



DIVERSITY OF ANGIOSPERMS IN THE KUKKARAHALLI LAKE, MYSURU, KARNATAKA, INDIA

Manjunatha S., Devabrath Andia J., Ramakrishna Police Patil, Chandrashekar R. and K.N. Amruthesh

Department of studies in Botany, University of Mysore, Manasagangotri, Mysuru-570006 (Karnataka) India.

Abstract

Kukkarahalli lake is situated in the campus of the University of Mysore, Mysuru. It is one of the richest sites of plant diversity in Mysuru. The diversity of angiosperms has been found to be very rich both in population and species richness (290 species) that show seasonal variation. Among angiosperms, dominance shown by the families such as Poaceae, Fabaceae, Asteraceae, Amaranthaceae, Malvaceae. The present study is highly significant since study finds 129 species of angiosperm which were not recorded in the “Flowering Plants of the Mysore University Campus” (1974) which recorded angiosperms. Lake has large number of herbs than other forms of plants that indicates a high rate of anthropogenic disturbances. Presence of large number of invasive species and weeds are leading to the loss of species diversity in the lake area.

Key words : Wetlands, Angiosperm diversity, Herbs, Invasive species.

Introduction

Wetlands are one of the most valuable resources of the global ecosystem, which support a high level of biological diversity and also serve as an uncountable service to the environment (Roy, 2015). Wetlands, include rivers, lakes, peatlands, marshes and coastal and marine areas such as estuaries, lagoons, mangroves and coral reefs which currently occupies an area of more than 12.1 million Km², which is higher than the area of Greenland. Between 13-18 percent of them are on the Ramsar List of Wetlands of International Importance, which are protected sites (COP 13, 2018). Wetlands - are imported, self-sustained ecosystem that plays a significant role in the formation of a wide range of well-diversified flora (Mitra and Mukherjee, 2009). The contributions that wetlands make to human well-being have often been overlooked or underappreciated (Ramsar, 2018). Nature itself control the formation, modification, and destruction of wetlands but the direct or indirect consequences of human activity are the leading causes of wetlands change and loss worldwide (Roy, 2015).

The angiosperms provide ecosystem services including oxygen, fuel, medicines and flood control, soil

*Author for correspondence : E-mail : dr.knamruthesh@gmail.com

regeneration, and other benefits that are essential to human kind and indeed are a cornerstone of the global ecosystem (Paterson *et al.*, 2004). The millennium ecosystem assessment reported that about 60% of all ecosystem services (benefits that humans gain from natural ecosystems) have declined as a direct result of the growth of agriculture, industry, forestry, fisheries, etc. (Kinzing *et al.*, 2011). Ecologists are nowadays monitoring the effect of biodiversity on ecosystem functions owing to the rapidly changing climatic conditions throughout the world (Saurola, 2008). The identification of each group in an ecosystem serves as the first and foremost step to understand the changes in an ecosystem (Dantas *et al.*, 2016). The quality of water of an ecosystem directly or indirectly determines the microphytic and macrophytic flora and their distribution (Rajashekar *et al.*, 2009). The species richness in a wetland varies according to the period of flooding and transportation of chemicals in the systems (Gupta, 2014). Lakes are already degraded by anthropogenic interventions such as unscientific waste disposal, sewage entry from surrounding areas, construction activities in the vicinity of the lake. In this regard, the present work would be of greater significance since it attempts to

highlight the diversity of angiosperms of Kukkarahalli lake.

The city of Mysuru can be called as ‘Limnological capital of Karnataka’ due to the presence of many water bodies in and around. Kukkarahalli Lake is a eutrophic one, situated in the campus of University of Mysore, Mysuru (12°18' N latitude and 76°38' E longitude) with a total surface area of 49 hectares, $1.72 \times 10^6 \text{ m}^3$ in volume, with a mean depth of 3.5 m and a maximum depth of 8 m. The lake has got two arches of bundles bearing thrust of water with a catchment area of 4.14 sq Km, in range of 55 hectares comprising woody vegetation, mixed forestry and scrub vegetation (Rajashekar et al., 2009). Few pteridophytes like *Azolla*, *Marsilea* and *Salvinia* spp. and gymnosperms like *Araucaria* and *Cycas* spp can also be seen in the lake and its vicinity. Studies carried out in the past include ‘Flowering Plants of the Mysore University Campus’ (1974) which reported 431 species of angiosperms and ‘Ecological studies on wetland vegetation and their diversity in Kukkarahalli Lake’ (2009) which reported 78 species of aquatic macrophytes respectively.

