Indian J. Applied & Pure Bio. Special Volume 40-45 (2021).
Environment & Sustainable Development : Problems, Prospects & Mitigation Date : 25th-27th November, 2021
ISSN: 0970-2091
A web of Science Journal

Rare, Endemic and Threatened Plants of Terai – Duars Belt of West Bengal, India

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Abstract

Being located at the foot of the *Darjeeling* part of the *Eastern Himalayas*, Terai-Duars region is very rich in phytodiversity and unique habitats of a number of rare, endemic and threatened elements. Present study documented a total of 41 species (22 Endemic, 9 Endangered, 2 Near Threatened, 6 Vulnerable and 1 Critically Endangered) belonging to 27 families. Uncontrolled increase in anthropogenic activities leading to destruction and fragmentation of vegetations, invasion of exotic aggressive species were detected as the major threats. Presently replacement of natural forest by economically potent exotic species and their huge plantation has also been added to the list of threats. Thus the present work suggest further extensive study on this RET elements, their population structure and status, major threats to them and to frame the proper conservational strategies.

Terai - Duars belt of West Bengal is the Sub-Himalayan region of the Indian state that extends from Nepal to Assam. Geographically this area is located from 26°16′00″ N to 27°00′00″ N latitudes and from 87°59′30″ E to 89°53′00″ E Longitudes and bordered by Hilly region of Darjeeling district and Bhutan to the North; by Cooch Behar, North Dinajpur and Bangladesh to the South. Botanically, Terai is defined as the region of forest trees. Duars is divided into two distinct types of land forms - plains and undulated areas. The topography of Terai region is uneven and the altitude ranges from 62 to 350 m, whereas that of Duars ranges from 90 to 1750 m. Soil of this marshy Sub-Himalayan belt consists of almost horizontal layers of unconsolidated sand, silt, pebbles and gravels[1]. The entire belt is criss-crossed by a number of the monsoon-swollen Himalayan Rivers, rivulets and streams and encounters mostly of humid subtropical type of climates more or less similar to that of the remaining districts of North Bengal. Due to its proximity to the hills, it faces longer winter and receives heavier rainfall. Average Monthly maximum temperature varies between 23°C – 32°C in January and September respectively whereas the average

monthly minimum temperature ranges from 10°C in January to 24.6°C in September. Sometimes in winter it falls down to 8.5° C. The area receives rainfall almost throughout the year except winter. The maximum amount of rainfall is brought about by the South-West monsoon and is restricted within a period of 103 to 110 days during monsoon.

Terai - Duars of West Bengal is extremely rich in plant resources and its diverse floristic components are greatly influenced by the Himalayan elements. Different type of vegetation in this marshy belt of dense forests and the grasslands are unique home to a large number of endemic and/or threatened plants[8,11,24]. Forests and the Vegetation of Terai-Duars region mainly are of (i) Tropical and Plain Vegetation and (ii) Subtropical vegetation. Both the Terai and Duars region have excellent Savannah type of thick and dense grasslands which supported to develop a number of Wildlife Sanctuary and National Parks in this zone[3]. Different workers[4,19,25] worked on vegetation of Duars. Mohanta[18] prepared a vegetation cover map using remote sensing and GIS and classified the vegetation of Duars as – Semi-evergreen forest, Mixed Sal forest, Sub-tropical broad leaved hill forest, Bamboo brakes, Riverine forest, Forest plantation, Teak plantation, Degraded forest, Savannahs, Scrubs, Grass land, Agriculture, Tea garden etc.

Being diverse and rich in RET elements Darjeeling and Sikkim Himalayan region have been the area of interest for studying the threatened groups and their habitats and most of the studies are restricted mainly to Himalayan region. Terai-Duars belt has been studied for its floristic and ethnobotanical aspects mainly. A few have been done on its rare endemic and threatened elements. So the present piece of work attempted to find and document the rare, endemic and threatened plants of Terai Duars belt along with the threats they face, suitable way for their conservation and restoration of their habitats etc.

Extensive field visits with experienced forest personnel were conducted in three consecutive season of the year (winter, pre monsoon and post monsoon) to record the floral elements of the selected study sites. The voucher specimens were collected, prepared and preserved following Jain & Rao[17]. Identification of the specimens was performed using available literatures. Rare, endemic and threatened elements were recognized with the help of Red Data Book for Indian Flora[1,2,5,6,21-24] Flora of India (Botanical Survey India) and the IUCN guidelines[16] for determination of different classes of threatened plants.

