

Original Research Article

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## Flora of Muniyattukunnu, Part of Western Ghats, Kerala, India

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### ABSTRACT

#### Keywords

Floral diversity, Muniyattukunnu, Muniyaras, threatened species, invasive species, endemic plants

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The present investigation is regarding the diversity of plants in the hills of Muniyattukunnu, in Mupliyam village of Varandarappilly Grama Panchayath, Thrissur district, Kerala, and is a part of Western Ghats. The geographic location of the study is 10°24' 44.2" N and 076°21'30.9" E. The assessment of the flora was done for a period of one year from February 2016 to January 2017. During the period of study, 138 plant species under 117 genera and 55 families were documented from Muniyattukunnu. In the study area, two species, *Tectona grandis* and *Utricularia cecilia* come under the endangered category, and three species, *Aporosa cardiosperma*, *Dalbergia latifolia* and *Santalum album* are categorized as vulnerable according to the IUCN Red List. *Blepharistemma membranifolium*, *Dillenia bracteata*, *Impatiens minor*, *Murdannia semiteres*, *Naregamia alata*, *Osbeckia muralis*, *Pouzolzia wightii* var. *caudata*, *Tabernaemontana alternifolia*, *Terminalia paniculata*, *Themeda cymbaria* and *Utricularia cecilia* are the endemic plants found in Muniyattukunnu during the period of study.

### Introduction

Kerala is rich in biodiversity and is located in between Western Ghats and the Arabian Sea that gives a peculiar climate. The vegetation is the assemblage of plants growing under the same climate over a wide range. The present investigation was undertaken to assess the plant diversity in Muniyattukunnu, Thrissur District, Kerala, India. The biodiversity studies of Muniyattukunnu assist in analyzing the structure and functioning of ecological communities of the area.

The Muniyattukunnu, a protected monument, is on the verge of being erased from the megalithic map of the

country due to the unscientific mining. Muniyattukunnu was famous for its dolmens, which were declared as protected monument as per Government proceeding dated 13-10-1937 RDIS 1894-2-1112 development department and in accordance with Cochin Government Ancient Monument Preservation Regulation Act XI of 110. These monuments are mostly in reserved forest of Vellikulanagara range under Chalakudy forest division, Kerala.

### Materials and Methods

The present study was conducted in the Muniyattukunnu hill located in the Mupliyam village of Varandarappilly

Panchayath, Chalakudy Taluk, Thrissur District, Kerala (Fig. 1). A major portion of the hill, which is home to a dozen Muniyaras - the dolmens of the megalithic age - has been troubled away through excessive mining (Fig. 2). The geographic location of the study is 10°24' 44.2" N latitude and 076°21'30.9" E longitude. It is located 27 km towards South from Thrissur town. Muniyattukunnu is surrounded by Chalakudy Taluk towards South, Irinjalkkuda and Vellangallur Taluks towards west and Ollukkara Taluk towards North. Climate of the study area have uniform temperate and annual rainfall occur the year. Dry weather from December - February, hot weather from March - May, South West monsoon from June - September and North East monsoon from October - November.

The study was conducted for a period of one year from February 2016 to January 2017. The periodical field trips were arranged and the plants were collected along with its flowers and fruits from the Muniyattukunnu hill. The photographs of the plants were taken by using a 20.1 Megapixel digital camera during the period of collection. The habit, morphology and floristic characters were recorded during the time of study. The plants in the area were identified with the help of standard floras (Gamble and Fischer, 1915-1936; Manilal and Sivarajan, 1982; Sreekumar and Nair, 1991; Sasidharan and Sivarajan, 1996; Sasidharan, 2004, 2011).

The identified plants were recorded with family, genus, species and the taxa were classified according to the life-form categories –trees, shrubs, herbs, and climbers. The botanical names and author citations of taxa identified were checked with international plant names index (<https://ipni.org>) and plants of the world online (<https://powo.science.kew.org>). The conservation status of the taxa identified from the study area were assessed with International Union for Conservation of Nature (IUCN) Red list (<https://iucnredlist.org>).

