

FLORA OF KERALA (Updating)

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Scientist-E**

**BOTANICAL SURVEY OF INDIA (Deployed)
SOUTHERN REGIONAL CENTRE
COIMBATORE- 641 003**

ABOUT THE PROJECT

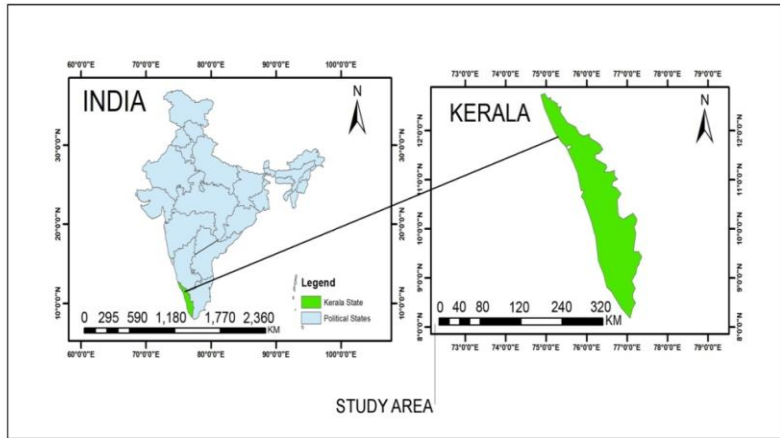
Title of the Project : Flora of Kerala
Executing officials : **Mrs. Murugan, Basil Paul & Sulaiman**
Drs. C. Murugan, K.A. Sujana & M. Murugesan
Dr. M.U. Sharief, Supervisor- cum- Team Leader
Duration : 19.06.2018 – 09.07.2022

Background of the Project: Flora of Kerala initiated during 1992-93 by **Dr A.N. Henry** and later it was pursued by **Dr N.P. Balakrishnan, Dr V.J. Nair, Dr. P. Daniel, Dr G.V.S. Murthy, etc.** Vol. 1 published in 2005 (Dr. P. Daniel) and Vol. 2. published in 2016 Dr . G.V.S. Murthy). In view of complete the Flora of Kerala, Former Director, Botanical Survey of India, Kolkata stressed at the Head of Office meeting held at the Central National Herbarium, Kolkata during May, 2018 (03-05-2018 to 04-05-2018). Hence, four students (*vide* letter No. BSI-292/2/2018-Tech dated 14-06-2018 & BSI, SRC, 5/67(Fl. Ind.) 2018/Tech 773 dated 19-06-2018; BSI, SRC, 5/67(Fl. Ind.) 2018/Tech 774 dated 19-06-2018; BSI, SRC, 5/67(Fl. Ind.) 2018/Tech 775 dated 19-06-2018) allotted to the Botanical Survey of India, Coimbatore to complete the target of Flora of Kerala Vol 3-7.

STATUS OF FLORA OF KERALA

Sl. No.	Title	Families	Status
1.	Flora of Kerala Vol. 1	Ranunculaceae to Connaraceae	Published 31-12-2005
2.	Flora of Kerala Vol. 2	Papilionaceae to Cornaceae	Published June, 2016
3.	Flora of Kerala Vol. 3 Reallotted 2018 & 2020	Caprifoliaceae to Menyanthaceae	Ongoing
4.	Flora of Kerala Vol. 4 Reallotted 2018 & 2020	Hydrophyllaceae to Plantaginaceae	Ongoing
5.	Flora of Kerala Vol. 5	Nyctaginaceae to Ceratophyllaceae	Manuscript will be submitted shortly by Dr. G.V.S. Murthy
6.	Flora of Kerala Vol. 6 Reallotted 2018 & 2020	Orchidaceae to Potamogetonaceae	Ongoing
7.	Flora of Kerala Vol. 7	Cyperaceae to Poaceae	Submitted to Director, BSI, Kolkata

STUDY AREA - KERALA



KERALA – Southernmost state of India

Location – 8°18' to 12°48' N & 74°52' to 77°22' E

Total Area – 38,864 km² (1.18 % of India)

Forest Area: 30%

Elevation: -2.2 m – 2695 m

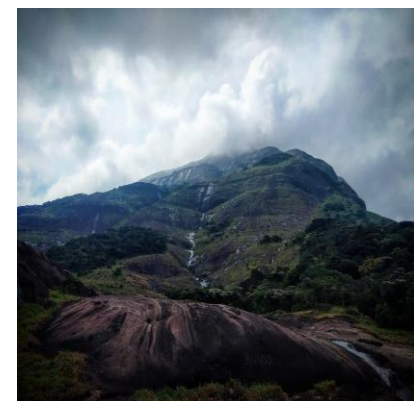
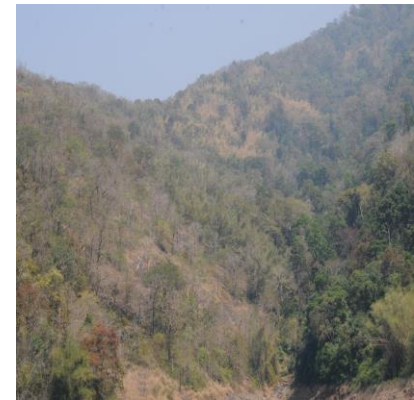
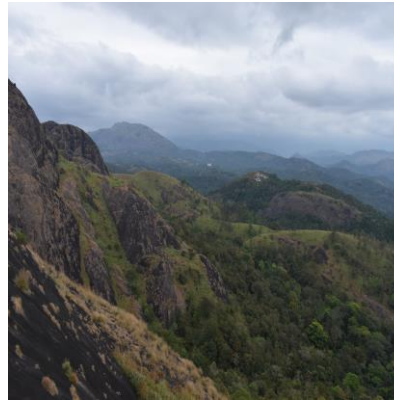
Forest Types

- Tropical Dry Deciduous Forests
- Tropical Moist Deciduous Forests
- Tropical Wet and Semi-evergreen Forests
- Montane Subtropical Temperate Forests
- Grasslands

Geography

- Lowland (Coastal Region)
- Midland
- Highland (Mountainous Region)

Districts: 14



OBJECTIVES

- To update of Flora of Kerala,
**Vol. 3 (Gamopetalae Part I),
Vol. 4 (Gamopetalae Part II),
Vol. 6 (Monocot)**
as per format of Vol. 1 & 2.

