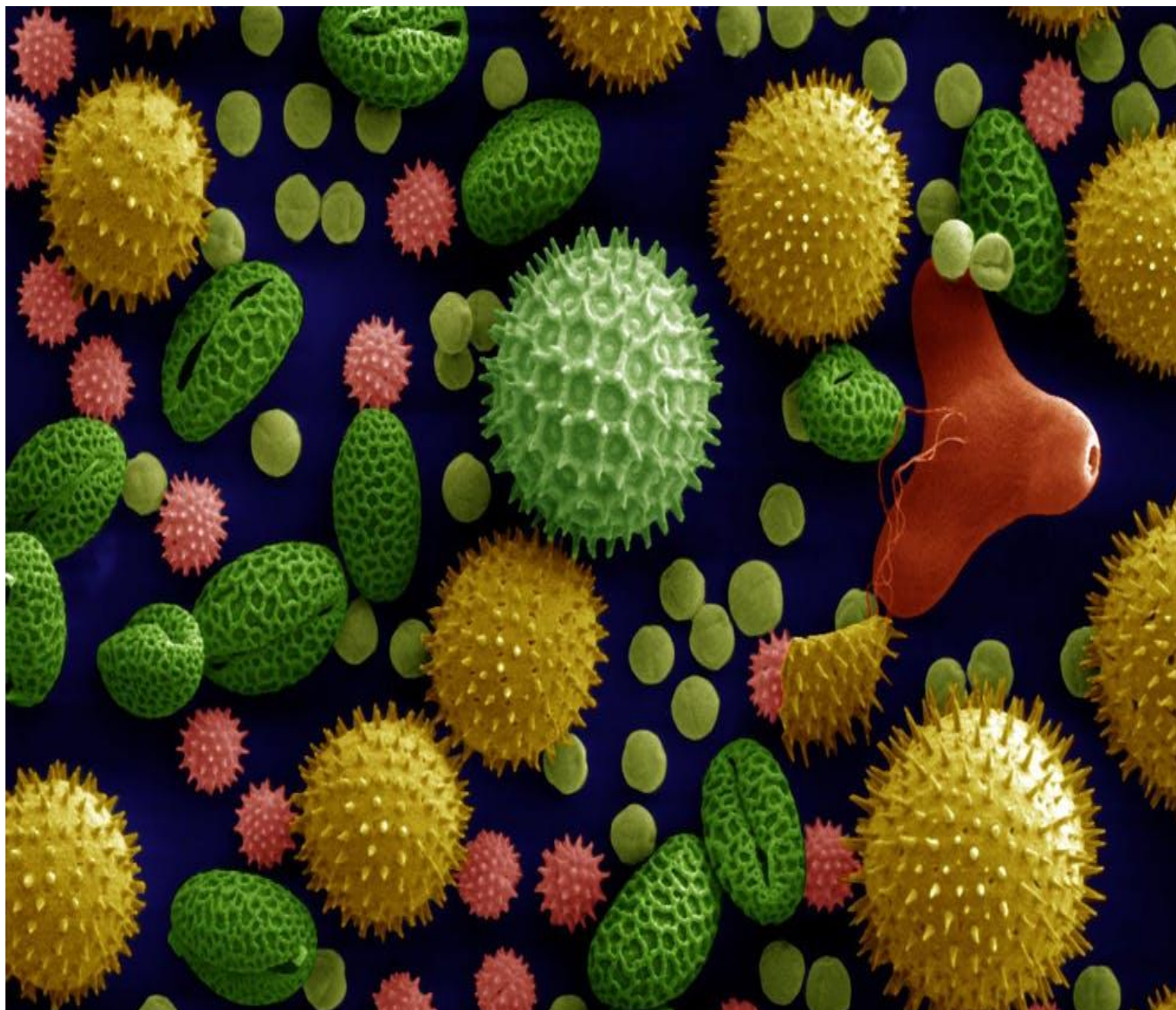




BOTANICAL EVIDENCE (FORENSIC BOTANY) COLLECTION AND ANALYSIS



**SOP Compiled by
(Under DBT STAR College Scheme)
Dr. B. Makesh Kumar & Dr. B. Umadvi
Department of Botany & Department of Chemistry
G. Venkataswamy Naidu College (Autonomous), Kovilpatti.**



