

DIPTERA (INSECTA) FROM SUNDARBAN, WEST BENGAL

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INTRODUCTION

Sundarban is composed of a group of islands encompassing area from the mouth of the river Hooghly on the West and extends up to the river Meghna in the East covering four districts—North and South 24-Parganas within Indian territory and Khulna and Barisal in Bangladesh. It lies between 21° 0' and 21° 21' N latitudes and 88° 0' and 89° 0' E longitudes occupying an area of 9827 sq. km. of which 4264 sq. km. falls within the jurisdiction of India.

The name Sundarban derives from the 'Sundari' tree which is predominant in the area.

Although Sundarban fauna pertaining to various groups have been dealt with by different workers, that of insects did not receive much attention. As regards dipteran fauna Annandale (1908, 1910), Brunetti (1912, 1923), Christophers (1933) and Barraud (1934) contributed considerably. Since then there is not much work except that of Ray and Choudhury (1986), and Mandal and Nandi (1989).

An attempt is made here to report on the materials collected by the various tour parties of the Zoological Survey of India, Calcutta and Canning together with the published records. The families dealt with here are Tipulidae, Psychodidae, Phlebotomidae, Culicidae, Cecidomyiidae, Stratiomyidae, Tabanidae, Syrphidae, Pipunculidae, Empididae, Sepsidae, Phoridae, Muscidae, Calliphoridae and Sarcophagidae.

The distributional records of the species are confined to Indian jurisdiction only. For records beyond India the reader may refer to Delfinado and Hardy (eds) 1973, 1975 and 1977.

LIST OF TAXA

Suborder : NEMATOCERA

Family : TIPULIDAE

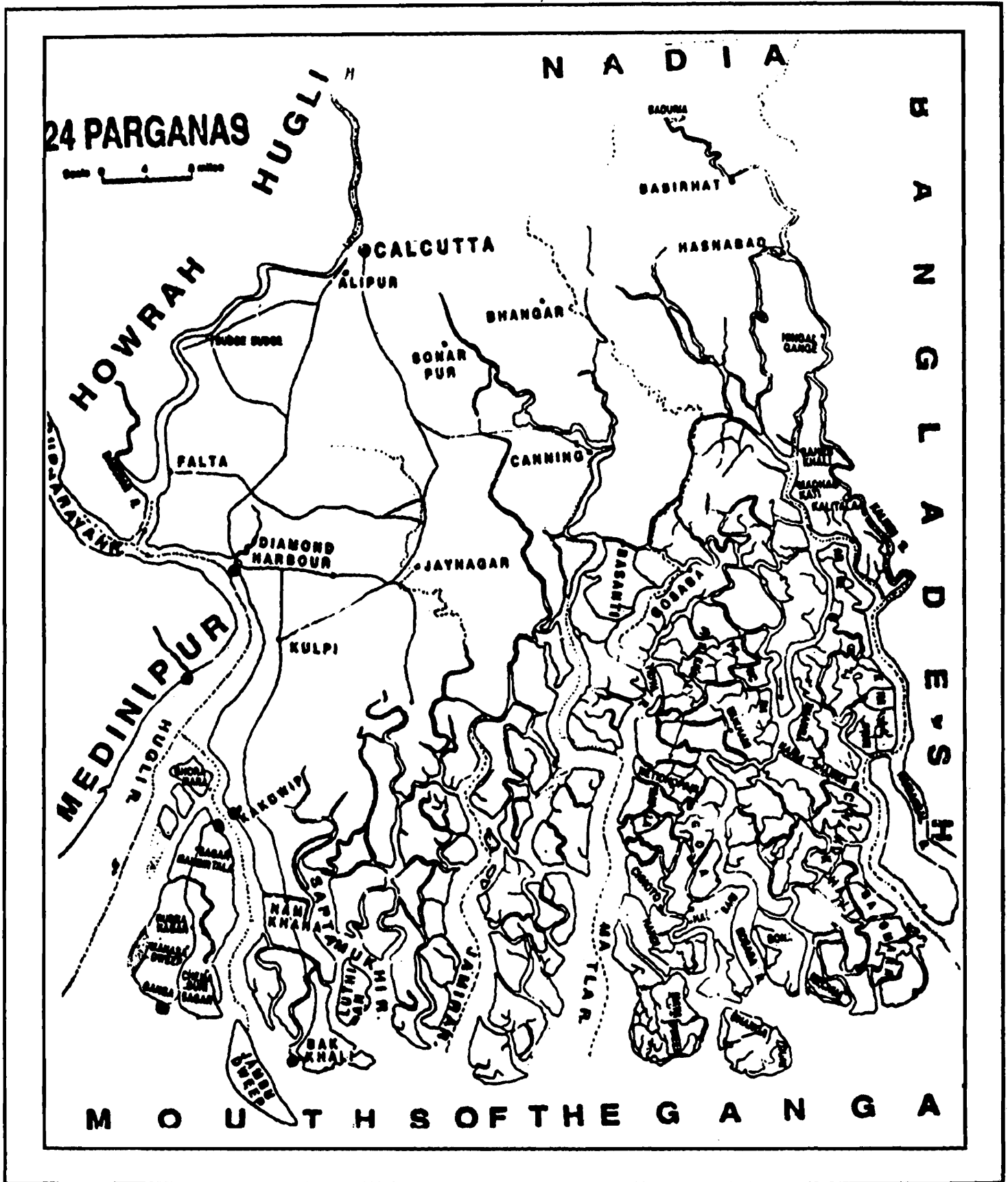
Subfamily : LIMONIINAE

Limonia (Geranomyia) circipunctata (Brunetti)

Limonia (Geranomyia) tridens (Brunetti)

Trentopohlia (Trentepohlia) trentepohlii (Wiedemann)

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MAP OF SUNDERBAN

Family : PHLEBOTOMIDAE

Phlebotomus (Euphlebotomus) argentipes Annandale and Brunetti

Sergentomyia (Parrotomyia) babu (Annandale)

Family : PSYCHODIDAE

Subfamily : PSYCHODINAE

Psychoda alternata Say

P. nigripennis Brunetti

Family : CULICIDAE

Subfamily : ANOPHELINAE

Anopheles (Cellia) subpictus Grassi

Anopheles (Cellia) sundaicus (Rodenwaldt)

Subfamily : CULICINAE

Aedeomyia catasticka Knab

Aedes (Finlaa) niveus (Ludlow)

Culex (Culex) vishnui Theobald

Culex (Lutzia) fuscus Wiedemann

Mansonia (Mansonioides) annulifera Theobald

Family : CECIDOMYIIDAE

Subfamily : CECIDOMYINAE

Stefaniola bengalensis Mani

Suborder : BRACHYCERA

Family : STRATIOMYIDAE

Subfamily : STRATIOMYINAE

Odontomyia dorsoangulata Brunetti

Oplodontha rubrithorax (Macquart)

Family : TABANIDAE

Subfamily : CHRYSOPSINAE

Chrysops dispar (Fabricius)

Subfamily : TABANINAE

Haematopota javana Wiedemann

Tabanus striatus Fabricius

Family : SYRPHIDAE

Subfamily : MYLESIINAE

Mesembrius quadrivittatus (Wiedemann)

Syritta indica (Wiedemann)

Syritta orientalis Macquart

Eristalinus (Eristalinus) obscuritarsis (de Meijere)

