CHAPTER 8
APPENDIX

APPENDIX

I. List of angiospermic plants (family wise) occurring in GNPS

Botanical Name	Life form	Plant description: (Vol. II)
Annonaceae		48
Annona reticulata L.	T	
Annona squamosa L.	T	
Miliusa tomentosa (Roxb.) Sinclair.	T	
Polyalthia longifolia (Sonn.) Thw.	T	
Minispermaceae		50
Cissampelos pareira L.	C	
Cocculus hirsutus (L.) Theob.	C	
Cocculus pendulus (J.R. & G. Forst.) Diels.	C	
Cyclea peltata (Lam.) Hook. f. & Thoms.	C	
Tinospora cordifolia (Willd.) Miers. ex. Hook. and Thoms.	C	
Nymphaeaceae		52
Nymphaea nouchali Burm.	H	
Papaveraceae		53
Argemone mexicana L.	H	
Brassicaceae		54
Brassica juncea (L.) Czern & Cros	H	
Brassica nigra (L.) Koch	H	
Brassica oleracea var. *capitata* L.	H	
Raphanus sativus L.	H	
Capparidaceae		56
Cadaba fruticosa (L.) Druce.	S	
Capparis decidua (Forssk.) Edgew.	S	
Capparis grandis L.f.	T	
Capparis sepiaria L.	S	
Crataeva magna (Lour.) DC.	T	
Maerua oblongifolia (Forssk) A.Rich.	C	
Cleomeceae		59
Cleome burmanni Wight & Arn.	H	
Cleome gynandra L.	H	
Cleome simplicifolia (Camb.) Hook.f. & Thoms.	H	
Cleome viscosa L.	H	
Flacourtiaceae		61
Caseria tomentosa Roxb.	T	
Flacourtia indica (Burm.f.) Merr.	S	
Flacourtia montana Grah.	T	
Polygalaceae		63
Polygala arvensis Willd.	H	
Polygala erioptera DC.	H	

Botanical Name	Life form	Plant description: (Vol. II)
Polygala persicariifolia DC.	H	
Portulacaceae		64
Portulaca oleracea L.	H	
Portulaca pilosa subsp. *grandiflora* (Hook.) Geesink.	H	
Portulaca quadrifolia L.	H	
Tamaricaceae		66
Tamarix ericoides Rottl.	S	
Elatinaceae		66
Bergia ammannioides Roxb. ex Roth.	H	
Bergia suffruticosa (Del.) Fenzl.	H	
Malvaceae		67
Abelmoschus esculentus (L.) Moench.	H	
Abelmoschus manihot (L.) Medik.	H	
Abutilon indicum (L.) Sweet.	H	
Abutilon pannosum (forst. F.) Schlect.	H	
Gossypium herbaceum L.	S	
Hibiscus lobatus (J. A. Murr.) O. Ktze.	H	
Hibiscus rosa- sinensis L.	S	
Hibiscus schizopetalus (Mast.) Hook. f.	S	
Hibiscus trionum L.	H	
Kydia calycina Roxb.	T	
Pavonia zeylanica (L.) Cav.	H	
Sida acuta Burm. f.	H	
Sida alba L.	H	
Sida cordata (Burm.f.) Borss.	H	
Sida rhombifolia L.	H	
Sida rhombifolia Var. *retusa* (L.) Borss.	H	
Sida veronicifolia Lam.	H	
Thespesia lampus (Cav.) Dalz. & Gibs.	S	
Thespesia populnea (L.) Soland.ex. Corr.	T	
Bombacaceae		77
Adansonia digitata L.	T	
Bombax ceiba L.	T	
Ceiba pentandra (L.) Gaertn.	T	
Sterculiaceae		79
Firmiana colorata (Roxb.) R.Br.	T	
Guazuma ulmifolia Lam.	T	
Helicteres isora L.	S	
Melochia corchorifolia L.	H	
Sterculia foetida L.	T	
Sterculia urens Roxb.	T	
Waltheria indica L.	H	

Botanical Name	Life form	Plant description: (Vol. II)
Tiliaceae		82
Corchorus aestuans L.	H	
Corchorus fascicularis L.	H	
Corchorus olitorius L.	H	
Grewia damine Gaertn.	H	
Grewia hirsuta Vah.	S	
Grewia tenex (Forssk.) Fiori.	S	
Grewia tiliaefolia Vahl.	T	
Triumfetta malabarica Koen.	H	
Triumfetta rhomboidea Jacq.	H	
Malpighiaceae		87
Hiptage benghalensis (L.) Kurz.	C	
Zygophyllaceae		87
Tribulus terrestris L.	H	
Oxalidaceae		88
Biophytum candolleanum Wight.	H	
Oxalis corniculata L.	H	
Balsaminaceae		89
Impatiens balsamina Var. *cocciinea* Hk.f.	H	
Impatiens balsamina Var. *rosea* (L.) Hook.f.	H	
Rutaceae		90
Aegle marmelos (L.) Corr.	T	
Citrus limon (L.) Burm.f.	T	
Limonia acidissima L.	T	
Murraya koenigii (L.) Spr.	T	
Simaroubaceae		92
Ailanthus excelsa Roxb.	T	
Balanitaceae		93
Balanites aegyptiaca (L.) Del.	T	
Burseraceae		94
Boswellia serrata Roxb. ex. Colebr.	T	
Commiphora wightii (Arn.) Bhandari.	S	
Garuga pinnata Roxb.	T	
Meliaceae		95
Azadirachta indica A.Juss.	T	
Melia azedarach L.	T	
Soymida febrifuge (Roxb.) A.Juss.	T	
Celastraceae		97
Celastrus paniculata Willd.	C	
Maytenus senegalensis (Lam.) Excell.	S	
Rhamnaceae		98
Zizyphus mauritiana Lam.	T	

Botanical Name	Life form	Plant description: (Vol. II)
Zizyphus nummularia (Burm.f.) Wight & Arn.	S	
Zizyphus oenoplia (L.) Mill.	C	
Zizyphus xylopyra (Retz.) Willd.	S	
Vitaceae		100
Ampelocissus latifolia (Roxb.) Planch.	C	
Cayratia auriculata (Roxb.) Gamble.	C	
Cayratia carnosa (Lam.) Gagnep.	C	
Cissus quadrangularis L.	S	
Cissus repanda Vahl.	C	
Leeaceae		103
Leea asiatica (L.) Ridsd.	H	
Sapindaceae		104
Cardiospermum halicocabum L.	C	
Sapindus emarginatus Vahl.	T	
Sapindus laurifolius Vahl.	T	
Schleichera oleosa (Lour.) Oken.	T	
Anacardiaceae		106
Anacardium occidentale L.	T	
Buchanania cochinchinensis (Lour.) Almeida.	T	
Lannea coromandelica (Houtt.) Merr.	T	
Mangifera indica L.	T	
Spondias pinnata (L.f.) Kurz.	T	
Moringaceae		108
Moringa concanensis Nimmo.	T	
Moringa oleifera Lam.	T	
Fabaceae (Papilionaceae)		109
Abrus precatorius L.	C	
Aeschynomene indica L.	H	
Alysicarpus hamosus Edgew.	H	
Alysicarpus longifolius (Rottl. ex. Spreng.) Wight & Arn.	H	
Alysicarpus monilifer (L.) DC.	H	
Alysicarpus vaginalis (L.) DC.	H	
Arachis hypogaea L.	H	
Atylosia scarabaeoides (L.) Bth.	H	
Butea monosperma (Lamk.) Taubert.	T	
Butea monosperma Var. *lutea* (Witt.) Mahesh.	T	
Butea superba Roxb.	C	
Cajanus cajan (L.) Millsp.	S	
Canavalia gladiata (Jacq.) DC.	C	
Cicer arietinum L.	H	
Clitoria biflora Dalz.	H	
Clitoria ternatea L.	C	

Botanical Name	Life form	Plant description: (Vol. II)
Crotalaria juncea L.	H	
Crotalaria leptostachya Bth.	H	
Crotalaria linifolia L.f.	H	
Crotalaria medicaginea Lam.	H	
Crotalaria nana Burm.f.	H	
Crotalaria retusa L.	H	
Dalbergia lanceolaria sps. *paniculata* Roxb.	T	
Dalbergia latifolia Roxb.	T	
Dalbergia sissoo Roxb.	T	
Desmodium dichotomum (Willd.) DC.	H	
Desmodium gangeticum (L.) DC.	H	
Desmodium neomexicanum A.Greay.	H	
Desmodium repandum (Vahl.) DC.	H	
Desmodium ritchei Sanj.	H	
Desmodium triflorum (L.) DC.	H	
Dolichos trilobus L.	H	
Erythrina suberosa Roxb.	T	
Erythrina variegata L.	T	
Heylandia latebrosa (Heyne. ex. Roth) Neens.	H	
Indigofera astragallina DC.	H	
Indigofera cordifolia Heyne. ex. Both.	H	
Indigofera karnatakana Sanj.	H	
Indigofera linifolia Retz.	H	
Indigofera oblongifolia Forssk.	H	
Indigofera tinctoria L.	H	
Indigofera trita L. f.	H	
Lablab purpureus (L.) Sweet.	C	
Mucuna prurita Hook.	C	
Phaseolus radiatus L.	C	
Pongamia pinnata L.	T	
Pseudarthria viscida (L.) Wight.& Arn.	H	
Psoralea corylifolia Linn.	H	
Pterocarpus marsupium Roxb.	T	
Pueraria lobata (Willd.) Sanj.	H	
Pueraria thunbergiana Benth.	C	
Pueraria tuberosa (Roxb. ex. Willd.) DC.	C	
Rhynchosia minima (L.) DC.	C	
Rhynchosia minima Var. *laxiflora* (Camb.) Baker.	H	
Rhynchosia rothii Benth. ex. Ait.	C	
Sesbania bispinosa (Jacq.) W.F. Wight.	S	
Smithia conferta J. E. Sm.	H	
Tephrosia pumilia (Lam.) Pers.	H	

Botanical Name	Life form	Plant description: (Vol. II)
Tephrosia purpurea (L.) Pers.	H	
Tephrosia senticosa (L.) Pers.	H	
Tephrosia strigosa (Dalz.) Sant. & Mahesh.	H	
Tephrosia tinctoria (L.) Pers.	H	
Tephrosia villosa (Linn) Pers.	H	
Teramnus labialis (L.f.) Spreng.	C	
Trigonella foenum-graecum L.	H	
Vigna radiata (L.) R.Wilczek.	C	
Vigna trilobata (L.) Verdcourt.	C	
Zornia diphylla Auct.	H	
Caesalpiniaceae		140
Bauhinia purpurea L.	T	
Bauhinia racemosa Lam.	T	
Bauhinia tomentosa L.	T	
Caesalpinia bonduc (L.) Roxb.	C	
Cassia absus L.	H	
Cassia auriculata L.	S	
Cassia fistula L.	T	
Cassia occidentalis L.	H	
Cassia pumila Lam.	H	
Cassia siamea Lam.	T	
Cassia surattensis ssp. *glauca* (Lam.) K. & S.	S	
Cassia tora L.	H	
Delonix elata (L.) Gamble.	T	
Delonix regia (Bojer. ex. Hook.) Rafin.	T	
Hardwickia binata Roxb.	T	
Parkinsonia aculeata L.	T	
Peltophorum pterocarpum (DC.) Backer. ex. K.Heyne.	T	
Piliostigma malabaricum (Roxb.) Bth.	T	
Tamarindus indica L.	T	
Mimosaceae		149
Acacia auriculiformis A. Cunn.	T	
Acacia catechu (L.f.) Willd.	T	
Acacia ferruginea DC.	T	
Acacia leucophloea (Roxb.) Willd.	T	
Acacia nilotica (L.) Willd ex. Delile.	T	
Acacia pennata (L.) Willd.	C	
Acacia senegal (L.) Willd.	T	
Albizzia lebbeck (L.) Benth.	T	
Albizzia odoratissima (L.f.) Benth.	T	
Dichrosachys cinerea var. *indica* Brenen.	T	
Leucaena leucocephala (Lamk.) De. Wit.	T	

Botanical Name	Life form	Plant description: (Vol. II)
Mimosa hamata Willd.	S	
Pithecellobium dulce (Roxb.)Benth.	T	
Prosopis cineraria (L.) Druce.	T	
Prosopis juliflora (Swartz.) DC.	T	
Samanea saman (Jacq.) Merr.	T	
Rosaceae		156
Rosa indica L.	S	
Combretaceae		156
Anogeissus latifolia (Roxb. ex. DC.) Wall.	T	
Combretum albidum G. Don.	C	
Quisqualis indica L.	C	
Terminalia bellirica (Gaertn.) Roxb.	T	
Terminalia catappa L.	T	
Terminalia chebula Retz.	T	
Terminalia cuneata Roth.	T	
Terminalia elliptica Willd.	T	
Myrtaceae		160
Eucalyptus globulus Labill.	T	
Psidium guajava L.	T	
Syzygium cumini (L.) Skeels.	T	
Syzygium heyneanum Duthie.) Wall. ex. Gamble.	T	
Syzyglium rubicandum Wight & Arn.	T	
Lecythidaceae		163
Couroupita guianensis Abul.	T	
Lythraceae		163
Ammannia baccifera L.	H	
Ammannia senegalensis Lam.	H	
Ammannia tenuifolia L.	H	
Lawsonia inermis L.	S	
Rotala serpyllifolia (Roth.) Bremek.	H	
Woodfordia fruticosa (L.) Kurz.	S	
Punicaceae		166
Punica granatum L.	S	
Onagraceae		167
Ludwigia perennis Roxb.	H	
Passifloraceae		167
Passiflora edulis Sims.	C	
Caricaceae		168
Carica papaya L.	T	
Cucurbitaceae		168
Cetenolepis cerasiformis (stocks.) HK.	C	
Citrullus colocynthis (L.) Schrad.	C	

Botanical Name	Life form	Plant description: (Vol. II)
Coccinia grandis (L.) Voigt.	C	
Corallocarpus conocarpus (Dalz.&Gibs.) Hook.f.	C	
Corallocarpus epigaeus (Rottl.) C.B.Cl.	C	
Cucumis sativus L.	H	
Diplocyclos palmatus (L.) Jeffrey.	C	
Luffa acutangula (L.) Roxb.	C	
Luffa echinata Roxb.	C	
Melothria maderaspatana Cogn.	C	
Momordica charantia L.	C	
Momordica dioica Roxb. ex Willd.	C	
Trichosanthes cucumerina L.	C	
Cactaceae		175
Opuntia elatior Mill.	S	
Aizoaceae		176
Trianthema portulacastrum L.	H	
Zaleya decandra Burm.f.	H	
Molluginaceae		177
Glinus lotoides L.	H	
Mollugo nudicaulis Lam.	H	
Mollugo oppositifolia L.	H	
Apiaceae (Umbelliferae)		178
Anethum graveolens L.	H	
Apiaceae		
Centella asiatica (L.) Urban.	H	
Coriandrum sativum L.	H	
Daucas carota L.	H	
Alangiaceae		180
Alangium salvifolium (L.f.) Wang.	T	
Rubiaceae		181
Anthocephalus indicus A. Rich.	T	
Borreria articularis (L. f.) F. N. Will.	H	
Borreria stricta (L. f.) Schym.	H	
Catunaregam spinosa (Thunb.) Tirvengadum.	T	
Dentella repens (L) J. R. & G. Forst.	H	
Gardenia resinifera Roth.	T	
Haldinia cordifolia (Roxb)	T	
Hymenodictyon orixense (Roxb.) Mabb.	T	
Ixora brachiata Roxb.	T	
Ixora pavetta Andr.	T	
Mitragyna parvifolia (Roxb.) Korth.	T	
Morinda citriflora L.	T	
Morinda pubescens J. E. Sm.	T	

Botanical Name	Life form	Plant description: (Vol. II)
Oldenlandia corymbosa L.	H	
Oldenlandia herbacea (L.) Roxb.	H	
Tamilnadia uliginosa (Retz.) Tirveng. & Sastre.	T	
Asteraceae (Compositae)		190
Acanthospermum hispidum DC.	H	
Ageratum conyzoides L.	H	
Bidens bipinnata L.	H	
Bidens biternata (Lour.) Merr.& Sherff.	H	
Blainvillea acmella (L.) Philip.	H	
Blumea fistulosa (Roxb.) Kurz.	H	
Blumea membranacea DC.	H	
Blumea mollis (D. Don.) Merr.	H	
Cyathocline purpurea (Ham. ex D. Don) O. Ktze.	H	
Echinops echinatus Roxb.	H	
Eclipta prostrata (L.) L.	H	
Elephantopus scaber L.	H	
Emilia sonchifolia (L.) DC.	H	
Glossocardia bosvallea (L.f.) DC.	H	
Goniocaulon indicum (Klein ex Willd.) C.B.Cl.	H	
Helianthus annuus L.	H	
Lactuca runcinata DC.	H	
Laggeara aurita (L.f.) Bth.ex C.B.Cl.	H	
Launaea glomerata (Jaub. & Spach.) HK. f.	H	
Launaea procumbens (Roxb.) Ramayya & Rajagopal.	H	
Parthenium hysterophorus L.	H	
Pulicaria angustifolia DC.	H	
Sclerocarpus africanus Jacq.	H	
Sonchus brachyotus DC.	H	
Sphaeranthus senegalensis DC.	H	
Spilanthus calva DC.	H	
Synedrella nodiflora (L.) Gaertn.	H	
Tricholepis amplexicaulis C. B. Cl.	H	
Tridax procumbens L.	H	
Vernonia anthelmintica (L.) Willd.	H	
Vernonia cinerea (L.) Less.	H	
Vicoa indica (L.) DC.	H	
Xanthium indicum Koen.	H	
Plumbaginaceae		206
Plumbago zeylanica L.	H	
Sapotaceae		206
Madhuca indica J.F. Gmel.	T	
Manilkara hexandra (Roxb.) Dubard.	T	

Botanical Name	Life form	Plant description: (Vol. II)
Manilkara zapota (L.) P. Royen.	T	
Mimusops elengi L.	T	
Ebenaceae		208
Diospyros melanoxylon Roxb.	T	
Oleaceae		209
Jasminum azoricum L.	C	
Jasminum multiflorum (Burm.f.) Andr.	C	
Nyctanthes arbor-tristis L.	T	
Schrebera swietenioides Roxb.	T	
Apocynaceae		211
Carissa congesta Wight.	S	
Catharanthus roseus (L.) G.Don.	H	
Ervatamia divaricata (L.) Burkill.	S	
Holarrhena pubescens (Buch – Ham.) Wall. Ex G. Don.	T	
Nerium indicum Mill.	S	
Plumeria alba L.	T	
Plumeria rubra Linn.	T	
Thevetia neriifolia Juss. ex Steud.	S	
Wrightia arborea (Dennst.) Mabb.	T	
Wrightia tinctoria R.Br.	T	
Asclepiadaceae		216
Calotropis gigantea (L.)	S	
Calotropis procera (Ait.) R.Br.	S	
Ceropegia bulbosa Roxb.	C	
Holostemma annulare (Roxb.) K.Schum.	C	
Leptadenia pyrotechnica (Forsk.) Decne.	C	
Leptadenia reticulata (Retz.) Wight & Arn.	C	
Marsdenia tenacissima (Roxb.) Moon.	C	
Pergularia daemia (Forsk.) Chiov.	C	
Telosma pallida (Roxb.) Craib.	C	
Tylophora dalzellii Hook.f.	H	
Periplocaceae		221
Hemidesmus indicus (L.) Schult.	C	
Loganiaceae		222
Strychnos potatorum L.f.	T	
Gentianaceae		222
Canscora diffusa (Vahl.) R.Br.	H	
Enicostemma hyssopifolium (Lam.) Willd.	H	
Exacum pedunculatum L.	H	
Exacum petiolare Griseb.	H	
Exacum pumilum Griseb.	H	
Exacum tetragonum Roxb.	H	

Botanical Name	Life form	Plant description: (Vol. II)
Hoppea dichotoma Heyne. ex. Willd.	H	
Boraginaceae		226
Coldenia procumbens L.	H	
Heliotropium bacciferum Forsk.	H	
Heliotropium ovalifolium Forssk.	H	
Heliotropium paniculatum R.Br.	H	
Heliotropium subulatum Hochst. ex DC.	H	
Heliotropium supinum Linn.	H	
Trichodesma inaequale Edgew.	H	
Trichodesma indicum (L.) Lehm.	H	
Ehretiaceae		229
Cordia dichotoma Forst.f.	T	
Cordia gharaf (Forsk.) Ehrenb.& Asch.	T	
Cordia monoica Roxb.	T	
Ehretia laevis Roxb.	T	
Convolvulaceae		231
Argyreia sericea Dalz. & Gibs.	H	
Convolvulus prostrates Forssk.	H	
Convolvulus rottlerianus Choisy.	H	
Evolvulus alsinoides L.	H	
Evolvulus nummularius (L.) L.	H	
Ipomoea aquatica Forssk.	H	
Ipomoea carnea Jacq. ssp. *fistulosa* (Mart. ex. Choisy) Austin.	S	
Ipomoea coptica (L.) Roth. ex R. & S. Syst.	C	
Ipomoea dichroa (R. & S.) Choisy.	C	
Ipomoea muricata (L.) Jacq.	C	
Ipomoea nil Linn.	C	
Ipomoea pes-tigridis Linn.	C	
Ipomoea quamoclit Linn.	C	
Ipomoea sinensis (Des.V.) Choisy.	H	
Merremia aegyptia (L.) Urb.	H	
Merremia gangetica (L.) Cufod.	H	
Rivea hypocrateriformis Choisy.	C	
Cuscutaceae		240
Cuscuta chinensis Lam.	C	
Cuscuta reflexa Roxb.	C	
Solanaceae		241
Capsicum annum L.	H	
Cestrum diurnum L.	S	
Cestrum nocturnum L.	S	
Datura innoxia Mill.	H	
Datura metel L.	H	

Botanical Name	Life form	Plant description: (Vol. II)
Lycopersicon lycopersicum (L.) Karsten.	H	
Nicotiana plumbaginifolia Viv.	H	
Physalis minima L.	H	
Solanum anguivi Lam.	H	
Solanum melongena Linn.	H	
Solanum nigrum Linn.	H	
Solanum virginianum L.	H	
Withania sominifera (L.) Dunal.	H	
Scrophulariaceae		247
Bacopa monnieri (L.) Wettst.	H	
Kickxia ramosissima (Wall.) Janch.	H	
Limnophila heterophylla (Roxb) Bth.	H	
Limnophila indica (L.) Druce.	H	
Lindenbergia muraria (Roxb.) Bruhl.	H	
Lindenbergia urticaefolia (Roxb. ex. D. Don.) P. Bruehl.	H	
Lindernia crustacean (L.) F. Muell.	H	
Lindernia multiflora (Roxb.) Mukerjee.	H	
Striga angustifolia (D. Don.) Saldhana.	H	
Striga gesneroides (WillD.) Vatke.	H	
Bignoniaceae		252
Haplophragma adenophyllum (Wall.) P.Dop.	T	
Millingtonia hortensis L.f.	T	
Oroxylum indicum (L.) Vent.	T	
Spathodea campanulata Beauv.	T	
Stereospermum colais (Buch – Ham. ex. Dillw.) Mabb.	T	
Tecoma stanus (Linn.) H.B.& K.	T	
Tecomella undulate (Sm.) Seem.	T	
Pedaliaceae		255
Sesamum orientale L.	H	
Martyniaceae		256
Martynia annua Linn.	H	
Acanthaceae		257
Adhatoda vasica Nees.	S	
Andrographis paniculata (Burm.f.) Wall. ex. Nees.	H	
Barleria cuspidate Heyne.ex. Ness.	S	
Barleria gibsoni Dalz.	H	
Barleria prionitis Linn.	H	
Blepharis maderaspatensis (L.) Roth.	H	
Blepharis repens (Vahl.) Roth.	H	
Dipteracanthus prostrate (Poir.) Ness.	H	
Eclipta prostrata (L.) L.	H	
Eranthemum roseum (Vahl.) R.Br.	H	

