



## A preliminary survey of the herbaceous flora of the Acharya Jagadish Chandra Bose Indian Botanic Garden (AJCBIBG), Howrah, W.B., India.

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**Abstract:** The Acharya Jagadish Chandra Bose Indian Botanic Garden (AJCBIBG) previously known as Indian Botanic Garden, Howrah, is a historic old garden. This botanic garden has a special position among all the botanic gardens that the world having. In earlier time this garden witnessed as the centre of plant introduction. Till then AJCBIBG served as a centre for *ex-situ* conservation of many RET species collected from different parts of the globe. The rich and diverse floristic wealth of this garden makes it unique and very special. AJCBIBG is a living repository of 1377 species of plants (excluding herbs). The garden abode a rich herbaceous flora due to its congenial climate. However, records on the herbaceous plants dwelling in AJCBIBG are very scanty. Taking this into account the present study aimed at enlisting the herbaceous flora of the garden. A checklist of plants belonging to various families has been provided in this communication.

**Key Words:** Survey; Herbaceous flora; AJCBIBG

### Introduction

Indian Botanic Garden (IBG), Howrah formerly known as 'Company Bagan', the Royal Botanic Garden, Kolkata, at present AJC Bose Indian Botanic Garden (AJCBIBG), Howrah, is one of the best landscaped gardens in the world. The original history of AJCBIBG is almost similar to the Kew Garden in England which is situated on the bank of the river Thames, a few miles away from London. The Kew garden is about 50 years younger to AJCBIBG, Howrah which owes its interests in the Botany of Royalty but the latter has been established with economic and scientific aims (Biswas, 1938). The Royal Botanic Garden, Kolkata, on the contrary, situated on the bank of river Hooghly a few kilometers away from Kolkata, initiated in a vast area of about 300 acres of land and it was regarded as the largest and one of the oldest botanic gardens in the world till the middle of 19<sup>th</sup> century and now occupies an area of 273 acres. At present, the garden with an area of 273 acres and being a living repository of 1377 species of plants possesses 25 divisions and 24 interconnected lakes, and the lakes are connected to the Ganges through sluices for the regular inlet and outlet of water (Map.1). The garden is a unique place of learning & rich array of curiosity and occupies matchless attractions like the 'Great Banyan Tree', a living wonder in the plant kingdom; the Large Palm House containing rich collection of palms including *Lodoicea maldivica* (J.F.Gmel.) Pers. (the Double Coconut palm); Branching palm [*Hyphaene thebaica* (L.) Mart.] introduced from Egypt; the century Palm (*Coryphata* Lam.); the Giant Water Lily (*Victoria amazonica* (Poep.) J.C. Sowerby and *V. cruziana* A.D. Orb.) brought from Amazon river; the queen of flowering trees (*Amberstia nobilis* Wall.) a native of Burma; the mountain rose or Venezuelan rose

(*Brownea* sp.); the Baobab tree or Kalpavriksh (*Adansonia digitata* L.) native of Africa; the Rosogolla tree (*Chrysobryllum cainito* L.); the Cannon ball tree (*Couroupita guianensis* Aubl.); the African Sausage tree (*Kigelia africana* (Lam.) Benth.) and the mad tree (*Pterigota alata* (Roxb.) R. Br. var. *irregularis*) and the 'Candle Stick Tree' (*Parmentiera cereifera* Seem.) etc., are a few to mention.

Presently Acharya Jagadish Chandra Bose Indian Botanic Garden is taken as a centre of conservation of plant resources from their extinction. This garden serves as a living repository of plants of a country and also of selected exotic species, and a "safe abode" for the rare and endemic plants. As a result it houses the germplasm collection of selected economic, ornamental and medicinal plants and their wild progenitors. The garden also act to promote educational programmes in order to generate awareness about the value of trees and other curious, beautiful, interesting plants with delightful landscaping and display. This garden also organizes flower, foliage and plant shows etc.; exchange of viable seeds, seedlings and other propagules as well. As a whole, it acts as a data bank of information and documentation on holdings in the botanic garden.

AJCBIBG, Howrah also played a significant role in introducing, multiplying and distributing many commercially important plants from various parts of the world. Introduction of some of the notable species directly influenced the welfare of people and economic development of the country. Tea (*Camellia sinensis* var. *assamica* (J.W. Mast.) Kitam.), Cinchona (*Cinchona pubescens* Vahl.), Rubber (*Hevea brasiliensis* (Willd. ex A. Juss.) Mull.Arg.), Mahagony etc. were first introduced in the garden and

