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Diversity of Bee-flies (Bombayliidae : Diptera) in India

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Diversity of Bee-flies (Bombyliidae : Diptera) in India

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INTRODUCTION

The bee-flies or Bombyliidae constitute one of the large and diverse families of brachycerous diptera. At present there are around 4547 species known worldwide with 1416 species known from the Afrotropical region, 1337 from the Palaearctic, 971 from the Nearctic, 472 from the Neotropical, 257 from the Oriental and 435 from the Australasian/Oceanian region {27 Patria Ignota} (Evenhuis & Greathead, 1999).

In general, the bombyliids are colourful flies with dense pubescence and marbled wings, and occur over a wide variety of habitats. From the dense flowering shrubs on the western Himalayas to the hot and arid areas of the Thar desert and also from the thick forests of northeast India to the inter-tidal zones of the Andaman Islands, they seem to occupy all the ecological niches. Most species have compact form, both in abdomen (which is usually broad and short) and thorax. Wings show highly variable venation and may be hyaline, dark brown, or show a beautiful pattern of spots, infuscations and iridescence (Hull, 1973). Some of these flies mimic bees and like bees have fine, rather long vestiture, or are sometimes composed of dense plush like pile. Again some species are exceptionally long, slender, bare and wasp like in appearance.

Adult bee-flies are nectar feeders and females are obligatory pollen feeders, obtaining pollen from anthophilous plants and are often the major pollinators of many flowering plants (Evenhuis and Greathead, 1999). Immature stages are parasitic or hyper-parasitic on a host of insects. Some species are important natural enemies of major pests including locusts, grasshoppers, armyworms, slug, nettle caterpillars and tsetse flies (Evenhuis and Greathead, 1999). Hence, bee-flies are of considerable economic importance both as pollinators and biological pest controllers and an important group for biodiversity studies.

Bowden, 1975 comprehensively catalogued the Oriental Bombyliidae and that provided the basics. Thereafter Evenhuis and Greathead, 1999, brought in nomenclatural changes which have been followed here. The present article is an overview of the diversity and distribution of the Indian species of the family Bombyliidae from the available distributional records known so far (updated till Jan. 2006). The distribution of the Indian bombyliids is dealt here as per the biogeographic regions of India (Alfred *et al., 2001*) and is also indicative of the habitats where they thrive.

Morphology of an adult bee-fly

Traditionally, the features used for classifying the Bombylliidae were chiefly details of wing venation, the head and antennae, and only recently have the usefulness of male and female genitalia been realised for taxonomic study. A general account of the bee-fly morphology has been described after Greathead and Evenhuis (2001). (Figs. A, B, C.)

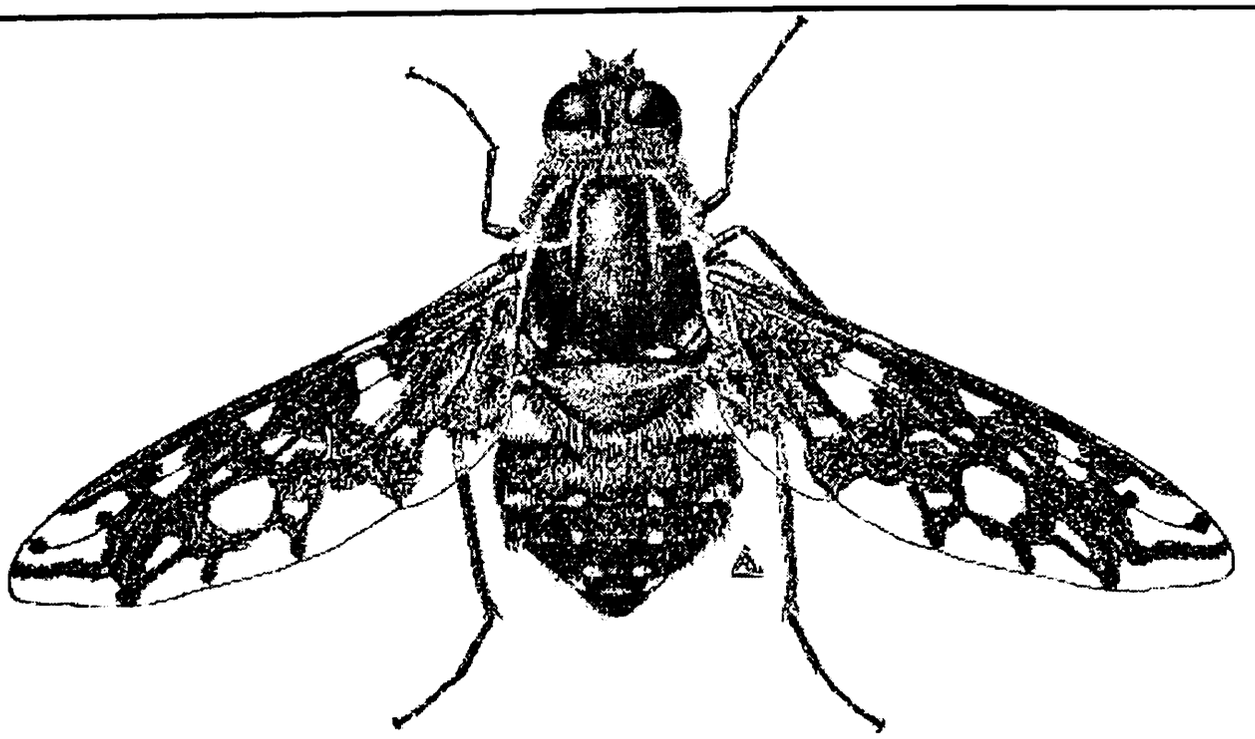


Fig. A. : Habitus *Anthrax* sp.

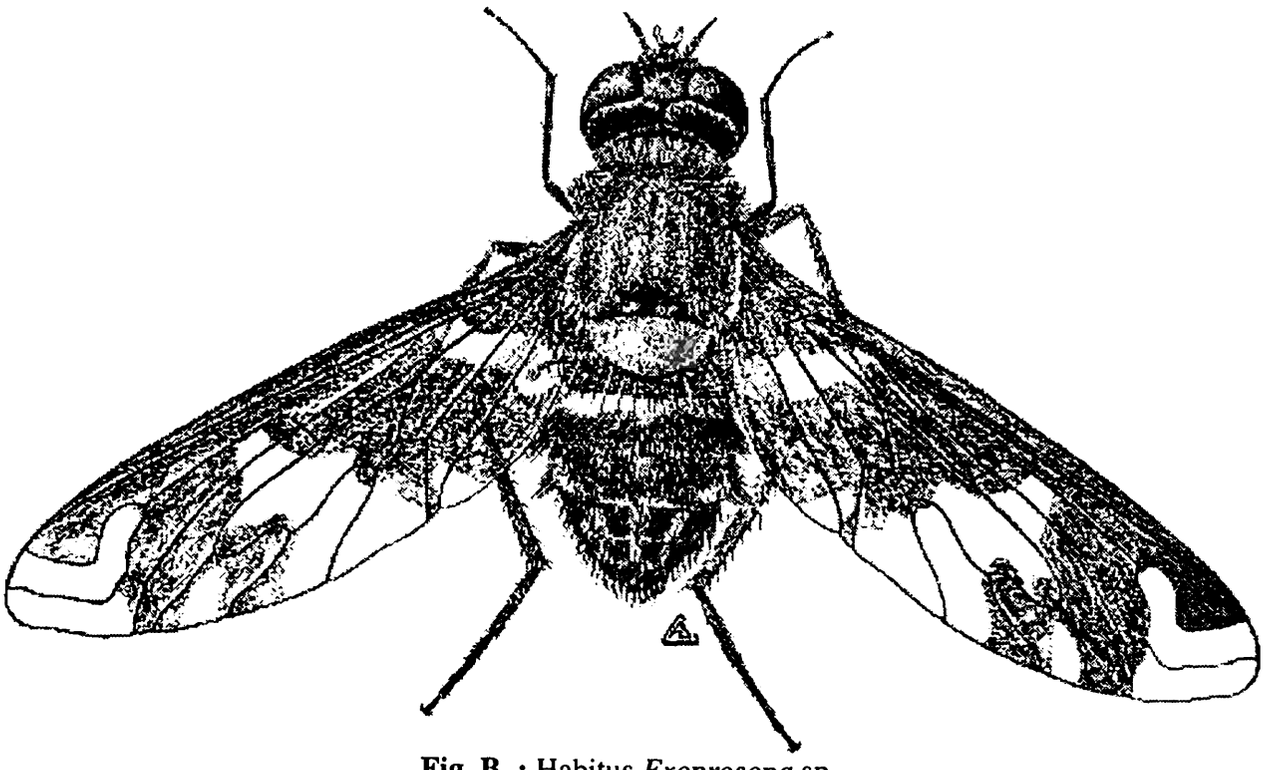


Fig. B. : Habitus *Exoprosopa* sp.

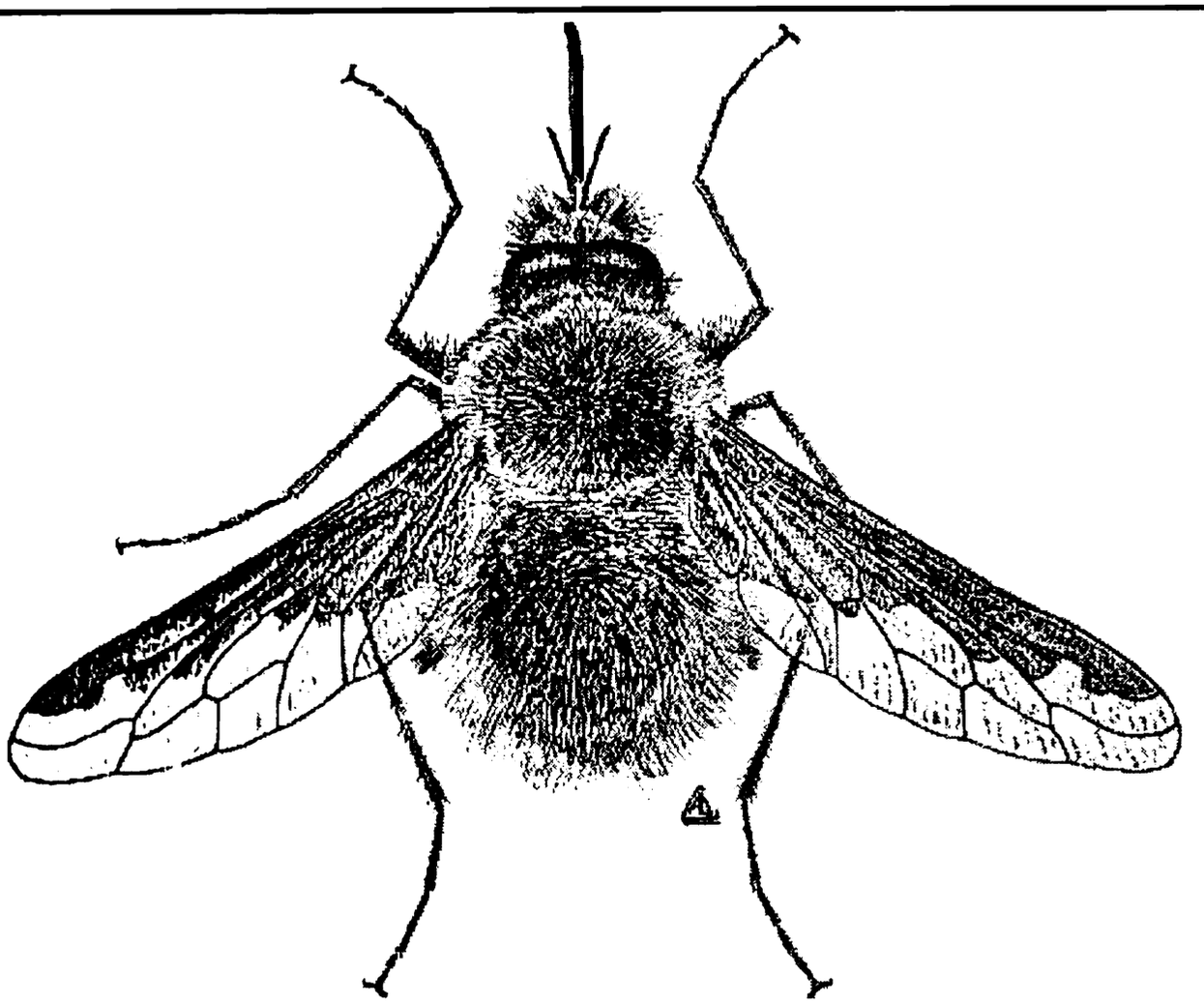


Fig. C. : Habitus *Bombylius major* Linnaeus.

