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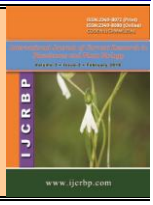

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Floral Diversity of Vaigai River in Thiruppuvanam Region of Sivagangai District, Tamil Nadu, Southern India

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Abstract

The present study includes the enumeration of floral diversity of Vaigai River in Thiruppuvanam region of Sivagangai District, was undertaken for a period of 12 months from May 2014 to April 2015. Totally 106 species belonging to 94 genera distributed among 40 families were recorded. Dicotyledons were represented by 92 species of 80 genera belonging to 35 families. Monocotyledons were 13 species of 13 genera belonging to 4 families. One pteridophyte species was also recorded in the present study. Among dicotyledons, the family Malvaceae (8 species) was the most dominant family. In the case of monocotyledons, Poaceae (7 species) was the dominant one. Among the 40 families listed 17 families were represented by a single genus and a single species. The herbs (59 species) were found to be more in number than shrub (27 species) followed by climber (14 species) and tree (6 species). The present study also revealed that the maximum frequency of plant population (53.448%) was recorded for *Cleome viscosa*. The minimum frequency (1.724%) was recorded for 45 plants. Maximum density of plant population was recorded for *Cleome viscosa* (17.986) and minimum for 21 plants (0.035). The maximum abundance range (21.66) was recorded for *Marsilea quadrifolia* and the minimum abundance (1.00) was recorded for 25 plants.

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Keywords

Abundance
Floral diversity
Thiruppuvanam
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Introduction

The comprehensive studies of the plants growing in a particular area are known as flora. A flora may cover any suitable area from a small patch of forest to a Taluk, City, District, State, Country or even a Continent. Floristic studies may be a simple complied check list or an elaborate analysis of the taxa of that area. As with other parts of India, plants have been studied in Tamil Nadu from ancient times mainly from medicinal, agricultural, ritualistic and other utilitarian points of view. Several botanists have studied the flora of Tamil Nadu and have been able to discover many taxa new to science and also several new records. A Handbook on some South Indian weeds was prepared by Tadulingam and Venkatanarayana (1955). Flora of Presidency of Madras was published by Gamble and Fischer (1957) in 3 volumes. Some considerations on the succession of vegetation around Kodaikanal were published by Meher-Homji (1969). Flora of Tamil Nadu Carnatic was also carried out (Matthew, 1981 – 83). Nair and Henry (1983) published the Flora of Tamil Nadu (Vol. I). Henry et al. (1987 and 1989) published the second and third volume of Flora of Tamilnadu respectively.

Subramanyam and Henry (1959) made a preliminary survey of the flora of Alagar hills, Karandamalais and surrounding regions in Madurai District. Krishnan and

Sri Ganesan (1971) prepared a supplementary list of plants of Alagar hills. Selvaraj (1982) studied the floristic study of Thiruparankundram and its surroundings. Flora of Alagar hill was carried out in detail by Sri Ganesan (1984). Angiospermic flora of Pachalur hills of Dindigul district was documented by Shanmugam et al. (2010). Angiospermic herbaceous plants associated with tea plantations at Maharajanmettu in High Wavy's Mountain of Tamil Nadu were documented by Shanmugam et al. (2015). Balamurugan et al. (2015) reported the plants inhabiting in Vaigai River at Manamadurai region of Sivagangai district, Tamil Nadu. Muthupandi et al. (2015) enumerated the plants present in Vaigai River at Sakkimangalam region of Madurai district, Tamil Nadu.

The investigation about the floristic composition will definitely useful in the utilization of information by non-taxonomists like, ecological consultant, environmental engineers, forest managers, silviculturists, farmers, real estate appraisers, agricultural consultants, landscape architects, plant breeders, plant pathologists, toxicologists, forensic scientists, elementary teachers and others (Morin et al., 1988). Having these facts in mind, here an attempt is made to study the floristic diversity of Vaigai River in Thiruppuvanam region of Sivagangai district in Tamil Nadu.

Materials and methods

Study area

The floral study was conducted in Vaigai River at Thiruppuvanam and its surrounding areas which include T. Pudur, Chellappanendhal and Ladanendhal of Sivagangai district in Tamil Nadu, India. Geographically, the entire area of Thiruppuvanam is lies between 9º 30' N and 9º 42' N latitude and 77º 00' E and 77º 17' E longitude. The altitude of the study area is about 102 m above mean sea level. Temperature is scarcely fluctuates in the year, with the mean monthly minimum and maximum temperatures of 22ºC and 40ºC respectively, and annual rainfall reaches 535 – 800 mm.

Methodology

A Comprehensive and exhaustive study on plants present in Vaigai River at Thiruppuvanam region was undertaken for a period of 12 months from May, 2014 to April, 2015. The known and familiar plants were recorded on the spot in the collection site itself. The unknown and doubtful plants were collected and brought to the laboratory for identification. All the plants were botanically identified by using the regional floras includes Flora of Presidency of Madras, I to III Vols. (Gamble and Fischer, 1957), Flora of Tamil Nadu Carnatic, (Matthew, 1981–83) and An Excursion Flora of Central Tamil Nadu, India (Matthew, 1991). Regarding the habit of the plants recorded during this study, prostate herb, erect herb and herb were included in the category of 'Herb'. Small shrub, sub-shrub and shrub were included in the category of 'Shrub'. Creeper, twiner and climber were mentioned as 'Climber' and small tree and trees as 'Tree'.

