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Assessment and Preservation of Tree Diversity of Uttar Pradesh, India

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Introduction

India is one of the 17 mega diverse countries in the world with four biodiversity hotspots. The country consists of ca. 19294 flowering plants (Karthikeyan, 2000) out of which ca. 2560 species have been estimated as trees (Rao, 1994). In addition to many general floristic studies available during the early 20th century, the first systematic account on tree species of the entire country was brought out by Brandis (1906) in his famous book 'Indian Trees' in which he has mentioned a total of 4,400 species including trees, shrubs and woody climbers from the then British India. Afterwards no efforts have been made in the recent time to reevaluate the Indian trees from the present political boundary of the country while over the years considerable changes have occurred both with regard to the number of species as well as circumscription of taxa and also nomenclature. The subsequent publications after Brandis (1906) appeared on Indian trees are either on regional basis or do not cover the entire trees of the country. The reassessment of trees of the entire country can only be possible when the information on tree species of all the provinces or phytogeographic zones are available.

As far as Uttar Pradesh is concerned, the province does not have any checklist or a flora of its own since the publication of 'Flora of the Upper Gangetic Plains' by Duthie (1906). Still the country depends on this flora written more than 100 years ago in which the plants of sub Himalayan to Siwalik

ranges have been included. Although there is no doubt about the utility of this flora even in the present time, however, it has become substantially out dated due to many changes in the circumscription and nomenclature of many taxa as well as reorientation of political boundary of the state. The recent checklist by Khanna et al. (1999) has been compiled before the separation of Uttarakhand from erstwhile Uttar Pradesh and therefore it includes the plants of both provinces in amalgamated form. Currently, Srivastava (2004) has presented an overview of floristic diversity of Uttar Pradesh and analysed 2711 angiosperms under 182 families and 1088 genera. After Duthie (1906), several district floras and other publications have been brought out by different workers on plant diversity of Uttar Pradesh (Kanjilal, 1933; Srivastava, 1938; Watts, 1953; Panigrahi & Ram Saran, 1967; Singh, 1969; Srivastava, 1976; Sharma & Dhakre, 1978; Paliwal & Singh, 1982; Sinha & Verma 1992; Singh, 1994; Sharma & Dhakre, 1995; Verma & Ranjan, 1995; Singh, 1997; Verma & Shukla, 1997; Saini, 2005; Singh & Khanuja, 2006; Srivastava, 2006; Mishra & Pal, 2010; Narain, 2010). However, a separate assessment exclusively devoted to all tree wealth of the entire province has not been done so far.

Uttar Pradesh is one of the largest provinces of India occupying an area of about 2,41,286 sq. km out of which 21,291 sq. km consists of forest and tree cover which is only about 3% of total forest cover of the country because the maximum lands have been occupied by agricultural fields and dense human



population. Although the forest cover is very minimal, however, it harbors good amount of flowering plants due to its varied climatic conditions. On the basis of forest and vegetation types, the province is broadly categorized into following four major zones: 1. Terai Region (northern part adjacent to Nepal which is tropical moist deciduous type), 2. Gangetic Plain (central area which is agriculturally most fertile and has tropical dry deciduous type of vegetation), 3. Vindhyan Region (between the Gangetic plains and the Deccan Peninsula with tropical dry deciduous type of vegetation) and 4. Semi arid Region (only a few areas in districts like Agra, Mathura, Etawah, Auraya and Jalaun with tropical dry deciduous type of vegetation).

Since last two years an effort has been taken to reassess the entire tree species (wild and cultivated) found in the present political boundary of Uttar Pradesh based on literature survey, field visit and herbarium study. All collected specimens have been deposited at National Botanical Research Institute (LWG) for future record. The preliminary studies reveal that Uttar Pradesh comprises ca. 410 tree species belonging to 227 genera and 66 families out of the 2711 angiosperms. The maximum numbers of the tree species have been recorded in Leguminosae (74 spp.) followed by Euphorbiaceae (37 spp.), Moraceae (28 spp.), Rubiaceae (16 spp.), Apocynaceae (15 spp.), Sterculiaceae (13 spp.), Rutaceae (10 spp.) etc. Similarly, *Ficus* with 18 spp., *Acacia* with 13 spp., *Bauhinia* with 8 spp., *Cassia* with 7 spp., *Diospyros* with 7 spp. and *Terminalia* with 6 spp. are some of the dominant genera having maximum number of tree species. There are about 148 genera which are represented by solitary species. As far as endemism is concerned, the province is poorly represented by 10 species of angiosperm (Srivastava, 2004), out of which only 2 species (*i.e.* *Derris kanjilalii* Sahni & H. B. Naithani and *Diospyros holeana* Gupta & Kanjilal) belong to tree. In the present study the families have been chiefly arranged following Bentham & Hooker (1862-83) classification and the genera and species alphabetically

under each family. To reduce the space, only a list of species name has been provided here. The comprehensive checklist and a flora of tree species of Uttar Pradesh which are presently under the preparation will be published separately with conducting more field and herbarium studies.

