



G3 The Effects of Liquid Bleach on Pig Decomposition in Southeastern Pennsylvania

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After attending this presentation, the participant will understand the effect of liquid bleach on carrion decomposition. This poster has two objectives to compare the rate of decomposition in pigs treated with and without bleach; and demonstrate the importance of understanding the impact chemicals have on corpses for criminal investigative purposes.

This study demonstrates that an easily accessible and common household chemical such as bleach can significantly influence decomposition rates and postmortem interval (PMI), leading to the possible incorrect estimate in the time of death of a victim.

Suspected use of bleach on the victim in a recent homicide trial in San Diego, CA, led the prosecutor to question if bleach on a body would affect a flies reproductive cycle. This case not only exemplified how forensic entomologists were unable to corroborate estimations of a postmortem interval (PMI), but also how the effect of such chemicals may influence arthropod colonization and utilization (if any) of a corpse, thus affecting PMI estimations.

To date, empirical studies published on the effect of controlled substances and other chemicals such as pesticides, have examined the effect on particular insects and provided logical implications of the potential impact on a PMI estimate. However, few field studies exist on how decomposition is influenced by any chemical substance. We hypothesized that the topical application via dousing of common household bleach would negatively impact insect colonization of pig carcasses directly, and indirectly slow decomposition.

The objective for our first experiment was to determine the effect of bleach on pig decomposition. In two later experiments we are comparing decomposition rates between habitats, each with and without bleach treatments, and determining the rate of degradation of bleach between habitats. Stillborn pig carcasses were used in this study. Control pigs (n=3/habitat), i.e., not treated with bleach and experimental pigs (n=3/habitat), i.e., treated topically with a dousing (4 liters) of Ultra Clorox® liquid bleach, were placed onto individual plastic trays inside separate animal Have-a-Hart® cages. In experiment 1, all cages were placed in an open field exposed to full sunlight. For experiment 2 and 3, cages will be placed in an open field (full sun light) and a wooded area (complete shade). Temperature probes (Tidbits®) were inserted into two pigs, 1 control and 1 doused, to monitor internal temperatures. Daily temperatures were recorded from a local weather station and a max/min thermometer located in the open field. Temperature data was used to determine degree-day totals for each habitat. The pigs were observed daily to record physical changes in decomposition. The pigs were weighed to the nearest gram to monitor percent weight loss. Dead/live insects were sampled from the pigs on days 2, 7, 14, 21, and 28 and preserved for identification.

Five stages of decomposition were easily distinguishable for the control and doused or bleach treated pig: fresh, bloat, decay, post-decay, and dry. The use of bleach appeared to affect the physical aspects of decomposition. Decomposition in the control pig progressed from the fresh to dry stage in 11 days. Preliminary results showed that bleach dousing slowed decomposition of pigs by 7 days. Insect colonization on experimental pigs was similar to control pigs, however insect feeding was negatively impacted through observations of dead maggots and a recolonization period on day 10.

The rate of decomposition as a function of weight loss was most rapid for the control pig. Decomposition rates for pigs treated with bleach tended to be similar initially but slowed overtime possibly due to decreased insect activity. Accumulated degree-days estimates were less for control pigs and significantly greater for pigs treated with bleach in full sunlight.

Results from the first experiment focused on the first objective of our study, the effect of bleach on pig decomposition. These results show that decomposition was slowed by the presence of bleach on the pigs. Our preliminary evidence suggests that decomposition and lack of insect activity may influence PMI estimations when bleach is topically applied to a corpse. We are currently conducting two additional experiments to examine the effects of habitat on the rate of decomposition, as well as extraction and detection techniques of bleach from carrion flesh.

Forensic Entomology, Bleach, Postmortem Interval