Family : PIPUNCULIDAE

Subfamily : PIPUNCULINAE

Pipunculus (Eudorylus) biroi Kertesz

Family : EMPIDIDAE

Subfamily : TACHYDROMIINAE

Drapetis (Elaphropeza) ferruginea Brunetti

Family : PHORIDAE

Subfamily : METOPININAE

Megaselia scalaris Loew

Suborder : CYCLORRHAPHA

Family : SEPSIDAE

Subfamily : SEPSINAE

Sepsis indica Wiedemann

Family : MUSCIDAE

Subfamily : MUSCINAE

Musca (Musca) domestica Linnaeus

Musca (Philaemetomyia) crassirostris Stein

Musca (Byomyia) pattoni Austen

Musca (Eumusca) seniorwhitei Patton

Orthellia indica (Robineau-Desvoidy)

Subfamily : LIMNOPHORINAE

Lispe pumila (Wiedemann)

Subfamily : STOMOXYINAE

Stomoxys calcitrans (Linnaeus)

Stomoxys indica Picard

Family : CALLIPHORIDAE

Subfamily : CHRYSOMYINAE

Chrysomya megacephala (Fabricius)

Subfamily : CALLIPHORINAE

Hemipyrellia pulchra (Wiedemann)

Family : SARCOPHAGIDAE

Subfamily : SARCOPHAGINAE

Parasarcophaga (Liopygia) ruficornis (Fabricius)

Parasarcophaga (Liosarcophaga) dux (Thomson)

Key to the families

1. Antenna with more than 5 segments which are fused into a solid structure 2
- Antenna either with less than 5 segments (generally 3) or with segments of flagellum fused into a solid structure, usually surmounted by a style or arista 7
2. Thorax with a v-shaped suture on scutum *Tipulidae*
- Thorax without such suture 3
3. Wing with 7 longitudinal veins (excluding branching of any of these veins), wing with scales *Culicidae*
- Wing with less than 7 longitudinal vein, wing without scales 4
4. Wing with the second longitudinal vein always forked 5
- Wing with the second longitudinal vein never forked 6
5. Second longitudinal vein forks at or very little before the middle of wing *Phlebotomidae*
- Second longitudinal vein forks quite near the base of wing *Psychodidae*
6. Costal vein ends at tip of wing *Cecidomyiidae*
- Costal vein continues around the whole margin of wing *Chironomidae*
7. Adult without ptilinum or frontal lunule 8
- Adult usually with ptilinum or frontal lunule 13
8. Antennal segment 3 with annulations; leg with 3 distinct pulvilli *Stratiomyidae*
- Antennal segment 3 without annulations 9
9. Basal cells long, atleast one-third the length of wing 10
- Basal cells short 11

10. Vena spuria present between third and fourth longitudinal veins; first posterior cell closed ...
..... *Syrphidae*
— Vena spuria absent; first posterior cell open *Pipunculidae*
11. Venation abnormal, no obvious cross vein present; second and third longitudinal veins united
..... *Phroidae*
— Venation usually normal, at least one cross vein present 12
12. Discal and second basal cells confluent; third longitudinal vein never forked
..... *Dolichopodidae*
— Discal and second basal cells separate; third longitudinal vein often forked
..... *Empididae*
13. Antennal segment 3 without distinct external groove; squama small or vestigial; space between
auxiliary vein and first longitudinal vein not sclerotised *Lonchaedae*
— Antennal segment 2 above with a distinct external groove; squama well developed 14
14. Oral vibrissae present; palpi reduced *Sepsidae*
— Oral vibrissae absent 15
15. Hypopleuron without bristle below spiracle *Muscidae*
— Hypopleuron with a row of strong bristles below spiracle 16
16. Arista of antenna pubescent or with feathering not extending much beyond its middle;
notopleurals invariably 3 or 4 *Sarcophagidae*
— Arista feathered to tip; body usually coloured; notopleurals nearly always 2
..... *Calliphoridae*

SYSTEMATIC ACCOUNT

Family : TIPULIDAE

Commonly called “daddy long-legged flies”, commonly found in damp shady places in hilly areas.

Subfamily : LIMONIINAE

Key to the genera

1. Antenna of 14 joints; wing with 4 posterior cells, discal cell present *Limonia* Meigen
(3 species only)
— Antenna of 16 joints; wing with 3 posterior cells, discal cell absent *Trentepohlia* Bigot
(1 species only)

Genus *Limonia* Meigen

1803. *Limonia* Meigen, *Magazin Insektkde*, 2 : 262. Type-species : *Tipula tripunctata* Fabricius.

Subgenus *Geranomyia* Haliday

1833. *Geranomyia* Haliday, *Magazin Insektkde*, 2 : 262. Type-species : *Tipula tripunctata* Fabricius.

Diagnosis : Proboscis conspicuously prolonged being longer than head and thorax together; wing with three branches of vein M reaching the wing margin, supernumerary cross-vein absent in first anal cell.

Key to the species

1. Thorax yellowish or brownish with a distinct dark brown spot on each side of shoulder and a mark like inverted '3' below it *tridens* Brun.
- Thorax yellow with distinct small black spots 2
2. Thorax with 5 black spots on dorsum *flavicosta* Brun.
- Thorax with a circle of 10 small black spots arranged towards the lateral side of dorsum
..... *circipunctata* Brun.

1. *Limonia (Geranomyia) circipunctata* Brunetti

1912. *Geranomyia flavicosta* Brunetti, *Fauna Brit. India Dipt.*, 1 : 390.

Distribution : West Bengal (Sundarban), Orissa and Tamil Nadu.

2. *Limonia (Geranomyia) flavicosta* Brunetti

1912. *Geranomyia flavicosta* Brunetti, *Fauna Brit. India, Dipt.*, 1 : 389.

Distribution : West Bengal (Sundarban).

3. *Limonia (Geranomyia) tridens* Brunetti

1912. *Geranomyia tridens* Brunetti, *Fauna Brit. India, Dipt.*, 1 : 391.

Distribution : West Bengal (Sunderban).

Genus *Trentepohlia* Bigot

1854. *Trentepohlia* Bigot, *Annl. Soc. ent. Fr.*, (3) 2 : 473. Type-species : *Limnobia trentepohlii* Wiedeman

Subgenus *Trentepohlia* Bigot

1854. *Trentepohlia* Bigot, *Annl. Soc. ent. Fr.*, (3) 2 : 473. Type-species *Limnobia trentepohlii* Wiedemann

Diagnosis : Fifth and sixth longitudinal veins (M_{1+2} and M_{3+4}) fused for a distance back from margin; first posterior cell open.

4. *Trentepohlia (Trentepohlia) trentepohlii* (Wiedemann)

1828. *Limnobia trentepohlii* Wiedemann, *Aussereurop. zweifl. Insekt.*, 1 : 551.

Diagnosis : Body wholly yellowish; antenna dusky with scape blackish; thorax shining with a faint median blackish stripe; legs yellow; wings clear with tip blackish, cross veins suffused.

Distribution : West Bengal (Sundarban), Assam, Bihar, Kerala and Orissa.

Family : PHLEBOTOMIDAE

Commonly called sandfly, occurs in dark or shady damp situations. Females suck blood of vertebrates including man causing irritation. Some species of *Phlebotomus* are vectors of Kala-azar and oriental sore.