Materials and Methods

The lake was repeatedly visited during rainy and summer season during 2016-2018 to collect all the angiosperms from the study area (Map 1). The plants were identified using Flora of Karnataka (Saldanha and Ramesh, 1984), Flora of Udupi (Bhat, 2003), Flora of the Presidency of Madras (Gamble, 1931), Flora of Chittoor (Madhavchitty, 2015), Invasive Alien Plants in the forests of Asia and the Pacific (Sankaran and Suresh, 2013) and web sources http://envis.frlht.org/bot_search and <https://theplantlist.org>. Plants were classified as per the APG IV system of classification and placed alphabetically.

Results and Discussions

The study reports 290 species of angiosperms belonging to 102 genera under 62 families- comprising 146 herbs, 05 aquatic herbs, 45 shrubs, 64 trees, 29 climbers and one straggler which are represented in the pie chart (Fig. 2).

37 species of monocots belonging to 31 genera under 11 families were reported mainly represented by Grass (Poaceae), Cyperaceae and Commelinaceae families which includes *Chloris barbata*, *Cynodon dactylon*, *Saccharum spontaneum*, *Setaria viridis*, *Typha domingensis*, *Commelina benghalensis*, *Fimbristylis quinquangularis*, *Cyperus rotundus*, etc. Among eudicots, 253 species belonging to 71 genera under 51 families represented by Fabaceae, Asteraceae, Amaranthaceae, Malvaceae, Acanthaceae and

Convolvulaceae. Among these, the members of Fabaceae were highest (42), mainly represented by the species of *Acacia*, *Albizia*, *Crotalaria*, *Senna*, etc., followed by members of Asteraceae (22), represented by species of *Ageratum*, *Blumea*, *Parthenium*, *Tridax*, etc.

The present study site is one of the major lakes in Mysuru, which harbors a variety of plants that shows seasonal variation, i.e., some plants are found in the large population at the specific season in a year. Present study adds a 112 eudicot species and 17 species of monocots to the ‘Flowering plants of the Mysore University Campus (1974)’ that indicates the totality and richness of unreported angiosperms. Some plants like *Grevillea robusta*, *Syzygium salicifolium*, *Melia azedarach*,

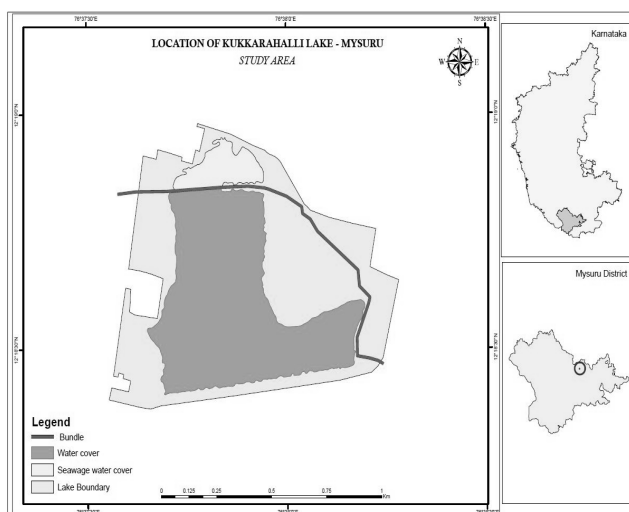


Fig. 1: Map showing Kukkarahalli Lake, University of Mysore, Manasagangothri, Mysuru.

Credits: Mr. Royal Tata, Kerala Forest Research Institute, Peechi, Kerala.

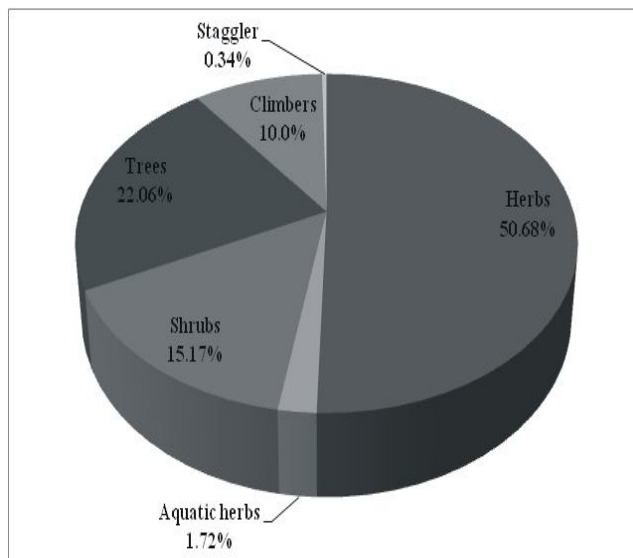


Fig. 2: Occurrence (%) of Habit among Angiosperms.

