



D34 Practical Applications of Forensic Botany

David O. Norris, PhD*, and Jane H. Bock, PhD*, Department of EPO Biology, University of Colorado, 334 UCB, Boulder, CO

The goals of this presentation are to illustrate to the forensic community some specific uses of botanical evidence and to highlight resources that are readily available.

Forensic botany is based upon the knowledge and techniques of plant science to legal matters, especially those related to crime. This presentation is based upon actual experiences with applications from three aspects of botany in criminal, especially homicide, investigations. These areas include Plant Anatomy, Plant Taxonomy, and Plant Ecology.

Plant Anatomy. Because of the indigestible nature of plant cell walls, they pass through the entire digestive system intact. Furthermore, many of the plants eaten (i.e., fruits, leaves, stems, roots) are composed of cells with unique cell wall features and/or particular combinations of cell types that make it possible to identify the source food plant from small pieces of plant material consisting of a number of cells. Occasionally, isolated cells may be useful. Specific plant food sources may often be identified after examining stomach, intestinal, or fecal samples. Vomit can also provide a rich source of plant tissues. The utilization of plant cell matter in the human digestive tract requires some special training, but the laboratory techniques are simple and employ accepted practices of identification of unknown samples by visual comparison with known samples using a compound microscope. Stomach contents or vomit may be used to reconstruct a victim's last meal and may be useful in determining time of death with respect to the last known meal a victim may have eaten. Two fecal samples may be examined and determined if they came from the same source. Unlike stomach contents, feces often are a unique mixture of several meals, and there are marked differences among unrelated samples with respect to frequency and identify of specific items. Fecal material on a suspect's clothing may link him/her to a crime scene. Plant material embedded in human tissues has also been identified. Photomicrographs depicting the distinct nature of these materials as well as information on processing of samples will be presented.

Plant Taxonomy. Beyond the identification of plants as specific drug sources, a second kind of botanical evidence in crime scene investigation comes from plant taxonomy. Specific plant materials associated with vehicles have been used to link suspects to a crime scene, to connect a suspect to a victim, and to verify that a body was transported from the original crime scene to where the body was found. Information on collection, preservation, and identification will be provided.

Plant Ecology. In the search for clandestine graves, ecological knowledge of patterns of plant succession is useful. Disturbance patterns of ground and vegetation over graves vary in known ways and are dependent upon time since burial, decomposition of the corpse, and regional climate among other factors. Knowledge of species that characterize specific habitats also may be useful in linking a suspect to a crime scene.

Resources. Virtually any college or university will have people trained in one or more of these botanical disciplines to aid in gathering evidence. Local experts are especially helpful for taxonomic and ecological evaluations. Specific help with food plant identification from digestive tract samples may be provided.

Education. Presently there are no formal training programs and no board certification available for forensic botany. Advanced education in botany is essential (MA or PhD) with some training in crime scene investigation, evidence procedures, and courtroom testimony, as well as appropriate professional affiliation.

Summary. Many aspects of botanical knowledge are useful in detection and in courtroom testimony in criminal cases. Some witnesses may require specialized training to be received as experts in courts. Botanical evidence as described here calls for relatively inexpensive traditional scientific techniques to produce credible evidence.

Forensic Botany, Techniques, Education