

AN OUTLINE OF PLANT DIVERSITY IN WEST BENGAL STATE

T.K. Paul

Central National Herbarium, Botanical Survey of India, Howrah

West Bengal, one of the states in Eastern India, lies between the Himalayas in the north and the Bay of Bengal in the south, at coordinates between 21°45'–27°16' N and 85°55'–89°56' E. It is the only state in India where Himalayas are in the north and Sea is at the south, with both plains and plateaus covering the remaining region. At present the state has a total area of about 88,752 km². The state on the north is bounded by Sikkim and Bhutan, on the east by Assam and Bangladesh, the Bay of Bengal forms the southern boundary and the on west it is bounded by Odisha, Bihar and Nepal. The state has a coastline of about 210 km.

The major land mass of the state can be divided into two natural geographical divisions, viz. the Northern Himalayas and the southern plane divisions excepting the spurs of western hilly tract of the bordering states of Bihar and Odisha. There are five broad land forms, namely Darjeeling Himalayan hill region, Tarai-Duars region, western undulating high land and plateau, North and South Bengal plains and Gangetic deltaic regions. The Darjeeling Himalayan region includes a number of mountainous ranges rising up to 3900 m, where almost alpine conditions prevail in Sandakphoo and Phaloot. However, administratively there are 20 districts and 3 divisions in the state. The Burdwan division consists of Bankura, Burdwan, Birbhum, East Medinipur, West Medinipur, Hoogly, and Purulia districts, the Jalpaiguri division consists of Alipurduar, Uttar Dinajpur, Dakshin Dinajpur, Cooch Behar, Darjeeling, Jalpaiguri and Malda districts, and the Presidency division consists of Kolkata, Murshidabad, Nadia, North 24 Parganas, South 24 Parganas and Howrah districts.

The climate of West Bengal varies from tropical savannah in the southern parts to humid subtropical in the north. The temperature during summer in the state ranges between 26°C and 40°C, while during winter it range from 13°C to 19°C. Because of high altitude, the mountainous parts of Darjeeling and Jalpaiguri districts experience a cool temperate kind of climate, where the average temperature in summer is about 15°C, and in winter about 2°C. Snowfall occurs in some part of this region. The annual rainfall varies in different parts of the state. North Bengal receives the highest rainfall, ranging from 200 to 400 cm annually. In the coastal areas, rainfall is about 200 cm, in the Gangetic plains and in the central part of the state rainfall is 150–200 cm and in the western plateau region the amount of

rainfall received is 100–125 cm. The atmospheric relative humidity varies from 80 to 90% over greater part of the state. West Bengal has many lakes and rivers. There are 54 major rivers that flow through the state, of which important ones are the Ganga, the Teesta, the Torsha, the Jaldhaka, the Raidak, the Sankosh, the Mahananda originate from the Himalayas; the river Damodar, the Mayurakshi, and the Rupnarayan originate from Chotonagpur plateau, the Matla, the Gosaba, the Harbhanga are tidal rivers in Sundarban areas. There are 19 major lakes in the state, of which East Calcutta wetlands and Rasikbil are important.

The varied and unique physical features in the state support to harbour diverse vegetation with enormous species diversity. The state has five well-defined phyto-ecological zones, viz. (i) The Himalayan zone of Darjeeling, between 500 and 3800 m, (ii) Sub-montane Terai region and the adjacent plain, (iii) Vast alluvial plain on both sides of the river Bhagirathi and its northern and western tributaries, (iv) The Western dry flanks of Chhotanagpur plateau and (v) Mangrove forest of Sundarbans majorly confined to South 24-Parganas (Bhattacharyya, 1997). However, forest types and patterns of vegetation in certain subdivisions have been further classified after critical analysis by the ecologists and plant sociologists (Gamble, 1875; Malik, 1966; Champion & Seth, 1968; Naskar & Guha Bakshi, 1987). The halophytic vegetation in the forests of the Sundarbans of the state cover large tracts of swampy land in the district of South 24 Parganas and is only a small part of the vast Gangetic delta encroached by sea-coast and all the time fringed with muddy salt water, creeks, lagoons and estuaries. Some of the most ideal conditions have rendered this forest a congenial habitat for harnessing the world fame Royal Bengal Tigers in the littoral forest. There are 1 Biosphere Reserve, 5 National Parks, 15 Wildlife Sanctuaries and 1 Tiger Reserve in West Bengal. The state of West Bengal has a total area of 16805 km² forest area, of which Protected Areas cover about 4% of area under Protected Area Network.