Botanical Name	Life form	Plant description: (Vol. II)
Haplanthus verticillata (Roxb.) R. Br. Majumdar.	H	
Hemiadelphus polyspermus (Roxb.) Nees.	H	
Hemigraphis latebrosa (Heyne ex. Roth.) Ness.	H	
Hygrophila schulli (Buch-Ham.) M. R. & S. M. Almeida.	H	
Hygrophila serphyllum (Ness.) T.Anders.	H	
Indoneesiella echioides (L.) Sreem.	H	
Justicia bitonica L.	H	
Justicia latispica (C.B.Cl.) Gamble.	H	
Justicia nagpurensis A. V. W. Grah.	H	
Lepidagathis cristata Willd.	H	
Lepidagathis cuspidate Ness.	H	
Neuracanthus nervius Wight.	H	
Neuracanthus sphaerostachys (Ness.) Dalz.	H	
Peristrophe paniculata (Forssk.) Brummitt.	H	
Rungia parviflora (Ret.) Ness.	H	
Rungia pectinata (Linn.) Ness.	H	
Verbenaceae		271
Clerodendron inerme (L.) Gaertn.	S	
Clerodendron multiflorum (Burm.f.) O.Ktze.	S	
Duranta repens L.	S	
Gmelina arborea Roxb.	T	
Lantana camara L.	S	
Lantana salvifolia Jacq.	S	
Phyla nodiflora (L.) Greene.	H	
Tectona grandis L.f.	T	
Vitex negundo L.	T	
Lamiaceae		275
Anisomeles indica (L.) O.Kuntze.	H	
Anisomeles malabarica R.Br.ex Sims.	H	
Leucas aspera (Willd.) Link.	H	
Leucas biflora R.Br.	H	
Leucas cephalotes (Koenig. ex. Roth.) Spreng.	H	
Leucas zeylanica (L). R.Br.	H	
Ocimum americanum L.	H	
Ocimum basilicum Linn.	H	
Ocimum tenuiflorum Linn.	H	
Pogostemon benghalensis (Burm. f.) O. Ktze.	H	
Nyctaginaceae		281
Boerhaavia chinensis (L.) Druce.	H	
Boerhaavia diffusa L.	H	
Boerhaavia verticillata Poir.	H	
Bougainvillea spectabilis Willd.	S	

Botanical Name	Life form	Plant description: (Vol. II)
Amaranthaceae		282
Achyranthes aspera Linn.	H	
Aerva javanica (Burm.f.) Juss.ex Schult.	H	
Aerva lanata (L.) Juss.	H	
Aerva sanguinolenta (L.) Bl.	H	
Amaranthus cruentus L.	H	
Amaranthus spinosus L.	H	
Amaranthus viridis L.	H	
Celosia argentea L.	H	
Digera muricata (L.) Mart.	H	
Nothosaerva brachiata (L.) Wt.	H	
Pupalia lappacea (L.) A. L. Juss.	H	
Polygonaceae		287
Antigonum leptopus Hook. & Arn.	C	
Polygonum barbata (L.) Hara.	H	
Polygonum glabrum Willd.	H	
Polygonum plebeium R.Br.	H	
Proteaceae		289
Grewillea robusta A.Cunn.ex R.Br.	T	
Loranthaceae		290
Dendrophthoe falcata (L.f.) Etting.	S	
Viscum articulatum Burm. f.	S	
Santalaceae		291
Santalum album L.	T	
Euphorbiaceae		291
Acalypha ciliata Firsk.	H	
Acalypha indica L.	H	
Bridelia retusa (L.) Spr.	T	
Dalechampia scandens Var. *cordofona* (Hochst. ex. A. Rich.) Muell-Arg.	C	
Drypetes roxburghii (Wall.) Hurusawa.	T	
Emblica officinalis Gaerth.	T	
Euphorbia geniculata Ort.	H	
Euphorbia hirta Linn.	H	
Euphorbia ligularia Roxb.	S	
Euphorbia nivulia Buch-Ham.	H	
Euphorbia parviflora L.	H	
Euphorbia prostrata Ait.	H	
Euphorbia thymifolia L.	H	
Euphorbia tirucalli L.	S	
Jatropha curcas L.	S	
Jatropha gossypifolia L.	S	

Botanical Name	Life form	Plant description: (Vol. II)
Kirganelia reticulata (Poir.) Baill.	S	
Mallotus philippensis (Lamk.) Muell.Arn.	T	
Phyllanthus fraternus Webster.	H	
Ricinus communis L.	S	
Securinega leucopyrus (Willd.) Mauell-Arg.	S	
Ulmaceae		301
Holoptelea integrifolia (Roxb.) Planch.	T	
Moraceae		302
Artocarpus heterophyllus Lam.	T	
Ficus amplissima Sm.	T	
Ficus benghalensis L.	T	
Ficus hispida L.f.	T	
Ficus racemosa L.	T	
Ficus religiosa L.	T	
Ficus rumphii Bl.	T	
Morus alba L.	T	
Casuarinaceae		306
Casuarina equisetifolia L.	T	
Hydrocharitaceae		306
Hydrilla verticillata (L.f.) Royle.	H	
Ottelia alismoides (L.) Pers.	H	
Orchidaceae		307
Nervilia aragoana Gaud.	H	
Nervilia plicata (Andr.) Schltr.	H	
Vanda tesselata L.	H	
Zingiberaceae		309
Curcuma inodora Blatt.	H	
Musaceae		309
Musa paradisiaca L.	H	
Cannaceae		310
Canna indica L.	H	
Amaryllidaceae		311
Crinum viviparum (Lam) R. Ansari & V.J. Nair.	H	
Hypoxidaceae		311
Curculigo orchioides Gaertn.	H	
Agavaceae		312
Agave americana L.	H	
Dioscoreaceae		312
Dioscorea bulbifera Linn.	C	
Dioscorea daemona Roxb.	C	
Dioscorea hispida Dennst.	C	
Dioscorea pentaphylla L.	C	

Botanical Name	Life form	Plant description: (Vol. II)
Dioscorea wallichii Hook.f.	C	
Liliaceae		314
Allium cepa L.	H	
Aloe benghalensis L	H	
Asparagus gonoclados Baker.	C	
Asparagus racemosus Willd.	C	
Chlorophytum tuberosum (Roxb.) Baker.	H	
Gloriosa superba L.	C	
Urginea indica (Roxb.) Kuntn.	H	
Commelinaceae		318
Commelina benghalensis L.	H	
Commelina diffusa Burm.f.	H	
Commelina erecta L.	H	
Commelina forskalaei Vahl.	H	
Commelina nudiflora L.	H	
Commelina suffruticosa Bl.	H	
Cyanotis cristata (L.) Schult.f.	H	
Cyanotis fasciculata (Heyne. ex. Roth.) Schult.f.	H	
Murdannia semiteres (Dalz.) Santapau.	H	
Arecaceae		322
Borassus flabellifer L.	T	
Cocos nucifera L.	T	
Phoenix sylvestris Roxb.	T	
Roystonea regia (H.B. & K.) O.F.Cook.	T	
Pandanaceae		324
Pandanus fascicularis Lamk.	T	
Typhaceae		324
Typha angustata Bory & Chaub.	H	
Araceae		325
Amorphophallus commutatus Engl.	H	
Colocasia esculenta (L.) Schott.	H	
Eriocaulaceae		326
Eriocaulon sollyanum Royle.	H	
Eriocaulon truncatum Buch-Ham.	H	
Cyperaceae		327
Cyperus alulatus Kern.	H	
Cyperus compressus L.	H	
Cyperus triceps (Rottb.) Endl.	H	
Poaceae		328
Alloteropsis cimicina (L.) Stapf.	G	
Andropogon pumilus Roxb.	G	
Apluda mutica Linn.	G	

Botanical Name	Life form	Plant description: (Vol. II)
Aristida adscensionis L.	G	
Arundinella pumila (Hochst.) Steud.	G	
Bambusa arundinacea Willd.	G	
Cenchrus ciliaris L.	G	
Chloris barbata Sw.	G	
Chloris dolichostachya Lagasca.	G	
Coix gigantean Koen.	G	
Cymbopogon martinii (Roxb.) Wats.	G	
Cynodon dactylon Pers.	G	
Dactyloctenium aegyptium (L.) P.Beauv.	G	
Dactyloctenium sindicum Boiss.	G	
Dendrocalamus strictus (Roxb.) Ness.	G	
Dimeria orinthopoda Trin.	G	
Dinebra retroflexa (Vahl.) Panz.	G	
Echinochloa colonum (L.) Link.	G	
Eragrostis ciliaris Link.	G	
Eragrostis japonica (Thunb.) Trin.	G	
Heteropogon contorutus (L.) P.Beauv.ex. R. & S.	G	
Oplismenus burmannii (Retz.) P.Beauv.	G	
Oryza sativa L.	G	
Paspalidium flavidum (Retz.) A.	G	
Pennisetum americanum (L.) K. Schum.	G	
Saccharum officinarum L.	G	
Saccharum spontaneum L.	G	
Sorghum bicolour Moench.	G	
Sorghum halepense (L.) Pers.	G	
Themeda cymbaria Hack.	G	
Triticum aestivum L.	G	
Zea mays L.	G	

II Names of plants of GNPS : changes as per ICBN

Old Botanical Name	New Botanical Name
Nymphaeaceae	
Nymphaea stellata Willd.	*Nymphaea nouchali* Burm.
Capparidaceae	
Cadaba indica L.	*Cadaba fruticosa* (L.) Druce.
Crateva nurvala Buch-Ham.	*Crataeva magna* (Lour.) DC.
Flacourtiaceae	
Caseria elliptica Willd.	*Caseria tomentosa* Roxb.
Polygalaceae	
Polygala chinensis L.	*Polygala arvensis* Willd.

Old Botanical Name	New Botanical Name
Portulacaceae	
Portulaca grandiflora HK.f.	*Portulaca pilosa* subsp. *grandiflora* (Hook.) Geesink.
Malvaceae	
Abutilon glaucum (Cav.) Sweet.	*Abutilon pannosum* (forst. F.) Schlect.
Azanza lampus (Cav.) Alef.	*Thespesia lampus* (Cav.) Dalz. & Gibs.
Tiliaceae	
Triumfetta rotundifolia Lam.	*Triumfetta malabarica* Koen.
Oxalidaceae	
Biophytum sensitivum (L.) DC.	*Biophytum candolleanum* Wight.
Celastraceae	
Maytenus emarginata (Willd.) D. Hou.	*Maytenus senegalensis* (Lam.) Excell.
Rhamnaceae	
Zizyphus rotundifolia Lam.	*Zizyphus nummulaia* (Burm.f.) Wight & Arn.
Leeaceae	
Leea edgeworthii Santapau.	*Leea asiatica* (L.) Ridsd.
Anacardiaceae	
Buchanania lanzan Spreng.	*Buchanania cochinchinensis* (Lour.) Almeida.
Fabaceae	
Alysicarpus procumbens (Roxb.) Schindl.	*Alysicarpus hamosus* Edgew.
Dalbergia paniculata Roxb.	*Dalbergia lanceolaria* sps. *paniculata* Roxb.
Desmodium ritchiei Sanj.	*Desmodium rotundifolium* Baker.
Erythrina indica Lamk.	*Erythrina variegata* L.
Indigofera tenulfolia Rottl. ex. Wt. & Arn.	*Indigofera karnatakana* Sanj.
Caesalpiniaceae	
Caesalpinia bonduceila (L.) Flem.	*Caesalpinia bonduc* (L.) Roxb.
Cassia glauca Lamk.	*Cassia surattensis* Burm. f. ssp. *glauca* (Lam.) K. & S.
Dichrostachys cinerea (L.) Wt. & Arn.	*Dichrostachys cinerea* var. *indica* Brenen.
Combretaceae	
Combretum ovalifolium Roxb.	*Combretum albidum* G. Don.
Terminalia arjuna (Roxb.) Wt. & Arn.	*Terminalia cuneata* Roth.
Terminalia crenulata Roth.	*Terminalia elliptica* Willd.
Rubiaceae	
Xeromphis spinosa (Thunb.) Keay.	*Catunaregam spinosa* (Thunb.) Tirvengadum.
Adina cordifolia (Roxb.) Ridsd.	*Haldina cordifolia* (Roxb)
Hymenodictyon excelsum (Roxb.) Wall.	*Hymenodictyon orixense* (Roxb.) Mabb.
Morinda tinctoria Roxb.	*Morinda pubescens* J. E. Sm.
Xeromphis ulignosa (Retz.) Maheshwari.	*Tamilnadia uliginosa* (Retz.) Tirveng. & Sastre.
Asteraceae	
Sphaeranthus indicus L.	*Sphaeranthus senegalensis* DC.
Xanthium strumrium L.	*Xanthium indicum* Koen.
Oleaceae	

Old Botanical Name	New Botanical Name
Jasminum flexile Vahl.	*Jasminum azoricum* L.
Apocynaceae	
Holarrhena antidysenterica (L.) Wall. ex. Dl.	*Holarrhena pubescens* (Buch – Ham.) Wall. Ex G. Don.
Thevetia peraviana (Pers.) Merrill.	*Thevetia neriifolia Juss.* ex Steud.
Wrightia tomentosa R. & S.	*Wrightia arborea* (Dennst.) Mabb.
Boraginaceae	
Trichodesma amplexicaule DC.	*Trichodesma inaequale* Edgew.
Convolvulaceae	
Convolvulus microphyllus (Roth.) Sieb. ex. Spr.	*Convolvulus prostrates* Forssk.
Ipomoea fistulosa Mart. ex. Choisy.	*Ipomoea carnea Jacq.* Subsp. *fistulosa* (Mart. ex. Choisy) Austin.
Solanaceae	
Solanum indicum L.	*Solanum anguivi* Lam.
Solanum surattense Burm. f.	*Solanum virginianum* L.
Bignoniaceae	
Stereospermum personatum (Hassk.) Chatt.	*Stereospermum colais* (Buch – Ham. Ex. Dillw.) Mabb.
Pedaliaceae	
Sesamum indicum L.	*Sesamum orientale* L.
Acanthaceae	
Hygrophila auriculata (Schum.) Heine.	*Hygrophila schulli* (Buch-Ham.) M. R. & S. M. Almeida.
Andrographis echioides (L.) Ness.	*Indoneesiella echioldes* (L.) Sreem.
Justicia simplex D. Don.	*Justicia nagpurensis* A. V. W. Grah.
Justicia procumbens L.	*Justicia latispica* (C.B.Cl.) Gamble.
Neuracanthus trinervius Wt.	*Neuracanthus nervius* Wight.
Peristrophe bicalyculata (Retz.) Ness.	*Peristrophe paniculata* (Forssk.) Brummitt.
Lamiaceae	
Ocimum canum Sims.	*Ocimum americanum* L.
Ocimum sanctum L.	*Ocimum tenuiflorum* Linn.
Pogostemon parviflorus L.	*Pogostemon benghalensis* (Burm. f.) O. Ktze.
Amaranthaceae	
Amranthus hybridus L.	*Amaranthus cruentus* L.
Euphorbiaceae	
Euphorbia microphylla Heyne.ex. Roth.	*Euphorbia heyneana* Spr. Syst.
Euphorbia neriifolia L.	*Euphorbia ligularia* Roxb.
Moraceae	
Ficus tsiela Roxb.	*Ficus amplissima* Sm.
Orchidaceae	
Nervilia discolour Schltr.	*Nervilia plicata* (Andr.) Schltr.
Amaryllidaceae	
Crinum defixum Ker-Gawl.	*Crium viviparum* (Lam) R. Ansari & V.J. Nair.
Poaceae	

Old Botanical Name	New Botanical Name
Apluda aristata L.	*Apluda mutica* Linn.
Coix lacryma-jobi L.	*Coix gigantean* Koen.
Pennisetum typhoides (Burm.f.) Stapf. & Hubb.	*Pennisetum americanum* (L.) K. Schum.

III Flora of Saurashtra : Addition based on the present study in GNPS

Botanical Name	Life form
Lecythidaceae	
Couroupita guianensis Abul.	T
Lythraceae	
Ammannia senegalensis Lam.	H
Cucurbitaceae	
Corallocarpus conocarpus (Dalz.&Gibs.)Hook.f.	C
Cucumis sativus L.	H
Aizoaceae	
Zaleya decandra Burm.f.	H
Molluginaceae	
Mollugo oppositifolia L.	H
Asteraceae	
Bidens bipinnata L.	H
Lactuca runcinata DC.	H
Parthenium hysterophorus L.	H
Sonchus brachyotus DC.	H
Spilanthus calva DC.	H
Synedrella nodiflora (L.) Gaertn.	H
Apocynaceae	
Plumeria alba L.	T
Asclepiadaceae	
Marsdenia tenacissima (Roxb.) Moon.	C
Loganiaceae	
Strychnos potatorum L.f.	T
Gentianaceae	
Exacum tetragonum Roxb.	H
Convolvulaceae	
Evolvulus nummularius (L.) L.	H
Ipomoea coptica (L.) Roth. ex R. & S. Syst.	C
Solanaceae	
Cestrum diurnum L.	S
Scrophulariaceae	
Limnophila heterophylla (Roxb) Bth.	H
Bignoniaceae	
Haplophragma adenophyllum (Wall.) P.Dop.	T
Acanthaceae	

Eclipta prostrata (L.) L.	H
Justica nagpurensis A. V. W. Grah.	H
Justicia bitonica L.	H
Justicia latispica (C.B.Cl.) Gamble.	H
Lepidagathis cristata Willd.	H
Neuracanthus nervius Wight.	H
Lamiaceae	
Leucas biflora R.Br.	H
Pogostemon benghalensis (Burm. f.) O. Ktze.	H
Amaranthaceae	
Aerva javanica (Burm.f.) Juss.ex Schult.	H
Polygonaceae	
Polygonum barbata (L.) Hara.	H
Polygonum glabrum Willd.	H
Proteaceae	
Grewillea robusta A.Cunn.ex R.Br.	T
Hydrocharitaceae	
Hydrilla verticillata (L.f.) Royle.	H
Orchidaceae	
Nervilia plicata (Andr.) Schltr.	H
Dioscoreaceae	
Dioscorea daemona Roxb.	C
*Dioscorea wallichii Hook.*f.	C
Commelinaceae	
Commelina erecta L.	H
Murdannia semiteres (Dalz.) Santapau.	H

IV List of non-angiospermic plants (family wise) noted in GNPS

Sr.no.	Botanical name	Family
Algae		
1	*Oscillatoria formosa* Bory.	Oscillatoriaceae
2	*Lyngbya nicronymuscii*	Oscillatoriaceae
3	*Nostoc* spp.	Nostocaceae
4	*Anabaena cirinalis* (Kutz.)Rab.	Nostocaceae
5	*Scenedesmus quadricauda* (Turp.) Breb.	Scendesmaceae
6	*Hydrodictyon* spp.	Hydrodictyaceae
7	*Ulothrix zonata* Kutz.	Ulotrichaceae
8	*Spirogyra* spp.	Zygnemataceae
9	*Closterium moniliforme* (Bory.) Her.	Desmidiaceae
10	*Cosmarium reniforme* (Ralfs.) Arch.	Desmidiaceae
11	*Chara crinata* Wallr.	Characeae
Fungi		

Sr.no.	Botanical name	Family
12	*Albugo candida* (Lev.) Kunze.	Phycomycetes
13	*Albugo platensis* Speg.	Phycomycetes
14	*Albugo portulacae* (DC.) Lev.	Phycomycetes
15	*Phycoderma aeschynomenis* Thirum. & W	Phycomycetes
16	*Rhizopus artocarpi* Rabenh.	Phycomycetes
17	*Sclerospora graminicola* (Kulk.) Safee & Thirum.	Phycomycetes
18	*Cladosporium zizyphi* Karst.	Ascomycetes
19	*Erysiphe acaciae* Blumer.	Ascomycetes
20	*Erysiphe polygoni* DC.	Ascomycetes
21	*Puccinia cynodontis* Desm.	Basidiomycetae
22	*Puccinia prainiana* Barclay.	Basidiomycetae
23	*Puccinia purpurea* Cke.	Basidiomycetae
24	*Puccinia versicolor* Diet & Holw.	Basidiomycetae
25	*Ustilago crameri* Koernicke.	Basidiomycetae
26	*Ustilago maydis* (DC.) Corda.	Basidiomycetae
27	*Ustilago sparsa* Underwood.	Basidiomycetae
28	*Agaricus bisporus*	Basidiomycetae
Bryophytes		
29	*Riccia curciata* Linn.	Ricciaceae
30	*Anthoceros lavis* L.	Anthocerotaceae
31	*Cyathodium* spp.	Marchantiaceae
32	*Funaria hygrometrica* L.	Funariaceae
Pterodophytes		
33	*Adiantum caudatum* Linn.	Polypodiaceae
34	*Ceratopteris thalictroides* Linn.	Parkeriaceae
35	*Marsilea quadrifolia* Linn.	Marsileaceae
36	*Ophioglossum costatum* R.Br.	Ophioglossaceae
Gymnosperms		
37	*Cycas circinalis*	Cycadaceae
38	*Aurocaria heterophylla*	Aurocariaceae
39	*Biota orientalis*	Cupressusceae

V Inventory of plants around religious places and tourist spots in GNPS

In Gir National Park and Sanctuary the four main temples are situated in inner part of the National Park as well as the Sanctuary area and the two main preservation areas are the Sinh Sadan and Safari Park in the Sanctuary. There is heavy traffic because of tourists as well as pilgrims who are visiting this area for safari and pilgrimage. Some exotic forms have within their

premises also been introduced at such places. In this connection, inventor of plants was generated for religious plaes (Kankai, Banej, Tulsishyam, Hanuman gala), and tourist spots (Safari Park and Sinh Sadan).

a. **Kankeshwari Mata Temple, Kankai**

Botanical name	Life form
Capparaceae	
Capparis grandis L. f.	T
Rutaceae	
Aegle marmelos (L.) corr.	T
Citrus limon (L.) Burm. f.	T
Simaroubaceae	
Ailanthus excelsa Roxb.	T
Burseraceae	
Boswellia serrata Roxb.ex Colebr.	T
Meliaceae	
Azadirachta indica A.Juss	T
Rhamnaceae	
Zizyphus mauritiana Lam.	T
Sapindaceae	
Sapindus laurifolius Vahl.	T
Anacardiaceae	
Lannea coromandelica (Houtt.) Merr.	T
Mangifera indica L.	T
Fabaceae	
Pongamia pinnata L.	T
Caesalpiniaceae	
Bauhinia racemosa Lam.	T
Cassia fistula L.	T
Delonix regia (Bojer ex Hook. Rafin.	T
Tamarindus indica L.	T
Mimosaceae	
Acacia catechu (L.f.) Willd.	T
Acacia leucophloea (Roxb.) Willd.	T
Acacia nilotica (L.) Willd ex. Delile.	T
Pithecellobium dulce (Roxb.) Benth.	T
Samanea saman (Jacq.) Merr.	T
Combretaceae	
Terminalia bellirica (Gaertn.) Roxb.	T
Myrtaceae	
Eucalyptus globules Labill.	T
Syzygium heyneanum (Duthie) Wall. ex Gamble.	T

Botanical name	Life form
Rubiaceae	
Mitraygna parvifolia (Roxb.) Korth.	T
Morinda pubescens J.E.Sm.	T
Ebenaceae	
Diospyros melanoxylon Roxb.	T
Ehretiaceae	
Cordia dichotoma Forst.f.	T
Verbenaceae	
Tectona grandis L.f.	T
Moraceae	
Ficus benghalensis L.	T
Ficus racemosa L.	T
Ficus religiosa L.	T
Arecaceae	
Cocos nucifera L.	T
Phoenix sylvestris Roxb.	T
Tamaricaceae	
Tamarix ericoides Rottl.	S
Sterculiaceae	
Helicteres isora L.	S
Rosaceae	
Rosa indica L.	S
Lythraceae	
Lawsonia inermis L.	S
Apocynaceae	
Ervatamia divaricata (L.) Burkill.	S
Nerium indicum Mill.	S
Thevetia neriifolia Juss.ex Steud.	S
Verbenaceae	
Clerodendron inerme (L.) Gaertn.	S
Nyctaginaceae	
Bougainvillea spectabilis Willd.	S
Malvaceae	
Hibiscus rosa-sinensis L.	S
Papavaraceae	
Argemone mexicana L.	H
Polygalaceae	
Polygala arvensis Willd.	H
Malvaceae	
Sida acuta Burm f.	H
Sida rhombifolia L.	H
Tiliaceae	

Botanical name	Life form
Corchorus aestuans L.	H
Zygophyllaceae	
Tribulus terrestris L.	H
Balsaminaceae	
Impatiens balsamina L.	H
Fabaceae	
Crotalaria linifolia L.f.	H
Crotalaria medicaginea Lam.	H
Indigofera cordifolia (Heyne. ex Roth) Neens	H
Indigofera linifolia Retz.	H
Tephrosia pumila (Lam) Pers.	H
Tephrosia strigosa (Dalz.) Sant. & Mahesh.	H
Caesalpiniaceae	
Cassia tora L.	H
Asteraceae	
Ageratum conyzoides L.	H
Vernonia anthelmintica (L.) Willd.	H
Xanthium indicum Koen	H
Convolvulaceae	
Evolvulus alsinoides (L.) L.	H
Scrophulariaceae	
Bacopa monnieri (L.) Wettst.	H
Acanthaceae	
Andrographis echioides (L.) Sreem.	H
Barleria prionitis Linn.	H
Justicia procumbens L.	H
Neuracanthus sphaerostachys (Ness.) Datz.	H
Lamiaceae	
Leucas aspera (Willd.) Link.	H
Leucas zeylanica (L.) R.Br.	H
Ocimum americanum L.	H
Euphorbiaceae	
Euphorbia heyneana Spr. Syst.	H
Zingiberaceae	
Curcuma inodora Blatt.	H
Cannaceae	
Canna indica L.	H
Poaceae	
Andropogon pumilus L.	H
Aristida adscenscionis L.	H
Chloris barbata Lam.	H
Sorghum halepense L.	H

