

were harvested by suction filtration on Whatman No. 1 filter paper, washed twice with distilled water, pressed between a few layers of blotting paper, weighed and stored at -70°C .

In the CTAB (cetyltrimethyl ammonium bromide) procedure nucleic acids were extracted essentially as described by Rogers and Benedich⁶ with the following modifications: PVP was omitted from the buffer and all centrifugations were done at room temperature ($30 \pm 3^{\circ}\text{C}$) except for the last centrifugation, which was done at 4°C .

The TENS procedure is as follows:

1. Grind the frozen mycelia with twice the weight of sand into a fine powder using a pre-chilled pestle and mortar and transfer the powder into a 50 ml polypropylene tube.
2. Add 10 volumes of TENS (0.05 M Tris (pH 8.0), 0.1 M EDTA (pH 8.0), 0.1 M NaCl and 1% SDS) buffer and mix thoroughly and gently.
3. Add an equal volume of neutral phenol, mix gently and place the tube at -20°C for 30 min.
4. Thaw the contents of the tube and centrifuge for 10 min at 12,000 g at room temperature ($30 \pm 3^{\circ}\text{C}$).
5. Extract the upper layer with phenol: chloroform: isoamyl alcohol (25:24:1).
6. Centrifuge for 10 min at 12,000 g at room temperature ($30 \pm 3^{\circ}\text{C}$).
7. Transfer the upper layer to a fresh tube and add 1/10 volume of 3 M potassium acetate (pH 4.8).
8. Precipitate the nucleic acids with 2 volumes of distilled, cold ethanol.
9. Centrifuge for 15 min.
10. Dry the pellet and dissolve in $0.1 \times \text{TE}$ (10 mM Tris (pH 8.0) and 1 mM EDTA (pH 8.0)).

For hot TENS procedure, TENS buffer at 65°C was added and incubated at 65°C for 10 min and then extracted with an equal volume of neutral phenol. The upper layer was processed as above from steps 5–10.

A modified procedure for DNA isolation from higher fungi, using hexadecyltrimethyl ammonium bromide has been reported after submission of this note⁹.

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The recent rise of the river bed near Mohand, Western Uttar Pradesh

Himalayan foreland basin between the rivers Ganga and Yamuna in the western Uttar Pradesh has many strike-slip faults cutting across the Siwalik range. One such fault, a small en echelon fault associated with Dhaulkhand fault zone, runs along Gajrao in its upper catchment area. A definite right lateral slip along this fault brings a northeasterly dipping clay band opposite to the sandstone bed. A major portion of the dislocated sandstone hillock rests precariously on the dip-slope provided by the underlying moistened clay band. The impounding enormous pressure on the substratum squeezes and uplifts these clays and the overlying recent sediments in the river bed abutting against the fault

It was January the 19th, 1994, when most of the news dailies in Dehradun valley carried a sensational news on the front page that a forest land near Mohand in Siwalik foothills is rising up abnormally and has gained a height of about 8 m above the stream level. This news caused panic amongst the populace sprawling in the nearby region (based on the FIR lodged at Mohand Police Station and Forest Check Post by Mr Mir Ali) as they suspected a catastrophe in the near future in the form of a volcano or related activity.

Mr Mir Ali, a Gujjar, who hails from the area of the present activity, has been an eyewitness to this whole event which, according to him, first started in 1992 monsoon time (July–August).

During that period, it attained a height of about 1.5 m before being washed out. Later, during 1993 monsoon time, the process was again reactivated at the same place and till October 1993 it kept on rising to a considerable height. The rise also produced noise, he said. Thereafter, he did not notice any significant change in height; however, fractures started appearing in the elevated rock mass. In 1990, an event of such unusual rise of the river bed was also reported from Tal valley¹, SE of Dehradun in Garhwal Lesser Himalaya.

To have a first-hand account of the operating processes in this region, the present team carried out geological investigations. These studies are presented in this paper.

