

# Trainer's Corner

## CIMEX: THE HIDDEN WITNESS

### The Role of 'Bug Dogs' in Forensic Investigations

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**T**hey are not bomb dogs, drug dogs, or human remains detector dogs, but *Cimex lectularius* or bed bug detector dogs now present an opportunity to locate forensic evidence in criminal investigations. What? Maybe a little background will help...

The first record of dogs being trained to locate the odor of insects was in the 1970s. Three dogs were trained to sniff out the eggs and larval stages of *Lymantria dispar*, the gypsy moth (Wallner & Ellis, 1976). Gypsy moths came to North America in the mid-1950s and to this day, continue to spread across the United States destroying millions of acres of forests [Hanna M, 1982]. Since that time, dogs have been utilized find other invasive insect species including the brown marmorated stink bug (*Halyomorpha halys*) and most recently, the newly emerging spotted lanternfly (*Lycorma delicatula*) [Lee et al., 2014; Shanes, 2020].

Detector dogs have been used in the private sector for years to help pest management professionals locate insect infestations. First used to find termites, over the last de-

cade more dogs have been trained to locate Cimex infestations. The sharp increase of Cimex infestations across the country has been attributed to increased international travel, increased resistance of Cimex to commonly used pesticides, and their unique behaviors. How does this relate to law enforcement detector canines?

It all comes down to a potential new source of forensic evidence. Although early research demonstrated that it was possible to isolate human DNA from a bed bug [Szalanski, et al., 2006], the true game changer came when an article was published in Forensic Science International in 2018, reporting that it was possible to extract human DNA from bed bugs that had fed on a person within the past 3 days [Schal, et al., 2018]. What this means is that bed bugs can be a source of viable physical evidence by providing human DNA and then potentially linking the presence of perpetrators and/or victims to that crime scene within a time frame of less than 3 days (temporal-spatial ties). To understand the role of Cimex detector (CD) dogs in forensic investigations, it is necessary to know a little bit more about Cimex.

By nature, Cimex feed exclusively on human blood by biting and drawing blood from their host. These bites are usually painless and often go undetected until the person finds bite marks on them [Stejskal, 2019]. Cimex are so flat they can slip in to spots as thin as a credit card. The hiding spots or harborages are commonly located in the vicinity of their food sources. As Cimex usually feed at night, they often stay around the bed, deep between mattresses and box springs, in bed frames, etc. They can also be found in dark warm places such electrical outlets, electronics such as computers, lamps, televisions, etc.

Cimex can actively travel from place to place by walking from one room or apartment to the next through the walls via conduits. They can cover fairly long distances in a fairly short period of time to find new sources of food. Cimex travels passively by crawling out of a harborage in one place, and climbing in to luggage, back packs, etc. and then later, crawling out once they get to their new home. Cimex commonly stays in one spot, only leaving to find another food source or for reproduc-

tive purposes. Cimex behavior to hide deep under cover is what makes finding them by visual inspection a real challenge. That is where CD dogs come in.

Training is the same as in other detector disciplines. Conceptually similar to human remains (cadaver) detection, CD canines are trained to locate the odor of live Cimex and not to alert on dead ones. CD canines are often used

after eradication treatments to see if all the Cimex present were killed. No alerts are a good thing as in this case, it means that the eradication practices were successful. CD canines come from the private sector where the teams may work for a pest management company or independently and provide reactive or proactive inspections of residential and/or commercial properties. CD canines are usu-

ally deployed indoors, but can also be used to inspect vehicles, equipment, parcels, etc. Like USPCA, credible teams are certified annually by certifying professional associations.

Because Cimex can't fly and commonly stay in one place for long periods of time, the information from the Schal article gave a new focus on finding bed bugs at a crime scene. It is possible





hidden deep in their harborages, yielding another potential source of forensic evidence.

As with other detector canine disciplines involved in forensic investigations, it is necessary to understand how the dogs work, what makes up of the target odor profile, and what may affect or interfere with target odor dispersion [Moser, et al., 2020]. Preliminary chemical profiling of the target and distraction odors (live vs. dead Cimex at different life stages) has been done along with evaluation of synthetic training aids compared to live Cimex [Cannon, Stejskal & Perrault, 2020; Tiedemann-Prada & Stejskal, 2020 unpublished]. Research is planned to evaluate the best method to collect and process Cimex in the field that will yield the best human DNA samples once submitted to a forensic biology laboratory.

Although the use of Cimex detection canines as part of a crime scene investigation at this time is a novel idea, the simple disgusting bed bug may now be considered a potential witness and valuable source of forensic evidence. In this case, this type of “bug dog” effectively becomes a forensic evidence detector canine.

to collect and separate out human DNA from a bed bug that has fed from a number of people within the last 3 days. With this capability, it may be possible to identify more than one person who may have been present at the crime scene. In

cases of homicides, child abduction, and human trafficking investigations, the resident bed bugs may yield DNA from a victim or potential perpetrator. After a crime scene is processed, it may be useful to deploy a CD canine to locate Cimex

## BIOGRAPHY

**Susan Stejskal** is a member of USPCA Region 19. As a cadaver dog handler for almost 20 years for the St. Joseph County Sheriff's Department (Michigan), she served as lead of the Forensic Support Unit and recently transitioned to Canine Unit Trainer. Stejskal combined her professional and educational experience to develop and deliver forensic science training for law enforcement personnel (including detectives, crime scene personnel and canine handlers) around the country. She has written several book

chapters, case reports, and two text books (*Death, Decomposition, and Detector Dogs: from science to scene*; CRC Press, copyright 2012; *Beds, Bugs & Breakfasts: planning and dealing with bed bugs in a small business setting*, CDCS, copyright 2019).

Her partners, K9 Maple and K9 Woody, are deputized and serve with Stejskal as part of the department's Crime Scene Unit and the county major crime task force.

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