

**Palinological analyses of quaternary
lacustrine sediments from
"Lagoa do Quari",
NE Brazil, (PI)**

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**S. A. Chaves² , F. Parenti,³ C. Guérin,⁴ M. Faure⁴ , F.
Candelato³, V. Rioda³, D. Mengoli³, S. Ferrari³, L. Natali³, G.
Scardia³, C. Oberlin³**

Pollens and spores are a very rich material to be used at paleovegetational and paleoethnobotanical research. Archaeological analyses in Brazil are especially noteworthy due to excellent preservation of sometimes enormous numbers of this rich organic material from single archaeological sites like “Lagoa do Quari”.

Most accepted theories on paleovegetational composition evolution over the American continent were developed on the basis of interdisciplinary studies carried out mainly after the 1980s. All these theories imply that, in Brazil, during the last 13, 000 years, different climatic conditions contributed to a new formation and a new distribution of vegetation and, consequently, to the appearance of new landscapes or environmental scenarios (Ab’saber 1989, Absy et al. 1991, Markgraf 1993, Ledru 1993, Salgado-Labouriau et al. 1997, Vivo & Carmignotto, 2004).

The palaeoenvironments reconstruction is supported by multiple lines of scientific investigation. Among them, is palynology, which is the study of pollen grains and spores. Through palynology we can obtain important information about past plant communities, as well as about possible plant distribution in a given geological time. At archaeological excavations, pollen grains can be found inside the sediments; in the funeral urns, on the surface of objects manipulated by humans or even on the surface and inside fossilized feces – coprolites (Chaves & Reinhard, 2006).

The history of the human occupation in America is intimately linked to movements to several ecosystems, through inhospitable regions.

During the Holocene, about 10,000 years ago, the development of the modern herbivore mammals in that continent is due to the expansion of new open vegetation areas. It was at the same time that the species *Homo sapiens sapiens* expanded its territorial habitat. Humans were already distributed through the American continent and more developing important cultural transformations related to the tropical ecosystems of South America. Even we can affirm that, already at the end of Pleistocene time, about 13, 000 and 11, 000 years ago, such recruitment of those human migrations that took the direction of the American continent they obtained an enormous adaptation success, mainly in what it respect to its economy of set subsistence in the hunt of wild animals, in the fishing and even in the collect of plants (Chaves, 2001). Those groups of hunter-fisherman-collectors were migratory and depended, without no doubt, on natural water resources as “Lagoa do Quari”.

The Holocene and Pleistocene palaeoenvironment reconstruction is based on various sciences, that are indispensable to the improvement of this kind of paleoecological researches. Through the study of the pollens and spores, we obtain important data about paleoenvironments, as well as, the possible plant communities in a given time. This contributes to answering questions related to paleoclimat, paleoenvironments and paleovegetations. Pollen grains are microstructures, male gametophytes, and are responsible for the fertilization of flowering plants - the angiosperms. Pollen grains are annually dispersed in amounts that vary from plant to plant. They can be taken for the distant places from its production area by draughts, insects, animals or even humans. Even so, most of the pollen grains drops in the proximity place of origin, characterizing the local flora. “Traps” placed close to the surface of the soil pick up what we know as “pollen rain” (Chaves, 2001).

We can extract pollen grains from recent sediments, lake sediments or archaeological sediments through chemical procedures, for later analysis of the relative frequency of pollen types in samples.

They are classified as arboreal (AP) and no-arboreal pollen (NAP). The work of paleoenvironment reconstruction begins with the analysis and the interpretation of the pollen diagrams. These are developed starting with the identification of taxa, and compared to pollen distribution from certain plant communities or a clima spectra plant association such as very dry, very moist, flooded, tropical forests, savannas, among others. It is very important to an serious research that the sediments previously be dated, through methods such as **C14**, for samples of up to 40.000 years in age (Chaves, 2001).

The soil preservation of pollen grains is very interesting. Pollen grains have an indestructible layer, the sexin - constituted of *sporopollenin*, a polysaccharide substance, resistant even to the strongest acids, as the sulfuric and fluoride acid. However this external layer of the pollen grain is not resistant to sediments where the oxygen is present. Even so, in moist sediments, lakes, ponds and swamps, we found good places for its conservation. This is because these sediments have not undergone drying periods that would destroy pollen grains due to oxidation.

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The archaeology of the arid "Sertão" of Piauí, at the Northeastern Brazil, provides a rich source of information about the first American cultures, environment and climatic changes data. In the Piauí "Sertão", the oldest paleohuman culture has been documented by burials, rock art, and associated artifacts from several well dated sites (Parenti, 2001).

At the present time archaeological excavations and searches undertaken at "Lagoa do Quari" site have yielded sedimentary samples in the aim of palynological studies. Informations/data from on osseous remains regarding faunal assemblage is rich due to the good preservation in this site. Both elements contribute to evidences regarding the Pleistocene - Holocene climate and the regional vegetation environment between 8770 +/- 55 and 5 425 +/- 45 B. P relies on the palynological study.

Two samples were selected from two different layers - 190cm and 240cm (Figure 1). The pollen was extracted from the sediments at the the "Laboratório de Ecologia da Fundação Oswaldo Cruz, Brazil". The samples were processed in HF 100%; 10% and 50% HCl and 10% KOH. solutions The resulting solutions were separated in zinc chloride heavy density solution. *Lycopodium* tablets were used to determine pollen concentration.