Head : The head of Bombyliidae is small and usually globular, and divided by a median groove behind the ocelli and is deeply concave; the occipital foramen is also incompletely divided into two apertures. Most genera with a deeply concave occiput also have the hind margin of the eye indented and frequently a short bisecting line extends forward from the indentation. The frons may be smooth with a central depression, or with a vertical or horizontal groove. The face is usually distinct as an area between the clypeus and antenna. The frons is sometimes produced and bulging above antenna, or the frons and face are produced so the antenna arise from a prominence. The face is frequently produced, snout-like below the antennae and separated from the genae by a distinct groove (Fig. E.).

Eyes : The eyes of males are holoptic, or the frons is much narrower in males than females. In many genera the facets of males are enlarged in the upper part of the eye, the ocelli are normally equally developed usually arranged in a triangle, and raised on a tubercle (ocellar tubercle) which is usually on the vertex but may be placed anterior to the vertex on the upper part of the frons.

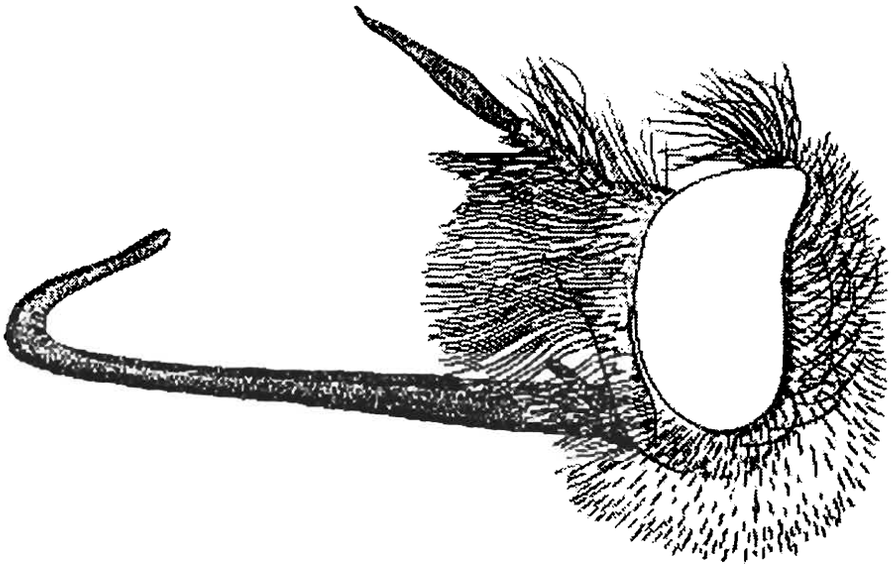


Fig. E. : Head with elongated proboscis of *Bombylius major* Linnaeus.

Antennae : The antenna consists of a scape (first segment), pedicle (second segment) and flagellum consisting of one or two flagellomeres. The scape may be elogated or compact, and little longer than the pedicel which is almost always quadrate. The first flagellomere (third segment) is elongate, rod-like or swollen at the base. The second flagellomere is always small, narrow and elongate or short and vestigial. (Fig. D.)

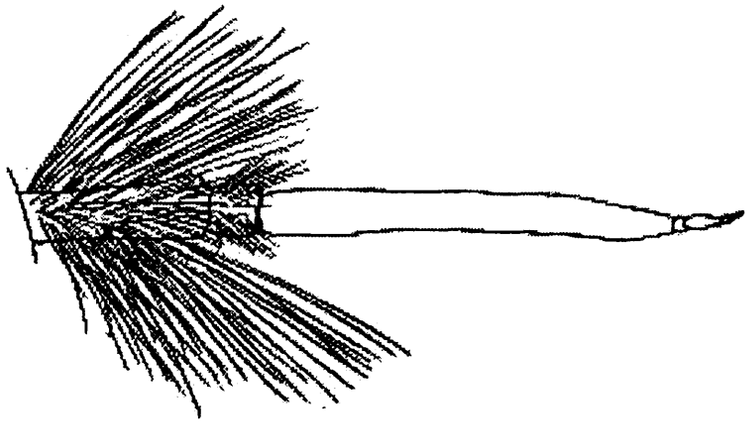


Fig. D. : Antenna of *Bombylius major* Linnaeus.

Mouthparts : The proboscis arises from a oral cavity between the genae. It is characteristically elongate, projects beyond the face in many genera, and has narrow elongate labella. In most subfamilies with a deeply concave occiput, it is short and thick with broad fleshy labella, and may not project beyond the oral cavity.

Thorax : In most genera the prothorax is vestigial and not visible from above as a distinct segment. The mesonotum is normally developed in most genera.

Legs : The legs are long and slender. The fore legs are often reduced in size. Pulvilli are present but frequently reduced in size or absent. The legs usually bear bristles, including large ones at the apices of the tibiae and which articulate with it.

Wings : The venation remains of considerable significance in classification. The full compliment of longitudinal veins comprises : the costa, which is usually complete; the subcosta, which reaches the fore margin of the wing; first radial vein (first longitudinal vein), which is unbranched and ends near the apex of the wing; the radial sector (second longitudinal vein) normally divides R2+3 and R4+5; the median vein has two branches; the cubital vein is fused with the first anal vein (fourth longitudinal vein) and there is a second anal vein (fifth longitudinal vein). Normally cell r1is not divided; an interradial crossvein (anterior crossvein) may be present (three submarginal cells)or, rarely, cell r4 may be divided by a crossvein (four submarginal cells) and open or closed and stalked; vein M3 is always absent (four posterior cells) and M2 absent in Toxophorinae (three posterior cels); cell cup (anal cell) is usually open but may be closed. The basal and discal cells are normally complete. The crossvein r-m (middle crossvein) is almost always present and its position is of importance in classification. The basicosta is often well developed and forms a costal hook (basal hook) at the root of the costa, and likewise there is often a well differentiated costal comb (basal comb) at the base of the costa itself. The allula may be broad and lobe-like, but in many genera having the wing base narrowed it is very narrow or vestigial. The squama is usually developed and rounded, with a fringe of scales or hairs. Usually, hairs or scales are absent from the wing membrane. (Fig. F, G.)

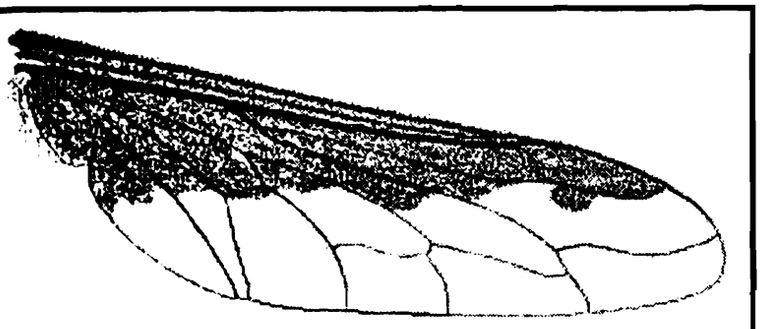


Fig. F. : Wing of *Bombylius major* Linnaeus.

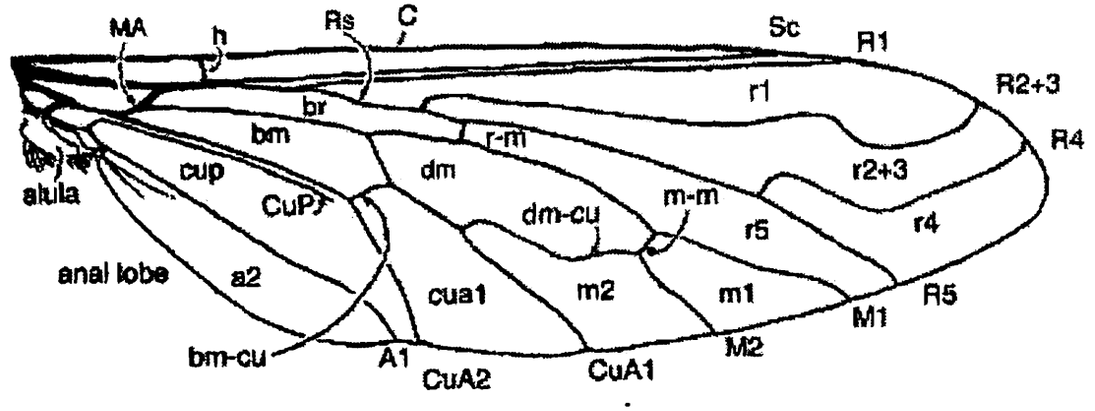


Fig. G. : Wing of a bombyliid showing veins and cells

Abbreviations : a = anal cells; A = anal veins; bm = basal medial cell; bm-cu = basal portion of CuA1 (posterior cross vein); br = basal radial cell; C = costal vein; cua = cubital anal cell; CuA = cubital anal veins; cup = anal cell; CuP = posterior branch of cubitus vein; dm = discal cell; dm-cu = discal-cubital crossvein; h = humeral crossvein; m = medial cells; m-m = medial crossvein; M = medial veins; MA = arculus; r = radial cells; R = radial veins; r-m = radial-medial crossvein; Sc = subcostal vein (courtesy Greathead & Evenhuis, 2001).

Abdomen : The abdomen is elongated and flattened, but may be long and cylindrical, or broad and short. In Systropodinae the abdomen is very slender and shaped to mimic Hymenoptera. Usually, seven terga is visible, with the remainder invaginated and concealed when viewed from above.

Genitalia : The male genital capsule (hypopygium) comprising a large hypandrium bearing lobe-like cerci; a pair of gonocoxae (basal part, basimere), usually fused; articulated gonostyli (beaked apical joint, telomere); a phallosome comprising an aedegus which is usually sheathed and sometimes has an epiphallus which may bear dorsal outgrowths. In addition, there is a large dorso-ventrally flattened ejaculatory apodeme (basal strut), and one or two pairs of lateral apodemes (lateral struts).

