RESEARCH PAPER | Zoology | Volume : 5 | Issue : 9 | September 2015 | ISSN - 2249-555X

Diversity Of Forensic Blowflies (Diptera: Calliphoridae) From Western Ghats, Maharastra, India

KEYWORDS: Blowflies, diversity, forensic insects, Western Ghats, India

Jadav Divya K.
Department of Zoology, Shivaji University, Kolhapur-416004, India

Dr. T. V. Sathe
Professor, Department of Zoology, Shivaji University, Kolhapur-416004, India

ABSTRACT *Western Ghats of Maharastra is amongst the 18 hot spots of the world for conservation and protection of biodiversity. It is harbor for many plant and animal species. However, due to human interference, the biodiversity of Ghats is under threat. Blowflies have forensic value and very useful for solving problems related to murder, suicide, sexual molestation, child neglect and abuse, etc. They have also important role in decomposition of vertebrate carcasses belonging to amphibia, reptilia, aves and mammalia in forest and plain ecosystems. Therefore, diversity of blowflies have been studied from Western Ghats of Maharastra, India. A total of 22 species belonging to 9 genera have been reported. The important genera refer to Silbomyia, Calliphora, Phumosia, Melinda, Lucilla, Pollenia, Tianania, Dexopollenia and Chrysomya.*

INTRODUCTION

Biodiversity plays an important role in sustainable development of a country or a region. Western Ghats is biodiversity rich area of India but, under serious threat due to human interference in forest ecosystems. Western Ghats of Maharastra is located between 8°20'-20° 40' N latitude and 73°-77° E longitude at an average elevation of 3900ft with about 2000- 6000 mm rainfall. Blowflies (Diptera: Calliphoridae) have forensic value and very useful for solving problems related to murder, suicide, sexual molestation, child neglect and abuse, etc. Their role as carcass decomposer in forest ecosystems is also very crucial. Carcass decomposition have eight stages and insects have their association with the specific stages. Therefore, blowfly diversity from Western Ghats have been studied. Review of literature indicates that blowfly diversity has been studied by several authors. Noteworthy amongst them refer to White et al. (1940), Putman (1977), Greenberg (1991), Crosskey and Lane (1993), Stevens and Wall (1997), Byrd & Castner (2001), Kurahashi and Chowanadisai (2001), Grassberger and Friedrich (2003), Nandi (2004), Singh and Sidhu (2004,2007), Kimberly (2005), Ronges (2005,2009), Vasconcelos et al. (2012), Sathe et al. (2013), Ghodake et al.(2014), Jadav and Sathe (2014,2015) etc. In the past, about 1100 species of blowflies have been described from the world and from India 63 species (Nandi, 2004; Ronges,2009).

MATERIALS AND METHODS

Blow fly diversity was studied from Western Ghats, Maharastra, India by spot observation method, by collecting blowflies with the help of insect net on the carcass found on the national and regional roadways and interior area of Western Ghats, specially , Sindudurg, Amboli, Sawantwadi, Vaipharwadi, Amba Ghats, Fonda Ghats, Gaganbawada, Radhanagari and Kolhapur. Morphological features were noted with the help of lens and compound microscope. After taking morphological features the insects were released in the environment from which they were collected. The blowflies were identified with the help of keys and literature cited in the references.

RESULTS AND DISCUSSION

Results recorded in table-1 and figures 1-4 indicated that a total of 22 species of blow flies were reported from Western Ghats of Maharastra, India belonging to nine genera namely *Silbomya*, *Calliphora*, *Phumosia*, *Melinda*, *Hemipyrellia* , *Lucillia*, *Pollenia*, *Tainanina* and *Chrysomya*. The dominant genus found in Ghats was *Lucilia* while, *Hemipyrellia* was rarely reported.

Table 1: Diversity of blowflies from Western Ghats of Maharastra

Sr. no	Species	Subfamily	Occurrence
1	*Silbomya asiatica* Crosskey	Ameniinae	Summer
2	*Calliphora vicina* Robinean- Desvoidy	Calliphorinae	Monsoon
3	*Calliphora vomitoria* (Linnaeus)	Calliphorinae	Monsoon
4	*Phumosia indica* (Surcouf)	Calliphorinae	Summer
5	*Melinda abdominalis* (Malloch)	Melanomyinae	Monsoon
6	Melinda sp	Melanomyinae	Monsoon
7	*Melinda pusilla indica* Kurahashi	Melanomyinae	Throughout the year
8	*Melinda scutellata* Senior-White	Melanomyinae	Throughout the year
9	Hemipyrellia sp	Luciliinae	Summer
10	*Lucillia ampullacea* Villeneauve	Luciliinae	Throughout the year
11	*Lucillia bazini* Seguy	Luciliinae	Throughout the year
12	*Lucillia cuprina* (Wiedmann)	Luciliinae	Throughout the year
13	*Lucillia papuensis* Macquart	Luciliinae	Monsoon
14	*Lucillia porphyrina* (Walter)	Luciliinae	Monsoon
15	*Lucillia sericata* (Meigen)	Luciliinae	Monsoon
16	*Pollenia asiatica* (Senior-White)	Polleninae	Monsoon
17	*Tainanina sacrophagoides* (Malloch)	Polleninae	Monsoon
18	*Chrysomya albiceps* (Wiedmann)	Chrysomyinae	Throughout the year

