Holocene vegetation dynamics and landscape-shaping in Central Tunisia: a preliminary palynological study from Sebkha El Bhira (Kairouan Governorate)

Rafael Cabral*†[1], Yannick Miras[1], Jean-François Berger[2], Ana Ejarque[3], Lionel Dubost[1], and Vincent Lebreton[1]

[1]Histoire naturelle des humanités préhistoriques – Museum National d'Histoire Naturelle, Université de Perpignan Via Domitia, Centre National de la Recherche Scientifique – France
[2]Environnement, Ville, Société – CNRS, Université Lumière-Lyon 2 – France
[3]Institut des Sciences de l'Evolution de Montpellier – CNRS, Université de Montpellier – France

Résumé

The low-steppe regions of Tunisia are highly sensitive to both climatic changes (*e.g.* increasing aridity) and anthropogenic pressures (*e.g.* agriculture, over-grazing, urban sprawl). A retrospective approach is essential to unravel the complex environmental, climatic and landscape shaping processes to understand how climate and social-ecological interactions have impacted this ecosystem throughout the Holocene. To this end, a 16.54 m long sequence was recovered from the Sebkha El Bhira (Kairouan Governorate, Tunisia) and provides a thorough pollen record spanning the Holocene.
Preliminary palynological analyses highlight three main pollen zones. The first zone, from 16.54 m to 5.56 m depth, is characterized by high values of *Artemisia*, Amaranthaceae and Poaceae, alongside smaller contributions of Asteroideae and *Helianthemum*. Mediterranean ligneous taxa like *Juniperus*, *Quercus ilex*-type and *Olea* all show a steady decline. The second zone, between 5.56 m and 2.60 m depth, is marked by a heavy contribution of Poaceae and Amaranthaceae, whilst *Artemisia* rates decline. Higher values of Brassicaceae, Asteroideae, Cichorieae, and Mediterranean plants are observed, along with minor inputs from the riparian vegetation (*e.g. Salix*, *Alnus*, *Fraxinus*) and the first appearance of Anthropogenic Pollen Indicator taxa (*e.g. Cerealia*-t., *Plantago lanceolata*-t.). The final zone, from 2.60 m depth until the surface, displays a resurgence of Amaranthaceae values and a decline in Poaceae. *Artemisia* rates gradually increases, reaching their acme in the uppermost samples, accompanied by notable peaks of *Olea* and Brassicaceae frequencies.

Overall, the pollen data reveal an early phase dominated by an *Artemisia* low-steppe surrounding an Amaranthaceae-dominated chott around the sebkha, with a Mediterranean matorral vegetation covering the neighboring *djbels* slowly declining. The second phase suggests episodic rises of the sebkha water levels, inferred from the replacement of halophytic Amaranthaceae values by Poaceae. The final phase indicates a shift in land-use practices, marked by clear evidence of olive cultivation and grazing-induced degradation of the steppe.
Ultimately, this preliminary palynological study outlines significant changes in vegetation composition over the Holocene and highlights a tipping point in the landscape shaping process driven by the onset of intensive agricultural land-use within the past two centuries.

*Intervenant
†Auteur correspondant: rafael.cabral@edu.mnhn.fr

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