

## MOLECULAR ANALYSIS OF BOTANICAL TRACE EVIDENCE

**Matthew Cimino, Lauren Brinkac, Emily Hopkins, Nicole Gross and Robert Bever**  
*The Bode Technology Group, Inc., Springfield, VA*



Molecular analysis of trace botanical evidence is a developing tool in forensic science. The composition of a sample may provide leads as to the geographic location or general environmental conditions of the sample origin. To establish laboratory methods involved in screening evidence and making geographic inferences, several test exercises have been performed. The general method, results, and analyses of data from one representative exercise will be presented. DNA was extracted from a less than 0.1 g sample of dust collected from an article of evidentiary clothing. The extraction product was used in PCR and the genes ITS and *rbcL* were amplified. The resulting PCR products were cloned, screened for inserts, and sequenced. Generated sequences were compared to existing sequences in Genbank using BLAST. Over sixteen different plants were identified from the clothing dust. Identifications were made at the species, genus, and family level and allowed a description of the sample origin to be inferred. For this exercise, the sequence data suggested that the evidentiary clothing originated from an abandoned agricultural site near a flowering stream with rocky outcroppings. The geographic inference was confirmed by microscopic analysis of mineral and particulate matter found in the dust sample. This type of inference, if used by itself or in conjunction with other forensic data, would be valuable for generating leads and otherwise assisting in investigations.