Quadrates of 1 sq. m area were laid down in a random manner for the diversity study. Totally, 58 quadrates were included. Various species and the total number of the individuals of each species were noted and the data were considered for statistical analysis. Frequency, density and abundance (per sq. m) of the species noted were calculated using the formula by Sharma (1998).

Results and discussion

Totally 106 species (105 species of 93 genera belonging to 39 families of Angiosperms and one species of the genus belonging to a family of Pteridophyte) belonging to 94 genera distributed among 40 families were recorded. The entire list of the plants recorded in the study area is given in Table 1. Some important plants are featured in Fig. 1. Among these, dicotyledons were represented by 93 species of 81 genera belonging to 35 families and monocotyledons were 13 species of 13 genera belonging to 4 families (Table 2).

Among dicotyledons, Malvaceae was found as dominant and largest family comprising 8 species. Two families (Amaranthaceae and Aizoaceae) shared the second largest family status equally; both were represented by 7 species and considered to be co-dominant families. 4 families were represented by 6 species, 1 family was represented by 4 species, 3 families were comprising 3 species, 9 families were represented by 2 species and the rest of the families by 1 species (Table 2). In the case of monocotyledons, Poaceae was found to be dominant family comprising 7 species followed by Cyperaceae (3 species) and Commelinaceae (2 species). Pontederiaceae was represented by single species only (Table 2). Balamurugan et al. (2015) reported that regarding dicots, Asteraceae, Amaranthaceae, Euphorbiaceae and Fabaceae comprising 5 species of each and in case of monocots, Poaceae with 10 species were found as

dominant families in Vaigai River at Manamadurai region which is adjacent to the present study area. They have documented 83 species belonging to 76 genera distributed among 37 families.

An another study carried out in Vaigai river at Sakkimangalam region of Madurai district by Muthupandi et al. (2015) revealed that totally 171 species belonging to 142 genera distributed among 55 families were recorded. Meanwhile, only 106 species were recorded by the present study. The higher number of species in Sakkimangalam region may be due the presence of Viraganoor Dam near to this area, by which the water is stored and moisture content is maintained for long time, which favors the growth of many species than that of Thiruppuvanam region.

Totally 54 herbs, 13 shrubs, 9 climbers and 7 trees were recorded from Vaigai river at Manamadurai region (Balamurugan et al., 2015) and 77 herbs (76 of angiosperm, 1 of pteridophyte), 37 shrubs, 35 trees and 23 climbers were recorded from Sakkimangalam region (Muthupandi et al., 2015). The present study revealed that herbs (59 species) were found to be more in number than shrubs (27 species) followed by climbers (14 species) and trees (6 species) (Table 1).

Table 1. List of the plants recorded in the study area with their family and habit.

S. No.	Botanical name	Family	Habit
1	*Abelmoschus setinervis* Dunn	Malvaceae	Shrub
2	*Abrus precatorius* L. ssp. *precatorius*	Fabaceae	Climber
3	*Abutilon indicum* (L.) Sweet ssp. *indicum*	Malvaceae	Shrub
4	*Acalypha indica* L.	Euphorbiaceae	Herb
5	*Achyranthes aspera* L.	Amaranthaceae	Shrub
6	*Aerva lanata* (L.) Juss.	Amaranthaceae	Herb
7	*Alternanthera sessilis* (L.) R.Br. ex Dc.	Amaranthaceae	Herb
8	*Alysicarpus rugosus* (Willd.) DC.	Fabaceae	Herb
9	*Amaranthus spinosus* L.	Amaranthaceae	Herb
10	*Ammania baccifera* L.	Lythraceae	Herb
11	*Annona squamosa* L.	Annonaceae	Tree
12	*Argemone mexicana* L.	Papaveraceae	Herb
13	*Asystasia gangetica* (L.) T.Anderson	Acanthaceae	Shrub
14	*Azadirachta indica* Adr. Juss	Meliaceae	Tree
15	*Baccopa monnieri* (L.) Pennell	Scrophulariaceae	Herb
16	*Bambusa arundinacea* (Retz.) Willd.	Poaceae	Herb
17	*Boerhavia diffusa* L.	Nyctaginaceae	Herb
18	*Boerhavia erecta* L.	Nyctaginaceae	Herb
19	*Calotropis gigantea* (L.) R.Br.	Asclepiadaceae	Shrub
20	*Cardiospermum halicacabum* L.	Sapindaceae	Climber
21	*Canavalia virosa* (Roxb.) Wight & Arn.	Fabaceae	Climber
22	*Celosia cristata* L. Kuntze	Amaranthaceae	Shrub
23	*Chromolaena odorata* L.	Asteraceae	Shrub
24	*Cissus setosa* Wallich	Vitaceae	Climber
25	*Citrullus colocynthis* (L.) Schader	Cucurbitaceae	Climber
26	*Chloris barbata* Sw.	Poaceae	Herb
27	*Cleome viscosa* L.	Capparidaceae	Herb
28	*Coccinia grandis* (L.) J.Voigt	Cucurbitaceae	Climber
29	*Commelina benghalensis* L.	Commelinaceae	Herb
30	*Corchorus trilocularis* L.	Tiliaceae	Shrub
31	*Croton bonplandianus* Baillon	Euphorbiaceae	Shrub
32	*Cucumis melo* L.	Cucurbitaceae	Climber
33	*Cynodon dactylon* (L.) Pers.	Poaceae	Herb
34	*Cyanotis arachnoidea* C.B. Clarke	Commelinaceae	Herb
35	*Cyperus rotundus* L.	Cyperaceae	Herb
36	*Datura metel* L.	Solanaceae	Shrub
37	*Dipterocanthus patulus* (Jacq.) Nees	Acanthaceae	Herb