POLLEN NATURE'S TINY CLUES



Botanical Evidence and Analysis

Botanical evidence is most often preserved by simply pressing plant material and allowing it to dry naturally. This is because plants retain nearly all of their morphological characteristics after drying. Although the colors and shapes of the fleshy parts of plants, such as fruits, often change, these characteristics can be noted and recorded when they are collected. Photography is an excellent method to use for the documentation of the physical characteristics observed at the crime scene before the collection drying process begins. It is important for the investigator to understand that plant material does not have to be “green” to be useful. The best method to preserve evidence is in paper, pressed between sheets of newsprint, telephone book, catalog, or in an inexpensive commercially made plant press. Paper bags can be used for drying and storage, but there is a risk of shattering dried plant parts if the bag is handled roughly or crushed. Pasteboard boxes are excellent for drying larger pieces and their rigid structure helps prevent crushing.



Figure 1. Commercially available botanical press.

When documenting and collecting fungi, it should be photographed in a manner that shows the color and shape of the fruiting parts. Fungi should be collected in pasteboard boxes, but if one is not available a paper bag will suffice until a box can be found. Since botanical evidence is collected in paper, certain collection information needed for the chain of custody and location notes can be written directly

on the paper or cardboard container. Documentation of the case number and item number is essential. However, additional information such as the date and time of collection (to the minute), and specific location information (exactly where found) must also be recorded for botanical evidence. Most other information can and should be recorded in the investigator's written notes and transcribed into a case file. The crime scene and evidence location information should include some reference to a major road, lake, or other documented landmark easily identified in the environment or located on a map. Fresh plant material contains moisture and sugars. Both of these elements promote the growth of bacteria and fungi, and the higher the sugar and/or moisture content, the faster the decomposition and degradation of the sample. If heat is also present, complete decomposition of the plant sample can occur within 2–3 days, with many of the distinguishing characteristics disappearing within a few hours.



Figure 2: Identifying information can be written on the paper used to dry the specimen.

To help prevent plant decomposition and sample degradation, it is crucial to not collect plant material in plastic bags or any non-porous container. However, if plant material is stuck to a body part or soaked in fluids it may be collected in plastic and refrigerated until it can be safely dried. Coolers with ice or chemical ice (cooling packs) can be used for temporary storage in the field. However, the plant material should not be placed directly on the ice to avoid freezing and damaging the sample. If botanical evidence is allowed to freeze, the plant cells could become damaged and

then quickly disintegrate, thereby destroying important identification characteristics. Any plant evidence in plastic bags should be placed in a refrigerator as soon as is practicable and examined quickly thereafter. Refrigeration of fresh plant samples will slow decomposition and deterioration of the sample, but it will not stop or completely prevent deterioration. Therefore any delay before the examination of refrigerated material will result in further degradation of the material, making drawing conclusions much more difficult. The only method to properly preserve plant evidence is to correctly dry the material.

The crime scene investigator can assist the eventual botanical evaluation by sampling the plants immediately surrounding the body or crime scene, and noting the information listed in Appendix 3.1. The same information should be recorded for all plant samples. When possible, smaller plants should be collected in their entirety. The whole plant, including roots, should be removed from the ground with a hand trowel or shovel. Once removed, the soil should be gently separated from the root system and the plant specimen placed in paper. If the plant is too large for the paper or container it can be folded, zigzag or accordion style. If the plant cannot be folded, it can be cut in half or into sections. Each cut section can be put into separate paper and all sections of the same plant should have the same evidence number. Each section should be marked as top, middle, or bottom.



