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LISTS OF SPECIES

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Tree species of the Himalayan Terai region of Uttar Pradesh, India: a checklist

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Abstract: The study catalogues a sum of 278 tree species belonging to 185 genera and 57 families from the Terai region of Uttar Pradesh. The family Fabaceae has been found to exhibit the highest generic and species diversity with 23 genera and 44 species. The genus *Ficus* of Moraceae has been observed the largest with 15 species. About 50% species exhibit deciduous nature in the forest. Out of total species occurring in the region, about 63% are native to India. Almost all tree species have some importance in one and another way for the local people. In the study area about 80 species flower in the spring, 74 in the summer, 73 in the winter and 30 in rainy season. As per the existing IUCN Red List, 24 species of the area fall under different categories. Presence of these red listed trees in the study area enhances the importance of their proper management and conservation plan.

Key words: trees, Terai region, phenology, economic importance, Uttar Pradesh

INTRODUCTION

Trees are not only the major components of the forest and the vital part of our ecosystem, rather they also provide shelter to lower organisms as well as wildlife, act as environment protector, reduce the pollutants and provide a number of useful things such as timber, fuel, fodder, food, medicine, charcoal, gum, resins, rubber, pulp for paper etc. for human beings in day to day life. Many natural habitats are under threat and the species within them face potential extinction. The trees are fast disappearing and genetic diversity in tree species has become more vulnerable than other plant species (Tripathi et al. 2013). Thus it is imperative to document and conserve the tree flora of any area before they become threatened and lost. For any conservation programme of the tree species and their sustainable use and management, the proper assessment of the diversity of tree species are highly needed (Chaudhary et al. 2014). The information on phenology, uses, native origin, and vegetation type of the tree species provide more scope of such type of assessment study in the field of sustainable management, conservation strategies and climate change etc. In the present study, the Terai region of Uttar Pradesh has been selected for the assessment of tree species as it consists of considerable number of species and has not been worked out during the recent time.

The low lying land stretch in the north of Indo-Gangetic Plain along the foothills of Central Himalaya is known as 'Terai' (Chauhan et al. 2010). The similar region below the foothills of eastern Himalaya is distinguished from the Terai and is termed as 'Dooars' (Rodgers et al. 2002). It is dispersed in three Northern Indian States namely Uttarakhand, Uttar Pradesh and Bihar and the southern Nepal (Rodgers et al. 2002). It forms an ecotone where the Sub-Himalayan foothills encounter the plain region. Due to the edge effect this region exhibits the vegetation of both the contiguous regions and becomes one of the highly diverse regions of the country (Shukla 2009) and is one of the most diverse eco-regions of the world (De 2001; Kumar et al. 2002).The region covers a geographical area of ca. 92,911 km² with a forest cover of ca. 8,108 km² (Anonymous 2008). About 68% forest cover (5,501 km²) of this region comes under the boundary of Uttar Pradesh covering 21 districts (Anonymous 2008; Jha 2007).

The information about the tree diversity of the Terai region is available in scattered form through various publications (Duthie 1903; Brandis 1906; Kanjilal 1933; Panigrahi et al. 1969; Srivastava 1976; Singh 1997; Saini 2005; Maliya and Datt 2010; Mishra and Pal 2010; Kishor et al. 2011; Kumar et al. 2011; Maliya 2011, 2012; Bajpai et al. 2012a, 2012b, 2014; Behera et al. 2012; Mishra et al. 2013; Chaudhary et al. 2014). All the information

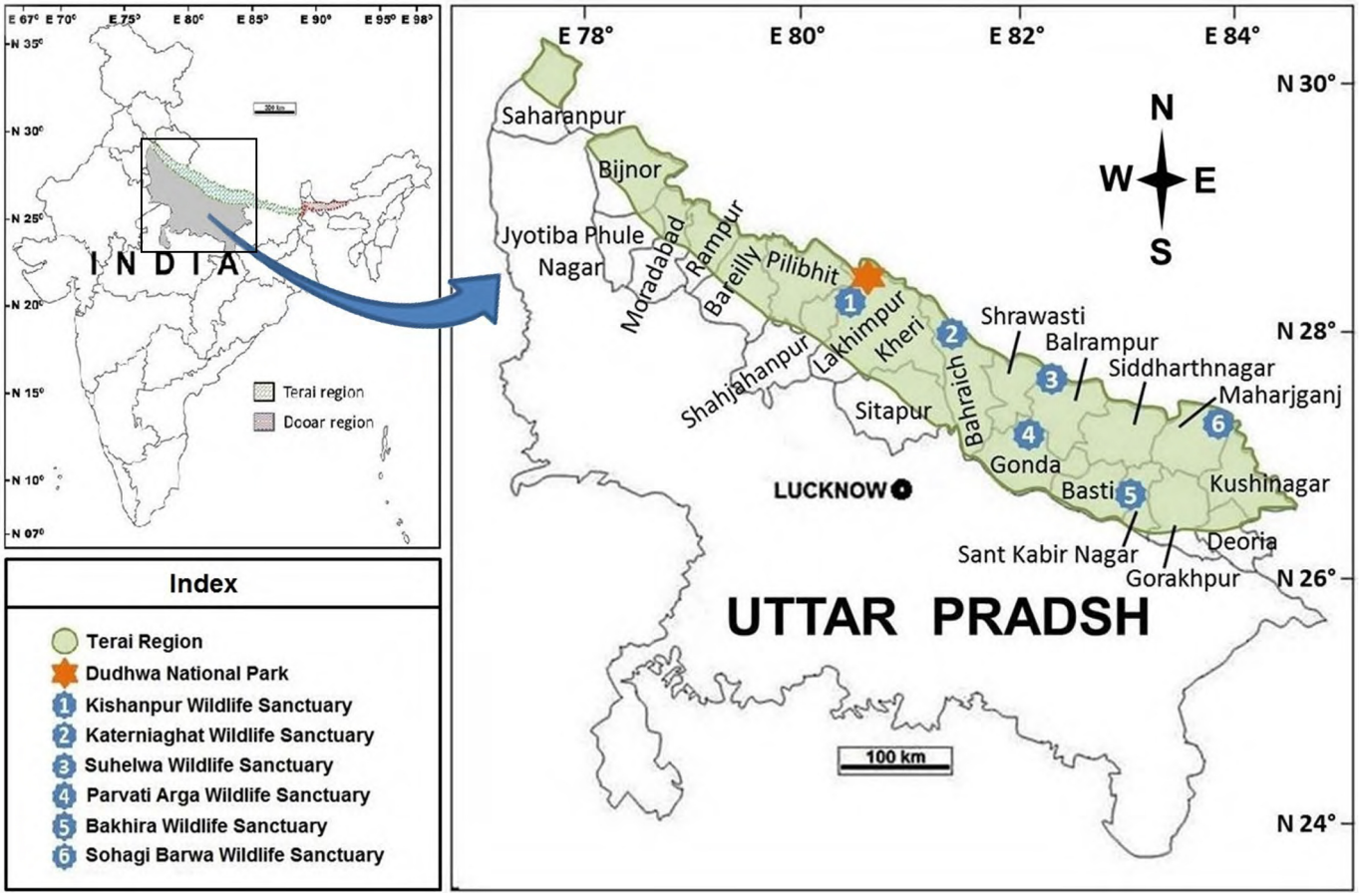

Figure 1. Study site in the Terai region of Uttar Pradesh, India.

pertain either to small areas or have become out dated due to changes in nomenclature, distribution and circumscription of various taxa. Therefore, the present study is a cumulative effort that includes review on the existing literature, herbarium specimens housed at Botanical Survey of India, Central circle, Allahabad (BSA), Birbal Sahni Institute of Palaeobotany, Lucknow (BSIP), Central Drug Research Institute, Lucknow (CDRI), National Botanical Research Institute, Lucknow (LWG) and collections made in the present study to prepare a checklist of tree species from the Terai region. The study will provide baseline information for floristic diversity assessments and updating flora in future.

MATERIALS AND METHODS

Study area

The Terai region in Uttar Pradesh spreads from Saharanpur to Deoria covering 21 districts of the State (Jha 2007). It is situated between 28°45′–26°15′ N and 079°51′–084°24′ E as a 30–50 km wide and ca. 1,670 km long strip with the elevation ranging between 100–300 m. For the safeguard of the biodiversity, one national park and six wildlife sanctuaries have been declared in this region (Figure 1). The study area comes under the monsoon type of climate which witness three different seasons: winters (November–February), summers (April–June) and rains (July–September) with one month spring (March) and autumn (October). The mean minimum temperature varies from 4–5°C in December–January and maximum 40–45°C in May–June. The average annual rainfall varies from 1,085–1,228 mm. The Terai region comes under the tropical moist deciduous type of vegetation (Champion and Seth 1968; Rodgers and Panwar 1988) which can be further divided into following forest types: Sal forest, miscellaneous forest, teak plantation and savannah grasslands (Bajpai et al. 2012b; Behera et al. 2012). The grass lands are chiefly located in the core zone of the forests. The teak plantation was used to fill the gaps within the forest in this region about 20–30 years ago, which has been now become naturalized in many areas by the regeneration of other associate species such as *Mallotus philippensis* (Lam.) Muell.-Arg., *Bridelia retusa* (L.) A. Juss., *Miliusa tomentosa* (Roxb.) Sinclair, *Murraya koenigii* (L.) Spreng., *Holarrhena pubescens* (Buch.-Ham.) Wall.ex G. Donetc.