METHODOLOGIES

- Literature survey and review of past work
- Updation of Manuscripts
- Consultation of Herbarium
- Field survey and preparation of vouchers using standard methods
- Incorporation of specimens to MH

Flora of Kerala Volume 3: Gamopetalae Part-I (230 Genera and 783 Taxa 25 Families)

List of families.

Sl. No.	Name of the Family	No. of the Genera	No. of the Species	Sl. No.	Name of the Family	No. of the Genera	No. of the Species
1	CAPRIFOLIACEAE	2	4	14	EBENACEAE	1	31
2	RUBIACEAE	55	253	15	SYMPLOCACEAE	1	14
3	VALERIANACEAE	1	3	16	OLEACEAE	6	34
4	COMPOSITAE (ASTERACEAE)	66	189	17	NYCTANTHACEAE	1	1
				18	SALVADORACEAE	1	1
5	GOODENIACEAE	1	1	19	APOCYNACEAE	26	40
6	CAMPANULACEAE	4	10	20	ASCLEPIADACEAE	21	72
7	LOBELIACEAE	1	6	21	PERIPLOCACEAE	6	8
8	VACCINIACEAE	1	2	22	LOGANIACEAE	5	13
9	ERICACEAE	2	2	23	BUDDLEIACEAE	1	1
10	PLUMBAGINACEAE	1	2	24	GENTIANACEAE	6	28
11	PRIMULACEAE	2	3	25	MENYANTHACEAE	1	7
12	MYRSINACEAE	7	24	Total		230	783
13	SAPOTACEAE	8	22				

STATUS OF THE FLORA OF KERALA VOLUME 3 (GAMOPETALAE PART I)

VOLUME NO. 3 (GAMOPETALAE- PART I) 25 FAMILIES, 230 GENERA AND 783 TAXA				
S. NO.	FAMILY	GENERA & TAXA	MANUSCRIPT	STATUS
1	CAPRIFOLIACEAE	2 G & 4 T	✓	Completed
2	RUBIACEAE	55 G & 253 T	✓	Updation is in Progress
3	VALERIANACEAE	1 G & 3 T	---	Completed
4	ASTERACEAE	66 G & 189 T	---	Completed
5	GOODENIACEAE	1 G & 1 T	---	Completed
6	CAMPANULACEAE	4 G & 10T	---	Completed
7	LOBELIACEAE	1 G & 6 T	---	Completed
8	VACCINIACEAE	1 G & 2 T	---	Completed
9	ERICACEAE	2 G & 2 T	---	Completed
10	PULMBAGINACEAE	1 G & 2 T	---	Completed
11	PRIMULACEAE	2 G & 3 T	---	Completed
12	MYRSINACEAE	7 G & 24 T	✓	Completed
13	SAPOTACEAE	8 G & 22 T	✓	Updation is in Progress
14	EBENACEAE	1 G & 31 T	---	Completed
15	SYMPLOCACEAE	1 G & 14 T	✓	Updation is in Progress
16	OLEACEAE	6 G & 34 T	---	Completed
17	NYCTANTHACEAE	1 G & 1 T	✓	Completed
18	SALVADORACEAE	1 G & 1 T	✓	Completed
19	APOCYNACEAE	26 G & 40 T	---	Pending
20	ASCLEPIADACEAE	21 G & 72 T	✓	Updation is in Progress
21	PERIPLOCACEAE	6 G & 8 T	✓	Updation is in Progress
22	LOGANIACEAE	5 G & 13 T	✓	Completed
23	BUDDLEIACEAE	1 G & 1 T	---	Completed
24	GENTIANACEAE	6 G & 28 T	✓	Completed
25	MENYANTHACEAE	1 G & 7 T	---	Completed

COMPOSITAE (ASTERACEAE *nom. alt.*)

Annual or Perennial, herbs, shrubs, occasionally trees or climbers; erect, decumbent, prostrate or twining, pubescent or tomentose or glandular, rarely laticiferous. Leaves simple or pinnately compound, opposite, alternate, sometimes radical, entire to variously lobed or divided; sessile or petiolate or sometimes auriculate at base. Inflorescence axillary or terminal, heads solitary or few to many, homogamous or heterogamous, discoid, disciform, radiate, or ligulate discoid or radiate; involucre bract 1 to many-seriate; sometimes outer bracts present and often differing from phyllaries; receptacle usually flattened, sometimes slightly concave or convex, rarely conical, smooth or alveolate, paleate or epaleate, with bristles, scales, hairs, or naked. Florets bisexual, female, or functionally male. Corolla (3–)5-merous, gamopetalous, tubular or tubular-filiform, and regular, radiate, or ligulate. Stamens (4 or)5, syngenesious; filaments adnate to proximal part of corolla; anthers basifixed or dorsifixed, ovate or lanceolate appendage. Style apically bifid or rarely entire, style branches variously shaped, hairs, or papillae. Ovary inferior, 1-loculed; ovule 1, basal, anatropous. Achenes dry, indehiscent, terete, angular or compressed, ridged and grooved or striate. Pappus usually considered as reduced calyx of hairs, 1 to many rows of scales or bristles, awns or absent.

Cosmopolitan especially temperate and subtropical regions, 1568 genera and 25,000 species, 193 and 999 in India and, 66 and 189 in Kerala.

