

Life cycle of calliphoridae on vertebrate corpse

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Abstract

The study of arthropods including insects, arachnids, centipedes, millipedes and crustaceans, to criminal or legal cases is called as Forensic entomology. *Chrysomya saffrana* is the most important fly which is used for the estimation of the dead body and the post-mortem interval (PMI). It belongs to family Calliphoridae and order Diptera. This is the first fly which comes on the vertebrate corpse due to the release of gases like putrescine because they seek a warm, moist protein-rich source to lay eggs. In the larval development the temperature and humidity play a major role in the estimation of time since death. This is the most forensically important fly known as blow fly. Blow flies are used as an entomological evidence for the estimation of death. This paper deals with the biology and life cycle of *Chrysomya saffrana* and their interaction with the corpse. In order dipteran Holometabolous metamorphosis takes place.

Keywords: forensic entomology, *chrysomya saffrana*, post mortem interval, life cycle, forensic importance. Necrophagous flies

Introduction

Forensic entomology in which insects are known to have been used in the detection of crimes for a long time. It is important to know which species of insects are infesting the body and something about their habits and environmental requirements when we interpret the crime scene. The field of forensic entomology is divided into three parts—Urban entomology in which involving insects that affect houses, buildings, and similar human environments. Stored products entomology which involving insects infesting stored goods

such as food or clothing. And the last one is Medico legal entomology which involving insects and their utility in solving criminal cases. Calliphoridae is a type of fly that lay their eggs in dung, rotting, meat, or open wounds. When these eggs hatch, the resulting larvae feed on the surrounding materials and through the larvae's digestive system, materials are broken down into their components, and nutrients are returned to the soil. Without the blowflies breaking down waste and dead carcasses, this decomposition process would take longer.

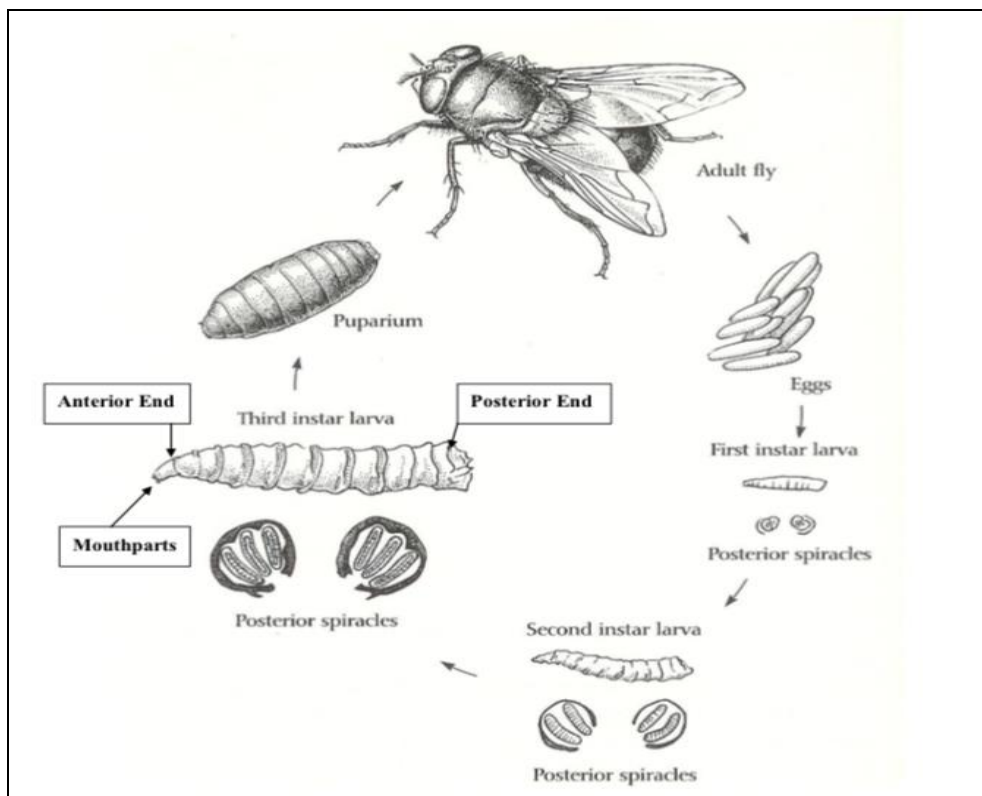


Fig 1: Showing life cycle of Calliphoridae

Adult blowfly lays eggs

The adult blowfly travels around finding a place to lay her eggs. The open hole in carcasses the perfect spot is such as in wound, mouth, nostrils, ears, resulting larvae has to place to feed when hatched.

Hatching of eggs

Most blowfly eggs are between 1-2mm long and typically take 24-25 hours after being laid to hatch.