Table 1: The diversity of Angiosperms in Kukkarahalli lake.

* New Additions to the flora, 'Flowering Plants of the Mysore University Campus' (1974).

Family	Plant	Habit
Acanthaceae	<i>Asystasia dalzelliana</i> Santapau *	Herb
	<i>A. gangetica</i> (L.) T.Anderson *	Herb
	<i>Andrographis serpyllifolia</i> (Vahl) Wight.	Herb
	<i>Barleria buxifolia</i> L.	Herb
	<i>Hygrophila</i> spp *	Herb
	<i>Peristrophe bicalyculata</i> (Retz.) *	Herb
	<i>Ruellia prostrata</i> Poir. *	Herb
	<i>Thunbergia erecta</i> (Benth.) T.Anderson *	Climber
	<i>Justicia tranquebariensis</i> L. f.	Herb
Aizoaceae	<i>Trianthema portulacastrum</i> L.	Herb
Alismataceae	<i>Sagittaria latifolia</i> Willd.*	Aquatic herb
Amaranthaceae	<i>Achyranthes aspera</i> L.	Herb
	<i>A. aspera</i> var. <i>porphyristachya</i> (Wall. ex Moq.) Hook.f. *	Herb
	<i>Alternanthera bettzickiana</i> (Regel) G.Nicholson *	Herb
	<i>A. brasiliana</i> (L.) Kuntze *	Herb
	<i>A. pungens</i> Kunth	Herb
	<i>A. sessilis</i> (L.) R.Br. ex DC.	Herb
	<i>Amaranthus caudatus</i> L. *	Shrub
	<i>A. graecizans</i> L. *	Herb
	<i>A. hybridus</i> L. *	Herb
	<i>A. retroflexus</i> L. *	Herb
	<i>A. spinosus</i> L.	Herb
	<i>A. viridis</i> L.	Herb
	<i>Atriplex leucoclada</i> Boiss. *	Herb
	<i>Bassia crassifolia</i> (Pall.) Soldano	Herb
	<i>Cyathula prostrata</i> (L.) Blume *	Herb
<i>Gomphrena globosa</i> L.*	Herb	
Amaryllidaceae	<i>Pancratium</i> spp.*	Herb
Anacardiaceae	<i>Mangifera indica</i> L.	Tree
	<i>Spondias mombin</i> L. *	Tree
Annonaceae	<i>Annona squamosa</i> L.	Tree
	<i>Polyalthia longifolia</i> (Sonn.) Thwaites	Tree
Apiaceae	<i>Centella asiatica</i> (L.) Urb.	Herb
Apocynaceae	<i>Asclepias curassavica</i> L. *	Shrub
	<i>Calotropis gigantea</i> (L.) Dryand.	Shrub
	<i>Catharanthus roseus</i> (L.) GDon	Herb
	<i>Hemidesmus indicus</i> (L.) R. Br. ex Schult. *	Herb
	<i>Pergularia daemia</i> (Forssk.) Chiov.	Climber
	<i>Oxystelma esculentum</i> (L. f.) Sm. *	Climber
	<i>Tylophora indica</i> (Burm. f.) Merr.	Climber
	<i>Wrightia tinctoria</i> R.Br.	Tree
Araceae	<i>Colocasia esculenta</i> (L.) Schott*	Aquatic herb
	<i>Pista</i> spp	Aquatic herb
Areaceae	<i>Cocos nucifera</i> L.	Tree

Table 1 contd.....

Table 1 contd.....

