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Modern pollen–vegetation relationship from the Mahasamund District (Chhattisgarh), central India: implications for palaeoecological reconstruction

NAGENDRA PRASAD[1,2] & MOHAMMAD FIROZE QUAMAR [1,2]

[1]*Quaternary Palynology Laboratory, Birbal Sahni Institute of Palaeosciences (BSIP), Lucknow, India,* [2]*Academy of Scientific and Innovative Research (AcSIR), Ghaziabad, India*

Abstract
The study of modern pollen–vegetation relationship is crucial for the proper interpretation of fossil pollen records. In the present study, a total of 29 surface samples, collected from the edge of the forested areas of the Mahasamund District, Chhattisgarh State, central India, were palynologically analysed with the principal aims of evaluating the modern pollen assemblages and understanding the modern pollen and extant vegetation relationship. The study reveals the dominance of non-arboreal pollen (NAP) taxa over the arboreal pollen (AP) taxa, suggesting open mixed tropical deciduous forest type vegetation in and around the study area. The tree taxa, on the whole, constitute an average sum of 19.78% pollen of the total pollen sum, whereas the contribution of herbs is 43.58% pollen (average sum). The major non-arboreal taxa are Cerealia/Cereal Poaceae (average value; 5.45% pollen) and Poaceae (average value; 4.34%), whereas the cultural plant pollen taxa, such as Amaranthaceae, Caryophyllaceae, Brassicaceae, *Cannabis sativa*, *Alternanthera*, and *Borreria* contribute with an average sum of 11.69% pollen to the total pollen sum. Most of the common forest elements are not recorded because they are insect-pollinated or have low pollen preservation potential, and, hence, the modern pollen assemblages do not directly reflect the actual extant vegetation occupying the landscape of the study area. This bias would also be expected in late Quaternary pollen records of central India and, hence, can provide information of the actual vegetation when analysing fossil pollen samples.

Keywords: *pollen rain, surface samples, tropical deciduous forests*

Pollen analysis is an important tool for understanding changes in vegetation and contemporary climate (variability) in a definite time-frame (Wright 1967; Flenley 1973; Moore & Webb 1978; Birks & Birks 1980; Quamar & Bera 2020; Quamar & Kar 2020b; Kar & Quamar 2019, 2020; Quamar 2022a; Quamar 2022b; Quamar et al. 2023a, 2023b; Quamar et al. 2024, and references cited therein). But prior to undertaking the study, it is first necessary to understand how the current vegetation is represented in the modern pollen-rain of the study area (Webb III et al. 1981). Pollen, produced by the plant itself, however, does not distribute evenly across the landscape. Moreover, the pollen records, retrieved from various preserving media/substrates, especially surface soil samples, mud samples, moss cushions, and samples from sediment profiles/cores do not directly reveal plant abundance around the study area (Prentice 1985) owing to differences in pollen production, dispersal, and preservation potential of taxa, which in turn depends on plant species and climatic conditions (Bush 1995; Hicks 2001; Spieksma et al. 2003). This leads to the over-representation of some taxa and under-representation

Correspondence: Mohammad Firoze Quamar, Birbal Sahni Institute of Palaeosciences (BSIP), 53 University Road, Lucknow 226007, India. E-mail: *quamar_bot@yahoo.co.in*; *firoz.quamar@gmail.com*; *mohdfiroze_quamar@bsip.res.in*

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