Figure 3: Plants with large leaves may be encountered as physical evidence and these can be preserved in a standard plant press.

For extremely large plants, only a portion of the plant needs to be collected. For instance a 20–30 cm portion of a branch or vine, with its accompanying leaves, should be satisfactory for identification. A single species of plant can be as variable as individual humans, therefore several samples of the same plant can be extremely helpful in determining the variation that exists. Be certain to look for flowers and fruits, and collect several samples of each. These pieces can be trimmed with sharp pruners or a sharp knife. Dull tools can cause significant damage to plant samples and their use should be avoided.

Very small plant fragments or seeds can be put into a packet made from a folded piece of paper, called a druggist fold. Alternatively, thick roots, branches, stems, and bark can sometimes be split so that they conveniently fit into collection paper or boxes. It is very important to look under and around the collected plant for fallen leaves, fruits, flowers, or other parts that may be valuable to the investigation. If several of the same kinds of plants are in the area, always try to collect a plant with fruits or flowers.

All plants (even if they are the same kind) do not necessarily flower at the same time. By looking around the scene for flowers or fruits on identical plants you will greatly enhance the chances of identification. Succulent plants, or samples with watery or juicy fruits such as an orange, should either be sliced thinly enough to place into newsprint or placed whole into a pasteboard box. Since sugar-filled fruits and excessively wet samples will stick to newsprint, such samples should have waxed paper placed on both sides or around them. This will keep the sample from sticking to the paper or cardboard container and still permit proper drying. If plant material becomes stuck to the paper or cardboard container, determination and analysis may be impossible. Many, if not all, outdoor crime scenes have plants present. If not present directly within the scene, they are often in the immediate vicinity. Additionally, many homes contain flower arrangements and/or potted plants. Most commercial buildings have ornamental plants outside, including lawns and lawn weeds. Potted plants, flower arrangements, and landscaping may be damaged or in disarray after a crime. The suspect may inadvertently walk across lawns, indicating the path of ingress or egress. At any crime scene, damaged plants should be photographed and collected as a matter of routine standard operating procedure. Likewise, weeds that are common and often overlooked in nature are also frequently ignored in forensic science. Weeds can be extremely valuable in an investigation because of their adaptations for seed transport. Also, the investigator should not forget that pollen can be everywhere. If not preserved flat and supported by a rigid surface, a dried plant can be easily crushed when any heavy object is placed on top of it. A plant press is the best device to preserve and flatten plant evidence and facilitate the drying process. A plant press has a hard wooden board or wood lattice on each side and is filled with successive layers of cardboard and newsprint (containing the sample), with blotter paper on each side of the newsprint. The blotters on each side of the newsprint will aid in removing the moisture and helping to dry the plant so that it will not deteriorate. The corrugated cardboard also helps to remove moisture. Cardboard absorbs moisture and channels it out through the

corrugations. Dry air can be channeled through the cardboard to help quickly remove moisture.

Given that field conditions can be difficult, a handy plant collection device, called a field press, can easily be made using cardboard. Two pieces of cardboard are cut to the size of a once-folded page of newspaper. Newspaper can then be folded to this size (newspapers are frequently delivered folded only once), and when all samples are in newspaper they should be stacked. One piece of the cardboard is placed on each side of the stacked samples. Any rope, webbing, belting, etc. can be used to secure the stack. This bundle is ready for transport and easily carried. If a field press cannot be made, a phone book or magazine can be utilized. Each page containing a plant sample should be carefully numbered just as the individual sheets or newspapers are in a standard press. Phone books are useful because they have very absorbent paper and most are heavy, thereby greatly aiding the drying process. Some magazines use slick or wax coated paper stock. If using a magazine with slick paper, the samples should be placed into newsprint as soon as possible.