S. No.	Botanical name	Family	Habit
38	*Eclipta prostrata* (L.) L.	Asteraceae	Herb
39	*Eichhornia crassipes* (C. Martius) Salms-Laub	Pontederiaceae	Herb
40	*Eragrostis unioloides* Steudel	Poaceae	Herb
41	*Euphorbia hirta* L.	Euphorbiaceae	Herb
42	*Ficus religiosa* L.	Moraceae	Tree
43	*Fimbristylis eragrostis* (Nees) Hance	Cyperaceae	Herb
44	*Glinus lotoides* L.	Aizoaceae	Herb
45	*Glinus oppositifolius* (L.) DC.	Aizoaceae	Herb
46	*Gomphrena celosiodes* C. Martius	Amaranthaceae	Herb
47	*Heliotropium indicum* L.	Boraginaceae	Herb
48	*Hibiscus micranthus* L.f.	Malvaceae	Shrub
49	*Hibiscus vitifolius* L.	Malvaceae	Shrub
50	*Hybanthus enneaspermus* (L.) F.Muell	Violaceae	Herb
51	*Indigofera linnaei* Ali.	Fabaceae	Herb
52	*Ipomoea carnea* Jacq. ssp. *fistulosa* (Choisy) D. Austin	Convolvulaceae	Shrub
53	*Ipomoea pes–tigridis* L.	Convolvulaceae	Climber
54	*Justicia tranquebariensis* L.f.	Acanthaceae	Shrub
55	*Lantana camara* L.	Verbenaceae	Shrub
56	*Leonotis nepetiifolia* (L.) R.Br.	Lamiaceae	Herb
57	*Leucaena leucocephala* (Lam.) de Wit	Mimosaceae	Tree
58	*Leucas aspera* (Willd.) Link	Lamiaceae	Herb
59	*Luffa cylindrica* (L.) M. Roemer	Cucurbitaceae	Climber
60	*Marsilea quardrifolia* L.	Marsiliaceae	Herb
61	*Mollugo cerviana* (L.) Ser. var. *spathulifolia* Fenzc	Aizoaceae	Herb
62	*Mollugo nudicaulis* Lam.	Aizoaceae	Herb
63	*Mollugo pentaphylla* L.	Aizoaceae	Herb
64	*Ocimum canum* Sims	Lamiaceae	Herb
65	*Oldenlandia umbellata* L.	Rubiaceae	Herb
66	*Opuntia dillenii* (Ker Gawler) Haw.	Cactaceae	Shrub
67	*Oxystelma esculentum* (L.f.) R.Br. ex. Schultes	Asclepiadaceae	Climber
68	*Panicum repens* L.	Poaceae	Herb
69	*Parthenium hysterophorus* L.	Asteraceae	Herb
70	*Passiflora edulis* Sims	Passifloraceae	Climber
71	*Passiflora foetida* L.	Passifloraceae	Climber
72	*Pedalium murex* L.	Pedaliaceae	Herb
73	*Peristophe paniculata* (Forsskal) Brummit.	Acanthaceae	Herb
74	*Pergularia daemia* (Forsskal) Chiov.	Asclepiadaceae	Climber
75	*Phaseolus trilobus* auct.non L.	Fabaceae	Herb
76	*Phyla nodiflora* (L.) E.Greene	Verbenaceae	Herb
77	*Phyllanthus amarus* Schum & Thonn.	Euphorbiaceae	Herb
78	*Phyllanthus maderaspatensis* L.	Euphorbiaceae	Herb
79	*Physalis minima* L.	Solanaceae	Shrub
80	*Pithecellobium dulce* (Roxb.) Benth.	Mimosaceae	Tree
81	*Portulaca oleracea* Willd.	Portulacaceae	Shrub
82	*Prosopis juliflora* (Sw.) DC.	Mimosaceae	Tree
83	*Pupalia lappacea* (L.) A.L. Juss. var. *lappacea*	Amaranthaceae	Herb
84	*Ricinus communis* (L.) Nees	Euphorbiaceae	Shrub
85	*Rungia repens* (L.) Nees	Acanthaceae	Herb
86	*Ruellia tuberosa* L.	Acanthaceae	Herb
87	*Saccharum spontaneum* L.	Poaceae	Shrub
88	*Scirpus grossus* L.f.	Cyperaceae	Herb
89	*Scoparia dulcis* L.	Scrophulariaceae	Herb

