



## **A Career as a Forensic Entomologist**

Our guest blog today is written by Andrew Whittington. Andrew is an Entomologist, and taxonomist specialised in the identification and naming of insects, most particularly, but not exclusively, dealing with flies (Diptera). With thirty years' experience as a fly taxonomist, Andrew has written approximately 50 scientific papers and described more than 60 new species!

Andrew kindly shares his experience with us here, thank you Andrew!

### **The Role**

The Role of a Forensic Entomologist is to facilitate forensic investigation, and ultimately, provide the law courts with accurate and up-to-date information, regarding the role of insects encountered in casework.

Forensic Entomologists are Expert Witnesses, not usually members of the Police force or Forensic Services, doing most work on contract - and in this sense, are self-employed. Consequently, Forensic Entomologists answer directly to the courts, even if the finance for the contract came through a police force, a solicitor or, in Scotland, the Procurator Fiscal.

The primary task is to attend crime scenes or autopsies as requested, to seize insect specimens in line with standard protocols (see: Amendt *et al.* 2007), to process those specimens (that is identify them to species) and then to report on the role those species played in the crime attended.

The bulk of work concerns the minimum time since death, based on insect life cycles, but can range from minor offences to do with food hygiene, to major crimes such as murder and drug trafficking.

### **Key Responsibilities**

These include:

- Assisting in the location, extraction, and seizure of insect specimens.
- Microscopically examine insect specimens to provide species level identification.
- In murder cases, establish a sequence of succession of insect species, and/or estimate minimum time since death, based on accumulated degree hours, using known insect developmental durations.
- In other cases, establish potential insect species distributions, or life cycle patterns and provide detailed assessment of how these relate to the crime.

### **Skills and attributes**

Well-honed skills in insect identification are essential for a career in Forensic Entomology. In addition, experience with spreadsheets or data analytical software is relevant and detailed knowledge of statistical analysis such as regression, is a requirement. Further to that, it is essential to be well versed in the protocols and procedures required of all Crime Scene personnel attending crime scenes, and if required to attend autopsies at a mortuary, then a full understanding of mortuary etiquette is also needed.



## **Qualifications and experience**

As a consequence of the amount of detail within the discipline, a PhD in Entomology (preferably in fly or beetle biology or taxonomy) is a minimum requirement for a career as a Forensic Entomologist. An undergraduate degree in species biology that includes morphological and anatomical taxonomy, or in forensic science/biology can precede this, but post-graduate specialisation in Entomology, would be a requirement in order to gain sufficient knowledge, to fully function as an Expert Witness. Some universities do offer post-graduate studies in forensic science, within which a focus on entomology can be placed, but rather few offer post-graduate studies in forensic entomology *per se*.

## **Hints and Tips**

- You will need to be a post-graduate, preferably with a PhD and preferably some crime scene experience.
- Obviously, an undergraduate degree (and potentially a Masters degree) needs to precede the PhD and you should aim to make these as biological in content as possible, with a leaning toward entomology.
- It helps to already be strongly interested in insects - there are over 80,000 species in the UK alone, and while not all of these are found at crime scenes, the application of entomology to the law, means that a great many may be encountered in your career.
- It also helps to have a good understanding of mathematics and to develop statistical skills.
- You will need to be proficient on computers, with well-developed writing and spreadsheet skills.
- Try to develop skills in communication and public speaking, no matter how daunting this may seem, as you will inevitably be required to give evidence in court at some stage in your career.
- A clean driving licence will certainly be required.
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## **'A day in the life of a Forensic Entomologist'**

There is no such thing as a 'typical crime scene' as each is unique, but most usually an instruction to attend a crime scene is delivered a day or more before the event (depending on the type of crime). Attendance normally begins with a strategy meeting at police headquarters, at which it is decided how the crime scene will be approached, and in which sequence specialists will examine the circumstances that are presented there.

Once at the scene, forensic overalls, gloves, foot covers, and face mask are donned. When required to examine the crime scene, it is approached and examined for insect activity or specimens. These are seized as encountered, noted, sealed and bagged by the evidence/productions officer, who signs and dates the entry. Ambient temperature readings would be taken at the scene and if necessary, from the deceased. It may be necessary to leave a data logger for a minimum of one week at the scene. The day usually ends with



another strategy meeting to summarise and conclude the events, and also to determine if further attendance is required.

The countersigned, sealed, evidence bags are then taken to the laboratory, where (usually on days following the crime scene attendance) these can be individually and separately opened (signing each for continuation of chain of evidence), the specimen(s) examined, identified, measured, photographed (if needed) and returned to the evidence bag, which is then again sealed and signed. When returned to the evidence/productions officer it will be signed and dated again. A log of all these activities is kept.

The data acquired through the detailed specimen examination, is entered during the examination into a spreadsheet. The data are then analysed according to the crime examined. For example, if a murder was attended, then the oldest insect specimen would become the focal point of the investigation, because it potentially represents the first insect egg laid at the scene on the deceased. The species that this specimen represents is a critical detail, as each species of insect has a specific developmental time, dependent on temperature.

The known developmental rates for the species would then be plotted and the potential developmental sequence at the scene determined, from a regression of the ambient temperature at a local weather station, against the scene temperatures acquired. Accumulated degree hour analysis would then be conducted to determine the minimum time since death. A confidential report is then compiled and submitted.

## Reference

Amendt, J., Campobasso, C.P., Gaudry, E., Reiter, C., LeBlanc, H.N. & Hall, M.J.R. 2007. Best practice in forensic entomology: standards and guidelines. *International Journal of Legal Medicine* **121**: 90–104.

Thank you for reading

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