Family	Plant	Habit
<i>Caryota urens</i> L. *	Tree	
	<i>Roystonea regia</i> (Kunth) O.F.Cook *	Tree
	<i>Phoenix sylvestris</i> (L.) Roxb.	Tree
Aristolochiaceae	<i>Aristolochia littoralis</i> Parodi	Climber
Asparagaceae	<i>Asparagus racemosus</i> Willd.*	Herb
	<i>Agave americana</i> L.	Herb
	<i>Sansevieria roxburghiana</i> Schult. & Schult.f.*	Herb
Asteraceae	<i>Acanthospermum hispidum</i> DC. *	Herb
	<i>Acmella uliginosa</i> (Sw.) Cass. *	Herb
	<i>Ageratina adenophora</i> (Spreng.) R.M.King&H.Rob. *	Herb
	<i>Ageratum conyzoides</i> (L.) L.	Herb
	<i>Bidens pilosa</i> L.	Herb
	<i>Blumea axillaris</i> (Lam.) DC. *	Herb
	<i>B.lacera</i> (Burm.f.) DC. *	Herb
	<i>B.obliqua</i> (L.) Druce *	Herb
	<i>Chromolaena odorata</i> (L.) R.M.King&H.Rob. *	Shrub
	<i>Crassocephalum crepidioides</i> (Benth.) S.Moore *	Herb
	<i>Cyanthillium cinereum</i> (L.) H.Rob *	Herb
	<i>Eclipta prostrata</i> (L.) L.	Herb
	<i>Emilia sonchifolia</i> (L.) DC. ex DC.	Herb
	<i>Mikania cordata</i> (Burm.f.) B.L.Rob. *	Climber
	<i>M. cordifolia</i> (L.f.) Willd. *	Herb
	<i>Parthenium hysterophorus</i> L. *	Herb
	<i>Sonchus oleraceus</i> (L.) L.	Herb
	<i>Sphagneticola trilobata</i> (L.) Pruski *	Shrub
	<i>Spilanthes acmella</i> (L.) L. *	Herb
	<i>Synedrella nodiflora</i> (L.) Gaertn	Herb
<i>Tridax procumbens</i> (L.) L.	Herb	
Bignoniaceae	<i>Kigelia africana</i> (Lam.) Benth. *	Tree
	<i>Markhamia lutea</i> (Benth.) K.Schum. *	Tree
	<i>Millingtonia hortensis</i> L.f. *	Tree
	<i>Spathodea campanulata</i> P.Beauv	Tree
	<i>Tabebuia aurea</i> (Silva Manso) Benth. &Hook.f. ex S.Moore	Tree
	<i>T. rosea</i> (Bertol.) Bertero ex A.DC.	Tree
	<i>Tecoma stans</i> (L.) Juss. ex Kunth	Shrub
Boraginaceae	<i>Coldenia procumbens</i> L. *	Herb
Cactaceae	<i>Opuntia dillenii</i> (Ker Gawl.) Haw.	Herb
Capparaceae	<i>Cleome viscosa</i> L.	Herb
Caricaceae	<i>Carica papaya</i> L. *	Tree
Combretaceae	<i>Combretum indicum</i> (L.) DeFilipps	Tree
	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Tree
	<i>T. catappa</i> L.	Tree
Commelinaceae	<i>Commelina benghalensis</i> L.	Herb
	<i>C. communis</i> L.*	Herb
	<i>Tradescantia pallida</i> (Rose) D.R.Hunt*	Herb

Table 1 contd.....

Table 1 contd.....

Family	Plant	Habit
	<i>T. spathacea</i> Sw.*	Herb
	<i>T. virginiana</i> L.*	Herb
Convolvulaceae	<i>Evolvulus alsinoides</i> (L.) L.	Herb
	<i>Ipomoea alba</i> L.*	Climber
	<i>I. aquatica</i> Forssk.	Climber
	<i>I. cairica</i> (L.) Sweet *	Climber
	<i>I. eriocarpa</i> R. Br.*	Climber
	<i>I. hederifolia</i> L.	Climber
	<i>I. marginata</i> (Desr.) Verdc.*	Climber
	<i>I. nil</i> (L.) Roth	Climber
	<i>I. obscura</i> (L.) Ker Gawl *	Climber
	<i>Merremia emarginata</i> (Burm. f.) Hallier f.	Herb
	<i>Rivea hypocrateriformis</i> Choisy *	Climber
	<i>Cuscuta chinensis</i> Lam.	Climber
Cucurbitaceae	<i>Benincasa hispida</i> (Thunb.) Cogn *	Climber
	<i>Coccinia grandis</i> (L.) Voigt	Climber
	<i>Citrullus lanatus</i> (Thunb.) Matsum. & Nakai	Herb
	<i>Cucurbita maxima</i> Duchesne	Climber
	<i>Diplocyclos palmatus</i> (L.) C. Jeffrey *	Climber
	<i>Mukia maderaspatana</i> (L.) M. Roem. *	Climber
	<i>Momordica foetida</i> Schumach. *	Climber
Cyperaceae	<i>Cyperus alternifolius</i> L.*	Herb
	<i>C. rotundus</i> L.	Herb
	<i>Fimbristylis aestivalis</i> Vahl	Herb
	<i>F. quinquangularis</i> (Vahl) Kunth*	Herb
Euphorbiaceae	<i>Croton bonplandianus</i> Baill.	Herb
	<i>Euphorbia cyathophora</i> Murray *	Herb
	<i>E. heterophylla</i> L.	Herb
	<i>E. hirta</i> L.	Herb
	<i>E. indica</i> Lam. *	Herb
	<i>E. prostrata</i> Aiton	Herb
	<i>E. pulcherrima</i> Willd. ex Klotzsch *	Shrub
	<i>Jatropha curcas</i> L.	Shrub
	<i>J. gossypifolia</i> L.	Shrub
	<i>Microstachys chamaelea</i> (L.) Müll. Arg.	Herb
	<i>Ricinus communis</i> L.	Shrub
Fabaceae	<i>Acacia auriculata</i> Buch.-Ham. ex Wall. *	Tree
	<i>A. auriculiformis</i> Benth.	Tree
	<i>A. ferruginea</i> DC.	Tree
	<i>A. leucophloea</i> (Roxb.) Willd.	Tree
	<i>A. nilotica</i> (L.) Delile	Tree
	<i>Aeschynomene americana</i> L.*	Tree
	<i>Albizia amara</i> (Roxb.) B. Boivin	Tree
	<i>A. lebbek</i> (L.) Benth.	Tree
	<i>A. saman</i> (Jacq.) Merr.	Tree

