

Diversity of Angiosperms in Newtown, Rajarhat, North 24 Parganas, West Bengal.

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Abstract: This floristic exploration provides the complete checklist of Angiosperms along with the details of life forms of Newtown, North 24 Parganas, West Bengal, India. The area harbors 185 species belonging to 148 genera in 45 families. Families with maximum number of species include Fabaceae (31 species). The most genera rich families were Fabaceae (22/31). The species rich genera included Cassia and Solanum (5 each). The flora enumerates both natural elements and also the introduced or cultivated species growing in the campus.

Key words : *Angiosperms, Floristics, flowering time.*

Introduction :

Study of floristic composition of a place, whether natural or man-made, at periodic intervals proves essential in assessment of biodiversity in spatial and temporal scales since many of the constituent species perceive various degrees of threats of extinction. In view of this, the present authors prioritized identification and documentation of angiosperms in New Town area. New Town, is a fast-growing planned satellite city and a neighbourhood of Kolkata (earlier, Calcutta), located partly in North 24 Parganas district and South 24 Parganas district of the Indian state of West Bengal. This new information technology and residential hub is being developed on the north-eastern fringes of Kolkata. It consists of areas of two erstwhile villages Rajarhat and Bhangar, which is now a statutory planned development area. The area mainly consisted of huge acres of cultivable lands and water bodies, which have been acquired and developed in a planned manner. The master plan envisions a township which is at least three times bigger than the neighbouring planned Salt Lake City. New Town is located at 22.5894°N 88.4748°E. This township covers an area of 28 km² (11 sq mi), and is located partly in Barasat Sadar subdivision of North 24 Parganas district and partly in South 24 Parganas district. It is part of the Kolkata Metropolitan Area. The climate of this region is tropical, like the rest of Gangetic West Bengal. The weather remains dry during the winter (mid-Nov to mid-Feb) and humid during the summer and rainy with humidity range between 50-90%. Winter prevails for a short period with chilling dry wind coming from the northeast. Average rainfall ranges from 1500-2000 mm/yr and it generally fluctuates from year to year. The maximum temperature is 41°C in the month of May and the minimum temperature is 10°C in the month of January (Anon., 2006). Soil analysis results show that soil is mainly grey loam with bulk density varying from 1.23 gm/cm³ to 1.31 gm/cm³. It varies from sandy to clay loam. The analysis of soil shows that the water holding capacity is 62.80%. The pH level of soil is 6.95 comprising of organic carbon (2.31%), organic matter (3.98%), available nitrogen (291 mg/kg), available phosphorus (59.70 mg/kg), available potassium (425 mg/kg), copper (36.30 mg/kg), zinc (159.60 mg/kg), lead (112.90 mg/kg), chromium (29.80 mg/kg), nickel (13.40 mg/kg) and cadmium (2.44 mg/kg). The soil in this region exhibits multitype of ecological conditions having soil salinity from 0.5% to 0.8% (the average is taken from total dissolved solid particles in saline samples of 30cc water from different spots). (Anon., 2006).

From the beginning after reclamation, the area became occupied gradually by distribution of different plants through the dispersal and migration of diaspores. Now the study area in question is represented by large population of flowering plants. A part of the flora of Newtown represent cultivated and avenue trees. Many of them are of medicinal and economic values and some are rare species.

Urban green space that includes streets with trees, parks, vegetated colleges and schools plays vital role in conservation of local environment. It can decrease the urban island heat effect (Chow and Roth 2006), storm

water run-off and flooding (Mc Pherson et al. 1997). Trees of the concretized urban environment render food to birds and other city dwelling animals (Fernandez-Zuricic 2000). They act as noise filters, air purifiers, sequester carbon and pollutant traps (Mc Pherson 1997; Beckett et al. 2000). Urban greening and urban forests are particularly important to healthy cities in developing countries (Thaiutsa et al. 2008). Due to escalating urbanization, green space and urban trees become increasingly important in developing countries (Cy 2006). Documentation of existing green spaces of the urban environment is important to determine existing resources and to set target for future improvements (Miller 1996). Results of tree inventory and assessment of urban environment can be a useful tool in urban planning and conservation of important tree species (Cy 2006). Urbanization is one of the major reasons for destruction of the natural vegetation. Urbanized areas can also harbor a high number of threatened species (Sodhi et al. 2010). Considering the importance of enumeration of plants, particularly in a typical metropolitan area such as Kolkata, we made a qualitative floristic survey and prepared a checklist of angiosperm species of Newtown area.