Key to the genera

1. Cibarial teeth absent or if present usually in the form of spicules, and not arranged as in *Sergentomyia*. Pigment patch nearly always absent. Posterior end of abdominal tergites 2-6 with erect hairs, sockets as large as on I. Style of male with 3-5 spines and sometimes with 2 or 3 strong hairs *Phlebotomus* Rondani and Berte (1 species only)
- Cibarial teeth in a posterior transverse row, sometimes with fore teeth which mostly point upward. Pigment patch usually present. Hind ends of abdominal tergites 2-6 with all or nearly all hairs recumbent, sockets much smaller than on I. Style of male with 4 major spines and an accessory seta *Sergentomyia* France and Parrot (1 species only)

Subgenus *Euphlebotomus* Theodor

1948. *Euphlebotomus* Theodor, *Bull. ent. Res.*, 39 : 98. Type-species : *Euphlebotomus argentipes* Annandale & Brunetti.

5. *Phlebotomus (Euphlebotomus) argentipes* Annandale & Brunetti

1908. *Phlebotomus argentipes* Annandale & Brunetti, *Rec. Indian Mus.*, 2 : 101.

Diagnosis : Head brownish with concolourous bristly hairs; palpi 5 jointed, second joint more than half the length of the third; thorax covered with thick brownish yellow bristly hairs along with bunches of long bristly hairs; legs very long, femora much shorter than tibiae, metatarsus as long as the remaining tarsal joints combined, wing obtusely pointed at tip, second longitudinal vein (R_{2+3}) forks barely before the middle of wing, fifth vein (Cu_1) straight and long, sixth vein (Cu_2) sinuous; abdomen slender, cylindrical, covered with blackish bristly hairs; male genitalia with long and distinct structures.

Distribution : West Bengal (Sundarban), Bihar, Kerala, Maharashtra, Tamil Nadu and Uttar Pradesh.

Genus *Sergentomyia* France and Parrot

1920. *Sergentomyia* France and Parrot, *Bull. Soc. Path. exot.*, 13 : 699. Type-species : *Phlebotomus minutus* Rondani.

Subgenus *Parrotomyia* Theodor

1958. *Parrotomyia* Theodor, in Lindner, *Fliegen palaearkt. Reg.*, 9C : 42. Type-species : *Phlebotomus africanus* Newstead.

Diagnosis : Spermathecae are round or elliptical smooth capsules. Cibarial teeth in comb-like row, usually of parallel teeth with short points. Pharynx narrow, bulging near hind end, with many, few or no teeth.

6. *Sergentomyia (Parrotomyia) babu* (Annandale)

1910. *Phlebotomus babu* Annandale, *Rec. Indian Mus.*, 4 : 49.

Diagnosis : Second joint of antennal scape bears several rows of flat scales, first three palpal joints short, subequal the fourth one nearly as long as the first three together; thorax not so tumid; hind tibia longer than hind femur, the former being more than twice the length of basitarsus; wings narrow, pointed, the second branch of the second vein slightly longer than its anterior branch, and longer than the distance between the two forks of the vein; abdomen short, beset with upright hairs of different lengths.

Distribution : West Bengal (Sundarban), Bihar, Kerala, Maharashtra, Orissa, Rajasthan and Tamil Nadu.

Family : PSYCHODIDAE

Minute moth-like flies, whole body being covered with long coarse hairs, commonly found in damp and shady situations.

Subfamily : PSYCHODINAE

Genus *Psychoda* Latreille

1796. *Psychoda* Latreille, *Precis caracteres gen. Ins.* : 152. Type-species : *Tipula phalaenoides* Linnaeus.

Diagnosis : Head round, arched, much developed posteriorly; proboscis short; palpi 4 jointed; antennae 15-16 jointed, flagellar joints varying in shape in different species; thorax robust, nearly as broad as long; scutellum small covered with dense pubescence; legs short, robust, tibiae generally longer than femora, shape of wing varies from species to species, always covered with thick hairs; abdomen short, broad, arched, densely pubescent.

Key to the species

1. Wing pale grey, wholly unmarked; flagellum of antenna 14-jointed *nigripennis* Brun.
 — Wing with black hairs spots, flagellum of antenna 10-jointed *alternata* Say

7. *Psychoda alternata* Say

1824. *Psychoda alternata* Say, in Keating, Major Long's second Expedition (Appendix), 2 : 358.

Distribution : West Bengal (Sundarban), Bihar, Himachal Pradesh, Karnataka, Kerala and Uttar Pradesh.

8. *Psychoda nigripennis* Brunetti

1908. *Psychoda nigripennis* Brunetti, *Rec. Indian Mus.*, 2 : 376.

Distribution : West Bengal (Sundarban), Bihar, Himachal Pradesh, Kerala and Uttar Pradesh.

Family : CULICIDAE

Commonly called 'mosquitos' has utmost importance being the intermediary hosts of malaria, yellow-fever, filariasis, dangué etc. *Anopheles culicifacies*, *A. minimus*, *A. stephensis*, *A. fluviatilis* etc. are vectors of malaria. *Aedes aegypti* transmit the virus of dangué; *Culex fatigans* carries the pathogen of elephantiasis. Their larvae may be phytophagous or carnivorous.

Key to the subfamilies

1. Wing usually spotted; palpi long and of about same length as the proboscis in female; in male palpi with 2 apical segments swollen and flattened to be shaped as the head of a golf club ...
 Anophelinae
 — Wing usually unspotted; palpi not as above Culicinae

Subfamily : ANOPHELINAE

Genus *Anopheles* Meigen

1818. *Anopheles* Meigen, *Syst. Besch. europ. Zweifl. insekt.*, 1 : 10, Type-species *Anopheles maculipennis* Meigen.

Diagnosis : Palpi of both sexes equal to the length of proboscis, only male with apical two segments club-shaped; posterior edge of scutellum bar-shaped with hairs on it in a continuous series; male with single claw in fore tarsi; in female abdomen with scattered scales on tergites but rare on sternites.

Subgenus *Cellia* Theobald

1902. *Cellia* Theobald, *J. trop. Med.*, 5 : 183, Type-species : *Anopheles pharoensis* Theobald.

Diagnosis : Wing with at least 4 infuscated areas on costa and first longitudinal vein (R_1); male coxite with 4 or 5 parbasal spines, internal spines absent.

Key to the species

1. Femora and tibiae speckled; base of femora without any dark colour
..... *sundaicus* (Rodenwaldt)
- Femora and tibiae not speckled; each femur with a dark ring at their base
..... *subpictus* Grassi

9. *Anopheles (Cellia) subpictus* Grassi

1899. *Anopheles subpictus* Grassi, *Re. R. Accad. Lincei*, 8 : 101.

Distribution : West Bengal (Sundarban) and most of the states in India.

10. *Anopheles (Cellia) sunaicus* (Rodenwaldt)

1925. *Myzomyia ludlowi* var. *sundaica* Rodenwaldt, *Geneesk Tijdschr. Ned. India*, 65 : 185.

Distribution : West Bengal (Sundarban) and Andaman and Nicobar Islands.