Table 1 contd.....

Table 1 contd.....

Family	Plant	Habit
	<i>Bauhinia purpurea</i> L.	Tree
	<i>Butea monosperma</i> (Lam.) Taub. *	Tree
	<i>Caesalpinia pulcherrima</i> (L.) Sw. *	Shrub
	<i>Cassia javanica</i> L. *	Tree
	<i>Clitoria ternatea</i> L.	Climber
	<i>Crotalaria pallida</i> Aiton	Sub shrub
	<i>C.retusa</i> L.	Sub shrub
	<i>C.verrucosa</i> L.	Herb
	<i>Dalbergia latifolia</i> Roxb. *	Tree
	<i>D.sissoo</i> DC.	Tree
	<i>Delonix regia</i> (Hook.) Raf.	Tree
	<i>Desmodium gangeticum</i> (L.) DC.	Herb
	<i>D.scorpiurus</i> (Sw.) Desv. *	Herb
	<i>Enterolobium cyclocarpum</i> (Jacq.) Griseb. *	Tree
	<i>Indigofera linnaei</i> Ali *	Herb
	<i>I.tinctoria</i> L.	Shrub
	<i>I.trita</i> L.f. *	Herb
	<i>Leucaena leucocephala</i> (Lam.) de Wit *	Tree
	<i>Macroptilium lathyroides</i> (L.) Urb. *	Herb
	<i>Mimosa pudica</i> L.	Herb
	<i>M.tenuiflora</i> (Willd.) Poir. *	Herb
	<i>Peltophorum pterocarpum</i> (DC.) K.Heyne	Herb
	<i>Pithecellobium dulce</i> (Roxb.) Benth.	Tree
	<i>Pongamia pinnata</i> (L.) Pierre	Tree
	<i>Prosopis juliflora</i> (Sw.) DC. *	Tree
	<i>P.glandulosa</i> Torr. *	Tree
	<i>Senna occidentalis</i> (L.) Link	Shrub
	<i>S.siamea</i> (Lam.) H.S.Irwin&Barneby	Shrub
	<i>S.sophera</i> (L.) Roxb.	Shrub
	<i>S.spectabilis</i> (DC.) H.S.Irwin&Barneby	Sub shrub
	<i>S.tora</i> L.	Herb
	<i>Sesbania sesban</i> (L.) Merr. *	Shrub
	<i>Tamarindus indica</i> L.	Tree
Hydrocharitaceae	<i>Hydrilla verticillata</i> (L.f.) Royle	Aquatic herb
Lamiaceae	<i>Hyptis suaveolens</i> (L.) Poit. *	Herb
	<i>Leucas aspera</i> (Willd.) Link	Herb
	<i>L.eriostoma</i> Hook.f. *	Herb
	<i>L.lavandulifolia</i> Sm. *	Herb
	<i>L.martinicensis</i> (Jacq.) R.Br. *	Herb
	<i>Ocimum basilicum</i> L. *	Herb
	<i>O.tenuiflorum</i> L. *	Herb
	<i>Tectona grandis</i> L.f. *	Tree
Lecythidaceae	<i>Couroupita guianensis</i> Aubl.	Tree
Loranthaceae	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	Shrub
Lythraceae	<i>Punica granatum</i> L.	Shrub

Table 1 contd.....