Materials and methods

For collections of specimens and taking field data during survey, several attempts were made in different seasons of each year from 2015-2017. In each collection trip, the assistance of local people was sought. These people assisted in plant collection in various ways. During the field trips three to five samples for each species were taken. In case of plants collected in vegetative condition during a particular field trip, the place of collection of these plants were carefully marked in such a manner that these could be easily spotted out during their flowering and fruiting time. At least five to ten specimens were studied from various habitats and localities within the studied area. The Flowering-fruiting time was also noted.

After collection, the specimens were pressed, preserved and mounted on herbarium sheets following the standard and modern herbarium techniques (Jain and Rao, 1977). For identification purpose, collected specimens were matched with the specimens at the Central National Herbarium (CAL) and the Calcutta University Herbarium (CUH). The well preserved specimens with voucher number were deposited in Herbarium of Post Graduate Department of Botany, Bethune College, Kolkata, India.

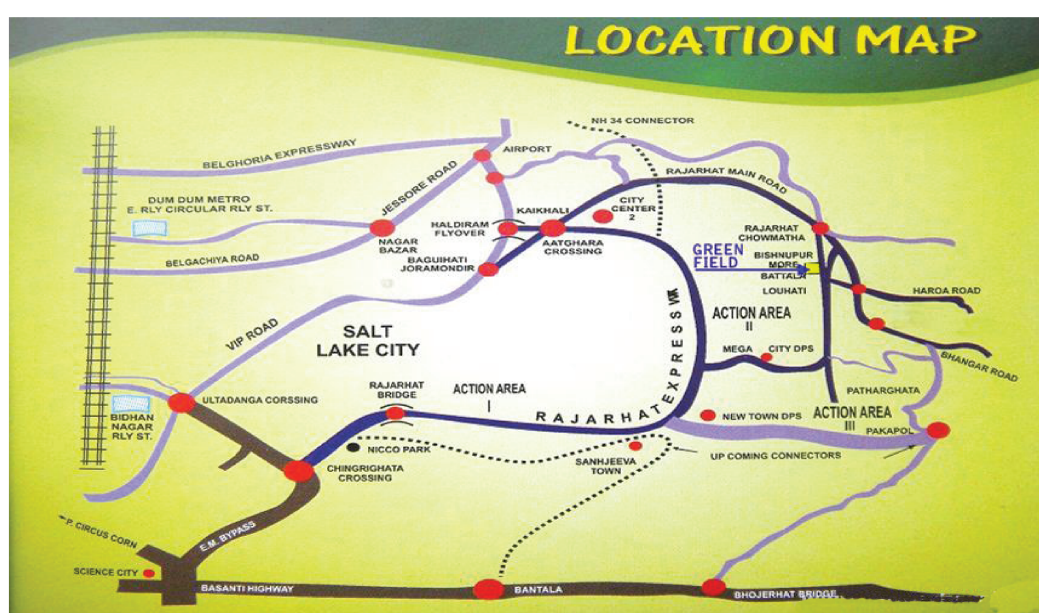


Fig.1: Location Map of Newtown area (not to scale)

Results and Discussion

This qualitative floristic survey revealed the presence of 185 Angiosperm species belonging to 148 genera in 45 families. Plant binomial, family, life form and voucher number are provided in Table 1. The most speciose families include Fabaceae (30 species) followed by Euphorbiaceae (16), Malvaceae (15), , Compositae and Solanaceae (10 each), Poaceae (09), Acanthaceae and Lamiaceae (8 each), Bignoniaceae (7species),Amaranthaceae, Apocynaceae, Malvaceae, Scrophulariaceae, and Verbenaceae (6 each), Rubiaceae(5 species) Combretaceae(4 species), Annonaceae, Moraceae, Sterculiaceae (3 species), Asclepiadaceae, Bombacaceae, Boraginaceae, Capparidaceae, Cucurbitaceae, Nyctaginaceae, Pedaliaceae, Polygonaceae, Sapotaceae, Sapindaceae (2 species each), whereas 16 families represented by a single species which include Aizoaceae, Commelinaceae, Cruciferae, Vitaceae, Zygophyllaceae etc., (Table 1). Among life-forms herbs dominate the place with 105 species followed by trees (53) and shrubs (27). Few climbers and lianas are also found like *Pyrostegia*.