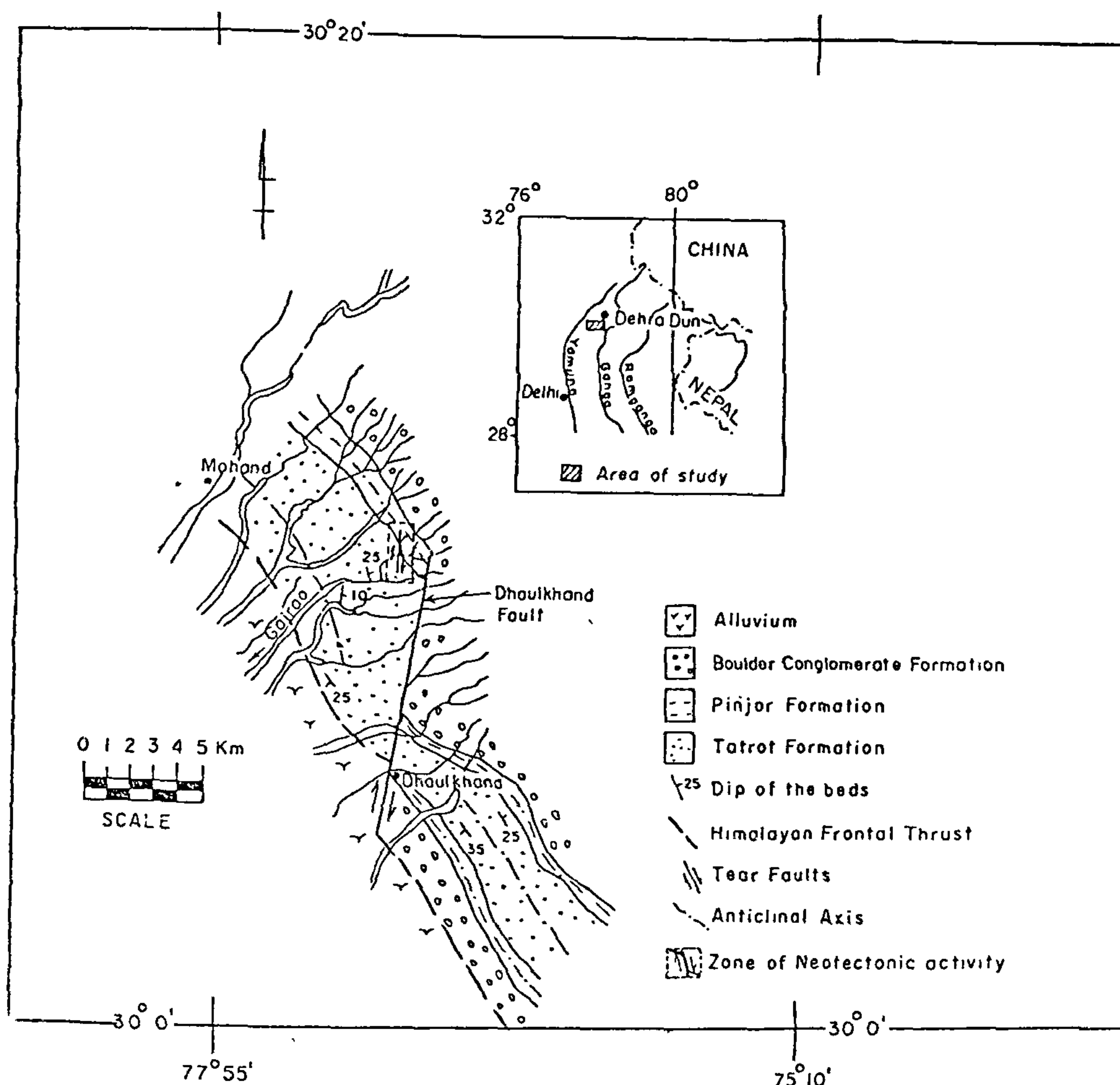


Figure 1. Geological map of Himalayan foreland basin in Mohand area.

In the Himalayan foreland basin the poorly indurated northeast dipping Siwalik sandstone and clays have recently changed the geomorphic configuration of the upper catchment area of Gajrao. This nala (stream) flowing across the Siwalik range is located in the Rajaji National Park at about 12 km east of Mohand on Mohand-Haridwar forest road (Figure 1), wherein the area of present activity falls on $30^{\circ}9'N$ latitude and $77^{\circ}59'E$ longitude^{2,3}. The following observations have been made in the field.

