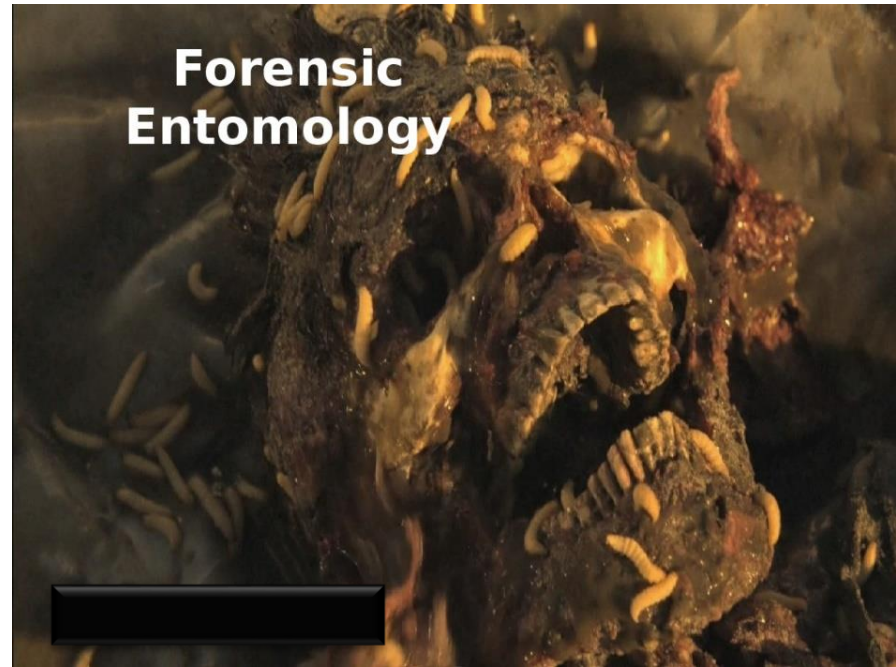


Plant protection
Elective - Forensic insects
Stage- 4th
Lecture 2
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Dr. Gazang Tahier Omar

Limitations of Forensic Entomology:

- 1-Time of death estimates depend on accurate temperature information, but local weather patterns can be variable and data may come from stations quite distant from the crime scene.
2. Forensic entomology relies on insect abundance. In winter, there are fewer insects and entomology's use is limited.
3. Since it takes time to rear insects, forensic entomology cannot produce immediate results.
4. Treatments (like freezing, burial or wrapping) that exclude insects can affect estimates.

Post Mortem Interval (PMI) :

Time since death (the time between death and corpse discovery) this is called postmortem interval or PMI. It help to give information about

1-Movement of the corpse

2-Manner and cause of death, Association of suspects with the death scene,

3- Detection of toxins, drugs

4- Detection the DNA of the victim through analysis of insect larvae.

Correct estimation of the PMI is extremely important for death scene investigations when a death is not witnessed . There are many scientific methods used for the time elapsed since death, however, approaches based on entomological data are supposed the most valuable and accurate ones when medical parameters are no longer of value . Insect evidences are used to determine of postmortem interval or estimate period of insect activity.

Factors that might affect their PMI estimates:

1-Was the body enclosed in an area or wrapped in a material that would have prevented flies from finding the corpse and laying eggs?

2-Were other insect species present that may have affected the development of the collected species?

3-Were there drugs or other poisons in or on the body that might have affected the larvae's development?

Estimates of postmortem intervals can be made from insects inhabiting remains. The estimates are based on:

1-The time required for a given species to reach a particular stage of development.

2-Comparisons of all insect species present on the remains at the time of examination.

3-Ecological succession occurs as an unexploited habitat (like a corpse) is invaded by a series of different organisms

Steps in estimating the postmortem index with insect larvae

For estimating the PMI

1- Age of the larvae has to be determined. By measuring the length or dry weight of the oldest larvae and comparing it with the reference data.

2-The rate of development of the larvae is dependent on the surrounding ambient temperatures. Each stage of development has its temperature requirement hence each species has its own defined number of accumulated degree days or accumulated degree hours to complete its development. Once the thermal history of the larvae is obtained, it can be compared with temperatures at the death scene and PMI can be estimated.

3-The first-generation adult flies can also be used to determine the age. They can be identified by the shriveled wings, and tiny abdomen with dull grey color.

4-When insects colonizing the carrion in a particular area is known, an insect colonizing succession model can also be used to estimate the PMI.

Using insect data for determining the site of crime

There are reported differences in the species of insects involved with the decomposing corpse in different habitats and environments. A careful examination can reveal species variation, as species associated with one type of habitat present on a corpse is found to be different from those when the corpse is transported after death.

DNA analysis for species identification

Identifying the correct species is the important initial step for estimating the age of the larvae. Morphological comparison is usually used for species identification which requires special expertise and is often time-consuming. In order to overcome this difficulty species identification can be done by polymerized chain reaction amplification suitable regions of the larvae genomes and comparing it with reference data.

Entomotoxicology:

The larvae of the flies which feed on the carrion can accumulate drugs ingested by the deceased person. Bodies which are in advanced stages of decomposition or which are skeletonized are difficult to examine for toxicological substances. In these instances, the larvae feeding on this body can be macerated and analyzed with techniques like thin-layer chromatography, gas chromatography and/or mass spectrometry. Toxins can influence the stages of development of the larvae. Cocaine and heroin in the carcass can speed up the larval development. Poisons like malthione in the carrion can delay the insect colonization.