

Floristic Diversity and Threat Status in Pilibhit Tiger Reserve, Uttar Pradesh

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Citation: Rajesh Kumar Sonkar, Pratibha, Shubham Kumar, Atul Kumar Anand, and Alka Kumari (2025). Floristic Diversity and Threat Status in Pilibhit Tiger Reserve, Uttar Pradesh. *Environmental Reports; an International Journal*.

DOI: <https://doi.org/10.51470/ER.2025.7.1.129>

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Received 12 March 2025 | Revised 10 April 2025 | Accepted May 17 2025 | Available Online June 15 2025

ABSTRACT

The forests of Pilibhit district, which is a part of the Rohilkhand division in the Indian state of Uttar Pradesh, are home to the Indo-Nepal sub-Himalayan international border region within the Pilibhit Tiger Reserve. The Tharu tribal community resides in the region. Angiospermic plant species found in the Pilibhit Tiger Reserve were surveyed; 123 species from 56 families and 101 genera were found. Six of these are monocots, and 117 are dicotyledons. With 13 species, the family Asteraceae had the most, followed by Poaceae with 6, Amaranthaceae with 5, and Malvaceae with 5. According to the survey data, 58 species were herbs, 8 were shrubs, and 5 were climbers. The survey data showed that herbs accounted for 58 species, under shrubs 8 species, shrubs 21 species, climbers 5 species, trees 21 species, sedge 4 species, and grasses 6 species were represented.

Keywords: Indo-Nepal sub-Himalayan, Diversity, P.T.R., Uttar Pradesh.

INTRODUCTION

India is recognized as one as of the 17 mega biodiverse countries in the world, ranking 7th in terms of biodiversity. Uttar Pradesh, covering about 2,40,928km², is among the largest states in India. However, its recorded forest cover is only around 16,583 km², - roughly 7% of its total geographical area since most of the land is occupied by agricultural lands and human populations [5]. To conserve its biodiversity, the state has set up 23 wildlife sanctuaries and a national park [5, 6].

Pilibhit, the north-easternmost district of Rohilkhand division, lies in the sub-Himalayan belt along the Nepal border. In 2014, the Government of Uttar Pradesh declared the forests of Pilibhit Division along with parts of Shahjahanpur, as Pilibhit Tiger Reserve. Covering the area of 73024.98 ha, the reserve includes 60279.80 ha of the core area and 2745.18 ha of buffer zone. It comprises of five ranges, Mala, Mahof, Barahi, Haripur, and Deoria along with part of the Khutar range forming a single protected area. The Tiger Reserve is situated in the Terai landscape, which is known for salforests, tall grasslands and swamps sustained by seasonal flooding, but considered the most threatened ecosystems in India. The headquarters of the reserve is located in the Pilibhit district. The climate of the region varies from an average winter minimum of around 5°C to summer highs 40-44°C with an average annual rainfall of about 612.59 mm. A maximum of 43 C in summer with relative humidity ranging from 49 to 67 % in different seasons. There is a great variation in annual rainfall and also in the number of rainy days in a year. The rainfall and productive alluvial soil are the main factors that control the distribution of variable forests like evergreen, deciduous, grassland and swamp types on which tribal and rural people, directly and indirectly, depend for their livelihood. Several villages from all sides also surround the forest area. Therefore, in this study, the whole protected area was selected to document the complete naive angiospermic plant diversity along with cultivated species.

MATERIALS AND METHODS

Study Area

The study was carried out mainly in the forests of Pilibhit district surrounding the Pilibhit Tiger Reserve. Tharu is the main tribal community living in and around dense forest areas. Geographically, Pilibhit is located between 28 54' N-28 60' 0 0 N latitude and 79 37' E-88 27' E longitude, covering an area of 3765.7 sq km, of which nearly 23 % (roughly 310 sq km) consists of natural forest. The region lies along the Indo-Nepal sub-Himalayan International border and experiences temperatures ranging from 0-10 °C in winter (Fig 1).

Plant specimens were collected and processed for herbarium preparation and further studies [1]. Identification of collected plant specimens was carried out with the help of standard literature and published flora [2] and preserved according to standard herbarium techniques. During the field survey, plants were collected in the flowering stage, with details such as plant habit and local name recorded. Plant samples were collected from different habitats across the reserve to comprehensively document all angiospermic species present in the study area.