Subfamily : CULICINAE

Key to the genera

1. Pulvilli present; buccopharyngeal armature present in female
..... *Culex* Linnaeus (2 species only)
- Pulvilli absent; buccopharyngeal armature absent in female 2
2. Postspiracular bristles absent; all segments of antenna in female and last two segments of male thick and short
..... *Aedeomyia* Theobald (1 species only)
- Postspiracular bristles present; antenna of different shape 3
3. Wing scales unusually broad and many asymmetrical; tergite VIII of female with a row of short tooth-like spines; apical segment of palpi in male minute
..... *Mansonia* Blanchard (2 species only)
- Wing scales not unusually broad; tergite VIII of female without spines; apical segment of palpi in male of moderate length
..... *Aedes* Meigen (1 species only)

Genus *Aedes* Meigen

1818. *Aedes* Meigen, *Syst. Besch. europ. Zweifl. Insekt.*, 1 : 13. Type-species; *A. cinereus* Meigen.

Subgenus *Finlaya* Theobald

1903. *Finlaya* Theobald, *Monogr. Cul.*, 3 : 281. Type-species : *Culex kochi*. Donitz.

Diagnosis : Species with ornamentation and scales variable; proboscis longer than fore femur; palpi of male half to full length of proboscis, in female less than one-fourth of proboscis; tarsal claws of fore and mid legs toothed; abdomen with sternite VIII large and prominent.

11. *Aedes (Finlaya) niveus* (Ludlow)

1903. *Stegomyia niveus* Ludlow, in Theobald, *Monogr. Cul.*, 3 : 139.

Diagnosis : In male scales on dorsum of head black with a narrow silvery eye margin, mesonotum with a large snow-white patch in front; in female mesonotum divided into lateral patches; scutellum covered with black scales; wing scales all dark, except for a short line of pale ones.

Distribution : West Bengal (Sundarban) and Andaman Islands.

Genus *Culex* Linnaeus

1758. *Culex* Linnaeus, *Syst. Nat.*, 10 : 602. Type-species : *C. pipiens* Linnaeus.

Key to the subgenera

1. Four or more lower mesepimeral bristles *Lutzia* Theobald
 — One or two lower mesepimeral bristles *Culex* Linnaeus

Subgenus *Culex* Linnaeus

1758. *Culex* Linnaeus, *Syst. Nat.* 10 : 1 : 602. Type-species : *C. pipiens* Linn.

12. *Culex (Culex) vishnui* Theobald

1901. *Culex vishnui* Theobald, *Monogr. Cul.*, 1 : 355.

Diagnosis : Proboscis dark brown with a pale band nearer to apex; mesonotum usually covered with golden brown or pale brown scales, in cases there may be an admixture of dark-brown and pale-brown forming a pattern; wing dark scaled; fore and mid femora dark brown on anterior surface being devoid of speckling of pale scales, hind femur with pale scalling on outer side, mid and hind tibiae with pale stripes on outer side for its whole length; abdominal tergites dark brown with ochreous basal bands.

Distribution : It is one of the common Indian species spreading almost all over the states of India including Sunderban in West Bengal.

Subgenus *Lutzia* Theobald

1903. *Lutzia* Theobald, *Monogr. Cul.*, 3 : 155. Type-species : *Culex bigoti* Bellardi.

13. *Culex (Lutzia) fuscanus* Wiedemann

1820. *Culex fuscanus* Wiedemann. *Dipt. exot.*, 1 : 9.

Diagnosis : Proboscis dark brown with wide pale yellow area in middle both dorsally and ventrally; mesonotum with indefinite faint line and spots formed by the admixture of dark brown and lighter scales, two pairs of pale spots present—one pair at level of anterior spiracle and the other pair at wing level; wing with dark scales; fore and mid femora anteriorly sprinkled with pale scales, tibiae predominantly speckled with pale scales; abdominal tergites V-VIII entirely yellow scales or with broad apical bands, II-IV entirely dark or with very narrow apical bands.

Distribution : West Bengal (Sundarban), Andaman Islands, Assam and some other states of India.

Genus *Mansonia* Blanchard

1900. *Panoplitis* Theobald, *Rep. Colla. Mosq. Br. Mus.* 5 (Preoccupied Gould 1854). Type-species : *Culex taeniorhyncus* Wiedemann.

Subgenus *Mansonioides* Theobald

1907. *Mansonioides* Theobald, *Monogr. Cul.*, 4 : 498. Type-species : *M. septemquittata* Theobald.

Diagnosis : Palpi of male longer than proboscis; pleura with well developed bristles, 10-12 postspiracular, 9-15 proepimeron, 12-18 upper mesepimeral, 4-9 at lower part of mesepimeron; tergite VIII of female with a number of chitinous hooks or teeth, phallosome with a small tooth at apex, paraprocts with a few teeth at crown and with minute hairs.

14. *Mansonia (Mansonioides) annulifera* (Theobald)

1903. *Panoplitis annulifera* Theobald, *Monogr. Cal.* 2 : 183.

Diagnosis : Yellowish-brown species; in female palpi about one-third length of proboscis and in male three-fourth of proboscis; flagellum of antenna brown with lighter rings, scutum with 2 distinct round white spots on anterior margin and another 2 at wing level together with 3 less distinct spots; wing speckled with yellowish and dark brown asymmetrical scales; legs yellow with about 5 snow-white rings on each femora, tibiae with 4-5 rings of similar colour, knees white; abdomen with varied colour scaling on dorsum, tergite VIII with lateral chitinous hooks.

Distribution : West Bengal (Sundarban) and Assam, Bihar, Maharashtra, Madhya Pradesh and Uttar Pradesh.

Genus *Aedeomyia* Theobald

1901. *Aedeomyia* Theobald, *J. trop. Med.*, 4 : 235. Type-species : *Aedes squamipenna* Lynch.

15. *Aedeomyia catasticta* Knab

1909. *Aedeomyia catasticta* Knab, *Ent. News*, 20 : 387.

Diagnosis : Palpi less than one-fourth of proboscis; proboscis black with 3 white rings; scutum with a median broad stripe of ochre-yellow scales which spreads posteriorly in the level of wing; legs dark brown, speckled and spotted with yellowish and white scales; abdomen dorsally covered with ochre-yellow scales and patches of white scales laterally.

Distribution : West Bengal (Sundarban) and Assam, Bihar, Madhya Pradesh, Maharashtra, Orissa and South India.

Family : CECIDOMYIIDAE

Commonly called 'gall midges', are minute fragile flies. Larvae have wide range of habits—predaceous on mites, small insects; feed on decomposing organic matters and great majority feed on tissues of leave and stems of plants and form gall almost in all parts of plants.

Genus *Stefaniola* Kieffer

1898. *Stefaniola* Kieffer, *Synopse des Cecidomyies Kieffer d' Europe et 'd' Algerie* : 55.

Diagnosis : Antenna 11 segmented, palpi uniarticulate, characterised by its obliquely truncate ovipositor with a row of hooks dorsally and small head covered by the mesonotum.

16. *Stefaniola bengalensis* Mani

1934. *Stefaniola bengalensis* Mani, *Rec. Indian Mus.*, 36 : 401.

Diagnosis : Although the genus possesses only 11 antennal segments the species in question has 20 segments and moderately setose; palpi uniarticulate, with the length two and half times its diameter; claws strongly curved, simple; empodium well developed, longer than claws.

Distribution : West Bengal (Sundarban).

Family : STRATIOMYIDAE

Commonly called "soldier flies" found around garbage, in forest, dense vegetations, grass meadows and on flowers.