The females of a majority of the subfamilies of Bombyliidae have a special modification, the sand chamber, used in oviposition. The terminal segments are invaginated to form a cavity guarded by hairs or bristles and which is filled with sand particles prior to oviposition. The sand is scraped up using strong spines borne on acanthophorites. There are usually three spermathecae; each comprises a terminal sperm capsule or bulb that is a closed tube but may be modified into a thick-walled, more or less globular chamber; this is joined to a sperm pump by a narrow duct of varying length. The sperm pump is usually a distinct structure with disc like end plates. It is connected to a duct of varying length which joins to a common duct opening into the sand chamber. The genital opening of females is surrounded by a structure derived from sternite 9 which may be U-shaped or divided into two and is referred to as furca Figs. (H, I, J).

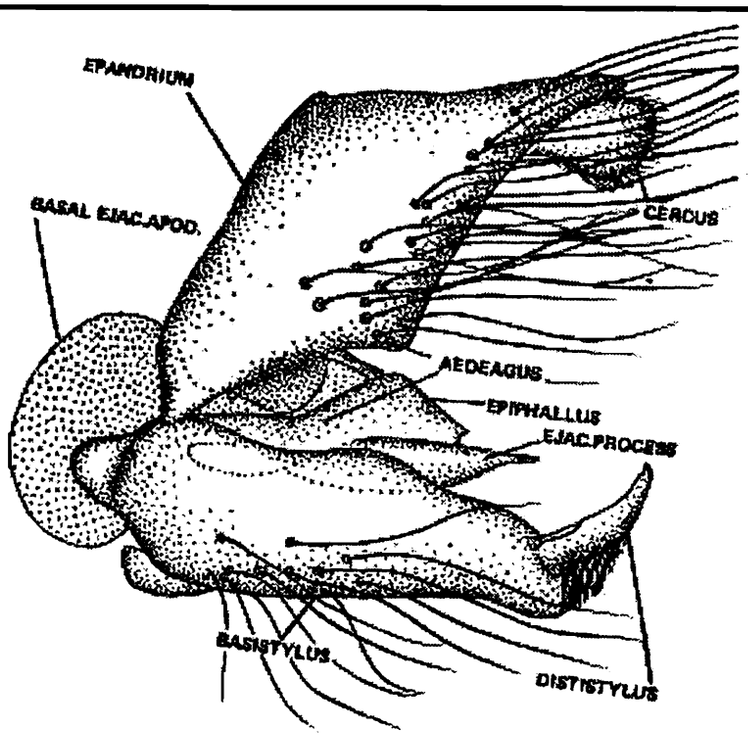


Fig. H. : Genitalia (lateral aspect) of *Bombylius major* Linnaeus.

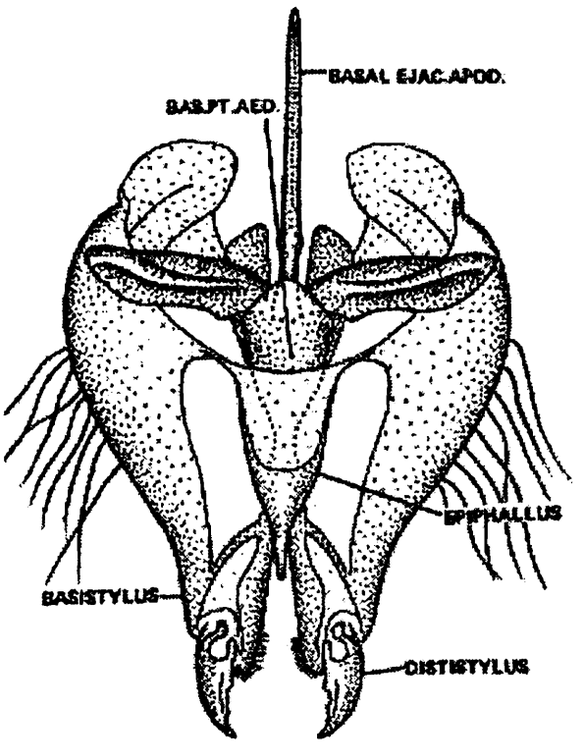


Fig. I. : Genitalia (dorsal aspect) of *Bombylius major* Linnaeus.

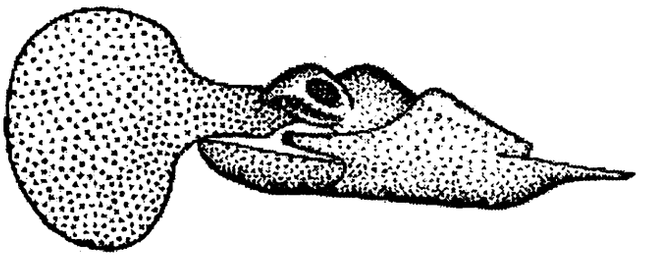


Fig. J. : Genitalia (axial system) of *Bombylius major* Linnaeus.
(Figs. A–F, H–J, courtesy Hull, 1973)

Body colour and vestiture : The body of bombyliids are usually black, sometimes with areas of paler cuticle. Sometimes all of the cuticle or discrete areas are polished or shining, but usually the body is covered with tomentum and appeares dull and dusted; bristles are present. However majority of the bombylids have hairs on the body (dense in many cases) giving a bee-like appearance. Short, adpressed scale-like hairs may also be present beneath the long hair. The scales may be dull or glossy, or exhibit interference colours like metallic silver or gold.

Most anthophilous genera of Bombyliidae have modified fore-tarsal setae. These setae have clubbed ends which aid in pollen collection and those genera possessing them are all frequent flower visitors.

Current Status of the bee-flies in India

In India approximately 138 species are known from 36 genera of 11 tribes under 8 subfamilies. Indian Bombyliidae comprises nearly 3% of the global fauna and 53.70% of the Oriental bombyliids (Fig. 1). It is evident that 86.23% (119 spp.) of Indian species are widely distributed within the Oriental region, while 48.55% (67 spp.) are endemic to India (Table 3, Fig. 1). Of the 51.45% of non-endemic species only a few extend over the Palaearctic (10.14%; 14 spp.), Australasian/Oceanian (4.35%; 6 spp.), Afrotropical (2.17%; 3 spp.), and Nearctic (0.72%; 1 spp.) regions in their distribution (Table 2, Fig. 2).

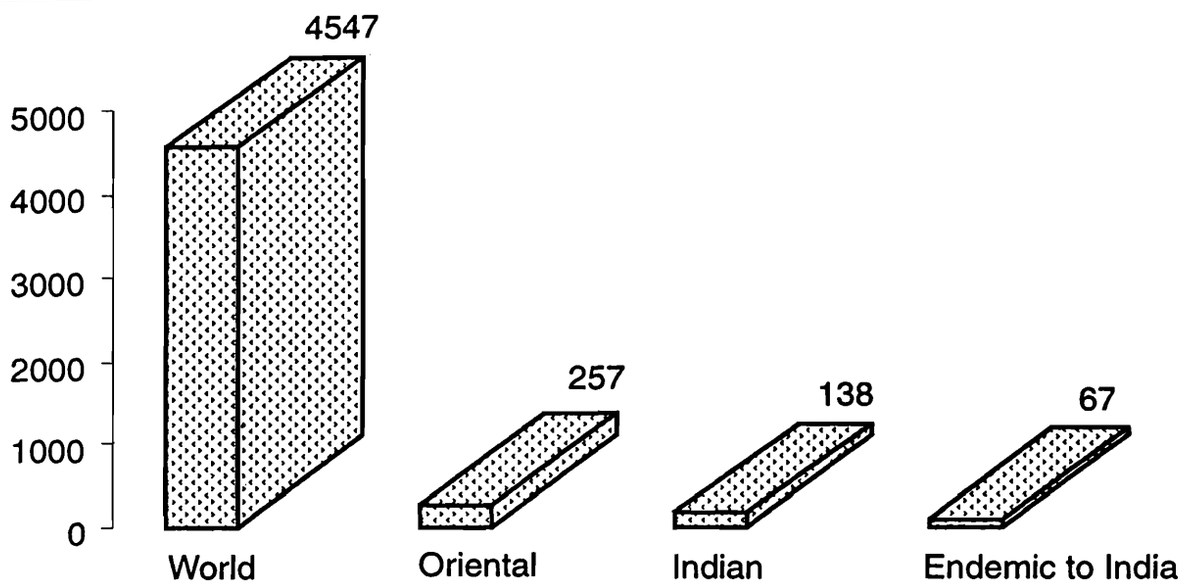


Fig. 1. : Distribution of bombyliid fauna (in number)

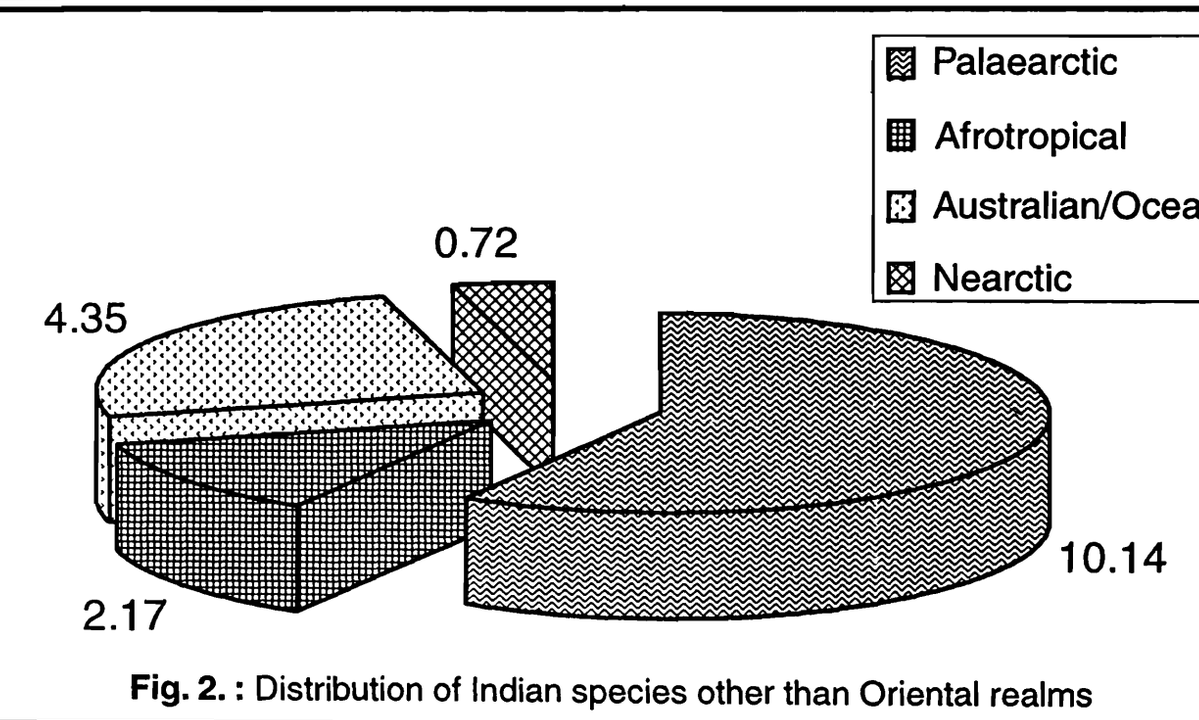


Fig. 2. : Distribution of Indian species other than Oriental realms

DISTRIBUTION

India happens to be a highly variable natural continuum divided into separate bio-geographic regions. As mentioned earlier the distribution of the bombyliids has been discussed over the 6 major biogeographic zones, the **Himalayan**, the **Arid, Semi-arid and hot desert**, the **Indo-Gangetic plains**, the **Ghats and Peninsular** region, the **North-east** and the **Islands. The zones** have been discerned primarily following Alfred *et al.* (2001), as well as on the basis of available distributional records, and the collection surveys conducted by the Diptera Section of the Zoological Survey of India. Since only one dipteran family is dealt with, further division of these regions into sub regions has been avoided so as to yield numerically significant data.