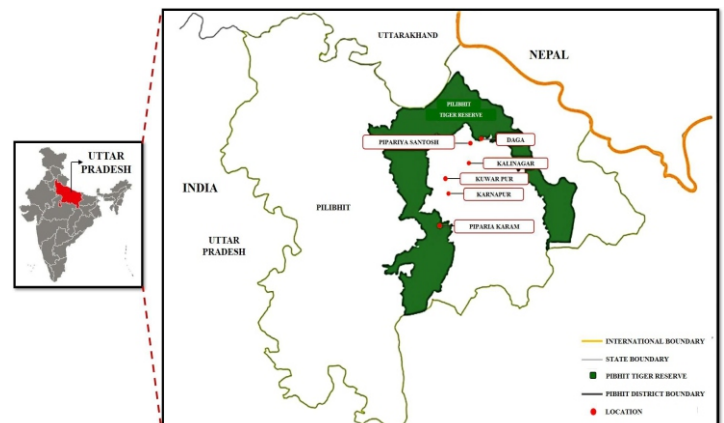


Figure 1. Map of Pilibhit Tiger Reserve, Uttar Pradesh, India

RESULTS AND DISCUSSION

This study aims to document angiospermic flora of Pilibhit Tiger Reserve, recording a total of 123 species distributed across 56 families and 101 genera. Plants are enumerated alphabetically in the table along with their species names and families (Table 1).

Table 1. Diversity of angiospermic plants in pilibhit tiger reserve

S.N.	FAMILY	PLANT'S NAME	LIFE FORM	IUCN STATUS
1.	Acanthaceae	<i>Andrographis paniculata</i>	H	NE
		<i>Dicliptera paniculata</i>	H	NE
		<i>Ruellia tuberosa</i>	H	NE
2.	Aleaceae	<i>Nyctanthes arbortristis</i>	S	LC
3.	Amaranthaceae	<i>Alternanthera pungens</i>	H	NE
		<i>Alternanthera ficoidea</i>	H	NE
		<i>Celosia argentea</i>	H	LC
		<i>Digera muricata</i>	H	NE
		<i>Gamphrena serrata</i>	H	NE
4.	Anacardiaceae	<i>Semecarpus anacardium</i>	T	LC
5.	Araceae	<i>Acorus calamus</i>	H	LC
6.	Annonaceae	<i>Annona squamosa</i>	T	LC
7.	Asclepiadaceae	<i>Calotropis gigantea</i>	S	NE
		<i>Calotropis procera</i>	S	LC
8.	Asteraceae	<i>Bidens pilosa</i>		
		<i>Blumea eriantha</i>	H	NE
		<i>Blumea lacera</i>	H	NE
		<i>Echinops echinatus</i>	H	NE
		<i>Eclipta prostrata</i>	H	NE
		<i>Erigeron canadensis</i>	H	LC
		<i>Galinosoga parviflora</i>	H	NE
		<i>Grangeama diraspatana</i>	H	NE
		<i>Parthenium hysterophorus</i>	H	NE
		<i>Sonchus asper</i>	H	NE
		<i>Tridax procumbens</i>	H	NE
		<i>Tridax procumbens</i>	H	LC
		<i>Ageratum conyzoides</i>	H	NE
		<i>Ageratum conyzoides</i>	H	NE
		<i>houstonianum</i>		
9.	Balsaminaceae	<i>Impatiens balsamina</i>	H	NE
10.	Boraginaceae	<i>Cordia macleodii</i>	T	LC
11.	Caesalpinaceae	<i>Senna obtusifolia</i>	US	LC
		<i>Senna occidentalis</i>	US	LC
		<i>Senna tora</i>	H	NE
		<i>Cassia fistula</i>	T	LC
12.	Celastraceae	<i>Celastrus paniculatus</i>	S	NE
13.	Cleomaceae	<i>Cleome gynandra</i>	H	NE
		<i>Cleome viscosa</i>	H	NE
14.	Convolvulaceae	<i>Ipomoea carnea</i>	S	NE
		<i>Ipomoea eriocarpa</i>	H	NE
		<i>Ipomoea pestigridis</i>	H	NE
15.	Cucurbitaceae	<i>Momordica dioica</i>	CL	NE
		<i>Trichosanthes tricuspidata</i>	CL	NE
16.	Cuscutaceae	<i>Cuscuta reflexa</i>	CL	LC
17.	Cyperaceae	<i>Cyperus difformis</i>	SG	LC
		<i>Cyperus iria</i>	SG	LC
		<i>Cyperus rotundus</i>	SG	LC
		<i>Cyperus articulatus</i>	SG	NE
18.	Dipterocarpaceae	<i>Shorea robusta</i>	T	LC
19.	Euphorbiaceae	<i>Chrozophora rottleri</i>	H	NE
		<i>Phyllanthus tenellus</i>	H	NE
		<i>Euphorbia hirta</i>	H	NE
		<i>Euphorbia cyathophora</i>	US	NE
		<i>Mallotus philippensis</i>	T	LC
20.	Fabaceae	<i>Bauhinia variegata</i>	T	NE
		<i>Buchanania lanzan</i>	T	LC
		<i>Butea frondosa</i>	T	NE
		<i>Cajanus cajan</i>	S	NE
		<i>Mimosa pudica</i>	S	LC
		<i>Phyllodium pulchellum</i>	S	LC
		<i>Tamarindus indica</i>	T	LC
21.	Garryaceae	<i>Aucuba japonica</i>	S	NE
22.	Gentianaceae	<i>Enicostema littorale</i>	H	NE
23.	Guttiferae	<i>Mesua ferrea</i>	T	VU
24.	Hydroleaceae	<i>Hydrolea zeylanica</i>	H	LC
25.	Hypoxidaceae	<i>Curculigo orchiodes</i>	H	NE