The study of plants in West Bengal was initiated as early as in 1784 when W. Jones founded the Asiatic Society of Bengal in Calcutta. Robert Kyd in 1787 founded the Botanic Garden on the bank of the river Hooghly near Calcutta and since its establishment some of the most important economic plants such as Tea, Jute, Cinchona, Teak and Mahogany were introduced into the garden, for cultivation and development, especially in Bengal.

William Roxburgh in 1814 published an interesting catalogue of about 3500 species of plants under cultivation in Calcutta Botanic Garden. The contributions of two contemporary Botanists, viz. William Carey and Buchanan-Hamilton in botanical and horticultural research are of great significance to West Bengal. Voigt in 1845 enlisted the plants grown in the Botanic Garden of Calcutta and that of Carey's Garden at Serampore. The history of botanical researches in West Bengal and growing interest of local people in plants have a close link with the establishment of the Calcutta Herbarium (CAL). David Prain in 1903 published the flora of the plains of Bengal as "Bengal Plants" in 2 volumes and it is the only comprehensive and useful flora of the erstwhile Bengal. Since then, numerous works on the flora of different parts of West Bengal as well as on different groups of plants in the state have been published. Some of the recent publications pertaining to the flora of West Bengal are "Flora of Howrah District" by Bennet (1979), "Flora of Murshidabad District" by Guha Bakshi (1984), "Flora of Bankura District" by Sanyal (1994), Flora of West Bengal Volume 1 by Botanical Survey of India in 1997 and "Flora and Ethnobotany of West Dinajpur District, West Bengal" by Mitra & Mukherjee (2013).

Based on the floristic studies it reveals that the Angiospermic flora of West Bengal state harbours about 3580 species under 1333 genera in 200 families (Chakraverty & al., 1999). Besides, the state supports 21 species of Gymnosperms, 416 species of Pteridophytes, 771 species of Bryophytes, 873 species of Algae, 539 species of Fungi and 329 species of Lichens. There are 37 rare and threatened taxa in the state (Chakraverty & al., 1999) and 19 taxa have been described from West Bengal, which are not collected after type collection (Sanjappa & al., 2012). There are about 850 species of medicinal plants in the state and about 1600 species are used by various tribal communities in the state (Chakraverty & al., 1999).

The ENVIS Centre on Floral Diversity, Botanical Survey of India has published the "Bibliography and Abstracts of Papers on Flora of West Bengal" in 2 volumes; Volume I (BSI-ENVIS, 2008) contains 439 entries, and Volume II (Lakshminarasimhan & al., 2010) contains 386 entries; each reference is provided with a brief abstract. Mitra & al. (2010) published "Bibliography of Flora and Ethnobiology in West Bengal". These works would facilitate the researchers to easily gather information on floristic, taxonomy, vegetation, diversity of flowering and non-flowering plants, forestry, ecology, ethnobotany, medicinal plants and conservation issues in the state of West Bengal.