Botanical name	Life form
Themeda cymbaria Bory & Chaub.	H
Menispermaceae	
Tinospora cordifolia (Willd.) Miers ex Hook. and Thoms	C
Fabaceae	
Abrus precatorius L.	C
Mucuna prurita Hook.	C
Combretaceae	
Quisqualis indica L.	C
Oleaceae	
Jasminum azoricum L.	C
Caesalpiniaceae	
Caesalpinia bonduc (L.) Roxb.	C
Mimosaceae	
Acacia pennata (L.) Willd.	C
Combretaceae	
Combretum ovalifolium G.Don.	C
Periplocaceae	
Hemidesmus indicus (L.) Schutt.	C
Convolvulaceae	
Ipomoea coptica (L.) Roth. ex. R. & S. Syst.	C
Ipomoea quamoclit Linn.	C
Dioscoreaceae	
Dioscorea bulbifera Linn.	C
Liliaceae	
Asparagus racemosus Willd.	C

b. Mahadev Temple: Banej

Botanical name	Life form
Annonaceae	
Polyalthia longifolia (Sonn.) Thw.	T
Capparaceae	
Capparis grandis L.f.	T
Malvaceae	
Kydia calycina Roxb.	T
Streculiaceae	
Sterculia urens Roxb.	T
Rutaceae	
Aegle marmelos (L.) Corr.	T
Citrus limon (L.) Burm. f.	T
Murraya koenigii (L.) Spr.	T
Burseraceae	
Boswellia serrata Roxb. ex Colebr.	T

Botanical name	Life form
Meliaceae	
Azadirachta indica A. Juss	T
Melia azedarach L.	T
Anacardiaceae	
Lannea coromandelica (Houtt.) Merr.	T
Mangifera indica L.	T
Moringaceae	
Moringa oleifera Lam.	T
Fabaceae	
Butea monosperma (Lamk.) Taubert.	T
Dalbergia lanceolaria sps. *paniculata* Roxb.	T
Pongamia pinnata L.	T
Caesalpiniaceae	
Bauhinia racemosa Lam.	T
Delonix regia (Bojer ex Hook.) Rafin	T
Tamarindus indica L.	T
Mimosaceae	
Pithecellobium dulce (Roxb.) Benth.	T
Albizzia odoratissima (L.f.) Benth.	T
Samanea saman (Jacq.) Merr.	T
Combretaceae	
Terminalia bellirica (Gaertn.) Roxb.	T
Terminalia elliptica Willd.	T
Myrtaceae	
Eucalyptus globules Labill.	T
Syzygium heyneanum (Duthie) Wall. ex Gamble	T
Caricaeae	
Carica papaya L.	T
Rubiaceae	
Hymenodictyon orixense (Roxb.) Mabb.	T
Ixora arborea Andr.	T
Mitragyna parvifolia (Rxob.) Korth.	T
Morindacitrifiora L.	T
Sapotaceae	
Manilkara zapota (L.) P. Royen	T
Ebenaceae	
Diospyros melanoxylon Roxb.	T
Ehretiaceae	
Cordia dichotoma Forst.f.	T
Cordia gharaf (Forsk.) Ehrenb. & Asch.	T
Verbenaceae	
Tectona grandis L.	T

Botanical name	Life form
Vitex negundo L.	T
Santalaceae	
Santalum album L.	T
Euphorbiaceae	
Emblica officinalis Gaerth.	T
Moraceae	
Ficus benghalensis L.	T
Ficus religiosa L.	T
Morus alba L.	T
Arecaceae	
Cocos nucifera L.	T
Phoenix sylvestris Roxb.	T
Malvaceae	
Hibsicus rosa-sisensis L.	S
Hibiscus schizopetalus (Mast.) Hook.f	S
Sterculiaceae	
Helicteres isora L.	S
Tiliaceae	
*Grewia hirsuta*Vah.	S
Dhaman	
Grewia tenex (Forssk.) Fiori Tiliaceae	S
Rhamnaceae	
Zizyphus nauritiana (Burm.f.)	S
Caesalpinaceae	
Cassia auriculata L.	S
Rosaceae	
Rosa indica. L.	S
Lythraceae	
Lawsonia inermis L.	S
Apocynaceae	
Ervatamia divaricata (L.) Burkill.	S
Nerium indicum Mill.	S
Thevetia peruviana Juss.ex Steud	S
Solanaceae	
Cestrum nocturnum L.	S
Acanthaceae	
Barleria cuspidate Heyne.ex.Ness.	S
Verbenaceae	
Clerodendron inerme (L.) Gaertn.	S
Nyctaginaceae	
Bougainvillea spectabilis Willd.	S
Polygalaceae	

Botanical name	Life form
Polygala arvensis Willd.	H
Polygala erioptera DC.	H
Malvaceae	
Sida acuta Burm. f	H
Sida rhombifolia var. retusa	H
Tiliaceae	
Corchorus aestuans L.	H
Corchorus olitorius L.	H
Triumfetta malabarica Koen.	H
Balsaminaceae	
Impatiens balsamina L.	H
Oxalidacaeae	
Biophytum candolleanum Wight.	H
Fabaceae	
Crotalaria juncea L.	H
Crotalaria leptostachya Bth.	H
Crotolaria medicaginea Lam.	H
Paneravo	
Heylandia latebrosa (Heyne. Ex. Roth) Neens. Fabaceae	H
Fabaceae	
Indigofera cordifolia Heyne ex. Both.	H
Indigofera linifolia Retz.	H
Indigofera tinctoria L.	H
Tephrosia pumila (Lam.) Pers.	H
Tephrosia purpurea (L.) Pers.	H
Tephrosia tinctoria (L.) Pers.	H
Caesalpinaceae	
Cassia tora L.	H
Lythraceae	
Ammannia baccifera L.	H
Asteraceae	
Blumea fistulosa (Roxb.) Kurz.	H
Blumea mollis (D.Don.) Merr.	H
Tridax procumbens L.	H
Vernonia cinerea (L.) Less.	H
Plumbaginaceae	
Plumbago zeylanica L.	H
Apocynaceae	
Catharanthus roseus (L.) G.Don.	H
Scrophurlariaceae	
Striga gesneroides (WillD.) Vatke.	H
Acanthaceae	

Botanical name	Life form
Barleria prionitis Linn.	H
Acanthaceae	
Justicia latispica (C. B. Cl.) Gamble.	H
Gunthera	
Neuracanthus sphaerostachys (Ness.) Dalz.Acanthaceae	H
Lamiaceae	
Leucas biflora R.Br.	H
Lamiaceae	
Leucas cephalotes (Koening ex Roth) Spreng.	H
Ocimum americanum L.	H
Zingiberaceae	
Curcuma inodora Blatt.	H
Musaceae	
Musa paradisiacal L.	H
Commelianaceae	
Commelina benghalensis L.	H
Commelina forskalaei Vahl.	H
Poaceae	
Apluda mutica Linn.	H
Aristida adscenscionis L.	H
Chloris barbata Swartz	H
Heteropogon contortus (L.) P. Beauv	H
Themeda cymbaria Hack.	H
Menispermaceae	
Cocculus hirsutus (L.) Theob.	C
Cocculus pendulus (J.R. & G. Forst.) Diels.	C
Tinospora cordifolia (Willd.)	C
Fabaceae	
Abrus precatorius L.	C
Combretaceae	
Combretum ovalifolium G.Don.	C
Oleaceae	
Jasminum multiflorum (Burm.f.) Andr	C
Convolvulaceae	
Ipomoea muricata (L.) Jacq.	C
Liliaceae	
Asparagus racemosus Willd.	C
Asparagus gonoclados Baker.	C

d. Krishan Temple, Tulsishyam

Botanical name	Life form
Sterculiaceae	

Botanical name	Life form
Sterculia urens Roxb.	T
Rutaceae	
Aegle marmelos (L.) Corr.	T
Burseraceae	
Boswellia serrata Roxb. ex Colebr.	T
Meliaceae	
Azadirachta indica A. Juss.	T
Soymida febrifuga (Roxb.) A. Juss.	T
Anacardiaceae	
Lannea coromandelica (Houtt.) Merr.	T
Mangifera indica L.	T
Fabaceae	
Butea monosperma (Lamk.) Taubert.	T
Pongamia pinnata L.	T
Caesalpiniaceae	
Bauhinia purpurea L.	T
Parkinsonia aculeate L.	T
Mimosaceae	
Acacia catechu (L.f.) Willd.	T
Acacia nilotica (L.) Willd ex. Delile.	T
Acacia senegal (L.) Willd.	T
Combretaceae	
Anogeissus latifolia (Roxb. ex DC.) Wall	T
Terminalia elliptica Willd.	T
Myrtaceae	
Syzygium heyneanum (Duthie) Wall. ex Gamble.	T
Rubiaceae	
Hymenodictyon orixense (Roxb.) Mabb.	T
Ixora Pavetta Andr.	T
Morinda citriflora L.	T
Ebenaceae	
Diospyros melanoxylon Roxb.	T
Verbenaceae	
Tectona grandis L.f.	T
Moraceae	
Ficus benghalensis L.	T
Ficus religiosa L.	T
Arecaceae	
Cocos nucifera L.	T
Phoenix sylvestris Roxb.	T
Rhamnaceae	
Zizyphus mauritiana (Burm.f.)	T

Botanical name	Life form
Sterculiaceae	
Helicteres isora L.	S
Rhamnaceae	
Zizyphus xylopyra (Retz.) Willd.	S
Mimosaceae	
Mimosa hamata Willd.	S
Lythraceae	
Lawsonia inermis L.	S
Apocynaceae	
Ervatamia divaricata (L.) Burkill.	S
Thevetia peruviana Juss. ex Steud	S
Verbenaceae	
Clerodendroninerme (L.) Gaertn.	S
Nyctaginaceae	
Bougainvillea spectabilis Willd.	S
Papaveraceae	
Argemone mexicana L.	H
Malvaceae	
Sida acuta Burm. f.	H
Sida rhombifolia L.	H
Fabaceae	
Corchorus fascicularis L.	H
Zygophyllaceae	
Tribulus terrestris L.	H
Balsaminaceae	
Impatiens balsamina L.	H
Fabaceae	
Alysicarpus longifolius (Rottl. Ex.Spreng.) Wight & Arn.	H
Crotalaria leptostachya Bth.	H
Crotalaria medicaginea Lam.	H
Indigofera cordifolia Heyne ex. Both.	H
Indigofera tenuifolia L.	H
Indigofera tinctoria L.	H
Tephrosia pumila (Lam) Pers.	H
Tephrosia purpurea (L.) Pers.	H
Tephrosia tinctoria (L.) Pers.	H
Caesalpiniaceae	
Cassia pumila Lam.	H
Cassia tora L.	H
Asteraceae	
Blainvillea acmella (L.) Philip.	H
Blumea fistulosa (Roxb.) Kurz.	H

Botanical name	Life form
Blumea mollis (D.Don.) Merr.	H
Vicoa indica (L.) DC.	H
Xanthium indicum Koen	H
Convolvulaceae	
Evolvulus alsinoides (L.) L.	H
Solanaceae	
Solanum virginianum L.	H
Acanthaceae	
Andrographis echioides (L.) Sreem.	H
Barleria prionitis Linn.	H
Neuracanthus sphaerostachys (Ness.) Dalz.	H
Lamiaceae	
Leucas aspera (Willd.) Link.	H
Leucas biflora R.Br.	H
Leucas zeylanica (L.) R. Br.	H
Ocimum basilicum Linn.	H
Ocimum americanum L.	H
Zingiberaceae	
Curcuma inodora Blatt.	H
Commelinaceae	
Commelina benghalensis L.	H
Commelina nudiflora L.	H
Poaceae	
Apluda mutica Linn.	H
Aristida adscenscionis L.	H
Chloris dolichostachya Lagasca.	H
Echinochloa colonum (L.) Link.	H
Heteropogon contortus (L.) P. Beauv. ex. R. & S.	H
Themeda cymbaria Hack.	H
Menispermaceae	
Cocculus hirsutus (L.) Theob.	C
Cocculus pendulus (J.R. & G. Forst.) Diels	C
Fabaceae	
Abrus precatorius L.	C
Caesalpiniaceae	
Caesalpinia bonduc (L). Roxb.	C
Combretaceae	
Combretum albidum G.Don.	C
Quisqualis indica L.	C
Hemidesmus indicus (L.) Schutt.	C
Convolvulaceae	
Ipomoea nil Linn.	C

Botanical name	Life form
Ipomoea pes-tigridis Linn.	C
Liliaceae	
Asparagus racemosus Willd.	C
Asparagus gonoclados Baker.	C

e. Hanuman Temple, Hanuman Gala

Botanical name	Life form
Annonaceae	
Polyalthia longifolia (Sonn.) Thw.	T
Capparaceae	
Capparis grandis L.f.	T
Bombacaeae	
Bombax ceiba L.	T
Rutaceae	
Aegle marmelos (L.) Corr.	T
Balanitaceae	
Balanites aegyptiaca (L.) Corr.	T
Burseraceae	
Boswellia serrata Roxb. ex Colebr.	T
Meliaceae	
Azadirachta indica A. Juss	T
Melia azaderach L.	T
Soymida febrifuga (Roxb.) A. Juss	T
Anacardiaceae	
Lannea coromandelica (Houtt.) Merr.	T
Fabaceae	
Butea monosperma Var. lutea (Witt.) Mahesh.	T
Pongamia pinnata L.	T
Caesalpiniaceae	
Bauhinia racemosa Lam.	T
Cassia fistula L.	T
Mimosaceae	
Acacia catechu (L.f.) Willd.	T
Acacia leucophloea (Roxb.) Willd.	T
Pithecellobium dulce (Roxb.) Benth.	T
Prosopis juliflora (Swartz) DC Prodr	T
Combretaceae	
Anogeissus latifolia (Roxb. ex DC.) Wall.	T
Terminalia cuneata Roth,	T
Myrtaceae	
Syzygium heyneanum (Duthie) Wall. ex Gamble	T
Rubiaceae	

Botanical name	Life form
Ixora Pavetta Andr.	T
Morinda citriflora L.	T
Ebenaceae	
Diospyros melanoxylon Roxb.	T
Moraceae	
Ficus benghalensis L.	T
Ficus religiosa L.	T
Ficus racemosa L.	T
Verbenaceae	
Gmelina arborea L.	T
Anacardiaceae	
Mangifera indica L.	T
Rutaceae	
Citrus limon (L.) Burm.f.	T
Arecaceae	
Cocos nucifera L.	T
Sterculiaceae	
Helicteres isora L.	S
Caesalpiniaceae	
Cassia auriculata L.	S
Rosaceae	
Rosa indica L.	S
Lythraceae	
Lawsonia inermis L.	S
Apocynaceae	
Ervatamia divaricata (L.) Burkill.	S
Nerium indicum Mill.	S
Thevetia peruviana Juss. ex Steud	S
Verbenaceae	
Lantana camara (L.) Moldenke	S
Clerodendron inerme (L.) Gaertn.	S
Papavaraceae	
Argemone mexicana L.	H
Malvaceae	
Sida acuta Burm. f.	H
Sida rhombifolia L.	H
Balsaminaceae	
Impatiens balsamina L.	H
Fabaceae	
Crotalaria juncea L.	H
Crotalaria linifolia L.f.	H
Heylandia latebrosa (Heyne. Ex. Roth) Neens.	H

Botanical name	Life form
Tephrosia villosa (Linn) Pers.	H
Tephrosia purpurea (L.) Pers	H
Tephrosia tinctoria (L.) Pers.	H
Caesalpinaceae	
Cassia tora L.	H
Asteraceae	
Blainvillea acmella (L.) Philip.	H
Tridax procumbens L.	H
Venonia cinerea (L.) Less.	H
Vicoa indica (L.) DC.	H
Xanthium indicum Koen	H
Apocynaceae	
Catharanthus roseus (L.) G.Don.	H
Boraginaceae	
Heliotropium subulatum Hochst. ex DC.	H
Convolvulaceae	
Convolvulus microphyllus Forssk.	H
Scrophulaceae	
Bacopa monnieri (L.) Wettst.	H
Acanthaceae	
Barleria prionitis Linn.	H
Justicia butibuca L.	H
Neuracanthus sphaerostachys (Ness.) Dalz.	H
Lamiaceae	
Leucas aspera (Willd.) Link.	H
Zingiberaceae	
Curcuma inodora Blatt.	H
Cannaceae	
Canna indica L.	H
Poaceae	
Apluda mutica Linn.	H
Alloteropsis cimicina (L.) Stapf.	H
Aristida adscenscionis L.	H
Dimeria orinthopoda Trin.	H
Eragrostis japonica (Thunb.) Trin.	H
Heteropogon contortus (L.) P. Beauv. Ex. R. & S.	H
Themeda cymbaria Hack.	H
Menispermaceae	
Cocculus hirsutus (L.) Theob.	C
Cocculus pendulus (J.R. & G. Forst.) Diels	C
Fabaceae	
Abrus precatorius L.	C

Botanical name	Life form
Liliaceae	
Asparagus racemosus Willd.	C

f. **Forest Department Administrative Premises, Sinh Sadan**

Botanical name	Life form
Annonaceae	
Annona squamosa L.	T
Polyalthia longifolia (Sonn.) Thw.	T
Capparaceae	
Capparis grandis L.f.	T
Crataeva magna (Lour.) DC.	T
Flacourtiaceae	
Flacourtia Montana Grah.	T
Bombaceae	
Bombax ceiba L.	T
Ceiba pentandra (L.) Gaertn.	T
Sterculiaceae	
Sterculia urens Roxb.	T
Tiliaceae	
Grewia tenex Vhal.	T
Rutaceae	
Aegle marmelos (L.) Corr.	T
Simaroubaceae	
Ailanthus excelsa Roxb.	T
Balanitaceae	
Balanites aegyptiaca (L.) Del.	T
Burseraceae	
Boswellia serrata Roxb. ex Colebr.	T
Meliaceae	
Azadirachta indica A.Juss	T
Fabaceae	
Butea monosperma (Lamk.) Taubert.	T
Sapindaceae	
Sapindus laurifolius Vahl.	T
Caesalpiniaceae	
Bauhinia racemosa L.	T
Cassia fistula L.	T
Delonix regia (Bojer ex Hook.) Rafin.	T
Tarmarindus indica L.	T
Mimosaceae	
Acacia catechu (L.f.) Willd.	T
Acacia leucophloea (Roxb.) Willd.	T

Botanical name	Life form
Acacia nilotica (L.) Willd ex. Dellie.	T
Acacia Senegal (L.) Willd.	T
Pithecellobium dulce (Roxb.) Benth.	T
Dichrostachys cinerea Var. indica Brenen.	T
Combretaceae	
Terminalia elliptica Willd.	T
Myrtaceae	
Eucalyptus globules Labill.	T
Rubiaceae	
Anthocephalus indicus A.Rich.	T
Sapotaceae	
Madhuca indica J.F.Gmel.	T
Ebenaceae	
Diospyros melanoxylon Roxb.	T
Ehretiaceae	
Ehretia laevis Roxb.	T
Verbenaceae	
Gmelina arborea Roxb.	T
Tectona grandis L.	T
Santalaceae	
Santalum album L.	T
Euphorbiaceae	
Emblica officinalis Gaerth.	T
Moraceae	
Ficus benghalensis L.	T
Ficus religiosa L.	T
Ulmaceae	
Holoptelea integrifolia (Roxb.)	T
Arecaceae	
Cocos nucifera L.	T
Casuarinaceae	
Casuarina equisetifolia L.	T
Poaceae	
Dendrocalamus strictus L.	T
Fabaceae	
Pongamia pinnata L.	T
Mimosaceae	
Albizzia odoratissima (L.f.) Benth.	T
Rubiaceae	
Morinda pubescens J. E. Sm.	T
Myrtaceae	
Syzygium heyneanum (Duthie) Wall. ex Gamble	T

Botanical name	Life form
Sterculiaceae	
Sterculia foetida L.	T
Leathiadaceae	
Couroupita guianensis Abul.	T
Rhamnaceae	
Zizyphus mauritiana Lam.	T
Mimosaceae	
Acacia auriculiformis A. Cunn. Ex.	T
Malvaceae	
Hibsicus rosa-sinensis L.	S
Hibiscus schizopetalus (Mast) Hook. f.	S
Rhamnaceae	
Zizyphus xylopyra (Retz.) Willd.	S
Rosaceae	
Rosa indica L.	S
Lythraceae	
Lawsonia inermis L.	S
Apocynaceae	
Nerium indicum Mill.	S
Thevetia peruviana Juss.ex Steud	S
Asclepiadaceae	
Calotropis gigantean L.	S
Verbenaceae	
Clerodendron inerme L.	S
Lantana camara (L.) Moldenke	S
Nyctaginaceae	
Bougainvillea spectabilis Willd.	S
Papavaraceae	
Argemone mexicana L.	H
Capparaceae	
Cleome gynandra L.	H
Malvaceae	
Abutilon indicum (L.)	H
Sida acuta Burm. L.	H
Sida rhombifolia L.	H
Sida veronicifolia Lam.	H
Tiliaceae	
Corchorus aestuans L.	H
Corchorus olitorius L.	H
Triumfetta malabarica Koen.	H
Zygophyllaceae	
Tribulus terrestris L.	H

Botanical name	Life form
Oxalidaceae	
Biophytum candolleanum Wight.	H
Fabaceae	
Crotalaria medicaginea Lam.	H
Desmodium rotundifolium Baker.	H
Heylandia latebrosa (Heyne. Ex. Roth) Neens	H
Indigofera cordifolia Heyne ex. Both.	H
Indigofera tinctoria L.	H
Tephrosia purpurea (L.) Pers.	H
Tephrosia villosa (Linn) Pers.	H
Caesalpinaceae	
Cassia absus L.	H
Cassia occidentalis L.	H
Cassia tora L.	H
Asteraceae	
Blainvillea acmella (L.) Philip.	H
Parthenium hysterophorus L.	H
Tridax procumbens L.	H
Xanthium strumarium Koen	H
Apocynaceae	
Catharanthus roseus (L.) G. Don.	H
Convolvulaceae	
Convolvulus microphyllus L.	H
Solanaceae	
Datura innoxia Mill.	H
Acanthaceae	
Barleria prionitis Linn.	H
Justicia latispica (C.B.Cl.) Gamble.	H
Neuracanthus sphaerostachys (Ness.) Dalz.	H
Lamiaceae	
Leucas aspera (Willd.) Link.	H
Leucus biflora R. Br.	H
Ocimum basilicum Linn.	H
Nyctaginaceae	
Boerhaavia diffusa L.	H
Amaranthaceae	
Achyranthes aspera Linn.	H
Euphorbiaceae	
Euphorbia heyneana Spr. Syst.	H
Euphorbia geniculata Ort.	H
Hydrocharitaceae	
Hydrilla verticillata (L.f.) Royle	H

Botanical name	Life form
Cannaceae	
Canna indica L.	H
Poaceae	
Apluda mutica Linn.	H
Aristida adscenscionis L.	H
Chloris barbata Swartz	H
Eragrostis cilliaris L.	H
Themeda cymbaria L.	H
Menispermaceae	
Cocculus hirsutus (L.) Theob.	C
Cocculus pendulus (J.R. & G. Forst.) Diels.	C
Oleaceae	
Jasminum azoricum L.	C
Jasminum multiflorum (Burm.f.) Andr	C
Periplocaceae	
Hemidesmus indicus (L.) Scult.	C
Convolvulaceae	
Ipomoea dichroa (R. &S.) Choisy	C
Ipomoea nil Linn.	C
Liliaceae	
Asparagus racemosus Willd.	C
Asparagus gonoclados Baker.	C
Cycadaceae	
Cycas circinalis L.	G
Aurocariaceae	
Araucaria heterophylla (Salisb). Franco	G
Cupresseceae	
Thuja orientalis (L.) Endl.	G
Gesneriaceae	
Achimenes longiflora L.	HO
Bromeliaceae	
Aechmea coelestis Royle	HO
Cryptanthus bromelioides Kern.	HO
Begoniaceae	
Begonia rex L.	HO
Liliaceae	
Asparagus sprengeri Baker.	HO
Cordyline terminalis L.f.	HO
Sansevieria trifasciata Willd.	HO
Pleomele reflexa Roxb.	HO
Araceae	
Caladium hortulanum Bl.	HO