## Results and Discussion

During the present investigation, 138 species of flowering plant species representing 117 genera and 55 families were collected and documented from Muniyattukunnu. The flowering plant species collected from the study area are listed in Table 1. The flora showed 46 herbs (33.33%), 30 shrubs (21.74%), 15 climbers (10.87%) and 47 trees (34.06%) during the period of study (Table 1, Fig 3). The Dicotyledons dominate with 119 species (86.23%) belonging to 100

genera and 45 Families. The Monocotyledons are represented by 19 species (13.77%) under 17 genera and 10 families (Fig. 4).

Among these, Fabaceae was the most dominant family with 20 species, followed by Phyllanthaceae (8 species), Apocynaceae, Combretaceae, Poaceae and Rubiaceae (6 species each), Euphorbiaceae, Malvaceae, Moraceae and Verbenaceae (5 species each), Sterculiaceae (4 species) and Anacardiaceae, Commelinaceae, Cyperaceae and Rutaceae were represented by three species each. In addition, ten families were represented by two species each and 30 families by a single species each (Table 2).

*Blepharistemma membranifolium* (Miq.) Ding Hou, *Dillenia bracteata* Wight, *Impatiens minor* (DC.) Suresh, *Murdannia semiteres* (Dalzell) Santapau, *Naregamia alata* Wight & Arn., *Osbeckia muralis* Naudin., *Pouzolzia wightii* Bennett var. *caudata* (Bennett) C.E.C. Fisch., *Tabernaemontana alternifolia* L., *Terminalia paniculata* Roth., *Themeda cymbaria* Hack. and *Utricularia cecilia* P. Taylor are the endemic plants found in Muniyattukunnu (Sasidharan, 2011). Kerala has 344 endemic taxa pertaining to 175 genera belonging to 65 families of flowering plants (Reddy *et al.*, 2007).

The recorded plant taxa revealed varying degrees of extinction risk within the study area. According to the IUCN Red List, two species, *Tectona grandis* L.f. and *Utricularia cecilia* P. Taylor come under the endangered category, and three species, *Aporosa cardiosperma* (Gaertn.) Merr., *Dalbergia latifolia* Roxb. and *Santalum album* L. are categorized as vulnerable. The presence of these endangered and vulnerable species highlights the study area's importance for conservation and makes habitat preservation and sustainable management measures essential. In addition, *Artocarpus altilis* (Parkinson.) Fosberg, *Curcuma longa* L. and *Mangifera indica* L. were designated as Data Deficient, 70 species are categorized as Least Concern, and 60 species have not yet been evaluated ([www.iucnredlist.org](http://www.iucnredlist.org)). *Blepharistemma membranifolium* (Miq.) Ding Hou, *Dalbergia latifolia* Roxb. and *Santalum album* L. are reported as vulnerable species by Sasidharan, (2011).

The flora of Muniyattukunnu documented 74 medicinally important plants (Table 1). Medicinal plants provide easily accessible and relevant resources for primary health care with minimum side effects (Pushpagadhan and Nair, 1997; Sivarajan and Balachandran, 1998; Warriar *et al.*, 1996).