Preservation of tree species

The trees are fast disappearing and have become more vulnerable than other plant species due to deforestation, urbanization and rapid depletion meeting various human needs. According to Thorne (2002) and Scotland & Wortley (2003), the number of species of flowering plants is estimated to be in the range of 2,50,000 to 4,00,000. Out of these, about 1,00,000 species are expected as trees. Oldfield et al. (1998) have documented over 7300 tree species as globally threatened. Today, when 2011 is celebrated as 'International year of Forests' information on tree species distributed in any part of the world cannot be over emphasized. Over the last 20 years, much concern has been shown on the loss of plant genetic resources due to human and natural factors. To reduce the risk of loss of genetic materials of wild and cultivated varieties, worldwide efforts are being made towards *in situ* and *ex situ* conservation of plant germplasm. The conservation possibilities have been widened by the recent advances in plant genomics which allow the retrieval of large amount of information from DNA. In view of this, the plants are now stored in the form of DNA which has many merits over other systems of storing plants. The DNA bank is a particular type of genetic resource bank that preserves and distributes the DNA samples and provides associated information and is useful in several application, *e.g.* characterizing true genetic variation in life forms, understanding genetic and evolutionary relationships, DNA barcoding for rapid species identification, association genetics, comparative genomics to monitor the changes in the genetic structure, applications to plant breeding and for the development of new molecular markers and search



for gene variants, etc. In the present work, apart from inventorying the tree species, a plant DNA bank has also been developed at CSIR- NBRI, Lucknow to preserve their genetic materials.

The DNAs have been extracted from fresh leaves or from silica gel dried leaf tissues from more than 300 tree species chiefly growing in Lucknow and its surroundings. Minimum 3 - 5 accessions of each species have been collected for DNA extraction. Good quality genomic DNA has been isolated by standard CTAB-Chloroform method. Milligramm

(0.5 ml) quantity of DNA has been prepared from each accession and quality has been checked on agarose gel. The extracted amount of DNA can be split and sent out to users as 30 µl aliquots to 15 different researchers according to requirement. Till date, DNA of more than 500 accessions of different tree species are available in DNA bank at CSIR- NBRI, Lucknow. The DNA samples have been coded and divided into two quantities, one for long term preservation at -800°C and the other one as working sample.

Enumeration of the species

FAMILY	SPECIES
Dilleniaceae	<i>Dillenia aurea</i> Sm., <i>D. indica</i> L., <i>D. pentagyna</i> Roxb.
Magnoliaceae	<i>Magnolia grandiflora</i> L., <i>Michelia champaca</i> L.
Annonaceae	<i>Annona muricata</i> L., <i>A. reticulata</i> L., <i>A. squamosa</i> L., <i>Miliusa tomentosa</i> (Roxb.) Finet & Gagnep., <i>M. velutina</i> (Dunal) Hook. f. & Thoms., <i>Polyalthia longifolia</i> (Sonn.) Thw., <i>P. suberosa</i> (Roxb.) Thw.
Capparaceae	<i>Capparis decidua</i> (Forsk.) Edgew., <i>Crataeva adansonii</i> subsp. odora (Buch.-Ham.) Jacobs, <i>C. magna</i> (Lour.) DC., <i>C. unilocularis</i> Buch.-Ham.
Bixaceae	<i>Bixa orellana</i> L., <i>Cochlospermum religiosum</i> (L.) Alston
Flacourtiaceae	<i>Casearia elliptica</i> Willd., <i>C. graveolens</i> Dalz., <i>C. tomentosa</i> Roxb., <i>Flacourtia indica</i> (Burm. f.) Merr., <i>F. Jangomas</i> (Lour.) Raeu., <i>Xylosma longifolium</i> Clos.
Pittosporaceae	<i>Pittosporum floribundum</i> Wight & Arn.
Tamaricaceae	<i>Tamarix aphylla</i> (L.) Karsten, <i>T. dioica</i> Roxb. ex Roth., <i>T. indica</i> Willd.
Dipterocarpaceae	<i>Shorea robusta</i> Roxb. ex Gaertn. f.
Malvaceae	<i>Hibiscus mutabilis</i> L., <i>H. rosa-sinensis</i> L., <i>H. tiliaceus</i> L., <i>Kydia calycina</i> Roxb., <i>Thespesia lampas</i> (Cav.) Dalz. & Gibs., <i>T. populnea</i> (L.) Soland. ex Correa
Bombacaceae	<i>Adansonia digitata</i> L., <i>Bombax ceiba</i> L., <i>Ceiba pentandra</i> (L.) Gaertn.
Sterculiaceae	<i>Abroma augusta</i> (L.) L. f., <i>Eriolaena candollei</i> Wall., <i>E. hookeriana</i> Wight & Arn., <i>Firmiana colorata</i> (Roxb.) R. Br., <i>Guazuma ulmifolia</i> Lam., <i>Helicteres isora</i> L., <i>Kleinhovia hospida</i> L., <i>Pterospermum acerifolium</i> (L.) Willd., <i>P. lanceifolium</i> Roxb., <i>Pterygota alata</i> (Roxb.) R. Br., <i>Sterculia foetida</i> L., <i>S. urens</i> Roxb., <i>S. villosa</i> Roxb. ex Sm.



