Searching unique signatures of (pre-)historical human impact on East African ecosystems: using fossil spores of dung fungi as indicators of ancient pastoralism

One of the most pressing challenges to evaluate the resilience of tropical ecosystems to the large-scale anthropogenic disturbances occurring today is the problem to determine a baseline of presumed 'pristine' conditions which prevailed before human impact became significant, and to which these ecosystems may eventually be restored. Global studies of land-use history have assumed that human impact on natural ecosystems in East Africa was negligible before ca.1800 AD because the (estimated) mean population density at that time was probably only ~3% of present-day values. In contrast, fragmentary archaeological and palaeoecological evidence has traditionally been interpreted as indicating that significant anthropogenic deforestation occurred already 2000-3000 years ago, together with the spread of farming which followed the introduction of iron metallurgy into East Africa. The large discrepancy between these two paradigms reflects the lack of solid evidence about the exact timing and relative magnitudes of indigenous (i.e., pre-colonial), historical (i.e. colonial-period) and modern-day landscape disturbance, and a general lack of appreciation that also natural vegetation changes have occurred in recent millennia, due to long-term climate variability. Resolving this conflict has long been hampered by a lack of unambiguous indicators of past human activity in archeological and paleoecological records. This study aims to reveal the unique signature of ancient human impact on the woodland savannah landscape of western Uganda through analysis of the fossil spores of dung fungi preserved in the sediments of a crater lake potentially used as watering hole by migrant pastoralists. Although such fungi grow on the dung of all large herbivores, previous studies show that their abundance in sediments greatly increases when water bodies are visited regularly by herds of cattle, goats or sheep. The practical work for this thesis involves microscopic identification and counting of fossil fungal spores in pollen slides (using a photographic atlas of all spore types documented from western Uganda), and comparison of the recorded temporal patterns with independent reconstructions of regional climate and vegetation changes.

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