**Table.1** List of plants recorded from Muniyattukunnu

Sl. No:	Family	Scientific name of plants	Vernacular name	Habit	M / W / IW
1	Ranunculaceae	<i>Clematis zeylanica</i> (L.) Poir.	Vathamkodi	C	M
2	Dilleniaceae	<i>Dillenia bracteata</i> Wight	Kattupunna	T	-
3		<i>Dillenia pentagyna</i> Roxb.	Vazhapunna	T	M
4	Annonaceae	<i>Milusa tomentosa</i> (Roxb.) Finet & Gagnep	Kanakaitha	T	-
5	Menispermaceae	<i>Tinospora cordifolia</i> (Willd.) Miers ex Hook.f. & Thomson	Chitamruthu	C	M
6	Cochlospermaceae	<i>Cochlospermum religiosum</i> (L.) Alston	Appakudukka	T	M
7	Malvaceae	<i>Abelmoschus angulosus</i> Wall. ex Wight & Arn.	-	S	-
8		<i>Abelmoschus moschatus</i> Medik.	Kattukasthuri	S	M
9		<i>Sida rhombifolia</i> L. subsp. <i>alnifolia</i> (L.) Ugbor.	Kurunthotti	S	M
10		<i>Azanza lampas</i> (Cav.) Alef.	Kattuparathi	S	M
11		<i>Urena lobata</i> L.	Uthiram	S	-
12	Bombacaceae	<i>Bombax ceiba</i> L.	Elavu	T	M
13	Sterculiaceae	<i>Helicteres isora</i> L.	Idampiri-valampiri	S	M
14		<i>Melochia corchorifolia</i> L.	Cheruvuram	H	-
15		<i>Sterculia urens</i> Roxb.	Theethondi	T	M
16		<i>Sterculia villosa</i> Roxb. ex Sm.	Vakka	T	-
17	Tiliaceae	<i>Triumfetta rhomboidea</i> Jacq.	Oorpam	S	M, W
18	Oxalidaceae	<i>Biophytum reinwardtii</i> (Zucc.) Klotzsch	Mukkutti	H	M
19	Balsaminaceae	<i>Impatiens minor</i> (DC.) Suresh	-	H	-
20	Rutaceae	<i>Bergera koenigii</i> (L.) Spreng.	Karivepu	S	M
21		<i>Naringi crenulata</i> (Roxb.) Nicolson	Kattunarakam	T	M
22		<i>Zanthoxylum rhetsa</i> (Roxb.) DC	Mullilam	T	M
23	Ochnaceae	<i>Campylospermum serratum</i> (Gaertn.) Bittrich & M.C.E. Amaral	Aanaperal	S	-
24	Meliaceae	<i>Naregamia alata</i> Wight & Arn.	Nilanaragam	H	M
25	Rhamnaceae	<i>Ziziphus oenopolia</i> (L.) Mill.	Cheriyalantha	C	M
26	Vitaceae	<i>Ampelocissus indica</i> (L.) Planch.	Chemparavalli	C	M
27		<i>Cissus repanda</i> (Wight & Arn.) Vahl.	-	C	-
28	Sapindaceae	<i>Allophylus serratus</i> (Roxb.) Kurz.	Mukkannanpezhu	S	M
29		<i>Schleichera oleosa</i> (Lour.) Oken	Poovam	T	M
30	Anacardiaceae	<i>Anacardium occidentale</i> L.	Kasumavu	T	M

31		<i>Lannea coromandelica</i> (Houtt.) Merr.	Karasu	T	M
32		<i>Mangifera indica</i> L.	Mavu	T	-
33	Fabaceae - Papilionoideae	<i>Abrus precatorius</i> L.	Kunnikuru	C	M
34		<i>Cajanus cajan</i> (L.) Millsp.	Thuvara	S	M
35		<i>Dalbergia latifolia</i> Roxb.	Veeti	T	-
36		<i>Tadehagi triquetrum</i> (L.) H. Ohashi	Adakkapaanal	S	M
37		<i>Geissaspis cristata</i> Wight & Arn. var. <i>tenella</i> (Benth.) M.R. Almeida	-	H	-
38		<i>Gliricidia sepium</i> (Jacq.) Kunth	Seemakonna	T	-
39		<i>Tephrosia canarensis</i> J.R. Drumm.	-	S	-
40		<i>Vigna radiata</i> (L.) R. Wilczek var. <i>sublobata</i> (Roxb.) Verdc.	Kattuzhunnu	H	M
41		<i>Zornia diphylla</i> (L.) Pers.	Murokkotti	H	-
42		Fabaceae - Caesalpinioideae	<i>Bauhinia racemosa</i> Lam.	Malamandaram	T
43	<i>Chamaecrista absus</i> (L.) H.S. Irwin & Barneby		Thakarakeera	H	M
44	<i>Chamaecrista leschenaultiana</i> (DC.) O.Deg.		Avarekkachedi	H	-
45	<i>Chamaecrista mimosoides</i> (L.) Greene		Cheruthakara	H	-
46	<i>Delonix regia</i> (Bojer ex Hook) Raf.		Poomaram	T	-
47	<i>Tamarindus indica</i> L.		Puli	T	M
48	Fabaceae - Mimosoideae	<i>Senegalia pennata</i> (L.) Maslin	Karinja	C	-
49		<i>Albizia lebbek</i> (L.) Benth.	Kattuvaka	T	M
50		<i>Mimosa diplotricha</i> C. Wight ex Sanvalle var. <i>diplotricha</i> Delin Wu & Ivan	Aanathottavadi	C	IW
51		<i>Mimosa pudica</i> L.	Thottavadi	H	M, IW
52		<i>Xylia xylocarpa</i> (Roxb.) W. Theob.	Irul	T	-
53	Droseraceae	<i>Drosera indica</i> L.	Theppullu	H	-
54	Rhizophoraceae	<i>Blepharistemma membranifolium</i> (Miq.) Ding Hou	Nircurunda	S	-
55	Combretaceae	<i>Terminalia arjuna</i> (Roxb. ex DC) Wight & Arn.	Neermaruthu	T	M
56		<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Thanni	T	M
57		<i>Terminalia catappa</i> L.	Badam	T	-
58		<i>Terminalia chebula</i> Retz.	Kadukka	T	M
59		<i>Terminalia elliptica</i> Willd.	Thembavu	T	-
60		<i>Terminalia paniculata</i> Roth.	Maruthu	T	-
61	Melastomataceae	<i>Melastoma malabathricum</i> L.	Athirani	S	M