Literature: Grierson, A.J.C. 1980. *Compositae*. In: Dassanayake, M.D. (ed.), *Revis. Handb. Fl. Ceylon* 1: 111 – 278. Chen, Y.S., Shi, Z., Anderberg, A.A & Gilbert, M.G. 2011. Asteraceae. In: Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds), *Flora of China*, 20 & 21: 892 -894. Mabberley, D.J. 2018. Mabberley's Plant-book: A portable dictionary of plants, their classification and uses, 223 – 228.

ACANTHOSPERMUM Schrank

Annual, herbs, dichotomously branched. Leaves simple or pinnatifid, opposite, blade mostly elliptic to deltate, rhombic or ovate, sometimes lyrate, margin entire or toothed; petiolate or sessile. Inflorescence capitula, heterogamous, radiate, 1; phyllaries persistent or deciduous, 10-13, biseriate. Ray florets 5-8, ligulate, yellow, female, fertile. Disk florets 3-8 (-12), functionally male; corollas yellowish, lobes 5, deltate. Anthers base rounded; apical appendage ovate, inflexed. Achenes of ray flowers fertile, trigonous, slightly compressed, echinate with straight or usually uncinat prickle; achenes of disc flowers sterile; pappus absent.

Tropics especially America and introduced to Old World *ca.* 6 species, 1 in India and 1 in Kerala.

Literature: Blake, S.F. 1921. Revision of the genus *Acanthospermum*. *Con trib. U.S. Nat. Herb.* 20: 383-392. Stuessy, T.F. 1970. The genus *Acanthospermum* (*Compositae-Heliantheae-Melampodinae*): Taxonomic changes and generic affinities. *Rhodora*, 72: 106-109.

Acanthospermum hispidum DC., *Prodr.* 5: 522. 1836; Gamble, *Fl. Pres. Madras* 2: 704. 1921; Manilal & Sivar., *Fl. Calicut*: 151. 1982; Mohanan, *Fl. Quilon Dist.*: 224. 1984; Ansari, *Fl. Kasaragod Div.*: 207. 1985; Ramach. & Nair, *Fl. Cannanore Dist.*: 240. 1988; Antony, *Syst. Stud. Fl. Kottayam Dist.*: 207. 1989; Babu, *Fl. Malappuram Dist.*: 357. 1990; Vajr., *Fl. Palghat Dist.*: 247. 1990; Mohanan & Henry, *Fl. Thiruvanthapuram*: 251. 1994; H.J. Chowdhery in Hajra *et al.*, *Fl. India* 12: 361. 1995; Sasidh. & Sivar., *Fl. Pl. Thrissur For.*: 243. 1996; Swarup. *et al.*, *Shola For. Kerala*: 37. 1998; Sivar. & Mathew, *Fl. Nilambur*: 356. 1997; Sasidh., *Fl. Periyar Tiger Reserve*: 192. 1998; Sasidh., *Fl. Chinnar WLS*: 160. 1999; Sasidh., *Fl. Parambikulam WLS*: 165. 2002; Anil Kumar *et al.*, *Fl. Pathanamthitta*: 273. 2005; Sunil & Sivadasan, *Fl. Alappuzha Dist.*: 373. 2009; Ratheesh Narayanan, *Fl. Stud. Wayanad Dist.*: 456. 2009.

Mal.: *Njeringil, Musumus*

Annual, densely hispid erect herbs, up to 60 cm high; branchlets terete, ascending dichotomously branched, covered with spreading hirsute hairs. Leaves simple, opposite, obovate to spatulate or oblanceolate or elliptic, 3 - 8 × 2 - 6 cm, cuneate to attenuate at base, margin shallowly serrate, obtuse to acute at apex, whitish pilose on both surfaces; petiole 0 or subsessile. Inflorescences axillary or sometimes terminal, capitula, radiate; sessile or subsessile, involucre bracts in two series; outer 5, lanceolate, 3.5 - 4.5 mm long, pubescent; inner connate, 3 - 5 mm long, enveloping the ovary of ray florets, softly prickly with two long awns. Ray florets 5-8, female; corolla 2 mm long, elliptic, pale yellow; 3-lobed. Styles puberulous. Disk florets 5 - 7, bisexual; corolla 1.5 - 2.5 mm long, yellow; tube 5-lobed, papillose. Stamens 5; anthers linear with sagittate base. Style shortly bifid. Scales narrowly spatulate, 1.5 - 2 mm long. Achenes of ray florets, 5 - 6 mm long, obovate-cuneate, black, covered with stiff, hooked bristles and two longer awns, strongly compressed; achenes of disc florets, sterile, glandular. Pappus absent.

Fl. & Fr.: Jan. – June

Habitat: Roadsides, waste lands and open forests.

Distrib.: Throughout Kerala. All places of India. Pantropical and introduced to Old World.

ACHEIVEMENTS/OUTCOMES(2020-2021)

1. **Documentation:** A total number of **79** taxa belongs to **04** families were documented and also updated manuscripts for two families Gentianaceae & Loganiaceae.

Sl. No.	Name of the Family	No of Genera documented	No of Species documented
1.	COMPOSITE (ASTERACEAE)	87	27
2.	EBENACEAE	01	26
3.	MYRSINACEAE	06	22
4.	GENTIANACEAE	00	04
TOTAL		94	79

2. **Field exploration:** A total of **38** days was in field and **128** field numbers vouched; ca. **400** photographs were taken and **116** taxa identified.