Tiliaceae	<i>Grewia abutilifolia</i> Vent. ex Juss., <i>G. asiatica</i> L., <i>G. disperma</i> Rottl., <i>G. elastica</i> Royle, <i>G. flavescens</i> Juss., <i>G. helicterifolia</i> Wall. ex G. Don, <i>G. hirsuta</i> Vahl., <i>G. rotundifolia</i> Juss., <i>G. subinaequalis</i> DC., <i>G. tiliaefolia</i> Vahl.
Averrhoaceae	<i>Averrhoa bilimbi</i> L., <i>A. carambola</i> L.
Rutaceae	<i>Aegle marmelos</i> (L.) Correa, <i>Atlantia monophylla</i> (L.) Correa, <i>Citrus aurantium</i> L., <i>C. aurantifolia</i> (Christm. & Panz.) Swingle, <i>C. lemon</i> (L.) Burm. f., <i>C. maxima</i> (Burm.) Merr., <i>C. medica</i> L., <i>Limonia acidissima</i> L., <i>Murraya koenigii</i> (L.) Spreng., <i>M. paniculata</i> (L.) Jack.
Simaroubaceae	<i>Ailanthus excelsa</i> Roxb., <i>Balanites aegyptiaca</i> (L.) Delile
Ochanaceae	<i>Ochna obtusata</i> ssp. <i>gamblei</i> (King ex Brandis) Kavis
Burseraceae	<i>Boswellia serrata</i> Roxb. ex Colebr., <i>Commiphora wightii</i> (Arn.) Bhandari, <i>Garuga pinnata</i> Roxb.
Meliaceae	<i>Aphanamixis polystachya</i> (Wall.) Park, <i>Azadirachta indica</i> A. Juss., <i>Heynea trijuga</i> Roxb. ex Sims, <i>Melia azedarach</i> L., <i>Soymida febrifuga</i> (Roxb.) A. Juss., <i>Swietenia mahagoni</i> Jacq., <i>Toona ciliata</i> M. Roem., <i>Trichilia connaroides</i> (Wight & Arn.) Benthelzen
Olacaceae	<i>Olax zeylanica</i> L.
Celastraceae	<i>Elaeodendron glaucum</i> (Rottl.) Pers., <i>Gymnosporia senegalensis</i> (Lam.) Loes.
Rhamnaceae	<i>Rhamnus davurica</i> Pallas, <i>R. persica</i> Boiss., <i>R. triquetra</i> (Wall.) Brandis, <i>Ziziphus mauritiana</i> var. <i>fruticosa</i> (Haines) Seb. & Balakr., <i>Z. mauritiana</i> var. <i>mauritiana</i> Lamk., <i>Z. nummularia</i> (Burm.f.) Wight. & Arn., <i>Z. rugosa</i> Lamk.
Sabiaceae	<i>Meliosma simplicifolia</i> (Roxb.) Walp.
Anacardiaceae	<i>Buchanania lanzan</i> Spreng., <i>Lansea coromandelica</i> (Houtt.) Merr., <i>Mangifera indica</i> L., <i>Pistacia khinjuk</i> Stocks, <i>Semecarpus anacardium</i> L. f., <i>Spondias pinnata</i> (L.f.) Kurz.
Moringaceae	<i>Moringa concanensis</i> Nimmo, <i>M. oleifera</i> Lamk.
Leguminosae-papilionoideae	<i>Butea monosperma</i> (Lam.) Taub., <i>B. monosperma</i> var. <i>lutea</i> (Witt.) Maheshwari, <i>B. superba</i> Roxb., <i>Derris kanjilalii</i> Sahni & Naithani, <i>Dalbergia lanceolaria</i> ssp. <i>laneolaria</i> L. f., <i>D. lanceolaria</i> ssp. <i>paniculata</i> (Roxb.) Thoth., <i>D. lanceolata</i> L., <i>D. latifolia</i> Roxb., <i>D. sissoo</i> Roxb., <i>Erythrina stricta</i> Roxb., <i>E. suberosa</i> Roxb., <i>E. variegata</i> L., <i>Milletia extensa</i> (Benth.) Benth. ex Baker, <i>M. ovalifolia</i> Kurz., <i>M. peguensis</i> Ali, <i>Mucuna prureins</i> (L.) DC., <i>Ougeinia oojeinensis</i> (Roxb.) Hochr., <i>Pongamia pinnata</i> (L.) Pierre, <i>Pterocarpus indicus</i> Willd., <i>P. marsupium</i> Roxb., <i>Sesbania grandiflora</i> (L.) Pers., <i>S. sesban</i> (L.) Merr.
Leguminosae-caesalpinioideae	<i>Bauhinia acuminata</i> L., <i>B. blackeana</i> Dunn., <i>B. malabarica</i> Roxb., <i>B. purpurea</i> L., <i>B. racemosa</i> Lam., <i>B. roxburghiana</i> Voigt., <i>B. tomentosa</i> L., <i>B. variegata</i> L., <i>Brownea ariza</i> Benth., <i>B. hybrida</i> Hort. ex Backer, <i>Caesalpinia bonduc</i> (L.) Roxb., <i>C. sappan</i> L., <i>Cassia auriculata</i> L., <i>C. fistula</i> L., <i>C. javanica</i> L., <i>C. nodosa</i> Buch.-Ham. ex Roxb., <i>C. roxburghii</i> DC., <i>C. siamea</i> Lamk., <i>C. surattensis</i> Burm. f., <i>Delonix regia</i> (Boj. ex Hook.) Raf., <i>Hardwickia binata</i> Roxb., <i>Parkinsonia aculeata</i> L., <i>Peltophorum pterocarpum</i> (DC.) Baker ex K. Heyne, <i>Saraca asoca</i> (Roxb.) de Wilde, <i>Tamarindus indica</i> L.