62		<i>Osbeckia muralis</i> Naudin	Cherkulathi	H	-
63	Lythraceae	<i>Lagerstroemia speciosa</i> (L.) Martyn	Manimaruthu	T	M
64	Onagraceae	<i>Ludwigia hyssopifolia</i> (G. Don) Exell	Neergrampu	H	M
65	Rubiaceae	<i>Canthium coromandelicum</i> (Burm.f.) Alston	Karamullu	S	-
66		<i>Chassalia curviflora</i> (Wall ex Kurz.) Thwaites var. <i>ophioxyloides</i> (Wall.) Deb. & B. Krishna	Vellakurinji	S	-
67		<i>Hymenodictyon orixense</i> (Roxb.) Mabb.	Vellakdamabu	T	M
68		<i>Mitracarpus hirtus</i> (L.) DC.	Thaval	H	W
69		<i>Psydrax umbellatus</i> (Wight) Bridson	Karimchulungu	T	-
70		<i>Spermacoce latifolia</i> Aubl.	Vellatharavu	H	W
71	Asteraceae	<i>Chromolaena odorata</i> (L.) R. M. King & H. Rob.	Communist-pacha	S	IW
72		<i>Mikania micrantha</i> Kunth	Vayara	C	IW
73	Apocynaceae	<i>Alstonia scholaris</i> (L.) R. Br	Ezhilampala	T	M
74		<i>Catharanthus pusillus</i> (Murray) G. Don	Kapavila	H	M, IW
75		<i>Holarrhena pubescens</i> Wall. ex G.Don	Kudagapala	T	M
76		<i>Ichnocarpus frutescens</i> (L.) W.T. Aiton	Palvalli	C	M
77		<i>Tabernaemontana alternifolia</i> L.	Kuruttupala	T	M
78		<i>Wrightia tinctoria</i> (Roxb.) R.Br.	Dhanthappala	T	M
79	Periplocaceae	<i>Hemidesmus indicus</i> (L.) R.Br.	Naruneendi	C	M
80	Loganiaceae	<i>Strychnos nux-vomica</i> L.	Kanjiram	T	M
81	Convolvulaceae	<i>Ipomoea mauritiana</i> Jacq.	Anchilathali	C	M
82		<i>Xenostegia tridentata</i> (L.) Austin & Staples subsp <i>hastata</i> (Ooststr.) Parmar	Cheruvayera	H	M
83	Solanaceae	<i>Capsicum frutescens</i> L.	Kantharimulaku	H	M
84	Scrophulariaceae	<i>Bonnaya ciliata</i> (Colsm.) Spreng.	-	H	-
85		<i>Torenia crustacea</i> (L.) Cham. & Schldtl.	-	H	-
86	Lentibulariaceae	<i>Utricularia ceciliae</i> P. Taylor	Krishnapoo	H	-
87	Verbenaceae	<i>Clerodendrum infortunatum</i> L.	Peruku	S	M
88		<i>Gmelina arborea</i> Roxb.	Kumizhu	T	M
89		<i>Lantana camara</i> L.	Kongini	S	IW
90		<i>Rothea serrata</i> (L.) Steane & Mabb.	Cheruthekkku	S	M
91		<i>Tectona grandis</i> L.f.	Thekku	T	M
92	Lamiaceae	<i>Coleus strobilifer</i> (Roxb.) A.J. Paton	Mathilkkooka	H	M
93		<i>Mesosphaerum suaveolens</i> (L.) Kuntze	Nattapoochedi	S	-
94	Amaranthaceae	<i>Alternanthera brasiliana</i> (L.) Kuntze	Choracheera	H	IW
95	Piperaceae	<i>Peperomia pellucida</i> (L.) Kunth	Mashithandu	H	W