Diversity assessment and data collection

The entire study area has been explored comprehensively to collect and document the tree diversity during the years 2011–2013. The plant specimens were randomly collected from the aforesaid vegetation types. The herbarium specimens have been prepared following Lawrence (1951) and Jain and Rao (1977) and were deposited at LWG. The identification of the species has been done with the

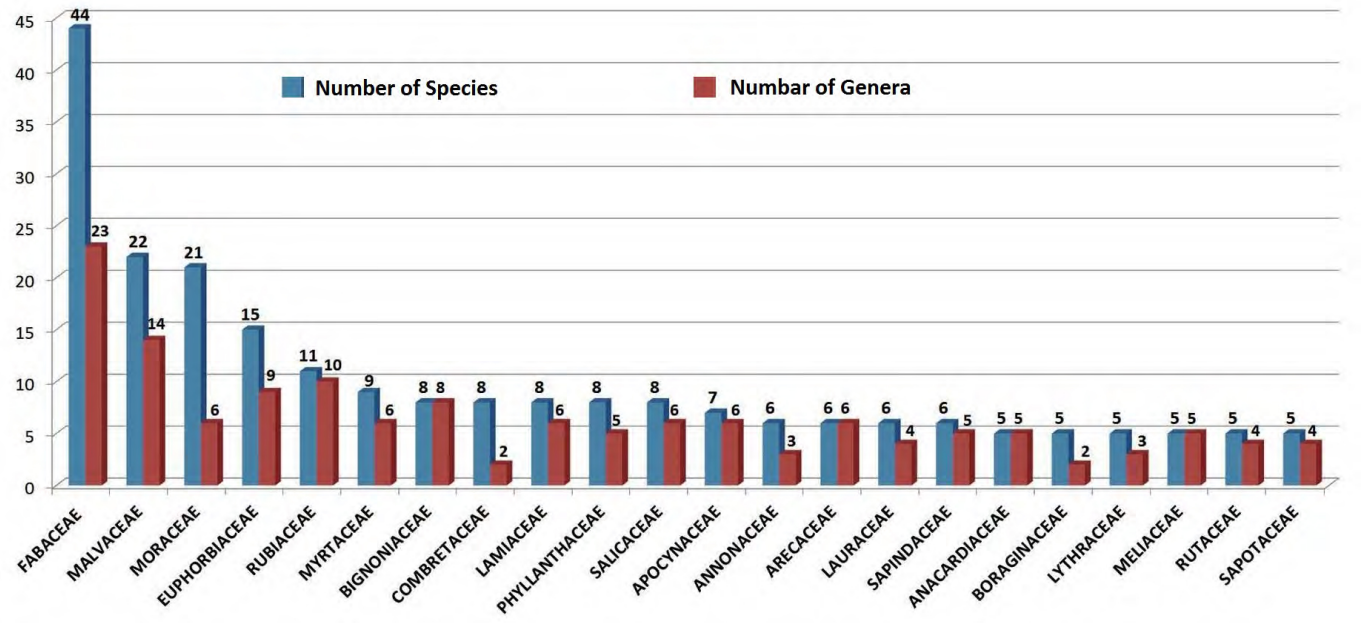

Figure 2. Dominant families with corresponding number of species and genera.

help of regional floras and existing literature. The earlier collections housed at BSA, BSIP, CDRI and LWG have also been observed for the proper assessment of the tree diversity of the study area. Different online databases such as GRIN, IPNI, ILDIS, The Plant list, TROPICOS, e-floras etc. have been used for the correct and updated nomenclature of the species. The flowering and fruiting behaviours (phenology) of the species have been assessed by seasonal visits as well as with the help of other (Saini 2005; Maliya and Datt 2010; Mishra and Pal 2010; Kumar et al. 2011; Maliya 2011, 2012; Bajpai et al. 2012a; Chaudhary et al. 2014) regional work. The deciduousness and ever greenness of the species has also been noticed during these visits. The economic values of the species have been assessed by interviewing the local *Tharu* tribal persons as well as from published work from the area. The native orgin of the species has also been traced out with the help of different available on-line data bases (http://www.flowersofindia.net; http://www.efloras.org; http://www.ipni.org; http://www.worldagroforestrycentre.org). In the checklist, the plants whose, herbarium specimens have not been seen, the references of the previous reports have been cited to know the source of occurrence of the species in the study area.

RESULTS

The present analysis includes 278 tree species under 185 genera of 57 families from the Terai region of the Uttar Pradesh. Each species has been provided with phenology, economic importance, native origin, vegetation type, vernacular name and collection number/references (Table 1). Fabaceae has been found as the largest family representing 44 species under 23 genera. Twenty

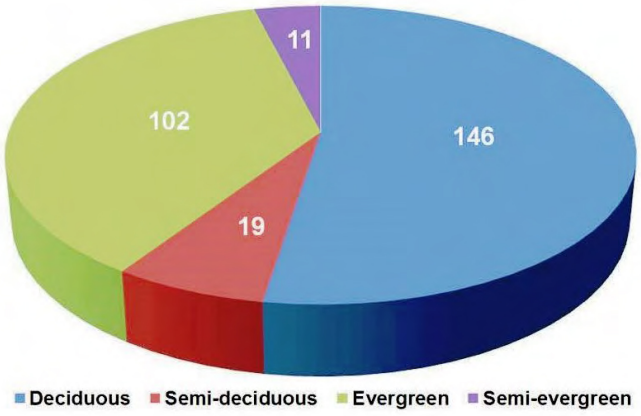

Figure 3. Number of species distributed across different vegetation types.

families (Araliaceae, Capparaceae, Casuarinaceae, Celastraceae, Dipterocarpaceae, Loganiaceae, Olacaceae, Oxalidaceae, Pandanaceae, Pittosporaceae, Primulaceae, Proteaceae, Putranjivaceae, Rhizophoraceae, Sabiaceae, Santalaceae, Simaroubaceae, Symplocaceae, Urticaceae, Verbenaceae) are represented by only single species and genus (Figure 2). About 146 species show the deciduous nature followed by 102 evergreens, 19 semi-deciduous and 11 semi-evergreen species (Figure 3). The area encompasses about 63% (177) species native to India. This clearly reflects that the Terai region has its own natural diversity which supports the stable ecosystem with well adaptability for the area. The remaining species belong to Asian, American, African or Australian origin (Figure 4). The present documentation also recognizes the importance of tree species, as about 204 have been observed to be used for medicinal purposes in different human ailments. Similarly, 90 tree species

Table 1. List of tree species with their phenology, economic importance, native origin, vegetation type, vernacular name and collection number/reference.

Sp. No.	Botanical Name	Phenology	Economic Importance	Native Origin	Vegetation Type	Vernacular Name	Collection No./Reference
DICOTYLEDONS							
Anacardiaceae							
1	*Buchanania cochinchinensis* (Lour.) Almeida	Feb. – May	Seed edible, medicinal	India	Semi-deciduous	Chirongi	*Mishra* 7942 (BSA)
2	*Lannea coromandelica* (Houtt.) Merr.	Mar. – Jun.	Local timber, medicinal	India	Deciduous	Jhingan	*Kumar* and *Bajpai* 252198 & 252248 (LWG)
3	*Mangifera indica* L.	Feb. – Jul.	Fruits edible, medicinal, timber wood	India	Evergreen	Aam	*Bajpai* et al. 263733 (LWG)
4	*Semecarpus anacardium* L. f.	Apr. – Oct.	Medicinal, timber wood	India	Deciduous	Bhilawa	*Bajpai* and *Chaudhary* 264456 (LWG)
5	*Spondias pinnata* (J. Koenig ex L. f.) Kurz.	Mar. - Aug.	Medicinal, light wooden work	South-East Asia	Deciduous	Ambara	*Kumar* et al. 263620; *Chaudhary* et al. 252282 (LWG)
Annonaceae							
6	*Annona reticulata* L.	May – Jan.	Fruits edible, medicinal	Central America & West Indies	Semi-deciduous	Ramphal	Kanjilal (1933)
7	*Annona squamosa* L.	Apr. – Jan.	Fruits edible, medicinal	Central America & West Indies	Semi-deciduous	Sharifa	*Kumar* et al. 263615 (LWG)
8	*Miliusa tomentosa* (Roxb.) Sinclair	Apr. – Jul.	Fruits edible, medicinal	Indian Subcontinent	Deciduous	Kari	*Kumar* and *Bajpai* 250620 & 250627; *Kumar* and *Bajpai* 252280 (LWG)
9	*Miliusa velutina* (Dunal) Hook. f. & Thoms.	Mar. – Aug.	Fruits edible, medicinal, local timber wood	Tropical Asia	Deciduous	Bari kari	*Bajpai* and *Chaudhary* 264499 (LWG)
10	*Polyalthia longifolia* (Sonner.) Thw.	Apr. – Sep.	Ornamental, medicinal	South India & Sri Lanka	Evergreen	Ashok	*Kumar* and *Bajpai* 252269 (LWG)
11	*Polyalthia suberosa* (Roxb.) Thwaites	Apr. – Sep.	Ornamental, medicinal	Indian Subcontinent	Evergreen	Barachali	*Chaudhary* et al. 250245 (LWG)
Apocynaceae							
12	*Alstonia scholaris* (L.) R. Br.	Nov. – Jun.	Ornamental & avenue tree, medicinal	Indian Subcontinent	Evergreen	Saptparni	*Bajpai* et al. 263719 (LWG)
13	*Calotropis gigantea* (L.) Dryand.	Dec. – Aug.	Religious, medicinal, fibre	Indian Subcontinent	Evergreen	Safed Madar	*Bajpai* and *Chaudhary* 264478 (LWG)
14	*Carissa carandas* L.	Mar. – Jul.	Fruits edible, medicinal	Indian Subcontinent	Deciduous	Karaunda	*Bajpai* and *Chaudhary* 264427 (LWG)
15	*Cascabela thevetia* (L.) Lippold	Most part of the year	Ornamental tree, medicinal	Tropical America	Evergreen	Pila Kaner	*Bajpai* and *Chaudhary* 264455 (LWG)
16	*Holarrhena pubescens* (Buch.-Ham.) Wall. ex G. Don	May – Feb.	Firewood, medicinal	Native of India	Deciduous	Dudhi	*Kumar* and *Bajpai* 250604 (LWG)
17	*Wrightia arborea* (Dennst.) Mabberley	Apr. – Dec.	Ornamental tree, medicinal	South-East Asia	Deciduous	Dharauli	*Maliya* 224667 & 225225 (LWG)
18	*Wrightia tinctoria* R. Br.	Mar. – Dec.	Medicinal	India & Myanmar	Deciduous	Kapar	Saini (2005)
Araliaceae							
19	*Heteropanax fragrans* (Roxb.) Seem.	Oct. – Apr.	Medicinal, timber wood	North-East Asia	Evergreen	Tarla	Duthie (1903); Kanjilal (1933)
Bignoniaceae							
20	*Fernandoa adenophylla* (Wall. ex G. Don) Steenis	Sep. – Feb.	Wood	Myanmar	Deciduous	Katsagon	Srivastava (1976); Saini (2005)
21	*Jacaranda mimosifolia* D. Don	Mar. – Oct.	Ornamental tree, medicinal	Brazil	Deciduous	Nili Gulmohar	*Chaudhary* et al. 252285 (LWG)
22	*Kigelia africana* (Lamk.) Benth.	Mar. – Dec.	Medicinal, timber wood	Africa	Deciduous	Balamkhira	*Bajpai* et al. 263966 (LWG)
23	*Millingtonia hortensis* L. f.	Oct. – Feb.	Ornamental tree, dye, medicinal	Myanmar and Malaya	Deciduous	Neem Chameli	Srivastava (1976); Saini (2005)
24	*Oroxylum indicum* (L.) Vent.	May – Dec.	Medicinal, firewood	India	Deciduous	Ullu	*Bajpai* and *Chaudhary* 263967 (LWG)
25	*Spathodea campanulata* Beauv.	Most part of the year	Ornamental tree, medicinal	Tropical Africa	Evergreen	Rudra Palash	Srivastava (1976); Singh (1997)
26	*Stereospermum chelonoides* (L. f.) DC.	Apr. – Dec.	Timber wood, medicinal	India and Myanmar	Deciduous	Padar	*Chaudhary* et al. 250266 & 252218 (LWG)
27	*Tecoma stans* (L.) Juss. ex Kunth	Most part of the year	Ornamental tree	Tropical South America	Evergreen	Piliya	*Maliya* 227146 (LWG)
Bixaceae							
28	*Bixa orellana* L.	Sep. – Mar.	Ornamental tree, medicinal	Tropical America	Evergreen	Sinduri	Saini (2005)
29	*Cochlospermum religiosum* (L.) Alston	Apr. – Jul.	Gum & fibre production, medicinal	India and Malaysia	Deciduous	Galgal	Kanjilal (1933)
Boraginaceae							
30	*Cordia dichotoma* G. Forst.	Mar. – Jul.	Fruits edible, medicinal	Indian Subcontinent	Deciduous	Lassora	*Bajpai* et al. 263732 (LWG)
31	*Cordia grandis* Roxb.	Mar. – Sep.	Fruits edible, medicinal	Indian Subcontinent	Deciduous	Lassora	Panigrahi et al. (1969)
32	*Cordia vestita* Hook. F. & Thoms.	Mar. – Oct.	Fruits edible, medicinal	Indian Subcontinent	Deciduous	Latora	Kanjilal (1933)
33	*Ehretia acuminata* R. Br.	Sep. – Apr.	Ornamental & avenue tree, medicinal	India & South-East Asia	Deciduous	Paniya	*Bajpai* et al. 263716 (LWG)
34	*Ehretia laevis* Roxb.	Jan. – Aug.	Ornamental & avenue tree, medicinal	India & South-East Asia	Deciduous	Chamror	*Bajpai* et al. 263705 (LWG)

