

A Preliminary Survey of Angiospermic Diversity of Thirukudder Hills in Madurai District, Tamil Nadu, India

P. Packiaraj^{1,*}, R. Ramar¹, M. Premkumar², K. Suresh¹, S. Gopala Krishnan¹

¹PG and Research Centre, Department of Botany, Saraswathi Narayanan College (Autonomous), India

²Botanical Survey of India, Southern Regional Centre, TNAU Campus, India

Received January 9, 2023; Revised April 27, 2023; Accepted May 18, 2023

Cite This Paper in the Following Citation Styles

(a): [1] P. Packiaraj, R. Ramar, M. Premkumar, K. Suresh, S. Gopala Krishnan, "A Preliminary Survey of Angiospermic Diversity of Thirukudder Hills in Madurai District, Tamil Nadu, India," *Universal Journal of Plant Science*, Vol. 10, No. 2, pp. 39 - 49, 2023. DOI: 10.13189/ujps.2023.100201.

(b): P. Packiaraj, R. Ramar, M. Premkumar, K. Suresh, S. Gopala Krishnan (2023). A Preliminary Survey of Angiospermic Diversity of Thirukudder Hills in Madurai District, Tamil Nadu, India. *Universal Journal of Plant Science*, 10(2), 39 - 49. DOI: 10.13189/ujps.2023.100201.

Copyright©2023 by authors, all rights reserved. Authors agree that this article remains permanently open access under the terms of the Creative Commons Attribution License 4.0 International License

Abstract The floristic checklists of particular regions serve as the primary sources for botanical information. The variations in floristic compositions in different endogenous environments reflect the existence of various ecological conditions that promote both inter and intra-specific variation, rendering floristic composition a significant floristic marker. So the current study is representing a qualitative assessment of the Angiosperm flora in the Thirukudder hills in Thiruparankundram, Madurai District, Tamil Nadu. During this floral exploration, a total of 264 species from 59 families and 202 genera were documented. Among these, 103 species under 78 genera and 28 families from Polypetalae group, 69 genera, 88 species and 17 families from Gamopetalae, 40 species, 27 genera, and 7 families from Monochlamydeae, and 33 species, 28 genera, and 7 families of Monocotyledons were recorded. Herbs emerged as the most frequently observed plant growth forms, followed by shrubs, trees, and climbers. The research site preserves a wide variety of plants, especially a greater proportion of native flora. Furthermore, weeds such as *Acanthospermum hispidum*, *Blainvillea acmella*, *Chromolaena odorata*, *Parthenium hysterophorus*, *Synedrella nodiflora*, *Pentanema indicum*, *Lantana camara*, *Mimosa pudica*, and *Ludwigia octovalvis* prevailed. Our findings indicate that a considerable number of different species exist in the studied area, along with a few alien species that have spread rapidly. Therefore, more

research is required and strategies for safeguarding rare plants must be developed. If not, there is a chance that particular plant species may vanish. It is a matter of great concern for the researchers and environmentalists to conserve nature and indigenous knowledge of local inhabitants for human welfare.

Keywords Madurai District, Thirukudder Hills, Qualitative Assessment, Angiosperms

1. Introduction

The diversity of plants is critical for maintaining ecosystems and preserving biodiversity [1]. The plant wealth of a country is its pride and acquiring information of flora and vegetation is of immense scientific and commercial importance, such as providing food, medicines, and raw materials for many industries [2]. For the conservation of biodiversity and long-term viability of ecosystems, it is essential to be acquainted with naturally occurring plant species. The species lists, which provide information essential to understanding the diversity and distribution of species. Such data have been used to study the taxonomy and biogeography of species for hundreds of years [3].

In Madurai district, regional floristic diversity has already been explored by various researchers [4-10]. Even though, just a few studies have examined the floristic composition of the studied districts, and there are still many parts of the area to be explored. Therefore, it is crucial to record the plants that are present before they go entirely. The current research attempts are to conduct a floristic assessment of Thirukudder Hill in Thiruparankundram, Madurai, with special reference to Angiospermic flora.

The ultimate aim of this research was to provide the basis for thorough further studies on the indigenous species of Thirukudder hills.

2. Materials and Methods

2.1. Description of Study Area

The present research adapted to the survey of plant diversity of Angiosperms was undertaken in the Thirukudder hills (Latitude 98.88545 and Longitude 78.08231), which are situated in Thiruparankundram of Madurai District, Tamil Nadu. The study site is situated in the southeastern part of Thiruparankundram. The Arulmigu Kattikulam Soottokkole Mayandi Swamy temple is situated in the foothill of north region, and Mottaiyarasu temple is found on the north side. The temperature scarcely fluctuates during the study periods, with the mean monthly minimum and maximum temperatures of 22°C and 40°C respectively, and annual rainfall reaches 535 – 800 mm.