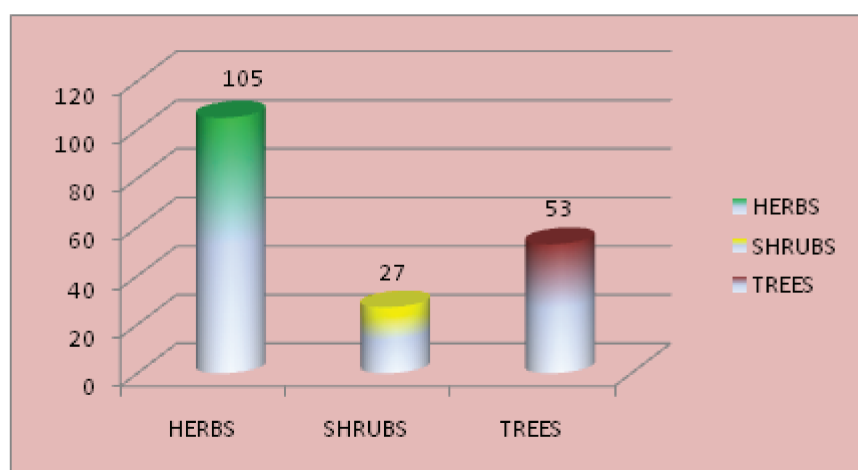


Fig:2. Different growth forms

Dicotyledons are more common with 175 (94.59%) species followed by monocotyledons with 10(6.41%) species. Fabaceae is the dominant family here. The species rich genera included Cassia and Solanum (5 each) and Ipomoea, Terminalia, Euphorbia (4 each). Among the plant species identified from here some species like, *Delonix regia* (IUCN 2009; Status: Vulnerable B1+2c ver. 2.3), are the most important species from the point of conservation. *Spathodea companulata*, *Tabebuia chrysantha*, *Peltophorum pterocarpum*, *Ficus benjamina*, *Kleinhovia hospital* etc. are extensively planted as avenue tree, and *Evolvulus nummularius* spreads as prostrate weed. Many of the introduced and exotic-ornamental plants are also growing along with the native flora to enhance the aesthetic value and biodiversity wealth of the location area. Documentation of plant biodiversity of the satellite township is also an essential factor that promotes to evaluate the total biodiversity wealth of any particular place such as town, city, district etc.



(a)



(b)



(c)



(d)



(e)



(f)



(g)



(h)



(i)

Plate I

(a) *Echolium viride* (x1.5)

(c) *Ruellia tuberosa* (x2.5)

(e) *Tabebuia chrysantha* (x1.5)

(g) *Parthenium hysterophorus* (x1.5)

(i) *Ipomoea quamoclit* (x4)

(b) *Trianthema portulacastrum* (x1)

(d) *Spathodea campanulata* (x1.5)

(f) *Cordia sebestena* (x1)

(h) *Synedrella nodiflora* (x1)



(a)



(b)



(c)



(d)



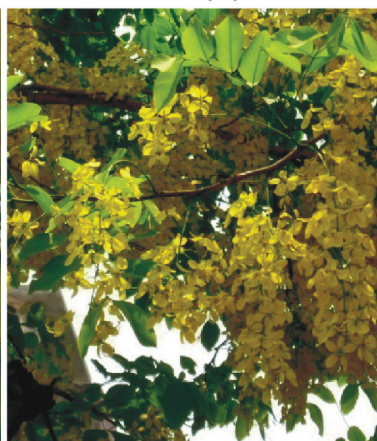
(e)



(f)



(g)



(h)



(i)

Plate II

(a) *Acalypha indica* (x1.5)

(c) *Cestrum diurnum* (x2)

(e) *Anisomeles indica* (x1.5)

(g) *Leucas cephalotes* (x1.5)

(i) *Cassia sophera* (x4)

(b) *Agyneia bacciformis* (x1.5)

(d) *Drypetes roxburghii* (x1.5)

(f) *Hyptis suaveolens* (x2.5)

(h) *Cassia fistula* (x1)



(a)



(b)



(c)



(d)



(e)



(f)



(g)



(h)



(i)

Plate III

(a) *Crotalaria pallida* (x1.5)

(c) *Peltophorum pterocarpum* (x2)

