D78 Taphonomically Important Fungi in Southern Illinois

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After attending this presentation, attendees will be aware of the variety of fungal communities (genus level) observed growing on decomposing human remains in southern Illinois, the importance of which is still being assessed. Knowledge of fungal presence has been suggested as useful for estimates of postmortem interval, location of buried remains, identification of primary and secondary deposition sites, and suspect inclusion/exclusion in a criminal investigation.

This presentation will impact the forensic science community by demonstrating some of the types of fungus present in southern Illinois, which may be useful in estimation of postmortem interval, identifying post-deposition body movement, and season of deposition, among other forensically important aspects.

This presentation addresses the variety of fungal colonies observed growing on the decomposing human remains deposited at the Complex for Forensic Anthropology Research in southern Illinois. Fungal communities were observed growing on all human research subjects deposited on the ground surface (n=6), regardless of whether the individual mummified or progressed via a moist decomposition processes. Over the course of the decomposition process, a variety of colors of fungal communities were observed, including green, orange, white, pink, purple, red, yellow, and black. Fungal communities were observed as early as two days post-deposition and some colonies required more than two months to appear. This presentation reports on the genetic identification of those colonies present on a specific data collection date (March 27, 2013). Ongoing and future research will involve collection of an increased number of samples to identify the entire spectrum of forensically important fungi present in southern Illinois. Fungal samples were collected from representative colonies of fungi of each color present on the date of sampling. These samples were collected from the exposed skin surfaces of three different individuals. All three individuals were in the advanced stages of decomposition (TBS≥17).[1,2] Samples included a green fungus from the right wrist, white fungus from the right forearm, and an orange fungus from the left hand of Research Subject 007 (RS007). Samples collected on Research Subject 008 (RS008) were of a green fungus on the right side of the upper chest and a white/pink fungus on the medial surface of the lower left leg at approximately midshaft. The lone sample from Research Subject 009 (RS009) was a white fungus collected from the left foot near the toes. Fungal samples were collected by scraping approximately 0.1g of material into an endomorph tube with approximately 0.5mL of 95% ethanol (EtOH) using a sterilized metal spatula and forceps. Six total samples were included.

Samples were dried, and DNA was extracted using a chelex bead extraction protocol. Following extraction, Polymerase Chain Reaction (PCR) was performed to amplify a region of the Internal Transcribed Spacer (ITS) gene using primers specific for fungi. Success of PCR was confirmed on an agarose gel stained with ethidium bromide. Successful samples were cleaned using exonuclease-shrimp alkaline phosphate (ExoSAP-IT®) and sequenced using an ABI® 3130xl Genetic Analyzer. Sequences were then annotated and concatenated in Sequencher® 5.10.

Of the six samples processed, four successfully yielded genetic sequences. The white fungal sample from RS007 did not amplify and the white fungal sample from RS009 did not yield a sufficient number of base pairs to successfully identify the fungus. The remaining four samples produced sequences of base pairs of varying lengths (442-568bp). The base pair sequences were processed using the Basic Local Alignment Search Tool (BLAST®) for nucleotide sequencing, which returned between one and five genus-level possible identifications for each sample. The genera identified include *Fusarium, Necria, Davidiella, Cladosporium, Sphaerulina, Mycophaerella, Gibberella*, and *Cordyceps.* The green fungus observed on the dorsal surface of the wrist of RS007 has been isolated as genus *Fusarium.* The other three samples are being assessed using a variety of ecological, biological, geographical, and climatological factors to narrow the results to a single genus for each sample. Further research is under way to identify the taphonomic effects of these fungi and their potential for use in forensic investigations in southern Illinois.

References:

1. Galloway A, Birkby WH, Jones AM, Henry TE, Parks BO. Decay Rates of Human Remains in an Arid Environment, Journal of Forensic Sciences, 1989, 34(3):607-616.
2. Megyesi MS, Nawrocki SP, Haskell NH. Using Accumulated Degree-Days to Estimate the Postmortem Interval from Decomposed Human Remains, Journal of Forensic Sciences, 2005,

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