

BOTANY OF ANAPADY MPCA, PALGHAT DISTRICT, KERALA WITH SPECIAL EMPHASIS ON SPECIES OF CONSERVATION CONCERN

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A B S T R A C T

Detailed botanical survey was carried out in Anapady Medicinal Plants Conservation Area (MPCA) during November 2003 which resulted in the documentation of 442 taxa of flowering plants including several endemic and threatened ones. Screening of literature showed that 58 taxa are additions to the flora of Palghat district. Of these, *Desmodium zonatum* Miq., *Digitaria tomentosa* (Koenig ex Willd.) Henrard and *Peperomia pseudo-rhombea* C.DC. form new reports to the state of Kerala. 34 of these taxa belong to the category of Red Listed medicinal plant species.

I N T R O D U C T I O N

Medicinal Plants Conservation Areas (MPCAs) are *in situ* gene banks harbouring rich diversity of plant species including medicinal plants of conservation concern. Foundation for Revitalisation of Local Health Traditions (FRLHT) has co-ordinated establishment of 55 such MPCAs in 5 southern Indian states viz. Kerala, Karnataka, Tamil Nadu, Andhra Pradesh and Maharashtra during 1993 to 2003 in collaboration with concerned State Forest Departments.

These MPCAs are designated as 'no harvest zones' ensuring protection of the flora and to provide a platform for future research activities especially relating to conservation. The size of each of these MPCAs ranges from 200 to 600 ha. and these are located at sites harbouring different forest types, altitudinal ranges, rainfall regimes and different climatic conditions across the region. Analysis of the botanical studies carried out in these MPCAs shows that more than 60% of the known medicinal flora of these states have been captured in this unique network which covers less than 1 % of the total forest area.

T H E A N A P A D Y M P C A

Anapady is one of the 9 MPCAs established in Kerala. It is located in the Western Ghats of Anamalai hills, Chittur Taluk of Palghat district at 10° 42' N latitude and 76° 81' E longitude. The MPCA covers nearly 400 ha. of the forest area with an altitude range of 650 to 900 m. Patches of

different forest types viz. Moist Deciduous, West Coast Semi-Evergreen and Evergreen forests, interspersed with grasslands and riverine vegetation, are encountered in the MPCA.

FLORISTIC COMPOSITION

Intensive floristic exploration conducted in Anapady MPCA during November 2003 resulted in documentation of 442 taxa of flowering plants including 34 Red Listed medicinal plants and several endemics. Of these, 101 taxa were collected for herbarium and remaining 341 were recorded based on field observation. The herbarium collections are deposited at FRLH (the herbarium of FRLHT), Bangalore, Karnataka. The life form analysis shows that herbs (189 taxa) constitute 43 % followed by trees (106 taxa) 24 %, climbers (85 taxa) 19 % and shrubs (62 taxa) 14 %. It also includes 16 epiphytes, 2 parasites, 2 saprophytes and 1 insectivorous taxa apart from 2 gymnosperms.

This MPCA harbours 65 unique plant taxa which have not been recorded earlier from any of the other 8 MPCAs in Kerala. It also harbours a high number of medicinal plant taxa (271) which have been recorded in medicinal use in one or more systems of Indian medicine i.e. Ayurveda, Siddha, Unani, Tibetan and Folk. This MPCA (about 400 ha.) is less than 0.1 % of the total area of the district (440,000 ha). In this small area more than 30 % of the total known flowering plants of the district (1400 species; Vajravelu, 1990) have been captured. This highlights the richness of floral diversity of the MPCA and also demonstrates the importance of carrying out thorough botanical explorations in such areas for contributing to the compilation of more comprehensive floras for the district, state as well as national floras

RED LISTED MEDICINAL PLANTS

To undertake and promote focussed conservation action, FRLHT has been engaged in systematic and rapid assessment of threatened medicinal plant taxa of India through the CAMP (Conservation Assessment and Management Plan) exercises. This methodology has been designed and developed by CBSG (Conservation and Breeding Specialist Group) of Species Survival Commission of IUCN (World Conservation Union) for rapid assessment of Red List status of prioritized taxa. During 1993-2003, 10 such CAMP workshops have been conducted for different states of India and a total of 304 taxa of medicinal plants have been assessed and assigned Red List status ranging from Near Threatened to Extinct. Four of these CAMP workshops have been conducted (from 1993-1997) for the 3 southern Indian states viz. Kerala, Karnataka and Tamil Nadu and results of these assessments enlist 110 taxa of medicinal plants for conservation focus (Ravikumar & Ved, 2000).

