

Recent pollen spectra from Nachiketa Tal, Garhwal Himalaya*

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Palynological study of surface samples collected around Nachiketa Tal, Uttarkashi District, Garhwal Himalaya reveals overall dominance of *Pinus* and *Quercus*. The former does not grow in the area and in immediate neighbourhood. Presence of *Pinus* pollen can only be attributed to the transportation from lower elevations where the pine forests occur. Pollen of *Quercus* reflect the predominance of the taxon in the area. Other arboreal as well as non-arboreal taxa are represented in low pollen frequencies reflecting the present vegetation. The fern spores are encountered in good numbers in all samples.

Key-words—Palynology, vegetation, Nachiketa Tal, Garhwal (India).

INTRODUCTION

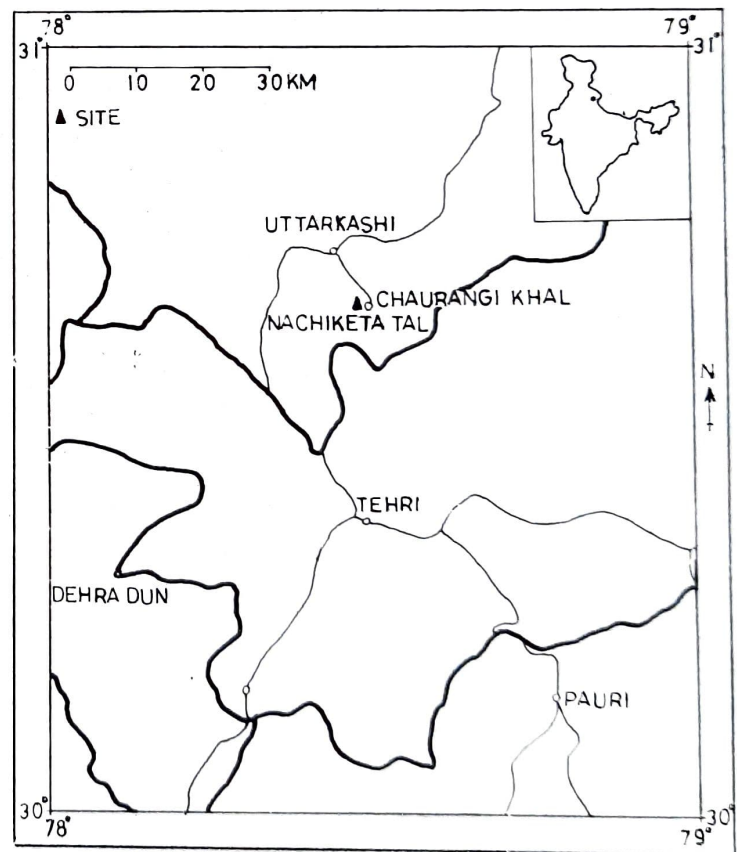
NACHIKETA Tal is located in Uttarkashi District of Garhwal Himalaya (30° and 31°N and 78° and 79°E) at an elevation of 2550 m a.s.l. and is about 4 km from Chaurangi Khal (Map 1). The lake is elliptical in outline, measuring about 150 m in length and 40 m in breadth with irregular margin.

Quaternary palynostratigraphical as well as surface sample studies have been carried out earlier from western Himalaya covering Kashmir, Himachal Pradesh and Kumaon (see Gupta, 1992; Sharma, 1992). Sharma (1985) carried out palynological investigation of surface samples from Dehradun District. Present pollen analysis from Nachiketa Tal is primarily aimed to extend such investigations to Uttarkashi for palaeovegetational and palaeoclimatic interpretations.