2.2. Specimens Collection and Identification

The explorations of Angiospermic flora were conducted through frequent field visits from January 2019 to September 2022, covering all seasons. The collected specimens were identified by using regional floras with standard keys and descriptions [11-13]. The checklist was compiled according to Benthem and Hooker system of classification [14], with some necessary alterations [15-19].

In relation to the habit of the plants observed during this study, prostrate herbs, erect herbs and herbs were all considered as 'Herb'. Small shrubs and shrubs were included in the category of 'Shrub'. Vines, twiners, stragglers and climbers were mentioned as 'Climber' and small trees and trees – as 'Tree'.

The voucher specimens are kept in the Meenakshi Herbarium (SN-MH) at the Department of Botany, Saraswathi Narayanan College, Madurai.

3. Results and Discussion

In this floral exploration, a total of 264 species from 59

families and 202 genera (Table 1), were documented from the Thirukudder hill. In Polypetalae, 103 species under 78 genera among 28 families were noted (Table 2). Sixty-nine genera and 88 species from 17 families were reported under Gamopetalae (Table 3); 40 species belonging to 27 genera distributed in 7 families of Monochlamydeae (Table 4), and 33 species, 28 genera and 7 families of Monocotyledons (Table 5) were found.

In Polypetalae, Fabaceae (29 species) is the most species-rich family, followed by Malvaceae (16 species), Capparaceae (9 species), Aizoaceae and Mimosaceae with 6 species, 5 species in Cucurbitaceae, 3 in Cactaceae with the remaining were monospecific families. Acanthaceae is the foremost family in Gamopetalae, with 18 species, followed by Asteraceae (11 species), Apocynaceae and Lamiaceae (9), Rubiaceae (8), Convolvulaceae (6), Asclepiadaceae, Boraginaceae, Solanaceae, and Verbenaceae (4 species each), Orobanchaceae (3 species), and Plantaginaceae and Pedaliaceae (2); other families had only one species each. With 18 species, Euphorbiaceae is represented as the largest family in Monochlamydeae, followed by Amaranthaceae (13), Asparagaceae, Aristolochiaceae, Moraceae, and Nyctaginaceae (2 species each), while the rest were monospecific families.

In Monocot, Poaceae is the rich in species family (22 species). It is followed by Commelinaceae and Cyperaceae (3 species each), and Arecaceae (2); others were monospecific families. Due to their effective seed dissemination and pollination strategies, the Fabaceae and Asteraceae families may have occupied the most dominant position. Mary [20] and Sukumaran et al. [21] both reported similar results, exhibiting the higher diversity of both the Fabaceae and Asteraceae families. However, variations in topography and environmental factors like rainfall and temperature may be responsible for variations in the dominance positions of different kinds of plants [22].

The analysis of the growth forms of the plants showed that the herbs (162 species) out of the 264 species were the most frequently noticed (61%), followed by the shrubs (40 species, 15%), the trees (35 species, 13%), and the climbers (27 species, 10%) (Fig. 1).

The number of herbaceous species was found to be twice that of the shrubs, trees, or climbers. Monocots predominated in the ecosystem, leading to larger species abundance, which is a reflection of the studied area's attributes. The grasslands are currently being altered severely due to urban development, overgrazing and invasion of exotic species [23]. The systematic documentation of Angiosperm species showed that, although being mostly subjected to various anthropogenic influences, the study site maintains a diverse range of plants and a greater proportion of native flora. Besides that, weeds notably *Acanthospermum hispidum*, *Blainvillea acmella*, *Chromolaena odorata*, *Parthenium hysterophorus*, *Sphaeranthus indicus*, *Synedrella nodiflora*, *Pentanema indica*, *Lantana camara*, *Mimosa pudica*, and

Ludwigia octovalvis were predominated. It is a matter of conserve nature and indigenous knowledge of local great concern for researchers and environmentalists to inhabitants for human welfare.

Table 1. Number of families, genera and species recorded in study site.

Group	Subclass	Number of families	Number of genera	Number of species
Dicotyledons	Polypetalae	28	78	103
	Gamopetalae	17	69	88
	Monochlamydae	07	27	40
Monocotyledons	-	07	28	33
Total		59	202	264

Table 2. A list of Polypetalae taxa in the study area.

