



24.0 Chotanagpur Plateau: Relict Habitats and Endemic Plants

¹Pankaj Kumar & G.S. Rawat

Department of Habitat Ecology, Wildlife Institute of India, Chandrabani,
Dehradun – 248001, Uttarakhand, India
¹pankajsahani@rediffmail.com

Introduction

Chotanagpur plateau is one of the oldest landmasses on earth. It is composed of Precambrian rocks which are more than 540 million years old. It is a collective name for the Ranchi, Hazaribagh, and Koderma plateaus, having an area of ca 65,509 km². Of these, Ranchi is the largest. The plateau in its entirety lies between the basins of the Ganges and Son rivers to the north and the Mahanadi River to the south. Through its centre, from west to east, runs the coal-bearing, faulted Damodar Valley. Numerous streams have dissected the uplands into a peneplain (an area reduced almost to a plain by erosion) with isolated hills. To the north of Chotanagpur lies the Rajmahal Hills which are very important on account of their fossiliferous deposits. Some of the important fossils found in the area are *Sahnioxylon rajmahalense*, *Pentoxylon sahnii*, *Sahania nipaniensis*, *Nipaniophyllum hobsoni*, *Carnoconites compactus* and *Nipanioxylon guptaii*.

Biogeographically, Chotanagpur plateau has a special significance. It forms the northern limit of Peninsular India that lies within Paleotropic region. Rodgers and Panwar (1988), in their Biogeographic Classification of India, recognized this plateau as part of province 6B (Deccan peninsula). The plateau has drawn the attention of several phytogeographers. Nayar (1996) identified 20 centres of plant endemism in India, of which Chotanagpur is one that has been recognized as an important 'microcentre'.

In this article we give an overview of the plant wealth, patterns of plant endemism and localities of botanical interest on the Chotanagpur plateau and suggest a few measures for their conservation.

Biophysical Features

The forest vegetation of the Chotanagpur Plateau is represented by three major groups as per the classification by Champion & Seth (1968): (i) Tropical Moist Deciduous Forests (3C/C3a and 3C/E1), (ii) Northern Tropical Dry Deciduous Forests (5B/C1c, 5B/C2 and 5/DS2) and (iii) Central Indian Subtropical Hill Forests (8A/C3). The total vegetation cover on the plateau is about 29.61 %. Out of this, 3.19% area is under very dense forest cover whereas 11.39% has moderately dense forests, 13.76% has open forests and 0.92% area has scrubland. There are 3 National Parks and 20 Wildlife Sanctuaries (Singh *et al.* 2001). According to Wildlife database there is 1 existing National Park and 2 proposed, whereas 11 Wildlife Sanctuaries existing and 2 are proposed (<http://www.wii.gov.in/nwdc/index.html>).

The climate of the plateau is Tropical monsoon type with three distinct seasons, *viz.*, summer (March to mid June), Monsoon (mid June to October) and winter (November to February). May is the hottest month with temperature going up to 45°C. During May and June the state also experiences hot winds known as *loo*. January is the coldest month with temperature ranging from 6°C to 22°C. The average rainfall varies between 100 cm to 150 cm. Likewise, the humidity varies from 38% (April - May) to 94% (August - September). On the basis of the ratio of total monthly precipitation and total monthly evaporation, Thronthwaite (1933) has placed the state under dry sub-humid category. The plateau has predominantly red soil that is derived from peculiar rock formations. This soil exhibits high percentage of acid soluble Ferric oxide and lower pH ranging from 5 - 6.8. In some higher parts of the plateau laterite soil is also found.



Chotanagpur has a human population of around 26.91 million of which 22.50% are of tribal origin, belonging to more than 30 different tribes. They are mostly dependent on the forest resources for their living. Some of these tribes are, Baiga, Santal, Asur, Chero, Gond, Larmali, Kond, Kurmi, Tharu, Munda, *etc.* Recent findings have suggested that the pre-Dravidian aborigines, whose descendants are speakers of the Munda Austric languages, living today in parts of Chotanagpur (Jharkhand), Chhattisgarh, Orissa, Bengal, and so on are the original inhabitants of India. This fact makes the area anthropologically unique.

(http://en.wikipedia.org/wiki/Dravidian_people).