Botanical name	Life form
Caladium hort (Schoott). Engl.	HO
Epipremnum pinnatum (L.) Schott.	HO
Euphorbiaceae	
Acalypha hispida L.	HO
Acalypha wilkesiana L.	HO
Codiaeum variegatum Muell-Arg.	HO
Croton bravo L.	HO
Croton goldenring Gaertn.	HO
Manihot exculenta Orteg.	HO
Asteraceae	
Chrysanthemum frutescens (Ham.ex.D.Don.) O. Ktze	HO
Chrysanthemum morifolium (Ham.ex.D.Don.) O. Ktze	HO
Cactaceae	
Cleistocactus straussii D.C.	HO
Pachycereus pectin D.C.	HO
Acanthaceae	
Pseuderanthemum sinuatum Klein.	HO
Aizoaceae	
Dorotheanthus bellidiformis (Jaub. & Spach) HK. f.	HO
Amaranthaceae	
Iresineherbstii aureo-reticulata C.B.Cl.	HO
Amaranthus caudatus L.	HO
Commalinaceae	
Rhoeo spathacea Burm. f.	HO
Cornaceae	
Aucuba japonica Vahl.	HO
Moraceae	
Ficus elastic L.	HO

g. **Safari Park, Devalia**

Botanical name	Life form
Annonaceae	
Polyalthia longifolia (Sonn.) Thw.	T
Capparaceae	
Capparis grandis L.f.	T
Crataeva nurvala (Lour.) DC	T
Flacourtiaceae	
Flacourtia Montana Grah.	T
Bombaceae	
Bombax ceiba L.	T
Sterculiaceae	
Sterculia foetida L.	T

Botanical name	Life form
Sterculia urans Roxb.	T
Tiliaceae	
Grewia tiliaefolia Vahl.	T
Rutaceae	
Aegle marmelos (L.) Corr.	T
Simaroubaceae	
Ailanthus excelsai Roxb.	T
Balanitaceae	
Balanites aegyptiaca (L.) Del.	T
Burseraceae	
Boswellia serrata Roxb. ex Colebr.	T
Meliaceae	
Azadirachta indica A.Juss	T
Melia azedarach L.	T
Soymida febrifuga (Roxb.) A.Juss	T
Sapindaceae	
Schleichera oleosa (Lour.) Oken.	T
Anacardiaceae	
Lannea coromandelica (Houtt.) Merr.	T
Mangifera indica L.	T
Fabaceae	
Dalbergia lanceolaria sps. *paniculata* Roxb.	T
Butea monosperma L.	T
Pterocarpus marsupium Roxb.	T
Pongamia pinnata L.	T
Caesalpiniaceae	
Bauhinia racemosa Lam.	T
Cassia fistula L.	T
Delonix regia (Bojer ex Hook.) Rafin	T
Mimosaceae	
Tarmarindus indica L.	T
Acacia catechu (L.f.) Willd.	T
Acacia ferruginea DC.	T
Acacia leucophloea (Roxb.) Willd.	T
Acacia nilotica (L.) Willd ex. Delile.	T
Acacia Senegal (L.) Benth.	T
Dichrostachys cinerea var. indica Brenen.	T
Pithecellobium dulce (Roxb.) Benth.	T
Combretaceae	
Terminalia catappa L.	T
Myrtaceae	
Eucalyptus globules Labill.	T

Botanical name	Life form
Syzygium heyneanum (Duthie) Wall. ex Gamble	T
Alangiaceae	
Alangium salvifolium (L.f.) Wang.	T
Rubiaceae	
Haldinia cordifolia (Roxb)	T
Ixora Pavetta Andr	T
Morinda citriflora L.	T
Catunaregam spinosa (Thunb.) Trivengadum	T
Tamilnadia uliginosa (Retz.) Tirveng. & Sastre.	T
Sapotaceae	
Madhuca indica J. F. Gmel	T
Manilkara hexandra (Roxb.) Dubard in Ann	T
Ebenaceae	
Diospyros melanoxylon Roxb.	T
Apocynaceae	
Holarrhena pubescens (Buch-Ham.) Wall. ex G.. Don.	T
Wrightia tinctoria R.Br.	T
Ehretiaceae	
Ehretia laevis Roxb.	T
Verbenaceae	
Gmelina arborea Roxb.	T
Tectona grandis L.f.	T
Santalaceae	
Santalum album L.	T
Euphorbiaceae	
Bridelia retusa (L.) Spr.	T
Emblica officinalis Gaerth.	T
Moraceae	
Ficus benghalensis L.	T
Ficus racemosa L.	T
Ficus religiosa L.	T
Morus alba L.	T
Ulmaceae	
Holoptelea integrifolia (Roxb.) Planch.	T
Casuarinaceae	
Casuarina equisetifolia L.	T
Poaceae	
Dendrocalamus strictus L.	T
Capparaceae	
Capparis sepiaria L.	S
Flacourtiaceae	
Flacourtia indica (Burm.f.) Merr	S

Botanical name	Life form
Tiliaceae	
Grewia tenex (Forssk.) Fiori	S
Malvaceae	
Hibsicus rosa-sinensis L.	S
Hibiscus schizopetalus (Mast.) Hook. f.	S
Sterculiaceae	
Helicteres isora L.	S
Celastraceae	
Maytenus senegalensis (Lam.) Excell.	S
Rhamnaceae	
Zizyphus nummulaia (Burm.f.)	S
Zizyphus xylopyra (Retz.) Willd.	S
Caesalpiniaceae	
Cassia auriculata L.	S
Rosaceae	
Rosa indica. L.	S
Lythraceae	
Lawsonia inermis L.	S
Apocynaceae	
Ervatamia divaricata (L.) Burkill.	S
Nerium indicum Mill.	S
Thevetia peruviana Juss. ex Steud	S
Asclepiadaceae	
Calotropis gigantean	S
Verbenaceae	
Clerodendron inerme (L.) Gaertn.	S
Lantana camara (L.) Moldenke	S
Lantana salvifolia Jacq.	S
Nyctaginaceae	
Bougainvillea spectabilis Willd.	S
Euphorbiaceae	
Kirganelia reticulata (Poir.) Baill.	S
Securinega leucopyrus (Willd.) Mauell-Arg.	S
Papaveraceae	
Argemone mexicana L.	H
Capparaceae	
Cleome gynandra L.	H
Malvaceae	
Abelmoschus manihot (L.) Medik.	H
Abutilon indicum (L.)	H
Hibiscus lobatus (J.A. Murr.) O. Ktze.	H
Sida acuta Burm. f.	H

Botanical name	Life form
Sida rhombifolia L.	H
Sida rhombifolia var.retusa	H
Sida veronicifolia Lam.	H
Tiliaceae	
Corchorus aestuans L.	H
Corchorus olitorius L.	H
Corchorus fascicularis L.	H
Triumfetta malabarica Koen.	H
Zygophyllaceae	
Tribulus terrestris L.	H
Balsaminaceae	
Impatiens balsamina var. rosea	H
Oxalidaceae	
Biophytum candolleanum Wight.	H
Fabaceae	
Alysicarpus longifolias (Rottl.Ex.Spreng.) Wight &Arn.	H
Crotalaria leptostachya Bth.	H
Crotalaria linifolia L.f.	H
Crotalaria medicaginea Lam.	H
Desmodium dichotomum (Willd) DC	H
Heylandia latebrosa (Heyne. Ex. Roth) Neens	H
Indigofera cordifolia Heyne ex. Both.	H
Indigofera tinctoria (L.) DC	H
Tephrosia purpurea (L.) Pers.	H
Tephrosia tinctoria (L.) Pers	H
Tephrosia villosa (Linn) Pers.	H
Caesalpinaceae	
Cassia absus L.	H
Cassia tora L.	H
Asteraceae	
Ageratum conyzoides L.	H
Blainvillea acmella (L.) Philip.	H
Blumea mollis (D.Don.) Merr.	H
Blumea fistulosa (Roxb.) Kurz.	H
Parthenium hysterophorus L.	H
Tridax procumbens L.	H
Vernonia cinerea (L.) Less.	H
Xanthium indicum Koen.	H
Apocynaceae	
Catharanthus roseus (l.) G.Don.	H
Boraginaceae	
Trichodesma indicum (L.) Lehm.	H

Botanical name	Life form
Convolvulaceae	
Evolvulus alsinoides (L.) L.	H
Scrophulariaceae	
Bacopa monnieri (L.) Wettst.	H
Acanthaceae	
Barleria prionitis Linn.	H
Justicia bitonica L.	H
Neuracanthus sphaerostachys (Ness.) Dalz.	H
Lamiaceae	
Leucas aspera (Willd.) Link.	H
Leucas biflora R.Br.	H
Leucus zeylanica (L.) R.Br.	H
Amaranthaceae	
Amaranthus gracillis Desf.	H
Loranthaceae	
Dendrophthoe falcate L.	H
Viscum articulatum L.	H
Lamiaceae	
Ocimum basilicum Linn.	H
Euphorbiaceae	
Euphorbia geniculata Ort.	H
Musaceae	
Musa paradisiacal L.	H
Cannaceae	
Canna indica L.	H
Agavaceae	
Agave Americana L.	H
Commelinaceae	
Commelina benghal ensis L.	H
Commelina forskalaei Vahl.	H
Araceae	
Colocasia esculenta (L.) Schott.	H
Poaceae	
Apluda mutica Linn.	H
Andropogon pumilus Roxb.	H
Chloris barbata Sw.	H
Coix lachryma-jobi Koen.	H
Dimeria orinthopoda Trin.	H
Eragrostis cilliaris Link.	H
Eragrostis japonica (Thunb.) Trin.	H
Heteropogon contorutus (L.) P. Beauv. Ex. R. & S.	H
Themeda cymbaria Hack.	H

Botanical name	Life form
Menispermaceae	
Cocculus hirsutus (L.) Theob.	C
Cocculus pendulus (J.R. & G. Forst.) Diels.	C
Capparaceae	
Maerua oblongifolia (Forssk.) A.Rich	C
Vitaceae	
Cissus repanda Vahl.	C
Fabaceae	
Abrus precatorius L.	C
Mimosaceae	
Acacia pennata (L.) Willd.	C
Combretaceae	
Combretum ovalifolium G. Don.	C
Oleaceae	
Jasminum azoricum L.	C
Jasminum multiforium (Burm.f.) Andr	C
Periplocaceae	
Hemidesmus indicus (L.) Schult.	C
Convolvulaceae	
Ipomoea coptica (L.) Roth. ex R. & S. Syst	C
Ipomoea quamoclit Linn.	C
Dioscoreaceae	
Dioscorea bulbifera Linn.	C
Liliaceae	
Asparagus racemosus Willd.	C
Asparagus gonoclados Baker.	C
Cycadaceae	
Cycas circinalis L.	G
Aurocariaceae	
Araucaria heterophylla (Salisb). Franco	G
Cupresseceae	
Thuja orientalis (L.) Endl.	G
Gesneriaceae	
Achimenes longiflora L.	HO
Bromeliaceae	
Aechmea coelestis Royle	HO
Cryptanthus bromelioides Kern.	HO
Begoniaceae	
Begonia rex L.	HO
Liliaceae	
Asparagus sprengeri Baker.	HO
Cordyline terminalis L.f.	HO

Botanical name	Life form
Sansevieria trifasciata Willd.	HO
Pleomele reflexa Roxb.	HO
Araceae	
Caladium hortulanum Bl.	HO
Caladium hort (Schoott). Engl.	HO
Epipremnum pinnatum (L.) Schott.	HO
Euphorbiaceae	
Acalypha hispida L.	HO
Acalypha wilkesiana L.	HO
Codiaeum variegatum Muell-Arg.	HO
Croton bravo L.	HO
Croton goldenring Gaertn.	HO
Manihot exculenta Orteg.	HO
Asteraceae	
Chrysanthemum frutescens (Ham.ex.D.Don.) O. Ktze	HO
Chrysanthemum morifolium (Ham.ex.D.Don.) O. Ktze	HO
Cactaceae	
Cleistocactus straussii D.C.	HO
Pachycereus pectin D.C.	HO
Acanthaceae	
Pseuderanthemum sinuatum Klein.	HO
Aizoaceae	
Dorotheanthus bellidiformis (Jaub. & Spach) HK. f.	HO
Amaranthaceae	
Iresineherbstii aureo-reticulata C.B.Cl.	HO
Amaranthus caudatus L.	HO
Commalinaceae	
Rhoeo spathacea Burm. f.	HO
Cornaceae	
Aucuba japonica Vahl.	HO
Moraceae	
Ficus elastic L.	HO

VI Browsable species in GNPS

Botanical Name	Edible Part
Capparidaceae	
Capparis sepiaria L.	Leaf / Fruit
Meliaceae	
Soymida febrifuge (Roxb.) A. Juss.	Leaf / Fruit
Rhamnaceae	
Zizyphus mauritiana Lam.	Leaf / Fruit
Zizyphus nummularia (Burm.f.) Wight & Arn.	Leaf / Fruit

Botanical Name	Edible Part
Zizyphus xylopyra (Retz.) Willd.	Leaf / Fruit
Fabaceae	
Butea monosperma (Lamk.) Taubert.	Leaf / Fruit
Caesalpiniaceae	
Bauhinia purpurea L.	Leaf / Fruit
Bauhinia racemosa Lam.	Leaf / Fruit
Mimosaceae	
Acacia ferruginea D.C.	Leaf / Fruit
Acacia leucophloea (Roxb.) Willd.	Leaf / Fruit
Acacia nilotica (L.) Willd ex. Delile.	Leaf / Fruit
Acacia senegal (L.) Willd.	Leaf / Fruit
Sapotaceae	
Manikara hexandra (Roxb.) Dubard.	Leaf / Fruit
Apocynaceae	
Carissa congesta Wight.	Leaf / Fruit
Halorrhena pubescens (Buch - Ham.) Wall. Ex. G. Don.	Leaf / Fruit
Wrightia tinctoria R.Br.	Leaf / Fruit
Verbenaceae	
Tectona grandis L.f.	Bark
Poaceae	
Apluda mutica Linn.	Whole plant
Aristida adscensionis L.	Whole plant
Cynodon dactylon Pers.	Whole plant
Eragrostis ciliaris Link.	Whole plant
Eragrostis japonica (Thunb.) Trin.	Whole plant
Heteropogon contorutus (L.) P. Beauv.ex. R. & S.	Whole plant
Thermeda cymbaria Hack.	Whole plant

VII Phenological data of trees species in GNPS

Botanical Name	Phenology											
	N	D	J	F	M	A	M	J	J	A	S	O
Annona reticulata L.												
Annona squamosa L.												
Miliusa tomentosa (Roxb.) Sinclair.												
Polyalthia longifolia (Sonn.) Thw.												
Capparis grandis L.f.												
Crataeva magna (Lour.) DC.												
Caseria tomentosa Roxb.												
Flacourtia montana Grah.												
Kydia calycina Roxb.												
Thespesia populnea (L.) Soland.ex Corr.												
Adansonia digitata L.												
Bombax ceiba L.												
Ceiba pentandra (L.) Gaertn.												
Firmiana colorata (Roxb.) R.Br.												
Guazuma ulmifolia Lam.												
Sterculia foetida L.												
Sterculia urens Roxb.												
Grewia tiliaefolia Vahl.												
Aegle marmelos (L.) Corr.												
Citrus limon (L.) Burm.f.												
Murraya koenigii (L.) Spr.												
Ailanthus excelsa Roxb.												
Balanites aegyptiaca (L.) Del.												
Boswellia serrata Roxb. ex Colebr.												
Garuga pinnata Roxb.												

Botanical Name	Phenology											
	N	D	J	F	M	A	M	J	J	A	S	O
Azadirachta indica A.Juss.												
Limonia acidissima L.												
Melia azedarach L.												
Soymida febrifuge (Roxb.) A.Juss.												
Zizyphus mauritiana Lam.												
Sapindus emarginatus Vahl.												
Sapindus laurifolius Vahl.												
Schleichera oleosa (Lour.) Oken.												
Anacardium occidentale L.												
Buchanania cochinchinensis (Lour.) Almedia.												
Lannea coromandelica (Houtt.) Merr.												
Mangifera indica L.												
Spondias pinnata (L.f.) Kurz.												
Moringa concanensis Nimmo.												
Moringa oleifera Lam.												
Butea monosperma (Lamk.) Taubert.												
Butea monosperma Var. *lutea* (Witt.) Mahesh.												
Dalbergia lanceolaria SPS. *paniculata* Roxb.												
Dalbergia latifolia Roxb.												
Dalbergia sissoo Roxb.												
Erythrina suberosa Roxb.												
Erythrina variegata L.												
Pongamia pinnata L.												
Pterocarpus marsupium Roxb.												
Bauhinia purpurea L.												
Bauhinia racemosa Lam.												
Bauhinia tomentosa L.												

Botanical Name	Phenology											
	N	D	J	F	M	A	M	J	J	A	S	O
Cassia fistula L.												
Cassia siamea Lam.												
Delonix elata (L.) Gamble.												
Delonix regia (Bojer ex Hook.) Rafin.												
Hardwickia binata Roxb.												
Parkinsonia aculeata L.												
Peltophorum pterocarpum (DC.) Backer ex K.Heyne.												
Piliostigma malabaricum (Roxb.) Bth.												
Tamarindus indica L.												
Acacia auriculiformis A. Cunn.												
Acacia catechu (L.f.) Willd.												
Acacia ferruginea DC.												
Acacia leucophloea (Roxb.) Willd.												
Acacia nilotica (L.) Willd ex. Delile.												
Acacia senegal (L.) Willd.												
Albizzia lebbeck (L.) Benth.												
Albizzia odoratissima (L.f.) Benth.												
Dichrosachys cinerea var. *indica* Brenen.												
Leucaena leucocephala (Lamk.) De. Wit.												
Pithecellobium dulce (Roxb.)Benth.												
Prosopis cineraria (L.) Druce.												
Prosopis juliflora (Swartz) DC.												
Samanea saman (Jacq.) Merr.												
Anogeissus latifolia (Roxb. ex DC.) Wall.												
Terminalia bellirica (Gaertn.) Roxb.												
Terminalia catappa L.												

Botanical Name	Phenology											
	N	D	J	F	M	A	M	J	J	A	S	O
Terminalia chebula Retz.												
Terminalia cuneata Roth.												
Terminalia elliptica Willd.												
Eucalyptus globulus Labill.												
Psidium guajava L.												
Syzygium cumini (L.) Skeels.												
Syzygium heyneanum (Duthie) Wall. ex Gamble.												
Syzyglium rubicandum Wight & Arn.												
Couroupita guianensis Abul.												
Carica papaya L.												
Alangium salvifolium (L.f.) Wang.												
Anthocephalus indicus A. Rich.												
Catunaregam spinosa (Thunb.) Tirvengadum.												
Gardenia resinifera Roth.												
Haldinia cordifolia (Roxb) Ridsd.												
Hymenodictyon orixense (Roxb.) Mabb.												
Ixora brachiata Roxb.												
Ixora pavetta Andr.												
Mitragyna parvifolia (Roxb.) Korth.												
Morinda citriflora L.												
Morinda pubescens J. E. Sm.												
Tamilnadia uliginosa (Retz.) Tirveng. & Sastre.												
Madhuca indica J.F. Gmel.												
Manilkara hexandra (Roxb.) Dubard.												
Manilkara zapota (L.) P. Royen.												
Mimusops elengi L.												
Diospyros melanoxylon Roxb.												

Botanical Name	Phenology											
	N	D	J	F	M	A	M	J	J	A	S	O
Nyctanthes arbor-tristis L.												
Schrebera swietenioides Roxb.												
Holarrhena pubescens (Buch – Ham.) Wall. ex G. Don.												
Plumeria alba L.												
Plumeria rubra Linn.												
Wrightia arborea (Dennst.) Mabb.												
Wrightia tinctoria R.Br.												
Strychnos potatorum L.f.												
Cordia dichotoma Forst.f.												
Cordia gharaf (Forsk.) Ehrenb.& Asch.												
Cordia monoica Roxb.												
Ehretia laevis Roxb.												
Haplophragma adenophyllum (Wall.) P.Dop.												
Millingtonia hortensis L.f.												
Oroxylum indicum (L.) Vent.												
Spathodea campanulata Beauv.												
Stereospermum colais (Buch – Ham. Ex. Dillw.) Mabb.												
Tecoma stanus (Linn.) H.B.& K.												
Tecomella undulate (Sm.) Seem.												
Gmelina arborea Roxb.												
Tectona grandis L.f.												
Vitex negundo L.												
Grewillea robusta A.Cunn.ex R.Br.												
Santalum album L.												
Bridelia retusa (L.) Spr.												
Drypetes roxburghii (Wall.) Hurusawa.												

Botanical Name	Phenology											
	N	D	J	F	M	A	M	J	J	A	S	O
Emblica officinalis Gaerth.												
Mallotus philippensis (Lamk.) Muell.Arn.												
Holoptelea integrifolia (Roxb.) Planch.												
Artocarpus heterophyllus Lam.												
Ficus amplissima Sm.												
Ficus benghalensis L.												
Ficus hispida L.f.												
Ficus racemosa L.												
Ficus religiosa L.												
Ficus rumphii Bl.												
Morus alba L.												
Casuarina equisetifolia L.												
Borassus flabellifer L.												
Cocos nucifera L.												
Phoenix sylvestris Roxb.												
Roystonea regia (H.B. & K.) O.F.Cook.												
Pandanus fascicularis Lamk.												

Vegetative Condition
Flowering Condition
Fruiting Condition

PLANT BIODIVERSITY IN VANSDA NATIONAL PARK, VANSDA (GUJARAT)

Yogesh T. Jasrai, Premendrasingh Sisodia and H.S. Singh[1]

Department of Botany, Faculty of Science,
The Maharaja Sayajirao University of Baroda, Vadodara - 390 002.
[1]GEER Foundation, Indroda Park, Gandhinagar - 382 009

Abstract

The Vansda National Park comprising of total of 23.99 sq.km is located in the Navsari district of Gujarat State. It lies between 20° 51' 16" and 21° 21' 22" N latitude and 73° 20' 30" and 73° 31' 20" E longitudes. The Vansda National park along with Puma Wildlife sanctuary represents the northern zone of the Western Ghats in Gujarat. It forms the moist deciduous forest of western Ghats. A major part Ambica catchment area constitutes the Vansda National Park. The prerequisites for any biodiversity study of an area include detailed inventory of the available plant forms and theirs associations. As a part of these, studies were undertaken to generate an inventory of present flora and its implication on the vegetation. In all 407 plant species representing a total of 81 families were noted during the survey. Out of this 81 families-Fabaceae, caesalpiniaceae, Asteraceae, Malvaceae, Acanthaceae and Euphorbiaceae were in order of dominance.

Key words : National Park, Biodiversity, Plants, Vansda.

Introduction

Biodiversity studies are gaining immense significance and are the hot topic today. The importance of Biodiversity as well as the need to protect floristically rich areas is now universally accepted. Biodiversity conservation is not only for ecological and environmental rejuvenation, but also for sustainable economic development. Being the primary producers in the ecosystem and supporting hosts for many dependant species, plants deserve particular attention. It is estimated that the disappearance of one plant species results in the loss of 10 to 15 dependant species of insect, higher animals and even other plants (Manilal, 1997). Sanctuaries and protected areas have a major role in the Biodiversity conservation because these areas can serve as natural repositories for many plant and animal species characteristic to a particular region or zone. However, the protected areas are under various threats from different sources. The major threat to such natural habitats is the biotic pressure.

The state of Gujarat is very unique in having four biogeographic zones such as Indian Desert, the semi-arid zone, the Western Ghats and the coastal region. The vast range of habitats coupled with the difference in climatic and other environmental factors in these biogeographic zones are responsible for its rich natural vegetation.

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Geology :

The area of Vansda National Park has hilly terrain with hills having moderate altitudes. The altitude of the area varies from 110m to 360m above MSL. Generally, the hills have gentle slopes. The tops of the hills do not form well-defined ridges but form small plateaus. The hillsides are covered with gravel mixed with rocks and boulders. According to the Geological Survey of India, the tract is covered with Deccan lava flows in the form of horizontally bedded sheets. The flows usually form the flat-topped hills, which are a characteristic of the trappean country. The deccan traps belong to a type called "Plateau basalt" and are uniform in comparison, corresponding to a dolarite or basalt. The soil in the village is chiefly back cotton soil, while that in the uplands is red soil. The black cotton soil is largely of clay material and is clayey to loamy fertile soil. It contains high amounts of alumina, lime and magnesia with a variable amount of low nitrogen and phosphorus (Singh. H.S.2001).

Climate :

The climate is tropical with three different seasons viz- monsoon from mid June to October, winter season from October to February, summer from March to June. The southwest monsoon is irregular; the month of July is the rainiest month of the year. The temperature begins to increase by the February and May is the hottest month.

The Area :

The Vansda National Park comprising of total of 23.99 sq.km is located in the Navseri district of Gujarat State. It lies between 20° 51' 16" and 21° 21' 22" N latitude and 73° 20' 30" and 73° 31' 20" E longitudes. Vansda National Park is a forest area with good biodiversity forming a contiguous tract with the Dangs forest towards its eastern side. The forests of Navrasi district also fall on the southern border of the forest. The major portion of the park forms a part of Ambica catchment. The forest areas of Unai range of Vyara division surround the park. The Vansda declared as National Park in 1979.