(e) *Malachra capitata* (x1.5)

(g) *Solanum torvum* (x1.5)

(i) *Solanum virginianum* (x4)

(b) *Millettia ovalifolia* (x1.5)

(d) *Lagerstroemia speciosa* (x1.5)

(f) *Pedalium murex* (x2.5)

(h) *Solanum violaceum* (x1)



(a)



(b)



(c)



(d)



(e)



(f)



(g)



(h)



(i)

Plate IV

(a) *Withania somnifera* (x1.5)

(c) *Sterculia foetida* (x2)

(e) *Lantana camara* (x1.5)

(g) *Vitex negundo* (x2.5)

(i) *Tribulus terrestris* (x4)

(b) *Kleinhovia hospita* (x1.5)

(d) *Ternera ulmifolia* (x1.5)

(f) *Lippia geminata* (x1.5)

(h) *Cayratia trifolia* (x1)

Table 1. Angiosperm plant species from Newtown, Kolkata India. The life-form was also presented (H = Herb; S = Shrub; T = Tree).

TAXON	LIFE-FORM	FLOWERING/ FRUITING TIME	VOUCHER NUMBER
Acanthaceae			
<i>Andrographis paniculata</i> (Burm.f.) Wall. ex Nees	H	Throughout the year.	Sanyal 155
<i>Barleria prionitis</i> L.	S	Oct-Dec	Sanyal 277
<i>Ecbolium viride</i> (Forssk.) Alston Pl.Ia	H	Feb, Mar to Aug	Sanyal 150
<i>Hemigraphis hirta</i> (Vahl) T. Anderson	H	Jan-Feb	Sanyal 110
<i>Justicia diffusa</i> Willd.	H	Apr-Aug.	Sanyal 108
<i>Ruellia tuberosa</i> L. Pl.Ib	H	Almost throughout the year.	Sanyal160
<i>Rungia pectinata</i> (L.) Nees	H	Nov-Jan,	Sanyal 187
<i>Ruellia brittoniana</i>	S	Apr-Nov.	Sanyal 129
Aizoaceae			
<i>Trianthema portulacastrum</i> L. Pl.Ic	H	Apr-Jun	Sanyal 177
Amaranthaceae			
<i>Achyranthes aspera</i> L.	H	Jun-Aug,	Sanyal 410
<i>Alternanthera paronychioides</i> A. St.-Hil.	H	May-Jun	Sanyal 308
<i>Alternanthera philoxeroides</i> Griseb.	H	May-Oct.	Sanyal167
<i>Alternanthera sessilis</i> (L.) R. Br. ex DC.	H	May-Sep.	Sanyal 487
<i>Amaranthus spinosus</i> L.	H	Jul-Oct	Sanyal 329
<i>Amaranthus viridis</i> L.	H	Jun-Oct	Sanyal 255
Annonaceae			
<i>Annona squamosa</i> L.	T	Apr- Jun	Sanyal 215
<i>Annona reticulata</i> L.	T	Jan- Oct	Sanyal 116
<i>Polyalthia longifolia</i> (Sonn.) Thw.	T	Mar-May	Sanyal 108
Apocynaceae			
<i>Alstonia scholaris</i> (L.) R. Br.	T	Dec-May.	Sanyal 487
<i>Allamanda cathartica</i> L.	S	May-Aug.	Sanyal 429
<i>Gardenia jasminoides</i> J.Ellis	T	Mar: Apr.	Sanyal 355
<i>Plumeria pudica</i> Jacq.	T	May-Sep.	Sanyal 377
<i>Nerium indicum</i> Mill.	T	Apr-Jun	Sanyal 315
<i>Thevetia peruviana</i> (Pers.) K. Schum.	T	Throughout the year.	Sanyal 115
Asclepiadaceae			
<i>Calotropis gigantea</i> (L.) W.T.Aiton	S	May- Jul	Sanyal216
<i>Pergularia daemia</i> (Forssk.) Chiov.	H	Jan to Apr.	Sanyal 287
Bignoniaceae			
<i>Allamanda cathartica</i> L.	S	Throughout the year	Sanyal 555
<i>Pyrostegia venusta</i> (Ker Gawl.) Miers	S	Nov-Mar	Sanyal 677
<i>Millingtonia hortensis</i> L.f.	T	twice a year from Apr -Jul and from Oct- Dec	Sanyal 615
<i>Spathodea campanulata</i> Beauv. Pl.Id	T	Mar-Jul	Sanyal 113
<i>Tabebuia chrysantha</i> (Jacq.) Nichols. Pl.Ie	T	Mar-Jul	Sanyal 608
<i>Tabebuia rosea</i> DC.	T	Mar-Sep	Sanyal616
<i>Tecoma stans</i> (L.)Juss.ex Kunth	T	Apr-Jul	Sanyal 687