Sl. No.	Period	Field Visit & Field Survey	Field no. vouched
1	12.11.2020 & 13.11.2020	Vazhikkadavu Forest Range, Malappuram	05
2	14.12.2020 & 20.12.2020	Idukki Wildlife Sanctuary, Idukki	28
3	04.01.2021 To 10.01.2021	Olavakkodu Forest Range, Palakkad	14
4	23.01.2021 & 24.01.2021	Pampadum Shola National Park, Idukki	04
5	02.02.2021 to 07.02.2021	Marayoor Forest Range, Idukki	23
6	15.02.2021 to 19.02.2021	Edamalayar Forest Range, Ernakulam	06
7	22.03.2021 To 30.03.2021	Agasthyamalai Biosphere Reserve, Thiruvananthapuram	48
Total			128

3. **Herbarium consultation:** Consulted a total of **965** Herbarium sheets deposited in MH and FRC, Coimbatore.



Acranthera grandiflora Bedd.



Aidia gardneri (Thwaites) Tirveng.



Cyanthillium hookerianum (Arn.) H.Rob.



Monosis travancorica (Hook.f.) H.Rob. & Skvarla



Canthiumera neilgherrensis (Wight) K.M.Wong



Hedyotis travancorica Bedd.



Senecio ludens C.B.Clarke



Uniyala bourdillonii (Gamble) H.Rob. & Skvarla



Octotropis travancorica Bedd.



Pseudaidia speciosa (Bedd.) Tirveng.



Uniyala comorinensis (W.W.Sm.) H.Rob. & Skvarla



Uniyala salviifolia (Wight) H.Rob. & Skvarla

Flora of Kerala Volume 4: Gamopetalae Part-II (177 Genera and 641 Taxa under 16 Families)

Sl. No.	Name of the Family	No. of the Genera	No. of the Species
1	HYDROPHYLLACEAE	1	1
2	BORAGINACEAE	9	26
3	CONVOLVULACEAE	17	84
4	SOLANACEAE	12	40
5	SCROPHULARIACEAE	27	74
6	OROBANCHACEAE	3	7
7	LENTIBULARIACEAE	1	24
8	GESNERIACEAE	5	15
9	BIGNONIACEAE	17	20
10	PEDALIACEAE	3	6
11	ACANTHACEAE	37	174
12	VERBENACEAE	19	52
13	SYMPHOREMATACEAE	2	2
14	AVICENNIACEAE	1	2
15	LAMIACEAE	22	113
16	PLANTAGINACEAE	1	1
Total		177	641

STATUS OF THE FLORA OF KERALA VOLUME 4 (GAMOPETALAE PART II)

VOLUME NO. 4 (GAMOPETALAE- PART II) 16 FAMILIES, 177 GENERA AND 641 TAXA				
S. NO.	FAMILY	GENERA & TAXA	MANUSCRIPT	STATUS
1	HYDROPHYLLACEAE	1 G & 1 T	---	Completed
2	BORAGINACEAE	9 G & 26 T	---	Completed
3	CONVOLVULACEAE	17 G & 84 T	✓	Updation is in Progress
4	SOLANACEAE	12 G & 40 T	---	Completed
5	SCROPHULARIACEAE	27 G & 74 T	✓	Updation is in Progress
6	OROBANCHACEAE	3 G & 7T	---	Completed
7	LENTIBULARIACEAE	1 G & 24 T	✓	Updation is in Progress
8	GESNERIACEAE	5 G & 15 T	---	Pending
9	BIGNONIACEAE	17 G & 20 T	---	Pending
10	PEDALIACEAE	3 G & 6 T	---	Completed
11	ACANTHACEAE	37 G & 174 T	---	Pending
12	VERBENACEAE	19 G & 52T	✓	Updation is in Progress
13	SYMPHOREMATAACEAE	2 G & 2 T	---	Completed
14	AVICENNIACEAE	1 G & 2 T	---	Completed
15	LAMIACEAE	22 G & 113 T	---	Pending
16	PLANTAGINACEAE	1 G & 1 T	---	Completed

ACANTHACEAE

Herb or shrub, erect, climbing or prostrate, occasionally twining; stem quadrangular, terete or subterete, nodes bulged, greenish to purplish, hairy or glabrous. Leaves simple, opposite, decussate, occasionally subradicle in whorls, exstipulate; lamina generally variously lineolate with cystoliths, margin entire or serrate or pinnatifid, petiolate or sessile. Inflorescence solitary or cymes, terminal or axillary raceme or spikes or often developed into panicles. Flowers zygomorphic, bisexual, pedicellate or sessile; bracts 1, 2 or more, conspicuous, large and brightly colored or small and greenish, often spinose; bracteoles present or absent, usually 2, less conspicuous. Calyx 4 or 5 lobed, lobes equal or unequal, often spinescent. Corolla campanulate or infundibular often tubular-ventricose, sympetalous; tube cylindrical or tubular; limb usually 5 lobed or bilipped (upper lip entire or bilobed, lower lip 3 lobed), spreading, imbricate or twisted in bud. Stamens epipetalous, 2 or 4 and didynamous, with or without staminodes, included or exerted; anther usually 2-thecous, thecae unequal, parallel, superposed, mucicous or spurred, basifixed. Ovary superior, oblong-cylindrical, bilocular, 1 or more ovules per locule, placentation axile; style slender, stigma usually bifid, curved or capitate. Capsule ovoid, oblong, cylindrical or clavate, apex with or without beak, 2 or more seeded, valves often elastically dehiscent; seeds ovoid or orbicular, often compressed, smooth, tuberculate or rugose, supported by hook like retinacula; endosperm absent.

C. 202 genera and 3800 species distributed in the tropical regions including open country and deserts, extending to Mediterranean, U.S.A and Australia; 49 genera and 472 species in India; 35 genera and 202 taxa in Kerala.

JUSTICIA L.