continued

Table 1. *Continued.*

Sp. No.	Botanical Name	Phenology	Economic Importance	Native Origin	Vegetation Type	Vernacular Name	Collection No./Reference
Burseraceae							
35	*Boswellia serrata* Roxb. ex Colebr.	Jan. – May	Rope fibre, medicinal	India	Deciduous	Saleh	Kanjilal (1933); Saini (2005)
36	*Commiphora wightii* (Arn.) Bhandari	Mar. – Sep.	Medicinal	India	Deciduous	Guggul	Saini (2005)
37	*Garuga pinnata* Roxb.	Mar. – Oct.	Fruits edible, medicinal	India	Deciduous	Kharpat	*Maliya* 227178 (LWG)
Cannabaceae							
38	*Celtis australis* L.	Feb. – Nov.	Timber wood, fodder, medicinal	Asia Minor	Deciduous	Nettle Tree	*Maliya* 224927 (LWG)
39	*Celtis tetrandra* Roxb.	Feb. – Nov.	Firewood, medicinal	India	Deciduous	Kakai	*Chaudhary* et al. 252861 (LWG)
Capparaceae							
40	*Crataeva magna* (Lour.) DC.	Feb. – Aug.	Medicinal	Indian Subcontinent	Deciduous	Barna	Srivastava (1976); Saini (2005)
Casuarinaceae							
41	*Casuarina equisetifolia* L.	Mar. – Jul.	Ornamental & avenue tree	India & South-East Asia	Evergreen	Jangli Saru	*Bajpai* et al. 263729, 263730, 263738 (LWG)
Celastraceae							
42	*Cassine glauca* (Rottb.) Kuntze.	Mar. – Jan.	Timber wood, medicinal	India	Evergreen	Jamrasi	Kanjilal (1933); Saini (2005)
Combretaceae							
43	*Anogeissus acuminata* (Roxb. ex DC.) Wall. Ex Guill. & Perr.	Mar. – Dec.	Household timber, dye	South Asia	Deciduous	Dhau	Srivastava (1976); Saini (2005)
44	*Anogeissus latifolia* (Roxb. ex DC.) Wall ex Guill & Perr.	May – Feb.	Fire & timber wood, gum & dye, medicinal	South Asia	Deciduous	Dhaora	Kanjilal (1933); Saini (2005)
45	*Anogeissus sericea* Brandis	Nov. – Feb.	Timber wood, fodder	South Asia	Evergreen	Dhaukra	Duthie (1903); Kanjilal (1933)
46	*Terminalia arjuna* (Roxb. ex DC.) Wight & Arn.	Apr. – Mar.	Avenue tree, medicinal	India	Evergreen	Arjun	*Bajpai* et al. 263914 (LWG)
47	*Terminalia bellirica* (Gaertn.) Roxb.	Mar. – Sep.	Timber wood, tannin, medicinal	India	Deciduous	Bahera	*Chaudhary* et al. 250248 (LWG)
48	*Terminalia catappa* L.	May – Oct.	Timber wood, tannin, medicinal	India	Deciduous	Jangli Badam	Srivastava (1976); Saini (2005)
49	*Terminalia chebula* Retz.	Apr. – Sep.	Timber wood, tannin, medicinal	India	Deciduous	Harad	Srivastava (1976); Singh (1997); Saini (2005)
50	*Terminalia elliptica* Willd.	May – Mar.	Timber wood, medicinal	India	Deciduous	Asna	*Bajpai* and *Chaudhary* 264453 (LWG)
Cornaceae							
51	*Alangium chinense* (Lour.) Harms	May – Aug.	Timber wood, medicinal	North-East Asia	Evergreen	Chinese Langium	Kanjilal (1933)
52	*Alangium salvifolium* (L. f.) Wang.	Feb. – Aug.	Medicinal	India	Deciduous	Akohar	*Kumar* and *Bajpai* 250606, 250779 & 252197 (LWG)
Dilleniaceae							
53	*Dillenia aurea* Sm.	Mar. – Jul.	Medicinal	South-East Asia	Deciduous	Aggai	Duthie (1903); Kanjilal (1933)
54	*Dillenia indica* L.	May – Feb.	Local timber & fire wood, medicinal	South-East Asia	Evergreen	Karambel	Srivastava (1976); Saini (2005)
55	*Dillenia pentagyna* Roxb.	Mar. – May	Medicinal	Tropical Asia	Deciduous	Karmal	*Kumar* and *Bajpai* 252271 (LWG)
Dipterocarpaceae							
56	*Shorea robusta* Gaertn. f.	Mar. – Jun.	Quality timber wood, tannin, resin, medicinal	India	Semi-deciduous	Sakhu	*Bajpai* et al. 263736 & 263737 (LWG)
Ebenaceae							
57	*Diospyros melanoxylon* Roxb.	Apr. – Oct.	Timber wood, bidi making	India	Semi-deciduous	Tendu	*Kumar* and *Bajpai* 252247 (LWG)
58	*Diospyros malabarica* (Desr.) Kostel.	Apr. – Jan.	Furniture wood, tannin, medicinal	India	Semi-deciduous	Gaub	Duthie (1903); Srivastava (1976)
59	*Diospyros montana* Roxb.	Mar. – Sep.	Medicinal	India	Deciduous	Bistendu	*Bajpai* and *Chaudhary* 264445 & 264475 (LWG)
Euphorbiaceae							
60	*Bischofia javanica* Bl.	Mar. – Dec.	Timber wood, tannin, medicinal	North-East Asia	Deciduous	Kein	Srivastava (1976); Singh (1997)
61	*Croton laevigatus* Vahl.	Jan. – Apr.	Medicinal	Tropical Asia	Deciduous	Arjunna	*Chaudhary* et al. 250237 (LWG)
62	*Falconeria insignis* Royle	Feb. – Dec.	Poisonous	Indian Subcontinent	Deciduous	Shirwa	Duthie (1903); Kanjilal (1933)
63	*Flueggea virosa* (Roxb. ex Willd.) Royle	Mar. – Aug.	Medicinal	Tropical Africa	Deciduous	Pula	*Kumar* et al. 263635 (LWG)
64	*Glochidion daltonii* (Mull. Arg.) Kurz	Sep. – Dec.	Medicinal	South-East Asia	Evergreen	----	*Panigrahi* and *Mishra* 6526 (BSA)
65	*Glochidion ellipticum* Wight	Mar. – Dec.	Medicinal	India	Evergreen	Bhoma	Kanjilal (1933); Singh (1997)
66	*Glochidion heyneanum* (Wight & Arn.) Wight	Feb. – Oct.	Medicinal	India	Evergreen	Kalikath	Kanjilal (1933)
67	*Glochidion lanceolarium* (Roxb.) Voigt	Mar. – Dec.	Medicinal	Indian Subcontinent	Evergreen	Largeleaf Glochidion	Kanjilal (1933); Singh (1997)
68	*Glochidion multiloculare* (Rottler ex. Willd.) Voigt	Mar. – Dec.	Medicinal	Indian Subcontinent	Evergreen	Keura	Kanjilal (1933); Singh (1997)