S. No	Family	Species	Growth Forms
1.	Annonaceae Juss.	<i>Annona squamosa</i> L.	Shrub
2.	Capparaceae Juss.	<i>Cadaba fruticosa</i> (L.) Druce	Shrub
		<i>Capparis sepiaria</i> L.	Climber
		<i>Capparis zeylanica</i> L.	Shrub
		<i>Cleome chelidonii</i> L.f.	Herb
		<i>Cleome felina</i> L.f	Herb
		<i>Cleome gynandra</i> L.	Herb
		<i>Cleome viscosa</i> L.	Herb
		<i>Crateva religiosa</i> G. Forst.	Tree
3.	Moringaceae Martinov	<i>Moringa oleifera</i> Lam.	Tree
4.	Portulacaceae Juss.	<i>Portulaca oleracea</i> L.	Herb
5.	Violaceae Batsch	<i>Hybanthus enneaspermus</i> (L.) F. Muell.	Herb
6.	Polygalaceae Hoffmanns. & Link	<i>Polygala arvensis</i> Willd.	Herb
		<i>Polygala javana</i> DC.	Herb
7.	Malvaceae Juss.	<i>Abutilon indicum</i> (L.) Sweet	Shrub
		<i>Corchorus aestuans</i> L.	Herb
		<i>Corchorus capsularis</i> L.	Herb
		<i>Corchorus tridens</i> L.	Herb
		<i>Grewia tiliifolia</i> Vahl	Tree
		<i>Guazuma ulmifolia</i> Lam.	Tree
		<i>Hibiscus micranthus</i> L.f.	Herb
		<i>Hibiscus rosa-sinensis</i> L.	Shrub
		<i>Melochia corchorifolia</i> L.	Herb
		<i>Pavonia odorata</i> Willd.	Herb
		<i>Pavonia zeylanica</i> (L.)Cav.	Herb
		<i>Sida acuta</i> Burm.f.	Herb
		<i>Sida cordata</i> (Burm.f.) Borss. Waalk.	Herb
		<i>Triumfetta pentandra</i> A. Rich.	Herb
<i>Triumfetta rotundifolia</i> Lam.	Herb		
<i>Waltheria indica</i> L.	Herb		

Table 2 continued.

8.	Onagraceae Juss.	<i>Ludwigia perennis</i> L.	Herb
9.	Lythraceae J.St.-Hil.	<i>Ammannia multiflora</i> Roxb.	Herb
		<i>Lawsonia inermis</i> L.	Shrub
10.	Simaroubaceae DC.	<i>Ailanthus excelsa</i> Roxb.	Tree
11.	Zygophyllaceae R. Br.	<i>Tribulus terrestris</i> L.	Herb
12.	Rutaceae Juss.	<i>Atalantia monophylla</i> DC.	Tree
13.	Hydroleaceae R. Br.	<i>Hydrolea zeylanica</i> (L.) Vahl	Herb
14.	Burseraceae Kunth	<i>Commiphora caudata</i> (Wight & Arn.) Engl.	Tree
15.	Meliaceae Juss.	<i>Azadirachta indica</i> A. Juss	Tree
16.	Papaveraceae Juss.	<i>Argemone mexicana</i> L.	Herb
17.	Celastraceae R. Br.	<i>Gymnosporia montana</i> (Roth) Benth.	Shrub
18.	Rhamnaceae Juss.	<i>Ziziphus jujuba</i> Mill.	Shrub
		<i>Ziziphus oenopolia</i> (L.) Mill.	Shrub
19.	Vitaceae Juss.	<i>Cissus quadrangularis</i> L.	Climber
		<i>Causonis trifolia</i> (L.) Mabb. & J. Wen	Climber
20.	Sapindaceae Juss.	<i>Cardiospermum halicacabum</i> L.	Climber
		<i>Dodonaea viscosa</i> Jacq.	Shrub
21.	Anacardiaceae R. Br.	<i>Lannea coromandelica</i> (Houtt.) Merr.	Tree
		<i>Spindias pinnata</i> (L.F) Kurz.	Tree
22.	Fabaceae Lindl.	<i>Abrus precatorius</i> L.	Climber
		<i>Aeschynomene indica</i> L.	Herb
		<i>Adenanthera microsperma</i> Teijsm. & Binn.	Tree
		<i>Alysicarpus monilifer</i> (L.) DC.	Herb
		<i>Alysicarpus vaginalis</i> (L.) DC.	Herb
		<i>Cassia auriculata</i> L.	Shrub
		<i>Cassia occidentalis</i> L.	Herb
		<i>Chamaecrista mimosoides</i> (L.) Greene	Herb
		<i>Clitoria ternatea</i> L.	Climber
		<i>Crotalaria calycina</i> schrank	Herb
		<i>Crotalaria verrucosa</i> L.	Herb
		<i>Dalbergia coromandeliana</i> prain	Tree
		<i>Delonix elata</i> (L.) Gamble	Tree
		<i>Desmodium triflorum</i> (L.) DC.	Herb
		<i>Dichrostachys cinerea</i> (L.) Wight & Arn.	Tree
		<i>Dumasia villosa</i> DC.	Climber
		<i>Indigofera aspalathoides</i> Vahl ex DC.	Herb
		<i>Indigofera linnaei</i> Ali.	Herb
		<i>Indigofera tinctoria</i> Forssk.	Herb
<i>Pongamia pinnata</i> (L.) Pierre	Tree		
<i>Prosopis juliflora</i> (Sw.) DC.	Tree		

Table 2 continued.