THE HIMALAYAN REGION

The Himalayas extend over three countries viz, India, Nepal and Bhutan (approx. length 2400 kms). Bulk of this complex mountain system lies in India while Nepal occupies the central Himalayas and Bhutan forms a part of the eastern Himalayas. The Indian Himalayan bio-geographic region is divided into Trans –Himalayan zone (Jammu Kashmir including Ladakh and parts of Himachal Pradesh) and the Himalayan zone (J&K, parts of Himachal Pradesh, Uttaranchal, Sikkim, Darjeeling district of West Bengal and Arunachal Pradesh)and the North east Hills (parts of Assam, Manipur, Mizoram, Nagaland, Tripura and Meghalaya, (Alfred et al, 2001; Ahmed et al, 1990). This zone has a forest cover of almost all types like the tropical wet evergreen, subtropical pine, montane wet temperate, Himalayan moist and dry temperate, as well as subalpine and alpine forests. Temperature fluctuations in this region are also high, from below 0°C in winter on the snow-clad peaks to around 30°C in the foothills in summer. Ambient temperature conditions usually found during collection were around 25°to 30°C in the foothills and 6°to 10°C in the high altitude valleys. In very cold weather however bombyliids were not found. The altitudinal gradient over which the species were distributed was about 300 to 2500 mts., with 23.4% of the species found at altitudes between 1200-1800 mts. The Himalayan region harbours around 40.58% (56 spp.) of the Indian bombyliid species and nearly 58.33% (21 gen.) of the Indian genera (Table 1, Fig. 3).

The North-east Indian region

This region is primarily a hilly region covering the "seven sisters" or the states of Assam, Manipur, Meghalaya, Mizoram, Nagaland, Arunachal Pradesh and Tripura and physiographically spreads over the Naga, Patkai, Khasi, Jaintia, Garo, Lusai, Mikir hills and a part of the Eastern Himalayas. Vegetation in this area is mainly tropical wet evergreen, semi-evergreen, and moist deciduous forests, subtropical broad leaved hill and pine forests, and montane wet temperate forests. Average rainfall is around 250 to 300 cms with some

regions of Assam and Meghalaya receiving over 500 cms of rainfall. Summer temperature is around 7°to 20°C and winter temperature is around 2°to 18°C. The bee-fly fauna in this region is high in diversity but low in numbers. The fauna is rich in the lower ranges and diversity is low as we go higher up. About 21.74% (30 spp.) of the bee-fly species and 36.11% (13 gen.) of the Indian genera are represented in this region (Table 1, Fig. 3).

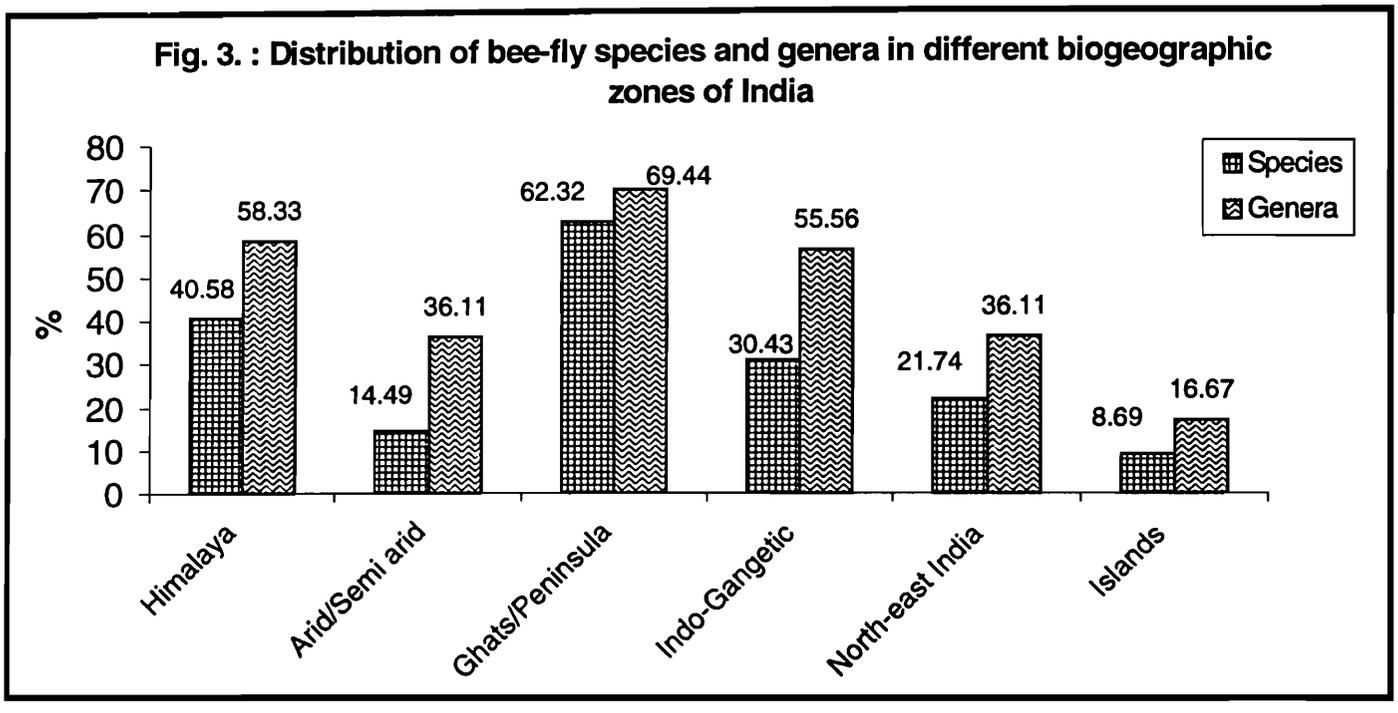


Fig. 3. : Distribution of bee-fly species and genera in different biogeographic zones of India

The Indo-Gangetic Plains

The Indo-Gangetic plain is the entire fertile stretch of low lying plains on either side of the river Ganges covering the states of Uttar Pradesh, Bihar, parts of Orissa and West Bengal (excluding Darjeeling dist.). Vegetation in this region is mainly tropical semi-evergreen, moist deciduous, swampy and dry deciduous forest. Mean annual temperature in summer is over 24°C and 18°C in winter with an annual rainfall of 100-200 cms. Species diversity of bee-flies in these plains is 30.43% (42 spp.) and generic diversity is around 55.56% (20 genera) (Table 1, Fig. 3).

The Arid, Semi-Arid and Hot Desert region

This region is typified by low rainfall and sparse vegetation spreading over the majority areas of Gujarat, Rajasthan and small regions of Haryana and Punjab. This area experiences extremes of weather conditions. Winter is cold, with temperatures as low as 4°C and summer is extremely hot around 45°C. The area receives an annual rainfall of 300-500 mm in the hot desert to about 50-100 cms in the semi-arid areas. Vegetation is usually thorn forests in the arid zones and dry deciduous tropical forests and dry grassland in the semi-arid zone.

The region records a low species diversity, approximately 14.49% (20 spp.) but has a high generic diversity 36.11% (13 genera). 2 species and 2 genera, *Pachyanthrax velleris* Greathead and *Eremyia transcaspica* Paramonov are found to be restricted to this region and not found anywhere else in India. Considering the fact that globally bee-flies are found more in similar physiographic conditions, paucity of faunal records and poor faunal exploration could be the reason for the low species diversity of this region (Table 1, Fig. 3).

The Ghats and Peninsular Region

The Ghats and Peninsular region covers the Deccan plateau and the Western and Eastern Ghats speading over the states of Maharashtra, Karnataka, Kerala, Andhra Pradesh, Goa, Madhya Pradesh, Tamil Nadu, parts of Orissa and parts of Gujarat. The plateau part of the Deccan peninsula covers an area of 700000 sq. km. with an average altitude of 600 m (Alfred *et al.*, 2001) A major part of the Deccan peninsula is covered by dry deciduous forests and degraded scrubland. The Eastern Ghats is an assemblage of discontinuous ranges of hills, plateaus and escarpments with an elevation around 1750 m. The Eastern Ghats receives 120-160 cms. in the humid areas and 60-100 cms rainfall in the semi-arid zones. The summer maxima is 41°C while winter is as low as 2°C. Forest cover in the Eastern Ghats is broadly evergreen, semi-evergreen, tropical moist deciduous, southern tropical dry deciduous, northern mixed dry deciduous, dry savannah, and dry evergreen scrub. The Western Ghats though broadly included in this region has been detailed under the 'Hotspots' This region displays the highest species diversity about 62.32% (86 spp.), probably because area wise it is the largest region and includes the Western Ghats. Generic diversity is approximately 69.44% (25 genera) (Table 1, Fig. 3).

Islands

Indian limits include two different island groups *viz.* the Andaman and Nicobar Islands lying in the Bay of Bengal and the Lakshwadeep islands in the Arabian sea. The Andaman Islands are an arcuate chain of more than 500 islands, islets, and rocky outcrops running north to south in the Bay of Bengal extending over 800 kms (Alfred *et al.*, 2001). Lakshwadeep archipelago is irregularly scattered in the south Arabian sea and stretches about 2500 kms in the ocean along north south direction (Alfred *et al.*, 2001). The archipelago comprises of 36 islands including 12 atolls, 3 reefs, and 5 submerged banks with a total land area of 32 sq. km. Vegetation in the Andamans is a varied mosaic of tropical evergreen, semi-evergreen, moist deciduous, littoral forests and mangroves. Climate in this region is tropical with temperature around 23°-30°C and 300 cms of annual rainfall. 8.69% (12 spp.) of bombyliids have been recorded from the Andaman Is. with three endemic species *Villa andamanensis* Bhalla *et al.*, *Villa kopanghatiensis* Bhalla *et al.*, and *Heteralonia (Acrodisca)*

andamanica (Pal). Interestingly bombyliid fauna is characterized by high generic diversity 16.67% (6 genera) and endemism (3 endemic spp. out of 12 spp.) (Table 1 & 2, Figs. 3 & 4). The recent devastation caused by the Tsunami in these regions, specially the Nicobar Is., might have destroyed even those few species which were exclusively found there.

