



### Short Communication

## ON A COLLECTION OF THE FLIES OF FORENSIC IMPORTANCE

### INTRODUCTION

The decomposition of a dead body starts firstly through the action of micro organisms such as fungi and bacteria, followed by the action of a series of arthropods, with the predominance of the sarcosaprophagous insects (Nuorteva, 1977).

Flies are the most important organisms for forensic study because most of them develop in the bodies of dead vertebrates, and several species leave behind a heavily sclerotized (hardened) puparial case that may persist for centuries which help to determine the time of death etc. But its use in India is meagre because of the lack of base line knowledge on carrion fauna. The scientists of Diptera section, Zoological Survey of India, have initiated a study with an aim to generate the basic data on these carrion feeding flies.

Our objective is to identify the flies those visit the corpse or carcass in the adult form and also breed on these substrates. This communication reports 2 species of family Muscidae and 1 species each of families Stratiomyidae, Calliphoridae, Ulididae and Sarcophagidae from the carcasses of Rhino, Rat and Frog.

### MATERIALS AND METHODS

The study was done in two different environments : in the Laboratory of National Museum of Natural History, Bhubaneswar, and in a natural forest area of a semi urban area. The rats and frogs were killed through head injury and immediately placed in the natural forest under a shaded tree. The adult flies were collected by sweeping insect net and larvae were collected through hand picking methods. Mostly collection was made in between 11 A.M. to 12 P.M. in the month of August' 2007 & February, 2008. Observations and collections were continued until the entire carcass had been consumed.

### KEY TO THE FAMILIES OF FLIES ASSOCIATED WITH CARCASSES

1. Third antennal segment with rings .....  
..... Stratiomyidae
- Third antennal segment with bristles ..... 2
2. Second antennal segment lacking longitudinal seam; inner calypter small or absent; thorax typically lacking complete transverse suture .....  
..... Ulididae
- Second antennal segment with longitudinal seam; inner calypter usually large; thorax usually with transverse suture ..... 3
3. Hypopleura usually lacking stiff bristles and without setae, or if hypopleural setae present, then pteropleural bristles absent or cell P<sub>1</sub> not narrowing towards wing tip ..... Muscidae
- Hypopleura and pteropleura with stiff bristles; cell P<sub>1</sub> narrowing or closed toward wing tip ..... 4
4. Antennal aristae usually plumose throughout, 2 notopleural bristles; body often metallic green or blue ..... Calliphoridae
- Antennal aristae typically plumose only on basal half, 3-4 notopleural bristles; body not-metallic .  
..... Sarcophagidae

#### Family STRATIOMYIDAE

#### *Hermatia illucens* (Linnaeus)

1758. *Musca illucens* Linnaeus, *Syst. Nat. Ed. 10*, 1 : 589.  
Type-locality : South America

1975. *Hermatia illucens* : Delfinado & Hardy, *A catalog of Diptera of the Oriental Region*, 2 : 31

*Material examined* : 1♂, NMNH, Bhubaneswar, 4.ix.2005, coll. P. Roy, from semi dried flesh of Rhino.

*Remarks* : This black-colored fly is easily recognized, having two translucent “windows” on the first abdominal segment. Larvae are occasionally found

indoors, particularly in bathrooms, latrines and kitchens. In the pupal stage, this insect resembles the larvae. Larval forms have also been extracted from human carrion, and there are reports that the larvae have been accidentally swallowed with contaminated food, causing myiasis. According to published records the species also breeds in old carrion (Bohart & Gressitt, 1951). But nothing has been known of its development inside the flesh of Rhino. So, this is the first report of development of *Hermatia illucens* (Linnaeus) inside the flesh of Rhino.

Family ULIDIDAE (=Family Otitidae)

***Physiphora aenea*** (Fabricius)

1794. *Musca aenea* Fabricius, *Ent. Syst.* 4 : 335. Type-locality : "in India Orientali".

1977. *Physiphora aenea* : Delfinado & Hardy, *A catalog of Diptera of the Oriental Region*, 3 : 167.

*Material examined* : 2 ♀♀, Shyamnagar, North 24 Parganas dist, West Bengal, 03.viii.2007, coll. S. Banerjee, ex. frog.

*Remarks* : Medium sized (6-9 mm), fairly stout, brilliant metallic blue green; eyes iridescent, multicoloured, epistome, proboscis and palpi black; frontal stripe green or blue; legs ochraceous; wings colourless, not pictured; abdomen unicolorous, green, hairs on anterior corners yellowish.

Adults of the specimens are found in many situations walking on the surfaces of rotting fruits, garbage, rotting vegetation, carrion or faeces, including human excrement. During the present study, a large number of specimens were collected from the rotten flesh of the frog.

Family MUSCIDAE

***Musca (Musca) domestica*** Linnaeus

1758. *Musca domestica* Linnaeus, *Syst. Nat. Ed.* 10, 1 : 596. Type-locality : Europe, America.

1977. *Musca (Musca) domestica* : Delfinado & Hardy, *A catalog of Diptera of the Oriental Region*, 3 : 459.