Floral Wealth and Endemism

Despite a large number of floral surveys, there is no comprehensive account on the angiosperm flora of Chotanagpur Plateau. However the flora of erstwhile Bihar (that includes the state of Jharkhand which encompasses maximum part of the Chotanagpur Plateau), has recorded 186 families, of which 148 are dicotyledons and 38 are monocotyledons. Total number of species in erstwhile Bihar is 2963 which belongs to 1151 genera (Singh *et al.* 2001). The plateau has played an important role in the migration of plants from Eastern Himalayas, Assam, Myanmar, Malaya and other countries of the South-East. Plants have migrated from here to Western and Eastern Ghats and Sri Lanka. It is also believed that in the geological past, this plateau formed a link between Satpura Hill Ranges and eastern Himalaya that allowed species exchanges between these ranges (Hora 1949). Jharkhand is even recognised as a distinct geographic region (IND-JK) in Indian subcontinent by Kew (Brummitt 2001).

The plateau has altogether 14 endemic taxa (Some endemic to India and others endemic to Jharkhand). The following table gives the details of these taxa:

Table 1 : List of Endemic Plant species of the Chotanagpur plateau (Singh *et al.* 2001)

| No. | Species name | Family |
|-----|--|---------------|
| 1. | <i>Clematis roylei</i> Rehder var. <i>patens</i> (Haines) Kapoor | Ranunculaceae |
| 2. | <i>Dendrocalamus strictus</i> (Roxb.) Nees var. <i>sericeus</i> (Munro) Gamble | Poaceae |
| 3. | <i>Dimeria ornithopoda</i> Trin. var. <i>gracillima</i> Bor | Poaceae |
| 4. | <i>Iseilema holei</i> Haines | Poaceae |
| 5. | <i>Leucas lanata</i> Wallich ex Benth. var. <i>nagpurensis</i> C.B. Clarke ex Haines | Lamiaceae |
| 6. | <i>Ligusticum alboalatum</i> Haines | Apiaceae |
| 7. | <i>Sophora bakeri</i> C.B. Clarke ex Prain | Fabaceae |
| 8. | <i>Swertia angustifolia</i> Buch.-Ham ex D. Don var. <i>pyramidalis</i> Haines | Gentianaceae |
| 9. | <i>Zingiber purpureum</i> Roscoe var. <i>palamaunsis</i> (Haines) K.K. Khanna | Zingiberaceae |

Table 2 : List of Orchid species Endemic to India and found in Chotanagpur Plateau

| No. | Species name | Habit | Remarks |
|-----|---|-------|----------------|
| 1. | <i>Dendrobium herbaceum</i> Lindl. | E+L | Wide Endemic * |
| 2. | <i>Dendrobium regium</i> Prain | E | Endemic |
| 3. | <i>Habenaria gibsoni</i> var. <i>foetida</i> Blatt. et McCann | T | Endemic |
| 4. | <i>Nervilia carinata</i> (Roxb.) Schltr. | T | Endemic |
| 5. | <i>Nervilia falcata</i> (King et Pantl.) Schltr. | T | Endemic |

(* found only in India and Sri Lanka)

Some Unique Habitats and Associated Flora

i. Parasnath Hills : Parasnath Hills are situated towards the centre of the state of Jharkhand in the Giridih District. Apart of it (49.3 km²) was designated as a Wildlife Sanctuary in 1984. The highest elevation goes to approximately 1500m asl. Clarke (1898) and Haines (1921 – 24) have suggested that the hills of Parasnath may have served in the past as stepping stone for the passage of plant species between the hills of Peninsular India and Eastern Himalaya. With respect to vegetation this area is unique due to the presence of Montane subtropical forests (8A/C3) above 1220 m asl



on this hills (Champion & Seth 1968). Some of the commonly found species in this area above 1220m are, *Pittosporum wightii*, *Grewia* spp., *Meyna spinosa*, *Berberis asiatica*, *Reinwarditia indica*, *Thallictrum foliolosum*, *Polygala* spp., *Lobelia alsinoides*, *L. heyneana*, *Clematis gouriana*, etc. The areas between 650 – 1220 are dominated by *Litsea monopetala*, *Ficus microcarpa*, *F. mollia*, *Symplocos racemosa*, *Alangium salvifolium*, *Indigofera pulchella*, *Vitis* spp., *Bauhinia vahlii*, *B. sericea* var. *anguina*, *Persea bombycina*, *Chionanthus ramiflorus* and *Caesalpinia bonduc* to name a few (Plates 24A, 24B & 24C).