Leguminosae-mimosoideae	<i>Acacia auriculiformis</i> A. Cunn. ex Benth., <i>A. catechu</i> (L.f.) Willd., <i>A. eburnea</i> (L.f.) Willd., <i>A. farnesiana</i> (L.) Willd., <i>A. ferruginea</i> DC., <i>A. jacquemontii</i> Benth., <i>A. lenticularis</i> Buch.-Ham. ex Benth., <i>A. leucophloea</i> (Roxb.) Willd., <i>A. modesta</i> Wall., <i>A. nilotica</i> (L.) Delile, <i>A. nilotica</i> (L.) Del. ssp. <i>indica</i> (Benth.) Brenan, <i>A. senegal</i> (L.) Willd., <i>A. tomentosa</i> Willd., <i>Adenanthera pavonina</i> L., <i>Albizia chinensis</i> (Osbeck) Merr., <i>A. lebbeck</i> (L.) Benth., <i>A. lucidior</i> (Steud.) Nielsen, <i>A. odoratissima</i> (L.f.) Benth., <i>A. procera</i> (Roxb.) Benth., <i>Dichrostachys cinerea</i> (L.) Wight & Arn. var. <i>indica</i> Brenan & Brummitt, <i>Indopiptadenia oudhensis</i> (Brandis) Brenan, <i>Lysiloma latisiliquum</i> (L.) Benth., <i>Pithecellobium dulce</i> (Roxb.) Benth., <i>Prosopis chilensis</i> (Molina) Stuntz, <i>P. cineraria</i> (L.) Druce, <i>P. juliflora</i> (Sw.) DC., <i>P. julifolia</i> DC., <i>Samanea saman</i> (Jacq.) Merr.
Rosaceae	<i>Eriobotrya japonica</i> (Thunb.) Lindl., <i>Prunus persica</i> (L.) Batsch, <i>Pyrus pashia</i> var. <i>pashia</i> Buch.-Ham. ex D. Don
Rhizophoraceae	<i>Carallia brachiata</i> (Lour.) Merr.
Combretaceae	<i>Anogeissus latifolia</i> (Roxb. ex DC.) Wall. ex Guill. & Perr., <i>A. pendula</i> Edgew., <i>A. sericea</i> Brandis, <i>Terminalia alata</i> Heyne ex Roth., <i>T. arjuna</i> (Roxb. ex DC.) Wight & Arn., <i>T. Bellirica</i> (Gaertn.) Roxb., <i>T. catappa</i> L., <i>T. chebula</i> Retz., <i>T. muelleri</i> Benth.
Myrtaceae	<i>Callistemon citrinus</i> (Curtis) Skeels, <i>C. lanceolatus</i> DC., <i>Eucalyptus camaldulensis</i> Dehnh., <i>E. citriodora</i> Hook., <i>E. tereticornis</i> Sm., <i>Melaleuca leucadendron</i> L., <i>Psidium cattleianum</i> Sabine, <i>P. guajava</i> L., <i>Syzygium cumini</i> (L.) Skeels, <i>S. heyneanum</i> (Duthie) Wall. ex Gamble, <i>S. jambos</i> (L.) Alston, <i>S. nervosum</i> DC.