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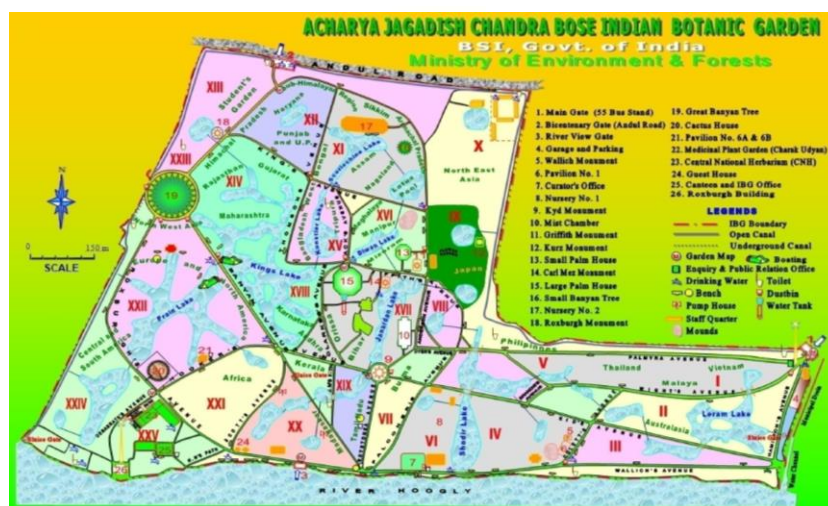
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subsequently transferred to other parts. The garden has served as a platform for acclimatization and distribution of a number of economic and ornamental plants of Agri- Horticultural importance of Indian and foreign origin. Some of the important species are *Amberstia nobilis* Wall. (the Queen of flowering trees) introduced from Burma in 1826 by Nathaniel Wallich; *Allamanda* sp. in 1803 by W. Hamilton; *Bougainvillea* sp. in 1803 by W. Hamilton; Garden Croton in 1798 by C. Smith; Australian pine in 1798; *Crescentia cujete* L. (Calabash tree) in 1795 by W. Hamilton; *Lodoicea maldivica* (J.F.Gmel.) Pers. (the Double Cocunut) in 1874 by Sir George King; Passion flower in 1797;

Chinese rose in 1794 by William Roxburgh; *Victoria amazonica* (Poepp.) J.C. Sowerby (the Giant Water lily) in 1873 by Sir George King. The foregoing examples are only a few of them. A large number of economic and spice species like Cardamom, Cinchona, Cinnamon, Coffee, Cotton, Indigo, Nutmeg, Pepper, Clove, Sugarcane, Potato, Sago, Teak etc., and other species used as forage, fodder, oil, fruit, fibre, timber and ornamental plants were first introduced into this historic Garden. Multiplication of most of the introduced species carried out in the Garden itself and distributed to different parts of the country for commercial cultivation.



**Map.1.** Layout map of AJC Bose Indian Botanic Garden, BSI, Howrah

Well before the Rio Earth Summit i.e. the way back in 1987 AJC Bose Indian Botanic Garden, Howrah has adopted and implemented a well-planned decision of Introducing Rare, Endangered and Threatened (RET) indigenous plant species, in the 'Annual Action Plans', prior to their extinction from the wild and to multiply and conserve them so as to check the loss of species. After the Rio Convention in 1992 the trend of introducing RET species in AJCBIBG has increased many folds and annually a large number of exclusive RET species being collected from the wild and introduced and multiplied for the purpose of effective conservation.

In the last eight years, i.e. from 2008 – 2015, AJCBIBG officials concentrated only in the collection of Endemic, Endangered & Threatened (RET) species. This is mainly due to the loss of many key species from the wild, because of habitat loss a number of species is being pushed annually into the IUCN list of threatened plants. Nevertheless, the mission of introducing threatened species from the phytogeographically and ecologically fragile Western Ghats, Eastern Ghats, North East India and Andaman & Nicobar Islands continues to be a major target of AJCBIBG under the Annual Action Plans.

## Materials and Methods

The current work is an exhaustive division wise survey of herbaceous plants of AJCBIBG, Howrah. It remained as a wide gap in the knowledge area since after the publication of 'Non-herbaceous Phanerogams of Indian Botanic Garden' by Sen & Nasker in 1965 in which the distribution of respective species in their concerned divisions have been mentioned; but deals only the trees and shrubs. The subsequent publications (Gage, 1912; Biswas, 1938; Chowdhury & Pandey, 2007) also have not dealt the herbaceous flora. Recently Debnath *et al.* (2014) published the Census of Plants of AJCBIBG. They also did not paid attention to enlist the rich herbaceous flora of this garden.

Realizing this, regular field surveys of different divisions of the AJCBIBG were made for enlisting the herbs. The detailed information regarding associate plants, ecology, other field characters were recorded. The plants were identified in consultation with modern floras and monographs. Information regarding utility was also recorded. The plants are arranged alphabetically along with their family. However, grasses and sedges are not enlisted in this communication.