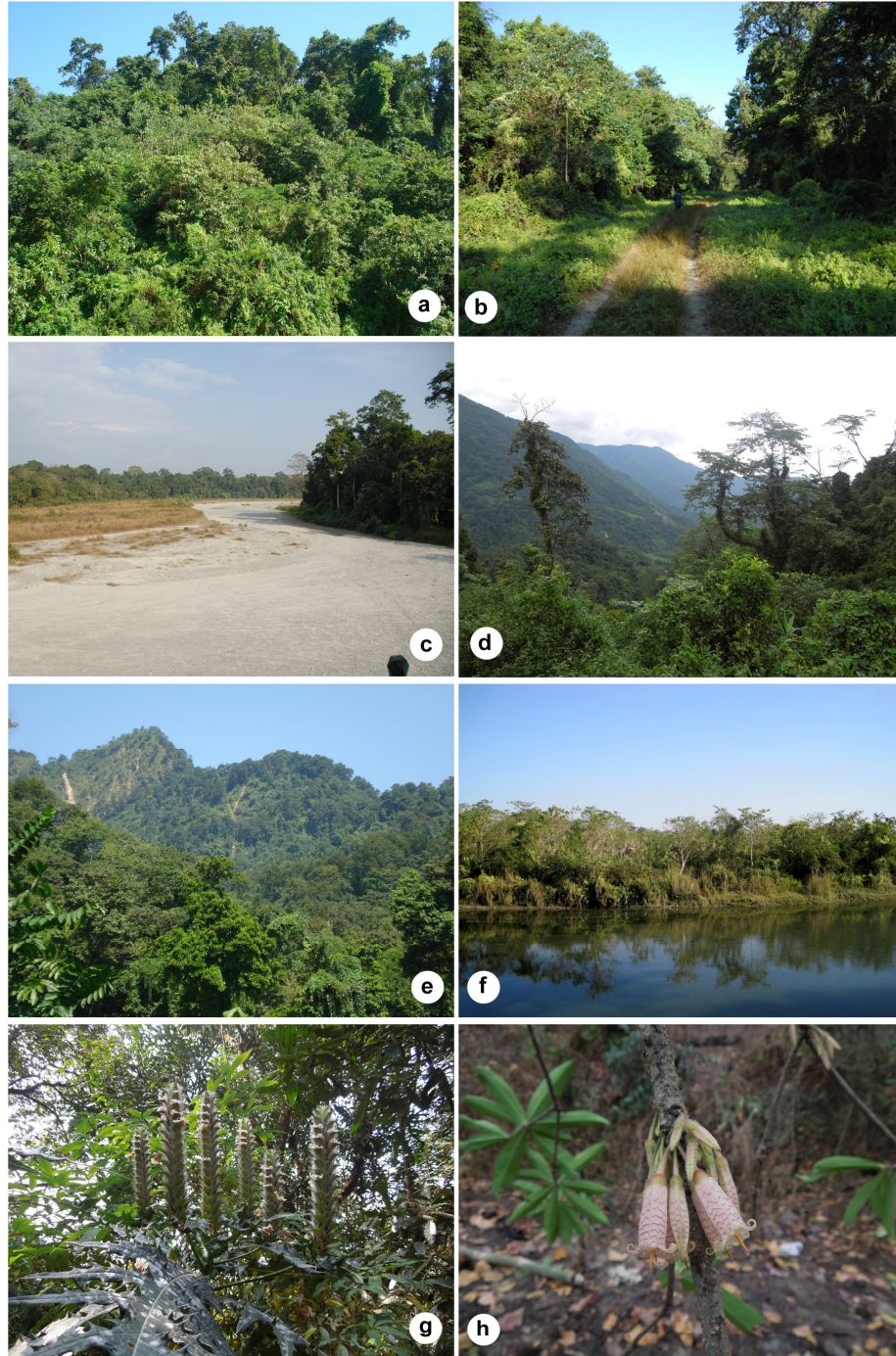


Plate 1: **a.** An evergreen vegetation of Mahananda wildlife sanctuary; **b.** Vegetation of Buxa National park; **c.** Riverine vegetation in Buxa National park; **d.** Vegetation of Buxa National park; **e.** Moist deciduous forest in Mahananda wildlife sanctuary; **f.** Dense inland vegetation in Jaldapara National Park; **g.** *Acanthus carduaceus* Griff. - an endemic to Bhutan and West Bengal; **h.** *Agapetes bhutanica* N.P. Balakr. & Sud. Chowdhury

Photo Courtesy: **a, e.** T.K. Paul; **b – d, h.** Gopal Krishna; **f.** K. Karthigeyan; **g.** Anant Kumar