Figure 4: For extremely large plants such as shrubs and trees, a 20–30 cm portion of a branch is all that is necessary to preserve once the plant is properly photographed as part of the crime scene documentation.

Collected plant evidence should be taken immediately to a botanist for separation, drying, and analysis. Involving a botanist shortly after the collection process is completed will ensure that any deterioration of the sample from improper preservation is minimized. If the investigator is not going to deliver the plant material to a botanist immediately, the material in the plant press will need to be separated to ensure proper drying. When separated, each sheet with a sample should be placed under a weight (such as a large book) to make sure it will be flat when dried. Using cardboard for separators, sheets with plants can be placed in a stack with a heavy weight (such as a large book) on top. Drying a normal, not fleshy or very wet, sample will take 2 to 7 days in an air conditioned room. Drying can be faster if using a drying oven or other specialized equipment. If using an oven, the heat should be set at the lowest or “warm” setting. Most plant identification experts will have laboratory equipment to aid drying. Any collected fungi samples should be left in a box to slowly air dry.

Initial crime scene notation

When doing the initial walk-through of a crime scene containing botanical evidence, there should be a review to determine if the plant material present may show how the suspect, victim, or vehicle entered and exited the area. The walk-through should include documentation of mashed or broken branches, or any vegetation that has been pushed aside. Walking, physically carrying a body, or the use of a vehicle will cause damage to vegetation around or leading into the scene. Following a trail of damage to plants can expand the parameters of a scene, which may provide valuable information for the investigation. Photographs of the disturbance and samples of each disturbed plant should be taken and the plants collected prior to the collection of any other type of physical evidence.

It is important to remember that all plants at a crime scene, indoors or outdoors, may be valuable evidence, therefore the entire area should be carefully photographed before any evidence is processed. Photographs of the scene should show at least each cardinal direction and include the suspected route of access to the site. In addition to photography, videography can be useful as a supplemental tool, but should never be used in place of still photography. The most common problem in reviewing videotape footage of a crime scene is blurred images. When videotaping, the movement of the camera should be extremely slow. If done slowly the process will limit sudden jerks and allow the viewer to freeze the video to carefully review objects.

In general, the method of collection should be as follows: (i) collect any evidence of the suspect’s pathway leading to and from the scene, (ii) collect evidence from the perimeter, especially plants typical of the surrounding habitat, and (iii) carefully search to find any remaining evidence throughout the scene.

Where to search for evidence

Clothing and hair are obvious places to search for evidence, but everything exposed to plant material should be carefully examined, including pockets, cuffs, and textile seams, which can easily conceal evidence. Other frequently overlooked items are

shoelaces and shoe seams. These are places which often contain small traces of botanical evidence. When dealing with vehicles as evidence, always search the undercarriage, chassis, and wheel wells. The front of the vehicle should not be overlooked. Grooves on and around the front bumper and radiator should be examined for plant material. Small plants and fragments can often stick to wet smooth surfaces and can be found on any portion of an automobile. Natural glandular secretions from leaves, fruits, seeds, and other plant parts serve to help plants naturally move from place to place, and these characteristics provide a means of attachment to many surfaces. Bruised or broken plants can also leak sap, which can enable plant parts to stick to various surfaces. The spines and thorns found on many plants can pierce skin, clothing, and other substances. Also, there are dozens of kinds of hairs found on plants, and these enable plant pieces to adhere to clothing and other surfaces. Most suspects overlook plant evidence because they have no knowledge of its possible importance. If warranted, to reduce the chances of missed plant evidence, have a botanist recheck all clothing and other evidence retrieved from an outdoor scene because trained eyes are more likely to see small pieces of plants. Perennial plants such as trees, which grow for several to many years, often contain seasonal and/or annual rings. If a plant with annual rings is growing over, through, or closely adjacent to a body, skeletal remains, a gravesite, or object at a crime scene, the rings can be counted and provide a time interval. Often, a time interval can be established for damage to trees and large branches such as could be caused by a vehicle running into a tree, a vehicle parked on the roots, soil being placed over a portion of the roots, flooding, shading of the foliage, unusual temperatures, and other disturbances. Other perennial and even annual species can be used similarly in certain situations.