Bee-fly diversity in the "Hotspots" of India

India has been recognized as one of the 'Megadiversity' countries with 2 of the 24 globally nominated biodiversity 'Hotspots' *viz* the Western Ghats and the Eastern Himalayas as both have high endemism and rapid rate of habitat modification and loss.

Diversity in the Eastern Himalayas

The Eastern Himalayas cover parts of 2 bio-geographic zones, North-east India and the Himalaya including the political boundaries of Sikkim, Arunachal Pradesh, Darjeeling dist. of West Bengal, and the North-east hills covering the states of north-east India. The stretch of Eastern Himalaya runs to approximately 850 Kms. rising abruptly from the plains. This mesic region has a high degree of precipitation around 300cms. to 1100 cms. Summer temperature varies from 5°C to 30°C and winter temperatures go below 0°C at higher elevations. Major forests in this area are the tropical evergreen, semi-evergreen, deciduous, grasslands and swamps upto 1000 m, subtropical evergreen forests at about 1200m-2000 m, temperate forests are found between 1800-3500 m, subalpine forests at 3500-4200 m and alpine vegetation at 4200-5500 m elevations. Bombyliid species diversity in this region is around 23.19% (32 spp.) and generic diversity is around 33.33% (12 genera) (Fig. 5), and endemicity of 5.97% (4 spp.) (Table 3).

Diversity in the Western Ghats

The complex topography, wide range of micro climatic and soil conditions and its evolutionary continuity for more than 50 million years have resulted in the exceptionally rich biological diversity of the Western ghats. These ghats stretch from 8°-22°N latitude for nearly 1400 km parallel to the west coast of peninsular India through the states of Gujarat, Maharashtra, Goa, Karnataka, TamilNadu and Kerala. Most of the high peaks are above 1400 mts. with the highest being 2695m. Depending on the elevation rainfall varies from 100-500 cms in some places to up to 700-850 cms in some regions. Mean annual temperature is about 38°C. The main vegetation in this area are tropical, and subtropical evergreen forests, moist deciduous and wet evergreen, montane subtropical, evergreen hill, dry semi-deciduous, dry deciduous forests and scrub. Diversity of bee-flies in this zone is quite high as expected. Species diversity is as high as 58.69% (81 spp.) and generic diversity is approximately 69.44% (25 genera) (Fig. 5), and endemicity of 29.85% (20 spp.) (Table 3).

Fig. 4. : Distribution of endemic species in different zones of India (in number)

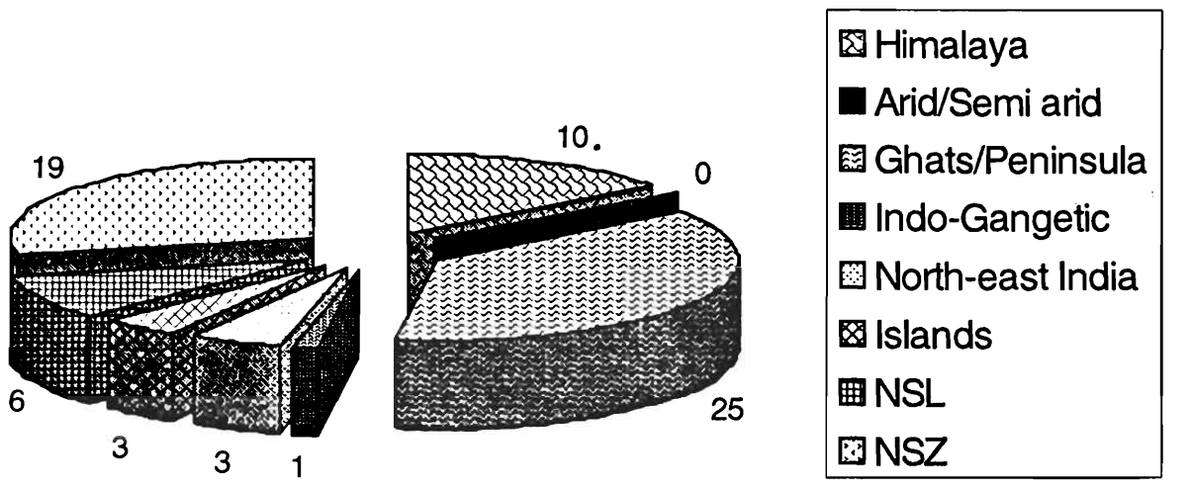
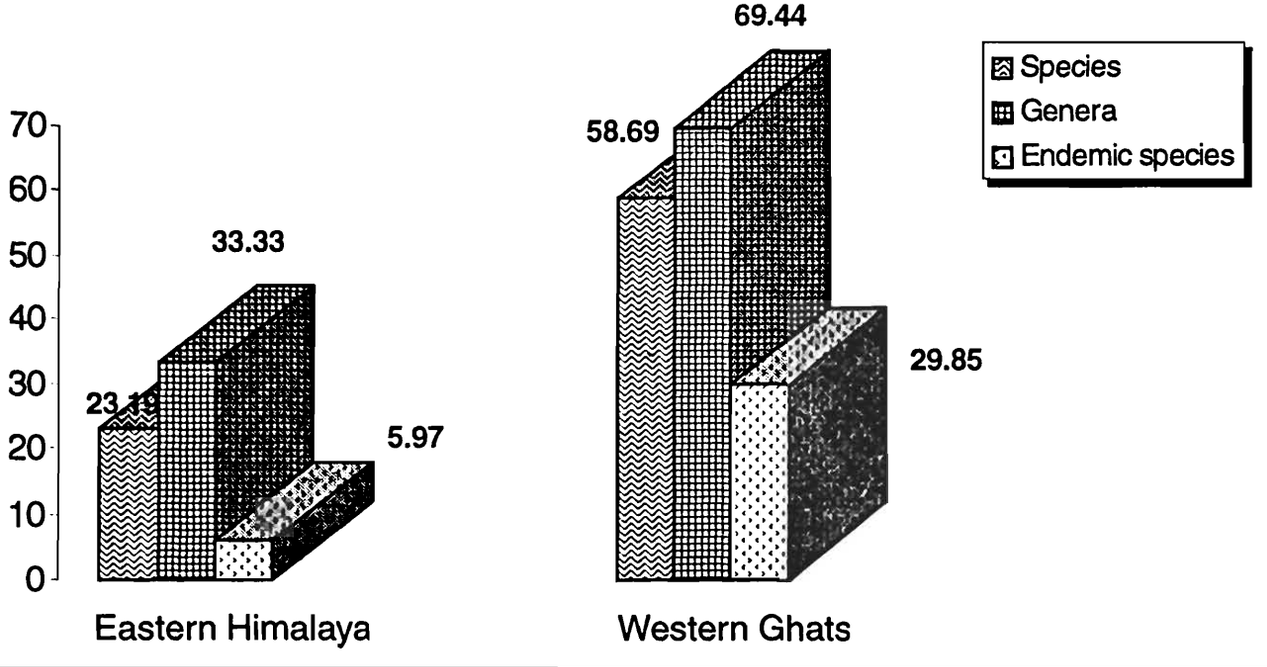


Fig. 5. : Diversity of bee-flies in two Hot spots of India



Endemicity

A high level of endemicity is discernable in this family represented in India. It is evident from Table 3 and Fig. 4, nearly 48.55% (67 spp.) of the species are endemic to India. The Ghats and Peninsular region shows maximum endemicity with 25 endemic and restricted

species followed by the Himalayan region with 10 endemic species, the Islands with 3 spp., the North-east India with 3 spp., the Indo-Gangetic plains with 1 and the Arid region none (Table 3, Fig. 4). In the 'Hotspots' 20 species are endemic to the Western Ghats and 4 species are endemic to the Eastern Himalayas. 19 species are distributed in more than one biogeographic zones and 6 have no specified locality (Table 3, Fig. 4).

DISCUSSION

Indian Bombyliidae comprises of a very small proportion of the world bombyliid population (only about 3% = 138 spp.). However the distribution pattern of these 138 species is interestingly diverse. A small proportion of the fauna (17.39%) is shared with the other realms while 82.61% are restricted to the Oriental region and 48.55% are endemic to India. The Palaeartic species have an affinity with the Indian bombyliids, as 14 species are shared between the Palaearctic region and India, while the Neotropical region has absolutely no affinity. Only 10 species are distributed over the rest of the other zoogeographical realms as detailed earlier. Interestingly, *Exoprosopa disrupta disrupta* Walker is distributed over the Afrotropical region, while *Systropus(S)maccus* (Enderlein), *Eremyia transcaspica* Paramonov and *Villa panisca* Rossi are distributed over the Palaearctic region, but these species are not found in any other Oriental countries outside India.

Distribution over the biogeographic zones within India has revealed that the maximum diversity is in the Ghats and the Peninsular region, probably because it encompasses a very large area and displays several varied physiographic conditions. Species diversity is minimum in the Islands, followed by the arid regions. Worldwide the bee-flies are found mostly in the semi-arid and arid regions and low species diversity in these regions of India is paradoxical. But the high generic diversity and the number of restricted species in the arid and semi-arid zones as well as in the islands (in both cases generic diversity is almost double the species diversity) indicate insufficient faunal exploration which may be the reason for low species diversity. Hence these regions definitely call for a thorough exploration. Distribution over the Himalayan region as expected shows high diversity. Of the two hotspots the Western Ghats is a high diversity zone but contrastingly the Eastern Himalayas is not. A major factor behind this discrepancy could be the limitations barring the faunistic surveys because of the political turmoil and militancy in the North-East.

The genera *Apolysis* Loew, *Usia* Latreille, *Phthiria* Meigen *and Parisus* Walker are found to be restricted to the Himalayan region. The genera *Eremyia* Greathead and *Pachyanthrax* Francois are restricted to the arid and semi-arid regions. The genus *Anthrax* Scopoli and *Ligyra* Newman are most ubiquitous and distributed over all the bio-geographic regions. *Villa* Lioy is the second most versatile genus distribution wise, followed by *Exhyalanthrax* Becker, *Petrorossia* Bezzi, *Heteralonia* Rondani *and Exoprosopa* Macquart.

In conclusion, it can be said that the bee-flies are a highly diverse group occupying almost all the varied ecological niches. If extrapolated on a global scale our knowledge of Indian Bombyliidae is quite poor. Considering the importance of the group as a pollinator and a biological pest controller, this group definitely merits thorough exploration and detailed study in future.

SUMMARY

Distribution pattern of 138 species, assigned to 36 genera, 11 tribes under 8 subfamilies, of the family Bombyliidae from India, over the six biogeographic zones and two biodiversity 'Hot spots' have been elucidated based on current distributional records in Table 1. Endemicity and distribution over the zoogeographic regions has been clarified in the added tables (Table 2 & 3.) as well as illustrated with bar diagrams and pie charts (Figs. 1-4). Morphology of the bombyliids have also been detailed and illustrated with diagrams (Figs. A-J). Colored plates as well as *habitus* drawings of 29 Indian genera of the family Bombyliidae have also been appended.

