

**DIVERSITY OF DIPTERON FAUNA IN DHAPAKEL, LALITPUR*
DISTRICT, CENTRAL, NEPAL**

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Abstract

The present paper deals with thirty-two genera and forty-five species dipteran insects reported from Dhapakhel, Lalitpur district have been categorized under 11 families. All the specimens are deposited at Central Department of Zoology, T.U., Kirtipur.

Key word: diversity, non-anopheline, systematics, local status, locality.

Introduction

Diptera commonly known as flies is one of the largest order of class insecta. They carry economic values with their role in pollination of plants, predators of insects pest and parasitic habit in mammals. *Chrysomya megacephala* sometimes produce "myiasis" of man and domestic animals, But no data regarding the biology have been published in Nepal (Zumpt 1965, Kurahashi and Thapa, 1994).

The pioneer entomologist of different countries have collected large number of insects from Nepal, which are identified and published periodically. Brunetti (1923) was the first to deal with the systematic study of Syrphid flies of Indian sub-continent in the Fauna of British India series. He included 21 species from Nepal. Since then no revisionary studies on these flies were carried out so far. After Brunetti, Coe (1965) described 51 species from East Nepal (Taplejung, Arun Valley, Khumbu) new to the science and many new reports to Nepal. Then Lambeck and Kiauta (1973) worked on a small collection of these flies of Kathmandu and Khumbu Himalayan region Nepal. Knutson et al. (1975) published a catalogue of Oriental Syrphidae. They listed only 79 species from Nepal. In the year 1979, Kapoor *et. al.* worked on Syrphid flies from Kathmandu Valley.

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First published report was done by Peters and Dewars (1955) on *Anopheles* species from Nepal. They listed 19 species from Nepal. Stone et al. (1959) listed 59 non-anopheline species from Nepal. Collections were made from southern plain (Terai) area and some from inner Tarai. Shrestha (1966) recorded 36 *Anophelis* species from Nepal.

James (1964) was the first to deal with the systematic study of Calliphorids of Nepal, based on a collection made by R.L. Coe during East Nepal Expedition in 1961-62 from British Museum. There after, Kurahashi (1992) studied on the flies and reported 4 new species to Nepal. The latest study on Calliphorids of Nepal was carried out by Kurahashi and Thapa (1994). They reported 77 species, of which 10 were new to Nepal.

Emden (1965) recorded some species of Muscidae as a distributional records from Nepal in his publication "Fauna of British India: Muscidae". Panta (1972,1975) described 10 species of Muscidae from Nepal. Shinonaga and Singh (1994) reported 112 species of Muscidae of Nepal. Rohdenderf (1966) was the pioneer taxonomist of Sarcophagid flies. He reported 8 species of Sarcophagids from Nepal, based on the collection made by R.L. Coe during East Nepal Expedition in 1961-1962 from British Museum (Natural History). Kano and Shinonaga (1994) reported 40 species of Sarcophagid flies from Nepal.

Alexander (1973) described 6 new undescribed species of Crane-flies from the Himalayan mountain (Dip. Tipulidae), which was referred by Kapoor (1981-1982).

In 1994, Iwasa and Thapa studied on sepsid flies of Nepal and they reported 33 species. Previously and thereafter no other work has been carried on family sepsidae known so far.

Most of the study on Diptera have been done in East Nepal, very few number from central Nepal and less from west Nepal except Nepal Malaria Eradication Organisation, HMG, was started in 1956 in order to combat the dreaded disease like Malaria (Shrestha, 1980-81).

The main objective of this study are to know the dipteron species diversity of Dhapakel, Central Nepal. It lies at south of Lalitpur and southeast of Kathmandu

district. This area is unexplored and it offers suitable habitat for diversified dipteron species including ecological importance too.