continued

Table 1. *Continued.*

Sp. No.	Botanical Name	Phenology	Economic Importance	Native Origin	Vegetation Type	Vernacular Name	Collection No./Reference
69	*Jatropha curcas* L.	Apr. – Jan.	Hedge tree, seeds for bio diesel, medicinal	Tropical America	Deciduous	Ratanjot	*Maliya* 225955 & 225256 (LWG)
70	*Mallotus nudiflorus* (L.) Kulju & Welzen	Feb. – Oct.	Timber wood, fodder, medicinal	South-East Asia	Deciduous	Gutel	*Bajpai* et al. 263711 (LWG)
71	*Mallotus philippensis* (Lamk.) Muell.-Arg.	Most part of the year	Timber wood, tannin, fodder, medicinal	South-East Asia	Semi-evergreen	Rohini	*Chaudhary* et al. 250244 (LWG)
72	*Mallotus polycarpus* (Benth.) Kulju & Welzen	Most part of the year	Timber wood	India	Deciduous	Bahlol	Srivastava (1976); Saini (2005)
73	*Ricinus communis* L.	Dec. – May	Highly medicinal	Tropical Africa	Evergreen	Arand	*Chaudhary* et al. 252844 (LWG)
74	*Triadica sebifera* (L.) Small	Jun. – Dec.	Medicinal, ornamental	China	Deciduous	Pahari Shisham	Duthie (1915); Kanjilal (1933)
Fabaceae (Caesalpinioideae)							
75	*Bauhinia acuminata* L.	Jul. – Dec.	Ornamental, medicinal	South-East Asia	Deciduous	Safed Kachnar	*Bajpai* and *Chaudhary* 264466 (LWG)
76	*Bauhinia malabarica* Roxb.	Aug. – Mar.	Ornamental, medicinal	India	Deciduous	Amlosa	*Kumar* and *Bajpai* 252138, 252187 (LWG)
77	*Bauhinia purpurea* L.	Sep. – Apr.	Ornamental, medicinal	India	Deciduous	Kachnar	*Bajpai* et al. 264429 (LWG)
78	*Bauhinia racemosa* Lamk.	Mar. – Dec.	Medicinal, religious	India	Deciduous	Katmauli	*Bajpai* and *Chaudhary* 264464 (LWG)
79	*Bauhinia roxburghiana* Voigt.	Sep. – Apr.	Ornamental tree	India	Deciduous	Chakera	Panigrahi et al. (1969); Saini (2005)
80	*Bauhinia tomentosa* L.	Jul. – Feb.	Medicinal, ornamental	Tropical Africa	Deciduous	Gurial	*Bajpai* 264408 (LWG)
81	*Bauhinia variegata* L.	Feb. – May	Ornamental, fodder, tannin, medicinal	India	Deciduous	Kachnar	*Chaudhary et al* 263961 (LWG)
82	*Brownea hybrida* Hort. ex Backer	Jan. – May	Ornamental	Java	Evergreen	Rose of Venezuela	Srivastava (1976); Saini (2005)
83	*Cassia fistula* L.	Mar. – Dec.	Ornamental & avenue tree, medicinal	India	Deciduous	Amaltas	*Chaudhary* et al. 250238 (LWG)
84	*Cassia javanica* L. ssp. *nodosa* (Buch.-Ham. ex Roxb.) K. Larsen & S.S. Larsen	May – Jan.	Ornamental & avenue tree	Java	Deciduous	Java Rani	*Chaudhary* et al. 263915 (LWG)
85	*Delonix regia* (Boj. ex Hook.) Raf.	Apr. – Mar.	Ornamental & avenue tree, fire wood	Madagascar	Deciduous	Gulmuhur	*Chaudhary* et al. 263960 (LWG)
86	*Parkinsonia aculeata* L.	Oct. – May	Ornamental & hedge tree	Tropical America	Deciduous	Vilayati Kikar	*Kumar* and *Bajpai* 250678 (LWG)
87	*Peltophorum pterocarpum* (DC.) Baker ex K. Heyne	Mar. – Nov.	Ornamental & avenue tree	South-East Asia	Deciduous	Peela Gulmohar	Srivastava (1976); Saini (2005)
88	*Saraca asoca* (Roxb.) de Wilde	Feb. – Aug.	Medicinal, ornamental	India	Evergreen	Sita Ashok	Saini (2005)
89	*Senna auriculata* (L.) Roxb.	Nov. – Mar.	Medicinal, ornamental	India	Evergreen	Tarwa	Duthie (1903); Srivastava (1976)
90	*Senna siamea* (Lamk.) Irwin & Barneby	Jul. – Feb.	Ornamental, fodder, fire & timber wood	Indian Subcontinent	Evergreen	Kassod	*Maliya* 224679 (LWG)
91	*Tamarindus indica* L.	May – Apr.	Fruits edible, avenue tree, fire & timber wood, medicinal	Tropical Africa	Evergreen	Imli	*Kumar* et al. 263638 (LWG)
Fabaceae (Faboideae)							
92	*Butea monosperma* (Lamk.) Taub.	Mar. – Jun.	Dye, tannin, timber wood, medicinal	India	Deciduous	Dhak	*Bajpai* et al. 263704 (LWG)
93	*Dalbergia lanceolaria* L. f.	Apr. – Oct.	Ornamental, fodder, timber, medicinal	India	Deciduous	Sirsa	*Chaudhary* et al. 250236 (LWG)
94	*Dalbergia latifolia* Roxb.	Apr. – Nov.	Timber wood, medicinal	India	Deciduous	Sitsal	Duthie (1903); Kanjilal (1933); Saini (2005)
95	*Dalbergia sissoo* Roxb. ex DC.	Mar. – Nov.	Timber wood, fodder, medicinal	India	Deciduous	Shisham	*Bajpai* et al. 263718 (LWG)
96	*Desmodium oojeinense* (Roxb.) H. Ohashi	Mar. – Jul.	Timber wood, medicinal	India	Deciduous	Chajan	*Chaudhary* et al. 250234 (LWG)
97	*Erythrina arborescens* Roxb.	Jul. – Feb.	Ornamental, local timber, medicinal	India	Deciduous	Mandero	*Maliya* 225936 (LWG)
98	*Erythrina suberosa* Roxb.	Feb. – Jul.	Ornamental, medicinal	India	Deciduous	Dauldhak	Saini (2005)
99	*Erythrina variegata* L.	Mar. – Jun.	Ornamental & avenue tree, fodder, medicinal	India	Deciduous	Parijat	*Chaudhary* et al. 263962 (LWG)
100	*Millettia peguensis* Ali	Apr. – Sep.	Ornamental & avenue tree,	South-East Asia	Deciduous	Tum	Srivastava (1976); Singh (1997); Saini (2005)
101	*Pongamia pinnata* (L.) Pierre	Apr. – Jul.	Avenue tree, bio diesel, medicinal	India	Deciduous	Karanja	*Bajpai* and *Chaudhary* 264477 (LWG)
102	*Pterocarpus marsupium* Roxb.	Sep. – Nov.	Timber wood, medicinal	India	Deciduous	Bijasal	Duthie (1903); Kanjilal (1933); Singh (1997)
103	*Sesbania sesban* (L.) Merr.	Sep. – Jan.	Fire wood, fodder, medicinal	Egypt	Deciduous	Jait	Srivastava (1976); Singh (1997)
Fabaceae (Mimosoideae)							
104	*Acacia auriculiformis* A. Cunn. ex Benth.	Sep. – Mar.	Avenue tree, fodder, fire & timber wood, tannin	Australia	Evergreen	Akashia	*Bajpai* 264406 (LWG)
105	*Acacia catechu* (L. f.) Willd.	Mar. – Jan.	Kattha, timber wood, fodder, medicinal	India	Deciduous	Khair	*Bajpai* et al. 264425 & 263931 (LWG)

continued

Table 1. *Continued.*

Sp. No.	Botanical Name	Phenology	Economic Importance	Native Origin	Vegetation Type	Vernacular Name	Collection No./Reference
106	*Acacia farnesiana* (L.) Willd.	Mar. – Dec.	Tannin, fodder	Tropical America	Deciduous	Guh Babul	Srivastava (1976); Singh (1997); Saini (2005)
107	*Acacia lenticularis* Buch.-Ham. ex Benth.	Apr. – Dec.	Fire & timber wood, fodder, medicinal	India	Deciduous	Khyn	Kanjilal (1933)
108	*Acacia modesta* Wall.	Mar. – Sep.	Fire & timber wood, medicinal	India	Deciduous	Pulahi	Duthie (1903)
109	*Acacia nilotica* (L.) Del. ssp. *indica* (Benth.) Brenan	Aug. – Apr.	Hedge tree, fire & timber wood, fodder, medicinal	India	Deciduous	Babul	*Bajpai* et al. 263938 (LWG)
110	*Adenanthera pavonina* L.	Mar. – Sep.	Timber wood, seed in jewellery, medicinal	India	Deciduous	Rakt Chandan	Duthie (1903); Kanjilal (1933)
111	*Albizia chinensis* (Osbeck) Merr.	Mar. – Dec.	Ornamental & avenue tree, fodder	South-East Asia	Deciduous	Siran	Singh (1997); Saini (2005)
112	*Albizia lebbeck* (L.) Benth.	Mar. – Jan.	Ornamental & avenue tree, medicinal	South-East Asia	Deciduous	Kala Siris	*Bajpai* et al. 263726 (LWG)
113	*Albizia lucidior* (Steud.) Nielsen ex Hara	Apr. – Jan.	Ornamental & avenue tree	India	Deciduous	Potka Siris	Saini (2005)
114	*Albizia odoratissima* (L. f.) Benth.	Mar. – Jan.	Ornamental & avenue tree, fodder, medicinal	India	Semi-deciduous	Sirisa	Saini (2005)
115	*Albizia procera* (Roxb.) Benth.	May – Feb.	Ornamental & avenue tree, tannin, medicinal	India	Semi-deciduous	Safed siris	*Maliya* 225986 (LWG)
116	*Leucaena leucocephala* (Lamk.) de Wit.	Apr. – Nov.	Avenue tree, fodder	Mexico	Evergreen	Subabul	*Bajpai* et al. 263721 (LWG)
117	*Indopiptadenia oudhensis* (Brandis) Brenan	Apr. – May	Timber & fire wood, fodder	India	Evergreen	Gainti	*Bajpai* and *Chaudhary* 264432; *Bajpai* et al. 263925, 263927, 263928, 263935 & 263936 (LWG)
118	*Pithecellobium dulce* (Roxb.) Benth.	Mar. – Sep.	Timber wood, fodder, medicinal	Mexico	Evergreen	Jangal Jalebi	*Chaudhary* et al. 263907 (LWG)
Lamiaceae							
119	*Callicarpa arborea* Roxb.	Mar. – Sep.	Medicinal	India	Semi-evergreen	Ghiwala	Kanjilal (1933)
120	*Clerodendrum phlomidis* L. f.	Jul. – Jan.	Ornamental tree, medicinal	India	Evergreen	Urui	Srivastava (1976); Saini (2005)
121	*Gmelina arborea* Roxb. ex Sm.	Feb. – Jul.	Ornamental & avenue tree, timber wood, medicinal	India	Deciduous	Gamari	*Bajpai* 264411 (LWG)
122	*Gmelina asiatica* L.	Most part of the year	Ornamental & avenue tree, medicinal	India	Deciduous	Badhara	Srivastava (1976)
123	*Premna barbata* Wallich ex Schaeur	Feb. – Jun.	Medicinal, fire wood	India	Deciduous	Basota	Duthie (1911); Kanjilal (1933)
124	*Premna mollissima* Roth.	Most part of the year	Medicinal	India	Deciduous	Bakar	Srivastava (1976); Singh (1997); Saini (2005)
125	*Tectona grandis* L. f.	Jun. – Dec.	Quality timber wood	South-East Asia	Deciduous	Sagon	*Chaudhary* et al. 250241 (LWG)
126	*Vitex negundo* L.	Most part of the year	Medicinal, fibre	South-East Asia	Deciduous	Nirgundi	Srivastava (1976); Singh (1997); Saini (2005)
Lauraceae							
127	*Beilschmiedia roxburghiana* Nees	Mar. – Aug.	Timber wood	India	Evergreen	Konhaia	Duthie (1911); Kanjilal (1933)
128	*Litsea chinensis* Lamk.	Apr. – Nov.	Timber & fire wood, medicinal	China	Semi-evergreen	Medha	Duthie (1911)
129	*Litsea glutinosa* (Lour.) Rob.	Apr. – Dec.	Essential oils from seeds, medicinal	India	Evergreen	Maidalabri	*Kumar* and *Bajpai* 252787 (LWG)
130	*Litsea monopetala* (Roxb.) Pers.	Mar. – Oct.	Timber wood, fodder, medicinal	India	Evergreen	Katmara	*Kumar* et al. 263621 (LWG)
131	*Machilus gamblei* King ex Hook f.	Mar. – Jun.	Dye	India	Evergreen	----	Duthie (1911)
132	*Phoebe lanceolata* (Nees) Nees	Feb. – Sep.	Fire wood	India	Evergreen	Haulia	Kanjilal (1933)
Lecythidaceae							
133	*Barringtonia acutangula* (L.) Gaertn.	Mar. – Nov.	Ornamental tree, medicinal	South-East Asia	Evergreen	Paniha	*Kumar* and *Bajpai* 250605; *Chaudhary* et al. 252164 (LWG)
134	*Careya arborea* Roxb.	Mar. – Jul.	Local timber wood, medicinal	India	Deciduous	Kumbhi	*Kumar* and *Bajpai* 252209 (LWG)
Loganiaceae							
135	*Strychnos nux-vomica* L.	Feb. – Jan.	Medicinal	India	Evergreen	Kuchla	*Chaudhary* et al. 252889 (LWG)
Lythraceae							
136	*Lagerstroemia floribunda* Jack.	May – Oct.	Ornamental tree	South-East Asia	Semi-evergreen	----	Srivastava (1976)
137	*Lagerstroemia parviflora* Roxb.	Apr. – Nov.	Ornamental tree, timber wood	India	Deciduous	Sidha	*Bajpai* and *Chaudhary* 264458 (LWG)
138	*Lagerstroemia speciosa* (L. ex Murray) Pers.	May – Nov.	Ornamental tree, timber & fire wood, medicinal	India	Deciduous	Gulchaman	*Chaudhary* et al. 252295 (LWG)
139	*Punica granatum* L.	Apr. – Oct.	Fruit edible, ornamental, medicinal	Iran	Deciduous	Anar	*Bajpai* et al. 263724 (LWG)
140	*Woodfordia fruticosa* (L.) Kurz.	Feb. – May	Ornamental & hedge tree, medicinal	India	Deciduous	Dhaunti	*Bajpai* et al. 263702 (LWG)