A total of 41 species of plants belonging to 27 families were recorded from the study site (table 1) including 15 species of trees, 12 climbers, 8 herbs and 6 shrubs. Endemic, Endangered (EN), Near Threatened (NT), Vulnerable (V) and Critically Endangered (CR) – these five categories were recorded (figure 1.) and the highest number of species were found to be endemic (22 spp.). Nine species were found to be Endangered (*Alpinia calcarata* (Haw.) Roscoe, *Ampelocissus barbata* (Wall.) Planch., *Asparagus racemosus* Willd., *Celastrus paniculatus* Willd., *Dioscorea prazeri* Prain & Burkill, *Helminthostachys zeylanica* (L.) Desv., *Mucuna pruriens* (L.)

DC., *Rauvolfia serpentina* (L.) Benth. ex Kurz), 6 as Vulnerable, 2 Near Threatened, 1 Critically Endangered and 1 species being endemic as well as Endangered. Regarding the occurrence of species, Vitaceae was found to be represented by highest number of species (EN = 2, endemic = 4). Apocynaceae was represented by 3 species [EN = 2, NT = 1]; Lauraceae with 1 CR species [*Persea glaucescens* (Ness) D.G.Long] and 2 endemic species. One species of Leguminosae was Endemic, 1 Endangered and another species was Vulnerable and thus Leguminosae was also represented by 3 species. Meliaceae and Piperaceae were found to have 2 species each under the RET category. Two species of pteridophytes belonging to Ophioglossaceae were also reported under RET category. CAMP Workshop-2007 also assessed the threatened status of prioritized medicinal plants of West Bengal (mainly from the Terai-Duars region) and assigned the status of Near Threatened (NT) and above[15]. Most of the recorded species are used medicinally and are exploited vigorously which was marked as one of the foremost threats[12]. Darjeeling Himalaya which is an important part of Himalaya Biodiversity Hotspot of Conservation, is rich in endemic floral elements[10,20] as well as in other category of threatened plants[21-23]. Being located at the foot of Himalaya and due to its proximity to the Darjeeling Himalaya, Terai and Duars region also appeared to be populated by a number of endemics and other category of threatened plants thus the study is corroborated by previous workers.[9,13,24] Out of the total recorded plant of RET category 22 were endemic to the Darjeeling Himalayan region or Eastern Himalaya region. As the present study was not a purely florist work, extensive study of the floral elements were not done. Only the elements encountered during the present survey, were considered for determination of RET elements. Thus extensive and complete floristic study must be able to record much more numbers of RET plants from this belt.

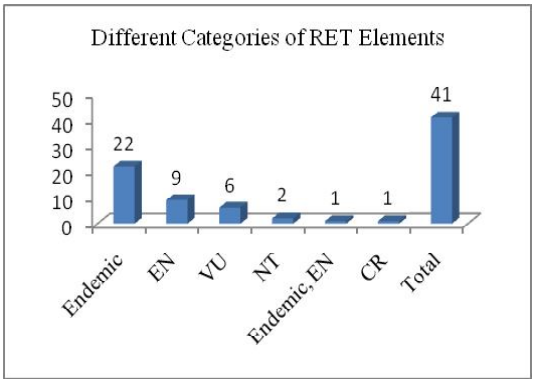

Figure 1. Number of RET plants of differnt categories in Terai-Duars belt.

Uncontrolled increase in anthropogenic activity that led to the destruction and fragmentation of vegetations and invasion of exotic aggressive species like *Parthenium hysterophorus* L., *Lantana camara* L., *Mimosa invisa* Colla, *Tithonia diversifolia* (Hamsl.) A. Gray, *Ageratum houstonianum* Mill. etc. were detected to be the major threats to the flora and vegetation of upper and lower past of Darjeeling Himalaya.[7,10] Similar types of threats were also relevant in the study area. In addition to that, burning of forest floor to facilitate illegal poaching, excessive collection of NTFPs, medicinal plants, grazing in forest floor etc. were some other worst from of threats to the flora, vegetation and ecosystem of the study area. Most of the endangered species were found to be used as food [*Dioscorea prazeri, Helminthostachys*

Annexure :

Table-1. Rare, Endemic and Threatened Elements recorded from Terai-Duars region of West Bengal
[CR = Critically Endangered, EN = Endangered, NT = Near to Threatened, VU = Vulnerable]