Materials and Methods

Study area

Dhapakhel is belong to Village Development Committee of Lalitpur district and is located southern part of this district, South-West of Kathmandu district. It is 7.3 km. away from Kathmandu. It covers about 6.25 sq. km area. It is situated between 27°37' to 27°39' N latitude and 85°25' E latitude. Altitude ranges from 1125-2337 m. Average temperature was found 20-30°. This area represents sub-tropical and temperate types of vegetation. Forest covered area is about 18% of the total area of Dhapakhel. Vegetation of this area is mixed types. In general, the vegetation includes *Pinus roxburghii*, *Castanopsis indica*, *Myrica esculenta*, *Ilex doniana*, *Rhododendron arboreum*, *Cinamomum tamala*, *Schima wallichii*, *Alnus nepalensis*, *Ficus nerifolia*, *Syzgium cumini*, *Quercus longinosa*, *Phyllanthus emblica*, and *Bambusa falcata* etc. Among shrubs and herbs *Eupatorium adenophorum*, *Barberis aristatus*, *Urtica dioica*, *Rubus ellipticus*, *Cirsium argyranthum*, *Artemisia vulgaris*, *Rumex actosa*, *Cynodon dactylon*, *Phargmatis maxima* are propagated. The cultivated crops of this area are maize, wheat, rice, soyabean and mustard. Dhapakhel covers seven small village "Gaon" and forest "Ban" These are Deuta Ban, 1585m.; Gathe Ban, 1557m.; Turungaya Dil, 1480m.; Tallo Gaon, 1520m.; Mahanta Gaon, 1610m.; Bahun Goan, 1620m.; Basnet Gaon, 1605m. Main forest of Dhapakhel are Deuta Ban and Gahte Ban. A famous religious Snake Pond "Naga Daha" lies in Basnet Gaon. These seven areas are selected for study site. During initial study, these seven sites were visited at different seasons in 1996.

Collection were made from March-October, 1996 by sweeping method, using insect net. Continuous sweeping was done through the varieties of plant, as they feed on pollen, nectar and fruits and some were collected sweeping the net near decaying materials, garbage, faeces, dungs, ditches and pool. where as parasitic insects were collected directly from the body of the host. Described species were identified to the possible taxonomical level consulting following

publication: Abentin and John (1940); Bigot (1896); Imms (1973); Kapoor et al. (1979); Kapoor (1981-82); Shinonaga (1968, 1971); Shima (1980); Shiraki (1968); Takahashi (1962) White *et al.* (1940) and so on. The identification was done at Natural History Museum, TU, Swoyambhu and Entomology Division, Department of Agriculture. HMG, Khumaltar. All the collected specimens were deposited in Central Department of Zoology, Tribhuvan University., Kirtipur., Kathmandu.

Result

This study programme was held on the month of March to October, 1996. Dhapakel area has a suitable habitat for various types of Diptera. A total of 45 species of Diptera belong to 11 families were collected. Of them 3 species of Tipulidae, 3 species of Culicidae; 1 species of Bibionidae; 1 species of Tabanidae; 3 species of Syrphidae; 2 species of Tephritidae; 1 species of Sepsidae; 14 species of Calliforidae; 7 species of Sarcophagidae; 9 species of Muscidae; 1 species of Hippoboscidae are the result of this programme and described with ecological habit and habitat. Arrangement of family and species are according to Imms (1973) are as follows;

Family: Tipulidae (Daddy leg-long or Crane fly)

Tipula cinctoterminalis, Brunetti

Length: 18 mm.

Habitat: moist wall near garbage

Locality: Mahanta Goan (ex: 1 specimen)

Distribution: Nepal, India.

Tipula gracilis, Brunetti

Length: 12 mm.

Habitat: moist wall near garbage.

Locality: Bahun Goan (ex:1)

Distribution: Nepal, India.

Tipula elegantula, Brunetti

Length: 12 mm.

Habitat: moist shaded places

Locality: Basnet Gaon (ex:1)

Distribution: Nepal, India.

Family: Culicidae

Culex fuscanus, Wiedman

Length: 3.5-5mm. (wing)

Habitat: garbage, natural pools.

