



### D38 Wrapping a Carcass in a Sheet - The Influence on Insect Succession During Summer and Winter in Central South Africa

Janine A. Kelly, MSc\*, and Theuns C. van der Linde, PhD, University of the Free State, Department of Zoology and Entomology, PO Box 339, Bloemfontein, Free State 9300, South Africa; and Gail S. Anderson, PhD, MPM, Simon Fraser University, School of Criminology, 8888 University Drive, Burnaby, British Columbia V5A 1S6, Canada

After attending this presentation, attendees will understand the importance of a possible delay in insect succession due to the presence of a sheet in the colder months of the year.

Forensic entomology is a relatively new field in South Africa. The authors are members of the only research group active in crime scene analysis and field research to that effect. Unfortunately with the high level of violent crime in the country, any information and support in the solving of these crimes is urgently and desperately needed. As most of the forensic entomological applications are often associated with the poorer impoverished section of the population, the need is even greater. As the only way to expand research is through international support, attendance at this congress may allow the authors work to become known, and support offered even if it is only simple information exchange.

This presentation will impact the forensic community and/or humanity by expanding the support to other researchers in the field.

A homicide case, south of Bloemfontein, in central South Africa during 2002, led to the question of the influence the wrapping of a body has on insect succession. Using pig carcasses, experimental trials were designed and conducted in four consecutive seasons at the experimental site on the western campus of the University of the Free State, Bloemfontein. In this presentation, the results from only two trials will be discussed.

The experimental site consisted of a 26 ha grass field interspersed with trees. Six carcasses were divided into three sample groups viz (i) daily, (ii) after five days, (iii) after ten days, each with a clothed carcass and an unclothed carcass wrapped in sheeting. Two additional unwrapped carcasses, one with clothes and one without, were sampled daily as controls. A 100 day trial during the winter months in 2003 (average daily temperature of 9°C) and a 50 day trial in the summer in 2004 (average daily temperature of 20°C) were conducted. The first insects to utilize the carcasses were adult Diptera. In the summer these were dominated by two species, *Chrysomya marginalis* and *Chrysomya albiceps*, with *Lucilia* spp. (*Lucilia cuprina* and *Lucilia sericata*), Muscidae (*Hydrotaea capensis* and other Muscidae spp.) and Sarcophagidae spp. present. In winter, there was a change in the dominant species present. These were *Lucilia* spp., *Chrysomya chloropyga* and *Calliphora vicina*, with few individuals of *C. marginalis*, *C. albiceps*, Muscidae (*H. capensis* and other Muscidae spp.) and Sarcophagidae spp. also present. However, during the winter months significantly fewer adults visited the carcasses.

In the summer months, oviposition was not delayed by the presence of wrapping or clothing. The adult Diptera were observed pushing through the smallest spaces to gain access to the carcasses, even if this resulted in wing damage or death when they failed to find an exit. In the winter months, oviposition was delayed by five days on the unwrapped carcasses and by nine days on the wrapped carcasses. In winter the carcasses remained acceptable to Diptera for an extended period. Oviposition continued up to 60 days after placement, whilst in the summer oviposition occurred within the first 3 days.

In summer, *C. marginalis* and *C. albiceps* maggots were dominant, with a low numbers of Sarcophagidae spp. In winter, no *C. marginalis* or *C. albiceps* maggots were found although the adults were recorded. Muscidae adults were present during both seasons, but no maggots of this family were recorded. Because of the short oviposition time during summer the maggots were of a similar age at any time, while the extended oviposition that occurred during winter resulted in different instar groups, often the same species, present at any time. The presence of the sheets in both seasons did allow the maggots to move more freely on the surface of the carcasses, especially in summer, when the maggot masses were much larger than in winter. The skin on these carcasses remained moist and was more easily consumed, while on the unwrapped carcass (especially the unclothed one) the skin dried out, becoming an unacceptable maggot food source. Less skin remained on the wrapped carcasses after the maggots migrated to pupate.

In either season, clothing and/or wrapping apparently had no influence on the Coleoptera community. However in the winter months, Dermestidae (*Dermestes maculatus*) larvae were found while dipteran maggots were still present on the carcasses. They were present when the carcasses were still moist and a fair amount of tissue remained. In summer, they were only present after maggot migration and little tissue remained, although the wrapped carcasses still retained some moisture. Cleridae (*Necrobia rufipes*) and Histeridae spp. were present in both seasons.

Significant maggot mortality was associated with the wrapped carcasses in the summer trial. All dead maggots were found underneath sheets soaked with decomposition fluids. The maggots were usually found



## General Section – 2005

---

along the back of the carcasses, which were facing east towards the rising sun. The fluid soaked sheets may have restricted the free flow of air, causing a significant increase in temperature and build up of metabolic heat generated by the maggot masses, or perhaps excessive build up of noxious gasses and insufficient oxygen flow.

### **Wrapping, Entomology, Succession**