To collect a tree in order to preserve the rings or other significant damage, the tree and any damage to it should be carefully photographed. If the tree is too large to collect in its entirety, the trunk should be cut off a few inches below and above any damage. This section should be kept in a cardboard box in the same way as for any other larger plant evidence. Be sure to collect samples of the leaves and any flowers or fruits to aid the identification of the tree. Samples of the leaves or other vegetation should be preserved separately, but tied together by the same item/sample number. The photographs and evidence for all of these samples must be linked in order to maintain the legal requirements for physical evidence. An easy way to do this is to record the item number within the photograph and list the item number in the evidence log and written notations.

Smaller broken branches should be carefully photographed, especially the ends within the broken area, any evident sap, and the branch tip showing the leaf wilt, if any. The branch should be cut at least 15 cm below the break and the entire branch collected. The sample should be placed in newspaper, a bag, or a box. Be sure to collect any flowers or fruits on the plant. Preserve leafy material flat.

Any plant part touching or buried with human remains can be valuable evidence. Frequently the time of death, time of year, or prior locations can be indicated from plant material. If a botanist is not on site, color photographs and preservation of all

associated plant material are crucial. Footprints on plant material, branches which have been broken, as well as all the vegetative material directly under, on, or buried with the remains should be collected. Collection of evidence concerning time of death is best conducted at the scene by a trained botanist. However, examination of high-quality crime scene photographs can be a useful tool in estimating the time of death if a visit to the scene by a botanist is not possible.

When someone digs a hole to bury remains they usually disturb and damage the associated plants to some extent. Soil from the hole is usually returned to cover the remains. Subsequent raking or shoveling the excavated soil into the hole will damage additional plants around the burial. Attention should especially be directed to the area where the soil from the hole was piled. Photograph all disturbed areas around the hole carefully.

Plant fragments, sometimes numbering in the thousands, can be buried with remains. All fragments should be saved, although this can be time-consuming and greatly slow the progress of remains recovery. Screening is usually the best means of finding small fragments. Photographs of each level of recovery will document that the plant material was actually buried with the remains.

Roots can be equally valuable. The roots of some species of plants produce annual rings, but even without annual rings roots can still be used to show relative time intervals. Roots that have been cut can indicate the edges of a burial pit. When a root is cut it may branch out and continue to grow after it is reburied. Preserving this new growth intact may enable the determination of the approximate time when the root was originally cut.

Roots should be photographed when encountered. If roots are to be collected, they should be pruned some distance from the damaged area to preserve the internal structure at the point of contact. Many species of plants are difficult to identify from roots alone, even for a specialist, as roots of many species appear quite similar. At the scene it is useful to try to follow the roots to their source at the plant and preserve a sample of that plant to assist with identification. Roots frequently intermingle or grow for considerable distances, thus following the root to its source is often a difficult and time-consuming task. Roots are collected as any other plant evidence: if small they can be placed between paper and if larger they can be put into a bag or box. The etching of bone by roots is a common occurrence in cases of extended time period burials. The depth of etching may be helpful in determining time intervals, but no research has been produced which shows the time interval necessary for the roots of various species of plants to etch bones.