**Enumeration:**

1. *Abutilon indicum* (L.) Sweet Malvaceae
2. *Acalypha indica* L. Euphorbiaceae
3. *Acanthus ilicifolius* L. Acanthaceae
4. *Achyranthes aspera* L. Amaranthaceae
5. *Acorus calamus* L. Araceae
6. *Adiantum farleyense* Moori Adiantaceae
7. *Adiantum tenarum* Swartz Adiantaceae
8. *Agave decipiens* Baker Agavaceae
9. *Ageratum conyzoides* L. Asteraceae
10. *Ageratum haustorianum* Mill. Asteraceae
11. *Alisma plantago* L. Alismaceae
12. *Alocasia indica* Schott. Araceae
13. *Alocasia macrorrhiza* Schott. Araceae
14. *Aloe vera* (L.) Burm.f. Liliaceae
15. *Aloystia citriodora* Palau. Lamiaceae
16. *Alternanthera sessilis* (L.) R.Br. ex DC. Amaranthaceae
17. *Amaranthus caudatus* L. Amaranthaceae
18. *Ammania laccifera* L. Lythraceae
19. *Amorphophalus paeijfolius* (Dennst.) Nico. Araceae
20. *Ampelocissus latifolia* (Roxb.) Planch. Vitaceae
21. *Andrographis paniculata* (Burm.f) Nees Acanthaceae
22. *Anisomeles indica* (L.) Kuntze Lamiaceae
23. *Antigonon leptopus* Hook. & Arn. Polygonaceae
24. *Aponogeton crispus* Thunb. Aponogetonaceae
25. *Aponogeton natans* (L.) Engl. & K. Krause Aponogetonaceae
26. *Argyreia cuneata* (Willd.) Ker-Gawl. Convolvulaceae
27. *Artemisia indica* Willd. Asteraceae
28. *Artemisia vulgaris* L. Asteraceae
29. *Asclepias curassavica* L. Asclepiadaceae
30. *Asystasia chelonoides* Nees. var. *quadrangularis* Cl. Acanthaceae
31. *Asystasia gangetica* (L.) T. Anderson Acanthaceae
32. *Basella alba* var. *rubra* L. Basellaceae
33. *Bidens pilosa* L. Asteraceae
34. *Boehmeria nivea* (L.) Gaudich. Urticaceae
35. *Boerhavia diffusa* L. Nyctaginaceae
36. *Cardiospermum helicacabum* L. Sapindaceae
37. *Cassia alata* L. Caesalpiniaceae
38. *Cassia biflora* L. Caesalpiniaceae
39. *Cassia sophera* L. Caesalpiniaceae
40. *Cassia tora* L. Caesalpiniaceae
41. *Cassytha filiformis* L. Lauraceae
42. *Catharanthus roseus* (L.) G. Don Apocynaceae
43. *Cayratia pedata* (Lam.) Juss. ex Gagnep. Vitaceae
44. *Cayratia trifolia* (L.) Domin Vitaceae
45. *Celosia argentea* L. Amaranthaceae
46. *Celosia argentea* L. var. *cristata* (L.) Kuntze Amaranthaceae
47. *Centella asiatica* (L.) Urb. Apiaceae
48. *Ceratophyllum demersum* L. Ceratophyllaceae
49. *Ceratopteris siliquosa* (L.) Copeland Parkeriaceae (Fern)
50. *Cheiranthus cheiri* L. Brassicaceae
51. *Chenopodium album* L. Chenopodiaceae
52. *Chenopodium ambrosioides* L. Chenopodiaceae
53. *Chrozophora rotteri* (Geisel.) A. Juss. ex Spreng. Euphorbiaceae
54. *Cleome aspera* Koenig ex DC. Capparidaceae
55. *Cleome gynandra* L. Capparidaceae
56. *Cleome monophylla* L. Capparidaceae
57. *Cleome rutidosperma* DC. Capparidaceae
58. *Cleome spinosa* Jacq. Capparidaceae
59. *Cleome viscosa* L. Capparidaceae
60. *Commelina benghalensis* L. Commelinaceae
61. *Corchorus olictres* L. Tiliaceae
62. *Coronopus didymus* (L.) Sm. Brassicaceae
63. *Costus speciosus* (Koenig.) J.C. Sm. Costaceae
64. *Crematobodium arnicoides* (DC. ex Royle) R.D. Good. Asteraceae
65. *Crinum asiaticum* L. Amaryllidaceae
66. *Croton bonplandianum* Baillon Euphorbiaceae
67. *Curculigo orchoides* Gaertn. Hypoxidaceae
68. *Cuscuta reflexa* Roxb. Cuscutaceae
69. *Datura metel* L. Solanaceae
70. *Dentella repens* (L.) Forst. Rubiaceae
71. *Didymoplexis pallens* Griff. Orchidaceae
72. *Dimorphotheca pluvialis* (L.) Moench. Asteraceae
73. *Dischidia benghalensis* Colebr. Asclepiadaceae
74. *Ecbolium viride* (Ferssk.) Alston. Acanthaceae
75. *Eclipta prostrata* (L.) L. Asteraceae
