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An archaeobotanical perspective in the study of inflorescence phytoliths of wild grasses from arid and semi-arid environments of Argentina

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ABSTRACT

Wild cereals have been harvested all over the world by hunter-gatherer with evidences as much in South America as in Australia, North America and Subsaharian Africa. In some places there are still used for human consumption. The goal of this paper is to document phytoliths in inflorescence axis, and in kernels/inflorescences/bracts of several native Argentinian wild grasses in order to get an archaeobotanical comparative referential for the analyses of residues from both food plant processing activities and consumption. We could observe typical phytolith morphotypes from specific anatomical parts of grasses, but non-taxon specific, as well as non-diagnostic phytolith morphotypes, but characteristic of the phytolith association of a certain taxa. They all allow us to get a more complete view of the phytolith production for each specific taxon. Results obtained by Morisita Test-Past Program-suggest a trend to the organization at the level of subfamilies for the phytoliths production in the 14 species studied. Species of the genus *Aristida* and *Cynodon* show an intra-generic consistency in the production of phytoliths morphotypes per organ, and tend to be grouped in cluster analysis. In some species as *Cynodon dactylon*, *Bromus catharticus*, *Aristida adscensionis*, *Sorghastrum pellitum* and *Paspalum dilatatum* it can be noted a similarity in the morphotype production as much in inflorescence axis as in kernels/inflorescences/bracts. A *morphological continuum* between similar morphotypes could be also established, by comparing series of shapes within fragments of silicified plant tissue. Finally, we consider phytolith production from potential useful plant parts for human consumption, in a way as their presence alone, or associated with starch grain analyses, as showed by a previous work, could be used for regional dietary reconstructions. Our results from inflorescence/kernel phytolith production give us good expectation to be able to identify them in archaeological contexts.

1. Introduction

Phytoliths are microscopic particles of hydrated silica deposited in intracellular and/or intercellular spaces of plant tissues, which can take on a considerable variety of forms, typically 5–200 μm in size (Bertoldi de Pomar, 1975; Rovner, 1983; Brown, 1984; Piperno, 2006). Because of their consistent shape within species, phytoliths provide significant taxonomic information (Twiss, 1992; Piperno, 2006). They form in plant tissues after soluble silica, in the form of monosilicic acid (H_4SiO_4), is taken up from the soil. Silica is then deposited as solid hydrogenated silicon dioxide (SiO_2 nH_2O) infillings of cell walls, cell interiors (lumina), and intercellular spaces.

Although the accumulation of silica occurs in various taxa of the plant kingdom, phytoliths are particularly abundant in the family Poaceae. Phytoliths from Poaceae short cells are shaped actively under genetic control which representing a valuable taxonomic attribute diagnostic of subfamily, tribe and even genus level of the

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Poaceae (Rovner, 1971; Piperno, 1988; Twiss, 1992). As in other families, Poaceae individuals produce many types of phytolith forms (multiplicity), and a particular form may be produced by a number of different species (redundancy) (Rovner, 1983). Data for wild grass inflorescences are potentially useful in paleoecological studies and we sustain they can be used in addition to the information from leaves and stems.

The goal of this paper is to document phytoliths in bracts, kernels/inflorescences as well as in inflorescence axis of several native Argentinian wild grasses from arid and semi-arid environments, in order to get an archaeobotanical comparative referential for the analyses of residues from both, food plant processing activities and consumption. This paper complements previous studies on starch grains from kernels of the same taxa selected here (Musaubach

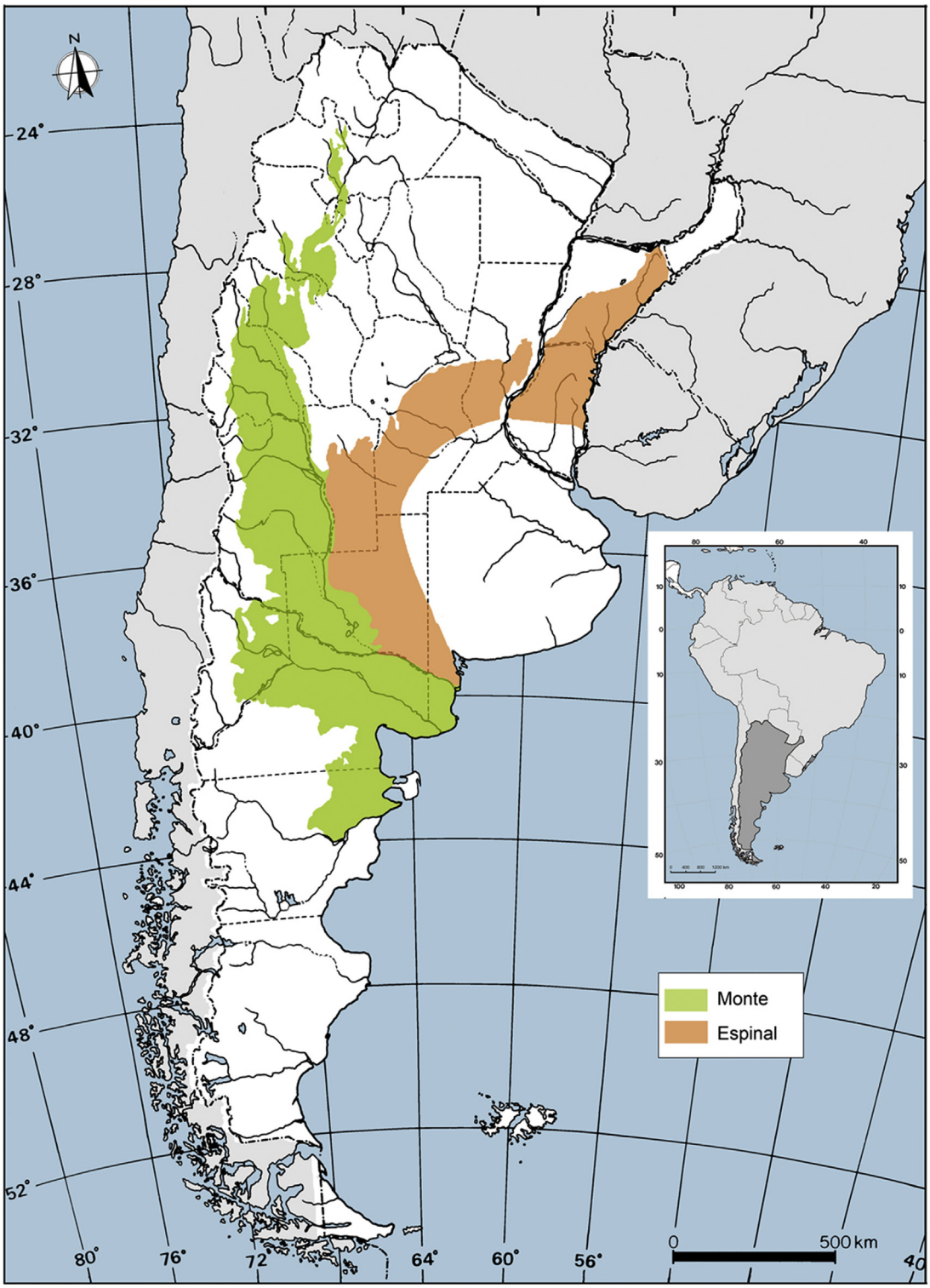

Fig. 1. Extension of arid and semi-arid biomes of Monte and Espinal in Argentine territory, according to Cabrera (1976) and Atlas de los Bosques Nativos de Argentina (2003).

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