Lagoa do Quari - Sondaggio C

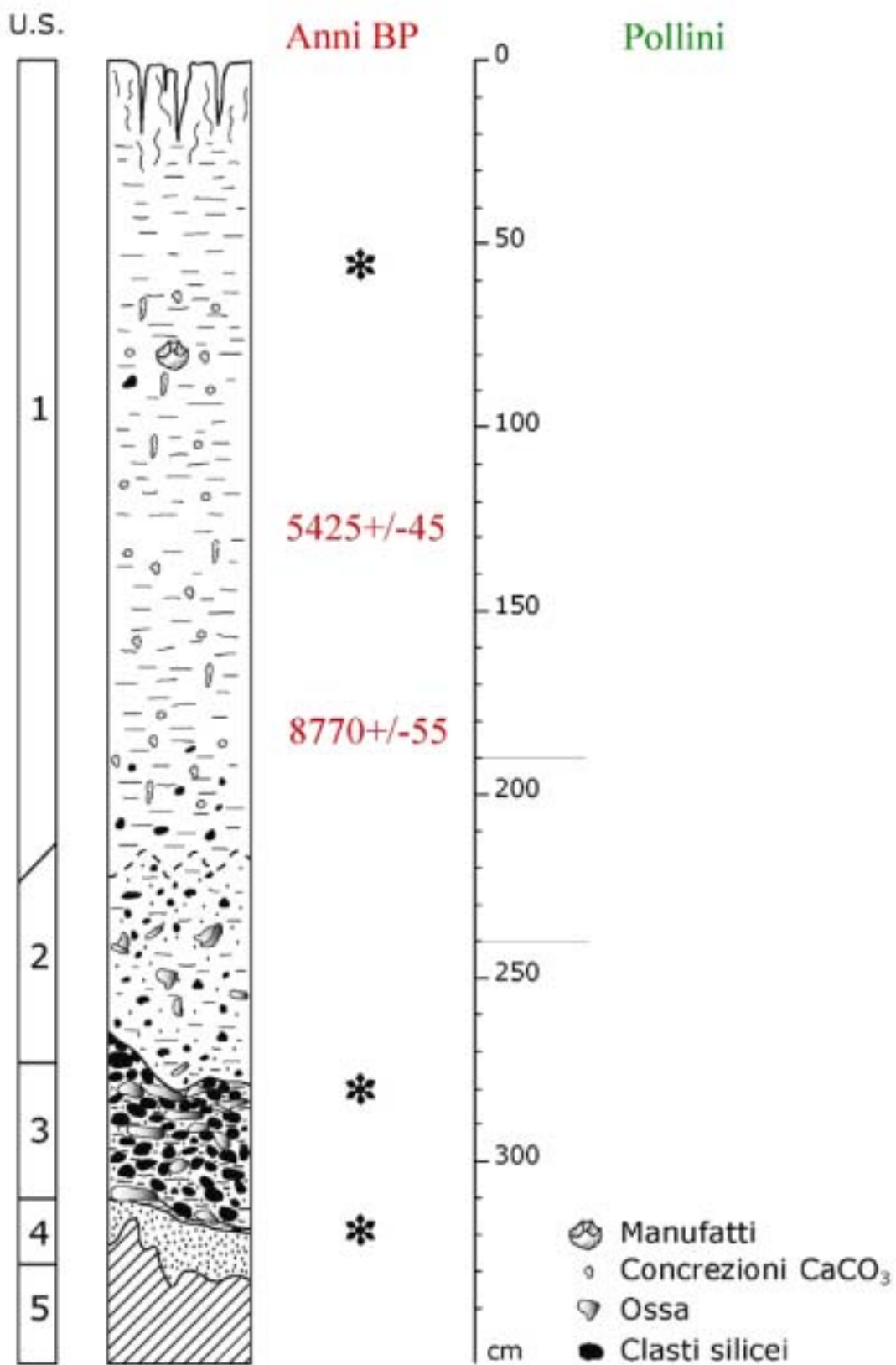


Figure 1 – Depth-age-industry for Quari

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Sample 1 – 190cm

Some of the taxa discovered are witnesses of a relatively open and an arboreal environment - 65% AP (Arboreal Pollen): *Combretum* sp., *Byrsonima* sp., *Piptadenia moniliformis*, *Piptadenia* sp., *Mimosa verrucosa*, *Bauhinia*, *Arecaceae*. Other taxa - 35% NAP (No Arboreal Pollen) were identified like – *Poaceae*, *Bromeliaceae* and *Pfaffia* sp. - *Amaranthaceae*.

Sample 2 – 240cm

The presence of pollen grains at this layer was not abundant, the conservation was not significative. Only NAP (No Arboreal Pollen) were identified *Liliaceae*, *Chenopodiaceae*, *Caryophyllaceae* and *Poaceae*. Maybe it can be a problem of conservation or a scenario from a picture of shortage environment.

To the first sample layer (1) the faunal remains collected and the pollen analysis in this site seems to characterize an open vegetation than at the present time, and has allowed the development of a savanna, probably interspersed by forest zones.

We hope in the future that the palynology researches be able to improve the environmental reconstruction with news scenarios from this region and improve our knowledge on the about the plants represented by pollen grains through the time.

Footnotes

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² Laboratório de Ecologia da Escola Nacional de Saúde Pública da Fiocruz / FUMDHAM
Rio de Janeiro- Brasil Tel: 55 21 2598 2666 – 2598 2671

Email: smiranda@ensp.fiocruz.br

³ Fondazione Ing. C.M. Lerici Roma - Itália

Email: f.parenti@tiscali.it

⁴ Université Claude Bernard / Lyon I / FUMDHAM Lyon - França

Email: claude.guerin@pop.univ-Lyon1.fr

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