Bombacaceae			
<i>Bombax ceiba</i> L.	T	Feb-Apr	Sanyal 655
<i>Ceiba pentandra</i> L.	T	Mar-Apr	Sanyal 677
Boraginaceae			
<i>Cordia sebestena</i> L. Pl.If	T	Mar-Jun	Sanyal 755
<i>Heliotropium indicum</i> L.	H	Jul-Dec	Sanyal 777
Capparidaceae			
<i>Cleome rutidosperma</i> DC.	H	Throughout the year	Sanyal 810
<i>Cleome viscosa</i> L.	H	Sep-Dec	Sanyal 808
Cannabaceae			
<i>Trema orientalis</i> (L.) Blume	T	Throughout the year	Sanyal 887
Combretaceae			
<i>Terminalia arjuna</i> (Roxb. ex DC). Wight & Arn.	T	Jul-Sep	Sanyal 855
<i>Terminalia bellirica</i> (Gaertn.) Roxb.	T	Dec-Jan	Sanyal 977
<i>Terminalia catappa</i> L.	T	Mar- Jun	Sanyal 315
<i>Terminalia chebula</i> Retz.	T	Mar- Jun	Sanyal 210
Commelinaceae			
<i>Commelina benghalensis</i> L.	H	Throughout the year	Sanyal 516
Compositae (Asteraceae)			
<i>Ageratum conyzoides</i> L.	H	Whole year	Sanyal 529
<i>Eclipta prostrata</i> (L.) L.	H	Jul-Sep	Sanyal 555
<i>Gnaphalium polycaulon</i> Pers.	H	Dec-Jan	Sanyal 577
<i>Mikania micrantha</i> Kunth	H	Jan to Mar	Sanyal 515
<i>Parthenium hysterophorus</i> L. Pl.Ig	H	Apr-Aug.	Sanyal 610
<i>Synedrella nodiflora</i> (L.) Gaertn. Pl.Ih	H	Throughout the year	Sanyal 708
<i>Tridax procumbens</i> L.	H	Throughout the year	Sanyal 164
<i>Vernonia cineria</i> (L.) Less.	H	Oct - Mar	Sanyal 873
<i>Xanthium indicum</i> Koen.	H	Oct-Dec	Sanyal 829
<i>Wedelia calendulacea</i> (L.) Less.	H	Throughout the year	Sanyal 855
Convolvulaceae			
<i>Hewittia sublobata</i> (L.f.) Ktze.	H	Throughout the year	Sanyal 155
<i>Ipomoea chryseides</i> Ker Gawl.	H	Mar-May	Sanyal 190
<i>Ipomoea pes-tigridis</i> L.	H	Aug to October	Sanyal 109
<i>Ipomoea quamoclit</i> L. Pl.Ii	H	Aug- Oct.	Sanyal 165
<i>Evolvulus nummularius</i> (L.) L.	H	Oct-Jan	Sanyal 877
Cruciferae			
<i>Rorippa indica</i> (L.) Hiern	H	Throughout the year	Sanyal 555
Cucurbitaceae			
<i>Coccinia grandis</i> (L.) Voigt	H	Throughout the year	Sanyal 165
<i>Mukia maderaspatana</i> (L.) M.J. Roem.	H	Throughout the year	Sanyal 180
Cyperaceae			
<i>Kyllinga monocephala</i> Rottb.	H	Mar- Sep	Sanyal 162
Euphorbiaceae			
<i>Acalypha indica</i> L. Pl.IIa	H	Jun-Nov	Sanyal 296