S. No.	Botanical name	Family	Habit
90	*Setaria italica* (L.) P. Beauv.	Poaceae	Herb
91	*Sida acuta* Burm. f.	Malvaceae	Shrub
92	*Sida cordata* L.	Malvaceae	Shrub
93	*Sida cordifolia* L.	Malvaceae	Shrub
94	*Sida rhombifolia* L.	Malvaceae	Shrub
95	*Spermacoce hispida* L.	Rubiaceae	Herb
96	*Streblus asper* Lour.	Moraceae	Shrub
97	*Tephrosia purpurea* (L.) Pers.	Fabaceae	Shrub
98	*Tinospora cordifolia* Hook.f. & Thomson	Menispermaceae	Climber
99	*Trianthema decandra* L.	Aizoaceae	Herb
100	*Trianthema portulacastrum* L.	Aizoaceae	Herb
101	*Tribulus terrestris* L.	Zygophyllaceae	Herb
102	*Trichodesma indicum* (L.) R.Br.	Boraginaceae	Herb
103	*Tridax procumbens* L.	Asteraceae	Herb
104	*Vernonia cinerea* (L.) Less.	Asteraceae	Herb
105	*Waltheria indica* L.	Sterculiaceae	Shrub
106	*Xanthium indicum* J. Koenig	Asteraceae	Herb

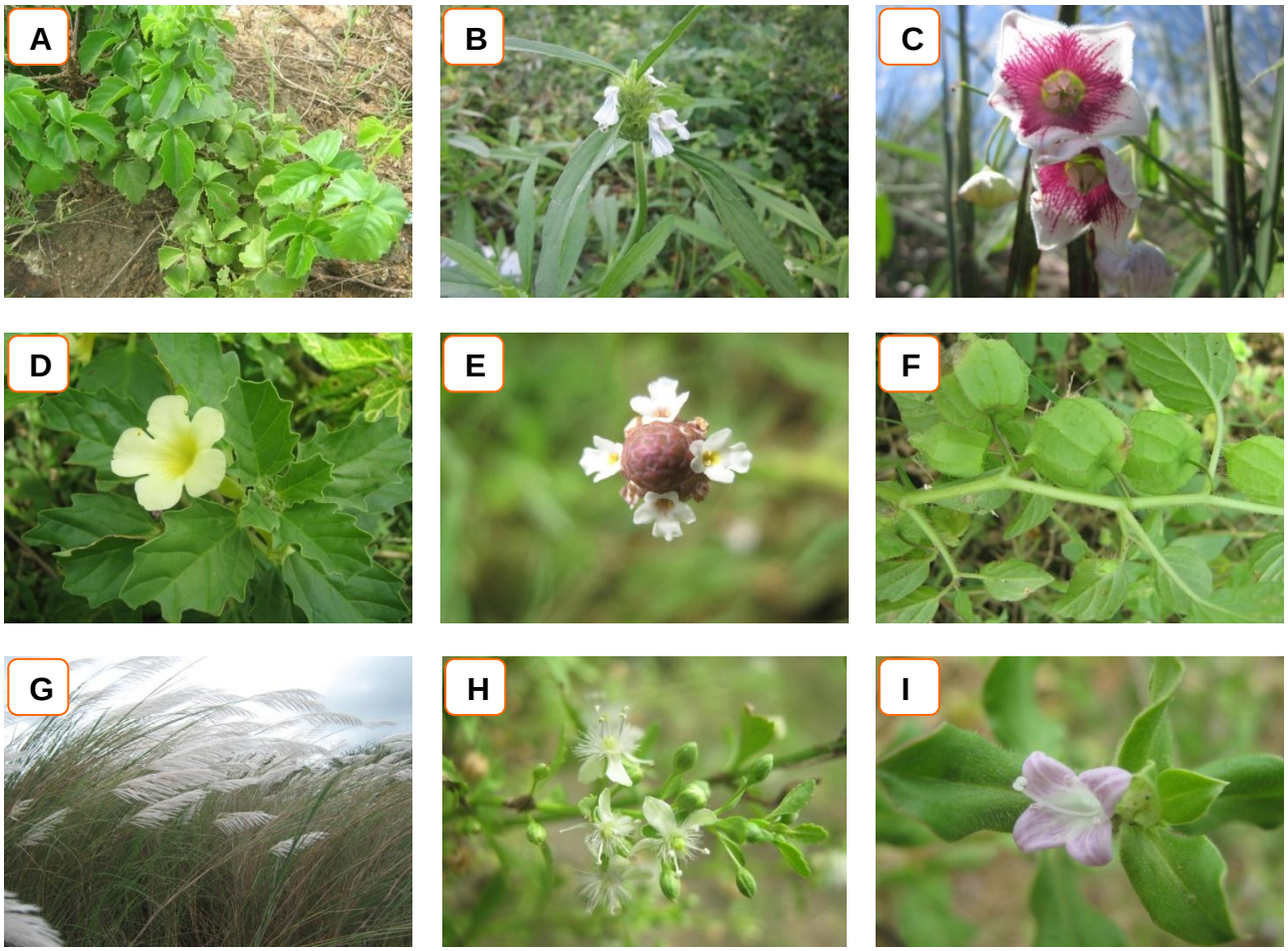

Fig. 1: Some important plants recorded during the survey. (A) *Cissus setosa,* (B) *Leucas aspera,* (C) *Oxystelma esculentum,* (D) *Pedalium murex,* (E) *Phyla nodiflora,* (F) *Physalis minima,* (G) *Saccharum spontaneum,* (H) *Scoparia dulcis* and (I) *Spermacoce hispida*.