23.	Fabaceae Lindl.	<i>Rhynchosia minima</i> (L.) DC.	Herb
		<i>Rothia indica</i> (L.) Druce	Herb
		<i>Tamarindus indica</i> L.	Tree
		<i>Tephrosia pumila</i> (L.) Pers.	Herb
		<i>Tephrosia purpurea</i> (L.) Pers.	Herb
		<i>Thespesia populnea</i> (L.) Sol. ex Corrêa	Tree
		<i>Vigna trilobata</i> (L.) Verdc.	Herb
		<i>Zornia diphylla</i> (L.) Pers.	Herb
23.	Mimosaceae R. Br.	<i>Acacia leucophloea</i> (Roxb) Willd.	Tree
		<i>Acacia nilotica</i> (L.) Willd. ex Delile	Tree
		<i>Albizia amara</i> (Roxb.) Boivin	Tree
		<i>Albiza lebbeck</i> (L.) Benth.	Tree
		<i>Albizia saman</i> (Jacq.) F. Muell.	Tree
		<i>Mimosa pudica</i> L.	Herb
24.	Myrtaceae Juss.	<i>Eucalyptus torelliana</i> F. Muell.	Tree
		<i>Syzygium cumini</i> (L.) Skeels	Tree
25.	Passifloraceae Juss. ex Roussel	<i>Passiflora foetida</i> L.	Climber
		<i>Turnera elegans</i> Otto	Herb
26.	Cucurbitaceae Juss.	<i>Citrullus colocynthis</i> (L.) Schrad.	Climber
		<i>Coccinia grandis</i> (L.) Voigt	Climber
		<i>Cucumis melo</i> L.	Climber
		<i>Mukia maderaspatana</i> (L.)M. Roem.	Climber
		<i>Solena amplexicaulis</i> (Lam.) Gandhi	Climber
27.	Cactaceae Juss.	<i>Cereus pterogonus</i> Lem.	Shrub
		<i>Opuntia dillenii</i> (Ker Gawl.) Haw.	Shrub
		<i>Opuntia monacantha</i> (Willd) Haw.	Shrub
28.	Aizoaceae Martinov	<i>Glinus lotoides</i> L.	Herb
		<i>Mollugo cerviana</i> (L.) Ser.	Herb
		<i>Mollugo nudicaulis</i> Lam.	Herb
		<i>Mollugo pentaphylla</i> L.	Herb
		<i>Trianthema decandrum</i> L.	Herb
		<i>Trianthema portulacastrum</i> L.	Herb

Table 3. A list of Gamopetalae taxa in the study area

S.No	Family	Binomial name	Growth Forms
1.	Rubiaceae Juss.	<i>Benkara malabarica</i> (Lam.) Tirveng.	Shrub
		<i>Canthium coromandelicum</i> (Burm.f.) Alston	Shrub
		<i>Morinda coreia</i> Buch.-Ham.	Tree
		<i>Oldenlandia umbellata</i> L.	Herb
		<i>Polycarpaea corymbosa</i> (L.) Lam.	Herb
		<i>Randia dumetorum</i> (Retz.) poir.	Shrub
		<i>Spermacoce articularis</i> L.f	Herb
		<i>Spermacoce ocymoides</i> Burm.f.	Herb
2.	Asteraceae Bercht. & J. Presl	<i>Acanthospermum hispidum</i> DC.	Herb
		<i>Ageratum conyzoides</i> L.	Herb
		<i>Blainvillea acmella</i> (L.) Philipson	Herb
		<i>Chromolaena odorata</i> (L.) R.M. King & H. Rob.	Herb
		<i>Parthenium hysterophorus</i> L.	Herb
		<i>Pentanema indicum</i> (L.) Y.Ling	Herb
		<i>Sphaeranthus indicus</i> L.	Herb
		<i>Synedrella nodiflora</i> (L.) Gaertn.	Herb
		<i>Tridax procumbens</i> L.	Herb
		<i>Vernonia cinerea</i> (L.) Less.	Herb
		<i>Xanthium strumarium</i> L.	Herb
3.	Oleaceae Hoffmanns. & Link	<i>Jasminum angustifolium</i> (L.) Willd.	Climber
4.	Salvadoraceae Lindl.	<i>Azima tetraantha</i> Lam.	Shrub
5.	Plumbaginaceae Juss.	<i>Plumbago zeylanica</i> L.	Shrub
6.	Plantaginaceae Juss.	<i>Bacopa monnieri</i> (L.) Wettst.	Herb
		<i>Scoparia dulcis</i> L.	Herb
7.	Apocynaceae Juss.	<i>Caralluma adscendens</i> vr. <i>Adscendens</i>	Shrub
		<i>Caralluma sarkariae</i> Lavranos & R. Frandsen	Shrub
		<i>Caralluma stalagmifera</i> C.E.C. Fisch.	Shrub
		<i>Catharanthus roseus</i> (L.) G. Don	Herb
		<i>Ceropegia juncea</i> Roxb.	Climber
		<i>Hemidesmus indicus</i> (L.) R. Br.	Climber
		<i>Pergularia daemia</i> (Forssk.) Chiov.	Climber
		<i>Vallis solanacea</i> (Roth) Kuntze	Climber
		<i>Wrightia tinctoria</i> (Roxb) R. Br.	Tree
8.	Asclepiadaceae Borkh.	<i>Calotropis gigantea</i> (L.) W.T. Aiton	Shrub
		<i>Calotropis procera</i> (Aiton) W.T. Aiton	Shrub
		<i>Gymnema sylvestre</i> (Retz.) R. Br. ex Sm.	Climber
		<i>Sarcostemma viminalis</i> (L.) R. Br.	Climber

Table 3 continued.