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TABLE 1 : DISTRIBUTION OF BEE-FLIES OVER THE BIOGEOGRAPHIC REGIONS OF INDIA

		SPECIES	BIOGEOGRAPHIC REGIONS OF INDIA					
			HIMALAYAN	ARID, SEMI-ARID, HOT DESERT	GHATS & PENIN-SULAR	INDO-GANGETIC PLAIN	NORTH-EAST INDIA	ISLANDS
Subfamily USIINAE Tribe APOLYSINI	1	*Apolysis sedophila* (Brunetti)	+					
Tribe USIINI	2	*Usia (Usia) marginata* (Brunetti)	+					
Subfamily PHTHIRIINAE Tribe PHTHIRIINI	3	*Phthiria gracilis* Walker	+			+		
Subfamily TOXOPHORINAE Tribe GERONTINI	4	*Geron (Geron) albescens* (Brunetti)	+		+	+		
	5	*Geron (Geron) argentifrons* (Brunetti)	+		+	+		
Tribe SYSTROPODINI	6	*Systropus (Systropus) eumenoides* Westwood						
	7	*Systropus (Systropus) flavipectus* Westwood	+				+	
	8	*Systropus (Systropus) flavipleura* (Brunetti)	+				+	
	9	*Systropus (Systropus) gracilis* (Enderlein)	+					
	10	*Systropus (Systropus) limbatus* (Enderlein)	+			+	+	
	11	*Systropus (Systropus) maccus* (Enderlein)	+					
	12	*Systropus (Systropus) mucronatus* (Enderlein)	+					
	13	*Systropus (Systropus) ophioneus* (Westwood)	+				+	
	14	*Systropus (Systropus) sikkimensis* (Enderlein)	+					
Tribe TOXOPHORINI	15	*Toxophora iavana* Wiedemann		+	+	+		
Subfamily HETEROTROPINAE	16	*Heterotropus indicus* Nurse			+			
Subfamily BOMBYLIINAE Tribe BOMBYLIINI	17	*Anastoechus bangalorensis* Kapoor & Agarwal			+			
	18	*Anastoechus kashmirensis* Zaitzev	+					
	19	*Anastoechus longirostris* Wulp	+					
	20	*Bombomyia maculata* Fabricius	+	+	+	+		

Table 1. : *(Cont'd.).*

		SPECIES	BIOGEOGRAPHIC REGIONS OF INDIA					
			HIMALAYAN	ARID, SEMI-ARID, HOT DESERT	GHATS & PENIN-SULAR	INDO-GANGETIC PLAIN	NORTH-EAST INDIA	ISLANDS
Subfamily BOMBYLIINAE Tribe BOMBYLIINI	21	*Bombomyia tricolor* Guerin-Meneville	+		+	+		
	22	*Bombylella albosparsa* Bigot			+			
	23	*Bombylella roonwali* Zaitzev			+			
	24	*Bombylisoma ghorpadei* Kapoor & Agarwal			+			
	25	*Bombylisoma resplendens* (Brunetti)	+		+			
	26	*Bombylius (Bombylius) ardens* Walker			+			
	27	*Bombylius (Bombylius) cirrophus* Evenhuis			+	+		
	28	*Bombylius (Bombylius) major* Linnaeus	+		+		+	
	29	*Bombylius (Bombylius) propinquus* (Brunetti)			+			
	30	*Bombylius (Bombylius) terminalis* (Brunetti)				+		
	31	*Eremyia transcaspica* Paramonov		+				
	32	*Euchariomyia dives* (Bigot)	+		+			
	33	*Euchariomyia scintillans* (Brunetti)			+			
	34	*Eurycarenus erectus* (Brunetti)			+			
	35	*Parisus pseudoterminalis* (Brunetti)						
	36	*Systoechus flavospinosus* Brunetti			+			
	37	*Systoechus nivalis* Brunetti	+					
	38	*Systoechus socius* Walker	+		+	+		
Subfmily MARIOBEZZIINAE	39	*Mariobezzia lichtwardti* Becker & Stein**						
Subfamily CYTHERINAE	40	*Amictus bowdeni* Kapoor & Agarwal			+			
	41	*Callostoma imperator* Nurse						

Table 1. : *(Cont'd.).*

		SPECIES	BIOGEOGRAPHIC REGIONS OF INDIA					
			HIMALAYAN	ARID, SEMI-ARID, HOT DESERT	GHATS & PENIN-SULAR	INDO-GANGETIC PLAIN	NORTH-EAST INDIA	ISLANDS
Subfamily ANTHRACINAE Tribe ANTHRACINI	42	*Anthrax argentiapicalis* Brunetti			+			
	43	*Anthrax bigoti* (Brunetti)			+			
	44	*Anthrax ceylonicus* (Zaitzev)				+	+	
	45	*Anthrax distigma* (Wiedemann)	+	+	+	+	+	+
	46	*Anthrax gestroi* Brunetti			+	+		+
	47	*Anthrax indicatus* Nurse			+			
	48	*Anthrax institutus* Walker**						
	49	*Anthrax niveicaudus* Brunetti			+	+	+	
	50	*Anthrax obscurifrons* Brunetti	+		+			
	51	*Brachyanax genitilis* (Brunetti)				+	+	
	52	*Satyramoeba bipunctata* (Fabricius)		+	+	+	+	
	53	*Spogostylum duvaucelli* (Macquart)	+	+	+	+		
Tribe EXOPROSOPINI	54	*Collosoptera latipennis* (Brunetti)			+		+	
	55	*Exoprosopa abrogata* Nurse			+			
	56	*Exoprosopa affinisima* Senoir-White			+			
	57	*Exoprosopa basifacia* Walker				+		
	58	*Exoprosopa disrupta disrupta* Walker**						
	59	*Exoprosopa efflatouni* Bezzi			+			
	60	*Exoprosopa flammea* Brunetti			+	+		
	61	*Exoprosopa niveiventris* Brunetti			+	+		
	62	*Exoprosopa puerula* Brunetti	+		+	+		

Table 1. : *(Cont'd.).*

		SPECIES	BIOGEOGRAPHIC REGIONS OF INDIA					
			HIMALAYAN	ARID, SEMI-ARID, HOT DESERT	GHATS & PENIN-SULAR	INDO-GANGETIC PLAIN	NORTH-EAST INDIA	ISLANDS
Tribe EXOPROSOPINI	63	*Exoprosopa punjabensis* Nurse		+				
	64	*Exoprosopa tamerlan* Portschinsky			+	+		
	65	*Hetralonia (Acrodisca) andamanica* Pal						+
	66	*Hetralonia (Homolonia) bengalensis* (Macquart)			+	+		
	67	*Heteralonia (Homolonia) gujaratica* Nurse			+			
	68	*Heteralonia (Homolonia) lateralis* (Brunetti)			+	+		
	69	*Heteralonia (Isotamia) annandalei* (Brunetti)			+			
	70	*Heteralonia (Isotamia) auriplena* (Walker)**						
	71	*Heteralonia (Isotamia) bangalorensis* (Zaitzev)			+			
	72	*Heteralonia (Isotamia) bramha* (Schiner)			+			
	73	*Heteralonia (Isotamia) brunettii* (Zaitzev)			+			
	74	*Heteralonia (Isotamia) insulata* (Walker)	+	+	+	+	+	
	75	*Heteralonia (Isotamia) lankiensis* (Zaitzev)			+			
	76	*Heteralonia (Isotamia) maculiventris* (Brunetti)	+	+	+			
	77	*Heteralonia (Isotamia) mudigerensis* (Zaitzev)			+			
	78	*Heteralonia (Isotamia) sipho* (Aldrich)					+	
	79	*Heteralonia (Isotamia) siva* (Nurse)	+		+			
	80	*Heteralonia (Isotamia) stylata* (Brunetti)			+			
	81	*Heteralonia (Isotamia) tarikerensis* (Zaitzev)			+			
	82	*Heteralonia (Zygodipla) abjecta* Nurse			+			
	83	*Heteralonia (Zygodipla) albida* Walker			+			

Table 1. : *(Cont'd.).*

		SPECIES	BIOGEOGRAPHIC REGIONS OF INDIA					
			HIMALAYAN	ARID, SEMI-ARID, HOT DESERT	GHATS & PENIN-SULAR	INDO-GANGETIC PLAIN	NORTH-EAST INDIA	ISLANDS
Tribe EXOPROSOPINI	84	*Heteralonia scutellata* Bhalla, Grewal & Kapoor	+					
	85	*Ligyra argyura* Brunette**						
	86	*Ligyra aurantiaca* Guerin-Meneville	+	+	+	+	+	
	87	*Ligyra flaviventris* (Doeschall)	+		+		+	+
	88	*Ligyra fuscipennis* Macquart	+		+			+
	89	*Ligyra oenomaus* (Rondani)	+	+	+	+	+	
	90	*Ligyra orientalis* Paramonov			+			
	91	*Ligyra peninsularis* Pal			+			
	92	*Ligyra semifuscata* (Brunetti)	+		+	+	+	+
	93	*Ligyra sphinx* (Fabricius)			+	+		
	94	*Ligyra suffusipennis* (Brunetti)	+		+	+		
	95	*Ligyra tantalus* (Fabricius)	+		+		+	
	96	*Ligyra tristis* (Wulp)			+			+
	97	*Litorhina collaris* (Wiedemann)	+	+	+			
	98	*Litorhina lar* (Fabricius)	+	+	+	+	+	
	99	*Micomitra iridipennis* Nurse			+			
	100	*Micomitra vitrea* (Bigot)			+	+		
	101	*Micomitra vitripennis* Brunetti			+			
	102	*Pterobates pennatus* Nurse			+			
	103	*Pterobates pennipes* Wiedemann				+	+	

Table 1. : *(Cont'd.).*

		SPECIES	BIOGEOGRAPHIC REGIONS OF INDIA					
			HIMALAYAN	ARID, SEMI-ARID, HOT DESERT	GHATS & PENIN-SULAR	INDO-GANGETIC PLAIN	NORTH-EAST INDIA	ISLANDS
Tribe VILLINI	104	*Exhyalanthrax absalon* (Wiedemann)		+	+	+		
	105	*Exhyalanthrax compactus* (Brunetti)			+	+		
	106	*Exhyalanthrax keiseri* (Francois)	+		+			+
	107	*Exhyalanthrax resculus* (Francois)		+	+			
	108	*Hemipenthes referens* (Walker)	+				+	
	109	*Pachyanthrax velleris* Greathead		+				
	110	*Villa andamanensis* Bhalla, Grewal & Kapoor						+
	111	*Villa aperta* Walker	+			+	+	
	112	*Villa approximata* Brunetti	+			+	+	
	113	*Villa aureohirta* (Brunetti)	+		+	+		
	114	*Villa baluchianus* (Brunetti)	+					
	115	*Villa brunettii* Evenhuis & Greathead	+					
	116	*Villa clara* (Walker)	+		+		+	
	117	*Villa dia* (Wiedemann)			+			
	118	*Villa fletcheri* (Brunetti)			+			
	119	*Villa fuscolimbata* (Brunetti)	+		+			
	120	*Villa kopanghatiensis* Bhalla, Grewal & Kapoor						+
	121	*Villa leucopyga* (Macquart)			+			
	122	*Villa limpida* (Walker)**						
	123	*Villa lucens* (Walker)**						