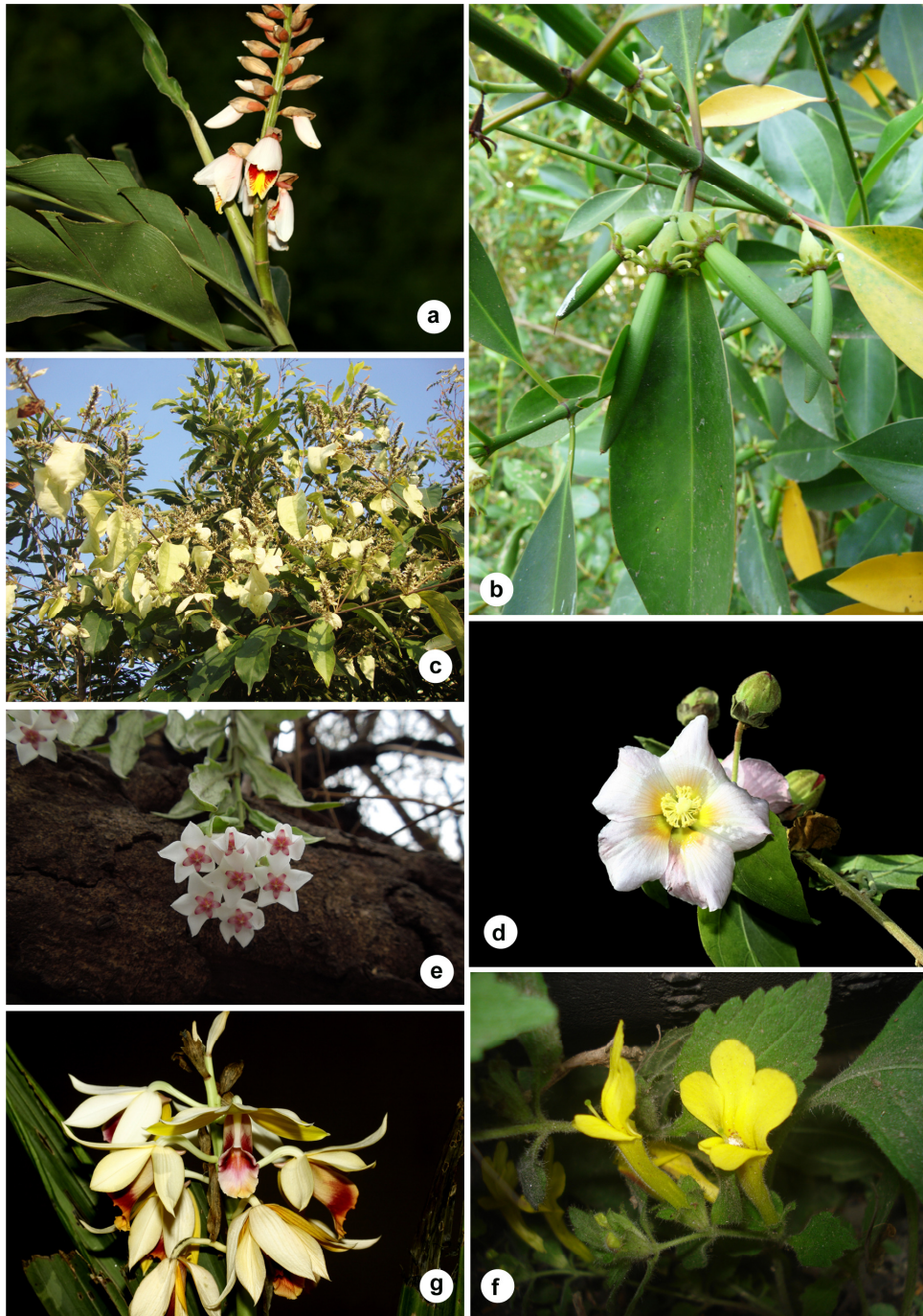


Plate 2: a. *Alpinia malaccensis* (Burm.f.) Roscoe; b. *Brugiera cylindrica* (L.) Bl.; c. *Combretum album* Pers.; d. *Hibiscus fragrans* Roxb.; e. *Hoya acuminata* (Wight) Benth. ex Hook. f.; f. *Lindenbergia hookeri* C.B. Clarke; g. *Phaius tankervilleae* (Banks) Blume

Photo Courtesy: a – b, d, g. K. Karthigeyan; c. Shyam Biswa; e. Gopal Krishna; f. T.K. Paul

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