Table 2. List of families of the plants with number of genera and species.

S. No.	Family name	No. of genera	No. of species
1	Acanthaceae	6	6
2	Aizoaceae	3	7
3	Amaranthaceae	7	7
4	Asteraceae	1	1
5	Asclepiadaceae	3	3
6	Asteraceae	6	6
7	Boraginaceae	2	2
8	Cactaceae	1	1
9	Capparidaceae	1	1
10	Commelinaceae*	2	2
11	Convolvulaceae	1	2
12	Cucurbitaceae	4	4
13	Cyperaceae*	3	3
14	Euphorbiaceae	5	6
15	Fabaceae	6	6
16	Lamiaceae	3	3
17	Lythraceae	1	1
18	Malvaceae	4	8
19	Marsiliaceae†	1	1
20	Meliaceae	1	1
21	Menispermaceae	1	1
22	Mimosaceae	3	3
23	Moraceae	2	2
24	Nyctaginaceae	1	2
25	Papaveraceae	1	1
26	Passifloraceae	1	2
27	Pedaliaceae	1	1
28	Poaceae*	7	7
29	Pontederiaceae*	1	1
30	Portulacaceae	1	1
31	Rubiaceae	2	2
32	Sapindaceae	1	1
33	Scrophulariaceae	2	2
34	Solanaceae	2	2
35	Sterculiaceae	1	1
36	Tiliaceae	1	1
37	Verbenaceae	2	2
38	Violaceae	1	1
39	Vitaceae	1	1
40	Zygophyllaceae	1	1

*Monocot; † Pteridophyte; Others – Dicotyledons.

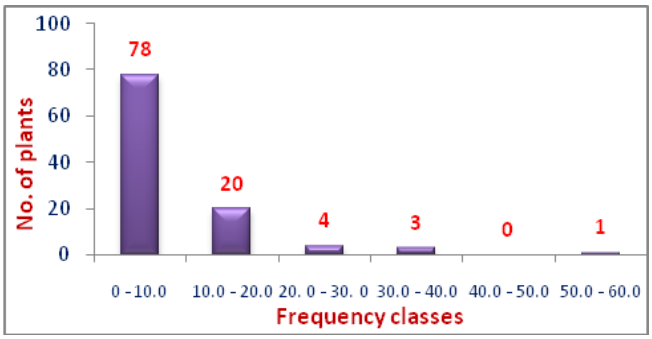

Fig. 2: Number of plants in different frequency classes.

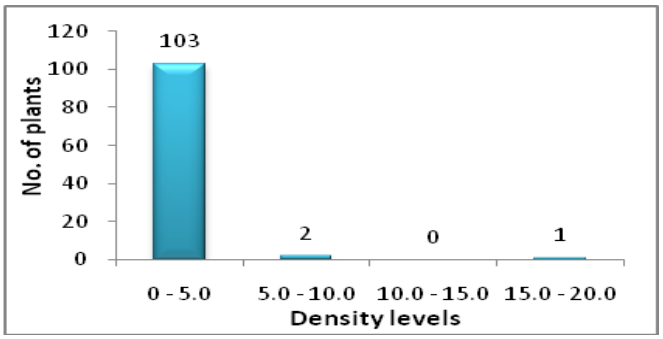

Fig. 3: Number of plants in different density levels.

In the case of dicotyledons, among 93 species recorded 59 species were found to be herbs, 14 species were found to be shrubs, 14 species were found to be climbers and 6 species were trees. Among monocots, 11 were herbs, 1 was shrub and 1 was tree. Regarding the trees found in the Vaigai River, *Annona squamosa*, *Azadirachta indica*, *Bambusa arundinacea*, *Ficus religiosa*, *Leucaena leucocephala*, *Pithecellobium dulce* and *Prosopis juliflora* are being in seedling stage as their mature trees are present in the river bank. *Prosopis juliflora* is being in mature stage also.

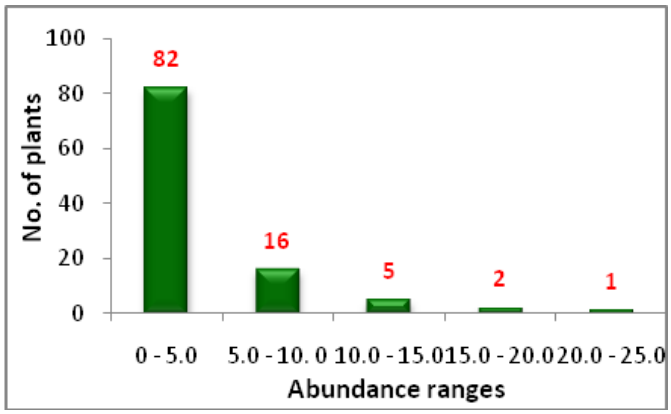

Fig. 4: Number of plants in different abundance ranges.