*Material examined* : 2 ♀♀, NMNH, Bhubaneswar, 21.v.2006, coll. P.Roy, ex. semidried flesh of Rhino, 1 ♂, 2 ♀♀, Shyamnagar, North 24 Parganas dist, West Bengal, 27.iii.2008, coll. S. Banerjee, ex. carcasses of rat.

*Remarks* : The common Housefly is easily distinguishable from the other known species of *Musca* with hairy propleura (sometimes only few setae are

visible). Females are usually larger and can extend the tip of the abdomen to form an ovipositor which is used to lay eggs. Sometimes males have enlarged eyes which meet on top of the head.

The house fly is 6 to 7 mm long. The eyes are reddish and the mouth parts are sponging. The thorax is greyish to olive pollinose, bears four narrow black stripes and there is a sharp upward bend in the fourth longitudinal wing vein. The abdomen is gray or yellowish with dark midline and irregular dark markings on the sides. The underside of the male is yellowish. The larvae are not normally found in carcasses, but the adults are attracted to tainted meat (Zumpt & Patterson, 1952). There is nothing known about the muscid development inside the flesh of Rhino in India. So, this is the first report of *Musca (Musca) domestica* Linnaeus from the flesh of Rhino.

***Atherigona (Acritochaeta) orientalis*** Schiner

1868. *Atherigona orientalis* Schiner, *Reise der osterreichischen Fregatte Novara, Dipt.* : 295. Type-locality : Nicobar Islands.

1977. *Atherigona (Acritochaeta) orientalis* : Delfinado & Hardy, *A catalog of Diptera of the Oriental Region*, 3 : 491.

*Material examined* : 8 ♀♀, Shyamnagar, North 24 Parganas dist, West Bengal, ex. carcasses of rat.

*Remarks* : Flies are small (3-4 mm), yellowish grey pruinose, with a pair of sublateral black spots on third, fourth and fifth abdominal tergites; leg bristles short; arista bare. The adult feeds on an exceptionally wide variety of substances, including all sorts of carrion, spoiling fruits and vegetables, table food of nearly all kinds, and human excrement in fresh, isolated deposits. These small flies were observed in large numbers on the dead body after three days of the death of the rat.

Family CALLIPHORIDAE

***Chrysomya megacephala*** (Fabricius)

1794. *Musca megacephala* Fabricius, *Syst. Ent.* 4 : 317. Type-locality : Guinea.

1977. *Chrysomya megacephala* : Delfinado & Hardy, *A catalog of Diptera of the Oriental Region*, 3 : 542.

*Material examined* : 2 ♂♂, 5 ♀♀, NMNH, Bhubaneswar, 21.v.2006, coll. P.Roy, ex. On semi dried flesh of Rhino, 7 ♀♀, Shyamnagar, North 24 Parganas dist, West Bengal, 27.ii.2008, coll. S. Banerjee, ex. carcasses of rat, 1 ♂♂, 5 ♀♀, Shyamnagar, North 24

Parganas dist, West Bengal, 03.viii.2007, coll. S. Banerjee, ex. frog.

*Remarks* : Moderate in size (8-11 mm). Adults are large, metallic blue to blue green, with purple reflections, dark reddish frontal stripe and antennae, face, cheek and palpi are orange with orange pubescence but frons predominantly black. Mesonotum with two short and narrow longitudinal black stripes anteriorly, and a small dark triangle situated in a postero-medial position to each humeral callus. Second and third abdominal segments black-banded on posterior margins. Wings hyaline, slightly darkened at base; legs black. Head in male with the eyes touching in the middle of the frons. In the female the eyes are separated by a broad frons.

Adults are strongly attracted to carrion, human excrement and sweats. It is reported that dead rats and large masses of excrement were most powerful attractant. The larvae of this species breed equally well in carrion and human excrement, but not in faeces of herbivores. In this study this species was collected from the three dead animals i.e. Rhino, rat and frog. In the field, this species was observed from the second day of our study on the carcass of the rat.

Family SARCOPHAGIDAE

*Parasarcophaga (s. str.) albiceps* (Meigen)

1826. *Sarcophaga albiceps* Meigen, *Syst. Besch. zweifl. Insekt.*, 5 : 22. Type-locality : Europe.

1992. *Parasarcophaga (s. str.) albiceps* : Nandi, *J. Beng. Nat. Hist. Soc.*, 11(2) : 38.

*Material examined* : 7 ♀♀, Shyamnagar, North 24 Parganas dist, West Bengal, 03.viii.2007, coll. S. Banerjee, ex. frog.

*Remarks* : Large flies (11 to 17 mm), frontal vitta black, arista long plumose; thorax greyish with silvery pollen and with three black longitudinal stripes; wings hyaline with brown veins, halter brown; legs black, hind tibia with bristles on antero-ventral surface in addition to long villosity; abdomen with silvery grey checkered pattern. This is a fairly common species which is attracted to excrement and dead bodies of different animals. The larvae breed from meat, beef, animal dung, human excrement, dead rabbit, human carcasses and garbage.

This species was observed and collected very soon after the death of the frog on the day 1 and till day 2.

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**BULGANIN MITRA, P. PARUI  
AND S. BANERJEE\***  
*Diptera Section, Zoological  
Survey of India, Kolkata*  
*\*Post Graduate Student,  
Naihati R.B.C. College*