A look into forensic entomology and how

“Maggots help crack Perth murder mystery”
Aug 13, 2003
http://news.bbc.co.uk/1/hi/sci/tech/3144839.stm

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Dr. Houseman
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From repulsive carrion to miniature Sherlock Holmes, one could come to think that these creatures are moving up in the world. In fact, it has been known for centuries that certain of the most successful creatures on the planet, insects, rapidly establish themselves in any decaying food-source—and that the dead human body is no exception to this infestation. Since this insect behaviour has been easy to detect—maggot activity on a corpse has been the interest of not only scientists but also artists—a discipline that makes use of these insects for death investigation, a procedure called entomology forensics, is nothing new. The first such recorded case occurred in 13th century China where insects were used to identify the culprit in a sickle-murder case: having been told to lay down their scythes by the authorities, the farmers watched to see which scythe attracted flies, thus identifying the murderer (Benecke, 2001). The article presented here sheds light on this somewhat obscure practice that some call a “youthful science” (Dadour, 2001).

**The maggot accuracy**

The essence of the “popular focus” of this article can be distilled to be an introduction to a practice which may appear to some as bizarre and complex. To this end, the article is highly accurate: as an introduction to forensic entomology, it could be considered complete, but as anything more than this, it is certainly lacking information.

The article addresses a particular case where Dr. Dadour is said to have proved that a Perth mystery murder occurred in the city even if the corpse was found in the Australian outback. According to this article, this happens to be “the latest breakthrough for forensic entomology – the science of using insects to crack criminal cases” (BBC
Three points of interest are then discussed: first, the analysis of the time of death based on fly presence; second, current research in improving database on fly development using pig carcasses, and third, the use of flies in identifying the cause of death.

In any murder case, the time of death at a crime scene is of vital importance, and the article adequately represents the role of forensic entomology in determining this post-mortem interval. The article states that this is a somewhat new procedure that “has not long come in police investigation” and that “its potential for yielding clues … is still being fully discovered” (idem). Although it is accurate that the background information required to use insects effectively in case investigations, this does not actually mean that forensic entomology has not been used in multiple times to help solve a case, and that in fact, it has drawn increasing attention for the last ten to fifteen years (Amendt, 2000).

Several key facts are not mentioned in regard to the time of death section of this article. It mentions nothing of the stepwise procedures involved in determining post-mortem interval using forensic entomology—it only briefly mentions that the elapsed time can be measured by estimating the age of the maggots found on the body, namely blowfly maggots. From an entomologist perspective, this is far from being sufficient.

Analyzing cadaver-fauna characteristics rely on several points. First, in regard to the post-mortem interval, a rough estimate can be gathered based on the stages of succession of the insects, but these estimates can vary widely when climatic and geographical aspects are considered: a cadaver found in different biogeographical regions will exhibit not only different decay but also a different insect fauna due to the simple fact that different climatic conditions can affect both of these. Second, from an
entomological perspective, the insect cycles and growth should be discussed in more
depth since an understanding of both of these would be essential for an appropriate
understanding of forensic entomology. Third, more on the current research could be
mentioned here, although this is somewhat covered in the two sections that follow the
time of death, namely the pig carcasses and the cause of death sections.

As a whole, the article introduces the concept of forensic entomology but fails to
adequately cover the topics mentioned above; these will now be further discussed as the
article should have done.

Forensic entomology—in more details

In order to determine time of death accurately using forensic entomology, certain
factors have to be analyzed and specific steps must be followed to ensure that the results
obtained are as accurate as possible.

As may seem logical, climatic conditions play a large role in forensic entomology.
These will affect both the corpse’s rate of decay as well as the insect fauna that will be
found on the body. Moreover, the simple emplacement of the corpse will determine what
types of insects have access to the body. For this reason, specific steps are followed when
examining a cadaver using forensic entomology, both at the scene of the crime, and in the
examination conducted at the morgue. First, a collection of any adult flies associated with
the body is done using a net; then the visible insects are removed from the body and an
estimate of the fly larval mass is done. The temperature of both the larval masses and the
soil beneath the body is recorded, and after corpse removal, the ground immediately
under the corpse is examined for insects and these are collected as well as the soil (to a
depth of 14 cm) that was found under the body. At the morgue, the forensic entomologist examines all procedures conducted and collects any other insects discovered, on clothing or the body (Dadour, 2001). All of these insects have to be considered when making an analysis with forensic entomology. However, these are the procedures associated with this science and have nothing to do with the insects themselves.

The only mention of a fly in the article is the blowfly, but even then, very little is mentioned on this blowfly or how it can be used in determining this time of death procedure described in the article.

The blowfly mentioned in the article is most likely Calliphora dubia, since this is the main blowfly found on carrion in Australia (idem). The cycle of blowflies is of high importance in determining the post-mortem interval, and this was not mentioned in the article. The cycle is the following: the adult female lays her eggs directly on the growth medium, which can range from a corpse to feces to blood, where they hatch and feed, eventually reaching a mature stage when they pupate, usually in the soil nearby (Chaubert). Hence, studying the presence of these larvae on a corpse would allow to determine the post-mortem interval if all the surrounding conditions were known. For this reason, much time and effort is going into organizing a set of experimentally controlled conditions and observations that would allow to accurately determine the time of death since time development of maggots is subject to many factors, the chief one being temperature (idem).

Therefore, the article was accurate in reporting that current studies are being performed using pig carcasses to determine the sequential development of maggots. The data generated by these experiments will then allow forensic entomologists to accurately
determine the time of death in humans based on the insect fauna found (Dadour, 2001). The article is also correct in suggesting that further studies in the analysis of the larvae themselves and the larvae casings would allow forensic entomologists to discover the cause of death of the victim in specific circumstances, even years after death (Idem).

Conclusions

Overall, the article successfully introduces the concept of forensic entomology in such a way that every regular reader would be able to understand the concept and gather an understanding of this entomological detective work. However, it remains vague in regards to any detail other than the introduction of this topic, and even though it is well-rounded in mentioning the current research and possible improvements of this field, it fails to include the details that would keep readers who already know about forensic entomology interested in this “breakthrough for forensic entomology” (BBC News, 2003).
References


Chaubert, Sylvain et al. “Forensic entomology.” Special sessions: ENT-TP-01. 388.