

“POLLEN FINGERPRINT” IN AREA SURROUNDING THE FACULTY OF MEDICINE, PERADENIYA

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Introduction

Studies of palynomorphs trapped in material associated with criminal or civil investigations are slowly gaining recognition as valuable forensic evidence. Palynology is the term first used by Hyde and Williams (1944) for the collective study of pollen grains and spores. The main forensic application of palynology is in determining the possibility of scene of crime or geographical location. Forensic palynologists should assess the significance of their evidence to assist the court in determining the guilt or innocence of the defendant.

Pollen is a type of trace evidence found at the scene of crime. In almost every case pollen is expected to be present, be it in clothing or body parts especially in hairs, shoes, *etc.*

Pollen grains can be differentiated by their external morphology, which may be circular, ovate, bean-shaped, spiculate, *etc.* Their variable shape, size, aperture, and wall characteristics are very helpful in their identification. The exine (outer layer) of the pollen is resistant to acetolysis, physical and biological degradation. Because of this property of exine, pollen grains can be found well preserved for a long period.

In Sri Lanka there is diversity of natural flora or cultivated flora depending on the geographical location. Flowers of different plants bloom during different periods of the year. As a result different types of pollen are airborne during different periods of the year. On the other hand plants dispose of pollen in different ways which means that even if pollen is produced it may not be airborne.

The diversity of pollen, often seen in a location by unique combinations of pollen types in a particular period is known as a “pollen fingerprint”. Prior knowledge of the pollen fingerprint of a location makes the use of pollen a reliable technique that can often be used to associate individuals with a unique crime scene or geographical region.

Objective

To find out the “pollen fingerprint” (in air and land) in an area surrounding the Faculty of Medicine during the months of July and August.

Methodology

Samples were collected around the Department of Forensic Medicine, Department of Anatomy and near the student canteen of the Faculty of Medicine, Peradeniya, by following two methods. The procedures

described by Kapil Dev (2005) were followed with slight modification in the collection and identification of pollen.

- (1) Filtering of air with vacuum cleaner. Samples were collected on the first and last Saturday of July and August for 5 minutes at a time using a domestic vacuum cleaner at 10.00 am and 3.00 pm. The inside of the cleaning sac of the vacuum cleaner was lined with tissue paper in order to trap the particles.
- (2) Collecting pollen attached to the bottom of trousers and shoes after a walk. The pollen was collected on to a clean glass plate using a smooth hair paintbrush.

The pollen collected by the above methods was placed on a glass slide and mounted using 10% glycerine. This was then observed under the light microscope.

Results

Two types of pollen were identified in the filtered air samples:

- (1) *Peltophorum pterocarpum*
- (2) *Cassia spectabilis*.

Two types of pollen were identified on the clothes:

- (1) *Vernonia cenerea*
- (2) Grass pollen

Discussion

Pollen and spore production and dispersion are important considerations in the study of forensic palynology. If one knows the expected production and dispersal patterns of spores and pollen (called

the pollen rain) for the plants in a given region, then one will know what type of "pollen fingerprint" to expect in samples that come from that area (Bryant, 1989). Therefore, the first task of the forensic palynologist is to try to find a match between the pollen in a known geographical region with the pollen in a forensic sample. Knowledge of pollen dispersal and productivity often plays a major role in solving such problems.

Identification and finding of pollen in the collected remains is a very difficult task. The pollen which is found in the forensic samples is compared under the microscope with a known sample to confirm the identification.

In this study *Vernonia cenerea* and grass pollen were found in clothes and shoes, the pollen of *Vernonia cenerea* being dominant on land. Even though grass lands are trimmed regularly the *Vernonia cenerea* plant survives and it had contributed significantly to the "pollen fingerprint" around the Faculty of Medicine. The importance of grass pollen in forensic work appears to be minimal as the morphology of different grass pollen types could not be made out. Therefore grass pollen does not contribute to forensic investigation significantly according to the concept of "Pollen fingerprinting". *Peltophorum pterocarpum* and *Cassia spectabilis* are dominant pollen types in the air in those two months.

The study of pollen in forensic problems has helped in solving

several cases of murder, rape, *etc.* in New Zealand, Sweden and many other countries. In Sri Lanka, however, this important area has not received much attention. If due attention is given to this important aspect many cases of adulteration of food and other eatables such as honey, milk, *etc* and cases of rape, murder, kidnapping may be solved easily. Pollen evidence has also become significant in determining the manner and time of death, source of origin of illegal drugs and their route through which it has probably been transported.

Conclusion

The pollen of *Peltophorum pterocarpum*, *Cassia spectabilis* and *Vernonia cinerea* were identified in the air and on land during the months of July and August, around the Faculty of Medicine. A combination of these species of pollen can be used as a "pollen fingerprint" in the area surrounding of the Faculty of Medicine during the above months.

Reference

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