<i>Agyneia bacciformis</i> (L.) A. Juss. Pl.IIb	H	Jun-Nov	Sanyal 556
<i>Cestrum diurnum</i> L. Pl.IIc	H	Jan-Apr, also Aug-Oct.	Sanyal 776
<i>Chrozophora plicata</i> (Vahl) A. Juss.	H	Feb- -Sept	Sanyal 156
<i>Croton bonplandianum</i> Baill.	H	Apr-Jul	Sanyal 1106
<i>Drypetes roxburghii</i> (Wall.)Hurus. Pl.IId	T	Apr-Jul	Sanyal 1085
<i>Euphorbia heterophylla</i> L.	H	Mar-Jul	Sanyal168
<i>Euphorbia heyneana</i> L.	H	May-Aug	Sanyal 879
<i>Euphorbia hirta</i> L.	H	Through out the year	Sanyal 299
<i>Euphorbia tirucalli</i> L	S	Apr-Jun	Sanyal 558
<i>Jatropha gossypifolia</i> L.	H	Aug- Feb	Sanyal 776
<i>Micrococca mercurialis</i> (L.) Benth.	H	Through out the year	Sanyal 154
<i>Phyllanthus amarus</i> Schum. & Thonn.	H	Mar-May;	Sanyal 410
<i>Phyllanthus reticulatus</i> Poir.	H	Mar-May;	Sanyal 408
<i>Phyllanthus urinaria</i> L.	H	Sept-Nov	Sanyal 616
<i>Ricinus communis</i> L.	S	Throughout year	Sanyal 787
Labiatae (Lamiaceae)			
<i>Anisomeles indica</i> (L.) O.Kuntze. Pl.IIe	H	Oct-Mar	Sanyal 755
<i>Hyptis suaveolens</i> (L.) Poit. Pl.IIf	H	Oct-Jan	Sanyal 877
<i>Ocimum tenuiflorum</i> L.	H	Sep-Dec	Sanyal 915
<i>Ocimum americanum</i> L.	H	Jul-Dec	Sanyal 910
<i>Ocimum gratissimum</i> (L.)	H	Jul-Dec	Sanyal 408
<i>Leonurus sibiricus</i> L.	H	Sep-Dec	Sanyal716
<i>Leucas aspera</i> (Willd.) Link	H	Jul-Mar	Sanyal 987
<i>Leucas cephalotes</i> (Roth) Spreng. Pl.IIg	H	Jul-Sep	Sanyal 929
Leguminosae (Fabaceae)			
<i>Acacia auriculiformis</i> A. Cunn. ex Benth.	T	Jun-Aug	Sanyal 774
<i>Atylosia scarabaeoides</i> (L.) Benth.	H	Feb- May	Sanyal 154
<i>Bauhinia purpurea</i> L.	T	Sep-Dec	Sanyal 1100
<i>Butea monosperma</i> (Lam.) Taub.	T	Feb- May	Sanyal 1087
<i>Calliandra umbrosa</i> Benth.	T	Jun-Aug	Sanyal1645
<i>Cassia alata</i> L.	S	Jan-May	Sanyal 8776
<i>Cassia fistula</i> L. Pl.IIh	T	Jun-Aug	Sanyal 2943
<i>Cassia siamea</i> Lam.	T	Nov-Mar	Sanyal 5567
<i>Cassia sophora</i> L. Pl.IIi	H	Jun-Nov	Sanyal 77
<i>Cassia tora</i> L.	H	Whole year,	Sanyal 15
<i>Clitoria ternatea</i> L.	H	Jun-Jan.	Sanyal 110
<i>Crotalaria pallida</i> W.Aiton Pl.IIIa	H	Mar-May	Sanyal 108
<i>Crotalaria verrucosa</i> L.	S	May-Jul	Sanyal169
<i>Dalbergia sissoo</i> Roxb. ex DC.	T	Mar-May	Sanyal 879
<i>Delonix regia</i> (Bojer ex Hook.) Raf.	T	Summer months	Sanyal 290
<i>Desmodium gangeticum</i> (L.) DC.	H	Aug-Dec	Sanyal 550
<i>Desmodium triflorum</i> (L.) DC.	H	Jul-Aug.	Sanyal 770
<i>Leucaena leucocephala</i> (Lam.) de Wit.	T	Jun-Nov	Sanyal 151