Subfamily : STRATIOMYINAE

Key to the genera

1. Legs generally entirely pale and without distinct femoral bands
 *Odontomyia* Meigen (1 species only)
- Legs coloured otherwise and with distinct broad black bands on some femora
 *Oplodontha* Rondani (1 species only)

Genus *Odontomyia* Meigen

1803. *Odontomyia* Meigen, *Magazin Insektkde*, 2 : 265. Type-species : *Musca hydroleon* L.

17. *Odontomyia dorsoangulata* Brunetti

1920. *Odontomyia dorsoangulata* Brunetti, *Fauna Brit. India*, Diptera, 2 : 68.

Diagnosis : Vertical triangle black with short yellow hairs; antennae orange, third segment with 4-annulations and a long narrow pointed style; thorax black with golden-yellow or brassy pubescence; scutellum shining apple green or yellow, narrowly black at base; wing clear; legs orange except tips of tarsi brownish; abdomen pale yellowish, varying from greenish-yellow to brownish, tergites 1-5 each with black spot of varying shape and size.

Distribution : West Bengal (Sundarban), Bihar, Karnataka and Tamil Nadu.

Genus *Oplodontha* Rondani

1863. *Oplodontha* Rondani, *Dipt. exot.*, : 78. Type-species *Stratiomys viridula* Fabricius.

18. *Oplodontha rubrithorax* (Macquart)

1838. *Odontomyia rubrithorax* Macquart, *Mem. Soc. Sci. Agric. Lille*, 1838 : 189 (185).

Diagnosis : In male eyes with upper faces much longer than lower ones; head with a black tubercle below antennae; thorax dull black with golden or brassy pubescence; scutellum black with golden dusts; legs orange yellow, fore femur with a narrow brown ring in the middle or a streak below middle femur with a brown streak below which sometimes form a ring; wing colourless; abdomen pale greenish or yellowish.

Distribution : West Bengal (Sundarban) and Uttar Pradesh.

Family : TABANIDAE

Commonly called 'horse flies' or 'deer flies' found in forest, vegetations and near cattle sheds; females are blood sucker of mammals.

Key to the subfamilies

1. Ocelli well developed; hind tibia with a pair of apical spurs **Chrysopsinae**
 — Ocelli rudimentary or absent; hind tibia without apical spur **Tabaninae**

Subfamily : **CHRYSOPSINAE**Genus *Chrysops* Meigen

1803. *Chrysops* Meigen, *Magazin Insektdke*, 2 : 267. Type-species : *Tabanus caecutiens* Linnaeus.

Diagnosis : Slender flies with large angular spots or variegated dark markings on eyes; antenna long, often as long as head and thorax together; wings banded.

19. *Chrysops dispar* (Fabricius)

1798. *Tabanus dispar* Fabricius, *Ent. Syst. Suppl* : 567.

Materials examined : 1 ♂, West Bengal : Port Canning, VIII. 1907, Coll. N. A.

Diagnosis : Abdomen with inverted black v-marking on tergum 2, its arms extending to 3 and sometimes 4 also.

Distribution : West Bengal (Sundarban) and also widely distributed in India.

Subfamily : **TABANINAE***Key to the genera*

1. Antennal style quadriangulate; wing clear; tibiae uniformly coloured
 *Tabanus* Linnaeus (1 species only)
 — Antennal style triangulate; wings with pale spots, wavy lines or punctulations; mid and hind tibiae with 2 pale rings *Haematopota* Meigen (1 species only)

Genus *Haematopota* Meigen

1803. *Haematopota* Meigen, *Magazin Insektdke*, 2 : 67. Type-species : *Tabanus pluvialis* L.

20. *Haematopota javana* Wiedemann

1821. *Haematopota javana* Wiedemann, *Dipt. exot.*, 1 : 100.

Diagnosis : Frontal callus yellow; scutum with broad pale band covering subscutelar suture; scutellum distinctly bicoloured, base pale, posterior margin darken; subapical band of wing double; fore coxa usually brown, fore tibia slightly swollen, hind tibia robust.

Distribution : West Bengal (Sundarban), Bihar, Mizoram and Tamil Nadu.

Genus *Tabanus* Linnaeus

1758. *Tabanus* Linnaeus, *Syst. Nat. Ed.*, 10 : 601. Type-species : *Tabanus bovinus* Linnaeus.

21. *Tabanus striatus* Fabricius

1787. *Tabanus striatus* Fabricius, *Mantissa Inset.* 2 : 356.

Material examined : 2 ♂, West Bengal : Port Canning, 21.iii.1907, Coll. N. A.

Diagnosis : Antennae rusty yellow; callus squire; thorax with broad whitish stripes and with a line in the middle; wings hyaline; femur rusty brown, tibiae paler, tarsi blackish; abdomen with 5 dorsal stripes.

Distribution : Widely distributed in India including West Bengal (Sundarban).

Family : SYRPHIDAE

Commonly called 'hover flies' or 'flower flies' are flower visitors and greatly helps in pollination. Larvae feeds on aphids, scale insects and soft bodied insects and few cause myiasis in man.

Subfamily : MYIESIINAE

Key to the genera

1. Hind femur extremely increased with short rigid spines below; second abdominal segment projected backward, laterally bearing a fringe of hairs
..... *Syritta* St. Farg. et. Serv. (2 species only)
- Hind femur well developed with anterior basal patch of setulae 2
2. Eyes pilose; marginal cell closed *Eristalinus* Rondani (1 species only)
- Eyes bare; marginal cell open at wing margin *Mesembrius* Rondani (1 species only)

Genus *Eristalinus* Rondani

1845. *Eristalinus* Rondani, *Nouvi Annali Sci. nat. Bologna*, 2 (2) : 453. Type-species : *Musca sepulchralis* Linnaeus.

Subgenus *Eristalinus* Rondani

Diagnosis : Metathoracic spiracular hair patch absent; hind tibia not thickened.

22. *Eristalinus (Eristalinus) obscuritarsis* (de Meij.)

1908. *Eristalis obscuritarsis* de Meijere, *Tijdscht. Ent.* 51 : 250.

Diagnosis : Abdomen with transverse bands or spots; femora black with pale tips, tarsi black, may be basally pale.

Distribution : West Bengal (Sundarban) and from Kashmir down to Kerala.

Genus *Mesembrius* Rondani

1857. *Mesembrius* Rondani, *Dipterol. ital. Prodr.*, 2 : 50. Type-species : *Helophilus peregrinus* Loew.

23. *Mesembrius quadrivittatus* (Wiedemann)

1819. *Eristalis quadrivittatus* Wiedemann, *Zool. Mag.*, 1 : 26.

Diagnosis : Eyes in both sexes with uniformly thick facets; thorax yellow with three longitudinal black stripes; coxae black, femora shining black, hind femur with a distinct comb-like fringe of stiff, black hairs from base to tip, hind tibia suddenly narrowed near tip forming a tooth-like structure; wing pale grey, squama yellow with yellow fringe; abdomen mainly orange with black varied markings on all segments, genitalia shining black.

Distribution : West Bengal (Sundarban), Assam, Bihar, Gujarat, Karnataka, Madhya Pradesh, Orissa and Tamil Nadu.

Genus *Syritta* Lepeletier and Serville

1828. *Syritta* Lepeletier and Serville, *Encyl. meth. (Ins.)*, 10(2) : 808. Type-species : *Musca pipiens* L.