Vegetation :

The forest is continuous in all parts except at few sloppy areas. According to the Champion and Seth classification (1968), Dangs forests fall in the south Indian tropical moist deciduous forests (Group 3A/ C1). The forest can be divided in to following two categories,

1. South Indian moist deciduous forests.
2. Southern dry deciduous forests.

The area supports very good vegetative growth. The variation of the species from the tall trees to orchids, ferns and lichens is largely due to the moist condition of the artea. The trees retain leaves almost throughout the year due to the moist condition of the forest. The composition of the vegetation in general is given below,

Top canopy :

Tectona grandis L.f., *Wrightia tinctoha* R.Br., ***Miliusa tomentosa*** **(Roxb.)** Finet & Gajnepain., *Mitragyna parvifolia* (Roxb.) Korth., ***Lannea coromandelica*** **(Houtt.)** Merrill., ***Adina cordifolia*** (Roxb.) Ridsd., ***Acacia chundra*** **(L.f.)** Willd., Grewia *tiliaefolia* Vahl., *Anogeissus latifolia* (DC.) Wall ex. Bedd., ***Lagerstroemia parviflora*** Roxb., *Morinda* tomentosa *Heyne. Ex. Roth.*, Ougeinia oojeinensis ***(Roxb.) Houchreut.***, Bhdelia retusa *(L.) Spr.*, Heterophragma quadriloculare (Roxb.) *K.Schum.*, Madhuca indica *J.F.Gmel.*, Dalbergia paniculata *Roxb.*, Albizzia lebbeck *(L.) Benth.*, Terminalia bellihca *(Gaertn.) Roxb.*, Bombax ceiba L. and *Samanea saman* (Jacq.) Merr.

Middle Canopy :

Helictaris isora L., *Lantana camara* Auct.non.L., *cairisa congesta* Wt., *Woodfordia fruticosa* Kurz., *Euphorbia nehifolia* L., *Tamanx ehcoides* Rottler & Willd., *Maytenus emarginata* (Willd.) D.Hou., *Zizyphus nummmularia* Lam., *Cadaba indica* L., *Capparis sepiaria* L., *Flacourtia indica* (Burm.f.) Merr., *Grewia hirsute* Vahl., *Cassia auhculata* L., *Barleria cuspidate* Heyne.ex.Ness. and *Secuhnega leucopyrus* (Willd.) MauellArg.

Ground cover :

Argemone mexicana L., *Cleome viscose* L., *Sida sp., Corchorus sp., Bioophytum sensitivum* (L.) Dc., *Crotalaria sp., Desmodium sp., Tephrosia sp., Cassia sp., Vicoa indica* (L.) Dc., *Xanthium strumahum* L., *Blumea sp., Vernonia sp., Zornia diphylla* Auct., *Heylandia latibrosa* Dc., *Justicia sp., Indigofera sp., Leucas sp., Chnum latifolia* L., *Curculigo orchioides* Gaertn., *Chlorophytum tuberosum* (Roxb.) Baker., and *Commelina sp.*

Climbers :

Cocculus sp., Tinospora cordifolia Miers., *Celastrus paniculata* Willd., *Abrus precatorius* L, *Mucuna pruhta* HK., ***Acacia pennata*** **(L.)** ***Willd.***, ***Combretum ovalifolium*** Roxb., *Corallocarpus epigaeus* (Rottl. & Willd.) Hook.f., *Ceropegia bulbosa* Roxb., *Hemidesmus indicus* (L.) Schult., *Ipomoea sp., Dioscoria sp.*and *Asparagus sp.*

Grasses :

Apluda aristata L., *Ahstida adscensionis* L., *Chloris barbata* Sw., *Coix lacryma-jobi* L, *Eragrostis sp., Heteropogon contorutus* (L.) P. Beauv.ex.R- & S. and *Themeda cymbaria*

Hack.

In the Vansda national park, due to the richness of the soil and also because the forest is provided extreme protection and no working is carried out, the trees have attained good height and girth, especially orchids also grow in very good number because of the

moist condition of the forest area.

Enumeration of plants :

Sr. no.	Botanical name	Sr. no.	Botanical name
	Ranunculaceae		
1.	*Clematis triloba* Heyne ex Roth		
	Dilleniaceae		
1.	*Dillenia pentagyna* Roxb.		
	Annonaceae		
1.	*Annona squamosa* L.	2.	*Miliusa tomentosa* (Roxb.) Finet & Gajnepain
3.	*Polyalthia longifolia* Benth. & HK.f.		
	Minispermaceae		
1.	*Cissampelos pareira* L.	2.	*Cocculus hirsutus* (L.) Diels
3.	*Cocculus pendulus* (Forsk.) Diels	4.	*Tinospora cordifolia* Miers
	Papaveraceae		
1.	*Argemone mexicana* L.		
	Capparidaceae		
1.	*Cadaba indica* L.	2.	*Capparis sepiaria* L.
3.	*Cleome burmanni* Wight & Arn	4.	*Cleome chelidorii* L.F.
5.	*Cleome gynandra* L.	6.	*Cleome viscosa* L.
7.	*Maerua oblongifolia* (Forsskal.) A. Rich		
	Flacourtiaceae		
1.	*Casearia esculenta Roxb.*	2.	*Casearia graveolens Dalz*
	Tamariceae		
1.	*Tamarix ericoides* Rottler & Wild		
	Elatinaceae		
1.	*Bergia ammannioides* Roxb.	2.	*Bergia capensis* L.
	Malvaceae		
1.	*Abelmoschus esculentus* (L.) *Moench.*	2.	Abelmoschus manihot (L.) Medikus
3.	*Abelmoschus moschatus* Medic	4.	*Abutilon glaucum* (Cav.) Sweet.
5.	*Abutilon. Indicum* (L.) Sweet.	6.	*Azanza lampas* (Cav.) Alef.
7.	*Hibiscus lobatus* (Murray) O.Ktze.	8.	*Hibiscus vitifolius* L.
9.	*Hibiscus sabdariffal.*	10.	*Kydia calycina* Roxb.
11.	*Sida acuta* Burn.f.	12.	*Sida ovata.* Forsk
13.	*Sida rhombifolia Var. retusa* L.	14.	*Sida rhombifolia* L.
15.	*Sida cordata* (Burm. F.) Borss	16.	*Sida glutinosa* Cav.
17.	*Thespesia populnea* (L.) Soland. ex Corr.		
	Bombacaeae		
1.	*Bombax ceiba* L.		
	Streculiaceae		
1.	*Helicteres isora* L.	2.	*Melochia corchorifolia* L.
3.	*Sterculia urens* (Roxb.)	4.	*Streculia villosa* Roxb. Ex Dc.
	Tiliaceae		
1.	*Corchorus aestuans* L.	2.	*Corchorus capsularis.* L.
3.	*Corchorus olitorius* Lam.	4.	*Corchorus tridens* L.
5.	*Grewia hirsuta* Vahl.	6.	*Grewia tiliaefolia* Vahl.

7. *Triumfetta rhomboidea* Jacq. 8. *Triumfetta rotundifolia* Lam.

Zygophyllaceae

1. *Fagonia cretica* L. 2. *Tribulus alatus* Del.

Oxalidaceae

1. *Biophytum sensitivum* (L.) Dc. 2. *Oxalis corniculata* L.

Balsaminaceae

1. *Impatiens balsamina* Var. rosea (L.) Hook f.

Rutaceae

1. *Aegle marmelos* (L.) Corr. 2. *Murraya paniculata* (L.) Jack

Burseraceae

1. *Garuga pinnata* Roxb.

Meliaceae

1. *Azadirachta indica* A. Juss 2. *Melia composita* Willd
3. *Soymida febrifuga* (Roxb.) A. Juss

Celastraceae

1. *Cassine glauca* (Roxb.) O. Ktze 2. *Celastrus paniculata* Willd.

Rhamnaceae

1. *Ventilago denticulata* Willd. 2. *Zizyphus mauritiana* Lamk.
3. *Zizyphus rugosa* Lam. 4. *Zizyphus xylopyra* (Retz.) Willd.

Vitaceae

1. *Ampelocissus latifolia* (Roxb.) Planch. 2. *Ampelocissus tomentosa* (Heyne ex Roth) Planch.
3. *Cayratia carnosa* (Lam.) Gagnep. 4. *Cissus repanda* Vahl.

Leeaceae

1. *Leea edgeworthii* Santapau. 2. *Leea macrophylla* Roxb. Ex. Hornem.

Sapindaceae

1. *Cardiospermum halicacabum* 2. Semecarpus anacardium L.F.
5. *Spondias pinnata* (L.f.) Kurz.

Moringaceae

1. *Moringa concanensis* Nimmo. 2. *Moringa oleifera* Lam.

Fabaceae

1. *Abrus precatorius* L. 2. *Aeschynomene indica* L.
3. *Alysicarpus procumbens* (Roxb.) Schindl. 4. *Alysicarpus longifolius* (Rottl. exspr.) W. & A
5. *Alysicarpus monilifer* (L.) Dc. 6. *Alysicarpus vaginalis* (L.) Dc.
7. *Astragalus prolixus* Sieb 8. *Atylosia scarabaeoides* (L.) Bth.
9. *Butea monosperma* (Lamk.) Taubert. 10. *Butea parviflora*
11. *Butea superba* Roxb. 12. *Canavalia gladiata* (Jacq.) Dc.
13. *Clitoria biflora* Dalz. 14. *Crotalaria fillips* Bth.
15. *Crotalaria leptostachya* Bth. 16. *Crotalaria linifolia* L.f.
17. *Crotalaria juncea* L. 18. *Crotalaria mysorensis* Roth
19. *Cylista scariosa* Roxb. 20. *Dalbergia latifolia* Roxb.
21. *Dalbergia paniculata* Roxb. 22. *Dalbergia wadubilis* Roxb.
23. *Derris indica* (Lamk.) Bemet. 24. *Derris scandens* (Roxb.) Bth.
25. *Desmodium repandum* (Vahl.) Dc. 26. *Desmodium velutinum* (Willd) Dc.
27. *Eleiotis monophylla* (Burm. F.) Dc. 28. *Erythrina suberosa* Roxb.

29. *Flemingues strobilifera*
30. *Gliricidia sepium* (Jacq.) Walp.
31. *Heylandia laterbrasa* Dc.
32. *Indigofera trita* L.F.
33. *Maghania macrophylla*
34. *Millettia racemosa* Bth.
35. *Moghania strobilifera* (L.) St.
36. *Mucuna prurita* HK.
37. *Ougeinics oojeinensis* (Roxb.) Houchreut.
38. *Phaseolus radiatus* L.
39. *Psoralea corylifolia* L.
40. *Rhynchosia minima* (L.) Dc.
41. *Pterocarpus marsupium* Roxb.
42. *Pueraria tuberosa* (Roxb.) Dc.
43. *Sesbania bispinosa* (Jacq.) W.F. Wight
44. *Smithia conferta* Sm.
45. *Tephrosia pauciflora* Grah.
46. *Tephrosia pumilia* (Lamk.) Pers.
47. *Tephrosia strigosa* (Dalz.) Sant. & Mahesh.
48. *Tephrosia purpurea* (L.) Pers.
49. *Uraria picta* Desv.
50. *Uraria rufescens* (Dc.) Schindl.
51. *Vigna radiata var. sublobata* (Roxb.) Verdcourt.
52. *Zornia diphylla* Auct.

Caesalpiniaceae

1. *Bauhinia purpurea* L.
2. *Bauhinia racemosa* Lamk.
3. *Cassia absus* L.
4. *Cassia occidentalis* L.
5. *Cassia fistula* L.
6. *Cassia pumila* Lamk.
7. *Cassia auriculata* L.
8. *Cassia tora* L.
9. *Delonix regia* (Boj.) Ref
10. *Piliostigma malbaricum* (Roxb.) Bth.
11. *Piliostigma Foveolatum* (Dalz.) Thoth.
12. *Tamarindus indica* L.

Mimosaceae

1. *Acacia auriculiformis*
2. *Acacia chundra* (Roxb. Ex. Rottl.) Willd.
3. *Acacia ferruginea* Dc.
4. *Acacia leucophloea* (Roxb.) Willd.
5. *Acacia nilotica* (L.) Willd ex. Delile.
6. *Acacia pennata* (L.) Willd.
7. *Acacia polyacantha* Willd.
8. *Acacia torta* (Roxb.) craib.
9. *Albizzia lebbeck* (L.) Benth.
10. *Albizzia odoratissima* (L.f.) Benth.
11. *Albizzia procera* (Roxb.) Bth.
12. *Leucaena leucocephala* (Lamk.) Dc. Wit.
13. *Mimosa pudica* L.
14. *Pithecellobium dulce* (Roxb.) Benth.
15. *Samanea saman* (Jacq.) Merr.

Combretaceae

1. *Anogeissus latifolia* (Dc.) Wall ex. Bedd.
2. *Combretum ovalifolium* Roxb.
3. *Terminalia arjuna* (Roxb.) W. & A.
4. *Terminalia bellirica* (Gaertn.) Roxb.
5. *Terminalia crenulata* Roth.

Myrtaceae

1. *Psidium guajava L.*
2. *Syzgium cumini* (L.) Skeels.
3. *Syzygium heyneanum* Wall ex W. & A.

Lecythidaceae

1. *Careya arborea* Roxb.

Lythraceae

1. *Ammannia baccifera* L.
2. *Ammannia multiflora* Roxb.
3. *Ammannia tenuifolia* L.
4. *Lawsonia inermis* L.
5. *Legerstroemia lanceolata* Wall.
6. *Legerstroemia parviflora* Roxb.
7. *Woodfordia fruticosa* Kurz.

Onagraceae

1. *Ludwigia octowalvis* (Mich.) Raven
2. *Ludwigia perennis* L.

Cucurbitaceae

1. *Citrullus colocynthis* (L.) Kuntze.
2. *Cucumis callosus* (Rtl.) Cogn. ex Cogn. & Harms.
3. *Diplocyclos palmatus* (L.) Roxb.
4. *Momordica dioica* Roxb. ex Wild.

5. *Mukia maderaspatana* (L.) M. Roem
6. *Solena heterophylla* Lour.
7. *Trichosanthes bracteata* (Lam.) Voigt.

Molluginaceae

1. *Mollugo nudicaulis* Lam.
2. *Mollugo pentaphylla* L.

Apiaceae

1. *Mollugo nudicaulis* Lam.
2. *Mollugo pentaphylla* L.

Apiaceae

1. *Trachyspermum roxburghianum* (Dc.) craib.

Alangiaceae

1. *Alangium salvifolium* (L.f.) Wang.

Rubiaceae

1. *Adina cordifolia* (Roxb.) Ridsd.
2. *Hymenodictyon excelsum* (Roxb.) Wall.
3. *Ixora brachiata* Roxb.
4. *Ixora arborea* Roxb. ex. Smith
5. *Meyna laxiflora* Robyns.
6. *Mitragyna parvifolia* (Roxb.) Korth.
7. *Morinda tomentosa* Heyne. Ex. Roth.
8. *Oldenlandia corymbosa* L.
9. *Spermacoce stricta* Sensu.
10. *Xeromphis spinosa* (Thunb.) Keay.
11. *Xeromphis uliginosa* (Retz.) Maheshwari

Asteraceae

1. *Adenostemma lavenia* (L.) O. Ktze.
2. *Ageratum conyzoides* L.
3. *Bidens biternata* (Lour.) Merr. & Sherff.
4. *Blainvillea acmella* (L.) Philip.
5. *Blumea lacera* (Burm. F.) Dc.
6. *Blumea membranacea* Dc.
7. *Blumea malcolmii* (Gl.) Kh. F.
8. *Blumea mollis* (D. Don) Merr.
9. *Caesulia axillaris* Roxb.
10. *Cyathocline purpurea* (D. Don) O. Ktze.
11. *Elephantopus scaber* L.
12. *Emilia sonchifolia* (L.) Dc.
13. *Gnaphalium luteo-album* L.
14. *Launaea procumbens* (Roxb.) Ramayya & Rajagopal.
15. *Pulicaria wightiana* (Dc.) Cl.
16. *Sonchus brachyotus* dc.
17. *Sphaeranthus indicus* L.
18. *Spilanthes calva* dc.
19. *Tridax procumbens* L.
20. *Vernonia cinerea* (L.) Less.
21. *Xanthium strumafium* L.

Myrsinaceae

1. *Embelia tsjeriam-cottam* (R. & S.) Dc.

Sapotaceae

1. *Madhuca indica* J.F. Gmel.

Ebenaceae

1. *Diospyros melanoxylon* Roxb.
2. *Diospyros montana* Roxb.

Oleaceae

1. *Schrebera swietenioides* Roxb.

Apocynaceae

1. *Carissa congesta* Wt.
2. *Catharanthus pusillus* (Murr.) G. Don.
3. *Carvia callosa* L.
4. *Holarrhena antidysenterica* (L.) Wall ex Dl.
5. *Nerium indicum* Mill.
6. *Thevetia peruviana* (Pers.) Merrill
7. *Wrightia tinctoria* R. Br.
8. *Wrightia tomentosa* R. & S.

Asclepiadaceae

1. *Calotropis procera* (Alt. R. Br.
2. *Leoptadenia reticulata* (Retz.) W. & A.

Periplocaceae

1. *Cryptolepis buchanani* (L.) R. & S. Syst.
2. *Hemidesmus indicus* (L.) Schult.
3. *Leptadenia reticulata* (Retz.) W. & A.

Gentianaceae

1. *Canscora diffusa* (Vahl.) R. Br.
2. *Enicostemma hyssopifolium* (Willd.) Verdoorn.

3.	*Exacum bicolour* Roxb.	4.	*Swertia minor* (Griseb.) Cooke.
	Ehretiaceae		
1.	*Cordia dichotoma* Forst. f.	2.	*Cordia monoica* Roxb.
3.	*Ehretia laevis* Roxb.		
	Boraginaceae		
1.	*Heliotropium indicum* L.	2.	*Heliotropium ovalifolium* Forsk.
3.	*Trichodesma amplexicaule* Dc.	4.	*Trichodesma indicum* (L.) R. Br.
	Convolvulaceae		
	Argyreia sericea Dalz.	2.	*Convolvulus arvensis* L.
3.	*Evolvulus alsinoides* (L.) L.	4.	*Ipomoea cuptica* (L.) Roth.
5.	*Ipomoea muricata* (L.) Jacq.	6.	*Ipomea pes caprae* (L.) Sw.
7.	*Ipomoea pes-tigridis* L.	8.	*Ipomoea quamoclit* L.
9.	*Ipomea sinensis* (Desr.) Cufod.	10.	*Ipomea triloba* L.
	Cuscutaceae		
1.	*Cuscuta reflaxa* Roxb.		
	Solanaceae		
1.	*Physalis minima* L.	2.	*Solanum surattense* Burm. f.
3.	*Solanum surattense* Burm. f.		
	Scrophulariaceae		
1.	*Bacopa monnieri* (L.) Pennell.	2.	*Kickxia ramosissima* (Wall.) Janch.
3.	*Lindenbergia muraria* (Roxb. ex. D. Don) P.	4.	*Lindernia crustacea* (L.) F. Muell.
5.	*Lindernia multiflora* (Roxb.) Mukerjee.	6.	*Limnophila heterophylla* R. Br. hom. Cons.
7.	*Striga gesneroides* (Willd.) Vatke.	8.	*Verbascum chinense* (L.) Santapau.
3.	*Alternenthera ficoidea* (L.) R. Br.	4.	*Alternenthera triandra* (L.) dc.
5.	*Amaranthus hybridus* L.	6.	*Amaranthus spinosus* L.
7.	*Amaranthus tricolour* L.	8.	*Amaranthus viridis* L.
9.	*Celosia argentea* L.	10.	*Digera muricata* (L.) Mart.
	Polygonaceae		
1.	*Polygonum barbatum* L.	2.	*Polygonum glabrum* Willd.
	Aristolochiaceae		
.	*Aristolochia indica* L.		
	Loranthaceae		
1.	*dendrophthoe falcata* (L.f.) Ettingsh.	2.	*Loranthus falcata var. pubescens* (L.f.) Ettinghs.
3.	*Viscum articulatum* Burm. f.		
	Euphorbiaceae		
1.	*Acalypha indica* L.	2.	*Baliospermum montanum* (Willd.) Muell-Arg.
3.	*Bridelia retusa* (L.) spr.	4.	*Chrozophora prostrata* Dalz.
5.	*Emblica officinalis* Gaerth.	6.	*Euphorbia acaulis* Roxb.
7.	*Euphorbia hirta* L.	8.	*Euphorbia nivulia* Buch-Ham.
9.	*Euphorbia tirucalli* L.	10.	*Jatropha curcas* L.
11.	*Kirganelia reticulata* (Poir.) Baill.	12.	*Mallotus philippensis* (Lam.) Muell. Am.
13.	*Phyllanthus lawii* Grah.	14.	*Phyllanthus fraternus* Webster.
15.	*Phyllanthus urinaria* L.	16.	*Securinega virosa* (Roxb. Ex Willd.) Pax. & Hoffm.
	Ulmaceae		
1.	*Holoptelea integrifolia* (Roxb.) Planch.	2.	*Trema orientalis* (L.) Bl.
	Moraceae		
1.	*Ficus amplissima* Sm.	2.	*Ficus arnottiana* Mig. In Ann.
3.	*Ficus asperrima* Roxb.	4.	*Ficus benghalensis* L.
5.	*Ficus hispida* L.f.	6.	*Ficus racemosa* L.

7. *Ficus religiosa* L.

Orchidaceae

1. *Aerides crispum* Lindl.
2. *Aerides maculosum* Lindl.
3. *Habenaria furcifera* Lindl.
4. *Nervilia aragona* Gaud.
5. *Nervilia discolour* (Bl.) Schltr.
6. *Peristylus plantagineus* Lindl.
7. *Peristylus stocksii* (HK. F.) Kranz.
8. *Vanda tessellata* (Roxb.) HK.F.
9. *Vanda testacea* (Lindl.) Reichb.
10. *Zeuxine strateumatica* (L.) Schltr.

Zingiberaceae

1. *Costus speciosus* (Koenig ex. Retz.) Sm.
2. *Zingiber cernuum* Dalz.

Musaceae

1. *Enseta superbum* (Roxb.) Cheesman.

Amaryllidaceae

1. *Crinum latifolium* L.

Hypoxidaceae

1. *Curculigo orchioides* Gaertn.

Agavaceae

1. *Agava americana* L.

Taccaceae

1. *Tacca leontopeloides* (L.) O. Ktze.

Dioscoriaceae

1. *Dioscoria bulbifera* L.
2. *Dioscorea hispida* Dennst.
3. *Dioscorea oppositifolia* L.
4. *Dioscoria pentaphylla* L.
5. *Dioscorea wallichii* Hk. F.

Liliaceae

1. *Asparagus racemosus* Willd..
2. *Chlorophytum borivilianum* Sant. & Fernand.
3. *Chlorophytum tuberosum* (Roxb.) Baker
4. *Gloriosa superba* L.
5. *Scilla hyacinthine* (Roth.) Macbr.
6. *Urginea indica* (Roxb.) Kuntn.

Commelinacea

1. *Commelina benghalensis* L.
2. *Commelina nudiflora* L.
3. *Commelina paludosa* Bl. Enum.
4. *Commelina erecta* L.
5. *Commelina suffruticosa* Bl. Enum.
6. *Cyanotis cristata* (L.) Schult.f.
7. *Cyanotis fasciculata* (Heyne.ex.Roth.) Schult.f.

Arecaceae

1. *Phoenix sylvestris* Roxb.

Araceae

1. *Amorphophallus commutatus* (Schott) Engler.
2. *Arisaema neglectum* Schott.
3. *Arisaema tortuosum* L.
4. *Colocasia esculenta* (L.) Schott.

Cyperaceae

1. *Cyperus alulatus* Kern.
2. *Cyperus compressus* L.
3. *Cyperus triceps* (Rottn.) Endl.

Poaceae

1. *Apluda aristata* L.
2. *Apluda mutica* L.
3. *Arundinella metzii* Hochst.
4. *Bambusa arundinacea* (Retz.) Willd.
5. *Chloris incompleta* Lagas
6. *Cynodon dactylon* (L.) Pers.
7. *Dendrocalamus strictus* (Roxb.) Ness.
8. *Eragrostis ciliaris* Link.
9. *Heteropogon contortus* (L.) P. Beauv. ex. R. & S.
10. *Oryza sativa* L.
11. *Panicum montanum* Roxb.
12. *Trilobachne cookie* (Stapf.) Schenck ex. Henr.

Results and Discussion

Plant diversity is considered to be an important aspect of forests as in certain areas, increase in dominance of certain species lead to the reduction of population of other species, It is observed that dominant species suppress the growth and regeneration of other flora.

The present study enumerated 407 species, belonging to 284 genera and 81 families of the flowering plant (Table-1).

Table 1 : Number and percentage of families, genera and species of each class.

Class	Families		Genera		Species	
	No	%	No	%	No	%
Dicotyledons	67	82.72	246	86.61	352	86.48
Monocotyledons	14	17.28	38	13.39	55	13.52
Total	81	100	284	100	407	100

Dicotyledons contributed 352 plant species belonging to 246 genera and 67 families, which is quite higher than that of monocotyledons. The monocotyledons contributed only 55 species belonging to 38 genera and 14 families proportion of the monocotyledons to dicotyledons was also recorded (Table 2).