continued

Table 1. *Continued.*

Sp. No.	Botanical Name	Phenology	Economic Importance	Native Origin	Vegetation Type	Vernacular Name	Collection No./Reference
Magnoliaceae							
141	*Magnolia champaca* (L.) Baill. ex Pierre	Mar. – Aug.	Ornamental tree, medicinal	India	Evergreen	Champa	Srivastava (1976); Saini (2005)
142	*Magnolia grandiflora* L.	May – Oct.	Ornamental tree, medicinal	North America	Evergreen	Him Champa	Srivastava (1976); Saini (2005)
Malvaceae							
143	*Bombax ceiba* L	Jan. – May	Silviculture, match industry, medicinal	India	Deciduous	Semal	*Chaudhary* et al. 252805 (LWG)
144	*Ceiba pentandra* (L.) Gaertn.	Dec. – Apr.	Ornamental & avenue tree, fibre, medicinal	South America	Deciduous	Kopak	*Chaudhary* et al. 250229 (LWG)
145	*Eriolaena candollei* Wall.	Mar. – Oct.	Local timber wood	India	Deciduous	Aranj	Duthie (1903); Kanjilal (1933)
146	*Eriolaena wallichii* DC.	May – Aug.	----	India	Deciduous	Bhiguna	Duthie (1903); Kanjilal (1933)
147	*Firmiana colorata* (Roxb.) R. Br.	Feb. – Jun.	Ornamental tree, medicinal, fodder	South-West India	Deciduous	Samari	Kanjilal (1933); Srivastava (1976); Saini (2005)
148	*Firmiana simplex* (L.) W. Wight	Feb. – Oct.	Ornamental, seeds edible, gum & resin, medicinal	South-East Asia	Deciduous	Kulu	*Mishra* 7995 (BSA)
149	*Grewia abutilifolia* Vent. ex Juss.	Most part of the year	Medicinal	India	Semi-deciduous	Dhaman	*Khanna* 39907 (BSA)
150	*Grewia asiatica* L.	Apr. – Jul.	Fruits edible, medicinal	India	Deciduous	Phalsa	*Kumar* and *Bajpai* 250662 (LWG)
151	*Grewia eriocarpa* A. L. Juss.	Feb. – Sep.	Fodder	Indian subcontinent	Deciduous	Dhaman	Kanjilal (1933); Singh (1997); Saini (2005)
152	*Grewia multiflora* Juss.	Aug. – Jan.	Fruits edible	Tropical Asia	Deciduous	Bhansuli	*Kumar* and *Bajpai* 252149 (LWG)
153	*Grewia optiva* Dumm. ex Burret.	Apr. – Sep.	Timber & fire wood, fruits edible, fodder	Tropical Asia	Deciduous	Bhimal	Maliya and Datt (2011)
154	*Grewia tiliifolia* Vahl.	Apr. – Sep.	Fruits edible, medicinal	Tropical Asia	Deciduous	Kakai	*Bajpai* and *Chaudhary* 264454 (LWG)
155	*Guazuma ulmifolia* Lamk.	Feb. – Sep.	Religious, tannin, medicinal	Tropical America	Deciduous	Rudrakshi	Saini (2005)
156	*Helicteres isora* L.	Jun. – Dec.	Medicinal	Tropical Asia	Deciduous	Maror Phali	*Maliya* 214860 (LWG)
157	*Hibiscus rosa-sinensis* L.	Most part of the year	Ornamental tree, medicinal	East Asia	Evergreen	Gurhal	*Bajpai* et al. 263723 (LWG)
158	*Kavalama urens* (Roxb.) Raf.	Jan. – Apr.	Gum production, timber, medicinal	India	Deciduous	Kulu	Panigrahi et al. (1969); Maliya and Datt (2010)
159	*Kydia calycina* Roxb.	Jul. – May	Medicinal, Fibre	India	Deciduous	Bharanga	*Bajpai* et al. 264433 (LWG)
160	*Pterospermum acerifolium* (L.) Willd.	Feb. – Jul.	Ornamental, timber wood, medicinal	Indian Subcontinent	Evergreen	Kanak Campa	*Bajpai* et al. 263703 (LWG)
161	*Pterygota alata* (Roxb.) R. Br.	Mar. – Dec.	Seeds edible	India	Deciduous	Tula	Saini (2005)
162	*Sterculia foetida* L.	Feb. – Aug.	Ornamental, seeds edible, fibre, gum, medicinal	South-East Asia	Deciduous	Jangali Badam	Saini (2005)
163	*Sterculia villosa* Roxb.	Feb. – Oct.	Ornamental, seeds edible, medicinal	India	Deciduous	Udar	*Chaudhary* et al. 252898; *Kumar* and *Bajpai* 252181 & 252224 (LWG)
164	*Thespesia populnea* (L.) Soland. ex Correa	Aug. – Jan.	Ornamental, medicinal	India	Evergreen	Paras Pipal	Kanjilal (1933); Srivastava (1976); Saini (2005)
Meliaceae							
165	*Aphanamixis polystachya* (Wall.) R. Parker	Aug. – Dec.	Ornamental, timber wood, medicinal	India	Evergreen	Sohaga	Duthie (1903); Saini (2005)
166	*Azadirachta indica* A. Juss.	Mar. – Jul.	Medicinal, avenue, timber wood	India	Semi-deciduous	Neem	*Bajpai* et al. 263926 (LWG)
167	*Heynea trijuga* Roxb. ex Sims	Feb. – Oct.	Ornamental, medicinal	India	Semi-deciduous	Gundira	*Kumar* and *Bajpai* 252248 & 252250 (LWG)
168	*Melia azedarach* L.	Mar. – Jun.	Timber wood, fodder, medicinal	India	Semi-deciduous	Bakain	*Bajpai* et al. 263707 (LWG)
169	*Toona ciliata* M. Roem.	Mar. – Jul.	Timber wood, tannin, medicinal	India	Semi-deciduous	Maha nim	*Bajpai* et al. 263701 (LWG)
Moraceae							
170	*Artocarpus heterophyllus* Lamk.	Feb. – Sep.	Vegetable fruits, timber wood, medicinal	South-East Asia	Evergreen	Kathal	*Chaudhary* et al. 252244; *Kumar* et al. 263619 (LWG)
171	*Artocarpus lakoocha* Roxb.	Mar. – Aug.	Fruits edible, timber wood, fodder, medicinal	India	Semi-evergreen	Barhar	*Chaudhary* et al. 263916 (LWG)
172	*Broussonetia papyrifera* (L.) L'Hér. ex Vent.	Mar. – Sep.	Fruits edible, fodder, fibre & paper	Japan	Deciduous	Jangali Toot	*Chaudhary* et al. 252872 & 252874 (LWG)
173	*Ficus auriculata* Lour.	Apr. – Nov.	Fodder, figs edible	South-East Asia	Evergreen	Timal	*Chaudhary* et al. 263959 (LWG)
174	*Ficus benghalensis* L.	Apr. – Jun.	Religious, avenue, fodder, medicinal	India	Evergreen	Bargad	*Bajpai* and *Chaudhary* 264444 (LWG)
175	*Ficus benjamina* L.	Oct. – Jan.	Ornamental, avenue & hedge tree	South-East Asia	Evergreen	Pukar	Kanjilal (1933)
176	*Ficus carica* L.	Jan. – Oct.	Figs edible	South Asia	Deciduous	Anjir	Srivastava (1976); Saini (2005)
177	*Ficus elastica* Roxb. ex Hornem.	Mar. – Apr. (Not seen)	Ornamental, rubber production	India	Evergreen	Rubar	*Chaudhary* et al. 250246 (LWG)
178	*Ficus hispida* L. f.	Apr. – Nov.	Figs edible, fodder	India	Evergreen	Kathgular	*Chaudhary* et al. 250250 (LWG)
179	*Ficus microcarpa* L. f.	Aug. – Feb.	Ornamental & avenue tree	India	Evergreen	Kamrup	Panigrahi et al. (1969)