<i>Millettia ovalifolia</i> (Wight & Arn.) Kurz Pl.IIIb	T	Mar-May	Sanyal 1101
<i>Mimosa pudica</i> L.	H	Sep-Oct	Sanyal 1081
<i>Peltophorum pterocarpum</i> (DC.) Baker ex K. Heyne Pl.IIIc	T	Mar- Jun	Sanyal 1609
<i>Pithecellobium dulce</i> (Roxb.) Benth.	T	Oct-Apr	Sanyal 8777
<i>Pongamia pinnata</i> (L.) Pierre	T	Apr-May	Sanyal 2988
<i>Samanea saman</i> (Jacq.) Merr.	T	Jun-Sep	Sanyal 5596
<i>Saraca asoca</i> (Roxb.) De Wilde	T	Nov-Apr	Sanyal 7745
<i>Sesbania cannabina</i> (Retz.) Pers.	T	Aug-Feb	Sanyal 1508
<i>Sesbania grandiflora</i> (L.) Poir.	T	Oct-Dec	Sanyal 1103
<i>Sesbania sesban</i> (L.) Merr.	T	Sept-Nov	Sanyal 1081
<i>Tephrosia purpurea</i> (L.) Pers.	H	Sept-Feb	Sanyal 1621
<i>Teramnus labialis</i> (L.f.) Spreng.	H	Jun-Sep	Sanyal 8732
Lythraceae			
<i>Lagerstroemia speciosa</i> (L.) Pers. Pl.IIIId	T	Jun-Sep	Sanyal 5554
Malvaceae			
<i>Fioria vitifolia</i> (L.) Mattei	S	Jun-Sep	Sanyal 1532
<i>Malachra capitata</i> (L.) L. Pl.IIIe	H	Jul-Oct	Sanyal 1103
<i>Malvaviscus arboreus</i>	S	winter-spring.	Sanyal 1086
<i>Sida acuta</i> L.	H	Sep-Feb	Sanyal 1698
<i>Urena lobata</i> L.	H	Jul-Oct.	Sanyal 8787
<i>Urena sinuata</i> L.	H	Jun-Oct.	Sanyal 2987
Meliaceae			
<i>Azadirachta indica</i> A. Juss.	T	Apr-Jun,	Sanyal 7745
Moraceae			
<i>Ficus benghalensis</i> L.	T	Apr-Jun and Dec-Feb	Sanyal 1107
<i>Ficus religiosa</i> L.	T	Mar-Oct	Sanyal 1083
<i>Ficus benjamina</i> L.	T	Oct-Jan	Sanyal 1609
Myrtaceae			
<i>Syzygium cumini</i> (L.) Skeels	T	Apr-Jun	Sanyal 2967
Nyctaginaceae			
<i>Boerhaavia repens</i> L.	H	spring-autumn.	Sanyal 7217
<i>Bougainvillea spectabilis</i> Willd.	S	winter-spring.	Sanyal 1455
Oleaceae			
<i>Nyctanthes arbor-tristis</i> L.	T	Aug-Oct	Sanyal 1088
Papaveraceae			
<i>Argemone mexicana</i> L.	H	Feb-May.	Sanyal 8007
Pedaliaceae			
<i>Pedaliium murex</i> L. Pl.IIIf	H	Mar-Dec.	Sanyal 5805
<i>Sesamum indicum</i> L.	H	Jun-Oct	Sanyal 7007
Piperaceae			
<i>Peperomia pellucida</i> (L.) Kunth.	H	Jun -Aug	Sanyal 1840

