
Phytoliths in livestock dung: the use of modern reference materials and ethnoarchaeological approaches

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Résumé

Dung is a key interdisciplinary area of research as it provides valuable information on a wide range of environmental and ecological issues and socio-economic and cultural aspects of human life. Livestock dung is commonly found in many settlements, especially after the domestication of herds. Although receiving increasing attention in archaeology, dung materials are regularly overlooked, despite their worldwide economic importance as suppliers of manure, fuel source, temper and building material. This oversight is largely due to problems in identifying dung during excavation in the field and in routine sampling procedures in which dung and its contents are frequently disaggregated and lost or mixed with other components of different origin. In many worldwide contexts, only microscopic (e.g. dung spherulites, phytoliths, non-pollen palynomorphs), molecular, isotopic, elemental and charred indicators of dung may survive. Phytoliths by themselves cannot be easily related to dung as similar morphotypes may derive from dung and non-dung sources. Precision sub-sampling for phytoliths in the field or from blocks, however, when combined with high-resolution contextual micromorphology and compositional analysis, and biomolecular analyses by GC-MS and GC-C-IRMS, may enable more robust identification and interpretation of dung content and context, and thereby a wider study of animal ecology, environment, diet, management practices, and animal-human interactions.

One key area of research is the development of reference models and comparative analytical data-sets on the characteristics, preservation and context of modern dung materials, dung-products and depositional contexts in current farming communities that maintain aspects of traditional ways of life in archeological site vicinities. These materials and activity areas include: dung pellets, sediments from pens, agricultural fields and pasture grounds, dung cakes, dung fuel residues from ovens and building materials (roofing, wall and floor plastering). Such materials from specific cultural and environmental contexts are examined using controlled ethnographic approaches, including questionnaires and ethical protocols. The specific objectives in research on this comparative data are, firstly, to obtain information on variation in the digestibility, durability and seasonality of phytoliths and other microfossils that are excreted with dung, which are still under-developed. Secondly, to evaluate the taphonomic history and preservation of these microfossils and dung remains in settlement, pen and off-site contexts and their wider ecological and social significance.

To illustrate the potential major contribution of integrated analysis of phytoliths and direct microfossil evidence from spherulites to our understanding of the major transformation

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from mobile hunting-gathering to more sedentary farming, a selection of case-studies are presented here from a transect through the Near East, one of the key heartlands in which plants and animals that were later domesticated occur naturally, and from the still little investigated North Africa, a potentially critical area with implications for surrounding regions including the Mediterranean and the Sahara. The selected case-studies span the critical periods of transformation from ca. 10,000 cal BC to the last centuries BC. These integrated approaches demonstrate the potential contribution of the still needed systematic interdisciplinary studies of ethnographic dung to provide robust data for the development of models for the identification and interpretation of dung in archaeology.

Mots-Clés: Near East, North Africa, ethnoarchaeology, animal, human interactions, livestock dung.