The following are the 34 Red Listed medicinal plants recorded in Anapady MPCA. The

Red List status of each taxa, for Kerala State, is also indicated:

1. *Adenia hondala* (Gaertn.) W.J. de Wilde (PASSIFLORACEAE) -VU
2. *Amorphophallus paeoniifolius* (Dennst.) Nicolson (ARACEAE) -NT
3. *Aphanamixis polystachya* (Wall.) Parker (MELIACEAE) -VU
4. *Aristolochia tagala* Cham. (ARISTOLOCHIACEAE) -LC
5. *Baliospermum montanum* (Willd.) Muell. Arg. (EUPHORBIACEAE) -VU
6. *Canarium strictum* Roxb. (BURSERACEAE) -VU
7. *Celastrus paniculatus* Willd. (CELASTRACEAE) -VU

8. *Chonemorpha fragrans* (Moon) Alston (APOCYNACEAE) -VU
9. *Cinnamomum sulphuratum* Nees (LAURACEAE) -VU/G
10. *Curcuma pseudomontana* Graham (ZINGIBERACEAE) -VU
11. *Cycas circinalis* L. (CYCADACEAE) -VU
12. *Diospyros candolleana* Wight (EBENACEAE) -VU/G
13. *Drosera indica* L. (DROSERACEAE) -LC
14. *Dysoxylum malabaricum* Bedd. ex Hiem (MELIACEAE) -EN/G
15. *Embelia tsjeriam-cottam* (Roem. & Schult.) DC. (MYRSINACEAE) -VU
16. *Garcinia gummi-gutta* (L.) Robson (CLUSIACEAE) -NT/G
17. *G. morella* (Gaertn.) Desr. (CLUSIACEAE) -NT
18. *Gloriosa superba* L. (COLCHICACEAE) -VU
19. *Glycosmis macrocarpa* Wight (RUTACEAE) -VU/G
20. *Gymnema khandalense* Santapau (ASCLEPIADACEAE) -EN/G
21. *Hydnocarpus alpina* Wight (FLACOURTIACEAE) -VU/G
22. *H. pentandra* (Buch.-Ham.) Oken (FLACOURTIACEAE) -VU/G
23. *Knema attenuata* (Hook.f. & Thoms.) Warb. (MYRISTICACEAE) -NT/G
24. *Nervilia aragoana* Gaud. (ORCHIDACEAE) -VU
25. *Nothapodytes nimmoniana* (Graham) Mabber. (ICACINACEAE) -VU
26. *Persea macrantha* (Nees) Kosterm. (LAURACEAE) -VU
27. *Piper nigrum* L. (PIPERACEAE) -LC
28. *Pseudarthria viscida* (L.) Wight & Arn. (FABACEAE) -VU
29. *Pueraria tuberosa* (Roxb. ex Willd.) DC. (FABACEAE) -VU
30. *Rauvolfia serpentina* (L.) Benth. ex Kurz (APOCYNACEAE) -EN
31. *Rhaphidophora pertusa* (Roxb.) Schott (ARACEAE) -LC
32. *Smilax zeylanica* L. (SMILACACEAE) -VU
33. *Tinospora sinensis* (Lour.) Merr. (MENISPERMACEAE) -NT
34. *Utlaria salicifolia* Bedd. (PERIPLOCACEAE) -CR/G

10 of these 34 species are endemic to the Western Ghats and have been assigned global Red List status, indicated above as G.

