

Forensic studies using a pollen assay

Recognition of pollen grains trapped in human body organs opens new vistas to catalyse crime resolution and paves way for integrating forensic and plant sciences at the dawn of 'Forensic Year 2010'. The investigations involve identification of these minute bio-units trapped in body parts of criminals and victims, and/or tools used in crime execution, pollen being indices of the parent plant and their flowering time and site of occurrence. Pollen grains are ubiquitous, naturally buoyant, easily dispersed in atmosphere, morphologically stable, tough, non-degradable particles which adhere readily on contact and are potential 'nature's fingerprints' of plants¹ and crucial markers of season and geographical region. A study of these 'grains of truth' provides factual clues of place of crime to link a suspect to the scene of a crime, or even link any object left at the crime scene to a suspect and unfold many hidden mysteries. These minute markers are invisible to the naked eye (size ranges between 6 and 120 microns) and cannot be wiped out, hence they furnish tangible evidences of the site of crime execution during crime resolution. This forms the bottom-line of forensic palynology².

Pollen grains that get trapped easily in hairy parts of the human body, soil, dirt, dust, clothes, nails, nasal tract, buccal

cavity, oesophagus and often get lodged in lungs along with the inhaled air of both criminal and victim, are generally extracted by direct contact of a microslide coated with glycerine jelly or scraped and dusted on the slide and stubs and examined under a light microscope and scanning electron microscope for identification. Extraction of pollen caught inside the body organs such as lungs, nasal tracts, oesophagus, etc. requires medical assistance. Once procured, these are cleared with acetolysis mixture (9:1 ratio of acetic anhydride and sulphuric acid), glacialacetic acid and water, prior to mounting on slides and stubs. Pollen morphology based on NPC system³ is studied and grains identified with the help of reference slides, keys and floras. The correctly identified pollen, recovered from anything connected with the crime such as the victim/suspect's appendages, weapons or related objects, is finally computed along with the floral and air-borne regional plant components to obtain a concrete indication of the site of crime. These 'organic' pollen particles therefore, prove to be as useful as the tiny gun shot residue and fire discharge residue inorganic particles (c. 1–10 µm). In extreme instances, when most of the dead body gets decomposed and physical evidences get destroyed,

pollen alone can provide significant evidences for an intelligible and rapid crime resolution. The information generated from assay of these important bio-tools, couched in judiciary crime files, can provide valuable clues and may even expose a latent story of great revelation⁴.

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Ranking of research performance of Indian universities

Prathap and Gupta¹ ranked 25 Indian universities on the basis of their research performance, measured in terms of their output and the quality of the output, for the period 1999–2008. In another study, Prathap² ranked top 20 universities on the basis of their research output for the period 2004–2008. Ghosh³ pointed out that the ranking of universities in these studies differed considerably and many of the universities listed in the first study¹ were absent in the other study². She noted that the discrepancy in ranking

appears due to the difference in the period of study. However, the difference in ranking is also due to the use of two different databases by the authors for the two studies. In the first study¹, the authors have used the *Scopus* database published by Elsevier, whereas for the other study², the author has used the *Web of Science* database of Thomson Reuters (formerly Institute of Scientific Information). *Scopus* has a wider coverage of journals as compared to *Web of Science*.

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