Table 2 : Comparison of Monocotyledons-Dicotyledon ratio of various levels in Vansda National Park.

Comparison	Monocotyledon : Dicotyledon ratio
Families	1 : 4.7
Genera	1 : 6.4
Species	1 : 6.4
Genera to Species	1 : 1.4

These ratios for are rather low in comparison to a corresponding ratio (1:7) for the whole of India (Menon, 1979). The ten dominant families recorded were Fabaceae (52), Asteraceae (21), Malvaceae (17), Euphorbiaceae (16), Mimosaceae (15), Acanthaceae (14), Convolvulaceae (12), Caesalpiniaceae (12), Poaceae (12), Rubiaceae (11), Orchidaceae (10), Scrophulariaceae (8). When compared with the flora of Gujarat for dominant families the first rank is same but in Gujarat the second rank is occupied by Poaceae in contrast to the Asteraceae in the Vansda National Park. In Vansda National

Park out of the total 307 plant species, noted 256 species are of medicinal as well as economically important uses. It has been noted that Orchidaceae families is dominant in Soputh Gujarat forest area (Suryanarajan, 1968, Desai, 1976). Therefore in terms of ecology the area falls under the moist decichious forest type (Champion and Seth, 1968). Flora of Vansda National Park such species like *Tectona grandis* L.f., *Terminalia crenulata Roth., Diospyros melanoxylon Roxb., Milius tomentosa* (Roxb.) Finet & Gajnepain., *Helicteres isora L.*, Carissa congesta Wt., *Zizyphus xylopyra* (Retz.) Willd., *Crotalaria spp. Corchorus sp. Euphorbia sp* are dominant and *Sterculia villosa* Roxb. e.x.Dc., *Terminalia arjuna* (Roxb.) W. & A., *Careya arborea* Roxb., *Legerstroemia parviflora* Roxb., *Citrullus colocynthis* (L.) Kuntze., *Meyna laxiflora* Robyns., *Oroxylum indicum* (L.) Vent., *Radermachera xylocarpa* (Roxb.) K. Schum., *Nervilia aragona* Gaud., *Nervilia discolor* (Bl.) Schltr., *Chlorophytum borivilianum* Sant. & Fernand. and *Gloriosa superba* L. are the rare plants in vansda National Park.

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Role of Vegetation in Making Cities Better Liven up

Yogesh T. Jasrai and P. S. Sisodia

Vegetation play an effective role in the urban environment, supporting many fundamental subsystems like hydrological cycles, nutrients cycles, atmospheric gas balance etc. However, increasing population and the rapid urbanization process are converting more and more green spaces into impermeable hard concrete jungles. Such implications deprive the city of green spaces and generate stress in our life. The urban areas also experience water scarcity, air pollution; heat islands etc apart from similar such problems like traffic congestion and vehicular pollution. Number of studies undertaken in this direction suggested that the development of green areas improves the urban environmental conditions. There could be number of attempts in this direction to increase the green spaces in the urban areas such as urban forestry, silviculture, afforestation, social forestry with the aim of improving the environmental conditions.

The golden corridor (Ahmedabad to Vapi) has been lined up with scores of small and large scale industries. Over the years, Vadodara has also witnessed establishment of medium and large scale industries with great strides in economic field. The city has giant industrial complexes and public undertakings like Gujarat Refinery, Indian Petro-chemicals, Gujarat State Fertilizers and Chemicals, Alembic Pharmaceuticals, Heavy

Water Project, Oil and Natural Gas Commission to name few of them. The present document deals with the role of trees in making cities liven up. In our survey total 179 tree species were found in Vadodara, of which 35 plant species are very important with their ability to control air pollution.

Key words: Vadodara, trees, urban environment

Introduction

Several factors are responsible for environmental pollution, chief among these factors are build up of CO_2 or other greenhouse gases in the atmosphere and a host of man made elements causing toxic wastes and ozone depletion. Air pollution and anthropogenic disturbances have caused destruction of plant and animal natural habitats to varying degrees. This rapid growth rate of many cities, combined with their huge population base, is pushing the cities to unprecedented sizes. These processes have modified the natural features of a city and its surroundings (geography, topography and climate) through following main ways: i.the conversion of agriculture land to urban uses, ii.the extraction and depletion of natural resources. iii. the disposal of wastes in the urban set up. As the cities expand, prime agricultural land and habitats such as wetlands and forests in and around the city get transformed into land for housing, roads and industry. Increasing industrial develop-mental activities accelerate these further due to which many of the plant species become rare. Losses of biological diversity are now significant and these could affect the future well being of human life. Sustainable use of biodiversity is therefore a matter of paramount importance. To develop biodiversity sustainably, one must know the species present in an ecosystem and their interdependence including causes of their disturbance. It is found that the number of such activities does bring more green spaces, however attempts on the integration of trees as an element of urban landscape are missing. Such an attempt would deliver functionally more effective and aesthetically pleasing environment. This requires many aspects to be considered such as ownerships, soil types, hydrology, topography, micro and macro climatic conditions, size and nature of the city, natural vegetation, type of industries etc.

The Vadodara city generally known as Garden city of Gujarat is also known as cultural capital of Gujarat. It comprises an area of about 108.22 km² and is situated on both the banks of the river Vishwamitri. It lies between 22° 17' 59" N latitude and 73°15' 18" E longitude. It is almost a plain area, beautifully planned city and a district place in the Gujarat State. The climate of the Vadodara city is markedly periodic and is characterized by a dry and increasingly hot summer from March to June, dry and cold winter from November to February and a warm monsoon from July to September.

Green spaces in the urban set up

The integrated system of human components and the biophysical variables (environment) of the city are commonly known as the urban ecosystem. The relationships between these two components are extremely complex and always conflicting with each other. The cities are expanding in its size at the expense of the nature (biophysical variables). The green spaces (trees, lawns/parks, forest and cultivated land) are the only potential biophysical elements to sustain our city. According to American Forestry Association (AFA), one city tree can provide over 57,000 $ worth of air conditioning, erosion, storm water control, wild life shelter and also air pollution control over 50 years of its life span. In fact such spaces are the lungs of the city, picking polluted air and releasing fresh and good air.

The ever-increasing demands for building and paving in the urban area impaires physical environment to the extent that the spatial patterns are more fragmented and city becomes less lively in nature. The gap between the urban man and the nature get widened. The green spaces are the potential design elements (apart from its ecological/environmental benefits) which are capable of bringing together the entire city through defining, reinforcing and creating various spaces in different levels (micro level to macro level). The potential use of the trees in shaping and making our cities more liven up remain unperceived one. As an animal, man always relates himself empathically to his environment. Many social scientist proved that introducing the nature in the form of vegetations, wildlife,

soil and water in significant quantity is very close to the natural living and working place which will improve the community health and the working efficiency of individuals in the city.

Present work in this direction towards control of air pollution in the urban ecosystem (through urban agriculture, social forestry, urban forestry, silviculture, aforestation, urban farming) apart from the marketable returns of the plantation emphasize on the air pollution resistance of tree species in the city. To get the quick and faster results, introduction of single species or exotic plants in large extent *(Eucalyptus, Casuarina equisetifolia)*, may create many problems in the urban area, such as,

i. Loss of biodiversity
ii. Altering basic cyclic pattern of the local ecosystem - hydrological cycle, nutrient cycle
iii. Some species do not allow the other species to grow near by (allelopathy) so that it slowly replaces the local species
iv. Monoculture - susceptible for environmental problems such as being prone to climatic change and diseases
v Impoverishment/nutrients imbalance of the soil due to over consumption of the particular minerals and nutrients.

The balance between the socio-economic development of the city and the threshold limits of its biophysical variables are inevitable to support the man's biological and physical needs to continue the existence. We often fail to integrate the green spaces with our city's functional systems. Because of our incompetence in handling this element in the urban space, urban tree remains impediment to various urban *activities* and stands aloof. In fact, this natural element needs to be integrated in such a way that it should support the efficient function and healthy growth of the urban area.

Design aspects of the green spaces

Urban trees are the powerful symbols (architectural objects), which can produce poetry or even inspire depending

on the way they are handled. The arrangement, spacing, location and type of species must be identified individually to meet the functional requirements of the each urban space. Some of the important design implications to use the green spaces as design elements in the urban area are

i. Plantation of some of the plant species which are resistant to air pollution.
ii. Trees should be used in such a way that it should convey a scale that is sympathetic to the nature of the function which is associated with each space.
iii. Trees should express the particular site wherever it is planted, through its arrangement in terms of unique pattern, foliage and form.
iv. Using single species in a group to express the collective impact of homogeneity of texture, pattern, light and shade than an individual tree.
v. The consistency between tree pattern and surroundings can be achieved by geometry or by subtle forms.

For these criteria, the choice of the right tree species is a very difficult task. We have surveyed the whole city and identified a total of 179 tree species of which 35 tree species are very important for their ability to control air pollution.

Table-1. Tree species with ability to purify polluted air.

Botanical name	Botanical name
Polyalthia longifolia	*Samanea saman*
Thespesia populnea	*Anogeissus sericea*
Ceiba pentandra	*Eucalyptus globulus*
Guazuma ulmifolia	*Lagerstroemia speciosa*
Ailanthus excelsa	*Alangium salvifolium*
Azadirachta indica	*Anthocephalus indicus*
Butea monosperma	*Manilkara hexandra*
Dalbergia latifolia	*Salvadora persica*
Dalbergia sissoo	*Cordia dichotoma*

Botanical name	Botanical name
Pongamia pinnata	*Kigelia pinnata*
Bauhinia purpurea	*Gmelina arborea*
Cassia fistula	*Tectona grandis*
Cassia siamea	*Emblica officinalis*
Tamarindus indica	*Putranjiva roxburghii*
Acacia auriculiformis	*Ficus benghalensis*
Acacia nilotica	*Ficus religiosa*
Albizzia lebbeck	*Streblus asper*
Casuarina equisetifolia	

Trees and urban air pollution

Trees play an invaluable role in reducing man made urban air pollution and improve human health through,

i. The direct and indirect benefits of trees for urban air quality and improving quality of life.

ii. Trees reduce the air pollution by removal of obnoxious gases and particulates from the air through stomatal movement and deposition.

iii. Trees also help to slow global warming, mostly attributed to the increasing levels of greenhouse gases, specially CO_2 caused by fossil fuel combustion and even deforestation.

iv. Trees are one of the most effective mechanisms for cleaning the air of contaminants and for supplying oxygen.

v. Trees reduce ambient temperature in three ways

   a. use of solar energy for photosynthesis.

   b. provide shade and shelter

   c. evapotranspiration to cool themselves and the surrounding air.

vi. Trees also reduce storm water run-off, erosion flooding and water pollution.

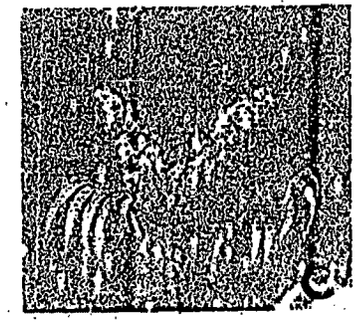
vii. Trees also reduce urban noise, which has been associated with a number of adverse health effects

Article 19

Pl. 1.Role of such trees for making cities better liven up.

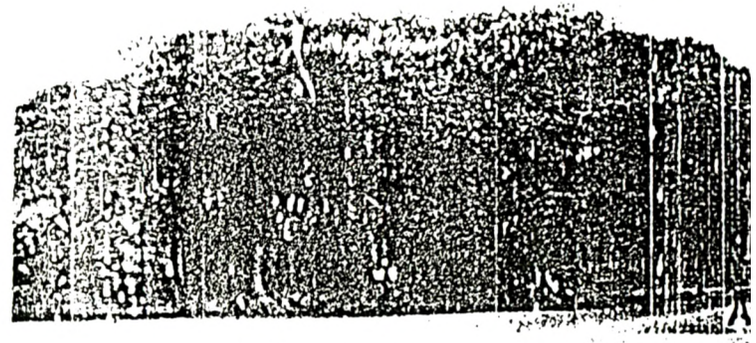
A.Butea monosperma

B.Manilkara hexandra

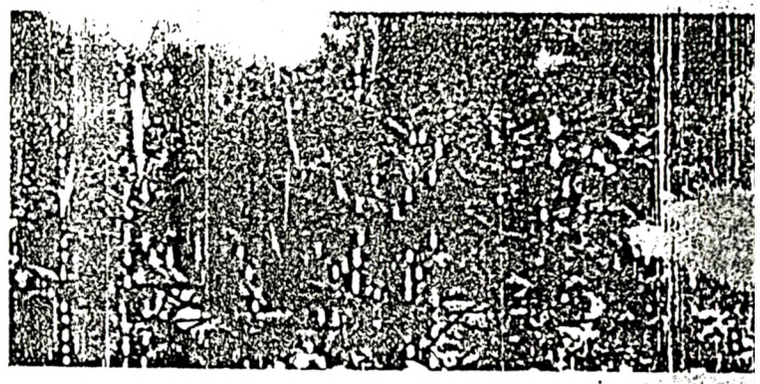


C.Azadirachta indica

Pl. 2.Role of such trees for making cities better liven up.



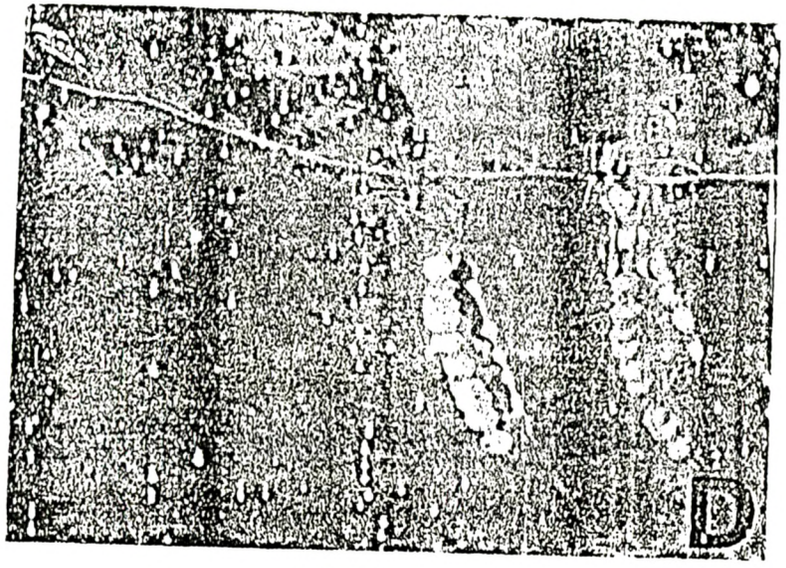
A.Ficus benghalensis



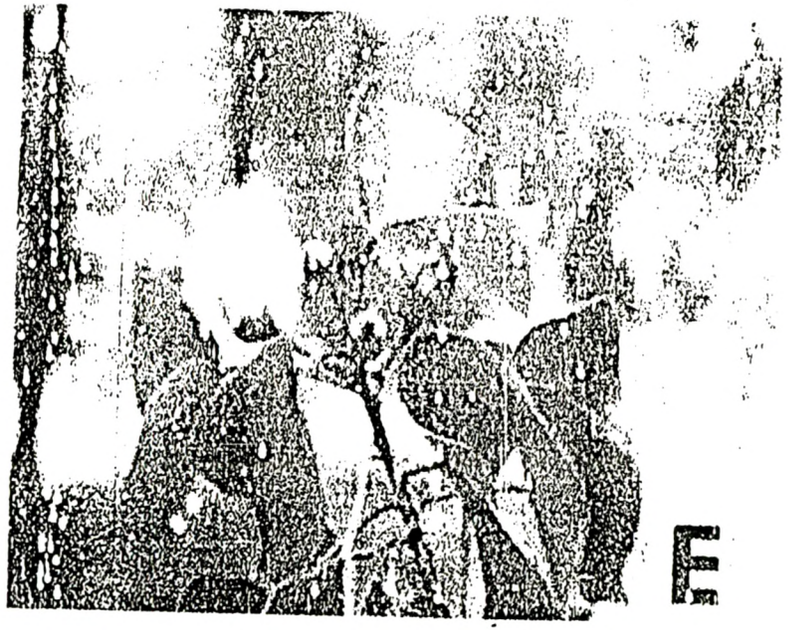
B.Tectona grandis

C.Anogeissus sericea

D.Mimusops elengi



D.Acacia nilotica



E.Thespesia populena

viii. As per the rough estimates the tree that lives for 50 years help in generating

a. Rs. 5.3 lakh worth of oxygen.

b. Rs. 6.4 lakh worth of soil fertility.

c. Rs. 6.4 lakh worth of soil erosion control.

d. Rs. 10.5 lakh worth of air pollution control.

e. Rs. 5.3 lakh worth of shelter for birds and animals.

So, when one tree falls or felled the city's net loss is worth more than Rs. 33 lakhs.

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COUNTING OF GREEN HEADS OF VADODARA CITY

B. D. Oza, P. S. Sisodia and Y. T. Jasrai*

Department of Botany, Faculty of Science, M. S. University of Baroda, Vadodara – 390002. *e-mail : yjasrai@yahoo.com

ABSTRACT

Vegetation play an effective role in the urban environment by supporting many fundamental sub-systems like hydrological cycle, nutrient cycle, atmospheric gas balance, climate in the surrounding and others. However increasing population and the expanding cities leading to rapid urbanization is converting more and more greener spaces into impermeable hard concrete sky-scrapers. Our activities both in-house and out-door causes several problems. Hence the urban areas experience water scarcity, air pollution, heat islands effect; traffic jams etc apart from many routine problems. For our convenience and needs the biota and soil components have been replaced by industrialization and urbanization. During last few decades because of this tremendous urbanization and industrialization the whole environment of Vadodara have changed. With all their beauty, city trees are also not spared. It is sometimes surprising how they can survive the artificial and adverse conditions under which they grow. Number of such studies under taken in this direction suggests that, the development of green areas help improve the urban environmental conditions. The present study includes tree census with their scientific identification and counting (of each tree species). In the present study 179 tree species were reported belonging to 56 plant families. The major families are Ceasalpiniaceae, Mimosaceae, Bignoniaceae, Moraceae, Arecaceae. The study has also identified VITrees (Very Important Trees) which need special care for their sustenance.

Key words: number of trees, VITs, rare trees

INTRODUCTION

For better managing the ecosystem, for the years, people have worked on bird census and animal census. And according to results of such census survey, the rare and endangered species are listed out and the missions get started for their conservation. As far as plants are concerned people do take care of those species which are exotic, having good ornamental or medicinal values or with good market value. No attention is paid to the plants of city area especially tree species which are maintaining themselves in the worst atmosphere of concrete jungle.

Vadodara is one of the major cities of Gujarat state. It is beautiful and well planned city and the main seat of learning and culture in the state of Mahatma Gandhiji. The general topography is plain. The weather in general remains dry and sunny except during monsoon. The city is situated on the southern bank of the river Vishwamitri, the total city area is 108.22 sq. kms. The population is estimated to be approximately 1,50,000.

Vadodara is also one of the major industrial cities in Gujarat. The industrial area covers an area of 35 sq. kms. and lies on North-West direction of the city. Due to anthropogenic activities gases like O_3, NO_x, CO_2, NH_3, and SO_2 are released in excess into the atmosphere. These pollutants are known to have effects on human health, animals, plants, natural and managed ecosystems. The impacts of pollutants on vegetation are much apparent due to their stationary nature. Trees, because of their perennial nature, are exposed to the pollutant most of the times and get damaged. Some of the common visible symptoms are chlorosis, necrosis, burnt tip of branches defoliation etc (Saha, 1998)

The present study includes tree census with scientific identification and counting of each tree species. The survey has been carried out in every street and road for the tree count of Vadodara city limits.

METHODOLOGY

The quality of vegetation in any ecosystem is one of the best indicators of the environmental conditions there. Plants being the primary producers are one of the important factors that determine the nature of all other life forms in the area. The survey included visits to each street and roads to collect data on number of trees of each species and subsequent analysis of information gathered. All the species were classified according to Bentham and Hooker's system of classification using reference flora (Cooke, 1958; Shah, 1978; Santapau, 1962; Bole and Pathak, 1988; Rao, 2001). For documentation, photographs were also taken for plant specimens. The photography was accomplished with the help of photographic camera (Canon, AE-1)

RESULTS AND DISCUSSION

There are many reasons for undertaking this tree census. This helps to determine the importance of a site, the population size of a species, the habitat requirements of a species, habitat management and also understand the population dynamics. All these help in better management of the city. Earlier, in an adjoining area Sayajibaug (well known as Kamatibaug), spread in an area of 113 acres, on river Vishvamitri, total 98 tree species were listed under the project-Tree Diversity of Sayaji Park, Vadodara. (Thaker et al. 1999). Similarly, Prof. Subnis (1967) has also reported 147 tree species from Baroda and its environs. In the present study, however 179 tree species were recorded belonging to 56 families (Table-1). The major families are Ceasalpiniaceae, Mimosaceae, Bignoniaceae, Moraceae, Arecaceae.

Table – 1 : Total Tree species recorded in Vadodara city limits

	FAMILY	GENERA	SPECIES
Dicotyledons	48	117	159
Polypetalae	30	68	94
Gamopetalae	11	37	46
Monochlamydae	07	12	19
Monocotyledons	03	12	12
Gymnospermae	05	06	08
Total	56	135	179

Total 96,475 numbers of tres were noted from Angiosperms and 1865 from Gymnosperm group. The lesser number of trees were found in the city areas like Raopura, Mangal Bazar, Panigate where both human population and vehicular traffic is the most. Some of the major tree species are *Azadirachta indica* A.Juss, *Mangifera indica* L., *Polyalthia longifolia* Benth. & HK.f., *Peltophorum pterocarpum* (Dc.), *Pongamia pinnata* L., *Mimusops elengi* L., etc. Ornamental flowering trees are *Bauhinia purpurea* Lamk., *Bombax ceiba* L., *Butea monosperma* (Lamk), *Cassia javanica* L., *Cassia fistula* L., *Cassia renigera*, *Delonix regia*(Boj.), *Erythrina variegata* L., *Jacandra mimosifolia* D. Don., *Nyctanthes arbor-tristis* L. *Saraca asoca* (Roxb.), etc. Ornamental foliage and shade trees are *Ailanthus excelsa*(Roxb.), *Alstonia scholaris* (L.), *Azadirachta indica* A. Juss, *Casuarina equisetifolia* J. R. & G. Forst., *Ciba pentendra* (L.), *Kigelia pinnata* (Jacq.), *Melia Azedarach* L., *Polyanthus longifolia* Benth., *Roystonea regia* (H. B. & K.). some medicinal tree species are *Acacia catechu* (L. f.), *Aegle marmalose* (L.), *Ailanthus excelsa* Roxb., *Azadirachta indica* A. Juss., *Saraca asoca* (Roxb.), *Strychnos nux-vomica*, *Tamarindus indica*, *Terminalia bellerica*(Gaertn.), *Terminalia chebula* Retz. etc.

Table – 2 : Major tree species with their numbers in Vadodara city limits.

Botanical name	No. of trees	% of total trees number
Polyalthia longifolia Benth. & HK.f.	2893	3
Azadirachta indica A.Juss	2710	3
Peltophorum pterocarpum (Dc.) Backeref.K.Heyne.	2271	2
Punica granatum L.	2040	2
Manilkara zapota (L.) Van.	1790	2
Thevetia peruviana (Pers.) Merrill.	1755	2
Holoptelia integrifolia (Roxb.) Planch.	1731	2
Plumeria rubra Linn.	1717	2
Pongamia pinnata L.	1686	2
Tecoma stans (L.) H.B. K.	1519	2
Vitex negundo L.	1484	2
Roystonea regia (H.B. & K.) O.F.Cook.	1437	1
Mangifera indica L.	1426	1
Mimusops elengi L.	1351	1
Kigelia pinnata (Jacq.) DC.	1236	1
Ficus benghalensis L.	668	0.5

Table – 3 : Tree species tolerant to air pollution

Resistant	Moderate	Sensitive
Anogessus latifolia (Roxb.) Wall.	Cordia dichotoma Forst. f.	Acacia nilotica (L.) Willd. Ex Delle,
Azadirachta indica A. Juss.	Holopptelia integrifolia (Roxb.)	Mangifera indica L.
Bauhinia recemosa Lamk.	Pithecellobium dulce (Roxb.) Benth.	Mimusops hexandra (Roxb.) Dub.
Strablus asper Lour.	Tamarindus indica L.	Moringa oleifera Lam.

(Saha, 1998)

The least number of trees were found for (Fig.-1) *Adansonia digitata* L., *Choclospermum religiosum* (L.) Alst. Handb., *Diospyros embryopteris* Pers., *Sterculia urens* Roxb., *Strychnos nux-vomica* , *Xerompis uglinosa* (Retz.) Maheshwari etc.