76. *Eichhornia crassipes* (Mart.) Solms Pontederiaceae
77. *Elephantopus scaber* L. Asteraceae
78. *Emilia sonchifolia* (L.) DC Asteraceae
79. *Eranthemum pulbellum* Andr. Acanthaceae
80. *Eryngium foetidum* L. Apiaceae
81. *Eulophia andamanensis* Rchb.f. Orchidaceae
82. *Euphorbia hirta* L. Euphorbiaceae
83. *Euryale ferox* Salisb. Nymphaeaceae
84. *Evolvulus alsinoides* L. Convolvulaceae
85. *Evolvulus nummularius* (L.) L. Convolvulaceae
86. *Gazania rigens* (L.) Gaertn. Asteraceae
87. *Gerbera jamesonii* Bolus ex Hook. Asteraceae
88. *Globba schomburgkii* Hook.f. Zingiberaceae
89. *Globba marantina* L. Zingiberaceae
90. *Gomphrena serrata* L. Amaranthaceae
91. *Heliotropium indicum* L. Boraginaceae
92. *Hemidesmus indicus* R. Br. Periplocaceae
93. *Hydrilla verticillata* (L.f) Royle Hydrocharitaceae
94. *Justicia simplex* D. Don Acanthaceae
95. *Kalanchoe pinnata* (Lam.) Pers. Crassulaceae
96. *Laportea interrupta* (L.) Chew. Urticaceae
97. *Lemna minor* L. Lemnaceae
98. *Leonurus sibiricus* L. Lamiaceae
99. *Lobularia maritima* (L.) Desk. Brassicaceae
100. *Ludwigia adscendens* (L.) Hara Onagraceae
101. *Ludwigia perennis* L. Onagraceae
102. *Malvestrum coromandelianum* (L.) Garcke Malvaceae
103. *Mansoa alliacea* (Lam.) A.H. Gentry. Bignoniaceae
104. *Maranta arundinacea* L. Marantaceae
105. *Marsilea quadrifolia* (L.) Willd. Marsiliaceae
106. *Medicago lupulina* L. Fabaceae
107. *Melastoma malabathricum* L. Melastomataceae
108. *Melochia corchorifolia* L. Sterculiaceae
109. *Merremia tridentata* (L.) Hallier. f. Convolvulaceae
110. *Merremia umbellata* (L.) Hallier.f. Convolvulaceae
111. *Mikania cordata* (Burm.f.) B.L. Rob. Asteraceae
112. *Mimosa pudica* L. Mimosaceae
113. *Mirabilis jalapa* L. Nyctaginaceae
114. *Monochoria hastata* (L.) Solms. Pontederiaceae
115. *Nelumbo nucifera* Gaertn. Nelumbonaceae
116. *Nicotiana plumbaginifolia* Viv. Solanaceae
117. *Nymphaea alba* L. Nymphaeaceae
118. *Nymphaea pubescens* Willd. Nymphaeaceae
119. *Nymphaea rubra* Roxb. ex Andrews Nymphaeaceae
120. *Nymphaea nouchali* Burm.f. Nymphaeaceae
121. *Ocimum gratissimum* L. Lamiaceae
122. *Oldenlandia lactea* (Willd.) DC. Rubiaceae
123. *Operculina turpethum* (L.) Silva Manso Convolvulaceae
124. *Ottelia alismoides* Pers. Hydrocharitaceae
125. *Oxalis corniculata* L. Oxalidaceae
126. *Oxalis debilis* H.B & K var. *corymbosa* (DC.) Lorr. Oxalidaceae
127. *Paederia foetida* L. Rubiaceae
128. *Panacratium pusillum* Schum. Amaryllidaceae
129. *Parthenium hysterophorus* L. Asteraceae
130. *Passiflora caerulea* L. Passifloraceae
131. *Passiflora geminiflora* D.Don Passifloraceae
132. *Pauzolzia zeylanica* (L.) Bennet & Brown Urticaceae
133. *Peperomia pellucida* (L.) H.B & K. Piperaceae
134. *Phacelia campanularia* A. Gray Hydrophyllaceae
135. *Phyla nodiflora* (L.) Grana Verbenaceae
136. *Phyllanthus amarus* Schum. & Thonn. Euphorbiaceae
137. *Phyllanthus frutescens* Webs. Euphorbiaceae
138. *Physalis minima* L. Solanaceae
139. *Physalis peruviana* L. Solanaceae
140. *Piper retrofractum* Vahl Piperaceae
141. *Piper nigrum* L. Piperaceae
142. *Pilea microphylla* (L.) Liebm. Urticaceae
143. *Pistia stratiotes* L. Araceae
144. *Plumbago auriculata* Lam. Plumbaginaceae
145. *Plumbago zeylanica* L. Plumbaginaceae
146. *Polygonum barbatum* L. Polygonaceae
147. *Polygonum glabrum* Willd. Polygonaceae
148. *Polygonum orientale* L. Polygonaceae
149. *Porana paniculata* Roxb. Convolvulaceae