Herbs or shrubs; stem quadrangular-subterete, nodes bulged, glabrous-pubescent. Leaves entire, lanceolate, linear, elliptic or ovate. Inflorescence spikes or panicles, often solitary or clustered. Flowers zygomorphic, bisexual, sessile-subsessile; bracts various, bracteoles usually narrow or absent; calyx 5 or 4 lobed; lobes linear-lanceolate, narrow, acute-acuminate often mucronate. Corolla tube slender or cylindrical, as long as or shorter than the calyx; limb bilipped; upper lip usually bilobed, rarely entire-emarginated; lower lip 3 lobed with slightly large middle lobe; purplish or white striated, imbricate in bud. Stamens 2, filaments slender, often dilated, hairy at base; anthers 2-loculed; thecae oblong or round, superposed, lower thecae spurred at base. Ovary oblong or ovate, glabrous-pubescent, 2-celled; 2 ovules in each cell; style filiform, pubescent at base; stigma shortly bifid or subcapitate. Capsule ovoid, ellipsoid or clavate, solid at base or not; seeds 4, ovoid or suborbicular, compressed, glabrous or pubescent, tuberculate, rugose; retinacula curved, acute.

c. 700 species, distributed in tropical and temperate regions, 53 species in India and 24 species in Kerala.

Literature: Mabberley, D.J. 2018. *The Plant-Book – A Portable Dictionary of the Higher Plants. 4th revised edition:* 482. Cambridge University Press, Cambridge.

Justicia santapau Bennet, Journ. Bombay Nat. Hist. Soc. 67: 358. 1970; Mohanan, Fl. Quilon: 305. 1984; V.S. Ramach. & V.J. Nair, Fl. Cannanore: 341. 1988; Vajr., Fl. Palghat: 352. 1990; M. Mohanan & A.N. Henry, Fl. Thiruvanth.: 349. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur: 342. 1996; Sivar. & Mathew, Fl. Nilambur: 511. 1997; Anil Kumar et al., Fl. Pathanamthitta: 382. 2005; Sasidh., Biodiv. Doc. Kerala 6. Fl. Pl.: 347. 2004; T.S. Nayar & al., Fl. Pl. Kerala: 24. 2006; Ratheesh, Fl. Stud. Wayanad: 618. 2009. *Hemichoristemontana* Nees in Wall., Pl. Asiat. Rar. 3: 102. 1832. *Justicia montana* (Nees) Wall. ex Anders., J. Linn. Soc. Bot. 9: 509. 1867, non Roxb. 1805; Hook.f., Fl. Brit. India 4: 525. 1883; Gamble, Fl. Madras 2: 1078(755). 1924.

Mal.: *Kattuvellakurunji*

Erect shrubs, about 3 m high; stem quadrangular, nodes bulged, glabrous except young parts, grooved. Leaves simple, opposite, decussate, exstipulate, elliptic, 15 – 32 × 5 – 10 cm, attenuate at base, margin entire, acute-subacuminate at apex, chartaceous, glabrous above, glabrous-glabrescent below; lateral nerves 7 – 10 pairs; petiole up to 6 cm long, glabrescent. Inflorescence terminal or upper axillary spikes, 10 – 20 cm long minutely pubescent. Flowers zygomorphic, bisexual, subsessile, fascicled on the nodes; bracts elliptic – oblong, 5 – 7 × 3 – 4 mm, acute-mucronate at apex, pubescent; bracteoles elliptic, thin, 5 – 6 × 2 – 3 mm, acute at apex, pubescent. Calyx 5 lobed; lobes lanceolate, 8 – 12 × 2 – 3 mm, acuminate at apex, pubescent; Corolla white with purple spots; tube cylindrical, 5 – 6 mm long; bilipped; upper lip oblong, slightly bilobed, 1.6 – 2.2 × 0.6 – 0.7 cm; lower lip broadly ovate, 3 lobed; lobes 1.5 – 2 × 0.5 – 0.7 cm, obtuse-rounded at apex, pubescent at base. Stamens 2, filaments 1.3 – 1.6 cm long, pubescent at base, anther bilobed; lobes 3 mm long, oblong, superposed, spurred at base, pale green. Ovary superior, oblong, c. 2 × 1 mm, tomentose; style 2 – 2.5 cm long, pubescent at base; stigma subcapitate. Capsule clavate, 2 – 2.5 × 0.5 – 0.6 cm, pubescent; seeds 4, 4 mm across, suborbicular, rugose.

Fl. & Fr.: Dec. – June.

Habitat: Evergreen and semi-evergreen forests

Distrib.: Idukki, Kannur, Kollam, Kozhikode, Malappuram, Palakkad, Thiruvananthapuram, Thrissur and Wayanad. Karnataka, Maharashtra and Tamil Nadu.

Endemic to India.

ACHEIVEMENTS/OUTCOMES(2020-2021)

1. **Documentation:** A total number of **186** taxa belongs to 6 families documented.

Sl. No.	Name of the Family	No. of taxa documented
1.	Acanthaceae	16
2.	Gesneriaceae	12
3.	Lamiaceae	97
4.	Orobanchaceae	7
5.	Pedaliaceae	5
6.	Solanaceae	49
Total		186

2. **Field exploration:** A total of **36** days spent in field and **139** field numbers vouched; ca. **300** photographs were taken and **132** taxa identified.

Sl. No.	Area	Duration	Field numbers vouched
1.	Vazhikadavu Forest Range, Nilambur, Malappuram	12.11.2020 & 13.11.2020	8
2.	Idukki Wildlife Sanctuary, Idukki	14.12.2020 – 20.12.2020	35
3.	Olavakkode Forest Range, Palakkad	04.01.2021 – 10.01.2021	38
4.	Marayoor Sandal Division, Idukki	02.02.2021 – 07.02.2021	11
5.	Edamalayar Forest Range, Ernakulam	15.02.2021 – 19.02.2021	15
6.	Agasthyamalai Biosphere Reserve, Thiruvananthapuram	22.03.2021 – 30.03.2021	32
Total			139



Plate 1: A. *Leptostachya wallichii* Nees B. *Phlogacanthus grandis* Bedd. C. *Pogostemon travancoricus* Bedd. D. *Rungia wightiana* Nees E. *Scutellaria violacea* B. Heyne ex Benth. F. *Sirobilanthes foliosa* (Wight) T. Anderson, G. *Thunbergia mysorensis* (Wight) T. Anderson H. *Torenia bicolor* Dalz..



