G35 A Summer Carrion Study in the North of Italy

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After attending this presentation, participants will more fully understand variables affecting postmortem changes to carrion exposed outdoors during summer. The presentation will show how weather conditions, combined with effects of extensive predation, may result in incorrect assumption of an extended PMI.

Forensic pathologists are often called upon to establish the time since death in badly decomposed bodies. Physical, chemical and biological changes start immediately after death and their development rate varies according both to external factors (temperature, humidity, and sunlight, insects) and internal factors (body characteristics).

Entomological analyses for the estimation of the postmortem interval are primarily based on the fly life cycle. Flies are rapidly attracted to the body were each female can oviposit hundreds of eggs. Within a few hours, depending on species and ambient temperature, eggs will hatch and a large number of larvae begin actively feeding on the body. In this stage, predators such as beetles, ants, or wasps are able to remove a large amount of fly larvae resulting in a slower rate of decomposition. Conversely, later foraging activity by predators while larvae are migrating from the carrion during the post-feeding stage may result in few larvae reaching the pupal stage. This interaction between insects colonizing remains may lead to an incorrect assessment of the level of Diptera activity on the decomposition rate and suggest a longer PMI.

Data concerning this problem were obtained by research conducted on exposed carrion in the North of Italy.

One pig carcass, Sus scrofa L., was exposed in a rural, grassy field. The animal, weighed 32 kg, was exposed in a wire mesh cage in direct sunlight. Hourly internal temperatures were recorded by two probes inserted into the mouth and anus. Additional information such as ambient air temperature, humidity, rainfall, wind, maggot mass temperature, soil and body surface temperature were also recorded.

At least two daily samplings were performed during the first ten days. During each sampling pictures of both morphological changes and insect activity on the carcass were taken and, entomological specimens were collected for species determinations and microbiological analyses.

The observations demonstrated that a large number of green bottle flies arrived immediately after the carcass was exposed, exploring head area. Insect colonization started from primary sites of oviposition (nose and mouth). Eggs were observed less than 2 hours after exposure. Hatching was observed 20 hours later. Few Sarcophagidae occurred on the carcass on day 2 and their larvae were noted in a small area on the head.

After 24 hours, large masses of eggs were observed on the pig skin at the interface with the soil, all around the carcass. The high ambient temperature caused the death of a large number of eggs on the dorsal surface.

Highest maggot activity was recorded at 72 hours when maggots completely covered the carcass. Stressed by both increasing temperature and ventilation, fully developed 3rd instar larvae start their migration at the end of day 4, leaving a nearly completely skeletonized carcass. Ambient conditions also affected the decomposition of the small amount of tissues spared by the feeding activity of larvae. The skin covering a small area of the abdomen was dehydrated, hardened and took on a dark brown color, usually observed in cadavers exposed for a long time after death.

Coleoptera (Staphylinidae, Dermestidae) were observed all around the carcass beginning on the afternoon of day 4; other species of Coleoptera (Necrobia) started their activity on the carcass after day 5, reaching the maximum at day 8 (Necrobia) and day 10 for Dermestidae.

Coleoptera were very abundant and their presence may explain the small number of pupae found in the ground all around the cage.

In order to clarify all variables affecting insect activity on the carcass, insects were tested for bacterial and chemical contamination by both microbiological and toxicological analyses. Results of this research are still in progress.

Forensic Entomology, Decomposition, Postmortem Interval

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