Natural Traces in forensic investigations - How pollen imprints can solve crime: Review of the open-access literature on forensic palynology

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Forensic palynology is a branch of palynology, the study of pollen grains, that focuses on its implementation in criminal investigations giving microbotanical evidences.
The PhD project is developed within the **Horizon Europe 2020 MSCA Doctoral Network 'Natural Traces' project** (Grant number: 101120165) and **is aimed** at **i)** studying existing forensic palynological literature, **ii)** finding and testing methods used in them and **iii)** modifying some of these protocols to develop the most effective, simple and not expensive in performance methods of sampling and pollen and non-pollen palynomorphs extraction that will work with the most common types of materials of a crime scene.

Materials and methods

This report represents some information got from the research on the **159 open-accessed literature sources** (as of May 2025). The review was made for the articles which were published **from 1971 to 2025**. The literature research was made in Scopus, ResearchGate and BASE (Bielefeld Academic Search System) with criteria: "forensic palynology"; "forensic AND palynology"; "forensic AND pollen"; "crime AND pollen"; "crime AND palynology" resulted in 160, 101 and 297 findings respectively.

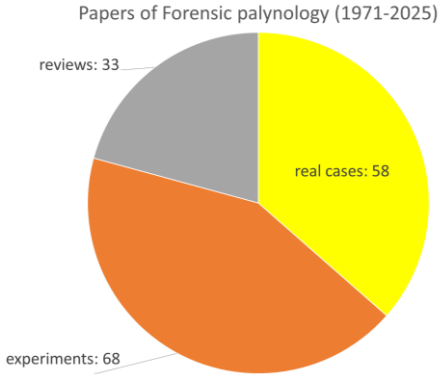
Sampling methods are mainly represented by collecting materials (Fig. 1), washing, brushing, swabbing the examined materials and surfaces. The most used methods for chemical extraction of pollen from samples were Faegri and colleagues' method [1], Erdtman's acetolysis [2] and von Post's method [3].

Fig. 1. Experimental research on the attachment of pollen on different surfaces [4].

References
[1] Faegri K., Kaland P. E., Krzywinski K., 1989. Textbook of pollen analysis. 4th edn. Caldwell: Blackburn Press.
[2] Erdtman G. 1960. The acetolysis method: a revised description. Svensk Bot Tidskr.
[3] von Post L. 1916. Einige südschwedischen Quellmoore. Bull. Geol. Inst. Univ. Upsala, 15: 219-278.
[4] Ochando J., Munuera M., Carrión J., Fernández S., Amorós G., Recalde J. 2018. Review of Palaeobotany and Palynology, 259: 29-38.
[5] *Montali et al. 2006 .Forensic Science International 163: 211-223.*

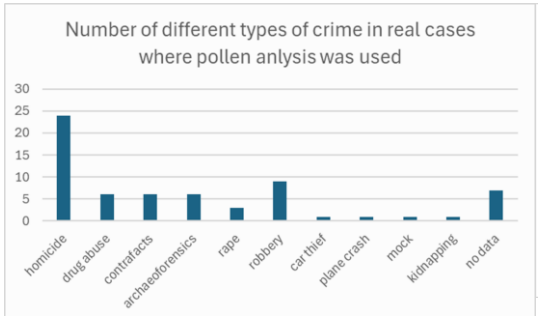
Results and discussion

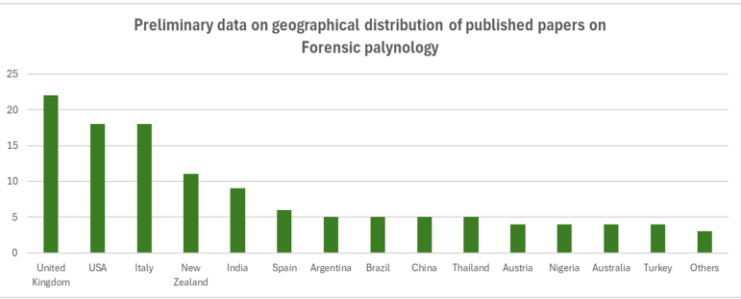
Pollen grains of Taxus *(diam. 25 µm) from eyebrows of a corpse [5].*



The most actively published years for forensic palynology **started in 2006**. There were found 58 papers based on real cases, 68 sources that were based on experiments and 33 articles were reviews. Real cases were associated mainly with homicide, robbery, drug abuse, contrafacts, archaeoforensics, rapes, etc. The most published papers were found from the UK, USA, Italy, New Zealand and India.

Further steps will be focused on the methodological aspects of palynological researches and their effectiveness of pollen extraction from the different materials.





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