Table 1 contd.....

Family	Plant	Habit
Malvaceae	<i>Abelmoschus ficulneus</i> (L.) Wight & Arn. *	Sub shrub
	<i>A. moschatus</i> Medik *	Shrub
	<i>Abutilon hirtum</i> (Lam.) Sweet *	Herb
	<i>A. indicum</i> (L.) Sweet	Shrub
	<i>Ceiba pentandra</i> (L.) Gaertn.	Tree
	<i>Hibiscus lobatus</i> (Murray) Kuntze *	Herb
	<i>H.rosa-sinensis</i> L. *	Shrub
	<i>H.surattensis</i> L. *	Sub shrub
	<i>H.vitifolius</i> L. *	Shrub
	<i>Malvastrum coromandelianum</i> (L.) Garcke	Herb
	<i>Melochia corchorifolia</i> L.	Herb
	<i>Sida acuta</i> Burm.f.	Herb
	<i>S. cordifolia</i> L.	Herb
	<i>S.cordata</i> (Burm.f.) Borss.Waalk.	Herb
	<i>S. rhombifolia</i> L.	Herb
	<i>Triumfetta rhomboidea</i> Jacq. *	Herb
	<i>Urena lobata</i> L.	Herb
	<i>Waltheria indica</i> L.	Herb
Martyniaceae	<i>Martynia annua</i> L.	Shrub
Meliaceae	<i>Azadirachta indica</i> A.Juss.	Tree
	<i>Melia azedarach</i> L. *	Tree
	<i>Swietenia mahagoni</i> (L.) Jacq.	Tree
Menispermaceae	<i>Cocculus hirsutus</i> (L.) W.Theob. *	Climber
	<i>Tinospora sinensis</i> (Lour.) Merr.	Climber
Moraceae	<i>Ficus benghalensis</i> L.	Tree
	<i>Fracemosa</i> L.	Tree
	<i>F.religiosa</i> L	Tree
Moringaceae	<i>Moringa oleifera</i> Lam.	Tree
Muntingiaceae	<i>Muntingia calabura</i> L.	Tree
Myrtaceae	<i>Eucalyptus tereticornis</i> Sm.	Tree
	<i>Psidium guajava</i> L.	Tree
	<i>Syzygium cumini</i> (L.) Skeels	Tree
	<i>S. salicifolium</i> (Wight) J.Graham *	Tree
Nyctaginaceae	<i>Boerhavia chinensis</i> (L.) Rottb.	Herb
	<i>B. diffusa</i> L.	Herb
	<i>B. erecta</i> L. *	Herb
	<i>Bougainvillea spectabilis</i> Willd.	Shrub
	<i>Mirabilis jalapa</i> L. *	Herb
Oleaceae	<i>Nyctanthes arbor-tristis</i> L.	Tree
Onagraceae	<i>Ludwigia perennis</i> L.	Herb
Oxalidaceae	<i>Biophytum sensitivum</i> (L.) DC.	Herb
	<i>Oxalis corniculata</i> L.	Herb
	<i>O.latifolia</i> Kunth *	Herb
Papaveraceae	<i>Argemone mexicana</i> L.	Herb
Passifloraceae	<i>Passiflora foetida</i> L. *	Climber

Table 1 contd.....

Table 1 contd.....

