



Pathology & Biology Section – 2004

G65 Does Carcass Enrichment Alter Community Structure of Predaceous and Parasitic Arthropods? A Second Test of the Arthropod Saturation Hypothesis at the Anthropology Research Facility in Knoxville, Tennessee

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The goal of this presentation is to present to the forensic sciences community the latest findings on the scientific usefulness of the Anthropology Research Facility (University of Tennessee, Knoxville) as a research and training site for forensic entomology.

This presentation will impact the forensic community and/or humanity by describing an application of probability and power testing of several key variables of arthropod community structure to test the scientific usefulness of the Anthropology Research Facility (University of Tennessee, Knoxville) as a research and training site for forensic entomology.

The on-campus Anthropology Research Facility (ARF) at the University of Tennessee, Knoxville, established by Professor William Bass in 1972, is an outdoor scientific laboratory devoted to the study of human decomposition. In a previous study, probability and power testing of several independent variables of decomposition rate and community structure showed that porcine remains in the ARF do not decompose faster, nor are they saturated with forensically-important (sarcosaprophagous) arthropods of reduced diversity, compared to remains in three non-enriched sites various distances away. In a second test of this 'arthropod saturation hypothesis,' we ask if the 30-yr history of carcass enrichment at the ARF has altered the community structure of predatory and parasitic arthropods that prey upon the sarcosaprophagous fauna. Over a 12-day period in 1998, using pitfall traps and sweep nets, we sampled over 81,000 invertebrates from freshly euthanized pigs (*Sus scrofa* L.) placed in the four sites: ARF: S2 (700 m away from ARF), S3 (6 km away), and S4 (40 km away). From these counts, we sorted 8,836 and 342 enemies of the sarcosaprophagous community (predators, parasitoids, and parasites) from pitfall and sweep-net counts, respectively, for a total enemy fauna of 9,178 individuals. The community structure of these organisms, measured by species and individuals' accumulation curves, rarefaction, and nonparametric correlation, was comparable in most paired-site tests with respect to colonization rates, ranked abundances, and colonization sequences of predatory/parasitic taxa on a per carcass basis. In the few exceptional cases, ARF differed from each of the three non-enriched sites in rarefaction-adjusted species richness (ARF pitfalls had more species). Spearman rank tests showed that correlations, although significantly positive between all site pairs, were stronger for sarcosaprophagous arthropods than for their natural enemies, confirming the tighter and more predictable relationship between carrion feeders and their carrion than between carrion feeders and their natural enemies. Overall, these findings parallel our earlier results on the sarcosaprophagous community, and except for species richness, bolster the conclusion that ARF is representative of surrounding sites with respect to the carrion-arthropod fauna.

Anthropology Research Facility (ARF), Forensic Entomology, Predatory and Parasitic Arthropods