ABBREVIATIONS:

CR -Critically Endangered; EN -Endangered; VU -Vulnerable; NT -Near Threatened; LC -Least Concern; G -Globally.

ADDITIONS TO THE FLORA OF PALGHAT DISTRICT

A thorough and critical screening of literature revealed that 58 taxa out of 442, recorded in the MPCA, have not been earlier recorded in any of the published floras pertaining to the district (Subramanian & al., 1987; Manilal, 1988; Vajravelu, 1990 and Manilal & Raveendrakumar, 1998) and hence they form new report to the district. These are:

1. *Abrus pulchellus* Wall. (FABACEAE), Coll. No. 73042*
2. *Ageratum haustonianum* Mill. (ASTERACEAE), Rec. No. 162*
3. *Alangium salvifolium* (L.f.) Wang. var. *hexapetalum* Lam. (ALANGIACEAE), Rec.No. 132*
4. *Alternanthera paronychioides* St. Hil. (AMARANTHACEAE), Rec. No. 12*
5. *Alysicarpus styracifolius* Wight & Arn. (FABACEAE), Rec. No. 87
6. *Ammannia octandra* L.f. (LYTHRACEAE), Rec. No. 293
7. *Amorphophallus paeoniifolius* (Dennst.) Nicols. (ARACEAE), Rec. No. 207*
8. *Andrographis elongata* T. Anderson (ACANTHACEAE), Coll. No. 73010*
9. *Antiaris toxicaria* (Pers.) Lesch. (MORACEAE), Rec. No. 335*
10. *Brachiaria paspaloides* (Presl) C.E. Hubb. (POACEAE), Coll. No. 73123

Note: This species is distributed in India, Myanmar, Sri Lanka, Malaya and Polynesia (Shukla, 1996). In India, it was thought to be restricted to Arunachal Pradesh and Assam until Manilal & Sivarajan (1982) reported from Calicut district of Kerala that formed first report from southern India. Present collection from the MPCA forms second report to the state and also confirms its existence. This species is characterised by its lower glumes (2.5 mm long) which are two-third of the length of the spikelet (3.8 mm long).

11. *Bridelia crenulata* Roxb. (EUPHORBIACEAE), Rec. No. 168
12. *Caesalpinia major* (Medik.) Dandy & Exell (CAESALPINIACEAE), Coll. No. 73008
13. *Cassia kleinii* Wight & Arn. (CAESALPINIACEAE), Coll. No. 73019
14. *Cerasiocarpum bennettii* Cogn. (CUCURBITACEAE), Coll. No. 73064*
15. *Chionanthus zeylanicus* L. (OLEACEAE), Rec. No. 282
16. *Chloris dolichostachya* Lagasca (POACEAE), Coll. No. 73115
17. *Chlorophytum arundinaceum* Bak. (LILIACEAE), Coll. No. 73055
18. *Chlorophytum nimmonii* (Grah.) Dalz. (LILIACEAE), Coll. No. 73052*
19. *Chonemorpha fragrans* (Moon) Alston (APOCYNACEAE), Rec. No. 188*
20. *Cleisostoma tenuifolium* (L.) Garay (ORCHIDACEAE), Coll. No. 73094*
21. *Cordia myxa* C.B. Clarke (CORDIACEAE), Rec. No. 189
22. *Croton gibsonianus* Nimmo (EUPHORBIACEAE), Rec. No. 119
23. *Cyathula prostrata* Blume (AMARANTHACEAE), Rec. No. 81*
24. *Cyrtococcum trigonum* (Retz.) A.Camus (POACEAE), Coll. No. 73121*
25. *Dactyloctenium aegyptium* P. Beauv. (POACEAE), Rec. No. 8*
26. *Dendrocalamus strictus* Nees (POACEAE), Rec. No. 192