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Sr. no	Species	Subfamily	Occurrence
19	*Chrysomya bezziana* Villeneauve	Chrysomyinae	Throughout the year
20	*Chrysomya indica* Sinha and Nandi	Chrysomyinae	Throughout the year
21	*Chrysomya megacephala* (Fabricius)	Chrysomyinae	Throughout the year
22	*Chrysomya rufifacies* Macquart	Chrysomyinae	Throughout the year

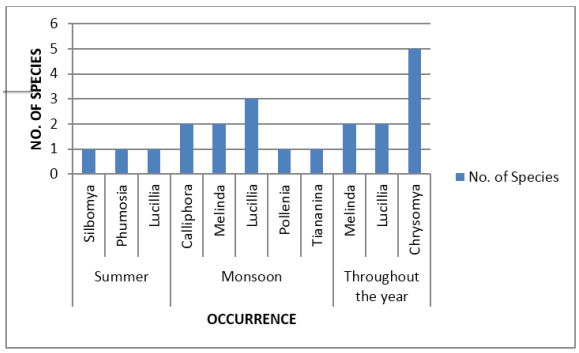

Fig. 1- Occurrence of blowflies from Western Ghats.

Fig - 2. *Lucillia* sp.

Fig - 3. *Chrysomia* sp.

Fig - 4. Flesh fly

Blowflies are called as blue bottles and green bottles which belongs to the family Calliphoridae. They are small to large, robustly- build, metallic blue green and covered more or less with dusting. Our observations indicated that adults were vegetarians and frequently visited vegetation or flowers. They also visited excrement or decaying animals and plant matters. The maggots of blowflies were carnivorous or parasitic or omnivorous. They also played a role of scavengers by feeding on dung, garbage, carrion and faeces. Larvae of some blowflies were parasitic on insects , snails, earthworms and mammals. Therefore, they have tremendous importance in medical, veterinary and forensic sciences.

According to Amendt et al. (2007) distribution of eggs or larvae (maggots) on a baby indicate presense of a wound from gunshot or stabbing. The insects found on the body can suggest that whether the body was moved from initial location. In cases of neglect or abuse, where a living person has become infested by insects (myiasis), ageing of the insects can indicate the period of mistreatment. The toxins present in the dead body can be detected with the help of insects feeding on carcass by critical analysis. DNA sequencing of dead person can also be obtained by insects feeding on the dead body. Thus, the forensic entomology can assist in cases of wild life poaching and illegal importation of animal parts and sourcing of illegal plant material such as cannabis, by identifying the origin of any insects present. Forensic insects also play an important role in detecting food contamination wherein insects indicate when and where the food may spoiled, either deliberately or through negligence.

Forensic insects and data preservation have tremendous importance in court as part of event evidence through insects. Therefore, correct and scientific protocols of methods of insect collection and data collection have tremendous importance otherwise insects may get spoiled. Insects like dipterous flies, coleopterous beetles and hymenopterous wasps should be collected by insect net and dried sufficiently in drying chamber at 60°C and adult insects should be pinned properly. Dipterous insects should be pinned from ventral side from mesothorax that pin should not be emerged from the dorsal side infact, pinning should not be made from dorsal side so that the chaetotaxy of the insect should not damage as it is extremely essential for running key for identification of insects. However, forensic hymenopterous insects should be pinned from dorsal side from mesothorax (Sathe, 2005).

The corpse have eight decomposing stages and the insects have specificity with the decomposing stages. Dipterous insects like fleshflies, blowflies, house flies, cheese skipper flies, coffin flies, lesser corpse flies, sunflies, scavenger flies, soldier flies, etc. appeared first on the corpse which were responsible for breaking down fatty and protienous part of the dead body (Rawat et al. 2014). Second arrivals on corpse were beetles. The beetles associated at second stage of decomposition refer to rove beetles, hister beetles, carrion beetles, ham beetles and carcass beetles. The skin or hide beetles played important role in the final stages of decomposition of corpse (Rawat et al., 2014).While, lepidopterous larvae of clothes moth were associated with the dead body for feeding on the hairs. Thus, insects play a very crucial role in the ecological recycling of carcass and obtaining clues in crime detection such as time of death, region of death occurred, transportation ways used, toxic materials responsible for death, etc.

Sasha et al. (2009) examined the insect succession variations on the decomposing remains in two areas, bush land and agriculture of western Australia. They reported 3 beetles involved in decomposition of carcass which refer to *Ptomaphila lacrymosa* (Schreibers) (Silphidae), *Omorgus tatei* (Blackburn) (Trogidae) and *Helea castor* (Pascoe) (Tenebrionidae).

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According to Vasconcelos et al. (2013) two Calliphorids namely *Hemilucillia segmentaria* (Fabricius)and *H. semidiaphana* (Rondani) were dominant in rain forest fragment on animal carcasses in Brazil. Besides Calliphoridae and Sarcophagidae species, forensically important families such as Phoridae, Anthomyidae and Fannidae were also registered from rain forest of Brazil. *Lucillia sericata* (Meigen) played significant role in human medicine. It's larvae were used for healing chronic injuries that donor respond to conventional treatments in case of ulcers and gangrenous or necrotic tissues (Gupta, 2008). The present work is very good baseline data for forensic science for Western Ghats for protecting wildlife and human life.

ACKNOWLEDGEMENT
Authors are thankful to Shivaji University, Kolhapur for providing facilities.

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