From the present investigation it was found that, among 106 plants recorded, about 78, 20, 4, 3 and 1 number of species were recorded at 0–10.0, 10.0–20.0, 20.0–30.0, 30.0–40.0 and 50.0–60.0% of frequency range respectively (Fig. 2). The maximum frequency of plant population (53.448%) was recorded for *Cleome viscosa* followed by *Cynodon dactylon* (36.206%). The minimum frequency (1.724%) was recorded for 45 plants (Table 3). Balamurugan (2012) stated that maximum frequency (69.23%) was recorded for *Cynodon dactylon* followed by *Oldenlandia umbellata* (53.84%), *Prosopis juliflora* (50%) and *Eragrostis unioloides* (42.30%) and minimum frequency (3.84%) was recorded for 39 plants. It was also found that the density of the plant species varied considerably. Maximum density of plant population was recorded for *Cleome viscosa* (17.986) and minimum for 21 plants (0.035). 103, 2, and 1 number of plants were recorded at 0 – 5.0, 5.0 – 10.0 and 15.0 – 20.0 density level respectively (Fig. 3). Regarding abundance, about 82, 16, 5, 2 and 1 number of species were recorded at 0 – 5.0, 5.0 – 10.0, 10.0 – 15.0, 15.0 – 20.0 and 20.0 – 25.0 of abundance range respectively (Fig. 4). The maximum abundance range (21.66) was recorded for *Marsilea quadrifolia* and the minimum abundance (1.00) was recorded for 25 plants (Table 3).

Table 3. Plants with their frequency, density and abundance.

S. No	Botanical name	Frequency	Density	Abundance
1	*Abelmoschus setinervis* Dunn	0.724	0.107	3.0
2	*Abrus precatorius* L. ssp. *Precatorius*	0 .724	0.071	2.0
3	*Abutilon indicum* (L.) Sweet ssp. *Indicum*	5.172	0.322	3.0
4	*Acalypha indica* L.	22.413	2.794	6.0
5	*Achyranthes aspera* L.	3.448	0.143	2.0
6	*Aerva lanata* (L.) Juss.	1.724	0.107	3.0
7	*Alternanthera sessilis* (L.) R.Br. ex Dc.	22.413	1.469	3.15
8	*Alysicarpus rugosus* (Willd.) DC.	1.724	0.107	3.0
9	*Amaranthus spinosus* L.	5.172	0.250	2.333
10	*Ammania baccifera* L.	6.896	0.394	2.75
11	*Annona squamosa* L.	1.724	0.071	2.0
12	*Argemone mexicana* L.	1.724	0.107	3.0
13	*Asystasia gangetica* (L.) T.Anderson	1.724	0.107	3.0
14	*Azadirachta indica* Adr. Juss	6.896	0.895	6.25
15	*Baccopa monnieri* (L.) Pennell	3.448	0.537	7.5
16	*Bambusa arundinacea* (Retz.) Willd.	5.172	0.358	3.333
17	*Boerhavia diffusa* L.	13.793	0.859	3.0
18	*Boerhavia erecta* L.	15.519	4.836	15
19	*Calotropis gigantea* (L.) R.Br.	13.793	0.286	1.0
20	*Cardiospermum halicacabum* L.	3.448	0.143	2.0
21	*Canavalia virosa* (Roxb.) Wight & Arn.	1.724	0.035	1.0
22	*Celosia cristata* L. Kuntze	1.724	0.143	4.0
23	*Chromolaena odorata* L.	1.724	0.035	1.0
24	*Cissus setosa* Wallich	6.896	0.394	2.75
25	*Citrullus colocynthis* (L.) Schader	12.068	1.218	4.85
26	*Chloris barbata* Sw.	53.448	17.986	16.19