Lecythidaceae	<i>Barringtonia acutangula</i> (L.) Gaertn., <i>Careya arborea</i> Roxb.
Lythraceae	<i>Lagerstroemia floribunda</i> Jack., <i>L. parviflora</i> Roxb., <i>L. speciosa</i> (L.) Pers., <i>L. thorelii</i> Gagnep., <i>Lawsonia inermis</i> L., <i>Woodfordia fruticosa</i> (L.) Kurz.
Punicaceae	<i>Punica granatum</i> L.
Caricaceae	<i>Carica papaya</i> L.
Araliaceae	<i>Brassaiopsis aculeata</i> Seem., <i>Heteropanax fragrans</i> Seem.
Alangiaceae	<i>Alangium begonifolium</i> Bail., <i>A. salvifolium</i> (L.f.) Wangerin
Caprifoliaceae	<i>Sambucus nigra</i> L.
Rubiaceae	<i>Catunaregam spinosa</i> (Thunb.) Tirveng., <i>Ceriscoides turgida</i> (Roxb.) Tirveng., <i>Gardenia latifolia</i> Soland, <i>Haldina cordifolia</i> (Roxb.) Ridsdale, <i>Hamelia patens</i> Jacq., <i>Hymenodictyon orixense</i> (Roxb.) Mabb., <i>Hyptianthera stricta</i> Wight & Arn., <i>Ixora pavetta</i> Andrews, <i>I. undulata</i> Roxb., <i>Mitragyna parvifolia</i> (Roxb.) Korth., <i>M. parvifolia</i> var. <i>parvifolia</i> Ridsdale., <i>Morinda pubescens</i> Sm., <i>Nauclea cadamba</i> Roxb., <i>Tamilnadia uliginosa</i> (Retz.) Tirveng. & Sastre, <i>Wendlandia heynei</i> (Roem. & Schult.) Santapau & Merch., <i>W. tinctoria</i> (Roxb.) DC.
Myrsinaceae	<i>Ardisia solanacea</i> (Poir) Roxb.
Sapotaceae	<i>Achras zapota</i> L., <i>Diploknema butyracea</i> (Roxb.) Lam., <i>Madhuca longifolia</i> (J. Koenig. ex L.) Macbr., <i>M. longifolia</i> var. <i>latifolia</i> (Roxb.) Chevalier, <i>Manilkara hexandra</i> (Roxb.) Dubard, <i>M. zapota</i> (L.) Royen, <i>Mimusops elengi</i> L.
Ebenaceae	<i>Diospyros chloroxylon</i> Roxb., <i>D. cordifolia</i> Roxb., <i>D. exsculpta</i> Buch.-Ham., <i>D. holeana</i> Gupta & Kanjilal, <i>D. malabarica</i> (Desr.) Kostel., <i>D. melanoxyton</i> Roxb., <i>D. montana</i> Roxb.



