



### **D18 Case Study: Insect Succession in Pig Carcasses in Two Regions of Japan Where U.S. Military is Present**

*Joanna L. Collins, MFS\*, AFOSI, 1535 Command Drive, Andrews AFB, MD 20762; Elizabeth Toomer, MFS\*, Naval Criminal Investigative Service, Far East Field Office, FEYK, Yokosuka NAS, 96326, Japan; and Raymond F. Dunton, PhD, United States Army, Center for Health Promotion & Preventive Medicine-Pacific, Camp Zama, 96326, Japan*

After attending this presentation, attendees will understand the use of entomology in determining of PMI and insect succession in two areas of Japan.

This presentation will impact the forensic community and/or humanity by helping to establish the succession of insects to remains in two different climates of Japan. The information collected will be used to help determine postmortem intervals and can be compared with similar climates in the United States.

A joint forensic entomology experiment was conducted to document insect succession in two regions of Japan where U.S. military troops are based. The experiment entailed documentation and sampling of adult and larval insects present on and around pig carcasses, and the rate of their development to assist in determination of postmortem interval. The results were then compared between the two U.S. military bases, approximately 40km apart: Yokosuka Naval Base and Yokota Air Base. This case study will provide U.S. law enforcement in Japan with information widely available in the United States on forensic entomology and estimates of postmortem interval, which is currently not available in Japan. Collection on the Yokosuka pig carcass (located in a humid, moist environment) produced three fly species, and at least six other insect species were collected in close proximity to the carcass. Collection on the Yokota pig carcass (located in a dry, arid climate) produced two fly species, and at least four other insect species were collected in close proximity to the carcass.

The pigs, both weighing approximately 95 pounds, were obtained from a local meat processing facility, and were transported to the research sites immediately after being sacrificed via blunt force trauma to the head. The carcasses were placed in metal mesh cages, enabling insects access to the carcasses, but preventing larger predators from consuming or tampering with the carcasses. Daily scene documentation, including humidity, soil temperature, and various body temperatures were collected from both pigs. Photographs and various samples, to include eggs, larva, adult, and soil, were collected daily from various places on and near the carcass. The Yokosuka pig was entirely covered by maggots by day #13 of the experiment and was fully desiccated and almost completely lacking in maggot activity on day #24. The experiment concluded after 39 days, when no insect activity was identified as present.

The Yokota pig exhibited more of the expected decomposition stages than the Yokosuka pig. The drier, more arid environment seemed to contribute to less immediate insect activity, and the pig carcass never reached the stage of full maggot coverage after 59 days, as seen on day #13 of the Yokosuka pig. The pig carcass experienced more normal stages of decomposition, vice complete consumption by insects, for the duration of the project which was ended after 60 days.

On the basis of these results, U.S. law enforcement in Japan should use caution in applying forensic entomology results from one region of Japan to another geographic region. The results indicate that even over short distances, the vast temperature and humidity disparities in Japan affect insect activity, decomposition, vegetation, and therefore, consumption rates by carrion feeders. Based on this, more comprehensive research is necessary to conclusively identify trends and species in Japan's varying climates and regions. Due to international shipping restrictions prohibiting the shipment of live insects overseas, continued collaboration amongst U.S. law enforcement agencies in Japan is critical in cases involving forensic entomology evidence.

#### **Insect, Postmortem Interval, Japan**