150. *Potamogeton crispus* L. Potamogetonaceae  
 151. *Potamogeton nodosus* Poir. Potamogetonaceae  
 152. *Pothos scandens* L. Araceae  
 153. *Premna barbata* Wall. Verbenaceae  
 154. *Premna benghalensis* C.B. Cl. Verbenaceae  
 155. *Premna corymbosa* Rottl. Verbenaceae  
 156. *Primula arvensis* E.H.L. Krause Primulaceae  
 157. *Pseudelephantopus spicatus* (Juss. ex Aubl.) Rohr. Asteraceae  
 158. *Psorelea corylifolia* L. Fabaceae  
 159. *Punica granatum* L. Punicaceae  
 160. *Rauwolfia serpentina* Benth ex Kurz Apocynaceae  
 161. *Rauwolfia tetraphylla* L. Apocynaceae  
 162. *Rhinacanthus nasuta* (L.) Kurz. Acanthaceae  
 163. *Ribnod spathacea* (Sw.) W.T. Stearn Commelinaceae  
 164. *Rivina bengalensis* Srivast. & Paul Phytolaccaceae  
 165. *Rivina humilis* L. Phytolaccaceae  
 166. *Rudbeckia bicolor* Nutt Asteraceae  
 167. *Rudbeckia laciniata* L. Asteraceae  
 168. *Ruellia neolongifolia* Bennet & Raizada Acanthaceae  
 169. *Ruellia tuberosa* L. Acanthaceae  
 170. *Rumex maritimus* L. Polygonaceae  
 171. *Sagittaria sagittifolia* L. Alismataceae  
 172. *Salvinia adnata* Desv. Salviniaceae  
 173. *Salvia splendens* Sellow ex Woes Saviniaceae  
 174. *Scoparia dulcis* L. Scrophulariaceae  
 175. *Setcreasea purpurea* Dyer Commelinaceae  
 176. *Sida acuta* Burm.f. Malvaceae  
 177. *Sida cordata* (Burm.f.) Borss. Malvaceae  
 178. *Sida cordifolia* L. Malvaceae  
 179. *Sida rhombifolia* L. Malvaceae  
 180. *Solanum americanum* Mill. Solanaceae  
 181. *Solanum diphyllum* L. Solanaceae  
 182. *Sonchus oleraceus* L. Asteraceae  
 183. *Spathoglottis plicata* Bleume Orchidaceae  
 184. *Spirodela polyrrhiza* (L.) Schiel. Lamiaceae  
 185. *Stachytarpheta jamaicensis* (L.) Vahl Verbenaceae  
 186. *Stapelia gigantea* N. & Br. Asclepiadaceae  
 187. *Stellaria media* (L.) Villars Caryophyllaceae  
 188. *Sulcorebutia arenacea* (Cardenans) F. Ritter Cactaceae  
 189. *Sulcorebutia mertosa* F. Ritter Cactaceae  
 190. *Tacca integrifolia* Ker-Gawl. Taccaceae  
 191. *Tagetes erecta* L. Asteraceae  
 192. *Tagetes patula* L. Asteraceae  
 193. *Telanthera ficoidea* Miq. Amaranthaceae  
 194. *Tenagocharis latifolia* (D. Don) Buch.-Ham. Limncharitaceae  
 195. *Tephrosia candida* (Roxb.) DC. Fabaceae  
 196. *Tephrosia purpurea* (L.) Pers Fabaceae  
 197. *Torenia floumieri* Lindl. ex Fourn. Scrophulariaceae  
 198. *Torenia travancorica* Gamble. Scrophulariaceae  
 199. *Tradescantia fluminensis* Vell. Commelinaceae  
 200. *Trapa natans* L. var. *bispinosa* (Roxb.) Makino Trapaceae  
 201. *Trichocereus bidesii* Britton & Rose Cactaceae  
 202. *Tridax procumbens* (L.) L. Asteraceae  
 203. *Tropaeolum majus* L. Tropaeolaceae  
 204. *Turnera ulmifolia* L. Turneraceae  
 205. *Typha unguifolia* L. Typhaceae  
 206. *Typhonium bilobatum* (L.) Schott Araceae  
 207. *Urena sinuata* L. Malvaceae  
 208. *Ursinia pulchra* N.E. Br. Asteraceae  
 209. *Utricularia aurea* Lour. Lentibulariaceae  
 210. *Vaccaria pyramidata* Medica. var. *rosea* Hort. Caryophyllaceae  
 211. *Vallisneria spiralis* L. Hydrocharitaceae  
 212. *Vanda tessellata* (Roxb.) Hook. ex. G. Don. Orchidaceae  
 213. *Venidium fastuosum* Stapf Asteraceae  
 214. *Verbena bipinnatifida* Nutt. Asteraceae  
 215. *Verbena tenuisecta* Briq. Verbenaceae  
 216. *Vernonia cinerea* (L.) Less Asteraceae  
 217. *Vernonia sp.* Asteraceae  
 218. *Victoria amazonica* (Poepp.) J.C. Sowerby Nymphaeaceae  
 219. *Victoria cruziana* A.D. Orb. Nymphaeaceae  
 220. *Viola tricolor* L. var. *bortensis* DC. Violaceae  
 221. *Wattakaka volubilis* (L.f.) Stapf. Asclepiadaceae  
 222. *Wedelia chinensis* (Osbeck.) Merrill Asteraceae  
 223. *Withania somnifera* Dunal Solanaceae  
 224. *Xanthium strumarium* L. Asteraceae  
 225. *Zenopsis stratenmatica* (L.) Schltr. Orchidaceae  
 226. *Zingiber zerumbet* (L.) Rose. ex J.B. Sm. Zingiberaceae  
 227. *Zephyranthus ajax* Sprenger Amaryllidaceae  
 228. *Zephyranthus rosea* Lindl. Amaryllidaceae