Storage

Plant evidence should be stored in a cool dry area. Plants are biological organisms and need to be killed and dried for the best preservation. On reaching the storage or processing area, each sample should be separated until dry. Drying will kill the plant and stop its biological processes. Drying is best if the plants are kept flat with cardboard and/or blotter paper on both sides and a weight placed on top. Several plants can be piled on top of each other as long as they are kept separated by cardboard. A commercial plant press can simply be left to dry as collected. Fungi and other large plants or plant parts collected in cardboard boxes should be left in the boxes. Most plants kept in this manner will dry in 3–7 days if humidity is low. Wet plants will need to have the surrounding paper replaced each day for best results. Special plant dryers using very low heat can be purchased or constructed. Once dry,

if not kept in the phone directory or magazine, each newsprint or bag with a sample should be removed from the cardboard and/or blotters and put into a cardboard box. The samples should be kept in numerical order for ease of processing. If the box is large enough, other samples in smaller boxes or bags can be included. Phone directories or magazines with samples should also be placed in a cardboard box. The box should have a few mothballs or a nopest strip included to repel any insects that may eat dried plants.

Documentation of botanical evidence

For plant material to be valuable as evidence, it is critical to record several types of information as a crime scene is processed. A sample data sheet is given in Appendix 3.2. Environmental conditions are frequently overlooked and not recorded, but should always be noted: is the weather sunny/clear/partly cloudy/rainy (how much rain), is there a slight breeze, is it breezy or windy, what is the humidity, and what is the temperature? In addition to general environmental conditions, other relevant information about scene conditions should also be recorded. Descriptions of the types of information that should be documented, preferably on a botany field data sheet, are as follows: * Habitat: The particular habitat (place) at the scene. The scene may be in a forest, but the sample may have been in an opening, ditch, or trail. Without knowing the habitat, much of the plant evidence cannot be interpreted. Is the site forested, shrubby, an open field, a roadside ditch, a home lawn? Is it a landscape planting, an industrial site, etc.? * Scene location: Usually only one scene location and description is needed and can be listed at the beginning of a log sheet. The scene must be linked to a permanent structure, such as a corner of a building, a utility pole (poles usually have an identification number), or a corner of a roadway. Local building codes require that permanent structures have surveyed locations so that records will indicate the exact location of the scene, even long after a structure has been destroyed.

Laboratory report

A laboratory examination form should be compiled for each container (Appendix 3.3). The form should list the date, case number, agency or company, contact person, method of contact, method of transport, and type of packaging. The form should document the kind of container, the date opened, and how the evidence was contained after opening. If several samples are in the same container they can be described separately on the same form. Care must be taken that each sample has a separate number. If unnumbered items are separated from a larger group, the examiner should place a unique sample number on each item and package them accordingly.

The method of analysis of each item should be detailed. This can be as simple as examination by eye or hand lens, or as complex as any machine might make it. If a machine is used for analysis, a procedures manual should be kept handy as a reference during the examination and for any testimony afterwards. A step-by-step analysis should be detailed, but if the analysis is standard a manual can be listed instead.

The results of each analysis must be noted, whether positive or negative, with as much information as can be discerned. If a leaf or stem fragment is examined and a species cannot be determined, a simple note that the fragment is from dicotyledonous (dicot) plant or an unknown woody plant might suffice. If the client wishes to pursue additional tests, other than those previously authorized, the methods and

costs must be discussed with the client and written authorization (a contract amendment) should be required.

A written report should only be prepared if requested by the client. The report must include a statement of how the evidence applies to the case. The examiner may need to ask for certain particulars of the case to provide a relevant analysis. Scientists should refrain from obtaining too many details to avoid prejudice.

Transportation of botanical evidence

The chain of custody is critical for most forensic cases, especially so for those criminal in nature. The chain of custody ensures that the evidence is secured and in someone's possession or control at all times. A log sheet for possession of the evidence is kept with the evidence (see Appendix 3.4). The person who collects the evidence must keep the evidence in his or her possession in a secure place, usually somewhere with a lock. If the evidence is given to someone else it must be someone who is authorized to accept it, such as the keeper of a locked evidence storage unit or the director of a laboratory. The person who accepts the evidence must sign, date, and note the time on the log sheet. The evidence is presumed to be in control of that person upon transfer.