Family	Plant	Habit
Phyllanthaceae	<i>Breynia retusa</i> (Dennst.) Alston *	Shrub
	<i>Flueggea</i> spp. *	Shrub
	<i>Phyllanthus amarus</i> Schumach. &Thonn. *	Herb
	<i>P.debilis</i> Klein ex Willd. *	Herb
	<i>Pemblica</i> L.	Tree
	<i>P.maderaspatensis</i> L. *	Herb
	<i>P.myrtifolius</i> (Wight) Müll.Arg. *	Shrub
	<i>Pniruri</i> L.	Herb
	<i>P.reticulatus</i> Poir.	Shrub
Plantaginaceae	<i>Bacopa monnieri</i> (L.) Wettst.	Herb
Plumbaginaceae	<i>Plumbago zeylanica</i> L.	Herb
Poaceae	<i>Bamboo</i> spp.	Herb
	<i>Chloris barbata</i> Sw.	Herb
	<i>Cynodon dactylon</i> (L.) Pers.	Herb
	<i>Digitaria ciliaris</i> (Retz.) Koeler	Herb
	<i>Eleusine coracana</i> (L.) Gaertn.	Herb
	<i>Eragrostis amabilis</i> (L.) Wight & Arn.	Herb
	<i>Eriochloa procera</i> (Retz.) C.E.Hubb.*	Herb
	<i>Melinis repens</i> (Willd.) Zizka*	Herb
	<i>Paspalidium flavidum</i> (Retz.) A.Camus	Herb
	<i>Saccharum spontaneum</i> L.	Herb
	<i>Setaria pumila</i> (Poir.) Roem. & Schult.	Herb
	<i>S. viridis</i> (L.) P.Beauv*	Herb
	<i>Themeda triandra</i> Forssk.*	Herb
	<i>Tragus racemosus</i> (L.) All.	Herb
Polygonaceae	<i>Persicaria glabra</i> (Willd.) M.Gómez *	Climber
	<i>Phydropiper</i> (L.) Delarbre *	Herb
Pontederiaceae	<i>Eichhornia crassipes</i> (Mart.) Solms	Aquatic herb
Proteaceae	<i>Grevillea robusta</i> A.Cunn. ex R.Br. *	Tree
Rhamnaceae	<i>Ziziphus jujuba</i> Mill.	Tree
	<i>Z.oenopolia</i> (L.) Mill.	Tree
Rubiaceae	<i>Canthium angustifolium</i> Roxb. *	Shrub
	<i>C.coromandelicum</i> (Burm.f.) Alston	Shrub
	<i>Hamelia patens</i> Jacq.	Shrub
	<i>Ixora coccinea</i> L. *	Shrub
	<i>Oldenlandia corymbosa</i> L.	Herb
	<i>Randia aculeata</i> L.	Shrub
	<i>Spermacoce alata</i> Aubl.	Herb
Rutaceae	<i>Citrus medica</i> L. *	Shrub
	<i>C.aurantifolia</i> (Christm. &Panz.) Swingle, J. Wash.	Shrub
	<i>Limonia acidissima</i> Groff *	Tree
	<i>Toddalia asiatica</i> (L.) Lam.	Straggler
Santalaceae	<i>Santalum album</i> L.	Tree
	<i>Viscum album</i> L.	Herb
Sapindaceae	<i>Cardiospermum halicacabum</i> L.	Climber
	<i>C. corindum</i> L. *	Climber

Table 1 contd.....

Table 1 contd.....

Family	Plant	Habit
Sapotaceae	<i>Manilkara zapota</i> (L.) P.Royen	Tree
Solanaceae	<i>Datura metel</i> L.	Shrub
	<i>D.stramonium</i> L.	Shrub
	<i>Lycopersicon hirsutum</i> Dunal*	Herb
	<i>Physalis pruinosa</i> L. *	Herb
	<i>Solanum americanum</i> Mill.	Herb
	<i>S.diphyllum</i> L. *	Herb
	<i>S.violaceum</i> Ortega *	Shrub
	<i>S.melongena</i> L. *	Herb
	<i>S.pimpinellifolium</i> L. *	Herb
	<i>S.seaforthianum</i> Andrews	Herb
	<i>S.sisymbriifolium</i> Lam. *	Herb
	<i>S.torvum</i> Sw.	Shrub
	<i>S.virginianum</i> L. *	Herb
	<i>Withania somnifera</i> (L.) Dunal	Herb
Typhaceae	<i>Typha domingensis</i> Pers.	Herb
Verbenaceae	<i>Stachytarpheta indica</i> (L.) Vahl *	Herb
	<i>Lantana camara</i> L.	Shrub
	<i>Phyla nodiflora</i> (L.) Greene	Herb
Zygophyllaceae	<i>Tribulus terrestris</i> L.	Herb

Dalbergia latifolia, *Ixora coccinea*, *Millingtonia hortensis*, *Tabebuia rosea*, etc. were introduced to the lake as part of afforestation and reforestation programmes which are mostly trees and ornamental plants. The present study also reveals that the herbs dominated the population followed by shrubs and climbers. Gupta (2014) have reported similar results from Asan wetland of Doon valley Uttarakhand. The dominance of herbs and shrubs signifies high rate of anthropogenic disturbances (Gupta, 2014). Many invasive, obnoxious & rampant weeds such as *Ageratina adenophora*, *Chromolaena odorata*, *Parthenium hysterophorus*, *Hyptis suaveolens*, *Prosopis juliflora*, *Mikania* spp etc. have invaded the lake which were not reported earlier. Allelopathic effects of these species retard the growth of other species (Reddy, 2008). Appropriate measures have to be taken for conserving the lake and its rich plant diversity.