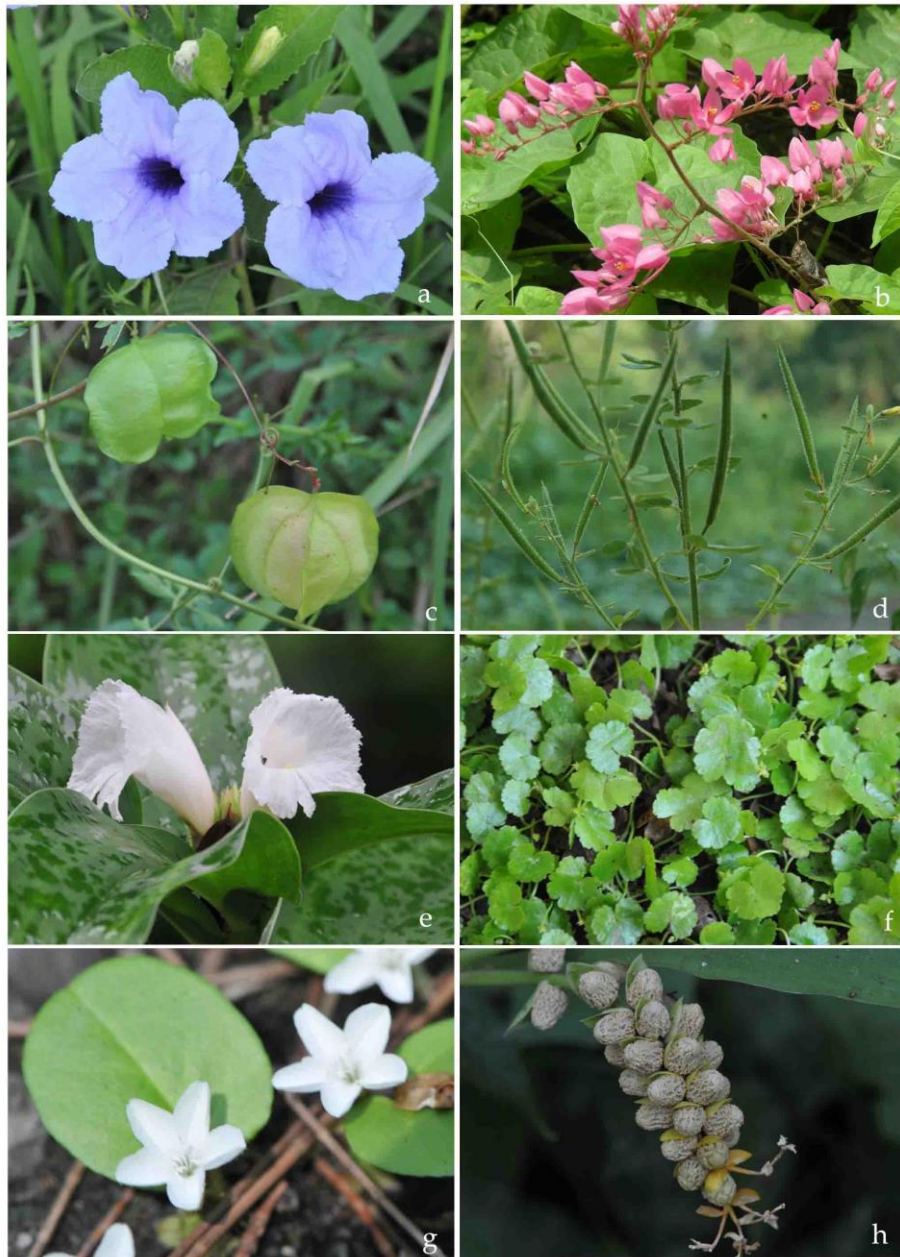


Plate:1. a. *Ruellia tuberosa*; b. *Antigonon leptopus*; c. *Cardiospermum helicacabum*; d. *Cleome viscosa*; e. *Costus speciosus*; f. *Centella asiatica*; g. *Evolvulus nummularius*; h. *Globba schomburgkii*.



Plate 2: a. *Urena sinuata*; b. *Euphorbia hirta*; c. *Plumbago zeylanica*; d. *Physalis minima*; e. *Operculina turpethum*; f. *Peperomia pellucida*.



Plate 3: a. *Boerhavia diffusa*; b. *Gloriosa superba*; c. *Anisomeles indica*; d. *Vanda tessellata*.