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Table 1. *Continued.*

Sp. No.	Botanical Name	Phenology	Economic Importance	Native Origin	Vegetation Type	Vernacular Name	Collection No./Reference
180	*Ficus palmata* Forssk. ssp. *virgata* (Roxb.) Browicz	Jun. – Oct.	Figs edible, fodder, medicinal	South Asia	Deciduous	Khemri	*Bajpai* and *Chaudhary* 264441 (LWG)
181	*Ficus racemosa* L.	Mar. – Nov.	Figs edible, fodder, medicinal	South-East Asia	Semi-deciduous	Goolar	*Chaudhary* et al. 250232 (LWG)
182	*Ficus religiosa* L.	Apr. – Sep.	Religious, avenue, fodder, medicinal	India	Deciduous	Pipal	*Chaudhary* et al. 252107 & 252807; *Kumar* et al. 263627 (LWG)
183	*Ficus retusa* L. var. *nitida* (Thunb.) Miq.	Most part of the year	Ornamental, avenue, medicinal	India	Evergreen	Inger	*Chaudhary* et al. 250257; *Kumar* and *Bajpai* 252104; *Kumar* et al. 263609 (LWG)
184	*Ficus rumphii* Blume	Apr. – Dec.	Avenue, fodder, medicinal	South-East Asia	Deciduous	Gajhar	*Bajpai* and *Chaudhary* 263923 (LWG)
185	*Ficus semicordata* Buch.-Ham. ex J. E. Sm.	May – Oct.	Figs edible, fodder, medicinal	India	Deciduous	Khurhur	*Bajpai* et al. 263714 & 263715 (LWG)
186	*Ficus squamosa* Roxb.	Most part of the year	Fodder	India	Evergreen	----	*Kumar* and *Bajpai* 250700 (LWG)
187	*Ficus virens* Ait.	Jul. – Oct.	Avenue	India	Semi-deciduous	Pakar	*Bajpai* and *Chaudhary* 264450 (LWG)
188	*Maclura cochinchinensis* (Lour.) Corner	Apr. – Jul.	Fruits edible	South-East Asia	Semi-deciduous	Damru	Kanjilal (1933)
189	*Morus alba* L.	Feb. – Jun.	Fruits edible, medicinal	China	Semi-deciduous	Shahtut	*Bajpai* et al. 263728 (LWG)
190	*Streblus asper* Lour.	Feb. – Jul.	Firewood, medicinal	India	Evergreen	Sihor	*Bajpai* et al. 263731 (LWG)
Moringaceae							
191	*Moringa concanensis* Nimmo ex Dalz. & Gibb.	Nov. – Feb.	Medicinal, firewood	India	Deciduous	Jangali Sehjana	Saini (2005)
192	*Moringa oleifera* Lamk.	Feb. – Jul.	Fruits edible, medicinal, firewood	India	Deciduous	Sahjan	*Chaudhary* et al. 252193; *Kumar* et al. 263603 (LWG)
Myrtaceae							
193	*Callistemon citrinus* (Curtis) Skeels	Mar. – Jun.	Ornamental & avenue tree	Australia	Evergreen	Bottle Brush	*Chaudhary* et al. 252292 & 252876 (LWG)
195	*Eucalyptus camaldulensis* Dehnh	Mar. – Sep.	Timber wood, avenue tree	Australia	Deciduous	Red Gum	Saini (2005)
196	*Eucalyptus tereticornis* Sm.	Feb. – Oct.	Quality Timber	Australia	Deciduous	Blue Gum	*Maliya* 214821 (LWG)
197	*Melaleuca leucadendra* (L.) L.	Feb. – May	Ornamental & avenue tree	Australia	Semi-evergreen	Shitanshu	Srivastava (1976)
198	*Psidium guajava* L.	Apr. – Dec.	Fruits edible, fodder, fire & timber, medicinal	Mexico	Deciduous	Amrood	*Bajpai* et al. 263734 (LWG)
199	*Syzygium cumini* (L.) Skeels	Mar. – Aug.	Avenue tree, fruits edible, fodder, fire & timber wood, medicinal	India	Evergreen	Jamun	*Chaudhary* et al. 250240 (LWG)
200	*Syzygium nervosum* A. Cunn. ex DC.	Apr. – Aug.	Fruits edible, timber wood	Australia	Evergreen	Madar Jamua	*Bajpai* and *Kumar* 252275 (LWG)
201	*Syzygium salicifolium* (Wight) J.Graham	Mar. – Aug.	Fruits edible, timber wood	India	Evergreen	Kathjamun	*Chaudhary* et al. 263946 (LWG)
Olacaceae							
202	*Olax zeylanica* L.	May – Jun.	Fire wood	Sri Lanka	Semi-evergreen	Mella	Saini (2005)
Oleaceae							
203	*Chionanthus ramiflorus* Roxb.	Mar. – Aug.	Fire wood	India	Evergreen	Olive	Kanjilal (1933)
204	*Jasminum brevipetiolatum* Duthie	Apr. – Jun.	Ornamental	India	Evergreen	----	Duthie (1903); Singh (1997)
205	*Nyctanthes arbor-tristis* L.	Sep. – Mar.	Ornamental, medicinal	India	Evergreen	Harsingar	*Bajpai* et al. 264424 (LWG)
Oxalidaceae							
206	*Averrhoa carambola* L.	Jun. – Oct.	Fruits edible, medicinal	South-East Asia	Semi-evergreen	Kamrakh	*Bajpai* and *Kumar* 252281 (LWG)
Phyllanthaceae							
207	*Antidesma acidum* Retz.	May – Dec.	Timber wood, fodder, medicinal	India	Deciduous	Khotura	Singh (1997)
208	*Antidesma bunius* (L.) Spreng	Mar. – Aug.	Fruits edible, medicinal	South-East Asia	Deciduous	Mala	Kanjilal (1933)
209	*Antidesma ghaesembilla* Gaertn.	Jun. – Dec.	Fruits edible, medicinal	South-East Asia	Deciduous	Janjharli	*Maliya* 225983 (LWG)
210	*Aporosa octandra* (Buch.-Ham. ex D.Don) Vickery	Most part of the year	----	South-East Asia	Semi-evergreen	----	Kanjilal (1933)
211	*Breynia vitis-idaea* (Burm.f.) C.E. Fischer	Apr. – Nov.	Medicinal	India	Evergreen	Oudh	*Panigrahi* and *Mishra* 6533 (BSA)
212	*Bridelia retusa* (L.) A. Juss.	May – Dec.	Medicinal	India	Evergreen	Khaja	*Bajpai* et al. 264428 (LWG)
213	*Phyllanthus acidus* (L.) Skeels	Feb. – Jun.	Fruits edible, tannin, medicinal	Brazil	Deciduous	Harphareuri	Srivastava (1976)
214	*Phyllanthus emblica* L.	Feb. – Dec.	Fruits edible, medicinal	India	Deciduous	Anwala	*Bajpai* et al. 263706 (LWG)
Pittosporaceae							
215	*Pittosporum napaulense* (DC.) Rehder & Wilson	Jun. – Dec.	Medicinal	India	Evergreen	Baghmuta	Maliya and Datt (2010)
Primulaceae							
216	*Ardisia solanacea* (Poir.) Roxb.	Mar. – Jan.	Medicinal	India	Evergreen	Mujrawa	Srivastava (1976); Singh (1997); Saini (2005)
Proteaceae							
217	*Grevillea robusta* A. Cunn. ex R. Br.	Mar. – Sep.	Ornamental & avenue tree, timber wood	Australia	Evergreen	Silver oak	Srivastava (1976); Singh (1997)

continued

Table 1. *Continued.*

Sp. No.	Botanical Name	Phenology	Economic Importance	Native Origin	Vegetation Type	Vernacular Name	Collection No./Reference
Putranjivaceae							
218	*Putranjiva roxburghii* Wall.	Most part of the year	Ornamental & avenue tree, fodder, medicinal	India	Evergreen	Patju	*Bajpai* et al. 263720 (LWG)
Rhamnaceae							
219	*Ziziphus mauritiana* Lamk.	Sep. – Mar.	Fruits edible, fodder, fire wood, tannin, medicinal	India	Evergreen	Ber	*Bajpai* and *Chaudhary* 264467 (LWG)
220	*Ziziphus rugosa* Lamk.	Feb. – Jul.	Fruits edible	India	Evergreen	Dhaura	*Chaudhary* et al. 263964 (LWG)
221	*Ziziphus xylopyrus* (Retz.) Willd.	Apr. – Jul.	Fruits edible, medicinal	India	Evergreen	Kathber	*Bajpai* and *Chaudhary* 264459 (LWG)
Rhizophoraceae							
222	*Carallia brachiata* (Lour.) Merr.	Dec. – May	Medicinal	India	Evergreen	Kierpa	Duthie (1903)
Rosaceae							
223	*Eriobotrya japonica* (Thunb.) Lindl.	Nov. – Jun.	Fruits edible, fodder, fire wood, medicinal	China	Evergreen	Laukat	Duthie (1903); Srivastava (1976); Saini (2005)
224	*Prunus persica* (L.) Batsch	Feb. – Jun.	Fruits edible	China	Deciduous	Aru	*Bajpai* et al. 263722 (LWG)
Rubiaceae							
225	*Catunaregam spinosa* (Thunb.) Tirveng.	Mar. – Dec.	Firewood, medicinal	India	Evergreen	Mainphal	*Bajpai* and *Chaudhary* 264451 (LWG)
226	*Ceriscoides turgida* (Roxb.) Tirveng.	Mar. – Nov.	Medicinal, fodder	India	Deciduous	Gudgudi	*Kumar* and *Bajpai* 250667 & 252153; *Chaudhary* 250766 (LWG)
227	*Haldina cordifolia* (Roxb.) Ridsdale	Jun. – Mar.	Timber wood, medicinal	India	Deciduous	Haldu	*Chaudhary* et al. 263912 (LWG)
228	*Hymenodictyon orixense* (Roxb.) Mabberley	May – Jan.	Timber & fire wood, medicinal	India	Deciduous	Bhurkul	*Bajpai* 264407 (LWG)
229	*Hyptianthera stricta* (Roxb.) Wight & Arn.	Feb. – Jun.	Fodder	India	Evergreen	----	Srivastava (1976); Singh (1997); Saini (2005)
230	*Mitragyna parvifolia* (Roxb.) Korth.	Mar. – Dec.	Timber wood, medicinal	India	Deciduous	Kaim	*Bajpai* and *Chaudhary* 264446 (LWG)
231	*Morinda citrifolia* L.	Jul. – Nov.	Ornamental, fruit edible, medicinal	South-East Asia	Evergreen	Bartundi	*Chaudhary* et al. 252626 (LWG)
232	*Neolamarckia cadamba* (Roxb.) Bosser	May – Dec.	Ornamental & avenue tree, timber wood, fodder, medicinal	India	Deciduous	Kadanb	*Bajpai* et al. 263725 (LWG)
233	*Tamilnadia uliginosa* (Retz.) Tirveng. & Sastre	Apr. – Dec.	Ornamental, medicinal	India	Semi-deciduous	Pedar	*Singh* et al. 5989 (LWG)
234	*Wendlandia heynei* (Schult.) Santapau & Merch.	Mar. – Aug.	Ornamental tree	India	Deciduous	Barsal	*Maliya* 218581 (LWG)
235	*Wendlandia tinctoria* (Roxb.) DC.	Mar. – Aug.	Root bark as dye	India	Deciduous	Tilka	Duthie (1903); Kanjilal (1933)
Rutaceae							
236	*Aegle marmelos* (L.) Correa	Mar. – Jul.	Fruits edible, medicinal, religious, gum & resin	India	Semi-evergreen	Bel	*Bajpai* 264403 (LWG)
237	*Citrus aurantiifolia* (Christm.) Swingle	Apr. – Jan.	Fruits edible, medicinal	Tropical Asia	Evergreen	Kaghzi nimbu	*Maliya* 225912 (LWG)
238	*Citrus medica* L.	Apr. – Jan.	Fruits edible, medicinal	India	Evergreen	Bara Nibu	*Chaudhary* et al. 252856 & 252857 (LWG)
239	*Limonia acidissima* L.	Feb. – Dec.	Fruits edible, medicinal, gum	India	Deciduous	Kaitha	Singh (1997)
240	*Murraya koenigii* (L.) Spreng.	Feb. – Oct.	Medicinal, leaf as spices	India	Semi-evergreen	Kathnim	*Bajpai* et al. 263712 (LWG)
Sabiaceae							
241	*Meliosma simplicifolia* (Roxb.) Walp.	Jan. – May	Timber wood	India	Evergreen	----	Duthie (1903)
Salicaceae							
242	*Casearia graveolens* Dalz.	Feb. – Aug.	Medicinal	India	Deciduous	Chilla	*Bajpai* and *Chaudhary* 264443 (LWG)
243	*Flacourtia indica* (Burm. f.) Merr.	Feb. – Jun.	Firewood, fruit edible, dye & tannin, medicinal	India	Deciduous	Katia	*Panigrahi* 2879 (BSA)
244	*Flacourtia jangomas* (Lour.) Raeusch.	Mar. – Oct.	Timber wood, medicinal	India	Deciduous	Talispatri	Srivastava (1976); Singh (1997); Saini (2005)
245	*Guidonia tomentosa* (Roxb.) Kurz	Feb. – Aug.	Firewood, fodder, medicinal	India	Deciduous	Chilla	*Maliya* 214853 (LWG)
246	*Populus deltoides* Bartr. ex Marsh.	Mar. – Jul.	Avenue tree, timber wood	North America	Deciduous	Popular	*Bajpai* and *Chaudhary* 264496 (LWG)
247	*Salix denticulata* Anders.	Mar. – Jul.	Timber & fire wood, fibre	India	Semi-evergreen	Bashal	*Maliya* 226648 & 226646 (LWG)
248	*Salix tetrasperma* Roxb.	Jan. – Jul.	Timber & firewood wood, medicinal	India	Deciduous	Bod	*Panigrahi* and *Mishra* 6541 (BSA)
249	*Xylosma longifolia* Clos.	Oct. – Apr.	Hedge tree, medicinal	India	Evergreen	Kantawa	Singh (1997); Saini (2005)
Santalaceae							
250	*Santalum album* L.	Mar. – Sep.	Sandalwood, medicinal	India	Evergreen	Chandan	*Chaudhary* et al. 250247 (LWG)
Sapindaceae							
251	*Dimocarpus longan* Lour.	Mar. – Sep.	Fruits edible	North-East India & China	Evergreen	Lichi	Kanjilal (1933)