1st Stage Larvae

Once the eggs hatch, the blowflies are known as first-stage larvae are known as maggots. The larvae produce an enzyme to break down the protein surrounding them so, they can feed on semi-liquid bodily fluids. As larvae help the body decompose in this way, they grow and are ready to shed their first exoskeleton after a few days. In the 1st larval stage, there are no mouthparts present.

2nd Stage Larvae

Once the first exoskeleton is shed, the larvae enter the second stage. After that, they continue to grow in size as the enzyme breaks down the body and feed on the resulting material. When the larvae are big enough, they molt their exoskeleton for a second time. In this stage, the mouth becomes very active and feed constantly.

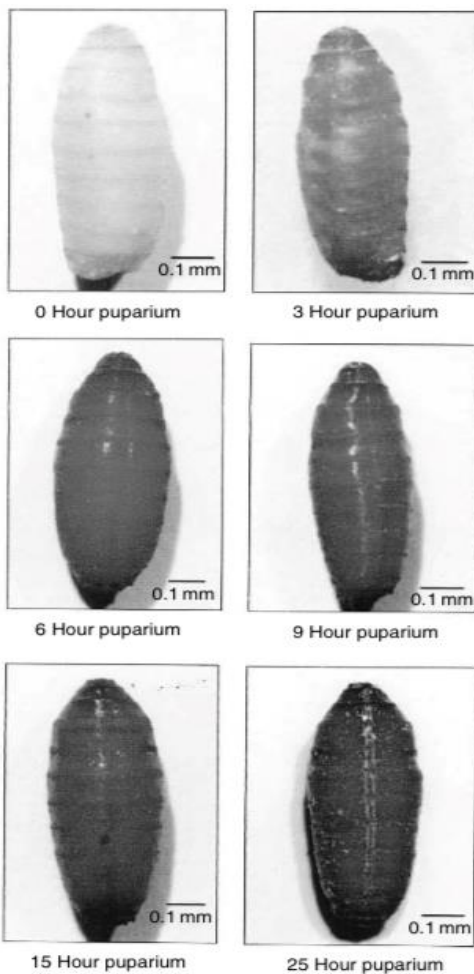


Fig 2: Showing Puparial color changes

3rd Stage Larvae

After the blowfly sheds the second exoskeleton, they are now called as pupae and are in third stage of their growth as

maggots. They are then find their way to the ground and no longer move or feed, their last exoskeleton hardens and gradually turn from a light brown to a black colour. In this stage the larvae forms a hard cocoon like shell and begins developing adult features which is called as pupation.

Adult blowfly

Once the exoskeleton has fully hardened, the adult blowfly emerges from inside and can fly after only a couple of hours. Once they have reached this final stage, a male blowfly can mate with a female right away. The female must feed on some additional protein such as another faces before she has the nourishment she needs to lay eggs of her own.

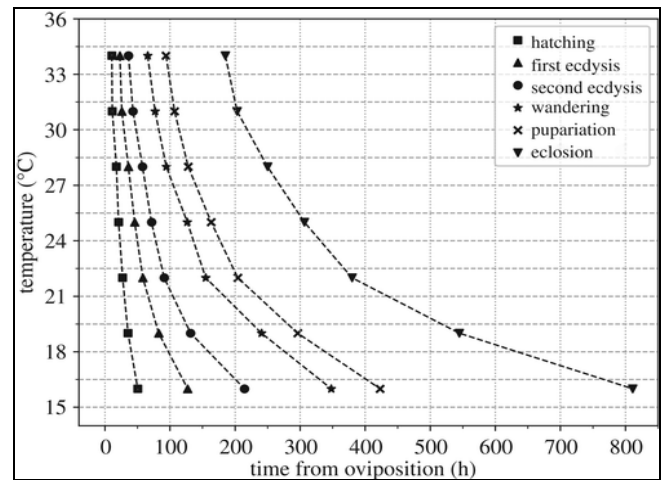


Fig 3

The temperature and humidity are the most important factors playing role in the larval development, decay and degradation of the cadavers. Therefore, the climatic fluctuations and environmental changes play an important role in the life cycle of *Chrysomya saffranaea*. All these factors must be considered in the Post Mortem Interval determination.

Conclusion

Forensic entomology is preferred for a case where the time since a death has exceeded 72hrs. The life cycle of the blowfly is varying with temperature. Low temperature increases the duration to complete the life cycle whereas high temperature decreases the duration to complete the life cycle. Variation in temperature and humidity influence growth and indirectly influence the estimation of time since death. Thus to ensure a more accurate estimation, the history of surrounding temperature and humidity in the location where the body was found must be taken into consideration. Insects also can provide other important information about a few crimes or victims and also about the person’s life before death. Insect behavior also can help know the incidents that happened around the time of death.

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