27. *Desmos lawii* (Hook.f. & Thoms.) Safford (ANNONACEAE), Rec. No. 116*
 28. *Dicliptera foetida* (Forssk.) Blatt. (ACANTHACEAE), Coll. No. 73054*
 29. *Dioscorea belophylla* Voigt ex Haines (DIOSCOREACEAE), Rec. No. 97
 30. *D. hamiltonii* Hook.f. (DIOSCOREACEAE), Rec. No. 182*
 31. *Diospyros montana* Roxb. (EBENACEAE), Rec. No. 214*
 32. *Ficus arnottiana* (Miq.) Miq. (MORACEAE), Rec. No. 173*
 33. *Filicium decipiens* (Wight & Arn.) Thw. (SAPINDACEAE), Coll. No. 73095
 34. *Glycosmis macrocarpa* Wight (RUTACEAE), Coll. No. 73081 & 73083
 35. *Gymnema khandalense* Santo (ASCLEPIADACEAE), Coll. No. 73087*
- Note:* The type locality of this endemic liana is the Khandala ghat of W.Ghats of Maharashtra. Later, it was reported from Vazhachal forests in Thrissur district, Kerala (Sasidharan, 1996) and Nilakkal forest near Sabarimala of Pathanamthitta district (Udayan & al., 2004). In the evergreen zone of the MPCA, 11 mature plants and many seedlings have been noticed. It is a rare species showing disjunct occurrence.
36. *Indigofera constricta* (Thw.) Trim. (FABACEAE), Coll. No. 73059*
 37. *I. galagoides* DC. (FABACEAE), Coll. No. 73053
 38. *Isachne kunthiana* (Steud.) Miq. (POACEAE), Rec. No. 125
 39. *Lepidagathis scariosa* Nees (ACANTHACEAE), Rec. No. 124
 40. *Leucas chinensis* (Retz.) R. Br. (LAMIACEAE), Coll. No. 73014*
 41. *Lindernia nummularifolia* (D. Don) Wettst. (SCROPHULARIACEAE), Coll. No. 73038
 42. *Meineckia parvifolia* (Wight) Webster (EUPHORBIACEAE), Rec. No. 86*
 43. *Meiogyne pannosa* (Dalz.) Sinclair (ANNONACEAE), Coll. No. 73062*
 44. *Memecylon malabaricum* (C.B. Clarke) Cognep. (MELASTOMACEAE), Rec. No. 249
 45. *Micrococca mercurialis* (L.) Benth. (EUPHORBIACEAE), Rec. No. 163*
 46. *Miliusa nilagirica* Bedd. (ANNONACEAE), Coll. No. 73028
 47. *Momordica charantia* L. var. *muricata* (Willd.) Chakravarty (CUCURBITACEAE), Coll.No. 73022
 48. *Nervilia aragoana* Gaud. (ORCHIDACEAE), Rec. No. 133*
 49. *Oryza meyeriana* (Zoll. & Mor. ex Steud.) Baill. subsp. *granulata* (Nees & Arn. ex Watt) Tateoka (POACEAE), Rec. No. 111
 50. *Paracroton pendulus* (Hassk.) Miq. subsp. *zeylanicus* (Thw.) N.P. Balakr. & Chakrab. (EUPHORBIACEAE), Rec. No. 245*
 51. *Piper wightii* Miq. (PIPERACEAE), Coll. No. 73090*

52. *Polygonum barbatum* L. (POLYGONACEAE), Coll. No. 73002*
53. *Pouzolzia aspera* Wight (URTICACEAE), Rec. No. 22
54. *Rhynchoglossum obliquum* Blume (GESNERIACEAE), Rec. No. 194
55. *Sehima nervosum* (Rottler) Stapf (POACEAE), Coll. No. 73125
56. *Tephrosia pumila* Baker (FABACEAE), Rec. No. 231
57. *Utleria salicifolia* Bedd. (PERIPLOCACEAE), Rec. No. 203

Note: A monotypic genus endemic to southern W. Ghats in Kerala & Tamil Nadu. This MPCA has been established exclusively to conserve the population of this Critically Endangered species. Around 25 clumps were located along Thekkadi Valley in Kurudimalai R.F. A viable population of more than 500 clumps are estimated to be present in the MPCA. The tubers of this plant is aromatic and are used by the local tribes for making pickles which is said to be digestive.