Locality: Gathe Ban, Turunga Dil, Tallo Gaon, Mahatma Gaon, Bahun Gaon, Basnet Gaon (ex.20)

Distribution: Nepal, India, Pakistan, Sri Lanka, Burma, Thailand, Malaysia, Singapore, Sumatra, Java, Boreno, Philippines, Indochina, Formosa, USSR, Korea, Japan.

Aedes indicus, Theobold

Length: 3.3-5mm. (wing)

Habitat: Open pools, rainfilled ditches.

Locality: Turungaya Dil, Basnet Gaon (ex. 5)

Distribution: Nepal, India, Pakistan, Sri Lanka, Burma, Sumatra, Thailand, Java.

Family: Bibionidae

Biblio hortulanoides Brunetti

Length: 14 mm

Habitat: flowers and cowdung.

Locality: Deuta Ban, Gathe Ban, Turangaya Dil. Mahanta Gaon, Bahun Gaon and Basnet Gaon. (ex.14)

Distribution: Nepal, India.

Family: Tabanidae

Tabanus rubidius, Wiedmann

Length: 22-25 mm.

Habitat: ectoparasites of cow, horse and buffalo.

Locality: Turungaya Dil, Mahanta Gason (ex.2)

Family: Syrphidae

Pseudovolucella decipiens Herve-Bazin

Length: 17mm; of wing 13mm

Habitat: composite flowers.

Locality: Gathe Ban (ex.1)

Distribution: Nepal, India.

Cheilosia hasegawai, Shiraki

Length: 8mm; of wing: 13mm.

Habitat: composite flowers.

Locality: Tallo Gaon (ex.1)

Distribution: Nepal; India; Sri Lanka; Korea; Eastern USSR.

Sphaerophoria indiana Bigot

Length: 7mm

Habitat: composite flowers.

Locality: Turungaya Dil (ex.1)

Distribution: Nepal, India Sri Lanka, Korea, Eastern USSR.

Family: Tephritidae

Dacus caudatus Fabricius

Length: 8 mm.

Habitat : Fruits

Locality: Turungaya Dil, Talo Gaon, Mahanta Gaon and Bahun Gaon (ex.14).

Distribution: Nepal; Burma; Formosa; India; Java; Thailand.

Dacus scutellaris Bezzi

Length: 10 mm

Habitat: fruit flies, destroying fruits of Cucurbitaceae.

Locality: Deuta Ban, Gathe Ban (ex.2)

Distribution: Nepal; India; Burma; Formosa; Java; Thailand

Family: Sepsidae

Sepsis monostigma Thomson

Length: 3.3-5 mm

Habitat: food and flowers.

Locality: Deuta Ban, Gathe Ban and Bahun Gaon.(ex. 6)

Distribution: Nepal; India; Sri Lanka; Thailand; Malayasia' Java; Philippines; China; Korea; Japan.

Family Calliphoridae

Lucilia caesar, Linn.

Length: 7-12mm.

Habitat: faecal excrement

Locality: Gathe Ban, Turungaya Dil, Tallo Goan, Mahanta Gaon, Bahun Gaon, Basnet Gaon, (ex.14).

Distribution: Nepal; India; Europe; Burma; China; N.America.

Lucilia papuensis, Macquart

Length: 8mm.

Habitat: Decomposition of dead animals in forest.

Locality: Turungaya Dil (ex.1)

Distribution: Nepal, India, Burma; China; N.America.

Lucilia porphyria Walker

Length: 5-10mm.

Habitat: carcasses of birds and mammals.

Locality: Tallo Goan, Bahun Gaon. (ex.2)

Distribution: Nepal; India; Sri Lanka; China; Honk Kong; Sumatra; Java; Philippines; Australia.

Bufolucilia chini, Fan.

Length: 5-7 mm.

Habitat: faecal excrement.