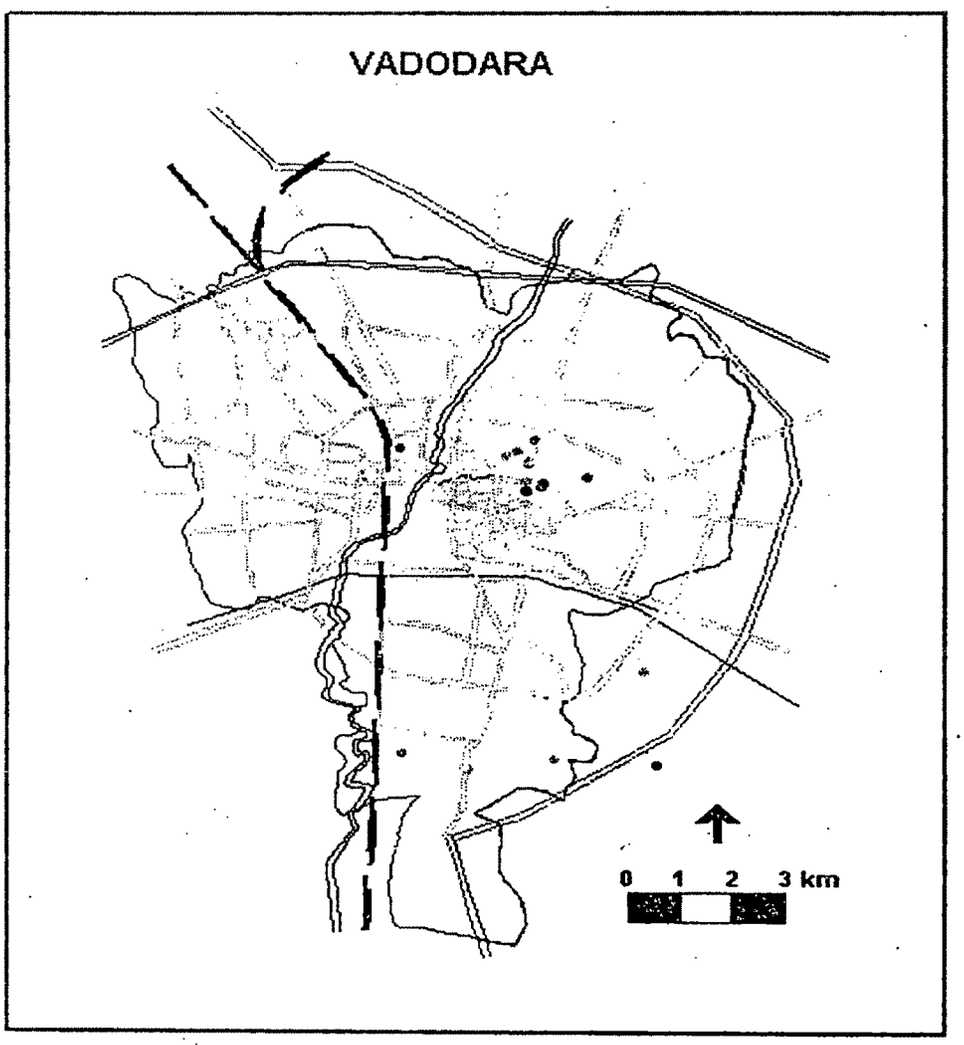
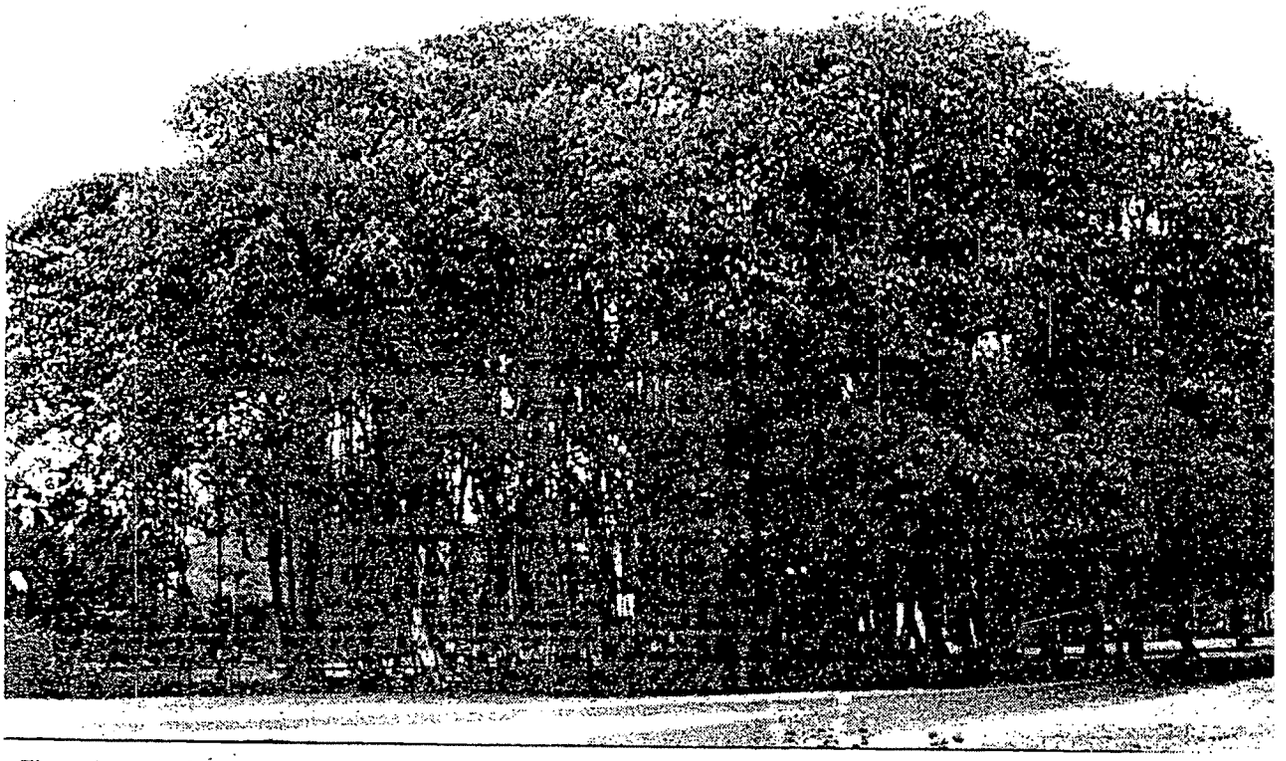
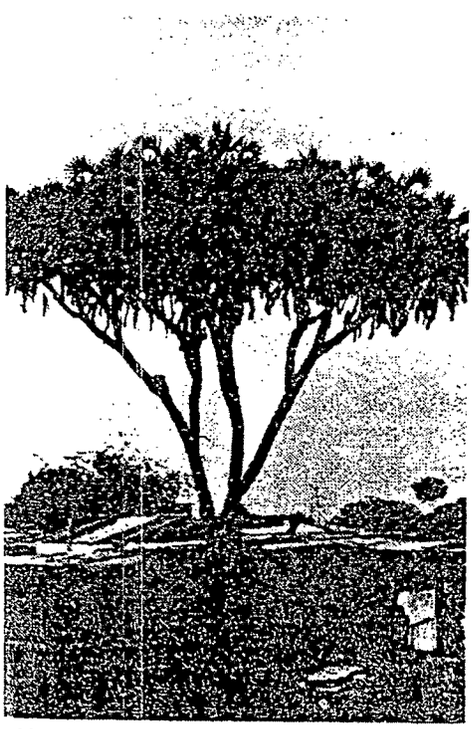


Fig. 1: The map showing the location of some of the rare and VITrees in Vadodara city limits.

Plate I



Ficus benghalensis L.



Hyphaene dichotoma

3. *Polyalthia longifolia*

4. *Adansonia digitata*

Fig. 2: Some of the rare and VITrees in

Some trees on private / public land locations seem to date back to several decades and in part define the long term association with the society. These trees have significant specification due to their characteristics/size/age etc. Such trees can be defined as VITs (Very Important Trees) as they have special / exceptional value to the community due to their enormous size / special characteristics or long term association of the species. The city must retain VITs (except when removal is mandatory for public health / safety or welfare) as they are the assets of our city. VITs with their enormous size in Vadodara has been identified as *Ficus benghalensis*, *Azadirachta indica* at D.N. Hall ground (M.S.U. Baroda), *Tamarindus indica* and *Mimusops elengi* in Faculty of Arts with the maximum girth among all tree species. Such huge canopy of trees speaks about the royal era of the University in the mid 20th century. Trees like *Adansonia digitata* at Ellora park; *Cassia fistula, Manilkara hexandra* and *Kigelia pinnata* at Kareli baug; have been marked as VITs.

Earlier, Sabnis (1967) has also reported 898 plant species from Baroda and its environs with 147 tree species. This clearly indicates that number of tree species has increased but numbers of trees have distinctly decreased. As per the latest survey (2001) the population of Vadodara is 15,000,00 approximately and the number of trees is 98,340 only. In fact, to maintain ecological balance fifteen trees are required for every person.

According to the survey by Gujarat State Forest Department, the number of trees of Vadodara District is 2,33,211. The survey showed the population of *Acacia nilotica* Del. being 14 %, *Azadirachta indica* is 13%, *Eucalyptus globulus* is 11 % and *Bombax ceiba* is 9 %. In the districts the number of trees per head is only 2 which are lesser than the average. 53 % of these trees are of 10 - 45 cm GBH with the age of 3 to 15 years and 31 % of trees are of 46 - 90 cm GBH with the age of 16 to 30 years. Among 20 main tree species, *Azadirachta indica* is found to be the most abundant and distributed all over the Gujarat state. Result also demonstrates that there are 12 trees per hectare in Vadodara District which is much less than the average. (Anonymous, 2000).

Benefits of city trees:

The city tree with the characteristic shape of its canopy, its habit of growing tall and slender or small and spreading, its spring bloom or fall color, the shape and size of its leaves, and its evergreen or deciduous nature. No single item distinguishes a city more than its green areas, and probably our first reaction to a society is to its abundance or lack of trees. The shade they give from the scorching sun makes the summer heat more tolerable, and natural filters for grateful eyes the dazzling reflection from masonry and concrete.

For all their beauty, city trees are no weaklings. It is sometimes surprising how they can survive the artificial and adverse conditions under which they grow. Smoke and gases, physical injuries, the disrupted water table, hard packed soil, lack of humus renewal and mulch, inadequate root space, reflected heat from pavements and buildings, and glacial blasts of air through the wind tunnel formed by street and buildings, all make their survival a lot hard

Trees act as catalyst in nature's antipollution squad. Tree alleviate dust, cleanse the air and absorbs moisture and as they play the role of cooling agents and as a buffer against noise. Besides all these biological activities trees aid to the beauty in the city's concrete infrastructure. Above all trees are beautiful to look at and to have them around.

Step forward to make our city beautiful :

Even if a single tree falls or is felled the community loses a worth more than Rs. 32 lakhs. Therefore every citizen should actively participate in the efforts being made by the government and voluntary agencies to protect existing trees and to plant more trees. The first task is of education and awareness about biodiversity and its important role in our lives. Nature clubs and residents' association need to encourage short trips to urban gardens of biodiversity to inculcate love and respect for the same. Citizens can put pressure on the city administration agencies to plant appropriate trees species or to ensure that biodiversity conservation is an important consideration in an urban development Plans. More parks and gardens should be planned with diverse but appropriate variety as per the need. Sometimes many exotics are introduced to arouse people's interests in trees. Citizens can do a lot towards the protection of their immediate environment. As a part of these exercises we have recently conducted a training programme for school children on Plants: Importance, Diversity and Conservation during 1-2 February 2005 with the successful training to students and teachers. (Anonymous, 2005)

In short, it is our duty to protect some of the surviving 'lungs' of the city before they catch the greedy eyes of the so call'developers' of the once beautiful urban green centre which combined all the good features of the city and a village.

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Tree diversity in Vadodara city

P. S. Sisodia, B. D. Oza and Y. T. Jasrai
Department of Botany, Faculty of Science, M. S. University of Baroda, Vadodara – 390002.

Abstract

The Vadodara city is situated on the southern bank of the river Vishwamitri. The total city area is 108.22 sq. km. it is one of the major industrial cities in Gujarat state. The industrial area covers an area of 35 sq. kms. and lies on north-west direction of the city. During last few decades because of tremendous urbanization and industrialization the whole environment of Vadodara have changed. The prerequisites for any biodiversity study of an area include detailed inventory of the available plant forms and their associations, as a parts of these, studies were under taken to generate an inventory of tree species. In the present study 179 tree species a reported form 56 families. The dominant families are Caesalpiniaceae, Mimosaceae, Bignoniaceae, Moraceae, Arecaceae.

Key words : Tree diversity, Vadodara, Urbanization, Tree species

Introduction

Biodiversity studies are gaining immense significance and are the hot topic today. Biodiversity conservation is not only for ecological and environmental rejuvenation, but also for sustainable economic development. In recent years, biodiversity – its conservation and sustainable utilization has become the most important component for the survival of human being on this earth. The biological diversity was at its extreme and natural resources were abundant and freely available to man for his survival and development at the time he entered the industrial age (Das, 2002).

For our convenience and needs the biota and soil have been stripped away and replaced by industrialization and urbanization. Vadodara is an example of such synthetic ecosystem where tremendous urbanization and industrialization during last dew decades have changed the whole landscape. Vadodara is one of the major industrial cities in Gujarat. The industrial area covers an area of 35 sq. km. And lies on the North - West direction of the city. In fact industrial units are located all around the city.

The prerequisites for any biodiversity/vegetation/green cover plans, it is essential to generate a detailed inventory of the available plant forms and their associations. Therefore, studies were undertaken to generate an inventory of tree forms growing in the Vadodara city.

Geology and Geography

The Vadodara city is situated on the banks of Vishwamitri river and between the fertile lands of rivers Narmada-Mahi. Vadodara is situated in the western parts of Gujarat between 22°17'59" latitude and 73°15'18" East longitudes and 35.5 Mts. Altitudes above mean sea level. The total area of the city is 108.22 sq. kms. The general topography is plain. The general soil types are black soil and red loam and the area is very fertile for agricultural use, soil characters are almost same at all localities.

Climate

In general the weather remains dry and sunny except during monsoon, the wind flow has a definite pattern with higher speeds during pre-monsoon. The wind remains calm during October. The average winter temperature is 31°C maximum and 11°C minimum. During summer

temperature rises up to 45°C maximum 24°C minimum. The duration of rainfall is mid June to mid September with an average rainfall of 931.9 mm.

Tree enumeration of the Vadodara city

Biodiversity means the variability among living organisms from all sources. It refers to the ecosystem complexes in which they occur. Biological resources contribute much to the social and economical development of the nation. Once they are lost, they can be replaced at any cost. An immediate action is required at the national and international levels for developing a global systems of protected areas, so that the biological diversity continues to remain available for their benefit and welfare of all human beings for all times to came Restoration of the habitats and the rehabilitation of the endemics and threatened species have to identified and located and to be untaken to promote biological diversity. (Dadhich and Sharma, 2002).

Therefore, studies were undertaken to generate an inventory of tree forms growing in the Vadodara city. The trees were identified with the help of general floras and text books (Batter; 1997, Cooks, 1906, Menon, 2000; Patil 1980; Randhawa, 1983; Sabnis, 1967; Shah 1978; Swaninathan, 2003, Verma et al, 1993; Vwarman, 1999).

Table - 1 : Tree species identified in the Vadodara city

Angiosperms

Sr. No.	Botanical Name	Sr. No.	Botanical Name
	Annonaceae		**Averrhoaceae**
1	*Annona reticulata* L.	1	*Averrhoa carambola* L.
2	*Annona squamosa* L.		
3	*Polyalthia cerasoides* (Roxb.)HK.f.&Bth		**Rutaceae**
4	*Polyalthia longifolia* (Sonn.) Thw.	1	Aegle marmelos (L.) Corr.
		2	*Citrus limon* (L.) Burm.f.
	Capparaceae	3	*Limonia acidissima* (L.) Linn.
1	*Crateva nurvala* Duch.-Hum.Var.*nurvala*	4	*Murraya koenigii* (L.) Spr.
		5	*Murraya paniculata* (L.) Jack.
	Bixaceae		
1	*Bixa orellana* L.		**Simarubaceae**
2	*Hydnocarpus* wightiana Bluma	1	*Ailanthus excelsa* Roxb.
		2	*Quassia amara* L.
	Cochlospermaceae		
1	*Cochlispermum religiosum* (L.) Alston		**Balanitaceae**
		1	*Balanites aegyptiaca* (L.) Delile.
	Tamaricaceae		
1	*Tamarix dioica* Roxb.Ex.Roth		**Burseraceae**
		1	*Boswellia serrata* Roxb.
	Clusiaceae		
1	*Garcinia mangostana* L.		**Ochnaceae**
2	*Garcinia xanthochymus* Hook.f.	1	*Ochna squarrosa* L.
	Malvaceae		**Maliaceae**
1	*Thespesia populnea* (L). Soland.ex.Corr.	1	*Azadirachta indica* A.Juss
		2	*Melia azedarach* L.
	Bombacaceae	3	*Melia composita* Willd.
1	*Adansonia digitata* L.	4	*Swietenia mahogany* (L.) Jacq.
2	*Bombax ceiba* L.		

3 *Ceiba pentandra (L.) Gaerth.*

Sterculiaceae

1 *Guazuma ulmifolia* Lam.
2 *Helicteres isora* L.
3 *Kleinhovia hospita* L.
4 *Pterospermum acerifolium* (L.)Willd.
5 *Pterospermum suberifolium* Lam.
6 *Sterculia alata* Roxb.
7 *Sterculia foetida* L.
8 *Sterculia urens* Roxb.

Zygolhyllaceae

1 *Guaiacum officinale* L.

Papilionaceae

1 *Butea monosperma* (Lamk.) Taubert.
2 *Dalbergia latifolia* Roxb.
3 *Dalbergia sissoo* Roxb.
4 *Erythrina indica* Lamk.
5 *Gliricidia sepium* (Jacq.) Walp.
6 *Pongamia pinnata* L.
7 *Pterocarpus marsupium* Roxb.

Caesalpiniaceae

1 *Bauhinia purpurea* L.
2 *Bauhinia racemosa* Lamk.
3 *Bauhinia variegata* L.
4 *Cassia fistula* L.
5 *Cassia javanica* L.
6 *Cassia renigera* Wall ex Bebth.
7 *Cassia roxburghii* DC.
8 *Cassia siamea* Lamk.
9 *Delonix regia* (Boj.) Ref
10 *Parkinsonia aculeate* L.
11 *Peltophorum prerocarpum* (DC.) Backeref K. Heyne.
12 *Saraca asoca* (Robx.) de. Willde.
13 *Tamarindus indica* L.

Mimosaceae

1 *Acacia auriculiformis* A.Cumm. ex. Benth.
2 *Acacia catechu* (L.f.) Willd.
3 *Acacia leucophloea* (Robx.) Willd.
4 *Acacia nilotica* (L.) Willd. Ex. Delile.
5 *Acacia Senegal* (L.) Willd.
6 *Adenanthera pavonina* L.
7 *Albizzia amara* (Robx.) Boiv.
8 *Alizzia lebbeck* (L.) Benth.

Mimosaceae

1 *Parkia biolandulosa* Wigth & Arn.
2 *Pithwcellobium dulce* (Robx.) Benth.

Rhamnaceae

1 *Zizyphus mauritiana* Lamk.
2 *Zizyphus nummularia* (Burm.f.) W.& A.

Sapindaceae

1 *Sapindus emarginatus* Vahl.

Anacardiaceae

1 *Anacardium occidentale* L.
2 *Lannea coromandelica* (Houtt.) Merrill.
3 *Mangifero indica* L.

Moringaceae

1 *Moringa concanensis* Nimmo.
2 *Moringa oleifera* Lam.

Myrtaceae

1 *Callistemon lanceolatus* D.C.
2 *Eucalyptus globules* Labill.
3 *Psidium guajava* L.
4 *Syzygium cumini* (L.) Skeels.

Lecythidaceae

1 *Cogerstroemia guianensis* Aubl.

Lythraceae

1 *Lagerstroemia speciosa* (L.) Pers.

Punicaceae

1 *Punica granatum* L.

Caricaceae

1 *Carica papaya* L.

Alangiaceae

1 *Alangium salvifolium* (L.f.) Wang.

Rubiaceae

1 *Adina cordifolia* (Robx.) Ridsd.
2 *Anthocephalus indicus* A. Rich.
3 *Gardenia jasminoides* Ellis
4 *Hymenodictyon excelsum* (Roxb.) Wall.
5 *Ixoro arborea* Roxb. Ex. Smith
6 *Ixoro coccinea* L.
7 *Mitragyna Parvifolia* (Roxb.) Korth.
8 *Morinda tinctoria* Roxb.
9 *Xeromphis spinosa* (Thunb.) Keay.
10 *Xeromphis ulignosa* (Retz.) Maheswari

Sapotaceae

1 *Madhuca indica* J.F. Gmel.
2 *Manilkara hexamdra* (Roxb.) Dub.

3 *Prosopis cineraria* (L.) Druce.
4 *Prosopis juliflora* (Sw.) DC.
5 *Samanea saman* (Jacq.) Merr.

Combretaceae
1 *Anogeissus sericea* Brandia.
2 *Terminalia arjuna* (Robx.) W.&A.
3 *Terminalia bellirica* (Gaertn.) Robx.
4 *Terminalia catappa* L.
5 *Terminalia chebula* Retz.
6 *Terminalia crenulata* Roth.

Oleaceae
1 *Nyctanthes arbor-tristis* L.
2 *Schredera swietenioses* Roxb.

Salvadoraceae
1 *Savadora persica* L.

Apocynaceae
1 *Alstonia scholaris* (L.) R.Br.
2 *Holarrhena anatidysenterica* (L.) Wall ex Dl.
3 *Plumeria rubra* Linn.
4 *Thevetia peruviana* (Pers.) Merrill.
5 *Wrightia arborea* (Dennst.) Mabberly
6 *Wrightia tinctoria* R.Br.

Loganiaceae
1 *Strychnos nux-vomica* L.

Ehretiaceae
1 *Cordia dichotoma* Forst f.
2 *Cordia gharaf* (Forsk.) Ehrenb. & Asch.
3 *Cordia sebestena* Linn.
4 *Ehretia laevis* Roxb.

Bignoniaceae
1 *Crescentia cujete* L.
2 *Haplophragma adenophyllum* (Wall.) P.Dop.
3 *Heterophragma quadriloculare* (Roxb.) K. Schum.
4 *Jacaranda mimosifolia* D.Don.
5 *Kigelia pinnata* (Jacq.) DC.
6 *Millingtonia hortensis* L.
7 *Oroxylum indicum* (L.) Vent.
8 *Radermachera xylocarpa* K.Schum.
9 *Spathodea campanulata* Beauv.
10 *Tabebuia argentea* (Bur. & Schum.) Britt.
11 *Tabebuia rosea* D.C.
12 *Tecoma stans* (L.) H.B.K.
13 *Tecomella undulata* (Sm.) Seem.
3 *Manilkara zapota* (L.) Van.
4 *Minusops elengi* L.

Ebenaceae
1 *Diospyros embryopteris* Pers.
2 *Diospyros melanoxylon* Roxb.
3 *Diospyros Montana* Robx.

Lauaceae
1 *Cinnamomum camphora* (L.) T. Nees & Eberm.

Proteaceae
1 *Grevillea robusta* A. Cunn. Ex. R. Br.

Santalaceae
1 *Santalum album* L.

Euphorbiaceae
1 *Emblica officinalis* Gaerth.
2 *Putranjiva roxburghii* Wall.
3 *Sapium insigne* Bth.

Ulmaceae
1 *Holoptelea integrifolia* (Roxb.) Planch.

Moraceae
1 *Artocarpus heterophyllus* Lam.
2 *Ficus amplissima* Sm.
3 *Ficus benghalensis* L.
4 *Ficus bengamina* L.
5 *Ficus elastica* Roxb.
6 *Ficus hispida* L.f.
7 *Ficus krishnae* C. DC.
8 *Ficus racemosa* L.
9 *Ficus religiosa* L.
10 *Morus alba* L.
11 *Streblus asper* Lour

Casuarinaceae
1 *Casuarina equisetifolia* L.

Sterlitziaceae
1 *Ravenala Madagascarensis* J.F.Gmel.

Arecaceae
1 *Borassus flabellifer* L.
2 *Calamus rotang* L.
3 *Caryota urens* L.
4 *Cocos nucifera* L.
5 *Elaeis guinensis* Jacq.

	Verbenaceae	6	*Hyphaene dichotoma* (White) Furtads.
1	*Gmelina arborea* Roxb.	7	*Livistonis chinesis* R.Br.
2	*Tectona grandis* L.f.	8	*Phoenix sylvestris* (L.) Roxb.
3	*Vitex negundo* L.	9	*Roystonea regia* (H.B.&K.) O.F.Cook.
		10	*Sabal palmetto* (Watter) Lodd. Ex R. & S.
	Pandanceae		
1	*Pandanus odoratissimus* L.f.		**Poaceae**
		1	*Bambusa orundinacea* Willd.