Table 1. : *(Cont'd.).*

		SPECIES	BIOGEOGRAPHIC REGIONS OF INDIA					
			HIMALAYAN	ARID, SEMI-ARID, HOT DESERT	GHATS & PENIN-SULAR	INDO-GANGETIC PLAIN	NORTH-EAST INDIA	ISLANDS
Tribe VILLINI	124	*Villa lucida* (Walker)**						
	125	*Villa manifesta* (Walker)	+				+	
	126	*Villa panisca* Rossi	+		+		+	
	127	*Villa transversa* (Brunetti)	+					
	128	*Villa troglodyta* (Fabricius)**						
Tribe XERAMOEBINI	129	*Petrorossia albofulva* (Walker)		+	+	+		
	130	*Petrorossia ceylonica* (Brunetti)	+			+	+	+
	131	*Petrorossia claripennis* (Brunetti)	+	+	+			
	132	*Petrorossia clauseni* (Brunetti)					+	
	133	*Petrorossia curvipennis* Zaitzev			+			
	134	*Petrorossia intermedia* (Brunetti)			+	+	+	
	135	*Petrorossia limitarsis* (Brunetti)	+	+				
	136	*Petrorossia nigrofemorata* (Brunetti)	+	+				+
	137	*Petrorossia orientalis* (Zaitzev)	+					
	138	*Petrorossia serata* (Aldrich)					+	

***Distribution in India not known*

TABLE 2 : ZOOGEOGRAPHIC DISTRIBUTION OF NON-ENDEMIC INDIAN BOMBYLIIDAE

		SPECIES	ZOOGEOGRAPHIC REGIONS				
			ORIENTAL OUTSIDE INDIA	AFRO-TROPICAL	PALAE-ARCTIC	NEARCTIC	AUSTRA-LASIAN/ OCEANIAN
Subfamily USIINAE Tribe APOLYSINI	1	*Apolysis sedophila* (Brunetti)	+				
Subfamily TOXOPHORINAE Tribe GERONTINI	2	*Geron (Geron) argentifrons* (Brunetti)	+				
Tribe SYSTROPODINI	3	*Systropus (Systropus) flavipleura* (Brunetti)	+				
	4	*Systropus (Systropus) flavipectus* Westwood	+				
	5	*Systropus (Systropus) limbatus* (Enderlein)	+		+		
	6	*Systropus (Systropus) maccus* (Enderlein)	+		+		
	7	*Systropus (Systropus) mucronatus* (Enderlein)	+				
	8	*Systropus (Systropus) ophioneus* (Westwood)	+				
	9	*Systropus (Systropus) sikkimensis* (Enderlein)	+				
Tribe TOXOPHORINI	10	*Toxophora iavana* Wiedemann	+		+		
Subfamily BOMBYLIINAE Tribe BOMBYLIINI	11	*Bombomyia tricolor* Guerin-Meneville	+				
	12	*Bombylisoma resplendens* (Brunetti)	+				
	13	*Bombylius (Bombylius) cirrophus* Evenhuis	+				
	14	*Bombylius (Bombylius) major* Linnaeus	+		+	+	
	15	*Bombylius (Bombylius) propinquus* (Brunetti)	+				
	16	*Bombylius (Bombylius) terminalis* (Brunetti)	+				
	17	*Eremyia transcaspica* Paramonov			+		
	18	*Euchariomyia dives* (Bigot)	+				
	19	*Parisus pseudoterminalis* (Brunetti)	+				

Table 2. : *(Cont'd.).*

		SPECIES	ZOOGEOGRAPHIC REGIONS				
			ORIENTAL OUTSIDE INDIA	AFRO-TROPICAL	PALAE-ARCTIC	NEARCTIC	AUSTRA-LASIAN/ OCEANIAN
Tribe BOMBYLIINI	20	*Systoechus flavospinosus* Brunetti	+				
	21	*Systoechus socius* Walker	+				
	22	*Mariobezzia lichtwardti* Becker & Stein	+		+		
Subfamily CYTHERINAE	23	*Callostoma imperator* Nurse	+		+		
Subfamily ANTHRACINAE Tribe ANTHRACINI	24	*Anthrax ceylonicus* (Zaitzev)	+				
	25	*Anthrax niveicaudus* Brunetti	+				
	26	*Anthrax distigma* Wiedemann	+	+			+
	27	*Brachyanax genitilis* (Brunetti)	+				
	28	*Satyramoeba bipunctata* (Fabricius)	+				
	29	*Spogostylum duvaucelli* (Macquart)	+				
Tribe EXOPROSOPINI	30	*Exoprosopa affinisima* Senoir-White	+				
	31	*Exoprosopa disrupta disrupta* Walker		+			
	32	*Exoprosopa efflatouni* Bezzi	+	+	+		
	33	*Exoprosopa flammea* Brunetti	+				
	34	*Exoprosopa niveiventris* Brunetti	+				
	35	*Exoprosopa punjabensis* Nurse	+				
	36	*Exoprosopa tamerlan* Portschinsky	+		+		
	37	*Hetralonia (Homolonia) bengalensis* (Macquart)	+				
	38	*Heteralonia (Isotamia) annandalei* (Brunetti)	+				
	39	*Heteralonia (Isotamia) bramha* (Schiner)	+				
	40	*Heteralonia (Isotamia) brunettii* (Zaitzev)	+				

Table 2. : *(Cont'd.).*

		SPECIES	ZOOGEOGRAPHIC REGIONS				
			ORIENTAL OUTSIDE INDIA	AFRO-TROPICAL	PALAE-ARCTIC	NEARCTIC	AUSTRA-LASIAN/ OCEANIAN
Tribe EXOPROSOPINI	41	*Heteralonia (Isotamia) insulata* (Walker)	+				
	42	*Heteralonia (Isotamia) lankiensis* (Zaitzev)	+				
	43	*Heteralonia (Isotamia) stylata* (Brunetti)					
	44	*Ligyra argyura* Brunetti			+		
	45	*Ligyra flaviventris* (Doeschall)	+				+
	46	*Ligyra fuscipennis* Macquart	+				+
	47	*Ligyra oenomaus* (Rondani)	+				
	48	*Ligyra orientalis* Paramonov	+				
	49	*Ligyra sphinx* (Fabricius)	+				
	50	*Ligyra suffisipennis* (Brunetti)	+				
	51	*Ligyra tantalus* (Fabricius)	+		+		
	52	*Ligyra tristis* (Wulp)	+				
	53	*Litorhina collaris* (Wiedemann)	+				
	54	*Litorhina lar* (Fabricius)	+				+
	55	*Pterobates pennatus* Nurse	+		+		
	56	*Pterobates pennipes* Wiedemann	+				+
Tribe VILLINI	57	*Exhyalanthrax absalon* (Wiedemann)	+				
	58	*Exhyalanthrax keiseri* (Francois)	+				
	59	*Hemipenthes referens* (Walker)	+				
	60	*Pachyanthrax velleris* Greathead			+		

Table 2. : *(Cont'd.).*

		SPECIES	ZOOGEOGRAPHIC REGIONS				
			ORIENTAL OUTSIDE INDIA	AFRO-TROPICAL	PALAE-ARCTIC	NEARCTIC	AUSTRA-LASIAN/ OCEANIAN
Tribe VILLINI	61	*Villa approximata* Brunetti	+				
	62	*Villa baluchianus* (Brunetti)	+				
	63	*Villa brunettii* Evenhuis & Greathead					
	64	*Villa fletcheri* (Brunetti)	+				
	65	*Villa leucopyga* (Macquart)	+				
	66	*Villa manifesta* (Walker)	+				
	67	*Villa panisca* Rossi			+		
	68	*Villa troglodyta* (Fabricius)					+
Tribe XERAMOEBINI	69	*Petrorossia ceylonica* (Brunetti)	+				
	70	*Petrorossia claripennis* (Brunetti)	+				
	71	*Petrorossia intermedia* (Brunetti)	+				

TABLE 3 :

		LIST OF ENDEMIC SPECIES	ENDEMIC REGIONS
Subfamily USIINAE Tribe APOLYSINI	1	*Usia (Usia) marginata* (Brunetti)	Him.
Subfamily PHTHIRIINAE Tribe PHTHIRIINI	2	*Phthiria gracilis* Walker	Him.
Subfamily TOXOPHORINAE Tribe GERONTINI	3	*Geron (Geron) albescens* (Brunetti)	NSZ
Tribe SYSTROPODINI	4	*Systropus (Systropus) eumenoides* Westwood	NSL
	5	*Systropus (Systropus) gracilis* (Enderlein)	Him., E.Him.
Subfamily HETEROTROPINAE	6	*Heterotropus indicus* Nurse	Gh-Pn, W.Gh.
Subfamily BOMBYLIINAE Tribe BOMBYLIINI	7	*Anastoechus bangalorensis* Kapoor & Agarwal	Gh-Pn, W.Gh.
	8	*Anastoechus kashmirensis* Zaitzev	Him.
	9	*Anastoechus longirostris* Wulp	Him.
	10	*Bombomyia maculata* Fabricius	NSZ
	11	*Bombylella albosparsa* Bigot	Gh-Pn.
	12	*Bombylella roonwali* Zaitzev	Gh-Pn, W.Gh.
	13	*Bombylisoma ghorpadei* Kapoor & Agarwal	Gh-Pn, W.Gh.
	14	*Bombylius (Bombylius) ardens* Walker	Gh-Pn, W.Gh.
	15	*Euchariomyia scintillans* (Brunetti)	Gh-Pn, W.Gh.
	16	*Eurycarenus erectus* (Brunetti)	Gh-Pn, W.Gh.
	17	*Systoechus nivalis* Brunetti	Him.
Subfamily CYTHERINAE	18	*Amictus bowdeni* Kapoor & Agarwal	Gh-Pn, W.Gh.
Subfamily ANTHRACINAE Tribe ANTHRACINI	19	*Anthrax argentiapicalis* Brunetti	Gh-Pn, W.Gh.
	20	*Anthrax bigoti* (Brunetti)	Gh-Pn.
	21	*Anthrax gestroi* Brunetti	
	22	*Anthrax indicatus* Nurse	Gh-Pn, W.Gh.
	23	*Anthrax institutus* Walker	NSL
	24	*Anthrax obscurifrons* Brunetti	NSZ
Tribe EXOPROSOPINI	25	*Collosoptera latipennis* (Brunetti)	NSZ
	26	*Exoprosopa abrogata* Nurse	Gh-Pn, W.Gh.
	27	*Exoprosopa basifacia* Walker	Indo-Gan. Pls.
	28	*Exoprosopa puerula* Brunetti	NSZ
	29	*Hetralonia (Acrodisca) andamanica* Pal	Islands