Symplocaceae	<i>Symplocos racemosa</i> Roxb.
Oleaceae	<i>Chionanthus roxburghii</i> var. <i>intermedius</i> (Wight) Srivastava & Kapoor, <i>Jasminum brevipetiolatum</i> Duthie ex Brandis, <i>Nyctanthes arbor-tristis</i> L., <i>Schrebera swietenoides</i> Roxb.
Salvadoraceae	<i>Salvadora oleoides</i> Decne., <i>S. persica</i> L.
Apocynaceae	<i>Alstonia macrophylla</i> Wall. ex G. Don, <i>A. scholaris</i> (L.) R. Br., <i>Carissa carandas</i> L., <i>C. spinarum</i> L., <i>Holarrhena antidysenterica</i> (Roth.) A. DC., <i>H. pubescens</i> (Buch.-Ham.) Wall. ex G. Don, <i>Nerium indicum</i> Mill., <i>Plumeria alba</i> L., <i>P. rubra</i> L., <i>P. rubra</i> L. forma <i>acuminata</i> (Ait.) Wood., <i>Tabernaemontana divaricata</i> (L.) R. Br. ex Roem. & Schult., <i>Thevetia peruviana</i> (Pers.) K. Schum., <i>Wrightia arborea</i> (Dennst.) Mabberley, <i>W. tinctoria</i> R. Br., <i>W. tomentosa</i> (Roxb.) Roem. & Schult.
Asclepiadaceae	<i>Calotropis gigantea</i> (L.) Ait.
Loganiaceae	<i>Strychnos nux-vomica</i> L., <i>S. potatorum</i> L. f.
Boraginaceae	<i>Cordia dichotoma</i> Forst. f., <i>C. macleodii</i> (Griff.) Hook. f. & Thoms., <i>C. obliqua</i> var. <i>obliqua</i> Willd., <i>C. sinensis</i> Lam., <i>C. sebestena</i> L., <i>C. vestita</i> Hook. f. & Thoms., <i>Ehretia acuminata</i> var. <i>acuminata</i> R. Br., <i>E. aspera</i> Willd., <i>E. laevis</i> Roxb.
Solanaceae	<i>Solanum erianthum</i> D. Don, <i>S. incanum</i> L.
Bignoniaceae	<i>Crescentia alata</i> Kunth., <i>Dolichandrone falcata</i> (Wall. ex DC.) Seem., <i>D. spathacea</i> (L. f.) K. Schum., <i>Haplophragma adenophyllum</i> (Wall. ex G. Don) Dop, <i>Handroanthus impetiginosus</i> (Mart. ex DC.) Mattos, <i>Jacaranda mimosifolia</i> D. Don, <i>Kigelia Africana</i> (Lam.) Benth., <i>Millingtonia hortensis</i> L. f., <i>Oroxylum indicum</i> (L.) Vent., <i>Pajanelia longifolia</i> (Willd.) K. Schum., <i>Spathodea campanulate</i> Beauv., <i>Stereospermum chelonoides</i> (L. f.) DC., <i>S. colais</i> (Buch.-Ham. ex Dillw.) Mabberley, <i>Tabebuia aurea</i> (Silva Manso) Benth. & Hook. f. ex S. Moore, <i>T. rosea</i> (Bertol) DC., <i>Tecomella undulata</i> (Sm.) Seem., <i>Tecoma stans</i> (L.) Juss. ex Kunth
Verbenaceae	<i>Callicarpa arborea</i> Roxb., <i>Clerodendrum phlomidis</i> L.f., <i>Duranta repens</i> L., <i>Gmelina arborea</i> Roxb. ex Sm., <i>G. asiatica</i> L., <i>Premna barbata</i> Wallich ex Schaeur, <i>P. gmelinoides</i> Haines, <i>P. mollissima</i> Roth., <i>Tectona grandis</i> L. f., <i>Vitex leucoxylon</i> Linn.f., <i>V. negundo</i> L.
Lauraceae	<i>Beilschmiedia roxburghiana</i> Nees, <i>Cinnamomum camphora</i> Nees, <i>Litsea chinensis</i> Lamk., <i>L. glutinosa</i> (Lour.) Rob., <i>L. monopetala</i> (Roxb.) Pers., <i>L. salicifolia</i> var. <i>laurifolia</i> Hook. f., <i>Persea gamblei</i> (King ex Hook. f.) Kosterm., <i>Phoebe pallida</i> (Nees) Nees
Santalaceae	<i>Santalum album</i> L.
Proteaceae	<i>Grevillea robusta</i> A. Cunn. ex R. Br.
Euphorbiaceae	<i>Aleurites moluccana</i> (L.) Willd., <i>Antidesma acidum</i> Retz., <i>A. bunius</i> (L.) Spreng, <i>A. ghaesembilla</i> Gaertn., <i>Aporosa octandra</i> (Buch.-Ham. ex D. Don) Vickery, <i>Bischofia javanica</i> Bl., <i>Breynia vitis-idaea</i> (Burm.f.) C. E. Fischer, <i>Bridelia montana</i> Willd. var. <i>communis</i> Prain, <i>B. retusa</i> (L.) A. Juss., <i>B. squamosa</i> (Lam.) Gehrm., <i>Cleistanthus collinus</i> (Roxb.) Benth. ex Hook. f., <i>Croton laevigatus</i> Vahl., <i>C. tiglium</i> L., <i>Drypetes roxburghii</i> (Wallich) Hurusawa, <i>Embllica officinalis</i> Gaertn., <i>Euphorbia antiquorum</i> L., <i>E. neriifolia</i> L., <i>E. nivulia</i> Buch.-Ham., <i>E. tirucalli</i> L., <i>Flueggea virosa</i> (Roxb. ex