Plate 2: A. *Aeschynanthus perrottetii* A. DC. B. *Asystasia chelonoides* Nees C. *Barleria courtallica* Nees D. *Barleria involucrata* Nees E. *Callicarpa tomentosa* Lam. F. *Clerodendrum infortunatum* L. G. *Gomphostemma eriocarpon* Benth. H. *Justicia latispica* (C. B. Clarke) Gamble

Flora of Kerala Volume 6: Monocot

(191 Genera and 623 Taxa under 38 Families)

Sl. No.	Name of the Family	No. of the Genera	No. of the Species	Sl. No.	Name of the Family	No. of the Genera	No. of the Species
1	Orchidaceae	77	264	20	Liliaceae	10	19
2	Zingiberaceae	10	64	21	Iridaceae	2	2
3	Marantaceae	4	4	22	Pontederiaceae	2	2
4	Musaceae	1	4	23	Xyridaceae	1	4
5	Sterlitziaceae	1	1	24	Commelinaceae	8	55
6	Heliconiaceae	1	1	25	Flagellariaceae	1	1
7	Cannaceae	1	1	26	Juncaceae	2	5
8	Costaceae	1	4	27	Arecaceae	11	45
9	Bromeliaceae	1	1	28	Pandanaceae	1	6
10	Haemodoraceae	2	2	29	Typhaceae	1	1
11	Taccaceae	1	1	30	Araceae	20	65
12	Dioscoreaceae	1	19	31	Lemnaceae	3	4
13	Trichopodaceae	1	1	32	Triuridaceae	1	1
14	Smilacaceae	1	5	33	Alismataceae	3	5
15	Agavaceae	2	4	34	Limnocharitaceae	1	1
16	Dracaenaceae	2	2	35	Hydrocharitaceae	4	5
17	Hypoxidaceae	3	3	36	Najadaceae	1	3
18	Amaryllidaceae	4	7	37	Aponogetonaceae	1	3
19	Burmanniaceae	2	7	38	Potamogetonaceae	1	1
				Total		191	623

STATUS OF THE FLORA OF KERALA VOLUME 6 (MONOCOT)

Sl. No.	Name of the Family	Genera & Taxa	Manu script	Status
1	Orchidaceae	77 G & 264 T	---	Completed
2	Zingiberaceae	10 G & 64 T	✓	Completed
3	Marantaceae	4 G & 4 T	---	Completed
4	Musaceae	1 G & 4 T	---	Completed
5	Sterlitziaceae	1 G & 1 T	---	Pending
6	Heliconiaceae	1 G & 1 T	---	Pending
7	Cannaceae	1 G & 1 T	---	Pending
8	Costaceae	1 G & 4 T	---	Completed
9	Bromeliaceae	1 G & 1 T	---	Pending
10	Haemodoraceae	2 G & 2 T	---	Pending
11	Taccaceae	1 G & 1 T	---	Pending
12	Dioscoreaceae	1 G & 19 T	✓	Completed
13	Trichopodaceae	1 G & 1 T	---	Pending
14	Smilacaceae	1 G & 5 T	✓	Updation is in progress
15	Agavaceae	2 G & 4 T	---	Completed
16	Dracaenaceae	2 G & 2 T	---	Pending
17	Hypoxidaceae	3 G & 3 T	---	Pending
18	Amaryllidaceae	4 G & 7 T	✓	Completed
19	Burmanniaceae	2 G & 7 T	✓	Completed

Sl. No.	Name of the Family	No. of the Genera	Manusc ript	Status
20	Liliaceae	10 G & 19 T	✓	Completed
21	Iridaceae	2 G & 2 T	✓	Completed
22	Pontederiaceae	2 G & 2 T	✓	Completed
23	Xyridaceae	1 G & 4 T	✓	Completed
24	Commelinaceae	8 G & 55 T	✓	Completed
25	Flagellariaceae	1 G & 1 T	---	Pending
26	Juncaceae	2 G & 5 T	---	Completed
27	Arecaceae	11 G & 45 T	---	Completed
28	Pandanaceae	1 G & 6 T	---	Pending
29	Typhaceae	1 G & 1 R	---	Pending
30	Araceae	20 G & 65 T	✓	Updation is in progress
31	Lemnaceae	3 G & 4 T	---	Pending
32	Triuridaceae	1 G & 1 T	---	Pending
33	Alismataceae	3 G & 5 T	---	Pending
34	Limnocharitaceae	1 G & 1 T	---	Pending
35	Hydrocharitaceae	4 G & 5 T	---	Pending
36	Najadaceae	1 G & 3 T	---	Pending
37	Aponogetonaceae	1 G & 3 T	---	Pending
38	Potamogetonaceae	1 G & 1 T	---	Pending

