

Insects as Witness to Man's Violent Strategies: Application to Forensic Science in Egypt

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Short Communication

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INTRODUCTION

The typical death scene investigator learns quickly that maggots and corpses go together. For many years, the "worms" crawling in the eyes, nose, and other orifices and wounds on dead bodies were considered just another disgusting element of decay something to be rinsed away as soon as the corpse was placed on the table for autopsy. While ballistics, firearm examination, bite marks, gunpowder residue chemistry, blood spatter analysis, and other elements of scientific criminology were studied and refined, the insects associated with death scenes were largely ignored.

On this sight, Forensic Entomology is the name given to the study of insects (or even other arthropod such as mites and ticks) that form part of the evidence in legal cases, but it is mainly associated with death inquiries.

Forensic entomology proceeds on the common observation that exposed remains present a temporary and progressively changing habitat and food source for a wide variety of organisms ranging from microbes like bacteria and fungi to vertebrate scavengers. Out of these, arthropod fauna comprises a major element of the biota and insects form the most constant, diverse and conspicuous group. Among the many large groups of insects, the flies (Diptera) and the beetles (Coleoptera) have been given the greatest attention as being instrumental in recycling carrion remains ^[1].

Insects and other arthropods colonize the body from the first stages of decay, in successive waves; each wave modifies its own substratum, which has the effect of making it attractive to the next one. The knowledge of this succession is an important tool in forensic studies to estimate the interval since death from the species of organisms found on the body ^[1].

The most important application is in the estimation of the postmortem interval (PMI) i.e., the time since death ^[2]. For intervals greater than 72 h, forensic entomology can be more accurate in determining PMI than traditional techniques, and sometimes is the only available method ^[3].

The first records of applied forensic entomology occurred in China in the 13th century ^[3] as narrated in a Chinese story (Washing away of wrongs) translated by Mcknight. A worker lay dead in the paddy field, killed by blows from a sickle. The local law enforcement officer went out to where the man has been killed and called together all the field workers in the area. He told them to lay down their sickles in a row on the ground. The weather was hot and it was not long before flies began to congregate on one sickle in particular, probably because of invisible remnants of tissues still adhering to it. At the sight of this evidence the owner of the sickle confessed the crime. Through the years, however, a few scientists have researched forensic entomology, which has become a fascinating, and at the same time a more arcane, field of biological study. Within the last decade or so entomology had been defined as a discrete field of forensic science ^[4].

With increasing stress on human rights these days, importance of physical evidence in criminal investigations has a major role ^[5-7]. Scientific investigations are going to replace the third degree methods all over the world. Insects can act as important forensic indicators in this regard. Insects can be a valuable tool in investigations of homicides, suicides, untimely deaths and other violent crimes. Accurate forensic determination is possible, however, only when representative specimens are recognized, properly collected, preserved and forwarded in a timely manner to a qualified forensic entomologist for analysis.

In several developed countries, such as the USA, forensic entomology is actually applied in forensic investigations and is

recognized by local courts. Forensic entomologists are, in fact, often hired as expert witnesses in suicide and homicide cases. The presence of this branch of forensic science within the FBI, clearly indicates the importance that such field is actually given in the USA. This field has obtained a discrete popularity through TV series such as C.S.I. Miami/New York and the famous movie "The Silence of the Lambs".

Forensic entomology is not yet applied in developing countries. However, the penal code of many of these countries currently allows its application. For example, in India, according to the evidence act 138 of the Indian Penal Code (IPC), "Evidence is real if supplied by material objects based on scientific documentation". Undoubtedly insects do fulfill the conditions as laid down in this act ^[4].

There is no similar article in the Egyptian Penal Procedure Law, as all the evidence issues are left to the judge discretion to investigate them on a case by case basis. However, it can be requested from the judge to obtain the opinion of an expert in the case under judgment. For example, if the case requires more accurate evidence that can be obtained through forensic entomology, the judge has to hire in this case a specialist in such field.

Accordingly, it seems evident that forensic entomology could be more than an asset in providing additional evidences in judicial cases in Egypt. Unfortunately, there are presently several factors impeding its implementation.

First, forensic entomology is still a relatively new branch of science in Egypt and, therefore, to successfully implement this field, several forensic entomology-related data still need to be collected. Moreover, potentially useful entomological data, obtained through previous research studies, are not properly stored and are, consequently, of difficult access or even lost.

The second impeding factor includes the lack of awareness on the potentialities of forensic entomology. This lack of awareness includes not only the police and the judiciary system, but also forensic medics who rely on traditional forensic procedures.

On the other hand, some efforts have been made in Egypt, targeting either scientific research or the increase of awareness.

The University of Alexandria has been a pioneer institution in forensic entomology studies. Different research studies have been already carried out by the Zoology Department of the Faculty of Science and have generated baseline data on the process of decomposition and on insect fauna of decaying animal carcasses ^[7-10].

Moreover, a joint research program, focusing on maggot therapy, is currently operational between staff members of the Faculty of Science and the Faculty of Medicine. Although this research program dealt with the use of insects in the treatment of wounds and not with their potential utilization in forensic science, it has provided the medical staff with some information on the potentialities of insects.

A recent attempt to explain such potentialities was made at the Second Egyptian International Conference of Medical and Forensic Sciences "Mass Disasters Preparedness and Management", held in Cairo in February 2007 under the patronage of the Ministry of Justice. During the conference an illustrative poster was presented ^[11]. As a result, the conference recommendations pointed to the importance of forensic entomology among other new branches and gave a preliminary accreditation to the forensic entomology specialist within the forensic science community in Egypt ^[12-15].

OBJECTIVES

The present program includes three main objectives:

1. To obtain field information and data on entomological succession in different habitat types and on different death cases in order to build an exhaustive database that could be used in criminal investigations.
2. To implement an awareness program targeting the Egyptian judicial system and other people involved in criminal investigations.
3. To establish, at the Faculty of Science of the University of Alexandria, an advanced unit specialized in forensic entomology where scientific research could be focused on forensic entomology and that could aid, in the future, investigative and judicial authorities in solving criminal cases ^[16-20].

EXPECTED OUTPUTS

The implementation of the research program would provide the basis for developing the understanding the ecology of local carrion insect community and to provide field data that could be used to build a local forensic entomology database, which is a vital prerequisite to the application of medico-criminal forensic entomology in Egypt. Moreover, involvement of a number of junior researchers would also aid in establishing a school of forensic entomologists within the Faculty of Science of the University of Alexandria.

The awareness program would introduce the science of forensic entomology to the members of forensic science community in our country, as an initial step towards the practice of this field through the judiciary system.

After the implementation of the present program, a developed forensic entomology unit it is expected to be established at the Faculty of Science, Alexandria University. As previously mentioned, this unit would aid in focusing scientific research on forensic entomology and would be used in investigating criminal death cases through forensic entomology^[21-24].

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