	Willd.) Royle, <i>Glochidion assamicum</i> Hook. f., <i>G. lanceolarium</i> (Roxb.) Voigt, <i>G. multiloculare</i> (Rottler ex. Willd.) Voigt, <i>G. velutinum</i> Wight, <i>Homonium riparia</i> Lour., <i>Jatropha curcas</i> L., <i>J. grandifera</i> Roxb., <i>J. integerrima</i> Jacq., <i>Mallotus philippensis</i> (Lam.) Muell. Arg., <i>Phyllanthus acidus</i> (L.) Skeels, <i>Ricinus communis</i> L., <i>Sapium insigne</i> (Royle) Benth. ex Hook.f., <i>S. sebiferum</i> Roxb., <i>Securinega virosa</i> (Roxb. ex Willd.) Baill., <i>S. multiflora</i> (Juss.) Baill., <i>Trewia nudiflora</i> L., <i>T. polycarpa</i> Benth. & Hook. f.
Urticaceae	<i>Debregeasia longifolia</i> (Burm.f.) Wedd.
Ulmaceae	<i>Celtis australis</i> L., <i>C. tetrandra</i> Roxb., <i>Holoptelea integrifolia</i> (Roxb.) Planch., <i>Trema orientalis</i> (L.) Bl., <i>T. politoria</i> (Planch) Bl.
Moraceae	<i>Artocarpus gomezianus</i> subsp. zeylanicus Jarrett, <i>A. heterophyllus</i> Lam., <i>A. lakoocha</i> Roxb., <i>Broussonetia papyrifera</i> Vent., <i>Maclura cochinchinensis</i> (Lour.) Corner, <i>Ficus arnottiana</i> (Miq.) Miq., <i>F. benghalensis</i> var. <i>benghalensis</i> L., <i>F. benghalensis</i> var. <i>krishnae</i> C. DC., <i>F. benjamina</i> L., <i>F. carica</i> L., <i>F. elastica</i> Roxb. ex Hornem., <i>F. hispida</i> L. f., <i>F. mollis</i> Vahl., <i>F. oligodon</i> Miq., <i>F. palmata</i> Forssk., <i>F. pumila</i> L., <i>F. racemosa</i> L., <i>F. religiosa</i> L., <i>F. retusa</i> L., <i>F. rumphii</i> Bl., <i>F. semicordata</i> Buch.-Ham. ex Sm., <i>F. tomentosa</i> Roxb. ex Willd., <i>F. virens</i> Ait., <i>Morus alba</i> L., <i>M. alba</i> var. <i>atropurpurea</i> (Roxb.) Bureau, <i>M. laevigata</i> Wall. ex Brandis, <i>M. nigra</i> L., <i>Streblus asper</i> Lour.
Casuarinaceae	<i>Casuarina equisetifolia</i> L.
Salicaceae	<i>Populus</i> sp. L., <i>Salix babylonica</i> L., <i>S. tetrasperma</i> Roxb.
Musaceae	<i>Musa paradisiaca</i> L.
Juglandaceae	<i>Engelhardtia spicata</i> var. <i>colebrookiana</i> (Lindl. ex Wall.) Kuntze.
Arecaceae	<i>Areca catechu</i> L., <i>Borassus flabellifer</i> L., <i>Caryota urens</i> L., <i>Cocos nucifera</i> L., <i>Livistona chinensis</i> (Jacq.) R. Br., <i>Phoenix sylvestris</i> (L.) Roxb., <i>Roystonea regia</i> (H. B.K.) Cook
Pandanaceae	<i>Pandanus fascicularis</i> Lamk.