26.	Lamiaceae	<i>Clerodendrum indicum</i> <i>Origanum ajorana</i>	US S	NE NE
27.	Lythraceae	<i>Lawsonia inermis</i>	S	LC
28.	Meliaceae	<i>Melia azedarach</i>	S	LC
		<i>Azadirachta indica</i>	T	LC
29.	Malvaceae	<i>Sida acuta</i>	H	NE
		<i>Urena lobata</i>	H	LC
		<i>Helicteres baruensis</i>	H	LC
		<i>Sterculia apetala</i>	H	LC
		<i>Abutilon indicum</i>	H	NE
30.	Menispermaceae	<i>Tinospora cordifolia</i>	CL	NE
		<i>Tiliacora racemosa</i>	CL	NE
31.	Mimosaceae	<i>Mimosa pudica</i>	H	LC
		<i>Prosopis juliflora</i>	T	LC
		<i>Acacia farnesiana</i>	T	LC
32.	Moraceae	<i>Morus alba</i>	T	LC
		<i>Ficus bengalensis</i>	T	NE
		<i>Ficus glomerata</i>	T	NE
		<i>Grewia optiva</i>	T	LC
33.	Muntingiaceae	<i>Muntingia calabura</i>	T	LC
34.	Myrtaceae	<i>Callistemon lanceolatus</i>	S	NE
		<i>Eucalyptus globules</i>	T	NE
35.	Nyctaginaceae	<i>Mirabilis jalapa</i>	H	NE
36.	Oxalidaceae	<i>Oxalis corniculata</i>	US	NE
37.	Papaveraceae	<i>Argemone mexicana</i>	H	NE
38.	Papilionaceae	<i>Crotalaria pallid</i>	US	NE
		<i>Crotalaria retusa</i>	US	NE
		<i>Melilotus albus</i>	H	LC
		<i>Sesbania bispinosa</i>	H	LC
39.	Plantaginaceae	<i>Plantago albicans</i>	H	NE
		<i>Scoparia dulcis</i>	H	NE
40.	Poaceae	<i>Chloris barbata</i>	G	NE
		<i>Eragrostis unioloides</i>	G	LC
		<i>Saccharum munja</i>	G	NE
		<i>Avena fatua</i>	G	LC
		<i>Echinochloa colona</i>	G	LC
		<i>Saccharum spontaneum</i>	G	LC
41.	Pontederiaceae	<i>Eichhornia crassipes</i>	H	NE
42.	Portulacaceae	<i>Portulaca oleracea</i>	H	LC
		<i>Portulaca quadrifida</i>	H	LC
43.	Premulaceae	<i>Anagalis arvensis</i>	H	NE
44.	Rhamnaceae	<i>Zizyphus oenoplia</i>	S	NE
45.	Rubiaceae	<i>Spermacoce hispida</i>	H	NE
46.	Rutaceae	<i>Feronia limonia</i>	T	NE
47.	Sapindaceae	<i>Sapinadus mukorossi</i>	T	NE
48.	Scrophulariaceae	<i>Veronica angallis</i>	H	LC
49.	Solanaceae	<i>Solanum americanum</i>	H	NE
		<i>Solanum torvum</i>	S	NE
		<i>Nicotiana</i>	H	NE
		<i>plumbaginifolia</i>	H	NE
50.	Sterculiaceae	<i>Waltheria indica</i>	US	LC
		<i>Helicteres isora</i>	S	LC
51.	Tiliaceae	<i>Corchorus tridens</i>	H	NE
52.	Typhaceae	<i>Typha angustifolia</i>	H	LC
53.	Verbenaceae	<i>Lantana camara</i>	S	NE
54.	Vitaceae	<i>Cyphostemma juttiae</i>	S	LC
		<i>Vitex negundo</i>	S	LC
55.	Zingiberaceae	<i>Alpinia zerumbet</i>	S	DD
		<i>Curcuma longa</i>	H	DD
56.	Zygophyllaceae	<i>Tribulus terrestris</i>	H	LC