Poaceae			
<i>Chloris barbata</i> Sw.	H	Apr-May.	Sanyal 1689
<i>Cynodon dactylon</i> (L.) Pers.	H	Mar to Sep	Sanyal 8279
<i>Dactyloctenium aegyptium</i> (L.) Willd.	H	Jan-Apr	Sanyal 2691
<i>Digitaria sanguinalis</i> Scop.	H	Jul-Sep.	Sanyal 5598
<i>Echinochloa colona</i> (L.) Link.	H	May -Sep	Sanyal 7007
<i>Eleusine indica</i> L.	H	Throughout the year	Sanyal 1587
<i>Eragrostis tenella</i> (Linn.) P. Beauv.	H	Mar-Sep.	Sanyal 1103
<i>Setaria glauca</i> Beauv.	H	Sep-Dec	Sanyal 1082
<i>Oplismenus burmanii</i> (Retz.) P. Beauv	H	Aug-Sept	Sanyal 1600
Polygonaceae			
<i>Polygonum orientale</i> L.	S	Jun-Oct	Sanyal 2965
<i>Rumex dentatus</i> L.	H	Aug-Sep	Sanyal 5529
Rubiaceae			
<i>Ixora coccinea</i> L.	S	Almost throughout the year	Sanyal 1547
<i>Catesbaea spinosa</i> L.	S	Mar-May	Sanyal 7110
<i>Oldenlandia corymbosa</i> L.	H	Jun-Oct	Sanyal 1085
<i>Oldenlandia paniculata</i> L.	H	Jun to Aug	Sanyal 1659
<i>Spermacoce articularis</i> L.f.	H	Jun-Jul	Sanyal 8712
Sapotaceae			
<i>Madhuca longifolia</i> (Koenig) Macbride	T	Feb-Apr	Sanyal 5543
<i>Mimusops elengi</i> L.	T	Sep-Nov	Sanyal 7734
Sapindaceae			
<i>Allophylus cobbe</i> (L.) Raeusch.	S	May-Jun	Sanyal 1109
<i>Cardiospermum halicacabum</i> L.	H	summer-autumn	Sanyal 1089
Scrophulariaceae			
<i>Bacopa monnieri</i> (L.) Penn.	H	Throughout the year	Sanyal 8765
<i>Lindenbergia indica</i> (L.) O. Kuntze	H	Sept to Jan	Sanyal 2956
<i>Lindernia crustacea</i> (L.) F. Muell.	H	Jul-Aug	Sanyal 5599
<i>Mazus pumilus</i> (Burm.f.) Steenis	H	Apr-Oct.	Sanyal 7777
<i>Mecardonia procumbens</i> (Miller) Small	H	Apr-Aug	Sanyal 1577
<i>Scoparia dulcis</i> L.	H	Throughout the year	Sanyal 1104
Solanaceae			
<i>Cestrum diurnum</i> L.	S	Jan- Oct	Sanyal 1698
<i>Datura metel</i> L.	S	May-Oct	Sanyal 8792
<i>Nicotiana plumbaginifolia</i> Viv.	S	Mar through Aug	Sanyal 2940
<i>Physalis minima</i> L.	H	Apr – Jan	Sanyal 5532
<i>Solanum nigrum</i> L.	H	Sep-Feb	Sanyal 3477
<i>Solanum sisymbirifolium</i> Lam.	S	Apr – Jan	Sanyal 7615
<i>Solanum torvum</i> Sw. Pl.IIIg	S	Apr-May	Sanyal 9110
<i>Solanum violaceum</i> Ortega Pl.IIIh	S	Apr-May	Sanyal 9108
<i>Solanum virginianum</i> L. Pl.IIIi	S	Mostly throughout the year.	Sanyal 8016
<i>Withania somnifera</i> (L.) Dunal Pl.IVa	S	Jan- Mar	Sanyal 6087

Sterculiaceae				
<i>Kleinhovia hospita</i> L.	Pl.IVb	T	Oct-Dec	<i>Sanyal 5554</i>
<i>Melochia corchorifolia</i> L.		H	Apr-Jul	<i>Sanyal 7732</i>
<i>Sterculia foetida</i> L.	Pl.IVc	T	Mar-May.	<i>Sanyal 1509</i>
Tiliaceae				
<i>Triumfetta rhomboidea</i> Jacq.		H	Aug-Nov.	<i>Sanyal 508</i>
Turneraceae				
<i>Turnera ulmifolia</i> L.	Pl.IVd	H	Spring-Summer,	<i>Sanyal 787</i>
Verbenaceae				
<i>Clerodendrum inerme</i> Gaertn.		S	Nov-Jan	<i>Sanyal 755</i>
<i>Clerodendrum viscosum</i> Vent.		S	Feb-Jul	<i>Sanyal 777</i>
<i>Lantana camara</i> L.	Pl.IVe	S	Mar-Jun	<i>Sanyal 715</i>
<i>Lippia geminata</i> (L.) Michx.	Pl.IVf	H	Nov-Jan	<i>Sanyal 610</i>
<i>Tectona grandis</i> L.f.		T	Jul-Dec	<i>Sanyal 808</i>
<i>Vitex negundo</i> L.	Pl.IVg	T	Throughout the year,	<i>Sanyal 816</i>
Vitaceae				
<i>Cayratia trifolia</i> (L.) Domin.	Pl.IVh	H	Apr- Sep	<i>Sanyal 829</i>
Zygophyllaceae				
<i>Tribulus terrestris</i> L.	Pl.IVi	H	May-Sep	<i>Sanyal 977</i>

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