9.	Boraginaceae Juss.	<i>Coldenia procumbens</i> L.	Herb
		<i>Ehretia aspera</i> Willd.	Tree
		<i>Euploca ovalifolia</i> (Forssk.) Diane & Hilger	Herb
		<i>Trichodesma indicum</i> (L.) Sm.	Herb
10.	Convolvulaceae Juss.	<i>Cuscuta chinensis</i> Lam.	Climber
		<i>Evolvulus alsinoides</i> (L.) L.	Herb
		<i>Ipomoea carnea</i> Jacq.	Shrub
		<i>Ipomoea pes-tigridis</i> L.	Climber
		<i>Merremia tridentata</i> (L.) Hallier f.	Climber
		<i>Rivea hypocrateriformis</i> (Desr) Choisy	Climber
11.	Solanaceae Juss.	<i>Datura metel</i> L.	Herb
		<i>Physalis minima</i> L.	Herb
		<i>Solanum nigrum</i> L.	Herb
		<i>Solanum torvum</i> Sw.	Shrub
12.	Pedaliaceae R. Br.	<i>Martynia annua</i> L.	Shrub
		<i>Pedaliium murex</i> L.	Herb
13.	Gentianaceae Juss.	<i>Enicostema axillare</i> (Poir. ex Lam.) A. Raynal	Herb
14.	Acanthaceae Juss.	<i>Andrographis echioides</i> (L.) Nees.	Herb
		<i>Barleria buxifolia</i> L.	Herb
		<i>Barleria mysorensis</i> Roth.	Herb
		<i>Barleria noctiflora</i> L.f.	Herb
		<i>Barleria prionitis</i> L.	Herb
		<i>Blepharis maderaspatensis</i> (L.) B. Heyne ex Roth	Herb
		<i>Blepharis molluginifolia</i> Pers.	Herb
		<i>Dyschoriste madurensis</i> (Burm.f.) Kuntze	Herb
		<i>Elytraria acaulis</i> (L.f.) Lindau	Herb
		<i>Hygrophila auriculata</i> (Schumach.) Heine	Herb
		<i>Justicia procumbens</i> L.	Herb
		<i>Justicia simplex</i> D. Don.	Herb
		<i>Lepidagathis cristata</i> Willd.	Herb
		<i>Peristrophe bicalyculata</i> (Retz) Nees	Herb
		<i>Ruellia patula</i> Jacq.	Herb
		<i>Ruellia prostrata</i> Poir.	Herb
<i>Ruellia tuberosa</i> L.	Herb		
<i>Rungia repens</i> (L.) Nees	Herb		
15.	Verbenaceae J.St.-Hil.	<i>Clerodendrum inerme</i> (L.) Gaertn.	Shrub
		<i>Lantana camara</i> L.	Shrub
		<i>Lantana wightiana</i> Wall. ex Gamble	Shrub
		<i>Vitex negundo</i> L.	Shrub

Table 3 continued.

16.	Lamiaceae Martinov	<i>Anisochilus carnosus</i> (L.f.) Wall. ex Benth.	Herb
		<i>Anisomeles malabarica</i> (L.)R. Br. ex Sims.	Herb
		<i>Hyptis suaveolens</i> (L.) Poit.	Herb
		<i>Leucas aspera</i> (Willd.) Link	Herb
		<i>Leucas hirta</i> (B. Heyne ex Roth) Spreng.	Herb
		<i>Ocimum basilicum</i> L.	Herb
		<i>Ocimum canum</i> Sims.	Herb
		<i>Ocimum sanctum</i> Linn.	Herb
		<i>Ocimum tenuiflorum</i> L.	Herb
17.	Orobanchaceae Vent.	<i>Parasopubia delphiniifolia</i> (L.) H.-P. Hofm. & Eb. Fisch.	Herb
		<i>Striga augustifolia</i> (D. Don.) C.J. Saldanha	Herb
		<i>Striga densiflora</i> Benth.	Herb