Key to the species

1. Hind femur entirely orange or brownish basally up to one-third or even two-thirds, rest black *indica* (Wiedemann)
- Hind femur entirely black or very narrowly pale at extreme tip and base *orientalis* Macquart

24. *Syritta indica* (Wiedemann)

1824. *Eumerus indicus* Wiedemann, *Analecta. Ent.*, : 33.

Distribution : West Bengal (Sundarban), Assam, Bihar, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Pondicherry and Uttar Pradesh.

25. *Syritta orientalis* Macquart

1824. *Syritta orientalis* Macquart, *Dipt. exot.*, 2 (2) : 76 (136).

Distribution : West Bengal (Sundarban), Bihar and Pondicherry.

Family : PIPUNCULIDAE

Commonly called 'big-headed flies' found hovering on flowers; larvae are endoparasitic on Hemiptera.

Subfamily : PIPUNCULINAE

Genus *Pipunculus* Latreille

1802. *Pipunculus* Latreille, *Hist. Nat. Crust. Ins.*, 3 : 463. Type-species : *P. compestris* Latreille.

Diagnosis : Head almost globose, eyes very large, antennae moderately long, first segment short, second more or less cup-shaped, third segment back-shaped; thorax subquadrate, pubescent, scutellum with microscopic marginal bristles; auxiliary, first and second longitudinal veins ends well before wing tip; third vein curved upwards and ends at wing tip, fourth vein curves downwards near tip of discal cell and again upwards shaping the first posterior cell very broad in the middle, fifth vein forked; abdomen cylindrical, 5-segmented, curved downwards.

26. *Pipunculus (Eudorylas) biroi* Kertész

1903. *Pipunculus biroi* Kertész, *Annl. hist-nat. Mus. natn. hung.*, 1 : 466.

Diagnosis : Frons brownish, grey-dusted, with an elongate black streak just below middle and with a white shimmer above antennae; face brightly shining white; first two antennal joints blackish, third yellowish grey with a white shimmer; thorax olive grey; scutellum brownishgrey; wing with brownish stigma, anterior crossvein barely before middle of discal cell; femora dark grey with tips of all and base of hind pair orange, tibiae orange, tarsi orange except their tips blackish; abdomen dark ash-grey.

Distribution : West Bengal (Sundarban), Assam, Bihar and Uttar Pradesh.

Family : EMPIDIDAE

Commonly called 'dance flies' found on flowers, in woods, in the pools and streams and prey upon soft bodied insects.

Subfamily : TACHYDROMIINAE

Genus *Drapetis* Meigen

1822. *Drapetis* Meigen, *Syst. Besch.*, 3 : 91. Type-species : *Drapetis exilis* Meigen.

Diagnosis : Eyes micropubescent; palpi single jointed; second antennal joint slightly broader at tip, third short, ovate; thorax squarish, roundish at humeral region, dorsum micropubescent; scutellum with two bristles; legs short and strong, fore and hind femora thickened, tibiae with or without spur, hind tibia with a small bump at tip; auxiliary vein indistinct, ending free, discal cell absent, first basal cell much shorter than second; abdomen 8-segmented, short and robust.

Subgenus *Elaphropeza* Macquart

1827. *Elaphropeza* Macquart, *Inst. Dipt. N. Fr.*, 3 : 86. Type-species : *Tachydromia ehippiata* Fallen.

Diagnosis : Third antennal joint elongate, conical; legs slender, fore tibia with short spur; abdomen elongate and relatively less broad.

27. *Drapetis (Elaphropeza) ferruginea* Brunetti

1913. *Elaphropeza ferruginae* Brunetti, *Rec. Indian Mus.*, 9 : 43.

Diagnosis : Eyes closely contiguous both above and below; antennae with basal joints brownish-yellow, third joint elongate, conical, densely pubescent; thorax wholly brownish-yellow; scutellum blackish; legs wholly brownish-yellow; wing pale yellow; abdomen blackish with pale pubescence.

Distribution : West Bengal (Sundarban).

Family : PHORIDAE

Commonly called 'scuttle flies' are seen on decaying vegetations and animal matters. Larvae also feed on decaying vegetations and animal matters.

Genus *Megaselia* Rondani

1856. *Megaselia* Rondani, *Dipterol. ital. Prodr.*, 1 : 137. Type-species : *M. crassineura* Rondani.

Diagnosis : Frons with two pairs of proclinate bristles on anteromedian projection; wing with the radial vein branched apically; hind tibia bears only apical bristles.

Subgenus *Megaselia* Rondani

28. *Megaselia (Megaselia) scalaris* (Loew)

1866. *Phora scalaris* Loew, *Berl. ent. Z.*, 10 : 53.

Diagnosis : Thoracic pleuron creamy; hind femur with dark apical spot; abdominal tergites black with anteromedian yellow areas.

Distribution : West Bengal (Sundarban) and widely distributed in many parts of India.

Family : SEPSIDAE

Ant-like flies, found on herbage, excrement, dung, decaying matters; larvae are coprophagus.

Subfamily : SEPSINAE

Genus *Sepsis* Fallen

1810. *Sepsis* Fallen, *Sp. Ent. nov. Dipt.* : 17. Type-species : *Musca cynipsea* Linnaeus.

Diagnosis : Thorax and abdomen usually shining; wing with first and second basal cells distinct; abdomen in both the sexes with distinct macrochaetae; epandrial process not bifurcated at tip.

29. *Sepsis indica* Wiedemann

1824. *Sepsis indica* Wiedemann, *Analecta Ent.*, : 57.

Diagnosis : Frons and face varying from reddish-yellow to nearly black; proboscis yellow; thorax reddish-yellow with a broad black longitudinal stripe, the stripe sometimes reduced, lateral margins with a broad whitish shimmering band across the sternopleuron; scutellum and metanotum reddish yellow; legs reddish yellow, fore femur in male with a peg-like bump in the middle bearing 3-4 short spines followed by a leaf-shaped appendage, fore tibiae slightly enlarged just below base and again on apical half where it bears a row of stiff short spiny bristles; wing clear; abdomen reddish yellow, 3-4 tergites bears 4 strong spiny bristles; genitalia reddish yellow with 2 strong bristles.

Distribution : Widely distributed species in India including Sundarban in West Bengal.

Family : MUSCIDAE

The commonly called 'house-fly' occur in all zoogeographical regions. Adults are generally saprophagous, but some species have biting habit and carry germs of diseases and some are mechanical carrier of germs.

Key to the subfamilies

1. Pteropleuron hairy on upper embosed part 2
- Pteropleuron bare, hind tibia without a pd seta and with at most a small preapical
..... *Limnophorinae*
2. Proboscis licking type, arista long plumose Muscinae
- Proboscis of blood-sucking type, arista pectinate or with a few rays on underside
..... Stomoxydinae

Subfamily : MUSCINAE

Key to the genera

1. Thorax and abdomen black or yellow with vittae; prostigmal bristle present
..... *Musca* L. (4 species only)
- Thorax and abdomen metallic blue, green or purple, without dense pollinosity; suprasquamal ridge hairy *Orthellia* Rob, Desv. (1 species only)

Genus *Musca* L.

1758. *Musca* Linnaeus, *Syst. Nat. Ed. 10* : 589. Type-species : *Musca domestica* L.

