycera. Science Herald, Budapest.
- Thompson, F. C. 2010 Syrphidae. Database, Systema Dipterorum, Version 1.0, <http://www.diptera.org/>
- Vockeroth J.R. 1969 A revision of the genera of the Syrphini (Diptera: Syrphidae). *Memoirs of the Entomological Society of Canada* 62: 1 –176.
- Van Enden, H. F. (Ed.) 1972. *Aphid Technology*. Academic press London.



*Episyrphus balteatus*

(i)



*Syrphus Sp.*

(ii)



*Betasyrphus sp.*

(iii)



*Ischiodon scutellaris*

(iv)



*Metasyrphus sp.*

(v)



*Allograpta sp.*

(vi)



*Sphaerophoria sp.*

(vii)



*Helophilus sp.*

(viii)



*Eristalinus sp.*

(ix)

Plate – 1