ORCHIDACEAE

Perennial. Terrestrial, Epiphytes, lithophytes, autotrophic or mycotrophic. Rhizomes, tubers, roots clustered or scattered along the stem or rhizome with or without velamen. Stems either symbodial or monopodial, usually leafy, leaves sometimes reduced to bract like scales, 1 or many internodes at base often swollen to form a pseudobulb. Leaves 1 to many, alternate or opposite often distichous, terete or caudiculate, glabrous or very rarely hairy, frequently fleshy or leathery, base almost always sheathing, sometimes articulated, sometimes forming a false petiole, margin entire, apex at often emarginated. Inflorescence basal, lateral, terminal, erect, pendulous, racemose, spicate, sub umbellate, paniculate, 1 to many flowered, flowers rarely secund or distichously arranged. Flowers small to large, usually zygomorphic, very rarely actinomorphic, usually bisexual, sessile or pedicellate, most often resupinate with pedicel and ovary twisted through 180°, occasionally not twisted or twisted through 360°. Ovary inferior, 1-locular, parietal placentation or rarely 3-locular and axil placentation. Sepals usually free, sometimes variously adnate; dorsal sepal dissimilar to laterals, lateral sepals sometimes adnate to a column foot to form a saccate, conic or spur like mentum. Petals free or rarely partly adnate to sepals, similar to sepals or not. Lip entire, lobed or 2 or 3 partite, ornamented, ridges, hair cushions or crests, with or without a basal spur or nectar, margins entire or laciniate. Column short to long, with or without a basal foot. Anther mostly 1, less often 2 or 3, terminal or ventral on column, caplike. Pollen usually forming distinct pollinia, usually pollinia 2, 4, 6 or 8, mealy, waxy or horny, sectile or not, sessile or attached by stalks (Caudicles or Stipes) to 1 or 2 sticky viscidia; Stigma 3-lobes; midlobe modified to form a rostellum, other lobes either sunken on ventral surface of column behind anther or 2 lobes porrect. Fruit a capsule, rarely berry like, usually opening laterally by 3 or 6 slits. Seeds very numerous, dust like, lacking endosperm, rarely winged.

About 762 genera and 26000 species worldwide, 186 and 1298 in India and 74 and 267 in Kerala.

Literature: Mabberley 2018. Mabberley's Plant Book 4: 652. Cambridge.

ACAMPE Lindl.

Epiphytes or Lithophytes. Stem usually simple or branched, long and stout. Leaves coriaceous, keeled, distichous, apex at emarginated or bilobed. Inflorescence axillary, racemose, corymbose or paniculate. Floral bracts persistent, inconspicuous, scale like. Flower fragile, corymbose, often panicked, fleshy. Sepals and petals similar, flat to curved; dorsal sepal often slightly larger than the lateral; lateral sepals adnate to spur. Lip upcurved, saccate or spurred, adnate to the column, rigid, often tubercled or pubescent within, papillose. Column short, thick; foot absent. Anther 2-celled, ovoid, apiculate; pollinia 2, waxy, globose; caudicle slender, longer than the pollinia; gland small, rotund. Stigma transverse, concave; rostellum short, emarginated.

About 7 species in worldwide, 5 in India and 2 in Kerala.

Acampe ochracea (Lindl.) Hochr., Bull. New York Bot. Gard. 6: 270. 1910; Abraham & Vatsala, Introd. Orchids: 452. 1981; V.S. Ramach. & V.J. Nair, Fl. Cannanore: 446. 1988; M. Kumar, Epiphytic Fl. Western Ghats: 74. 1998; Sasidh., Fl. Periyar Tiger Reserve: 399. 1998; Sasidh., Fl. Parambikulam WLS: 319. 2002; C.S. Kumar & Manilal, Orchid Memories: 163. 2004; Anil Kumar & al., Fl. Pathanamthitta: 477. 2005; Ratheesh, Fl. Stud. Wayanad: 781. 2009; T. S. Nair, M. Sibi & A. Rasiya Beegam, Flowering Plants of Western Ghats: 2. 1063. 2014. *Saccolabium ochraceum* Lindl., *Edwards's Bot. Reg. 28(Misc.): 2. 1842; Hook.f., Fl. Brit. India 6: 62. 1890.*

Epiphytes. Stem 7 mm diam., stout, covered by sheaths; sheaths cylindrical, overlapping. Leaves 8-22 x 1.5-2.5 cm, many, distichous, fleshy, rigid, oblong, obtuse, apex at unequally 2-lobed. Inflorescence a paniculate, 7-22 cm long, sub-erect, few to many flowered; peduncle slender, branched, glabrous. Flowers yellow with irregular brown marking, 0.6-1.2 cm across. Bracts 1-1.5 x 1-1.5 mm, broadly triangular, sub-tubular. Dorsal sepal 5.5-6 x 1.5-2 mm, broadly oblanceolate, obtuse; lateral sepals 5-5.5 x 1.5-2.3mm, oblong, weakly falcate, obtuse. Petals 4-4.5 x 1.5-1.8 mm, spatulate, obtuse. Lip 3-4 x 1.5-2 mm, 3-lobed; lateral lobes small, sub-triangular, erect, dentate below; midlobe white with brown spotted, deflexed, fleshy, broadly oblong, obtuse, undulate margin; spur yellow with brown spotted, 3-4 mm long, cylindrical, hirsute within. Column ca 2 mm long, thick, dentate. Anther cap dome shaped, beaked; pollinia 0.1-0.2 mm long; caudicle 1 mm long, clavate. Pedicel with ovary 2-6 mm long, slender, sparsely pubescent. Capsule 2-2.9 x 0.5-0.8 cm, fusiform, ovoid, sub-sessile.

Fl. & Fr.: Nov. - May

Habitat: Moist deciduous and Semi-evergreen forests.

Western Ghats: Maharashtra, Karnataka and Kerala Distrib.: Idukki, Kannur, Palakkad, Pathanamthitta and Wayanad. India, Sri Lanka, Bhutan, Bangladesh, Myanmar, China, Thailand, Laos, Cambodia and Vietnam.

Notes: Very distinct species, at once separated from the common *A. praemorsa* by the slender, much branched inflorescence bearing small flowers.

ACHEIVEMENTS/OUTCOMES(2020-2021)

1. **Documentation:** A total number of **190** taxa belongs to **8** families were documented.