Gymnosperms

Sr. No.	Botanical Name	Sr. No.	Botanical Name
	Cycadaceae		**Podocarpaceae**
1	*Cycas revolute* Thumb.	1	*Podocarpus gracilior*
2	*Cycas rumphii* Miq.		
3	*Cycas circinalis* L.		**Auaucariaceae**
		1	*Auaucaria auriculiformis*
	Cupressaceae		
1	*Biota orientalis* (L.) Endl.		**Pinaceae**
2	*Juniperus chinensis* L.	1	*Pinus longifolia Roxb.*
	Zamiaceae		
1	*Zamia furfuracea*		

Result and discussion

The trees are judged by the shape of its canopy, its habit of growing tall and slender or small and spreading, its bloom or fall color, the shape and size of its leaves, and its evergreen or deciduous nature. Besides its biological activities, trees aid to the beauty in the city's infrastructure and are beautiful to look at and to have around.

The present study enumerated 183 trees species belonging to 138 genera and 59 families (Table - 2).

Table – 2 : Number and Percentage of families, genera and species of each class

Class	Family		Genera		Species	
	No.	%	No.	%	No.	%
Dicotyledons	49	83.03	118	85.5	161	87.8
Polypetalae	32	65.3	68	57.62	95	59
Gamopetalae	10	20.4	38	32.2	47	29.2
Monochlamydae	7	14.3	12	10.18	19	11.8
Monocotyledons	4	6.78	13	9.42	13	7.1
Gymnospermae	6	10.17	7	5.08	9	4.92
Total	59	100	138	100	183	100

Among the Angiosperms, dicotyledons contributed 161 trees species belonging to 118 genera and 49 families which is 83.05% of the total. The monocotyledons are comparatively lesser in number having 13 species belonging to 13 genera and 4 families which is 6.78% of total. Gymnosperms were also found in some areas of city including the gardens of the Maharaja Sayajirao University of Baroda. The gymnosperms contributed 9 plant species belonging to 7 genera and 6 families which is 10.17% of total. Among the dicotyledons, the

polypetatae group was higher than that of others which is 65.30% of the total polypetalae group. The proportion of the monocotyledons to dicotyledons was also recorded (Table - 3).

Table – 3 : Comparison of Monocotyledons – Dicotyledons ratio of various levels in Vadodara city.

Comparison	Monocotyledons – Dicotyledons ratio
Family	01:12.3
Genera	01:09.1
Species	01:12.4
Genera to	01:01.3

These ratio are higher in comparison to a correspondence ratio (1:2.2) for the Vadodara city (Sabnic, 1967). The dominant families recorded were *Caesalpiniaceae, Mimosaceae, Rubiaceae, Sterculiaceae, Papilionaceae, Biononiaceae, Moraceae and Arecaceae*. Dominant tree species are *Azadirachta indica* A. Juss. *Mangifera indica* L., *Polylthia longifolia* Benth & H.K.f., *Peltophorum pteocarpum* (DC.) Backerf K. Heyne, *Pongamia pinnata* L., *Mimusops elengi* L. etc. Some medicinally important tree species noted were *Aegle marmelod* (L.) Corr., *Azadiracha indica* A. Juss., *Acacia catechu* (Lf) Willde, *Saraca asoca* (Roxb.) de Willde, *Ailanthus excelsa* Roxb., *Terminalia bellerica* (Gaertn) Roxb., *Tamarindus indica* L. etc. Some economically important trees were *Butea monopserma* (Lamk) *Taubert, Delonix reiga* (Boj) Ref., *Cassia fistula* L, *Bombox ceiba* L, *Alstonia scholaris* (L.)R.Br.

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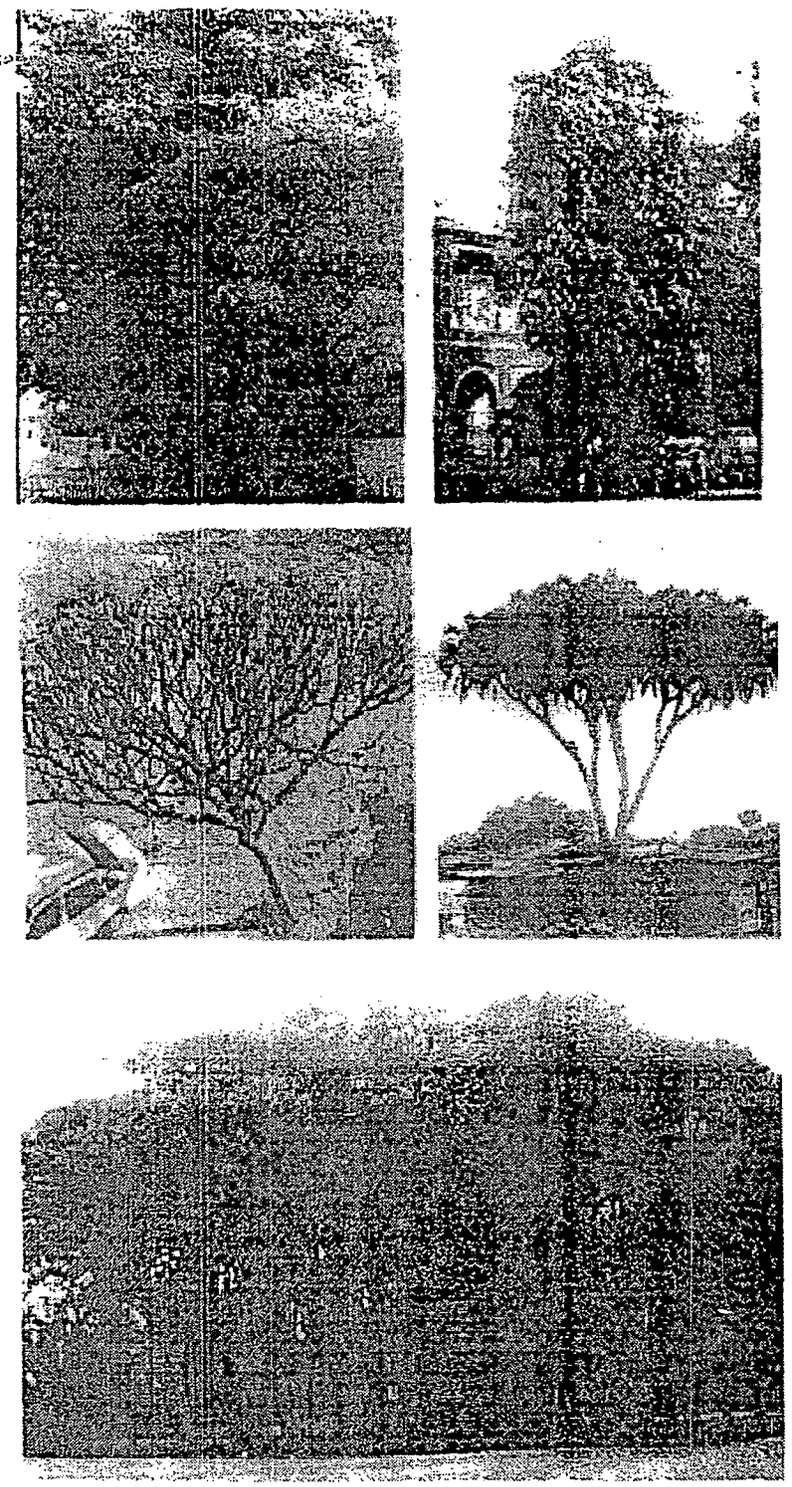

Plate - : Some of the trees in Vadodara city limits

(1) Adansonia digitate L. (2) Polyalthia longifolia (Sonn.) Thw. (3) Plumeria reubra Linn. (4) Hyphaene dichotoma (White) Furtads. (5) Ficus benghalensis L.

PHYTOSOCIOLOGICAL STUDIES OF TREES IN GIR NATIONAL PARK AND SANCTUARY

P.S.Sisodia, G. Pradeepkumar, G. Prathapasenan and Y.T.Jasrai*

Department of Botany, Faculty of Science,
The Maharaja Sayajirao University of Baroda, Vadodara -390002.

Abstract

Considerable information is now available on the floristic of Gujarat state with reference to phenology, flower colour, flowering and fruiting time, local names etc. This is a valuable information but a note on abundance, frequency, and density in an area is normally given on visual observations. However, It is necessary that ecological studies are conducted for benchmark data on areas including various National Parks, Sanctuaries and reserve forests. Such ecological studies have been undertaken in Gujarat for Dangs forest, Saurashtra, Narmada riverbanks, Chhotaudepur, Panchmahals etc. The present survey has been undertaken in Gir National Park and Sanctuary during Nov-1999 to Nov-2001 for gathering phytosociological data. The data was collected on floristic as well as ecological aspects, as life-form diversity, frequency, abundance, density, and species richness, species diversity index etc. Such documented data will certainly augment and strengthen efforts for conservation and management of vegetation in Gir National Park and Sanctuary, which is an abode for the keystone species *Panthera leo persica* (Asiatic Lion).

Key words : Ecology, Tree diversity, Gir Forest.

Introduction

Biological diversity means the variability among living organisms from all sources including interalia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. Biodiversity provides the basic biotic resource that sustains the human race. This includes diversity within species, between species and ecosystem. Biodiversity is not merely a natural resource; it is an embodiment of cultural diversity and the diverse knowledge and traditions of different communities across the world. It includes diversity of forms, right from the molecular unit to the individual organism and then on to the population, community, ecosystems and biospheric levels (Kumar and Asija 2000). The work on phytosociological studies in Gujarat for Dangs forests (Jain, 1963, Kuruvilla, 1967), Saurashtra (Menon, 1979), South Gujarat (Yadav, 1979), Narmada river banks (Vyas, 1973), Chhotaudepur (Karatela, 1973), Panchamahal (Bhatt, 1975) etc. have been accomplished. The present study was undertaken on phytosociological studies on trees in Gir National Park and Sanctuary.

Geology and Climate

A major part of the study area is composed of Deccan trap, their differentiates and associated intrusive of cretaceo Eocene age.

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Four lava flows are seen in the Gir forest. Major part of the Gir area is covered by finegrained olivine basalt. In addition to this, glomero-porphyritic and porphyritic basal lava flows several basic and acidic dykes intersecting each other, are found in the study area (Patel, 1991). Two main types of soils are black-cottan, red and brown soils.

Out of three main seasons in Gir National Park and Sanctuary i.e. summer, winter and monsoon, a longest season is the summer. The temperatures range between 10°C and 40°C respectively. April-May is the hottest months. Monsoon is usually active between mid June and September. Eastern Gir has slightly higher temperature than the western Gir, but has much less rainfall.

The area

The Gir National Park and Sanctuary comprising total of 1412.1 sq. km. forms a part of long stretches of forest in the Saurashtra peninsula of Gujarat. The Sanctuary extending over 1153.4 sq. km. completely surrounds the National Park measuring 258.7 sq. km. from all sides. It forms the largest tract of a dry deciduous forest in the Saurashtra region. It lies between 20°55' N to 21°20' N latitudes and 70°25' E to 71°15' E longitude and stretches over length of about 70 km. from West to East and 40 km. from North to South. The most important aspect of this forest is the fact that it has become a conducive ecosystem leading to be the best habitat for conservation of the rare and threatened keystone species the lion. However, for the better management of this large tract of forest ranges it is mandatory to study and monitor regeneration capabilities and self-sustaining capacity of the primary producers the diverse forms of plants. The knowledge of the existing diversity of flora of an area helps in species selection for plantation programmes that ultimately have tendency to change the ecology of the area.

Methodology

In community studies, quantitative estimation of community structure, and composition is necessary. This needs precise sampling units, which may be confined to small area or quadrates. Such data will provide the baseline information for conservation and sustainable management of forest ecosystem (Natiyal and Kaul, 1999) Therefore fieldtrips to Gir forest were arranged regularly. We have selected 35 points covering areas of Sanctuary and National Park.

The size and the number of plot depend on the objective of the study, the vegetation type (herb, shrub and trees), heterogeneity (many species) of plants, size or extent of the vegetation area. Idealy, 10% to 15% of the total area should be sampled in the study. In a mixed community with a number of layer or strata of vegetation the quadrates size different for the different life forms. For trees larger size 20 20 m^2 quadrats were taken. Quadrates in the field area were laid at random pattern and throughout the entire range of vegetation. Random sampling is desirable to divide sampling areas broadly into different stands (Shailaja and Sudha, 1997).

Results

Our knowledge about the flora and phytosociology of Saurashtra in general is through the earlier works of Thaker (1910). Kapadia (1947,1961), Pandya (1948). Raizada and Santapau (1957), Santapau (1962). Santapau and Janardhanan (1967). Menon (1967) and Shah (1978). The total number of plant species so far recorded from Saurashtra is 1090 belonging to 529 genera covering 112 families (Menon, 1967). The present work in Gir National Park and Sanctuary revealed a total plant inventory of 507 species belonging to 345 genera covering 97 families. This paper deals only with tree species with total 132 species belonging to 98 genera covering 38 families. The monocotyledon-dicotyledon ratio with reference to tree species, genera and families is 1: 25.4, 1: 18.6 and 1:18 respectively. This is in contrast to the ratio noted for Gujarat (Menon, 1967).

Tree diversity provides the baseline data on habitat for wild animals. In Gir National Park and Sanctuary, lion and ungulates prefers the bushy shrub habitat and this type of habitat is seen more in Sanctuary east compared to western division (Sharma and Johnsing, 1996). Tree diversity also gives the better knowledge and understanding of forest and vegetation type from an ecological point of view. The tree can provide good shade and protection from rain, sun and soil erosion. Out of 132 tree species 15 species were evergreen in the area is dry deciduous forests (Champion and Seth, 1968). These evergreen species were mostly seen in Western division.

Life form Diversity :

Numbers of Life form	Percent of Species	Species
Trees	132	26.03
Shrubs	50	9.36
Herbs	232	45.75
Climbers	68	13.41
Grasses	25	4.93
Total	507	99.98

Diversity index :

Sr. No.	Diversity index	Results
1.	Simpson diversity index DS	0.305
2.	Species diversity index D	0.695
3.	Shannon - Weaver index D	0.585
4.	Species evenness J.	0.193
5.	Species richness	5.86

Diversity in frequency, abundances, density of trees in Gir National Park and Sanctuary :

National Park			Sanctuary West			Sanctuary East		
F	A	D	F	A	D	F	A	D
3282.61	180.22	65.32	2792.2	163.7	67.82	1636.7	100.15	40.93

Ecological data of tree species ;

Botanical name	National Park			Sanctuary					
				West			East		
	F	A	D	F	A	D	F	A	D
Annona squamosa L.				40	2.25	0.9			
Mullusa tomentosa (Roxb.) Finet & Gajnepain	52.8	1.8	0.77				40	1	0.4
Cratera nurvala Buch-Ham.	32	1.78	0.4	20	1	0.2			
Casearia elliptica Wild				30	1.66	0.3			
Falcourtia montana Grahams.	28	1.9	0.52	35	1.9	0.6	60	2.1	1.3
Kydia calycina Roxb.	60	2.8	1.48						
Thespesia populnea (L.) Soland.ex. Corr.	20	3	02						
Bombax ceiba L.	35	1.2	0.4	56.6	2.6	1.03	50	1.5	0.8
Firmiana colorata (Roxb.) R. Br.	20	2	0.4				20	2	0.4
Sterculia urens Roxb.	36.2	1.95	0.47	42.5	2.6	1.1	40	1.25	0.5
Grewia tenex (Forsskal.) Fiori	60	2.8	1.5	40	1.75	0.4			
Grewia tiliaefolia Vahl.	60	0.16	0.6	50	1.6	0.8			
Zizyphus mauritiana Lamk.	61.7	3.11	1.62	60.7	2.4	1.3	56	1.9	1.16
Aegle marmelos (L.) Corr.	46.25	3.02	1.06	70	2.8	1.6	60	2	1.2
Ailanthus excelsa Roxb.	55	1.3	0.6						
Balanites aegyptiaca (L.) Delile.	30	3	0.3	46	1.9	0.8	26.6	1.5	0.4
Boswellia serrata Roxb. ex Colebr.	36	2.270	0.48	44	1.9	0.88	44	2.4	1.2
Garuga pinata Roxb.	55	1.33	0.55						
Azadirachta indica A. Juss	60	3	1.8	20	1.7	0.35			
Soymida febrifuge (Roxb.) A. Juss	40	1.94	0.6	47.5	4.9	1.6	60	1	0.6
Sapindus laurifolius Vahl.	35	2.3	0.55						
Sapindus emarginatus Vahl.	40	4	1.6	20	1	0.2			
Schleichere oleosa (Lour.) Oken.	34	2.5	0.7	20	2	0.2			
Lannea coromandelica (Houtt.) Merrill.	36.92	1.58	0.47	38.5	1.6	0.6	45	1.3	0.65
Moringa concanensis Nimmo.	30	2.66	0.3						
Butea monosperma (Lamk.) Taubert.	50	2.34	1.06	42.6	2.5	0.9	46.6	1.9	0.8
Dalbergia latifolia Roxb.	30	2	0.3	46.6	1.6	0.7			
Dalbergia paniculata Roxb.	37.14	1.6	0.66	33.3	2.3	0.6	20	1	0.2
Dalbergia sisoo Roxb.	37.14	1.94	0.58						

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Erythrina suberosa Roxb.	65	1.9	0.85				40	1	0.4
Derris indica (Lamk.) Bernet.	40	2.6	0.6	30	1	0.3			
Pterocarpus marsupium Roxb.	42.5	1.91	0.63	40	2.1	0.9	40	1	0.4
Bauhinia purpurea L.	40	1.5	0.6	40	3.51.4				
Bauhinia racemosa Lamk.	46.42	2.84	1.2	40	2.5	1	50	2.3	1.2
Bauhinia tomentosa L.	40	2	0.4	60		0.6			
Cassia fistula L.	38.3	1.78	0.6	34	1.5	0.44	30	1	0.3
Tarmarindus indica L.	46.6	1.9	0.8	50	1.8	1.02	40	1.2	0.5
Acacia catechu (L.f.) Wil.ld.	57.14	2.34	1.05	43.6	2.4	1.1	56.6	2.9	1.6
Acacia ferruginea Dc.	44.6	1.89	0.7	36.6	2.4	0.8	40	1.5	0.6
Acacia leucophloea (Roxb.) Willd.	45.3	1.8	0.73	35.7	2.1	0.65	40	1.8	0.6
Acacia nilotica (L.) Willd ex. Delile.	46	1.7	0.56	55.8	4.3	2.3	53.3	3.5	1.7
Acacia senegal (L.) Willd.25	1.5	0.25	47.5	8.17	3.8	40	8	3.2	
Albizzia lebbeck (L.) Benth.	35	1.4	0.3	20	2	0.2			
Albizzia odoratissima (L.f.) Benth.	40	1.7	0.4	40	1	0.4	20	5	1
Dichrostachys cinerea (L.) Wt. & Arn.	20	3	0.6	48.5	3.29	1.6	40	1.5	0.6
Pithecolobium dulce (Roxb.) Benth.				20	4	0.8			
Prosopis cineraria (L.) Druce.				50	2	0.5			
Samanea saman (Jacq.) Merr.	45	2.39	0.5						
Anogeissus latifolia (Dc.) Wall ex. Bedd.							80	4.9	4.2
Terminalia crenulata Roth.	50	2.75	1.32	56.6	3.3	1.7	50	3.07	1.6
Terminalia arjuna (Roxb.) W. & A.							60	3.6	2.2
Syzgium cumini (L.) Skeels.	60	2.7	0.6	26.6	3.5	0.6			
Syzygium heyneanum Wall ex W. & A.	45	4.38	1.55	42	3.02	0.7	20	8	1.6
Alangium salvifolium (L.f.) Wang.	50	3	1.1	70	2.57	0.7			
Adina cordifolia (Roxb.) Ridsd.	35	2.83	0.3						
Hymenodictyon excelsum (Roxb.) Wall.	58	3.49	1.9						
Ixora arborea Roxb. ex Smith.	40	1.8	0.4	30	3.6	0.7	20	1	0.2
Ixora brachiata Roxb.				70	1.5	0.6			

Mitragyne parvifolia (Roxb.) Korth.	37.7	2.84	0.93	26.6	2.3	0.6	20	3	0.6
Morinda tinctoria Roxb.	35	1.31	0.47	40	1.2	0.5	40	1	0.4
Morinda citriflora L.	60	2.4	0.6	20	10.2				
Xeromphis spinosa (Thumb.) Keay.	46.4	3.7	1.64	45	2.5	1.1	20	2	0.4
Xeromphis uliginosa (Retz.) Maheshwari.	55	2.1	1.05	20	1	0.2	20	1	0.2
Manilkara hexandra (Roxb.) Dub.	30	2	0.3	30	1.1	0.3	20	1	0.2
Mimusops elengi L.	50	2.6	0.5	25	2.5	0.45			
Diospyros melanoxylon Roxb.	59.28	3.05	1.75	48.7	2.6	1.3	60	2.5	1.6
Nyctanthes arbor-tristis L.				90	3.33	0.9			
Schrebera swietenioides Roxb.	33.3	3.8	1.6	80	1.37	1.1			
Holarrhena antidysenterica (L.) Wall ex Dl.	46	1.8	0.82	80	6.5	5.2	40	3	1.2
Wrightia tinctoria R. Br.	72.1	4.93	2.96	61.4	3.4	2.1	32	6.3	1.72
Cordia dichotoma Forst.f.	40	3	0.4	30	1.33	0.3			
Cordia gharaf (Forsk.) Ehrenb. & Asch.	45	2	0.65						
Ehretia laevis Roxb.	50	4	1.1	23.3	3.6	0.8			
Gmelina arborea Roxb.	40	2.25	0.6						
Tectona grandis L.f.	92.17	6.39	5.07	87.5	6.8	5.8	46.6	3.03	1.6
Santalum album L.				80	2.6	2.6			
Bridelia retusa (L.) Spr.	45	2.3	0.9	30	1.7	0.6			
Emblica officinalis Gaerth.	33	1.92	0.59	40	3	1.2	30	4.2	1.3
Mallotus philippinensis (Lamk.) Muell.Arg.				60	3.16	1.9			
Ficus benghalensis L.	40	3.25	1.25	22.5	1.7	0.3			
Ficus religiosa L.	20	1	0.2	22	1.6	0.5	20	1	0.2
Ficus tsiela Roxb.	16.6	2	0.16						
Holoptelea integrifolia (Roxb.) Planch.	60	2.5	1.5	50	2.8	1.4			
Phoenix sylvestris Roxb.	55	2.4	1.15						

Phytosociological analysis of a plant community is the first and foremost basis of the study of any area for vegetation and this study is important for understanding the functioning of any community (Warger and Morrel, 1976). The vegetation of the forest is of dry deciduous type but at some places thorny species with higher percentage of ecological data, the diversity index, frequency and species richness data shows that the

vegetation is heterogenius. The dominant communities are variable in different ranges and in different location within a zone. The number of species in different division is also variable, more in West division and less in East division. The vegetation in the Gir National Park indicates that the vegetation is more dense compared to the Sanctuary. The dominant community for the whole forest division is *Tectona grandis* L.f., *Whghtia tinctoria* R.Br., *Anogeissus latifolia* (DC.) Wall ex. Bedd., and *Diospyros mclenoxylon* Roxb. Species like *Annona reticulata* L., *Polyalthia longifotia* Benth.&HK. f., *Adanzonia digitata* L., *Guazuma ulmifolia* Lam., *Sterculia feotida* L., *Citrus limon* (L.) Burm.f., *Murraya koenigii* (L.) Spreng., *Melia azedarach* L., *Mangifera indica* L., *Spondias pinnata* (L.f.) Kurz., *Moringa oleifera* Lam., *Erythhna indica* Lamk., *Cassia siamea* Lamk., *Detonix regia* (Boj.)Ref., *Hardwickia binata* Roxb., *Parkinsonia aculeate* L., *Peltophorum pterocarpum* (DC.) Backeref.K.Heyne., *Leucaena leucocephala* (Lamk.) De.Wit., *Prosopis juliflora* (Sw.) DC., *Terminalia catappa* L., *Terminalia chebula* Retz., *Eucalyptus globules* Labill., *Syzygium rubicandum* W.& A , *Canca papaya* L., *Anthocephalus indicus* A. Rich., *Gardinia resifera* Roth., *Madhuca indica* J.F.Gmel., *Manilkara zapota* (L.) Van.Royen., *Whghtia tomentosa* R.&S., *Cordia monoica* Roxb., *Haplophragma adenophyllum* (wall.) P.Dop., *Oroxylum indicum* (L.) Vent., *Spathodea campanutata* Beauv., *Stereospermum personatum* (Hassk.) Chatt, *Tecomella undulata* (Sm.) Seem., *Vitex negundo* L., *Ficus hispida* L.f., *Ficus racemosa* L., *Ficus rumphii* Bl., *Morus alba* L., *Casuarina equisetifolia* J.R.&G.Forst., *Borassus flabellifer* L., Cocos *nucifera* L., *Roystonea* regia (H.B.&K.) O.F.Cook and *Pandanus odoratissimus* L.f. have been planted or very rare in number.

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