



Forensic Geopedology and Micropedology: New Indications and Lookouts from Pigs Experimental Burials.

Stephania Irmgard Elena Ern and Luca Trombino

Earth Sciences Department, Università degli Studi di Milano, Milano, Italy.

The role played by soil scientists in the modern forensic science is very real and important, above all in the crime scenes when buried remains, both strongly decomposed or skeletal, are found.

Thanks to a PhD project on Forensic Geopedology, an interdisciplinary team of the Universities of Milano and Milano Bicocca, has been working for the last four years on several sets of experimental burials of pigs and piglets, in different soil types and for different times of burial, in order to get new evidences on environmental responses to the burial, including geopedological and micropedological aspects.

The present work constitutes a conclusive synthesis of results emerged from comparative soil characterizations, listed as follow:

- Grainsize analyses;
- Determination of pH in H₂O and KCl;
- Total Nitrogen and Organic Carbon analyses;
- Quantification of Available Phosphorous;
- Determination of Cation Exchange Capacity and Base Saturation;
- Analyses of Volatile Fatty Acids;
- Scanning Electron Microscope and Energy Dispersive Spectroscopy analyses;
- Petrographic Optical Microscope analyses (including thin sections descriptions).

It is proposed a diachronic picture of the project where it is possible to follow the variability of significance of the different kinds of analyses carried out.

The achieved results, especially when cross-checked, are very stimulating as regards the setting of analytical protocols for:

- The determination of time since burial (TSB);
- The discrimination between primary and secondary burials;
- The identification of corpses concealments.

All the analyses and different approaches discussed and addressed in this work require extreme care when applied to real forensic scenarios; however, the protocols tested can be a piece of a large and articulated puzzle that depicts the major forensic case studies in which Geopedology can be of help in solving problems or in answering some peculiar questions.

It is important to understand that a science so rich in variability, as soil science is, has a great potential to reconstruct and solve various forensic cases. Many studies and experiments still need to be carried out to improve the knowledge of the specific processes, in order to give the correct answer to forensic and legal questions, together with the aim of reaching standardization for the analyses carried out.