58. *Vigna dalzelliana* (Kuntze) Verdc. (FABACEAE), Rec. No. 82

* Species reported from the adjacent district of Thrissur (Sasidharan & Sivarajan, 1996). Of the 58 taxa listed above *Dicliptera foetida*, *Filicium decipiens*, *Indigofera constricta* and *Leucas chinensis* are restricted to southern India & Sri Lanka; *Lindernia nummulariifolia* is endemic to India; *Andrographis elongata* is endemic to peninsular India; *Meiogyne pannosa*, *Piper wightii* and *Miliusa nilagirica* are restricted to W. Ghats.

ADDITION TO THE FLORA OF KERALA STATE

The following 3 species have not been earlier reported in any of the published floras pertaining to the districts of state of Kerala. Hence, they are presented here with nomenclature, brief description, specimens examined and note:

1. ***Desmodium zonatum*** Miq., Fl. Ind. Bat. 1, 1: 250. 1855; N.C.Nair & A.N.Henry, Fl. Tamil Nadu 1: 108. 1983; Saldanha & Gurudev Singh in Saldanha, Fl. Karnataka 456. 1984; Sanjappa, Legumes India 166. 1992. *Meiobomia zonatum* (Miq.) Kuntze, Revis. Gen. Pl. 1: 198. 1891. *Desmodium ormocarpoides* auct. non DC., 1825 : Baker in Hook.f., Fl. Brit. India 2: 149. 1876; Gamble, Fl. Madras 345(243). 1918. (Fabaceae).

Undershrubs, up to 60 cm high, with a woody rootstock. Leaves 1-foliate, ovate to oblong lanceolate, 5-12 × 2-4 cm, thin-coriaceous, glabrous above, pubescent beneath, base obtuse, apex subacute to subacuminate, margin entire; petioles ca 2 cm long; stipels subulate, ca 5 mm long; stipules triangular, ca 6 × 2 mm, scarious. Racemes terminal, 10–20 cm long, lax. Flowers ca 3 mm across, pale violet. Pods narrowly oblong, 5-10 cm long, compressed, instantly constricted, longstipitate, hooked-hairy; articles 3-6, ca 1.5 × 0.4 cm, narrowed at both ends.

Specimens examined: Kerala, Palghat district, Anapady MPCA, 24. 11. 2003, flowers & fruits, 560 malt., Ravikumar & al., 73007.

Note: This species was collected along the exposed western slopes of the MPCA. Though Gamble (1918) reports its distribution in Anamalais and Travancore, none of the floras of Kerala mention this species.

2. ***Digitaria tomentosa*** (Koenig ex Willd.) Henrard in Blumea 1: 100. 1934; Bor, Grass. Burma Ceylon India Pakistan 306. 1960; V.J. Nair in A.N. Henry & al., Fl. Tamil Nadu 3: 108. 1989; M.S. Gayathri & T. Pullaiah in T. Pullaiah, Fl. Andhra Pradesh 3: 1180. 1997 & 4: 1985. f. 635. 1998. *Milium tomentosum* Koenig ex Willd. in Ges. Naturf. Freunde Berlin Neue Schriften 4: 220. 1803. *Panicum subglume* Trin. in Mem. Acad. Sci. Petersburg, ser. 6, 3: 292. 1834; Hook.f., Fl. Brit. India 7: 51. 1896; Fischer in Gamble, Fl. Madras 3: 1235. (POACEAE).

Tufted herbs, up to 75 cm high; nodes hairy. Leaves linear, up to 15 × 0.8 cm, flat, apex acuminate, margin scaberulous; sheaths sparingly pilose; ligules membranous. Panicles ca 25 × 15 cm, lax. Spikelets lanceolate, ca 2 mm long, solitary; lower glumes absent; upper ones elliptic lanceolate; lower lemma covering most part of the fruit; stamens 3; stigmas plumose. Caryopsis oblongoid, ca 1.5 mm long.