Sl. No.	Name of the Family	No. of taxa documented
1.	Orchidaceae	106
2.	Arecaceae	44
3.	Costaceae	4
4.	Juncaceae	5
5.	Smilacaceae	6
6.	Flagellariaceae	1
7.	Dioscoreaceae	17
8.	Marantaceae	7
Total		190

2. **Field exploration:** A total of **34** days spent in field and **163** field numbers vouched; ca. **350** photographs were taken and **140** taxa identified.

Sl. No.	Area	Duration	Field numbers vouched
1.	Idukki Wildlife Sanctuary, Idukki	14.12.2020 – 20.12.2020	32
2.	Olavakkode Forest Range, Palakkad	04.01.2021 – 10.01.2021	44
3.	Marayoor Sandal Division, Idukki	02.02.2021 – 07.02.2021	16
4.	Edamalayar Forest Range, Ernakulam	15.02.2021 – 19.02.2021	13
5.	Agasthyamalai Biosphere Reserve, Thiruvananthapuram	22.03.2021 – 30.03.2021	58
Total			163

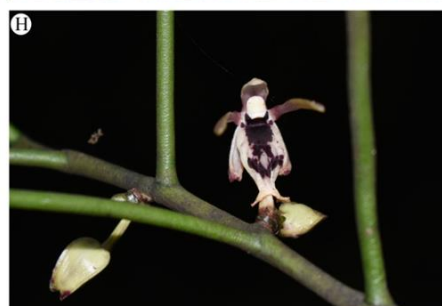


Figure 4. A. *Bulbophyllum indicum* (C.S.Kumar & Garay) Kottaim., B. *Chiloschista glandulosa* Blatt. & McCann, C. *Dendrobium herbaceum* Lindl., D. *Dendrobium panduratum* subsp. *villosum* Gopalan & A.N. Henry, E. *Dendrobium wightii* A.D.Hawkes & A.H.Heller, F. *Eulophia muda* Lindl., G. *Liparis elliptica* Wight, H. *Luisia abrahami* Vatsala.

Figure 5. A. *Oberonia bicornis* Lindl., B. *Oberonia brachystachys* Lindl., C. *Oberonia nayarii* R. Ansari & N.P. Balakr., D. *Peristylus spiralis* A.Rich., E. *Trichoglottis tenera* (Lindl.) Rchb.f., F. *Zeuxine gracilis* (Breda) Blume, G. *Alpinia abundiflora* Burtt & R.M.Sm., H. *Amomum muricatum* Bedd.

PLAN for 2021 – 2022

	Q1	Q2	Q3	Q4
Herbarium consultation		✓		
Field survey	✓	✓	✓	
Documentation	✓	✓	✓	
Updation of manuscript	✓	✓	✓	
Key preparation	✓	✓	✓	
Compilation of report			✓	✓
Submission of report				✓

DETAILS OF PUBLICATION

2018 Research Articles Published: 5 Nos.

1. KARTHIGEYAN, K AND MURUGAN, P. 2018. Typification of *Lophopogon tridentatus*, an Indian endemic (Poaceae, Andropogoneae). *Phytotaxa* 367(1): 097-099.
2. MURUGAN, P. AND KARTHIGEYAN, K. 2018. Notes on *Jasminum andamanicum* N.P. Balakr. & N.G. Nair (Oleaceae) From Andaman and Nicobar Islands, India. *Journal of Threatened Taxa* 10(10): 12439-12441.
3. KARTHIGEYAN, K AND MURUGAN, P. 2018. Lectotypification of *Themeda strigosa* (Poaceae, Panicoideae, Andropogoneae). *Phytotaxa* 372(2): 176-178.
4. MURUGAN, P., KOTTAIMUTHU R., KALIDASS, C. AND PANDA, P.C. 2018. Some additions to the Solanaceae of Sirumalai Hills, Southern Eastern Ghats, India. *Indian Journal of Forestry* 41(4): 391-395.
5. K. KIRUTHIKA, M. SULAIMAN, P.B. HARATHI AND R. GOPALAN 2018. Revelatory note on *Bulbophyllum fimbriatum* (Lindl.) Rchb.f – an endemic orchid of Western Ghats, India, *Journal of Economic and Taxonomic Botany*, 42 (1-4), 65-69.

2019 Research Articles Published: 1 No.

1. RAVICHANDRAN, V. & MURUGAN P. 2019. Addition of *Gymnosporia rothiana* (Walp.) M.A. Lawson (Celastraceae), in the flora of southern Western Ghats, India. *Tropical Plant Research* 6(3): 524–527.

Research Articles Published: 2 Nos.

1. MURUGAN, P., M. SULAIMAN AND BASIL PAUL. **2020**. *Tarenna flava* Alston (Rubiaceae): A New Record for Kerala from Agasthyamalai Biosphere Reserve, Western Ghats, India. *Indian Forester* 146(8): 780-781.
2. MURUGAN P AND MURUGAN C **2021** 'Taxonomy of *Ophiorrhiza pectinata*: Indo-Lankan Species with Notes on Lectotypification and Identity of *Ophiorrhiza falcata* (RUBIACEAE)'. *Phytotaxa* 490(3): 278-284.

Research Article Accepted: 3 Nos.

1. MURUGAN, P., MURUGAN, C. AND KARTHIGEYAN, K. **2021**. "Typification of twelve names in the genus *Anaphalis* DC. (Asteraceae)" Date: 01.02.2021.
2. SULAIMAN, M & C. MURUGAN. **2021**. Nomenclatural status of *Dendrobium georgei* Mathew (Orchidaceae). International Journal of Botany Studies, Delhi, India. (Botany 6-2-86). Date: 26.03.2021.
3. GEIGER D.L., M. SULAIMAN & C. MURUGAN. **2021**. Studies in *Oberonia* 10. A reevaluation of *Oberonia brachystachys* Lindl. and *O. subligaculifera* J.J.Sm. (Orchidaceae: Malaxideae) and their synonyms. Rheedeia.

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THANKYOU