Table 4. A list of Monochlamydeae taxa in the study area

S. No	Family	Binomial name	Growth Forms
1.	Nyctaginaceae Juss.	<i>Boerhavia erecta</i> L.	Herb
		<i>Boerhavia diffusa</i> L.	Herb
2.	Amaranthaceae Juss.	<i>Achyranthes aspera</i> L.	Herb
		<i>Aerva javanica</i> (Burm.f.) A.L. Juss. ex Schult.	Herb
		<i>Aerva lanata</i> (L.) A.L. Juss. ex Schult.	Herb
		<i>Allmania nodiflora</i> (L.) R. Br. ex Wight	Herb
		<i>Alternanthera pungens</i> Kunth	Herb
		<i>Alternanthera sessilis</i> (L.) R. Br. ex DC.	Herb
		<i>Amaranthus spinosus</i> L.	Herb
		<i>Amaranthus viridis</i> L.	Herb
		<i>Celosia polygonoides</i> Retz.	Herb
		<i>Digera muricata</i> (L.) Mart.	Herb
		<i>Gomphrena celosioides</i> Mart.	Herb
		<i>Nothosaerva brachiata</i> (L.) Wight	Herb
		<i>Pupalia lappacea</i> (L.) A.L. Juss.	Herb
3.	Aristolochiaceae Juss.	<i>Aristolochia bracteolata</i> Lam.	Herb
		<i>Aristolochia indica</i> L.	Climber
4.	Euphorbiaceae Juss.	<i>Acalypha fruticosa</i> Forssk.	Shrub
		<i>Acalypha indica</i> L.	Herb
		<i>Croton bonplandianus</i> Baill.	Herb
		<i>Euphorbia antiquorum</i> L.	Shrub
		<i>Euphorbia cyathophora</i> Murray	Shrub
		<i>Euphorbia hirta</i> L.	Herb
		<i>Euphorbia prostrata</i> Burch. ex Hemsl.	Herb

Table 4 continued.

4.	Euphorbiaceae Juss.	<i>Flueggea leucopyrus</i> Willd.	Shrub
		<i>Jatropha glandulifera</i> Roxb.	Shrub
		<i>Jatropha gossypifolia</i> L.	Shrub
		<i>Micrococca mercurialis</i> (L.) Benth.	Herb
		<i>Microstachys chamaelea</i> (L.) Müll. Arg.	Herb
		<i>Phyllanthus amarus</i> Schumach. & Thonn.	Herb
		<i>Phyllanthus maderaspatensis</i> L.	Herb
		<i>Phyllanthus virgatus</i> G. Forst.	Herb
		<i>Ricinus communis</i> L.	Shrub
		<i>Tragia involucrata</i> L.	Climber
		<i>Tragia plukenetii</i> Radcl.-Sm.	Herb
5.	Ulmaceae Mirb.	<i>Holoptelea integrifolia</i> (Roxb.) Planch.	Tree
6.	Asparagaceae Juss.	<i>Agave americana</i> L.	Tree
		<i>Urginea indica</i> kunth.	Herb
7.	Moraceae Gaudich.	<i>Ficus benghalensis</i> L.	Tree
		<i>Ficus religiosa</i> L.	Tree

Table 5. A list of Monocotyledons taxa in the study site

S.No	Family	Binomial name	Growth Forms
1.	Musaceae Juss.	<i>Musa × paradisiaca</i> L.	Shrub
2.	Asphodelaceae Batsch	<i>Aloe vera</i> (L.)Burm.f.	Shrub
3.	Arecaceae Bercht. & J.Presl	<i>Borassus flabellifer</i> L.	Tree
		<i>Phoenix sylvestris</i> (L.) Roxb.	Tree
4.	Colchicaceae DC.	<i>Gloriosa superba</i> L.	Climber
5.	Commelinaceae Mirb.	<i>Commelina benghalensis</i> L.	Herb
		<i>Cyanotis axillaris</i> (L.) D.Don ex Sweet	Herb
		<i>Cyanotis cristata</i> (L.)D.Don	Herb
6.	Cyperaceae Juss.	<i>Cyperus iria</i> L.	Herb
		<i>Cyperus rotundus</i> L.	Herb
		<i>Pycreus pumilus</i> (L.) Nees.	Herb
7.	Poaceae Barnhart	<i>Andropogon pumilus</i> Roxb	Herb
		<i>Apluda mutica</i> L.	Herb
		<i>Aristida hystrix</i> L.f.	Herb
		<i>Chloris barbata</i> Sw.	Herb
		<i>Chrysopogon orientalis</i> (Desv.)A. Camus	Herb
		<i>Cymbopogon caesius</i> (Hook.f. & Arn.) Stapf	Herb
		<i>Cynodon barberi</i> Rang. & Tadul.	Herb
		<i>Cynodon dactylon</i> (L.) Pers.	Herb
		<i>Dactyloctenium aegyptium</i> (L.) Willd.	Herb
<i>Dichanthium annulatum</i> (Forssk.) stapf.	Herb		

Table 5 continued.