H=Herb, S=Shrub, US=Undershrub, CL=Climber, T=Tree, SG=Sedge, G=Grass

Dicotyledons are represented by 117 species and monocotyledons by 6 species. The highest species representation was recorded in the family Asteraceae (13 species), followed by Poaceae (06), Amaranthaceae (05), and Malvaceae (05). The data revealed that herbs contributed for 58 species, undershrubs 8 species, shrubs 21 species, climbers 5 species, trees 21 species, along with 4 sedge species, and 6 grass species. The above data also reveals that amongst the most dominating families, 50 species have widespread and abundant distribution assessed under LC categories, 70 species are under NE, 2 species are under DD and 1 species is under VU (Table 1). Herbalists and experienced rural people also provide very interesting and meaningful information about many angiospermic flora. They helped us in the collection of these plants growing near them.

In this process of gathering information, the selection of informants was done randomly to fill in the questionnaire. Tharu tribal people are well-cultured and have deep faith in the supernatural powers of certain wild plants which are associated with taboos, safety from evil powers and protection from different diseases. The Tharu community utilizes various plant parts like roots, stems, leaves, fruits, and seeds in contact-based therapies to treat a range of ailments. This practice of specific alkaloids present in those plant parts. Following our colleagues' critical examination, a survey of literature and an account of naive and introduced plant species has been incorporated here, from which the species are listed. These species include 4 trees belonging to family Guttiferae, Mimosaceae, Moraceae, Muntingiaceae, Rutaceae etc. and 21 shrubs belonging to family Vitaceae, Rhamnaceae, etc. (TABLE 1). Among different families in dicots, *Alternanthera pungens*, *Zizyphus oenoplia*, *Solanum americanum*, *Lantana camara*, *Tribulus terrestris*, etc., are Asteraceae of the dominant family in the forest. These plants are present in the field, *Blumea lacera*, *Eclipta prostrata*, *Parthenium hysterophorus*, *Ageratum conyzoides* etc. As agricultural lands and numerous villages border the forest, a variety of ornamental and cultivated species are commonly found within it. Moreover, the forest department introduces non-naive ornamentals around rest houses and along roadsides to enhance the aesthetic appeal of the protected area.

CONCLUSION

A review of the available literature indicates that, apart from a few earlier works by Duthie [3] and Kanjilal [4], very limited research has been conducted on the taxonomy and distribution of angiosperms in the Pilibhit forest. There is a need to conserve and document this generation's knowledge from extinction due to one or more reasons, like the untimely unavailability of wild plants (birva) due to over-exploitation or an uninterested young generation, or due to legislative constraints. For the said purpose, it has been concluded with the request of scientific exploration, experimentation and documentation of this traditional knowledge for the generations to come.

ACKNOWLEDGEMENTS

The authors thank the Head of the Department, Botany, University of Lucknow, Lucknow, for their constant support, facilities, and encouragement. As this research paper is on the information obtained from various books, chapters, and research papers/articles in National and International publications, so the library staff are also acknowledged for their help during the study.

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