The transportation of the evidence can be by any methods that will ensure control and maintain chain of custody. The person holding the evidence may transport it themselves or by other carriers, such as Federal Express, a government mail service, courier, or any law enforcement personnel. Very sensitive evidence may require the courier to maintain the evidence in their possession at all times. A courier may stay with the evidence while it is analysed.

Evidence retention and disposition

The evidence can be retained by the examiner or returned to the law enforcement unit or attorney. Before the evidence leaves the examiner's possession, it should be resealed with tamper-evident tape. The examiner's initials or signature together with the date should be written across the evidence tape so that a portion of the signature is also on the packaging. Evidence tape is commonly available from police and forensic science equipment suppliers. If the evidence is transferred and retained by the examiner, it must be kept secured until authorization is given to destroy it.

All evidence that is not destroyed by testing should be returned on request by the client. The evidence might include prepared samples. If the original container is destroyed, a clearly labeled replacement container should be used. All remains of the original container should be included in the replacement container. Any evidence kept by the examiner should be kept in a secure place, such as a locked cabinet or closet. When evidence is returned, a record of the method used for return together with any receipts and the time the evidence left the examiner's control should be noted on the examination form. The client/agency should be consulted to determine the method of return, and written documentation always obtained for the return from the client/agency.

Step-wise method for the collection of botanical evidence

1. Set up a field or botanical press.
 - a. Newsprint or other cheap absorbent paper should be folded over each sample.
 - b. Each piece of evidence should have a case number and a distinct evidence number.
- Any writing, including numbering, should be done with a pencil or indelible marker

containing ink that will not run or blot undermoist conditions. Many types of ink will run or blot and can become indecipherable if they become wet.

c. Use wax paper or shiny photographic quality paper to collect wet samples, such as those in watery or fleshy fruits, so that they will not stick to the paper while drying.

d. Paper grocery-type bags and cardboard boxes can be used for larger samples or for cones or nuts that will not press flat.

2. Collection of plant material around and in the scene should include (see photographic examples) at least 10–12 samples of different plants around the scene to document local vegetation.

a. Prune 20–30 cm samples of branches of woody plants.

b. Dig up herbaceous plants and include roots.

c. If the sample is longer than the press or box, fold each specimen in an accordion zigzag-like manner.

d. If evidence is put into a paper bag, if possible the bag should be mashed and kept flat, just as for a sample put into a press. If a press is available, the flattened bag can be placed under a flat weight such as a large book. The flattened plant is more easily stored and less likely to incur damage by crushing of the dried material.

3. Each item of evidence should be photographed before it is collected and photographed again as it is placed into the press, bag, or box. The photograph of the plant being placed into the press, bag, or box should show the evidence number adjacent to the sample.

Equipment required

The basic equipment needed for the collection of botanical evidence is commonly available at most general stores. Some of the basic items needed are hand pruners, garden spade, archaeological (or masons) trowel, evidence numbering flags or tents, digital SLR camera, graphite pencils (at least two), wax paper (or alternatively magazines with coated photographic paper), paper grocery bags, cardboard boxes (various sizes), plant press, tamper-evident tape, and evidence and chain of custody forms.

Plant Presses

1. A formal press can be obtained from most biological supply houses. It is composed of a stiff board or other support on each side with alternating: cardboard, blotter, newsprint, blotter, cardboard, blotter, newsprint, blotter, cardboard, etc. The entire press is tightly bound with straps to keep the evidence flat. The covers, cardboard, blotters, and straps can be purchased separately.

2. A field press can be constructed with simple materials available by cutting two pieces approximately 20–30 cm in size from a cardboard box, then simply using newspaper to hold each specimen, and stacking the newspapers with specimens on top of each other. A strap, piece of tape, string, or belt can be used to bind the cardboards and specimens for transportation.

3. Other types of field presses can be simply fashioned using a phone directory or magazine and putting samples between the pages.