96		<i>Piper nigrum</i> L.	Kurumulaku	C	M	
97	Loranthaceae	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	Ithikkanni	S	M	
98	Santalaceae	<i>Santalum album</i> L.	Chandanam	T	M	
99	Phyllanthaceae	<i>Antidesma alexiteria</i> L.	Thathalamaram	T	-	
100		<i>Aporosa cardiosperma</i> (Gaertn.) Merr.	Ponvetti	T	M	
101		<i>Flueggea leucopyrus</i> Willd.	Amboorippachila	S	-	
102		<i>Phyllanthus amarus</i> Schum. & Thonn.	Keezhanelli	H	M	
103		<i>Phyllanthus quadrangularis</i> Willd.	Punarmuringa	S	M	
104		<i>Phyllanthus reticulatus</i> Poir.	Neeroli	S	-	
105		<i>Phyllanthus retusus</i> Dennst.	Aattacherukola	S	-	
106		<i>Phyllanthus urinaria</i> L.	Chuvannakeezharnelli	H	M	
107		Euphorbiaceae	<i>Falconeria insignis</i> Royle	Kalmaram	T	-
108			<i>Macaranga peltata</i> (Roxb.) Mull. Arg.	Vatta	T	M
109	<i>Mallotus philippensis</i> (Lam.) Muell-Arg.		Chenkolli	T	M	
110	<i>Microstachys chamaelea</i> (L.) Mull. Arg.		Kodiyavannakku	H	M	
111	<i>Tragia involucrata</i> L.		Choriyanam	H	M	
112	Ulmaceae	<i>Trema orientale</i> (L.) Blume	Aamathali	T	-	
113	Urticaceae	<i>Pouzolzia wightii</i> Bennett var. <i>caudata</i> (Bennett) C.E.C. Fisch.	-	H	-	
114		<i>Pouzolzia zeylanica</i> (L.) Benn.	Kallurukki	H	M	
115	Moraceae	<i>Artocarpus altilis</i> (Parkinson.) Fosberg	Kadapilavu	T	-	
116		<i>Artocarpus heterophyllus</i> Lam.	Plavu	T	-	
117		<i>Ficus heterophylla</i> L.f.	Vallitherakam	S	-	
118		<i>Ficus hispida</i> L.f.	Parakam	S	-	
119		<i>Ficus racemosa</i> L.	Atthi	T	M	
120	Orchidaceae	<i>Aerides ringens</i> (Lindl.) C.E.C. Fisch.	-	H	-	
121	Dioscoreaceae	<i>Dioscorea bulbifera</i> L.	Kattukachil	C	M	
122	Zingiberaceae	<i>Curcuma longa</i> L.		H	M	
123	Smilacaceae	<i>Smilax zeylanica</i> L.	Kareelanchi	C	M	
124	Commelinaceae	<i>Cyanotis cristata</i> (L.) D. Don	-	H	-	
125		<i>Murdannia pauciflora</i> (G. Bruckn.) G. Bruckn.	-	H	-	
126		<i>Murdannia semiteres</i> (Dalzell) Santapau	-	H	-	
127	Arecaceae	<i>Caryota urens</i> L.	Choondapana	T	M	
128	Araceae	<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson	Chena	H	M	
129	Eriocaulaceae	<i>Eriocaulon xeranthemum</i> Mart.	-	H	-	
130	Cyperaceae	<i>Bulbostylis densa</i> (Wall.) Hand. -Mazz.	-	H	-	
131		<i>Cyperus cuspidatus</i> Kunth	-	H	-	