7.	Poaceae Barnhart	<i>Digitaria ciliaris</i> (Retz.) Koeler	Herb
		<i>Eleusine coracana</i> (L.) Gaertn.	Herb
		<i>Eragrostis japonica</i> (Thunb.) Trin.	Herb
		<i>Eragrostis tenella</i> (L.) P.Beauv. ex Roem. & Schult.	Herb
		<i>Paspalum scrobiculatum</i> L.	Herb
		<i>Pennisetum americanum</i> (L.) Leeke	Herb
		<i>Pennisetum purpureum</i> Schumach.	Herb
		<i>Perotis indica</i> (L.) Kuntze	Herb
		<i>Saccharum officinarum</i> L.	Herb
		<i>Setaria verticillata</i> (L.) P.Beauv.	Herb
		<i>Urochola ramosa</i> (L.) T.Q. Nguyen	Herb
		<i>Urochola reptans</i> (L.) Stapf	Herb

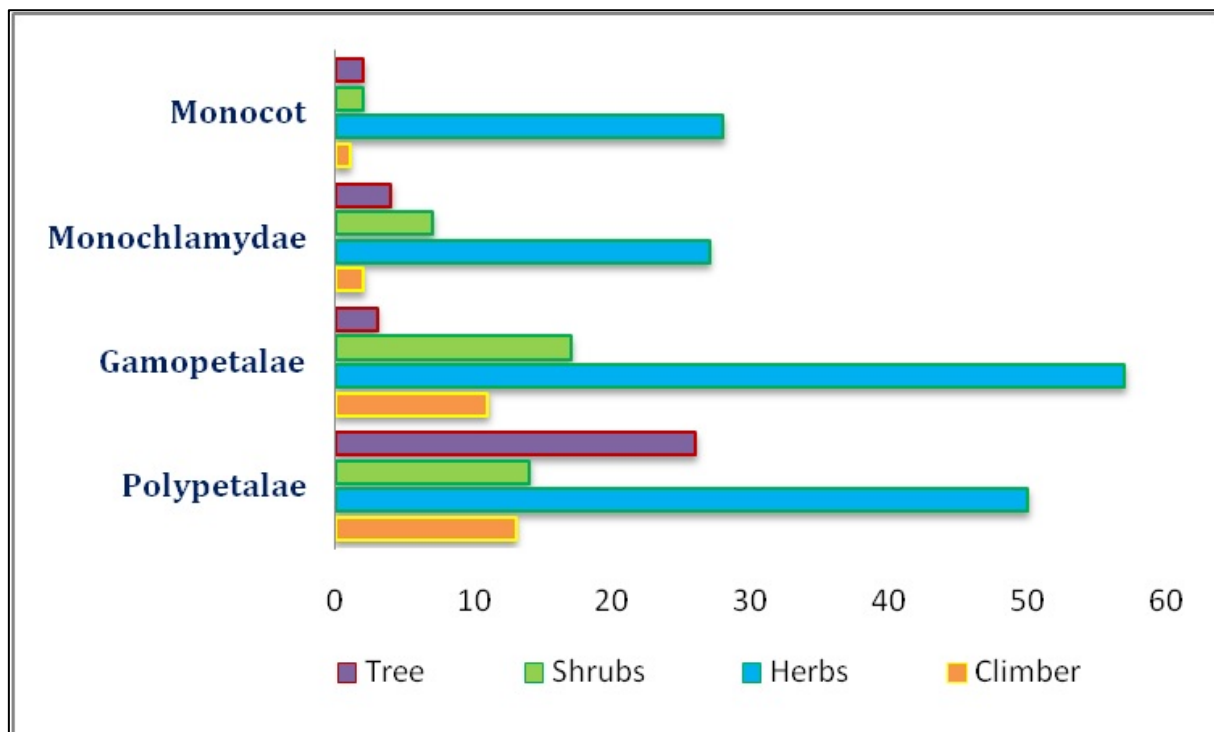


Figure 1. Number of Growth forms recorded in the study area

4. Conclusions

The floristic exploration showed that the Thirukudder Hills provide a diverse range of Angiosperms, with the overwhelming being wild species that are of the least concern. However frequent anthropogenic activities forced the research area to deteriorate over the years. Invasive species such as *Acanthospermum hispidum*, *Blainvillea acmella*, *Chromolaena odorata*, *Parthenium hysterophorus*, *Pentanema indica*, *Sphaeranthus indicus*, *Synedrella nodiflora*, and *Lantana camara* also had a substantial effect on the investigation region and replaced several wild plants.

Therefore, more research is required and strategies for safeguarding rare plants must be developed. If not, there is a chance that those particular plant species may vanish.

Acknowledgements

The authors are grateful to **Dr. D. Kannan**, Assistant Professor and Head, PG & Research Department of Botany, Thiagarajar College, Madurai for his never-ending support, inspiration, and wise counsel. The authors are thankful for the DST-FIST facility of Department of Botany,

Saraswathi Narayanan College (Autonomous), Madurai.