Specimens examined: Kerala, Palghat district, Anapady MPCA, 25. 11. 2003, 650 malt., Ravikumar & al., 73122.

Note: This species is endemic to southern peninsular India. It can easily be identified in the field by its effuse panicles without verticillate branches and solitary spikelets that are distributed throughout the panicle with a long pedicel as observed by Bor (1960).

3. ***Peperomia pseudo-rhombea*** C. DC. in DC., Prodr. 16(1): 440. 1869 & in Candollea 1: 350. 1923; Hook.f., Fl. Brit. India 5: 97. 1886; Huber in Dassan. & Fosberg (eds.). Revd. Handb. Fl. Ceylon 6: 296. 1987. *P. thomsoni* Hook.f., Fl. Brit. India 5: 97. 1886; Gamble, Fl. Pres. Madras 2: 1210. 1927; Kumari in Henry & al., Fl. Tamil Nadu 2: 203. 1987, "thomsoniz". *P. dindigulensis* Wight, Ic. t. 1821, auct. non Miq. (PIPERACEAE).

Epiphytic (sometimes saprophytic), sub succulent, glabrous herbs, 20-40 cm high. Leaves alternate below, opposite to subternate above, elliptic to obovate, 3-10 × 2-4.5 cm, sub fleshy, basally 3-5-ribbed, base obtuse to subacute, apex broadly acute to subacuminate, margin entire; nerves impressed above, prominent beneath; petioles ca 2.5 cm long, canaliculate, sheathing at base. Spikes terminal and in upper axils, 4-8 cm long, ca 2 mm across; peduncles ca 5 cm long. Flowers slightly immersed, minute, sessile. Fruits globose, ca 1 mm across, minutely verrucose, viscid.

Specimen examined : Kerala, Palghat district, Chittur taluk, Anapady MPCA, 27.11.2003, fruits, 800 m, K. Ravikumar & al., 73089.

Note: Hooker (1886) records the distribution of this species in Deccan Peninsula & Sri Lanka and quotes the collections of Thomson from 'Nilgiri or Kurg (Coorg) mountains' and Wight from Courtallam and Dindigul. However, the later floras of Nilgiri, Coorg and Courtallam neither collected the species nor even mentioned Hooker's collection reference in their respective areas. In 1925, K.C. Jacob collected this species (Coll. No. 17707, MH) from High Wavy Mountains of Madurai district, Tamil Nadu (Ravikumar, 1993). No further collection of this rare species is made since 1925. The present collection from Anapady MPCA, after a lapse of over 75 years extends its known distribution towards south of the Western Ghats.

ACKNOWLEDGEMENTS

The authors are thankful to Shri Darshan Shankar, Director, FRLHT, Bangalore, Karnataka for support and encouragement. Thanks are also due and expressed here to the Warden, Anamalai Wild Life Sanctuary, Palghat, Kerala for granting permission for botanical exploration; Dr. P. Ravichandran,

Agrostologist, SPKCES, Manonmaniam Sundaranar University, Alwarkurichi, Tamil Nadu for help in identification of grasses.

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जिला पालघाट, केरल के अनापाडी औषधीय पादप संरक्षण क्षेत्र में वानस्पतिक सर्वेक्षण एवं संरक्षण आश्रित जातियों का अध्ययन

आर. विजय शंकर, के. रवी कुमार, एन. एम. गणेश बाबू एवं डी.के. वेद
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सार संक्षेप

नवम्बर 2003 में अनापाडी में औषधीय पादप संरक्षण क्षेत्र में सर्वेक्षण किया गया। इस क्षेत्र से अभिलिखित 442 जातियों में से 58 पालघाट जिले के लिए नई हैं, जबकि *डैस्मोडियम जोनेटम*, *डिजीटेरिया टोमेंटोसा* एवं *पैपेरोमीया स्यूडोरेसीमोसा* केरल के लिए नई हैं। इसमें 34 टैक्सा जांच सूचीय औषधीय पौधे हैं।