H15 Insects of Forensic Importance: Seasonality and Georeferencing in the Mexican Territory

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After attending this presentation, attendees will understand the importance of collection, identification, and preservation of insects from different regions and seasons for forensic purposes.

This presentation will impact the forensic science community by providing information that will be transformed into a web tool to assist forensic investigations involving insects.

Forensic entomology is a discipline of utmost importance in the legal medical field because it contributes information to establish the time a body has been accessible to insects, possible circumstances of death, determination of toxic agents in the body, and even possible postmortem relocating.

Research on these issues is scarce in Mexico and the information occasionally used in forensic cases is usually of foreign origin, which are not always applicable to this region. For this reason, is necessary to generate research to know and georeference insects of forensic importance from Mexico.

This study references are insects of forensic importance, their geographical location, and the time of year in which each species can be found in Mexico. The purpose of this study is that the information generated can be found by researchers or related personnel to this area on a website, which will contain a database with information on the species found, as well as its georeferencing and time of year it can be found. It will also contain 2D and 3D insect pictures, which will serve as support in legal investigations in which insects or other arthropods of forensic importance are involved.

The results of this study will show the habitat where insects can be found (i.e, the different species can be associated to a type of environment, such as coast, mountain, forest, desert, or even if they are a synanthropic species, in other words, if they are species commonly associated with urban environments or humans, which in forensic investigations is useful to determine if an insect found in a site corresponds to that area or comes from other site). In this study can also contribute to the investigation of determining a possible postmortem relocation. Another scope of this study is that it can determine the presence or absence of different types of insects depending on the time of year, which will help establish in which season the death may have occurred.

During this study, insect collections were conducted using two methods: (1) by use of animal carcasses; and, (2) with scavenger insect traps. Samples collected were identified, labeled, and preserved by mounting with entomological pins. All samples were photographed with their data, including species name, location, time of year in which they were collected, biological characteristics, and the name of the person who made the identification, and were stored in a database. The insect collection work began in 2015, but there is no completion date, as sampling

work will take time to cover most of the country. On the other hand, the website and database were started in October 2015, and in June 2016, the web system was developed. This allows the specific registration and administration of insects. The system involves a "model-view-controller design," allowing visualization information, programs for the control system, and a database for storing information. It also allows you viewing of 3D images of insects registered in the system. It will allow georeferencing of each insect within Mexico.

Currently, collections have been gathered from three areas of the country: Coahuila, Mexico City, and Yucatan. Some of the insects that have been found in these samples are: the order Diptera, the Calliphoridae family containing the species, *Calliphora vomitoria, C. vicina, C. coloradensis, Lucilia sericata, L. mexicana, Pollenia rudis, Cochliomyia hominivorax, Compsomyiops callipes, Chrysomya rufifacies, C. megacephala,* and *Phormia regina*. The Muscidae family includes *Musca domestica* and the Sarcophagidae family has *Sarcophaga carnaria*. The order Coleoptera recorded the Staphilinidae family, the Silphidae family contained the species *Nicrophorus interruptus*, and the Histeridae includes *Xerosaprinus* sp. Nitidulidae contains *Omosita* sp., Dermestidae includes *Dermestes frischii*, *D. maculatus,* and *D. haemorrhoidalis,* and the Cleridae family has *Necrobia rufipes*. Parasitoids and other insect groups that mainly feed on other insects were also found, including the parasitoid *Pachycrepoideus vindemmiaelas*: Pteromalidae and fire ant *Solenopsis invicta*: Formicidae.

These preliminary results are the beginning of a long study that seeks to cover most of the country, so collecting and updating the database will continue indefinitely.

Forensic Entomology, Georeferencing, Insect Seasonality