H12 Inter-Tidal Decomposition Patterns in Croatia: An Experiment using *Sus scrofa* Pedal Elements

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The goal of this presentation is to introduce participants to key aspects of decomposition patterns for individual body parts in a Mediterranean coastal environment during late autumn. It will address aspects of decay uncharacteristic for the decomposition of a whole corpse, and the main components of the process essential for the application to the post-mortem interval (PMI) determination. Photographic and descriptive data will be presented of the unique decomposition patterns of individual body parts from pig carrion in two inter-tidal zones of the Adriatic coast, Croatia. Aquatic insect activity, identified for the first time for this geographic region will also be discussed.

This presentation will impact the forensic community and/or humanity by demonstrating the identification of environmental and other factors that serve as a basis of decomposition patterns of different body parts. Application of the decomposition models presented in this study may aid in producing a more accurate estimation of PMI for dismembered and disarticulated human limbs.

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This poster will demonstrate that various PMI techniques used for a whole corpse and skeletonized remains in medico-legal investigations may overlook the potentially different biological and taphonomic decomposition processes of individual body parts. The impact of these findings on forensic sciences and/or humanity includes the identification of environmental and other factors that serve as a basis of decomposition patterns of different body parts. Application of the decomposition models presented in this study may aid in producing a more accurate estimation of PMI for dismembered and disarticulated human limbs.

In a temperate central European coastal environment, soft-tissue decomposition could depend on the microclimate typical of marine or riverine ecosystems. In shallow waters for instance, typical factors that could cause soft tissue modification are of both terrestrial and aquatic nature**,** such as air temperature, exposure to the sunlight**,** or tidal fluctuation.

However, because putrefaction is almost certainly bacterially driven, it is hypothesized that with certain isolated single remains, absence of gastrointestinal organs result in the potentially different bacterial action affecting decomposition.

This experimental study was conducted in two inter-tidal zones, marine and riverine. The distance between the two depositories was approximately 70 metres to simulate isolated resources for small vertebrates and invertebrates in two different coastal sub zones in close proximity. Wire meshes were placed on the riverbank and on the shore platform, and exposed to sunlight throughout the day. Samples were in the middle tide zone and were submerged approximately every six hours. The sample size represented limb bones of a minimum of 20 *Sus scrofa* (ulnae, radii, carpals, metacarpals, tibiae, fibulae, tarsals, and metatarsals. Ten limbs in random order were used per depository. Observations of decomposition changes and the environmental data such as sea surface and air temperature were recorded daily. Microorganism extraction and pH sediment measurements were conducted twice a week. Fieldwork was carried out for the duration of 31 days, during the period from 28 October to 27 November 2005.

A total of five stages of decomposition were observed during a one- month period: Fresh, Putrefaction, Early Disintegration, Advanced Disintegration**,** and Decay. Contrary to previous research in this environment, all stages were purely terrestrial in nature, omitting bloating, floating**,** and submersion. The study demonstrated the process of decomposition of isolated single remains in this habitat to be more complex than occurs in the body as a whole, with an indication of a slower decomposition in comparison to whole carcasses, possibly due to the limited bacterial action involved. The effect of relative humidity and exposure to sunlight on rates of decomposition was significant. Spearman's rank correlation coefficient for humidity was: r=+0.90, p=0.08 for marine, and r=+0.94, p.0.01 for riverine

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sample. Exposure to sunlight yielded r=+0.92, p=0.07 for the marine sample and r=+0.90, p=0.03 for riverine sample. Interestingly, salinity was only marginally significant and for the riverine sample only (r=-0.76, p= 0.13), with the variable correlation of -0.76 to 0.94. None of the other environmental variables correlated significantly with the rates of decay.

Variability in decomposition patterns between marine and riverine microenvironments also yielded significant results for the number of days spent in each stage (Mann-Whitney test U= 338, n=2, p=0.032), indicating a different pattern of decomposition between two sites (stated with 95% confidence). This is reflected in different rates of decay, biomass removal, and insect and scavenger succession.

Postmortem events in nature regularly include scavenger succession and limb dispersions, natural disarticulation or dismemberment as part of clandestine disposals. For these reasons, principles of decomposition patterns of isolated single remains for the purpose of PMI are recommended across the board to medico-legal investigators in dealing with single body remains in coastal environments with a similar climate to Croatia.

Postmortem Interval, Body Parts, Croatian Coast

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