VEGETATION

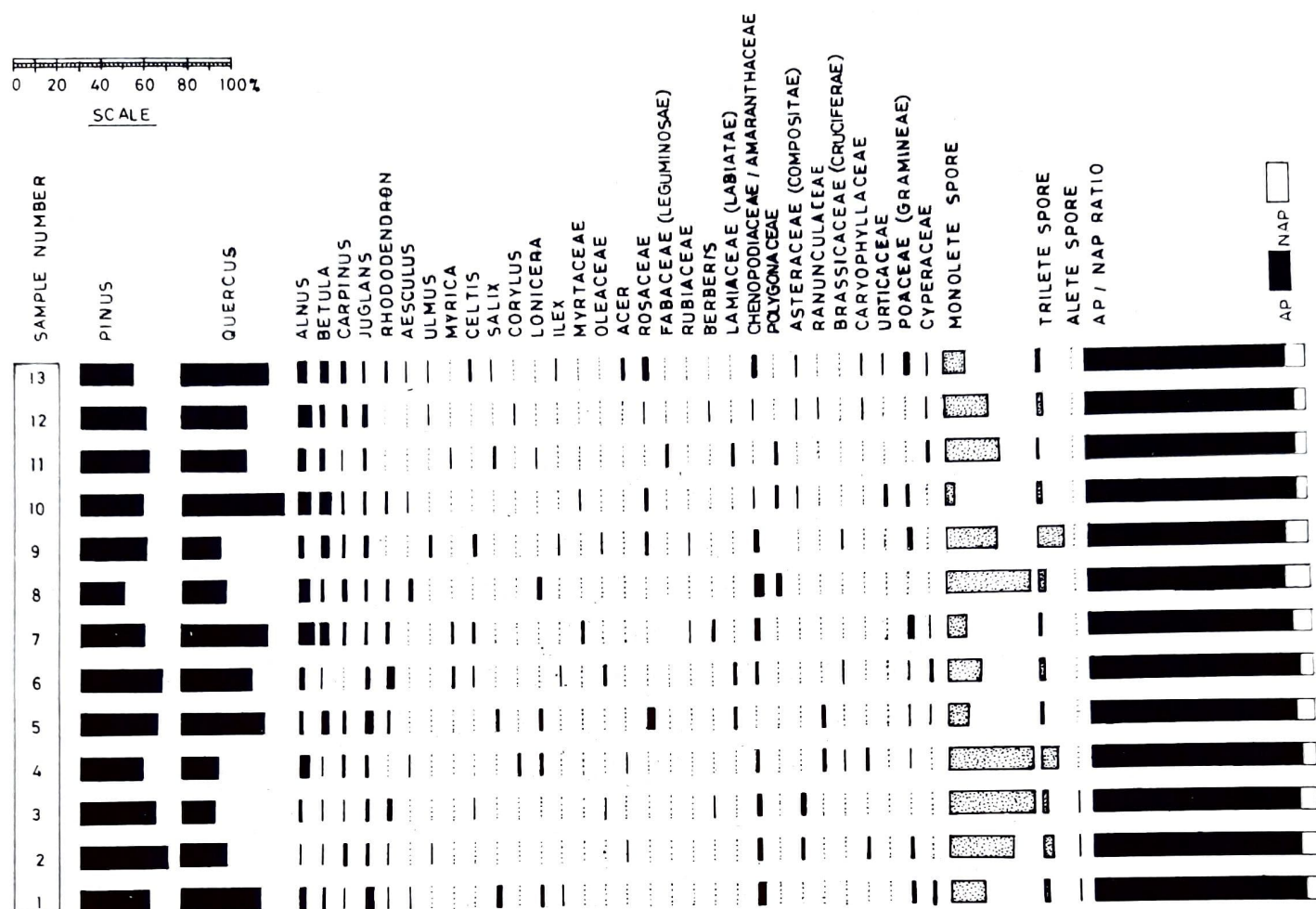
The temperate oak forests around Nachiketa Tal are fairly thick and besides the characteristic dominant *Quercus*, *Rhododendron arboreum*, *Aesculus indica*, *Salix* sp., *Alnus* sp., *Betula* sp., *Carpinus* sp., *Juglans regia*, *Myrica esculenta*, *Ulmus* sp., etc. are frequent forest associates. Among the shrubby elements—*Berberis asiatica*, *B. chitria*, *Lonicera* sp., *Rubus ellipticus*, *R. niveus*, *Rosa* spp. etc., are important components. The ground cover chiefly includes members of Chenopo-

diaceae, Amaranthaceae, Ranunculaceae, Asteraceae, Brassicaceae, Rosaceae, grasses and sedges.