Locality: Turungaya Dil, Tallo Gaon, Mahanta Gaon, Bahun Gaon, Basnet Gaon, (ex.20)

Distribution: Nepal; India.

Isomyia electa, Villeneuve

Length: 12-14mm.

Habitat: decomposition of dead animals, faecal excrement.

Locality: Turungaya Dil, Tallo Gaon, Mahanta Gaon, Bahun Goan (ex.9).

Distribution: Nepal; India, Burma; Malaysia; S.China; Japan; Taiwan

Isomyia gomezomenori, Peria.

Length: 12mm.

Habitat: adults in wild places.

Locality: Gathe ban (ex.1)
Distribution: Nepal; India; Sri Lanka; Japan

Protocalliphora azura, Fallen.

Length: 8mm.

Habitat: faecal excrement, decomposition of dead animal.

Locality: Deua Ban (ex.1)

Distribution: Nepal; India; Sri Lanka; Pakistan.

Protocalliphora maruyamensis, Kano-Shinonaga

Length : 8mm.

Habitat : Garbage, faecal excrement.

Locality : Basnet Gaon (ex.2).

Distribution : Nepal; India; Sri Lanka; Pakistan.

Protocalliphora terraenovae, Robineau-Desvoidy

Length : 6-11mm.

Habitat : as in previous species.

Locality : Mahanta Gaon, Bahun Gaon and Basnet Gaon.(ex.7)

Distribution : Nepal; India.

Phaenicia sericata, Meigan

Length: 5-10 mm.

Habitat: Garbage, faecal excrement.

Locality: Deuta Ban, Gathe Ban, Turungaya Dil, Tallo Gaon, Mahanta Gaon
(ex.8)

Distribution: Nepal; India.

Melinda gentilis Robineau-Desvoidy

Length: 8-10 mm.

Habitat: faecal excrement, decomposition of dead animal

Locality: Gathe Ban, Turungaya Dil, Tallo Gaon, Mahanta Gaon, Bahun and

Basnet Gaon. (ex.11)

Distribution: Nepal; India; Sri Lanka.

Chrysomya megacephala, Fabricius

Length: 8-10 mm.

Habitat: as in previous species.

Locality: Tallo Gaon, Mahanta Gaon, Bahun and Basent Gaon (ex.7).

Distribution: Nepal; India; Thailand; Malaysia; Java

Hemipyrellia ligurriens, Wiedmann.

Length: 8-10 mm.

Habitat: as in previous species.

Locality: Gathe Ban, Turungaya Dil, Tallo Gaon, Mahanta Gaon, Basnet and
Bahun Gaon.(ex.15)

Distribution: Nepal; India; China; Japan; Australia.

Family : Sarcophagidae

Sarcophaga (Parasarcophaga) crassipalpis, Macquart

Length : 18 mm.

Habitat : human excrement. dung, garbage.

Locality : Deuta Ban (ex.1).

Distribution : Nepal; India; Sri Lanka; Pakistan.

Sarcophaga (Parasarcophaga) albiceps, Meigan

Length : 11 mm.

Habitat : as in previous species.

Locality : Mahanta Gaon (ex.1).

Distribution : Nepal; India; Sri Lanka, Burma Java; Sumatra; Australia; Eu-
rope; New Guinea.

Sarcophaga ruficornis, Fabricius

Length : 8-14 mm.

Habitat : cattle dung, human excrement.

Locality : Gathe Ban, Bahun Gaon (ex.2).

Distribution : Nepal; India; Bangladesh; Sri Lanka; Philippines; Formosa.

Sarcophaga(Boethcherissa) peregrina, Robineau -Desvoidy

Length : 14 mm.

Habitat : garbage, decomposition of dead animals.

Locality : Bahun Gaon (ex.1).

Distribution : Nepal; India; Bangladesh; Sri Lanka.

Sarcophaga (Boethcharrissa) khasiensis, Senior-White

Length : 8-9 mm.

Habitat : as in previous species.