S. No	Botanical name	Frequency	Density	Abundance
27	*Cleome viscosa* L.	10.344	0.286	1.33
28	*Coccinia grandis* (L.) J.Voigt	3.448	0.143	2.0
29	*Commelina benghalensis* L.	3.448	0.107	1.5
30	*Corchorus trilocularis* L.	0.448	1.218	5.66
31	*Croton bonplandianus* Baillon	1.724	0.035	1.0
32	*Cucumis melo* L.	36.206	9.278	12.33
33	*Cynodon dactylon* (L.) Pers.	1.724	0.035	1.0
34	*Cyanotis arachnoidea* C.B. Clarke	10.344	2.973	13.83
35	*Cyperus rotundus* L.	3.448	0.071	1.0
36	*Datura metel* L.	1.724	0.179	5.0
37	*Diptercanthus patulus* (Jacq.) Nees	17.241	3.332	9.3
38	*Eclipta prostrata* (L.) L.	1.724	0.609	17
39	*Eichhornia crassipes* (C. Martius) Salms-Laub	0.244	2.651	12.33
40	*Eragrostis unioloides* Steudel	13.793	1.361	4.75
41	*Euphorbia hirta* L.	1.724	0.035	1.0
42	*Ficus religiosa* L.	6.896	1.003	7.0
43	*Fimbristylis eragrostis* (Nees) Hance	1.724	0.035	1.0
44	*Glinus lotoides* L.	1.724	0.071	2.0
45	*Glinus oppositifolius* (L.) DC.	3.448	0.286	4.0
46	*Gomphrena celosiodes* C. Martius	1.724	0.035	1.0
47	*Heliotropium indicum* L.	1.724	0.035	1.0
48	*Hibiscus micranthus* L.f.	5.172	0.322	3.0
49	*Hibiscus vitifolius* L.	1.724	0.035	1.0
50	*Hybanthus enneaspermus* (L.) F.Muell	1.724	0.071	2.0
51	*Indigofera linnaei* Ali.	6.896	0.358	2.5
52	*Ipomoea carnea* Jacq. ssp. *fistulosa* (Choisy) D. Austin	1.724	0.035	1.0
53	*Ipomoea pes–tigridis* L.	0.344	0.429	2.0
54	*Justicia tranquebariensis* L.f.	1.724	0.035	1.0
55	*Lantana camara* L.	1.724	0.250	7.0
56	*Leonotis nepetiifolia* (L.) R.Br.	1.724	0.250	7.0
57	*Leucaena leucocephala* (Lam.) de Wit	1.724	0.035	1.0
58	*Leucas aspera* (Willd.) Link	6.896	0.143	1.0
59	*Luffa cylindrica* (L.) M. Roemer	5.172	2.328	21.66
60	*Marsilea quardrifolia* L.	6.896	0.931	6.5
61	*Mollugo cerviana* (L.) Ser. var. *spathulifolia* Fenzc	6.896	2.221	4.76
62	*Mollugo nudicaulis* Lam.	22.413	2.543	4.73
63	*Mollugo pentaphylla* L.	1.724	0.071	2.0
64	*Ocimum canum* Sims	8.620	0.609	3.4
65	*Oldenlandia umbellata* L.	1.724	0.107	3.0
66	*Opuntia dillenii* (Ker Gawler) Haw.	1.724	0.035	1.0
67	*Oxystelma esculentum* (L.f.) R.Br. ex. Schultes	10.344	1.719	8.0
68	*Panicum repens* L.	31.034	4.192	6.5
69	*Parthenium hysterophorus* L.	1.724	0.035	1.0
70	*Passiflora edulis* Sims	8.620	0.214	1.2
71	*Passiflora foetida* L.	1.724	0.179	5.0
72	*Pedalium murex* L.	5.172	0.358	3.33
73	*Peristophe paniculata* (Forsskal) Brummit.	10.344	0.214	1.0
74	*Pergularia daemia* (Forsskal) Chiov.	1.724	0.035	1.0
75	*Phaseolus trilobus* auct.non L.	15.517	2.50	7.77
76	*Phyla nodiflora* (L.) E.Greene	10.344	1.182	5.5
77	*Phyllanthus amarus* Schum & Thonn.	8.620	0.573	3.2
78	*Phyllanthus maderaspatensis* L.	5.172	0.179	1.66
79	*Physalis minima* L.	3.448	0.107	1.5
80	*Pithecellobium dulce* (Roxb.) Benth.	10.344	0.102	19.5
81	*Portulaca oleracea* Willd.	17.241	0.967	2.7
82	*Prosopis juliflora* (Sw.) DC.	1.724	0.035	1.0

S. No	Botanical name	Frequency	Density	Abundance
83	*Pupalia lappacea* (L.) A.L. Juss. var. *lappacea*	3.448	0.107	1.5
84	*Ricinus communis* (L.) Nees	1.724	0.035	1.0
85	*Rungia repens* (L.) Nees	1.724	0.035	1.0
86	*Ruellia tuberosa* L.	32.758	7.703	11.31
87	*Saccharum spontaneum* L.	1.724	0.322	9.0
88	*Scirpus grossus* L.f.	3.448	0.214	3.0
89	*Scoparia dulcis* L.	1.724	0.250	7.0
90	*Setaria italica* (L.) P. Beauv.	3.448	0.143	2.0
91	*Sida acuta* Burm. f.	1.724	0.035	1.0
92	*Sida cordata* L.	1.724	0.035	1.0
93	*Sida cordifolia* L.	6.896	0.358	2.5
94	*Sida rhombifolia* L.	5.172	0.179	1.66
95	*Spermacoce hispida* L.	1.724	0.071	2.0
96	*Streblus asper* Lour.	1.724	0.107	3.0
97	*Tephrosia purpurea* (L.) Pers.	5.172	0.250	2.33
98	*Tinospora cordifolia* Hook.f. & Thomson	1.724	0.609	17
99	*Trianthema decandra* L.	8.620	0.501	2.8
100	*Trianthema portulacastrum* L.	13.793	1.683	5.87
101	*Tribulus terrestris* L.	3.448	0.107	1.5
102	*Trichodesma indicum* (L.) R.Br.	10.344	1.003	4.66
103	*Tridax procumbens* L.	1.724	0.071	2.0
104	*Vernonia cinerea* (L.) Less.	1.724	0.035	1.0
105	*Waltheria indica* L.	18.965	0.931	2.36
106	*Xanthium indicum* J. Koenig	1.724	0.107	3.0