Map 1. Sketch-Map (part of Garhwal) showing location of Nachiketa Tal, the investigated site.

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Text figure 1. Recent pollen spectra from Nachiketa Tal, Garhwal Himalaya.

MATERIAL AND METHOD

Thirteen moss cushions were collected around Nachiketa Tal (Text-fig. 2). About 10 gm of each sample was boiled in 10% KOH solution to deflocculate the matrix and then was sieved. The filtrate was centrifuged, washed repeatedly and then treated with 40% hydrofluoric acid to remove silica, followed by a thorough wash. Thereafter the material was acetolysed using conventional technique (Erdtman, 1943, 1960) and mounted in 50% glycerine for the study.

POLLEN SPECTRA

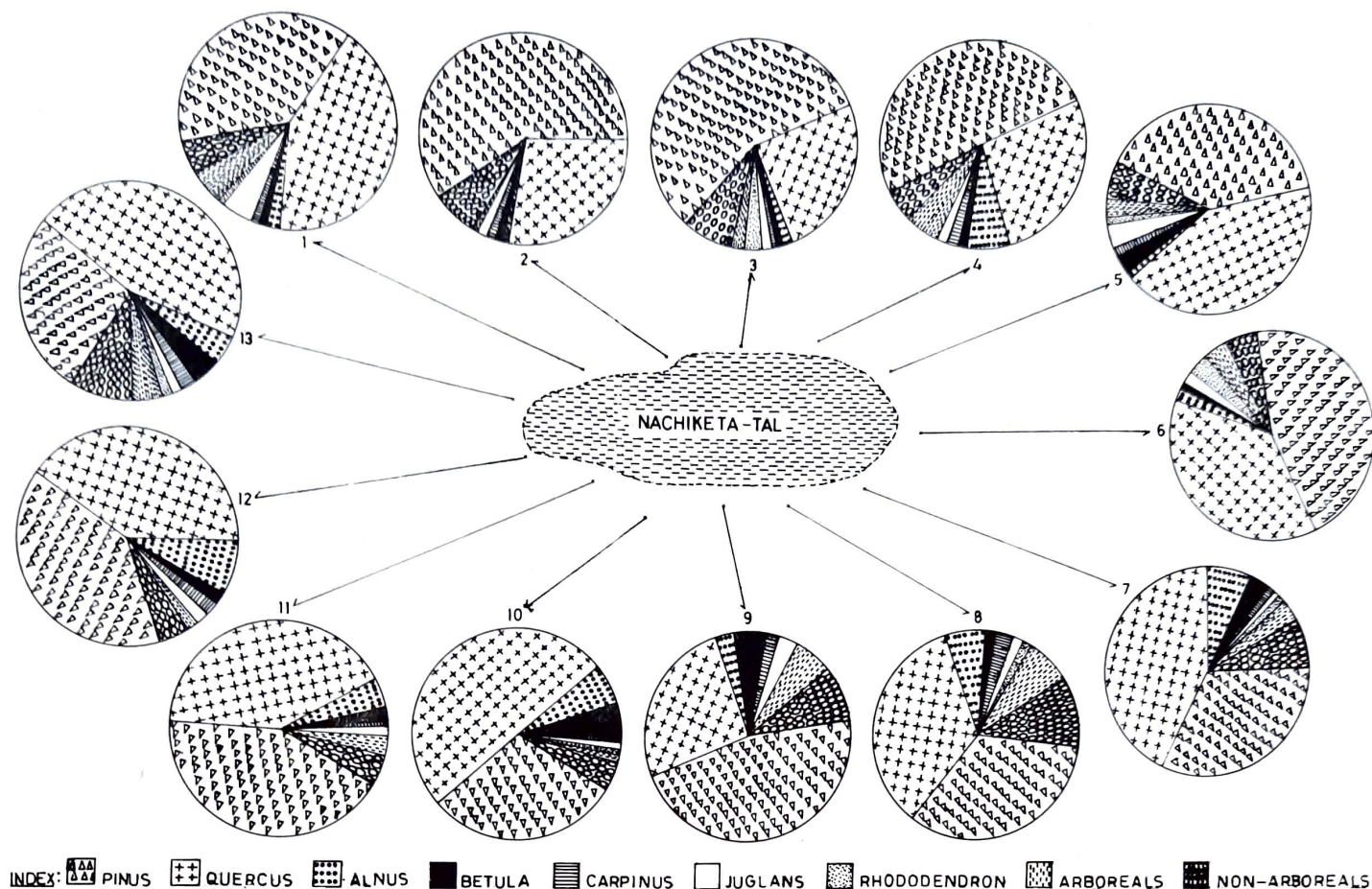
The pollen analysis of all samples reveals marked dominance of arboreals over non-arboreals in the pollen assemblages and show the preponderance of both *Quercus* and *Pinus* with fluctuating frequencies. Other arboreals, viz., *Alnus*, *Betula*, *Carpinus*, *Juglans*, *Rhododendron*, *Aesculus*, *Ulmus*, *Myrica*, *Celtis*, *Salix*, *Corylus*, *Ilex* and *Acer* are represented in low frequencies. Similarly, the non-arboreal taxa too are represented by low values of *Chenopodiaceae/Amaranthaceae*, *La-*