Locality : Tallo Gaon, Bahun gaon and Basnet Gaon. (ex.6).

Distribution : Nepal; India.

Brachycoma devia, Fallen.

Length : 8-10 mm.

Habitat : as in previous specimen.

Locality : Tallo Gaon, Basnet and Bahun Gaon. (ex.4).

Distribution : Nepal; Sri Lanka; Bangladesh.

Goniophyta yaeyamaensis Kano- Shinonaga

Length : 5-8 mm.

Habitat : as in previous species.

Locality : Bahun Gaon, Basnet Gaon. (ex.2)

Distribution : Nepal, Indai, Sri Lanka.

Family : Muscidae

Musca domestica, Linn

Length : 5-6mm.

Habitat : animal dung, spoiled meat.

Locality : Deuta Ban, Tirungaya Dil, Gathe Ban, Tallo Gaon. (ex.20)

Distribution : Cosmopolitan.

Musca (Byomya) pattoni, Austen.

Length : 4.5-7.7mm; of wing 5-6mm.

Habitat : sore of dead and living animals.

Locality : Deuta Ban, Gathe Ban, Tirungaya Dil, Tallo Gaon, Mahanta Gaon,

Bahun and Basnet Gaon. (ex.20).

Distribution : Nepal; India; Burma; Sri Lanka; Pakistan.

Musca ventrosa, Wiedmann.

Length : 6mm.

Habitat : bodies of cattle, horse, human.

Locality : Turangaya Dil (ex.1).

Distribution : Cosmopolitan.

Orthelia coerula Wiedmann.

Length : 5-8mm.

Habitat : cattle dung in pasture, human excrement.

Locality : Tallo Gaon, Bahun Gaon (ex.2).

Distribution : Nepal; India.

Orthelia pacifica Zimin.

Length : 6-10 mm.

Habitat : as in previous species.

Locality : Turungaya Dil, Mahanta Gaon.(ex.2).

Distribution : Nepal; India; Sri Lanka.

Phaonia aureola,

Length : 9 mm

Habitat : as in previous species.

Locality : Basnet Gaon (ex.1).

Distribution : Nepal; India.

Dichaetomyia bibax Wiedmann.

Length : 7.5 mm.

Habitat : as in previous species.

Locality : Basnet Gaon. (ex.1).

Distribution : Nepal; India; Boreno; Burma; China; Indonesia; Philippines;
Ryukyo, Island, Taiwan; Japan.

Dasyphora cyanicolor, Ztterstedt

Length : 8 mm.

Habitat : as in previous species.

Locality : Bahun Gaon (ex.1).

Distribution : Nepal; India; Sri Lanka

Polietes orientalis Pont

Length : 9-12 mm.

Habitat : Human faecal decomposition.

Locality : Deuta Ban, m Gathe Ban, Turungaya Dil, Tallo Gaon, Mahanta Gaon,
Bahun Gaon, Basnet Gaon.(ex.20)

Distribution : Nepal; India.

Family : Hippoboscidae.

Hippobosca rufipes, Fabricius

Length : 8-12mm.

Habitat : as in previous species.

Locality : Deuta Ban, Gathe Ban, Turungaya Dil, Tallo Gaon, mahanta Gaon, Bahun Gaon, Basent Gaon.(ex.15)

Distribution : Nepal, India, Bangladesh, Srilanka.

Discussion :