Conclusion

In the present study, totally 106 species belonging to 94 genera distributed among 40 families were recorded. Among dicotyledons, Malvaceae was the dominant family comprising 8 species whereas, Poaceae was found to be dominant family in monocotyledons. The herbs were found to be more in number than shrubs. The plant population frequency was higher for *Cleome viscosa* (53.448%) followed by *Cynodon dactylon* (36.206%). The density of the plant species enumerated in the study varied considerably. Further studies are required to be carried out to explore the entire floral wealth of Vaigai River and conservation strategies must be created on plants available with less frequency. Otherwise there may a possibility of the extinction of any particular plant species.

Conflict of interest statement

Authors declare that they have no conflict of interest.

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References

Balamurugan, S., 2012. Floral diversity of Vaigai River and their utilization as medicine in Manamadurai region of Sivagangai district in Tamil Nadu. M.Sc., Dissertation, Thiagarajar College, Madurai, Tamil Nadu.

Balamurugan, S., Shanmugam, S., Muthupandi, C.P., Suresh, K., Rajendran, K., 2015. Floral diversity of Vaigai river in Manamadurai region of Sivagangai district in Tamil Nadu, Southern India. In: Biodiversity & Evaluation – Perspective and Paradigm shifts. Department of Zoology, Sree Sankara College, Kalady, Kerala. pp. 217-219.

Gamble, J.S., Fischer, C.E.C., 1957. The Flora of the Presidency of Madras. Vols. I–III, Botanical survey of India, Kolkata.

Henry, A.N., Chitra, V., Balakrishnan, N.P., 1989. Flora of Tamil Nadu, India, Series–I, Analysis Volume III, Botanical Survey of India, Southern Circle, Coimbatore.

Henry, A.N., Kumari, G.R., Chitra, V., 1987. Flora of Tamil Nadu, India, Series–I, Analysis Volume II, Botanical Survey of India, Southern Circle, Coimbatore.

Krishnan, S., Sri Ganesan, T., 1971. Flora of Alagar Hills. Suppl. List. J. Madurai Univer. 3(1), 50-53.

Matthew, K.M., 1981 – 83. Flora of Tamil Nadu Carnatic. The Rapinat Herbarium, St. Joseph's College, Tiruchirapalli, Tamil Nadu. India.

Matthew, K.M., 1991. An Excursion Flora of Central Tamil Nadu. Oxford – IBH Publishing Co. Pvt. Ltd., New Delhi. India.

Meher–Homji, V.M., 1969. Some considerations on the succession on vegetation around Kodaikanal. J. Indian Bot. Soc. 48, 43-52.

Muthupandi, C. P., Shanmugam, S., Balamurugan, S., Rajendran, K., 2015. Floral diversity of Vaigai river in Sakkimangalam region of Madurai district in Tamil Nadu, Southern India. In: Biodiversity & Evaluation – Perspective and Paradigm shifts. Department of Zoology, Sree Sankara College, Kalady, Kerala. pp. 233-236.

Nair, N.C., Henry, A.N., 1983. Flora of Tamil Nadu, India, Series–I, Analysis volume I, Botanical survey of India, Southern Circle, Coimbatore.

Selvaraj, A., 1982. A Floristic Study of Thirupparankundram and its surroundings. M.Sc. Dissertation, Thiagarajar College, Madurai, Tamil Nadu, India.

Shanmugam, S., Selvakumar, P., Mohan, S., Dinesh Kumar, G., Rajendran, K., 2010. Angiospermic flora of Pachalur hills in Dindigul district of Tamil Nadu, India – A Checklist. J. Phytol. Res. 23(2), 223-238.

Shanmugam, S., Raja, B., Balamurugan, S., Muthupandi, C.P., Rajendran, K., 2015. Angiospermic herbaceous plants associated with tea plantations at Maharajanmettu in High Wavy's Mountain of Tamil Nadu, India. In: Biodiversity & Evaluation – Perspective and Paradigm shifts. Department of Zoology, Sree Sankara College, Kalady, Kerala. pp. 214-216.

Sharma, P.D., 1998. Ecology and Environment, Rastogi Publication, Meerut. India.

Sri Ganesan, T., 1984. Flora of Alagar Hills. Ph.D. Thesis, Madurai Kamaraj University, Madurai, Tamil Nadu, India.

Subramaniyam, K., Henry, A.N., 1959. A Contribution to the flora of Alagar hills, Karandamalais and surrounding regions in Madurai District, Madras State. J. Indian Bot. Soc. 38, 492-527.

Tadulingam, C., Venkatanarayana, G., 1955. A Hand book of some South Indian Weeds. Govt. Press, Madras.

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