ii. Saranda Forests : Saranda is a dense forest in the hilly region of West Singhbhum district. Saranda literally means seven hundred hills. It is supposed to be one of the largest sal forests in Asia. The forest covers an area of 820 km². Amongst these forests lies a scenic village, called Thalkobad, at a height of 550 m (1,800 ft) in the heart of the forest. This area represents a very nice habitat for Orchids including all the 11 species of *Dendrobiums* and it is a home for the last remnant population of *Bulbophyllum*, an epiphytic orchid represented by single species, *Bulbophyllum crassipes*. Another interesting orchid of this region is *Pecteilis triflora*, which is found only at two places in India, one being Saranda forests and the other site is in the western Himalaya in Tons Valley, Uttarkhand. Saranda also hides amongst its dense forests, Ligirdah swamp which harbours unique swamp vegetation dominated by the members of family Zingiberaceae such as *Hedychium coronarium* and other families of sedges and grasses. The swamp is deep enough to engulf huge wild Elephants and is surrounded by dense sal forests. The reserved forests are the home for many animals like, wild elephants (common), sambar, chital, bison, leopards and even tigers, though they were never numerous but they are there.

iii. Netarhat : This is a densely forested area dominated by both moist and dry deciduous sal forests. The elevation ranges from 600m – 950m asl, with minor and major streams. One of the highest waterfalls called the Lodh Falls is located in these forests along with the famous Mahuadanr Wolf Sanctuary. Lodh Falls represents an ideal riverine ecosystem, harbouring a very important economic orchid of this region, called *Pholidota imbricata*, locally called "Pathal Kela", literally meaning, 'banana growing on high cliff rocks'. The forests are ideal habitat for orchid species, especially *Dendrobiums* (Plate 24C). Ten out of 11 species of *Dendrobiums* are found in this locality. Economically this area is highly suited for the cultivation of *Pyrus cummunis* (Family: Rosaceae), commonly called as Naspati.

iv. Barkapahar, Ranchi – Khunti Highway : This is a small hillock of approximately 130m high ranging from 650m - 780m above sea level and it is called Barka Pahar by the locals of the area, which is basically in comparison to another small barren hillock nearby. On the steep slopes there are Sal forests at some places and at some places there are mixed forests with *Acacia* spp. and *Bauhinia variegata*. On the gentle slopes towards the foothills are *Shorea robusta*, *Bauhinia*, *Nyctanthes arbor-tristis*. There are some *Terminalia alata* trees too scattered all over the hillock. In the mixed forests *Shorea robusta* is dominant species alongwith many species of undershrubs. A river runs along half the stretch of its foothills.

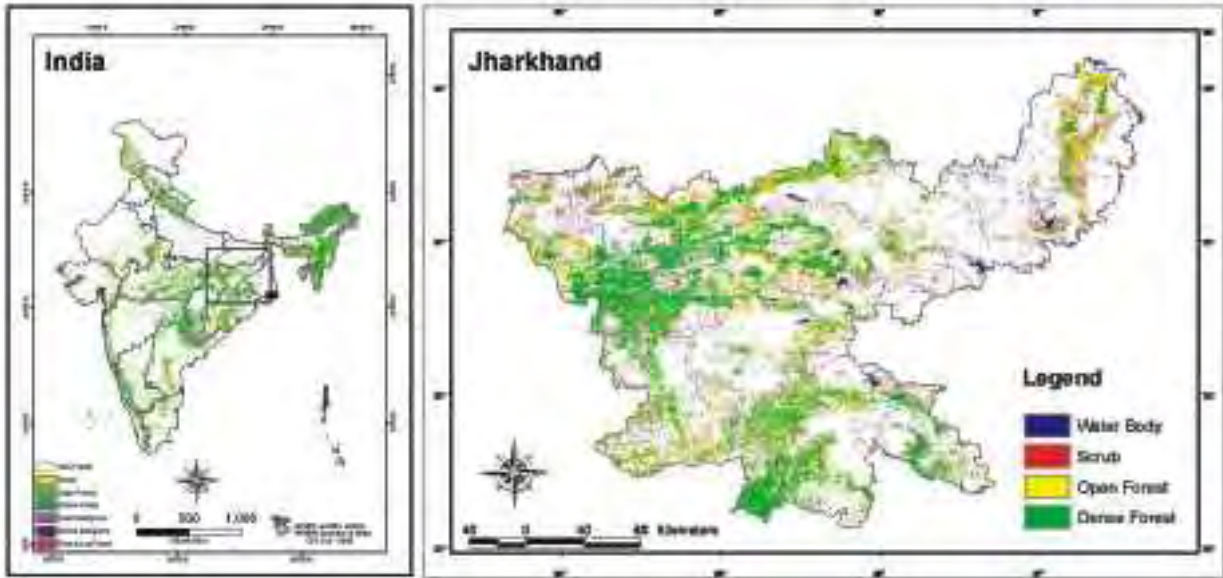
This hillock practically remained untouched by the scientific community and uninhabited by the local tribal community. Local tribal communities, use the land at the foot of the hillock for agriculture. The hillock recently gained importance due to the presence of 24 species of orchids of which 19 were collected specifically from the hillock and rest were from the trees scattered distantly on the plains below the hillock. Out of these 19 species, 16 are terrestrial, 2 are epiphytic and 1 is saprophytic. These represent around 40% of the total Orchids found in the whole state of Jharkhand.