132		<i>Cyperus mindorensis</i> (Steud.) Huygh	Vallimuthanga	H	M, W
133	Poaceae	<i>Alloteropsis cimicina</i> (L.) Stapf	-	H	W
134		<i>Bambusa bambos</i> (L.) Voss	Mula	S	M
135		<i>Cymbopogon flexuosus</i> (Nees ex Steud.) Will. Watson	Inchipullu	H	M
136		<i>Eragrostis unioides</i> (Retz.) Nees ex Steud.	Karayampullu	H	W
137		<i>Oplismenus compositus</i> (L.) P. Beauv.	-	H	W
138		<i>Themeda cymbaria</i> Hack.	-	H	-

C – Climbers, H – Herbs, S – Shrubs, T – Trees,  
M – Medicinal plants, IW – Invasive weeds, W – Weeds

**Table.2** Family wise distribution of plant species recorded from Muniyattukunnu

Sl. No.	Name of the family	D / M	No. of genera	No. of species	Sl. No.	Name of the family	D / M	No. of genera	No. of species
1	Amaranthaceae	D	1	1	29	Menispermaceae	D	1	1
2	Anacardiaceae	D	3	3	30	Moraceae	D	2	5
3	Annonaceae	D	1	1	31	Ochnaceae	D	1	1
4	Apocynaceae	D	6	6	32	Onagraceae	D	1	1
5	Araceae	M	1	1	33	Orchidaceae	M	1	1
6	Arecaceae	M	1	1	34	Oxalidaceae	D	1	1
7	Asteraceae	D	2	2	35	Periplocaceae	D	1	1
8	Balsaminaceae	D	1	1	36	Phyllanthaceae	D	4	8
9	Bombacaceae	D	1	1	37	Piperaceae	D	2	2
10	Cochlospermaceae	D	1	1	38	Poaceae	M	6	6
11	Combretaceae	D	1	6	39	Ranunculaceae	D	1	1
12	Commelinaceae	M	2	3	40	Rhamnaceae	D	1	1
13	Convolvulaceae	D	2	2	41	Rhizophoraceae	D	1	1
14	Cyperaceae	M	2	3	42	Rubiaceae	D	6	6
15	Dilleniaceae	D	1	2	43	Rutaceae	D	3	3
16	Dioscoreaceae	M	1	1	44	Santalaceae	D	1	1
17	Droseraceae	D	1	1	45	Sapindaceae	D	2	2
18	Eriocaulaceae	M	1	1	46	Scrophulariaceae	D	2	2
19	Euphorbiaceae	D	5	5	47	Smilacaceae	M	1	1
20	Fabaceae	D	17	20	48	Solanaceae	D	1	1
21	Lamiaceae	D	2	2	49	Sterculiaceae	D	3	4
22	Lentibulariaceae	D	1	1	50	Tiliaceae	D	1	1
23	Loganiaceae	D	1	1	51	Ulmaceae	D	1	1
24	Loranthaceae	D	1	1	52	Urticaceae	D	1	2
25	Lythraceae	D	1	1	53	Verbenaceae	D	5	5
26	Malvaceae	D	4	5	54	Vitaceae	D	2	2
27	Melastomataceae	D	2	2	55	Zingiberaceae	M	1	1
28	Meliaceae	D	1	1		Total		117	138