miaceae, *Polygonaceae*, *Asteraceae*, *Ranunculaceae*, *Brassicaceae*, *Caryophyllaceae*, *Urticaceae*, *Poaceae* and *Cyperaceae*, etc. The fern spores, however, are encountered in fairly high numbers, whereas bryophytic spores are poorly represented. The fungal spores are also encountered in all samples in addition to the hyphae fragments and microthyriaceous fruiting bodies.

In Text-figure 1, the frequency percentage of different pollen taxa and spores (excluding fungal ones) is given which depicts considerable fluctuating values. This indicates that the pollen deposition was not uniform in the area. In Text-figure 2, is shown the recent pollen deposition of important taxa and their frequency.

DISCUSSION AND CONCLUSION

The evaluation of each pollen spectrum uniformly establishes the marked dominance of arboreals over non-arboreals, and thus portrays a true picture of existing dense forests all around Nachiketa Tal. Moreover, in all samples the presence of almost the same taxa is also revealed. The difference in the frequencies of different taxa among the samples is possibly due to local factors



Text-figure 2. Recent pollen deposition model from Nachiketa Tal, Garhwal Himalaya.

and ecological situations. *Pinus* and *Quercus* are in abundance throughout, though *Pinus* is not growing in the region. Presence of its pollen is a result of long distance transportation from surrounding mountains where pine forests occur. Similar observation of pseudo-presence of *Pinus* has been reported by Sharma (1985) from Dehradun Division. *Quercus* is one such arboreal which is well represented in all samples with fluctuating frequencies.

The under-representation of some of the important arboreal taxa in the vegetation around Nachiketa Tal, such as, *Rhododendron*, *Salix*, *Aesculus*, *Myrica*, *Rosaceae*, etc. is obviously for their entomophilous nature. Besides, the poor representation of certain taxa may also be due to fungal degradation.

Comparatively very low frequencies of non-arbores

vis-a-vis arboreals reflect poor undergrowth or ground cover, or indirectly the existence of thick forests in the area.

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