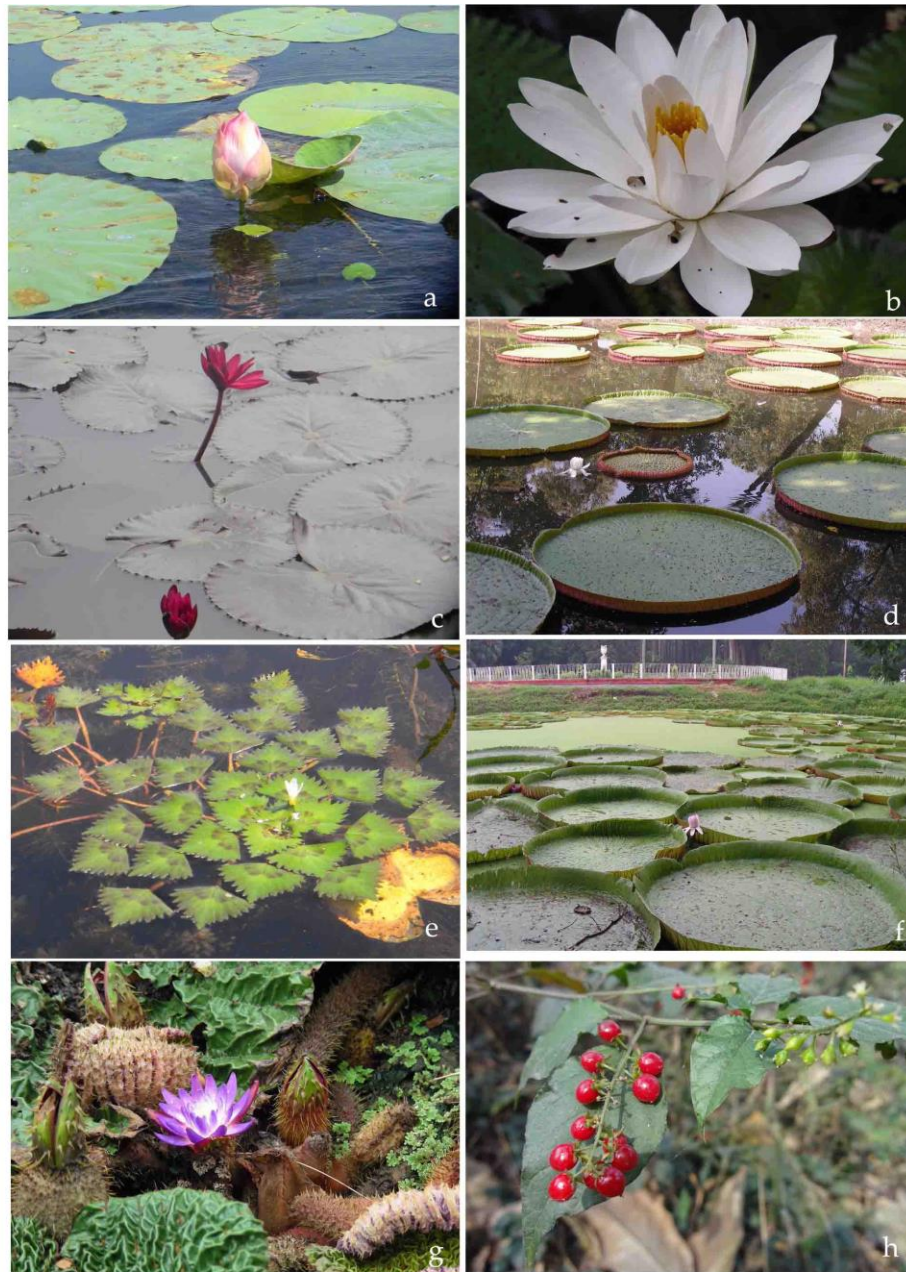


Plate: 4. a. *Nelumbo nucifera*; b. *Nymphaea nouchali*; c. *Nymphaea pubescens*; d. *Victoria amazonica*; e. *Trapa natans* var. *bispinosa*; f. *Victoria cruziana*; g. *Euryale ferox*; h. *Rivina bengalensis*.

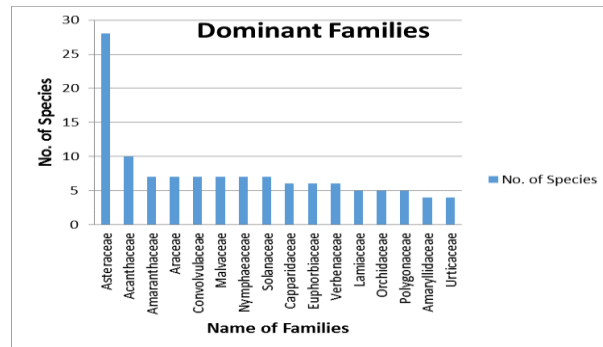
#### Statistical analysis

During the present survey programme a total of 228 herbaceous species under 181 genera belonging to 78 families have been observed to be growing in the garden including 4 fern species under 3 genera belonging to 3 families. Out of 228 species, 188 species of dicots are distributed under 146 genera belonging to 59 families, while 36 monocot species spread over 32 genera under 16 families. The approximate ratio of monocot and dicot species is 1:5.22. So it indicates that the

dicots are represented more than five times than the monocots, which is shown in the Table-1. Out of total 78 families, 34 families are represented by single species. Asteraceae is the first dominant family followed by the families like Acanthaceae, Amaranthaceae, Araceae, Malvaceae, Nymphaeaceae, Solanaceae, Verbenaceae etc. The herbaceous flora is also represented by 4 pteridophytes (ferns) belonging to 3 genera under 3 families.

**Table 1:** Percentage of families, genera and species of dicots, monocots and pteridophytes present in AJCBIBG.

Groups	Families		Genera		Species	
	No.	%	No.	%	No.	%
Dicotyledons	59	75.64	146	80.66	188	82.45
Monocotyledons	16	20.51	32	17.67	36	15.78
Pteridophytes	03	03.84	03	01.65	04	01.75