The present study deal with the study of dipteron fauna of Dhapakhel in different season from March-October, 1996. During this period, altogether 267 specimen were collected from seven sites. This has been catagorized under 11 families comprising 45 species. Among the collected species *Musca domestica*, *Musca pattoni*, *Polietas orientalis*, *Hippobosca rufipes* are the common species of Dhapakhel area whic were collectred from seven different sites. Among the collected species *Musca domestica* and *Polietas orientalis* are abundant. *Tipula cinctoterminalis*, *Tipula gracilis*, *Tripula elegantula* (Tipulidea); *Tabanus ravidus* (Tabanidae); *Pseudovolucelle decipiens*, *Cheilosa hasegawai* and *Sphaerophoria indian* (Syrphidae); *Dacus scutellaris* (Tephritidae); *Lucilia papuensis*, *Isomyia gomezmenori*, *Protocalliphora azurea* (Calliphoridae), *Sarcophaga crassipalpis*, *Sarcophaga ruficornis*, *Sarcophaga peregrina*, *Goniophyta yaeyamaensis* (Sarcophagidae); *Musca ventrosa*, *Orthellia pacifica*, *Orthelia coerule*, *Phaonia aureola*, *Dichaetomyia bibax*, *Dasyphora cynicolor* (Muscidae) are locally rare species. *Sepsis monostigma* an ant like flies collected form Deuta Ban, Gathe Ban and Bahun Gaon,. it is not so common in this area. From the collected dipterons, 13 species were recorded from Deuta Ban, 16 species from Gathe Ban, 21 species from Turungaya Dil, 20 species from Tallo Gaon, 22 species from Mahanta gaon, 24 species from Bahun Gaon, and 21 species from Basnet Gaon. Diversity of dipteron Fauna was high both in Bahun and mahanta Gaon. This might be due to the presence of water resources which is essential for the breeding needs. Besides this, uncontrolled garbage, moisture, filthy environment help dipterons for their extensive growth. The population density of the collected flies and mosquitoes was found tobe very high in Basnet Gaon due to the presence of "Naga Daha", main water resource of this area. The population density of flies was found to be least in Deuta Ban. This may be due to the unfavourable condition and lack of breeding sources in this forest. The soil of this site contain higher

percentage of sand and scarce of water resources.

The percentage of abundance of families are as follows : Calliphoridae (31%); Muscidae (20%); Sarcophagidae 15.5%); Culicidae (6.6%); Syrphidae (6.6%); Tipulidae (6.6%); Tephritidae (4.5%); Bibionidae, Hippoboscidae and Tabanidae (2.3% each). The most common species are belong to the family Calliphoridae.

This study reveals that Dhapakhel offers suitable environmental condition and breeding resources to increase the diversity of dipteron fauna.

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BRYOPHYTES OF PHULCHOKI, CENTRAL NEPAL

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Abstract

An initial investigation including compilation have been undertaken into the bryophytic flora of the Royal Botanical Garden, Godawari and Phulchoki hill. Some 111 moss taxa and 30 species of hepatics are presented here. *Hypnum Cupressiformae* Hedw. is a new report from Nepal.

Key Works: bryophytes, hepaticae, musci, taxa, systematic, frequency.

Introduction:

Bryophyta is one of the most remarkable group of plant kingdom forming the initial green carpet on humid forest floor and also serves as a substrate for the growth of higher plants. They are small but form a striking part of the vegetation in cooler northern and southern latitudes and extremely humid climates of both temperate and tropical regions. They thrive in humid environments and like other plants, require water for their their survivability. They represent the amphibians of plant kingdom and love damp, shaded places. They have on true root, being anchored on the substratum by special hairs called rhizoids, which correspond to the root hairs of higher plants.

In the life history of bryophytes, gametophytes are the dominant plants which alternate with sporophytic generation and dependent upon gametophyte. The spore is the first cell of the gametophytic generation. The gametophyte lack vascular tissues. The plants are adopted for absorption and due to lack of lignified cells they have creeping habit.

Bryophytes influence man by playing significant role in the ecology, horticulture, construction, household uses, medicine and even in the food. This field in Nepal is very much neglected because of the difficulties of gaining scientific literatures and lack of expertise.

The pioneer bryologists who made significant researches in this field were Dr. Francis Buchanan Hamilton, who collected Nepalese mosses during 1802-1803. Later by W.J. Hooker (1808), Stephani (1927), Bruhl (1931), Lindenberg and Lehman (1932), Wallich (1939), Pande (1957), Banerjee (1958), Norkett