TABLE 3 : *(Cont'd.).*

		LIST OF ENDEMIC SPECIES	ENDEMIC REGIONS
Tribe EXOPROSOPINI	30	*Heteralonia (Homolonia) gujaratica* Nurse	Gh-Pn, W.Gh.
	31	*Heteralonia (Homolonia) lateralis* (Brunetti)	NSZ
	32	*Heteralonia (Isotamia) auriplena* (Walker)	NSL
	33	*Heteralonia (Isotamia) bangalorensis* (Zaitzev)	Gh-Pn, W.Gh.
	34	*Heteralonia (Isotamia) maculiventris* (Brunetti)	NSZ
	35	*Heteralonia (Isotamia) mudigerensis* (Zaitzev)	Gh-Pn, W.Gh.
	36	*Hetralonia (Isotamia) sipho* (Aldrich)	N. E. In, E.Him
	37	*Heteralonia (Isotamia) siva* (Nurse)	NSZ
	38	*Heteralonia (Isotamia) tarikerensis*	Gh-Pn, W.Gh.
	39	*Heteralonia (Isotamia) abjecta*	Gh-Pn, W.Gh.
	40	*Heteralonia (Isotamia) albida*	Gh-Pn, W.Gh.
	41	*Heteralonia scutellata* Bhalla, Grewal & Kapoor	Him.
	42	*Ligyra aurantiaca* Guerin-Meneville	NSZ
	43	*Ligyra peninsularis* Pal	Gh-Pn.
	44	*Ligyra semifuscata* (Brunetti)	NSZ
	45	*Micomitra iridipennis* Nurse	Gh-Pn, W.Gh.
	46	*Micomitra vitrea* (Bigot)	NSZ
	47	*Micomitra vitripennis* Brunetti	Gh-Pn, W.Gh.
Tribe VILLINI	48	*Exhyalanthrax compactus* (Brunetti)	NSZ
	49	*Exhyalanthrax resculus* (Francois)	Gh-Pn.
	50	*Villa andamanensis* Bhalla, Grewal & Kapoor	Islands
	51	*Villa aperta* Walker	NSZ
	52	*Villa aureohirta* (Brunetti)	NSZ
	53	*Villa clara* (Walker)	NSZ
	54	*Villa dia* (Wiedemann)	Gh-Pn.
	55	*Villa fuscolimbata* (Brunetti)	NSZ
	56	*Villa kopanghatiensis* Bhalla, Grewal & Kapoor	Islands
	57	*Villa limpida* (Walker)	NSL
	58	*Villa lucens* (Walker)	NSL
	59	*Villa lucida* (Walker)	NSL
	60	*Villa transversa* (Brunetti)	Him.

TABLE 3 : *(Cont'd.).*

		LIST OF ENDEMIC SPECIES	ENDEMIC REGIONS
Tribe XERAMOEBINI	61	*Petrorossia albofulva* (Walker)	NSZ
	62	*Petrorossia clauseni* (Brunetti)	N.E.In, E.Him.
	63	*Petrorossia curvipennis* Zaitzev	Gh-Pn, W.Gh
	64	*Petrorossia limitarsis* (Brunetti)	Him.
	65	*Petrorossia nigrofemorata* (Brunetti)	NSZ
	66	*Petrorossia orientalis* (Zaitzev)	Him.
	67	*Petrorossia serata* (Aldrich)	N.E.In, E.Him.

Him–Himalayas
E.Him = Eastern Himalayas
NSZ = Not in a Single Zone
Gh-Pn = Ghats & Peninsular
W.Gh = Western Ghats
N.E.In = Northeast India
NSL = No Specified Locality

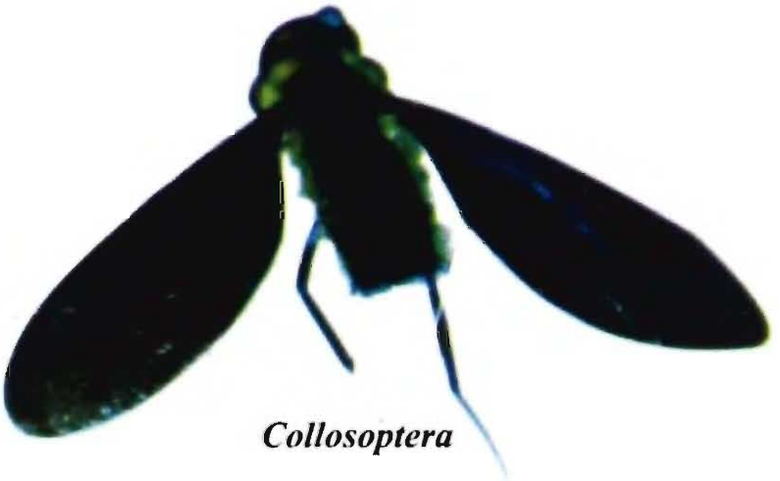
PLATE I

Some genera of Indian Bombyliidae

Bombylius

Exprosopa

Hyperalonia



Collosoptera

PLATE II

Some genera of Indian Bombyliidae

Litorhina

Geron

Ligyra

Villa

PLATE III

Some genera of Indian Bombyliidae

Bombylisoma

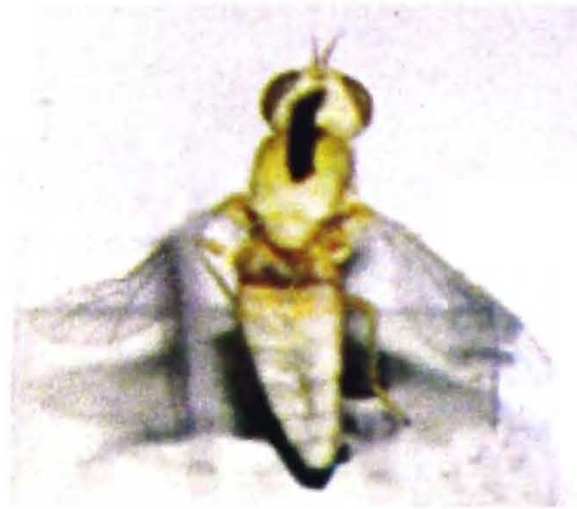
Usia

Toxophora

Systropus

PLATE IV
Some genera of Indian Bombyliidae

Bombyllela



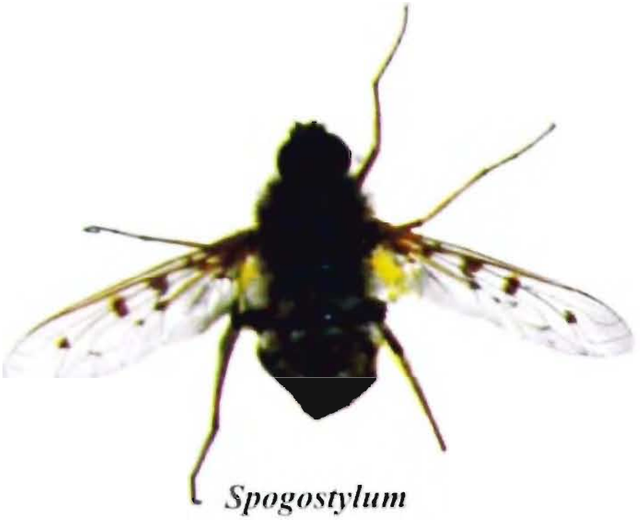
Heterotropus

Systoechus

Petrorossia

PLATE V

Some genera of Indian Bombyliidae



Spogostylum

Heteralonia

Parissus

Exhylanthrax

PLATE VI

Some genera of Indian Bombyliidae

Eurycarenus

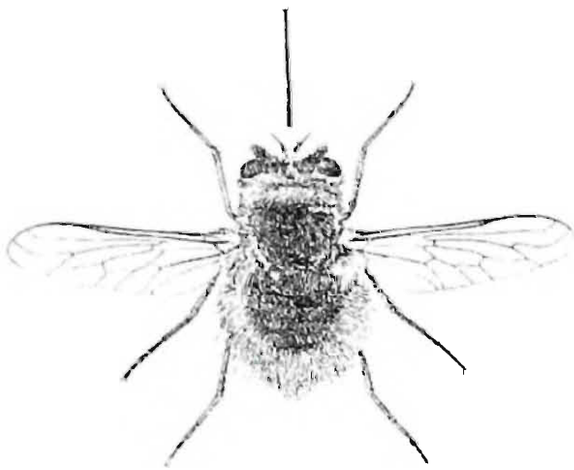
Anthrax

Villa

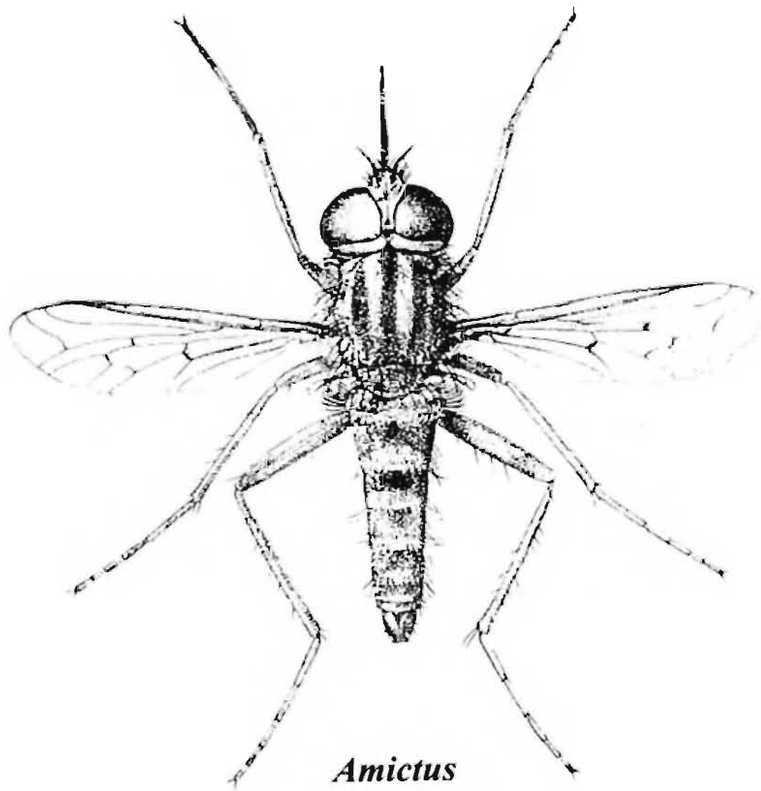
PLATE VII

Some genera of Indian Bombyliidae

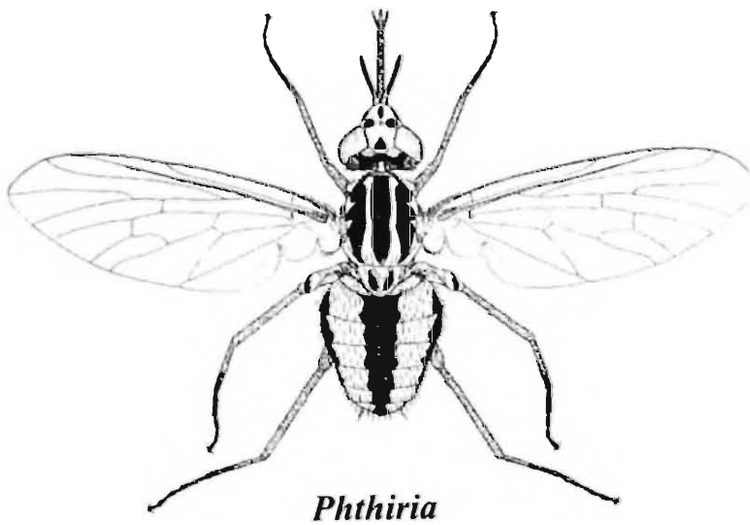
(From Hull, 1973)



Anastoechus



Amictus



Phthiria