Sl. no.	Species [Family]	Habit	Status
1	*Abelmoschus moschatus* Medik. [Malvaceae]	Shrub	Near to Threatened
2	*Aglaia spectabilis* (Miq.) S.S.Jain & S.Bennet [Malvaceae]	Tree	Endemic
3	*Ailanthus integrifolia* Lam. [Simaroubaceae]	Tree	Endemic
4	*Alpinia calcarata* (Haw.) Roscoe [Zingiberaceae]	Herb	Endangered
5	*Ampelocissus barbata* (Wall.) Planch. [Vitaceae]	Climber	Endangered
6	*Ampelocissus sikkimensis* (M.A.Lawson) Planch. [Vitaceae]	Climber	Endemic
7	*Argyreia roxburghii* (Wall.) Arn. ex Choisy [Convolvulaceae]	Climber	Endemic
8	*Aristolochia indica* L. [Aristolochiaceae]	Climber	Vulnerable
9	*Asparagus racemosus* Willd. [Asparagaceae]	Climber	Endangered
10	*Baccaurea ramiflora* Lour. [Euphorbiaceae]	Tree	Endemic
11	*Capparis olacifolia* Hook.f. & Thomson [Capparaceae]	Shrub	Endemic
12	*Casearia vareca* Roxb. [Salicaceae]	Tree	Endemic
13	*Castanopsis lanceifolia* (Roxb.) Hickel & A.Campus [Fagaceae]	Tree	Endemic
14	*Cayratia japonica* (Thunb.) Gagnep. [Vitaceae]	Climber	Endemic
15	*Celastrus paniculatus* Willd. [Celastraceae]	Climber	Endangered
16	*Desmodium motorium* (Houtt.) Merr. [Leguminosae]	Herb	Vulnerable
17	*Dioscorea prazeri* Prain & Burkill [Dioscoreaceae]	Climber	Endangered
18	*Garuga floribunda* Decne. [Burseraceae]	Tree	Endemic
19	*Gloriosa superba* L. [Colchicaceae]	Climber	Vulnerable
20	*Gynocardia odorata* R.Br. [Achariaceae]	Tree	Endemic, Endangered
21	*Helminthostachys zeylanica* (L.) Desv. [Ophioglossaceae]	Herb	Endangered
22	*Leea aequata* L. [Vitaceae]	Shrub	Endemic
23	*Leea indica* (Burm.f.) Merr. [Vitaceae]	Shrub	Endemic
24	*Litsea panamanja* (Buch.-Ham. ex Nees) Hook. f. [Lauraceae]	Tree	Endemic
25	*Litsea salicifolia* (J. Roxb. ex Nees) Hook. f. [Lauraceae]	Tree	Endemic
26	*Mucuna pruriens* (L.) DC. [Leguminosae]	Tree	Endangered
27	*Ophioglossum reticulatum* L. [Ophioglossaceae]	Herb	Endangered
28	*Pericampylus glaucus* (Lam.) Merr. [Menispermaceae]	Climber	Vulnerable
29	*Persea glaucescens* (Ness) D.G.Long [Lauraceae]	Tree	Critically Endangered
30	*Piper chuvya* Miq. [Piperaceae]	Herb	Endemic
31	*Piper sylvaticum* Roxb. [Piperaceae]	Herb	Endemic

32	*Polyalthia simiarum* (Buch.-Ham. ex Hook.f. & Thomson) Benth. ex Hook.f. & Thomson [Annonaceae]	Tree	Endemic
33	*Psychotria erratica* Hook.f. [Rubiaceae]	Herb	Endemic
34	*Pueraria sikkimensis* Prain [Leguminosae]	Climber	Endemic
35	*Rauvolfia serpentina* (L.) Benth. ex Kurz [Apocynaceae]	Herb	Endangered
36	*Sauropus quadrangularis* (Willd.) Müll.Arg. [Phyllanthaceae]	Shrub	Endemic
37	*Stereospermum tetragonum* DC. [Bignoniaceae]	Tree	Vulnerable
38	*Syzygium kurzii* (Duthie) N.P.Balakr. [Myrtaceae]	Tree	Endemic
39	*Tetrastigma campylocarpum* (Kurz) Planch. [Vitaceae]	Shrub	Endemic
40	*Toona ciliata* M.Roem. [Meliaceae]	Tree	Vulnerable
41	*Tylophora indica* (Burm.f.) Merr. [Menispermaceae]	Climber	Near to Threatened

zeylanica, Mucuna pruriens] and medicines [*Ampelocissus barbata, Asparagus racemosus, Celastrus paniculatus, Rauvolfia serpentina* (L.) Benth. ex Kurz)] or both [*D. prazeri, H. Zeylanica, M. pruriens*]. Presently replacement of natural forest by economically potent exotic species and their huge plantation has also started to threaten the plant wealth and diverse vegetation of this belt.

Diverse and varied habitats of Terai-Duars belt of West Bengal are home to the unique vegetation and a number of rare, endemic and threatened elements. Being in front of multifaceted threat complex their populations are declining in an alarming rate. Though the forest departments have taken initiative to protect these plant resources by establishment of Medicinal Plants Conservation Areas (MPCA) in this belt but their objective is restricted only to the medicinal plants and their habitats. A number of medicinal as well as non-medicinal or medicinally less known threatened plants are there outside MPCAs which are but still lacking conservational attention. Thus the present study recommend further study on the RET elements, their population structure and status, habitats, different forms of threats etc. and to frame proper conservation strategies including Biodiversity-Conservation educational and awareness camp among the fringe dwellers.

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