The dip of the beds on the northern limb of the regional anticlinal structure is shallow to moderate in the northeasterly direction. Along the nala, a N-S oriented right-lateral strike-slip fault has

been observed. This fault is traceable for about 300 m, offsetting the beds in the vicinity to the extent of about 100 m horizontal shift along the fault. The uplifted mass together with the material on the river bed follows the trend of this fault plane. The fault trends approximately parallel to the Ganga and Yamuna tear faults and perhaps represents an en echelon fault associated with the Dhaulkhand fault zone lying close to this location (Figure 1).

The nala (Gajrao) follows a N-S course in the vicinity of the neotectonic activity that well superimposes the strike-slip fault described earlier. On the southern side, this nala has a small NW-SE-trending tributary, while a dissected small NE-SW-trending valley is

noticed on the northern side. These two linear features (small lineaments) together with the third, the main nala, thus encircle a small sandstone hillock resting on an unstable dip-slope. On the toe of this hillock, rock mass consisting of variegated clays and loose sediments on the river bed has been raised. This raised mass attains a height of about 7.5 m above the stream bed.

The NE-SW lineament identified in the area exposes a zone of permanent landslip. Three prominent phases of landslip have been identified in this zone showing a net slip of 1.5 m, 1.1 m and 1.5 m, respectively. In the vicinity of the slip, a series of extensional fractures trending NE-SW is observed (Figure 2a). These fractures show dif-



Figure 2. a. Extensional fractures in the slip zone. Scale bar indicates 1 m. b. Uplifted part of the river bed.

ferential slip and, therefore, some blocks have been uplifted. An extension of 21.11% is estimated on a stretch of 8.5 m. In the northeastern side, the fracture dilation increases, while in the northwest the separation is comparatively small. Thus, it represents a rotational or oblique slip geometry. The uplift of the stream bed is observed to be of the order of 2.5–7.5 m (from south to north, i.e. sloping towards south) in an area of 16 × 3 m (Figure 2b). Two sets of extensional fractures are also noticed in the uplifted mass trending in NE–SW and NW–SE directions. Of these two, the NE–SW-trending fractures in the southern side have more dilation.

A major portion of the isolated sandstone hillock rests on a thick variegated clay band moderately dipping northeast-

erly. The occurrence of slickensides-type NE plunging striations (almost parallel to the dip direction) on top of the clay band suggests sliding of the sandstone hillock. Percolation of water along the clay band further facilitates gliding of the overburdened mass of sandstone.

It is proposed that the movement of the sandstone block causes the underlying clay band juxtaposing the sandstone to be in a state of compression across the N–S strike-slip fault in the nala. The sandstone at the fault plane acts as a buttress for the impinging east-directed squeezed mass of clays, causing rise of the bedrock (clay) along with loose sediments deposited on the stream bed.

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A critical appraisal of the type locality of a rare palm from Kumaon Himalaya, India

The *Red Data Book of Indian Plants*¹ reports the occurrence of *Trachycarpus takil* from the Thakil mountains in Kumaon Himalaya. This interesting palm species belonging to the family Arecaceae includes tall trees about 15–25 m in height with unbranched stems covered by persistent leaf-bases. The leaves are large, fan-shaped with plicately lobed margins. The flowers are numer-

ous, aggregated on compound interfoliar inflorescence, unisexual, with both male and female flowers appearing on the same plant (monoecious). The fruits are reniform^{1–3}. Nayar and Sastry¹ comment: 'A distinct palm species closely related to the Sino-Japanese species *Trachycarpus fortunei* H. Wdl. The only published picture of this palm is of a plant in O. Beccari's Garden in Flor-

ence, Italy, appeared in *Kew Bulletin* 1912; 291'. It is reported that this species grows on mountain slopes at 2000–2500 m, in the mixed forest of *Quercus*, where it sustains frost and snow. It prefers cool and narrow valley in the northwest Himalaya.

With a view to evaluate the correct status of the species and its type locality and also to investigate the reproductive