## H2 Postmortem Interval Field Research at Three High Elevation Biogeoclimatic Zones in Southwest Colorado

*Maria T. Allaire, MA*, 16 Pinedale Lane, Durango, CO 81303*

The goal of this presentation is to present the result for each decomposition stage and the arthropod taxa associated with pig carrion from three high elevation biogeoclimatic zones in southwest Colorado.

This presentation will impact the forensic community and/or humanity by presenting research, which describes an interdisciplinary animal model, involving the fields of anthropology and entomology, from high elevation sites in the southwest Colorado region.

This project is a result of master's thesis research while working toward an MA in anthropology at Louisiana State University. Postmortem interval field research was conducted during the summer of 2002 from June through August, in La Plata County and San Juan County, Colorado. Prior to this initial research, no previous postmortem interval research had been conducted in southwest Colorado. Subadult pig (*Sus scrofa*) carcasses were placed on the ground (within a specifically designed bottomless cage) in three biogeoclimatic zones and sun exposure scenarios. Daily collection and recording of carrion associated arthropods; decomposition stage, and meteorological data were conducted through fly emergence. After emergence, site monitoring occurred every other day until the designated research end date.

Results of the research are: 1) as elevation increased, the rate of decomposition lengthened due to a prolongation of the bloat stage; 2) of the 63 taxa collected, an overlapping of 30 species occurred in two of the biogeoclimatic zones; 3) there is a strong indication of elevational preference for the Sarcophagidae species due to no overlapping; and 4) a previously undescribed hybrid cross of Boettcheria was collected.

The three biogeoclimatic zones, sun exposure scenarios, and research lengths are as follows: 1) pinyon-juniper, mesa top at 6,700 feet, full sun for 40 days; 2) aspen grove, east facing slope at 8,700 feet, shade for 40 days, and 3) timberline pine, west facing slope at 11,100 feet, partial sun/shade for 30 days.

At the 6,700 feet sun exposed scenario, the lengths of decomposition were: less than 24 hours for the fresh stage; two days in the bloat stage; two days in the active decomposition stage, and one day in the advanced decomposition stage. Dry remains stage was reached on the seventh day since time of death. Emergence occurred during the 12th - 14th days since time of death. The maximum temperatures ranged from 94ºF to 106ºF with a mean temperature of 100ºF. The minimum temperatures ranged from 48ºF to 61ºF with a mean temperature of 55ºF. Relative humidity levels ranged from 8 to 45 percent with a mean of 20 percent. No measurable precipitation occurred during this 14 day period.

At the 8,700 feet shaded scenario, the lengths of decomposition were: three days for the fresh stage; five days in the bloat stage; two days in the active decomposition stage, and two days in the advanced decomposition stage. Dry remains stage was reached on the 13th day since time of death. Emergence occurred for seven days between the 20th and 28th days since time of death. The maximum temperatures ranged from 69ºF to 89ºF with a mean temperature of 82ºF. The minimum temperatures ranged from 50ºF to 60ºF with a mean temperature of 54ºF. Relative humidity levels ranged from 6 to 65 percent with a mean of 23 percent. Precipitation of 15mm was recorded during this 28 day period.

At the 11,100 feet partial sun/shade scenario, the lengths of decomposition were: five days for the fresh stage; 14 days for the bloat stage, and 11 days in the active decomposition stage. The maximum temperatures ranged from 43ºF to 73ºF with a mean temperature of 63ºF. The minimum temperatures ranged from 32ºF to 48ºF with a mean temperature of 42ºF. Relative humidity levels ranged from 10 to 93 percent with a mean of 38 percent. Precipitation of 72mm was recorded during this 30 day period.

Of the 28 Diptera taxa collected, *Phormia regina* was the sole Calliphorid that overlapped all three biogeoclimatic zones. *Cochliomyia macellaria*, *P. sericata*, *B. plinthopyga*, and *T. sulculata* were collected only at the 6700 feet site. *Sarcophaga nearctica* and *T. montanensis* were collected only at the 8,700 feet site. *Calliphora alaskensis*, *C. cadaverina* and a previously undescribed hybrid cross of *Boettcheria latisterna and Boettcheria litorosa* were collected solely at the 11,100 feet site.

Of the 28 Coleoptera taxa collected, *Thanatophilus lapponicus* overlapped all three biogeoclimatic zones. *Dermestes marmoratus*, *Nicrophorus marginatus*, *Nitidula ziczac*, *Cynaeus angustus*, and *Trox sonorae* were collected only at the 6,700 feet site. *Dermestes lardarius*, *Ontholestes cingulatus,* and *Omosita discoidea* were collected solely at the 8,700 feet site. *Aphodius fimetarius* was collected only at the 11,100 feet site.

Southwest Colorado consists of multiple biogeoclimatic zones; therefore, additional research has been ongoing in order to determine the decomposition rates and carrion associated arthropods in the various ogeoclimatic zones and elevations.

**Postmortem Interval, High Elevation Biogeoclimatic Zones, Hybrid Boettcheria**

 ** Presenting Author*