

Important Flies in Forensic Entomology in Criminal Investigation

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Abstract: *Insects can play a vital role in criminal investigation. Entomological evidence can be used as evidence in criminal cases in which it mainly helps to determine the time interval of which a person has been dead. This article focuses on forensic entomology and important flies in forensic entomology and their characteristics. There are flies like blow flies, flesh flies and much more. These flies can be discovered on corpses which have their own characters. For example, some flies will come at an early stage of decomposition of the body and some will at the end stage. Investigators can identify how long a body has been dead by examining those insects.*

Keywords: Forensic entomology, flies in forensic entomology, blow flies, families of flies, flesh flies, beetles.

1. Introduction

From earlier days onwards the time of death was determined based on the physical conditions of the corpse, the variation in body temperature, colour change in body and so on. Forensic entomology plays a vital role in determining the minimum post mortem interval. It can be done by examining the flies present at the time of death or found on the corpse. Each flies have different specialities. There are flies that come at the time of death, there will be flies that come at the stage of decomposition of the body and much more. Autolysis, putrefaction and diagenesis are the three decomposition processes which a body passes as it decays. Decomposition can be different in people due to age and other physical conditions. The time in which the individual life stage takes to the insect life stage that is discovered from the corpse will give an approximate length of time in which the person has been dead.

1.1 What is Forensic Entomology?

Forensic entomology is a branch of forensic science which deals with the study of insects, their life cycles to aid in investigation. Forensic entomology is used in legal context in civil and criminal matters. By examining and collecting the insects from corpses will help to correlate post - mortem intervals and it will lead to investigation.

1.2 Types of Flies Used In Forensic Entomology

Blowflies (Family Calliphoridae)

Blowflies belong to the family Calliphoridae which are forensically important species. This insect family specialized in metallic blue and green in appearance. Blowflies are the initial insects which interact with the corpse. They will arrive at carcasses or the human body within minutes of exposure. They can easily smell the corpse from a long distance. Taste receptors of flies are located on their body, legs and feet. So the flies will find an appropriate oviposition site and the female flies will lay their eggs on it. Commonly they lay the eggs on body openings that are exposed. So it is good to estimate the post mortem interval.

Calliphora vicina (Robineau Devoidy)

Calliphora vicina is one of the significant flies in forensic entomology. This is a large blowfly which is usually between 10 to 14mm length. The head is of black colour and the lower part of bucca (cheek) is red to yellow in colour. Thorax is black and the dorsum is of dense pubescence. The larvae are found on carrions.



Image 1: Calliphora vicina

Cynomya mortuorum (Linnaeus)

Cynomya mortuorum is commonly known as blue bottle fly. This species has blue - green thorax with silvery covering and its face and bucca are yellowish to dark orange colour. They are the most important flies at crime scenes which help to determine PMI and the time of colonization.



Image 2: Cynomya mortuorum

Flesh Flies (Family Sarcophagidae)

Flesh flies belong to the family sarcophagidae which is of over 2, 000 species. They are in length from 2 to 14mm. Flesh flies generally have grey and black longitudinal lines on the thorax and checkerboard pattern on abdomen. They are found on decomposing carrion. They won't lay eggs on corpses. While calculating PMI the developing time of eggs will be deducted.

Sarcophaga bullata and **Sarcophaga haemorrhoidalis** are examples of flesh flies. *Sarcophaga bullata* is also known as Parker which is 8 to 14mm in length. *Sarcophaga haemorrhoidalis* is also known as Red - tailed flesh fly which is seen world wide. In this, female species deposit larvae in human corpses mainly found in summer.



Image 3: *Sarcophaga bullata*



Image 4: *Sarcophaga haemorrhoidalis*

Beetles

Beetles belong to order Coleoptera which is about 300, 000 species. They vary widely in appearance. Adult beetles have the ability to fly. Beetles are the most forensically important flies in forensic entomology.

Carrion Beetles (Family Silphidae)

Carrion beetles have a flat body which has an antennae. They are usually 10 to 35mm in length. Its larvae also vary in size and shape. These beetles are attracted to decaying surfaces. Adult silphids consume maggots.



Image 5: American carrion beetle

Rov Beetles (Staphylinidae)

These beetles can be easily identified because of their short elytra. Rov beetles are attracted to corpses to feed on the larvae.

Clown Beetles (Histeridae)

These are the small beetles. They are attracted to decaying organic matter. Larvae and adults of this family are found on the corpse.

2. Conclusion

Forensic entomology is a vast area in forensic science. Different varieties of insects play an important role in criminal investigation. These species help to determine the approximate time of death and hints in manner of death. Each species has their own specialities, forensic entomology really helps to solve a crime.

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