Conservation Issues and Strategies

Despite all its marvelous biogeographical significance and uniqueness, Chotanagpur Plateau is not even prioritized for conservation by the Indian government, most probably because nowadays, conservation is based on effortlessness, rather than the necessity!



Plate 24A Chotanagpur Plateau: Vegetation and Habitat Features - I



Sal Forest, Netarhat, Latehar



Moist Mixed Deciduous Forest, Saraikela



Swamp Vegetation
(Ligirdah, Thalkobad, West Singhbhum)



Riverine Habitat
(Lodh Falls or Budhha Ghag Falls, Latehar)



Plate 24B
Chotanagpur Plateau: Vegetation and Habitat Features - II



Forested Habitat Islands around Chainpur, Gumla



Parasnath Wildlife Sanctuary
(Giridih)



Saranda Forests, West Singhbhum



Netarhat Plateau, Latehar



Barkapahar, Ranchi – Khunti Highway



Plate 24C
Threatened Orchids from Chotanagpur



Geodorum attenuatum Griff.



Odisha cleistantha S.Misra



Habenaria marginata Colebr.



Dendrobium herbaceum Lindl.



Bulbophyllum crassipes Hook.f.



Acampe papillosa (Lindl) Lindl.



Dendrobium formosum Roxb. ex Lindl.



Pholidota pallida Lindl.



According to Joshi and Dash (2006), the biodiversity of Jharkhand is under severe threat due to human induced activities, industries, mining, settlement, development projects and removal of forest products, overgrazing and forest fires. Majority of forest is lost due to industrialization and extraction of minerals from the earth crust. There is an urgent need to conserve the rich biodiversity of the state before the treasure is lost. There is an immediate need for the *in situ* conservation of this special habitat, *i.e.*, Chotanagpur Plateau on whole as well as its biodiversity. Being one of the oldest landmasses on earth, the Chotanagpur Plateau might be hiding some unforeseen information concerning the evolution of earth as well as its biodiversity.

Acknowledgements

Authors are grateful to Director and Dean, Wildlife Institute of India for providing the necessary facilities.

References

- Brummitt, R.K. 2001. World Geographical Scheme for Recording Plant Distributions. Plant Taxonomic Database. The Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh.
- Champion, H. G. & S. K. Seth. 1968. *A Revised Survey of Forest Types of India*. Manager of Publications, Govt. of India, Delhi.
- Clarke, C. B. 1898. Subareas of British India Illustrated by the Detailed Description of Cyperaceae in that Empire. *Journal of Linnean Society of London* **34**: 1 - 146.
- Haines, H. H. 1921-1924. The Botany of Bihar and Orissa. 6 parts. Allard & Son and West Newman Ltd. London. **5**: 1150 - 1182 (Rep. ed. 1961. *Bulletin of Botanical Survey of India*. Calcutta, 3 vols.).
- Hora, S. L. 1949. Satpura hypothesis of the distribution of the Malayan fauna and flora to Peninsular India. *In: Proceedings of National Institute of Science, India*. **15**: 309 -314.
- Joshi, P. K. & P. P. Dash. 2006. *Biodiversity characterisation at Landscape level using Satellite Remote Sensing and GIS*. Indian Institute of Remote Sensing, Dehra Dun.
- Nayar, M. P. 1996. Hot Spots of Endemic Plants of India, Nepal and Bhutan. Tropical Botanic Garden and Research Institute, Thiruvananthapuram.
- Rodgers, W. A. & H. S. Panwar. 1988. *Planning Wildlife Protected Area Network in India*. Vols. I & II. Wildlife Institute of India, Dehradun.
- Singh, N. P., V. Mudgal, K. K. Khanna, S. C. Srivastava, A. K. Sahoo, S. Bandopadhyay, N. Aziz, M. Das, R. P. Bhattacharya & P. K. Hajra. 2001. *Flora of Bihar. Analysis*. Botanical Survey of India, Calcutta Takhtajan, A. L. 1978. *Floristic regions of the World*, Nauka, Leningrad. (English edn. translated by T. J. Crovello & A. Cronquist, 1986). University of California Press, Berkeley.
- Thornthwaite, C. W. 1933. The climates of the Earth. *The Geographical Review* **23**: 433-440.
- http://en.wikipedia.org/wiki/Dravidian_people).
- <http://www.wii.gov.in/nwdc/index.html>.