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Reference

- Bentham, G. & J. D. Hooker. 1862-83. Genera Plantarum, 3 Vols. London.
- Brandis, D. 1906. Indian Trees. London.
- Duthie, J. F. 1903-1929. Flora of the Upper Gangetic Plains and of the adjacent Siwalik and subhimalayan tracts. Calcutta.
- Kanjilal, P. C. 1933. A forest flora of Pilibhit, Oudh, Gorakhpur and Bundelkhand. Narendra Publ. house, Delhi.
- Karthikeyan, S. 2000. A Statistical analysis of flowering plants of India. In: Singh, N. P. et al. (eds.), Flora of India, Intro. Vol. (pt. 2): 201-217.
- Khanna, K. K. et al. 1999. Dicotyledonous plants of Uttar Pradesh -A checklist. Bishen Singh Mahendra Pal Singh, Dehra Dun.

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- Mishra, K. N. & M. Pal. 2010. Tree wealth of eastern Uttar Pradesh, India. *Plant Archives* 10 (2): 833-836.
- Narain, S. 2010. Changing tree diversity of Bundelkhand region (U. P.) India. *Indian J. Forest.* 33(2): 253-243.
- Oldfield, S. et al. 1998. *The World list of threatened trees.* World Conservation Press. UNEP- WCMC, Cambridge, UK.
- Paliwal, M. K. & V. P. Singh 1982. A contribution to angiospermic flora of Moradabad distt. U.P. (India). *J. Econ. Taxon. Bot.* 3(3): 851-861.
- Panigrahi, G. & Ram Saran. 1967. Contribution to the flora of Gorakhpur forest Division. *Bull. Bot. Surv. India* 19: 249-261.
- Rao, R. R. 1994. *Biodiversity in India (Floristic Aspects).* Bishen Singh Mahendra Pal Singh, Dehra Dun.
- Saini, D. C. 2005a. Flora of Baharaich district, Uttar Pradesh - I-IV. *J. Econ. Taxon. Bot.* 29 (3): 528-637.
- Saini, D. C. 2005b. Flora of Baharaich district, Uttar Pradesh - V. *J. Econ. Taxon. Bot.* 29 (4): 843- 920.
- Scotland, R.W. & Wortley, A.H.(2003). How many species of seed plants are there? *Taxon* 52 (1) : 101-104.
- Sharma, A. K. & J. S. Dhakre. 1978. Some noteworthy plant species from Agra. *J. Bombay Nat. Hist. Soc.* 75: 526-527.
- Sharma, A. K. & J. S. Dhakre. 1995. *Flora of Agra District.* Botanical Survey of India, Kolkata.
- Singh, A. K. 1994. Floristic Composition of Deoria district . *J. Econ. Taxon. Bot.* 18: 267-270
- Singh, K. K. 1997. *Flora of Dudhwa National Park.* Bishen Singh Mahendra Pal Singh, Dehra Dun.
- Singh, N. P. 1969. Flora of Bulandshahar distt. *Bull. Bot. Surv. India* 11: 1-22.
- Singh, S. C. & S. P. S. Khanuja. 2006. *Lucknow Flora.* CIMAP, Lucknow.
- Sinha, B. K. & B. K. Verma. 1992. Contribution to the flora of Banda distt. (UP)-III. *J. Econ. Taxon. Bot.* 16: 77-83.
- Srivastava, G. D. 1938. *Flora of Allahabad.* Allahabad University Stud. 14: 87-133. 15: 51-127.
- Srivastava, R. C. 2006. *Plant resources of Uttar Pradesh.* Dehra Dun.
- Srivastava, S. K. 2004. Floristic diversity in Uttar Pradesh- an overview. *J. Econ. Taxon. Bot.* 28 (2): 292-334.
- Srivastava, T. N. 1976. *Flora Gorakhpuriensis.* Today & tomorrow's Print & Publ., New Delhi.
- Thorne, R.F. (2002). How many species of seed plants are there? *Taxon* 51 (1) : 511-522.
- Verma, B. K. & V. Ranjan. 1995 *Flora of Lalitpur district (U.P.).* In: Pandey, A. K. (ed.), *Taxonomy and Biodiversity* , Delhi., pp. 87-94.
- Verma, B. K. & Shukla, G. 1997. On the flora and phytogeography of Jalaun district U.P. *Higher Pl. Ind. Sbcontinent.* 6: 153-163.
- Watts, N. A. 1953. *Flora of Agra district.* A descriptive key to the flora. Calcutta.