continued

Table 1. *Continued.*

Sp. No.	Botanical Name	Phenology	Economic Importance	Native Origin	Vegetation Type	Vernacular Name	Collection No./Reference
252	*Dodonaea viscosa* Jacq.	Jan. – May	Hedge tree	Tropical Asia	Evergreen	Vilayati Mehndi	Srivastava (1976); Singh (1997); Saini (2005)
253	*Lepisanthes rubiginosa* (Roxb.) Leenh.	Apr. – Jul.	Fruits edible, timber & fire wood, medicinal	India	Evergreen	Anga-banga	*Kumar* and *Bajpai* 252296 & 252257 (LWG)
254	*Sapindus trifoliatus* L.	Nov. – May	Seeds as soap, timber wood, medicinal	India	Deciduous	Ritha	Kanjilal (1933); Srivastava (1976); Saini (2005)
255	*Sapindus saponaria* L.	May – Feb.	Timber wood, seeds as soap, medicinal	Mexico	Deciduous	Rithi	Srivastava (1976); Saini (2005)
256	*Schleichera oleosa* (Lour.) Merr.	Mar. – Nov.	Avenue tree, timber & fire wood, seed oil in biofuel, medicinal	India	Deciduous	Kusum	*Kumar* and *Bajpai* 250609 & 252207; *Kumar* et al. 263634 (LWG)
Sapotaceae							
257	*Diploknema butyracea* (Roxb.) Lam.	Nov. – Aug.	Timber & fire wood, fodder, seed oil as vegetable oil	India	Evergreen	Cheuli	Duthie (1903); Kanjilal (1933)
258	*Madhuca longifolia* (L.) Macbr. var. *latifolia* (Roxb.) Chev.	Feb. – Jul.	Timber wood, petals edible, seed for vegetable oil, medicinal	India	Deciduous	Mahua	*Maliya* 224978 (LWG)
259	*Manilkara hexandra* (Roxb.) Dub.	Sep. – Feb.	Fruits edible, timber wood, medicinal	India	Evergreen	Khirni	*Panigrahi* 2880 (BSA)
260	*Manilkara zapota* (L.) P. Royen	Dec. – Oct.	Ornamental, fruits edible, resin, medicinal	Tropical America	Evergreen	Chiku	Srivastava (1976); Saini (2005)
261	*Mimusops elengi* L.	Jan. – Aug.	Timber wood, fruits edible, medicinal	India	Evergreen	Maulsari	Kanjilal (1933); Srivastava (1976); Saini (2005)
Simaroubaceae							
262	*Ailanthus excelsa* Roxb.	Feb. – Jun.	Low grade timber, medicinal, gum & resin	India	Deciduous	Mahanim	*Bajpai* et al. 264431 (LWG)
Solanaceae							
263	*Solanum donianum* Walp.	Most part of the year	Medicinal	Tropical America	Evergreen	----	*Kumar* and *Bajpai* 252179 (LWG)
264	*Solanum erianthum* D. Don	Most part of the year	Medicinal	Tropical America	Evergreen	Ban Bhanta	Panigrahi et al. (1969); Saini (2005); Maliya and Datt (2010)
Symplocaceae							
265	*Symplocos racemosa* Roxb.	Dec. – Jun.	Medicinal	India	Evergreen	Lodh	Duthie (1903); Kanjilal (1933)
Tamaricaceae							
266	*Tamarix dioica* Roxb. ex Roth	Jul. – Nov.	Medicinal	India	Evergreen	Lal Jhau	Panigrahi et al. (1969); Singh (1997); Saini (2005)
267	*Tamarix gallica* L. var. *indica* (Willd.) Ehrenb.	Jul. – May	Ornamental tree, medicinal	India	Evergreen	Jhau	Panigrahi et al. (1969)
Ulmaceae							
268	*Holoptelea integrifolia* (Roxb.) Planch.	Feb. – Jul.	Timber & fire wood, fodder, medicinal, seeds edible	India	Deciduous	Chilbil	*Bajpai* et al. 263727 (LWG)
269	*Trema orientalis* (L.) Bl.	Feb. – Jul.	Charcoal, fibre from bark, medicinal	Tropical Asia	Deciduous	Andia	Kanjilal (1933); Srivastava (1976); Saini (2005)
Urticaceae							
270	*Debregeasia longifolia* (Burm. f.) Wedd.	Jul. – Feb.	Charcoal, fibre from bark, medicinal	India	Evergreen	Tushiari	Kanjilal (1933); Singh (1997)
Verbenaceae							
271	*Duranta erecta* L.	Jul. – Jan.	Ornamental	Tropical America	Evergreen	Neel Kanta	Singh (1997); Saini (2005)
MONOCOTYLEDONS							
Arecaceae							
272	*Borassus flabellifer* L.	Mar. – Aug.	Ornamental, fruits (endosperm) edible	India	Evergreen	Tad	Kanjilal (1933); Srivastava (1976); Saini (2005)
273	*Caryota urens* L.	Mar. – Jun.	Ornamental, leaves for fibre	India	Evergreen	Ramgoh	*Mishra* 7995 (BSA)
274	*Cocos nucifera* L.	Feb. – Oct.	Fruits (endosperm) edible, fibres from fruit pericarp	India	Evergreen	Nariyal	Srivastava (1976)
275	*Livistona chinensis* (Jacq.) R. Br.	Feb. – Oct.	Ornamental, leaves for fibre & handicraft	China	Evergreen	China Palm	Srivastava (1976)
276	*Phoenix sylvestris* (L.) Roxb.	Mar. – Dec.	Ornamental, fruits edible, leaves for handicraft	India	Evergreen	Khajur	Kanjilal (1933); Srivastava (1976); Saini (2005)
277	*Roystonea regia* (Kunth) Cook	Feb. – Dec.	Ornamental	Cuba	Evergreen	Vakka	Srivastava (1976)
Pandanaceae							
278	*Pandanus odorifer* (Forssk.) Kuntze	Mar. – Aug.	Perfume & aromatic oil	India	Evergreen	Kewra	Srivastava (1976); Saini (2005)

Table 2. Conservation status of the tree species as per IUCN Red List of Threatened Species (EN = Endangered, VU = Vulnerable, NT = Near Threatened, LC = Least Concern and DD = Data Deficient).

Sp. No.	Botanical Name	Families	IUCN status
1	*Alstonia scholaris* (L.) R. Br.	Apocynaceae	LC
2	*Jacaranda mimosifolia* D. Don	Bignoniaceae	VU
3	*Commiphora wightii* (Arn.) Bhandari	Burseraceae	DD
4	*Shorea robusta* Gaertn. f.	Dipterocarpaceae	LC
5	*Bauhinia acuminata* L.	Fabaceae (Caesalpinioideae)	LC
6	*Delonix regia* (Boj. ex Hook.) Raf.	Fabaceae (Caesalpinioideae)	VU
7	*Saraca asoca* (Roxb.) de Wilde	Fabaceae (Caesalpinioideae)	VU
8	*Dalbergia latifolia* Roxb.	Fabaceae (Faboideae)	VU
9	*Erythrina variegata* L.	Fabaceae (Faboideae)	LC
10	*Millettia peguensis* Ali	Fabaceae (Faboideae)	DD
11	*Pongamia pinnata* (L.) Pierre	Fabaceae (Faboideae)	LC
12	*Pterocarpus marsupium* Roxb.	Fabaceae (Faboideae)	VU
13	*Acacia auriculiformis* A. Cunn. ex Benth.	Fabaceae (Mimosoideae)	LC
14	*Punica granatum* L.	Lythraceae	LC
15	*Woodfordia fruticosa* (L.) Kurz.	Lythraceae	LC
16	*Eriolaena wallichii* DC.	Malvaceae	VU
17	*Ficus carica* L.	Moraceae	LC
18	*Maclura cochinchinensis* (Lour.) Corner	Moraceae	LC
19	*Chionanthus ramiflorus* Roxb.	Oleaceae	DD
20	*Jasminum brevipetiolatum* Duthie	Oleaceae	EN
21	*Santalum album* L.	Santalaceae	VU
22	*Dimocarpus longan* Lour.	Sapindaceae	NT
23	*Borassus flabellifer* L.	Arecaceae	EN
24	*Pandanus odorifer* (Forssk.) Kuntze	Pandanaceae	LC

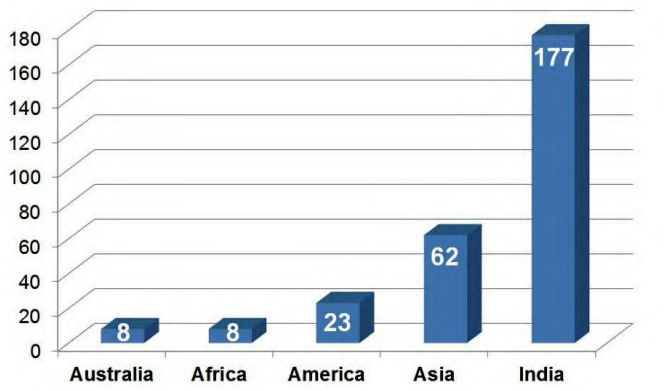

Figure 4. Number of species of different native areas.