Key to the subgenera

1. Mid tibia without an av seta2
 — Mid tibia with an av seta3
2. Propleural depression hairy *Musca* S. Str
 — Propleural depression bare, mid tibia without an au submedian seta *Byomyia* Rob. Desv.
3. Suprasquamosal ridge completely bare *Philaematomyia* Austin
 — Suprasquamosal ridge hairy on anterior region *Eumusca* Townsend

Subgenus *Musca* Linnaeus

1915. *Promusca* Townsend, *J. Wash. Acad. Sci.*, 5 : 434. Type-species : *Musca domestica* Linnaeus.

30. *Musca (Musca) domestica* Linnaeus

1758. *Musca domestica* Linnaeus, *Syst. Nat. Ed.* 10 : 596.

Material examined : 2 ♂, 1 ♀, West Bengal, Port Canning, 20.iii.1908, Coll. N. A.

Diagnosis : Propleuron hairy in the depression between humeral callus and propleural bristles; ventrobasal scale setulose; suprasquamal ridge bare; fore tibia without a submedian pv bristle; thorax with 4 black vittae; all post dc strong.

Distribution : Almost cosmopolitan.

Subgenus *Philaematomyia* Austen

1909. *Philaematomyia* Austen, *Ann. Mag. Nat. Hist.*, (8) 3 : 295. Type-species : *P. insignis* Austen

31. *Musca (Philaematomyia) crassirostris* Stein

1903. *Musca crassirostris* Stein, *Mitt. Zool. Mus. Berl.*, 2 : 99.

Material examined : 2 ♂, West Bengal, Canning, 6.xi.1984, Coll. B. N. Das.

Diagnosis : Thorax except for 4 narrow vittae, which remain separate and abdomen except for the basal part of segment 1, almost eventually covered with dense greyish dust; sides of mesonotum in the supra-alar area, sides of scutellum at base, and a wide-shaped median spot on the abdominal segments fuscous; vein r_{4+5} setulose at base only.

Distribution : Widely distributed in oriental region including Sundarban in West Bengal.

Subgenus *Byomyia* Rob.-Desv.

1830. *Byomyia* Rob.-Desv., (*Byomyia*) *Mem. Pres. div. Sav. Acad. Sci. Inst. Fr.*, 2 : 392. Type-species : *B. violacea* Rob. Desv.

32. *Musca (Byomya) pattoni* Austen

1910. *Musca pattoni* Austen, *Ann. Mag. nat. Hist.*, (8) 5 : 115.

Material examined : 2 ♂, 2 ♀, West Bengal : Canning, 6.xi.1984, Coll. B. N. Das.

Diagnosis : Thorax with 4 conspicuous, well separated vittai; scutellum with an apical and 2 basal spots—one at base and the other laterally; propleural depression bare, suprasquamal ridge without setulae; fore tibia without a p seta, mid tibia without an av or ad seta; setulae on vein r_{4+5} confined to base generally; abdomen pale ferruginous, male hypopygium dark.

Distribution : Widely distributed in India including Sundarban in West Bengal.

Subgenus *Eumusca* Townsend

1911. *Eumusca* Townsend, *Proc. ent. Soc. Wash.*, 13 : 170. Type-species : *E. corvina* Fabricius = *autumnalis* De Geer.

33. *Musca (Eumusca) seniorwhitei* Patton

1922. *Musca seniorwhitei* Patton, *Indian J. med. Res.*, 10 : 73.

Material examined : 1 ♂, West Bengal, Canning, 6.xi.1984, Coll. B. N. Das.

Diagnosis : Thorax with 4 black vittae, inner ones in males reaching upto middle of its length and widened at its end; scutellum with a basal spot laterally and another at apex; suprasquamal ridge with a group of bristles on anterior part; vein r_{4+5} setulose almost upto apex on underside; fore tibia without a pv seta, mid tibia with 1-3 av seta; abdomen with a complete glossy black median vitta which gradually narrowed and reaches to fourth segment.

Distribution : West Bengal (Sundarban), Andhra Pradesh and Tamil Nadu.

Genus *Orthellia* Robineau-Desvoidy

1863. *Orthellia* Robineau-Desvoidy, *Hist. nat. Dipt. env. Paris*, 2 : 837. Type-species : *O. rectinervis* Rob. Desv.

34. *Orthellia indica* Robineau-Desvoidy

1830. *Lucilia indica* Robineau-Desvoidy, *Mem. Pres. div. Sav. Acad. Inst. Fr.* : 453.

Material examined : 1 ♂, West Bengal, Canning, 6.xi.1984, Coll. B. N. Das.

Diagnosis : Bronze green to blueish-green species; occiput metallic green, eyes bare, in male facets highly enlarged on upper parts; second antennal segment and base of third bright reddish; thorax with linear vittae, presutural acrostichal absent, postsutural only one; legs ferruginous brown, mid tibia with an ad seta; stem vein with one setula, vein m with subangular bend and with slight dip behind it; abdomen without setae.

Distribution : Widely distributed in India including Sundarban in West Bengal.

Subfamily : LIMNOPHORINAE

Genus *Lispe* Latreille

1796. *Lispe* Latreille, *Precis caract gen. Ins.* : 169. Type-species : *Musca tentaculata* (De Geer).

Diagnosis : Palpi spoon shaped; arista long plumose usually upto basal half, prst ac absent; prosternum and hypopleura bare, pteropleura hairy; vein m_{1+2} not upcurved; lower squama tongue-shaped.

35. *Lispa pumila* (Wiedemann)

1824. *Coenosia pumila* Wiedemann, *Analecta Entomol.* : 51.

Diagnosis : Body non metallic; third antennal segment black; palpi orange or yellow at least apices; cell R5 not narrow apically; legs orange; dorsocentral bristles strong, presutural dorsocentral 2; abdomen with a pair of rectangular markings on 3-5 tergites.

Distribution : West Bengal (Sundarban), Andhra Pradesh, Assam, Bihar and Tamil Nadu.

Subfamily : STOMOXYINAE

Genus *Stomoxys* Geoffroy St. Halaire

1762. *Stomoxys* Geoffroy St. Halaire, *Hist. Ins.* 2 : 538. Type-species : *Conops calcitrans* L.

Diagnosis : Eyes with its hind margin conspicuously emerginate; antennal arista long pectinate dorsally, bare below; proboscis slender, very long; palpi less than half of proboscis; propleural depression with erect setulose hairs, sternopleuron 0 + 1; hind femur with strong av preapical setae, tibiae without submedian setae; vein r_{4+5} well setulose, R5 widely open at apex; abdomen short, semicircular type.

Key to the species

1. Setulae at base of r_{4+5} not reaching r-m; vein m strongly upcurved and distinctly sinuous near apex *calcitrans* (Linn.)
- Setulae at base of r_{4+5} crossed r-m; vein m moderately upcurved and barely sinuous near apex *indica* Picard

36. *Stomoxys calcitrans* (Linnaeus)

1758. *Conops calcitrans* Linnaeus, *Syst. nat.*, 10 : 604.

Material examined : 1 ♀, West Bengal, Canning, 6.xi.1984, Coll. B. N. Das.

Distribution : Widely distributed in India including Sundarban in West Bengal.

37. *Stomoxys indica* Picard

1908. *Stomoxys indica* Picard, *Bull. Soc. ent. Fr.*, 1908 : 20.

Material examined : 2 ♂, West Bengal, Canning, 6.xi.1984, Coll. B. N. Das.

Distribution : West Bengal (Sundarban), Andhra Pradesh, Assam, Bihar, Himachal Pradesh, Kerala and Uttar Pradesh.