Collection information needed for each botanical sample

* Evidence location: This should include information on exactly where at the crime scene was the evidence located, such as on the body, vehicle, or elsewhere and where on each was it found. If not on a body or vehicle, the evidence will require exact measurements for its location based on a coordinate system with the datum as a point of reference.

* Collector: All collected botanical evidence should include documentation of the individual who collected the item, therefore it is usually best if only one individual

collects all of the plant evidence at a scene as this makes for easier documentation on the chain of custody evidence log.

- * Agency: The agency name and title of the plant collector should be noted.

- * Date/time: The date and time of collection should be included on the evidence container and noted on the evidence log.

EVIDENCE COLLECTION AND ANALYSIS

- * Item number: Each plant sample should have a unique item number to eliminate possible confusion with any other sample. If an individually numbered tamper-evident

bag or seal is used, documentation of the number must be made in the scene notes.

- * Type of plant: The general type of plant should be noted (tree, shrub, herbaceous).

- * Height of plant: If the entire plant is not collected a height estimate should be made.

- * Flower color: Flower color often changes on drying so the original color should be documented with photography. If possible a photo-grey scale (18% grey) should be included in the photograph.

- * Fruit color: Fruit color often changes on drying so the original color should be documented with photography. If possible a photo-grey scale (18% grey) should be included in the photograph. * Fruit shape: Shape is subject to change on drying so the original shape should be documented with photography.

- * Habitat: The particular habitat found at the scene should be documented photographically and with written notations.

- * Plant frequency: The relative abundance of plant species at a crime scene should be documented both photographically and in writing. Make notes on whether a particular species is common, frequent, infrequent, occasional, or rare.

Botany field data sheet

Case number: _____ Date: _____

Agency: _____

Investigator: _____

Scene location: _____

Description of the scene: _____

Description of biological conditions at scene:

Visible botanical evidence description

Describe:

Plant material covering body, vehicle, or other object:

Other plant evidence on body, vehicle or other object:

Plant evidence under or buried with body, vehicle, or other object:

Sampling procedure for botanical evidence

Include list of botanical evidence collected

Item #	Description	Location	Disposition

Evidence analysis

Name of botanical analyst:

Location of analysis:

Conclusions

Botany laboratory examination data format

Date: _____

Case number: _____

Agency (or company): _____

Contact person: _____

Method of contact (phone, personal visit, etc.): _____

Method of transport (FedEx, US Mail, in person, etc.): _____

Type of packaging (box, paper bags, truck load, plastic bag, etc.): _____

Information documented for each container:

1. What kind of container?
2. Date opened.
3. How is evidence contained after opening?
4. Contents of container.
 - a. Number of samples.
 - b. ID of samples or best description of each item if not able to ID.
5. Number of each identified (or unidentified) item per container.
6. Analysis.
 - a. Method of analysis (dissecting scope, microscope, hand lens, SEM (include lens type and magnification).
 - b. Preparation details, if sample needs to be cut, stained, or otherwise prepared for analysis – should be step by step (can use standard steps from manuals if they directly apply to methodology).
 - c. If written report is requested, include statement of how this evidence applies to case.
 - Only prepare written analysis if requested by client/agency
 - Ask for certain particulars of case to provide relevant analysis (scientist should refrain from getting too many details to avoid prejudice).
7. Return all evidence (including any prepared samples to original container or into clearly labeled replacement container if original container destroyed or if samples not presented in a container).
 - a. If using a replacement container, save any remnants of original container and place into new container with evidence.
8. If evidence kept by investigator, all evidence should be in a secure place (locked case, cabinet, closet, room).
9. If or when evidence returned, keep record of time and method of return.
 - a. Consult client/agency to determine the method and location of the return, and the individual and agency who will receive it.
 - b. Obtain written documentation of return from the client/agency.

Appendix 3.4

Evidence log

Agency name:

Case number:

Scene location:

City, state:

Item #	Description	Location	Disposition

Item #	Description	Location	Disposition