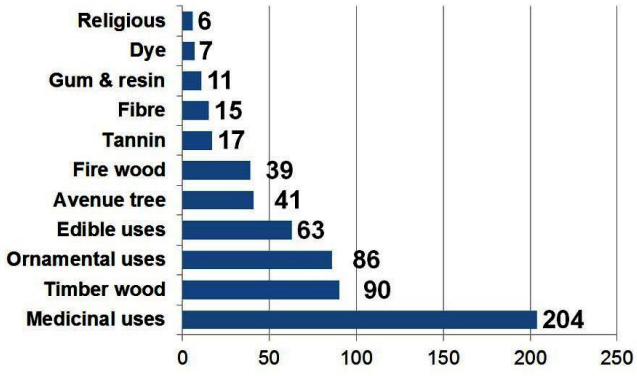

Figure 5. Number of species used for different purposes.

are used for timber, ornamental (86), edible (63), avenue (41), firewood (39), tannin (17), fibre (15), gum and resin (11) and seven species for dye production (Figure 5). In addition, six tree species namely *Calotropis gigantea* (L.) Dryand., *Bauhinia racemosa* Lamk., *Guazuma ulmifolia* Lamk., *Ficus benghalensis* L., *Ficus religiosa* L. and *Aegle marmelos* (L.) Correa have also been found of religious faith. The phenological assessment discloses that the maximum species flowers in the spring (ca. 80 species) followed by 74 in summer, 73 in winter and 30 in rainy season (Figure 6). On an average about 21.8±8.2 tree species have been observed in fruiting throughout the year which fitswell for wildlife as well as forest ecosystem. About 9% trees belong to various threat categories under IUCN Red List of Threatened Species (IUCN 2013), among them two are Endangered, seven are Vulnerable, one is Near Threatened, 11 are Least Concern, and three are Data Deficient (Table 2).

DISCUSSION

The extensive survey of the study area reveals that the *Shorea robusta* Gaertn. f., *Mallotus* spp., *Terminalia* spp., *Tectona grandis* L. f., *Syzygium* spp., *Haldina cordifolia* (Roxb.) Ridsdale, *Mitragyna parvifolia* (Roxb.) Korth., *Ficus* spp., etc. are dominant species in the forest area. In addition, *Ehretia laevis* Roxb., *Lagerstroemia parviflora* Roxb., *Diospyros* spp., *Schleichera oleosa* (Lour.) Merr., *Bridelia retusa* (L.) A. Juss., *Hymenodictyon orixense* (Roxb.) Mabberley, *Madhuca longifolia* (L.) Macbr. var. *latifolia* (Roxb.) Chev., *Aegle marmelos* (L.) Correa, *Cassia*

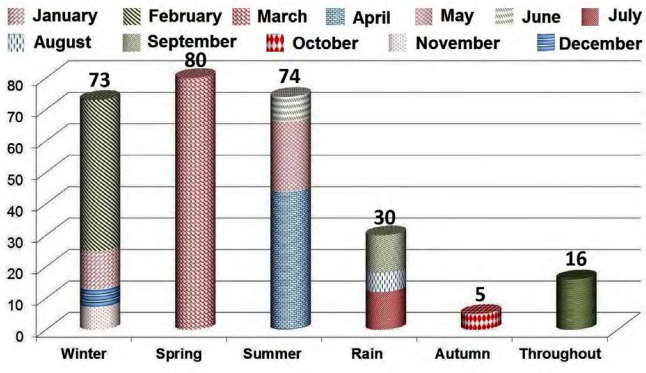

Figure 6. Number of flowering species in different seasons.

fistula L., *Bauhinia* spp., *Miliusa tomentosa* (Roxb.) Sinclair, *Buchanania cochinchinensis* (Lour.) Almeida, *Bombax ceiba* L., *Dalbergia sissoo* Roxb. ex DC. Mabberley, *Barringtonia acutangula* (L.) Gaertn., etc. are the relatively abundant species (Figure 7). The grasslands located in the core zone of major forests, are represented by only a few tree species such as *Bombax ceiba* L., *Grewia tiliifolia* Vahl, *Sterculia villosa* Roxb. ex Sm., *Ceriscoides turgida* (Roxb.) Tirveng., *Hymenodictyon orixense* (Roxb.) Mabberley etc. The forest vegetation of the study area can be divisible into upper, middle, lower strata and ground vegetation. The upper stratum constitutes the canopy of large and huge trees like *Shorea robusta* Gaertn. f., *Tectona grandis* L. f., *Terminalia elliptica* Willd., *Madhuca longifolia* (L.) Macbr. var. *latifolia* (Roxb.) Chev., *Ficus benghalensis* L., *Ficus racemosa* L., *Bombax ceiba* L., *Sterculia villosa* Roxb. ex Sm., *Lannea coromandelica* (Houtt.) Merr. etc. The midddle stratum is represented by *Hymenodictyon orixense* (Roxb.) Mabberley, *Syzygium cumini* (L.) Skeels, *Ehretia laevis* Roxb., *Lagerstroemia parviflora* Roxb., *Diospyros exculpta* Buch.-Ham., *Mallotus philippensis* (Lam.) Muell.-Arg., *M. nudiflorus* (L.) Kulju & Welzen, *Ficus hispida* L. f., *Streblus asper* Lour. etc. The lower and ground strata consist of shrubby and herbaceous plants. The present work reveals that the study area endures a good number of tree species. However, more than 8% trees fall under different categories of IUCN red list encountering several natural as well as anthropogenic threats (Bajpai et al. 2015). Thus a proper management plan is highly required for their conservation and sustainable utilisation.

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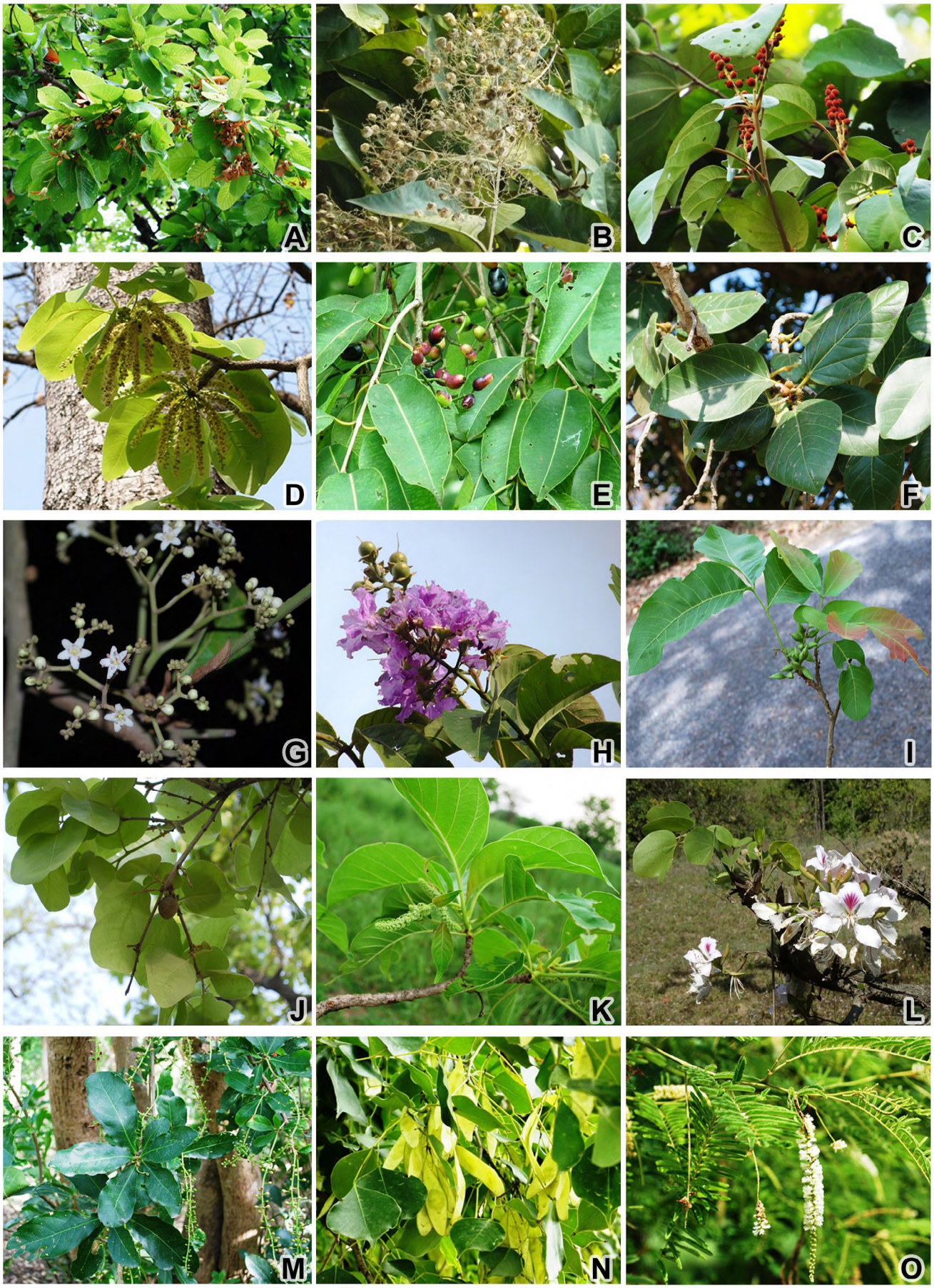

Figure 7. Some major tree species of Terai region: **A**, *Shorea robusta* Gaertn. f.; **B**, *Tectona grandis* L. f.; **C**, *Mallotus philippensis* (Lamk.) Muell.-Arg.; **D**, *Terminalia bellirica* (Gaertn.) Roxb.; **E**, *Syzygium cumini* (L.) Skeels; **F**, *Ficus benghalensis* L.; **G**, *Ehretia laevis* Roxb.; **H**, *Lagerstroemia speciosa* (L. ex Murray) Pers.; **I**, *Schleichera oleosa* (Lour.) Merr.; **J**, *Diospyros melanoxylon* Roxb.; **K**, *Hymenodictyon orixense* (Roxb.) Mabberley; **L**, *Bauhinia variegata* L.; **M**, *Barringtonia acutangula* (L.) Gaertn.; **N**, *Dalbergia sissoo* Roxb. ex DC.; **O**, *Acacia catechu* (L. f.) Willd.