



E13 Applications of Plant Sciences to Forensic Science

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The goal of this presentation is to show how students and professionals in the forensic field can apply an under-used form of evidence in their work. This message and work is especially relevant to those who participate in homicide investigations.

This presentation will impact the forensic science community by showing illustrations explaining how evidence from plant science can be utilized in many kinds of homicide investigations, including crime scene evidence, elaboration of autopsy results, and how ecological considerations can be highly significant.

The United States National Academy of Sciences (USNAS) 2009 Report, *Strengthening Forensic Science in the United States: A Path Forward*, raised serious questions and cautions about the validity and overall quality of forensic science. The American Academy of Forensic Sciences (AAFS) has strongly responded to these concerns and is a leader in helping to form national policy addressing these problems. Not addressed by the USNAS are the contributions and values of lesser-known but well-tested forensic tools. This presentation documents the strengths of a generally under-valued but potentially highly valuable aspect of forensic science — forensic plant science. At present, these techniques have not received enough attention, even though they often are both simple and inexpensive compared with current technical lines of evidence. It is believed this lack of use is due primarily to lack of knowledge as to how such evidence can be of use. This presentation illustrates how botanical evidence has multidimensional applications in forensic investigations. Evidence such as that illustrated in this presentation from the plant sciences is readily passed by *Frye* and/or *Daubert* tests.

The application of three aspects of plant science are described here: (1) plant anatomy (microscopic examination of plant cells, tissues, and organs); (2) plant taxonomy (identification of plant species using morphological characters); and, (3) plant ecology (relationships among plant species and their environments). All three contribute in many ways to forensic science. Plant anatomy has proved useful in determining time of death, place of last meal, and people, including suspects who were associated with the victim. Both plant anatomy and plant ecology have been used to connect suspects to particular crime locations, to suspects, to vehicles, to clothing, and to other evidence associated with the crime. Plant taxonomy can be used to identify poisonous plants and plants associated with illegal drugs, to establish links to the crime site, and to places where vehicles and other materials associated with the suspect or the victim have been. Furthermore, evidence using plant anatomy and plant ecology often are dependent upon the proper scientific identification of plant species. Algae, fungi, bryophytes, ferns, conifers, and flowering plants can all be utilized forensically. The roles played by plants in determination of time of death and connecting victims and suspects to crime scenes are emphasized.

This presentation illustrates how these various aspects of botany have been applied to homicide cases in many jurisdictions.

Plant Science, Plant Anatomy and Taxonomy, Plant Ecology