REFERENCES

- [1] Dobson A., Cattadori, I., Holt RD., Ostfeld RS., Keesing, F and K. Krichbaum. Sacred Cows and Sympathetic Squirrels: The Importance of Biological Diversity to Human Health. *PLoS Med*, 3(6); 231. 2006.
- [2] Díaz, S., Pascual, U., Stenseke, M., Martín-Lopez, B., Watson, R.T and Molnar, Z. Assessing nature's contributions to people. *Science* 359 (6373): pp. 270–272. 2018.
- [3] Chapman, A.D. Uses of Primary Species-Occurrence Data Version 1.0. *Report for the Global Biodiversity Information Facility, Copenhagen*. 1-111.2005. <http://www.niobioinformatics.in/books/Uses%20of%20Primary%20Data.spdf>.
- [4] Subramaniam, K. and Henry, A.N. A Contribution to the flora of Alagar hills, Karandamalais and surrounding regions in Madurai District, Madras State. *J. Indian Bot. Soc.* 38; 492–527. 1959.
- [5] Krishnan, S. and Sri Ganesan, T. Flora of Alagar Hills. Suppl. List. *J. Madurai Univer.* 3(1); 50–53. 1971.
- [6] Selvaraj, A. A Floristic Study of Thirupparankundram and its surroundings. M.Sc. Dissertation, Thiagarajar College, Madurai, Tamil Nadu, India. 1982.
- [7] Sri Ganesan, T. *Flora of Alagar Hills*. Ph.D. Thesis, Madurai Kamaraj University, Madurai, Tamil Nadu, India. (Unpublished). 1984.
- [8] Ravikumar, K. Systematic Studies on the Dicotyledons Plants of Madurai District, Tamil Nadu. Ph.D. Thesis, Bharathiar University, Coimbatore (Unpublished). 1993.
- [9] Packiaraj, P., Venkadeswaran, P. and Suresh, K. A Comparison of Aquatic Plants Composition in Poondi and Velliamkundram Ponds of Madurai District, South Tamil Nadu, India. Conference: *2nd Two Day National Conference on Water, Environment & Societ*, Hyderabad, India (NCWES - 2015) 30th-31st July, 2015; 315-320. 2005.
- [10] Jayakumar, M and Karuppusamy, S. Survey on the Narrow Endemic Threatened Plants in Madurai District of Tamil Nadu, India. *Kongunadu Research Journal*. 3(1): 56–58. 2016. 10.26524/krj128
- [11] Gamble, J.S and Fischer, C.E.C. Flora of the Presidency of Madras (Vol. 1-3), London: Adlord and Sons Ltd..1915-1935. <https://doi.org/10.5962/bhl.title.21628>.
- [12] Matthew, K.M. Flora of the Palni hills, Vols. 1 – 3. The Rapinat herbarium, St. Joseph's College, Tiruchirappalli, Tamil Nadu. 1999. <https://doi.org/10.1111/j.1756-1051.2000.tb01560.x>.
- [13] Sreekumar, P. V. and Nair, V.J. Flora of Kerala-Grasses, Botanical Survey of India, Coimbatore. 1991.
- [14] Bentham, G and J.D.Hooker. *Genera Plantarum*, Vol 1- 3. L.Reeve and Co., London. 1862-1883.
- [15] Hutchinson, J. *The families of flowering plants - I*. Macmillan & Co. Ltd., London. 1926.
- [16] Hutchinson, J. *The families of flowering plants - II*. Macmillan & Co. Ltd., London. 1934.
- [17] Hutchinson, J. *The families of flowering plants -Vol I & II* (ed. 2). Clarendon Press. 1956.
- [18] Hutchinson, J. *The families of flowering plants - II Monocotyledons* (ed.3). Clarendon Press, Oxford. 1973.
- [19] Brummitt, R.K and C.F. Powell. *Authors of Plant Names*. Royal Botanical Garden, Kew, London. 1992.
- [20] Mary, K. Floristic study in a Vembanur wetland, Kanyakumari district, Tamil Nadu, South India. *Plant Sciences Feed*, 1(11):194 – 199. 2011.
- [21] Sukumaran, S and Raj, A. D. S. Enumeration of aquatic and semiaquatic Angiosperms in sacred groves of Kanyakumari district, Southern Western Ghats. *Journal of Economic and Taxonomic Botany*, 33(1): 26 – 31. 2009.
- [22] Martinez-Camilo. R, M. Gonzalez-Espinosa, N. Ramirez-Marcial, et al. Tropical tree species diversity in a mountain system in southern Mexico: local and regional patterns and determinant factors. *Biotropica*, 50; 499-509. 2018.
- [23] Palsamy P. and Pandian, K.D. Riparian grass diversity of Pambar and Thalayar freshwater streams, Western Ghats, India. *J. Plant Sci.* 17:pp.161-165.2022. DOI: 10.3923/jps.2022.161.165.