D – Dicots; M – Monocots

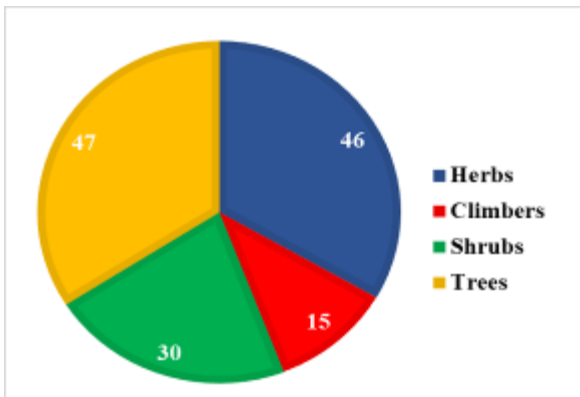
**Fig.1** View of Muniyattukunnu



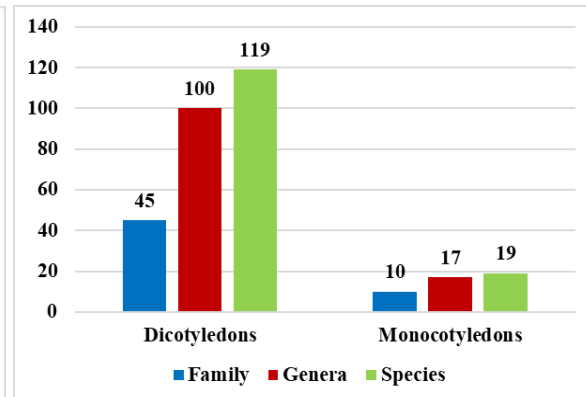
**Fig.2** View of Muniyara in Muniyattukunnu



**Fig.3** Habit of flowering plant species recorded from Muniyattukunnu



**Fig. 4** Floristic composition of plant species recorded from Muniyattukunnu



Commercial enterprises and local dwellers are regularly exploiting natural heritage of these medicinal plants.

The study area contains 15 species of weeds (Table 1), of which 7 are invasive (Reddy *et al.*, 2008; Sankaran *et al.*, 2012). There are various possibilities of utilization of weeds as biological resources which are used as important source of medicines by indigenous peoples (Stepp, 2004).

These weeds are the indication of disturbance in the vegetation of the area. The invasion of weeds is considered as the beginning of ecosystem degradation. The invasions of non-native species can both reduce the state's plant biological diversity and impact the animals that depend on a variety of native plants to survive. The impacts of invasive species can be social, economic and

environmental (Sankaran *et al.*, 2012). Because of their gregarious nature, these weeds not only suppress the native flora but also leading to their poor growth or even death (<http://www.kerenvis.nic.in>). These invasive weeds are one of the reasons for the depletion of natural flora.

The indigenous species are highly vulnerable because their growth and survival are inhibited by invasives (Sankaran and Suresh, 2013).

Human interference is the major risk for this area and the study showed that the natural foliage has been considerably reformed and altered by human activity.

Clearance of natural vegetation for other developmental accomplishments may ruin the plants of the area.

In conclusion, the present biodiversity study explored the plants present in Muniyattukunnu. The human establishments are one of the important causes for rapid decline in biological diversity. The present work showed that the natural vegetation of Muniyattukunnu has been significantly modified and altered by the human activity. Muniyattukunnu is a renowned historic and tourist place, and it is an area under pressure of widespread mining and land encroachment. The sudden developments have generated problems affecting the physical environment and the biotic components as well. The disturbance or clearance of natural flora threatens the existence of the organisms. Some species are adapted to the changes in these determining factors and they have high ecological amplitude. The studies of biodiversity have greater significance as ecologists try critically to document the global diversity and are valuable as a means of improving our understanding regarding the structure and functioning of ecological communities.

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### Author Contributions

Vishnu A. V.: Conceived the original idea, Designed the model, Formal Analysis, Investigation, Writing. P. Tessa Paul: Methodology, Resources, Analyzed the data, Review & Editing, Supervision

### Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

### Declarations

**Ethical Approval** Not applicable.

**Consent to Participate** Not applicable.

**Consent to Publish** Not applicable.

**Conflict of Interest** The authors declare no competing

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