Family : CALLIPHORIDAE

Commonly known as 'blow flies' or 'blue-green bottle flies.' Adults feed on nectar, excrement, decaying plants or animal matters. Larvae parasitic on insects, earthworms, snails etc. Some causes myiasis in man and animals.

Key to the subfamily

1. Stem vein of wing setulose on postero-dorsal surface of basal section Chrysomyinae
- Stem vein of wing not setulose on postero-dorsal surface of basal section Calliphorinae

Subfamily : CHRYSOMYINAE

Genus *Chrysomya* Rob.-Desv.

1830. *Chrysomya* Robineau-Desvoidy, *Mem. pres. div. Sav. Acad. Sci. Inst. Fr.* : 444. Type-species : *Chrysomya marginalis* Wied. = *C. regalis* Rob.-Desv.

Diagnosis : Small to medium sized-flies, usually metallic greenish blue in colour; eyes large and bare; prostigmatic bristles present or absent; propleuron and prosternum hairy; suprasquamal ridge usually with anterior parasquamal tuft; subcostal sclerite hairy; tergum 5 with many fine erect bristles on disc.

38. *Chrysomya megacephala* (Fabricius)

1794. *Musca megacephala* Fabricius, *Syst. Ent.*, 4 : 317.

Material examined : 3 ♂, 4 ♀, West Bengal, 24 Parganas (South) Canning, 3.iii.1986, Coll. B. N. Das.

Diagnosis : Eyes in male with upper facets strongly enlarged and sharply demarcated from small ones in the lower third; prostigmal bristle absent; antennal segment 3 entirely orange; thorax and abdomen greenish-blue with purple lustre; wing hyaline, dark at base, subcostal sclerite covered with brown pubescence and a few short erect hairs, upper squama white, dark margined.

Distribution : West Bengal (Sundarban) and most common in other states in India.

Subfamily : CALLIPHORINAE

Genus *Hemipyrellia* Townsend

1918. *Hemipyrellia* Townsend, *Insecutor. Insit. menst.*, 6 : 154. Type-species : *Lucilia fernandica* Macq.

39. *Hemipyrellia pulchra* (Wiedemann)

1830. *Musca pulchra* Wiedemann, *Aussereurop. Zweifl. insekt.*, 2 : 406.

Material examined : 1 ♂, West Bengal, 24 Parganas (South), Canning, 3.iii.1986, Coll. B. N. Das

Diagnosis : Eyes in male separated by distance equal to the width of third antennal segment; third antennal segment bright orange; thorax metallic green with purple lustre; legs black; wings hyaline; abdomen greenish to purple.

Distribution : West Bengal (Sundarban), Bihar, Orissa, Pondichery, Punjab, Tamil Nadu and Uttar Pradesh.

Family : SARCOPHAGIDAE

Commonly called 'flesh-flies', found on decaying flesh, excreta; larvae occur in decaying animal or vegetable matters.

Subfamily : SARCOPHAGINAE

Genus *Parasarcophaga* Johnston and Tieggs

1921. *Parasarcophaga* Johnston and Tieggs, *Proc. Roy. Soc. Queensland*, 23 : 78. Type-species : *S. omega* J. & T.

Diagnosis : Lateral verticals always present in female but may not be in male. Vibrissae bare; arista long plumose up to two-thirds; dorsocentrals 2 anteriorly, numbers variable posteriorly; sternopleurals 1 : 1 : 1 or 1 : 1; third longitudinal vein bristly half way to anterior cross vein; mid femur with a row of stout bristles on apical half ventrally, hind tibia with inner and outer fringe of long hairs.

Key to the subgenera

1. Lateral plate of paraphallus in the form of rudimentary process, its apical part with 2 lateral process *Liopygia* Enderlein (1 species only)
- Lateral plate of paraphallus with a single pair of lamellate processes, its apical part with no lateral process *Liosarcophaga* Enderlein (1 species only)

Subgenus *Liopygia* Enderlein

1928. *Liopygia* Enderlein, *Arch. Klass. phyl. Entl.*, 1 (1) : 41. Type-species : *Musca ruficornis* Fabricius.

40. *Parasarcophaga (Liopygia) ruficornis* (Fabricius)

1794. *Musca ruficornis* Fabricius, *Ent. Syst.*, 4 : 314.

Diagnosis : Antennae and palpi orange; propleuron bare; only pre-scutellar acrostichal present, posterior dorsocentrals 5, anterior 4 very weak; mid femur with comb and a few long basal setae; genital tergites orange.

Distribution : Common in most part of India including Sundarban.

Subgenus *Liosarcophaga* Enderlein

1928. *Liosarcophaga* Enderlein, *Arch. Klass. Phyl. Ent.*, 1 (1) : 18; Rohdendorf, 1937. *Fauna USSR : Dipt.*, 19(1) : 205, Type-species : *Cynomyia madeirensis* Schiner.

41. *Parasarcophaga (Liosarcophaga) dux* (Thomson)

1868. *Sarcophaga dux* Thomson, *K. Svenska Fregatten Eugenie Resa*. Dipt; 2 : 534.

Material examined : 1 ♂, West Bengal : 24-Parganas (South), Canning 3.iii.1986, Coll. B. N. Das.

Diagnosis : Lateral verticals wanting; propleura bare, single pre-sutural acrostichal, posterior dorsocentral 5 the anterior 3 weak; mid femur with comb and fringe at base, hind tibia double fringed; apex of paraphallus pointed with a subapical process having bifurcated apex.

Distribution : In all parts of India including Sundarban in West Bengal.

GENERAL REMARKS

The Dipteran fauna of Sundarban is not so diversified as in other parts of the state perhaps due to the absence of varied ecological niches that are available in those parts. The northern part of West Bengal particularly in Darjeeling areas with its mountain ranges and dense forests it is the abode of the varieties of Dipteran fauna.

Of the 15 families dealt with in this communication members of some families are haematophagus, *Anopheles (Cellia) sudaicus* Rod. (Culicidae) and *Phlebotomus argentipes* Annandale and Brunetti (Phlebotomidae) are intermediate carrier of malaria and Kala-azar diseases respectively and *Stomoxys calcitrans* Linn. (Muscidae) is carrier of germs.

Out of the 41 species reported here two species of Tipulidae *Limonia (Geranomyia) flavicosta* Brun. and *Limonia (Geranomyia) tridens* Brun. and one species of Cecidomyiidae *Stefaniola bengalensis* Mani are endemic in Sundarban. *Drapetis ferruginea* Brun. (Empididae) is endemic in West Bengal. *Oplodontha rubrithorax* (Macquart) (Stratiomyidae) is confined to West Bengal and Uttar Pradesh. The remaining species have been recorded from many states.

SUMMARY

The paper deals with 41 species under 31 genera of 19 subfamilies belonging to 15 families of Diptera of which 2 species of Tipulidae *Limonia (Geranomyia) flavicesta* Burn, and *Limonia (Geranomyia) tridens* Brun. and 1 species of Cecidomyiidae *Stefaniola bengalensis* Mani are endemic in Sundarban.

ACKNOWLEDGEMENTS

The senior author appreciates the favour of Sri K. N. Reddy, Scientist-SE and Officer-in-charge Sundarban Field Research Station, Canning, West Bengal for permission to conduct the survey and facilities provided for laboratory works. The author is grateful to Dr. J. R. B. Alfred, Director, Zoological Survey of India for approval of this project.

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