Acknowledgments

The authors are grateful to the Chairman, Department of Studies in Botany, University of Mysore for their support and encouragement. We are also thankful to scientists at Kerala Forest Research Institute in helping to identify the plants. Thanks are due for Mr. Royaltata of Forest ecology division, KFRI for helping to map the study area. Thanks are also for Mr. Chiranjeevi, P. for

assisting in writing scientific names.

References

- Bhat, K.G. (2003). Flora of Udipi. Indian Naturalist.
- COP 13. (2018). Wetlands-world's most valuable ecosystem – disappearing three times faster than forests, warns new report, Dubai, United Arab Emirates.
- Dantas, K. J., N. Sasidharan and K. V. Binu (2016). Additions to the angiosperms of the flora of Kannur district, Kerala, India from Aralam wildlife sanctuary. *Annals of Plant Sciences*, **5(07)**: 1381-1388.
- ENVIS centre on Medicinal Plants (2002). Available at http://envis.frlht.org/bot_search
- Flombaum, P. and Osvaldo E. Sala (2012). Effects of plant species traits on ecosystem processes: experiments in the Patagonian steppe. *Ecology*, **93(2)**: 227-234.
- Gamble, J.S. (1931). Flora of the Presidency of Madras. Secretary of State for India; Calcutta.
- Gupta, D.K (2014). Angiospermic diversity of Asan wetland, Doon valley (Uttarakhand). India. *Plant Archives*, **14(1)**: 271-275.
- Kinzig, A.P., C. Perrings, F.S. Chapin, S. Polasky, V.K. Smith, D. Tilman and B.L. Turner (2011). Paying for ecosystem services-promise and peril. *Science*, **334(6056)**: 603-604.
- Mitra, S. and S.K. Mukherjee (2008). Diversity of aquatic and wet land plants of west Dinajpur district, West Bengal Biodiversity impact and assessment (ed. PC.

- Trivedi). Printer Publishers, Jaipur, India, 169-184.
- Paterson, A.H., J.E. Bowers, B.A. Chapman, D.G. Peterson, J. Rong and T.M. Wicker (2004). Comparative genome analysis of monocots and dicots, toward characterization of angiosperm diversity. *Current opinion in biotechnology*, **15(2)**: 120-125.
- Rajashekara, N., S.T. Divakara, Nagabhushan, Nishan Varghese and D.L. Shrishya (2009). Ecological studies on wetland vegetation and their diversity in Kukkarahalli Lake at Mysore, Karnataka. *Asian Jr. of Microbiol. Biotech. Env. Sc.*, **11(2)**: 431-434.
- Ramsar (2018). Global Wetland Outlook: State of the World's Wetlands and their Services to People. Gland, Switzerland: Ramsar Convention Secretariat.
- Rao, B.R.P (2014). The Plant Directory, Anusha Publishers, Hyderabad.
- Rao, R. Raghavendra and B.A. Razi (1974). Flowering Plants of the Mysore University Campus. No. 2. Prasaranga, University of Mysore.
- Reddy, C.S., N. Bagyanarayana, K.N. Reddy and V.S. Raju (2008). Invasive alien flora of India. National Biological Information Infrastructure, U. S Geological Survey, USA.
- Roy, M.B., D. Chatterjee, P.K. Roy and A. Mazumdar (2015). Wetland conservation, management and community education-a review of published paper of 1995-2014. *Eco. Env. & Cons*, **21(4)**: 1769-1777.
- Saldanha, C.J. and S.R. Ramesh (1984). Flora of Karnataka. Vol. 1. Oxford & IBH.
- Sankaran, K.V. and T.A. Suresh (2013). Invasive alien plants in the forests of Asia and the Pacific. RAP Publication .
- Sasidharan, N. (2013). Flowering plants of Kerala: CD-ROM ver 2.0. Kerala Forest Research Institute, Peechi, Kerala.
- Saurola, P. (2008). Monitoring birds of prey in Finland: a summary of methods, trends, and statistical power. *AMBIO: A Journal of the Human Environment*, **37(6)**: 413-419.
- The Plant List. (2013). Version 1.1 Available at <http://www.theplantlist.org/>