**Graph 1:** Dominant Families

## Conclusion

The vegetation of the AJCBIBG is mainly of 3 storeyed. The top canopy consists of tree species; shrubs constitute the middle storey while the ground flora inhabited by herbs. The rich tree diversity provides an ideal abode for the growth and development of the herbaceous flora in a way of supplying the congenial climatic conditions. *Operculina turpethum* (L.) Silva Manso, *Asystasia gangetica* (L.) T. Anderson, *Commelina benghalensis* L., *Rivina benghalensis* Srivast. & Paul, *Euphorbia hirta* L., *Andrographis paniculata* (Burm.f) Nees, *Costus speciosus* (Koenig.) J.C. Sm., *Cardiospermum helicacabum* L., *Gomphrena serrata* L., *Sida acuta* Burm.f., *Wedelia chinensis* (Osbeck.) Merrill, *Tridax procumbens* (L.) L., *Globba schomburgkii* Hook.f, *Achyranthes aspera* L., *Eclipta prostrata* (L.) L., *Abutilon indicum* (L.) Sweet, *Evolvulus alsinoides* L. etc., are the dominant herb exhibiting luxuriant growth. Post-monsoon period is the best period for the growth of the herbaceous flora. In this period the diversity is very rich. The rich herbaceous cover in turn retains the moisture content, enhances the quality of the soil and checks soil erosion thereby helping the growth and natural regeneration of valued tree species conserved in this historic botanic garden by harboring specific ecological niche. The lakes are also home to many aquatic, semi-aquatic and marshy herbs under the genera *Nymphaea*, *Ipomoea*, *Hydrilla*, *Vallisneria*, *Utricularia*, *Limnophylla*, *Trapa* etc. But the lakes are heavily infested with massive growth of invasive exotic weeds like *Eichhornia crassipes* (Mart.) Solms, *Pistia stratiotes* L., *Salvinia* sp. etc. Intrusion of these species into the lakes hampers the growth of the other aquatic flora. Hence, immediate and effective management of

these species are essential to provide a chance for establishment of other herbaceous forms.

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