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RESEARCH ARTICLE

Endemic Asclepiads in Nilgiri biosphere reserve, India

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Abstract

While conducting field surveys to document gamopetalous flora of Nilgiri Biosphere Reserve, India, a special attention was given to document endemic asclepiad plant species. In addition to field surveys, consultation of herbarium and literature related to the flora of NBR revealed that a total of 38 endemic taxa of have been documented of which some of them categorized as Critically Endangered (5 species) followed by Endangered (5), Vulnerable (4) and Possibly extinct (1) by several authors. Based on habit analysis 18 species are categorized as twiners.

Key words: *Asclepiadaceae, Conservation status, Distribution, Eastern Ghats, Western Ghats.*

Introduction

India has ten biogeographic zones with characteristic habitat and biota, it is the 7th largest country by geographical area, ranks 10th positions of species richness (Singh & al., 2015) and one of the 17 mega biodiversity country in the world (Dash & Mao, 2020). In southern India, Nilgiri Biosphere Reserve (NBR) spread over 5520 km^2 (Daniels, 1996) and shares 4721 km^2 with Western Ghats of around 1,64,280 km^2 (Nayar & al., 2014) and 799 km^2 with Eastern Ghats of around 75,000 km^2 (Pullaiah & al., 2007). The Nilgiri-wayanad-silent valley is well known for its rich biodiversity and varied habitats of life due to its altitudinal variation from 700 to 2637 m (Singh & al., 2015). Asclepiadaceae *sensu stricto* are represented by 45 genera and 301 taxa (292 species, 09 infraspecific) in India (Jayanthi & al., 2020). It is a distinct family and can be easily identified by very unique flower organization and it seems to be very conservative for the family. 'Corona' it is an synorganization of corolla and androecium. 'Gynostegium and pollinaria' s an synorganization of androecium and gynoecium. Similarly, sympetaly, synandry and post-genital fusion of style head and anthers are characteristic to the family.

Materials and Methods

As a part of gamopetalous flora of NBR, botanical explorations were conducted since from 2019 to May 2024. During this exploration a special attention was given to locate and document the endemic asclepiads. As it never found in abundance and most of the species have restricted distribution. They don't have much economic importance but few of them has medicinal value, some are of ornamental value and few are edible. As a result, a total of 38 taxa has been recorded based on collection and consultation of literature and herbarium. Specimen collection and herbarium preparation were done by standard herbarium method (Jain & Rao, 1977). The voucher specimens were identified by using protologues, regional floras, revisions and monographs. The collected plants are arranged alphabetically, accepted names was given by referring databases (POWO, 2025 and IPNI, 2025). Followed by Flowering and fruiting (Fl. & Fr.), Habitat details given by observed field notes, based on earlier literature. Also distribution in NBR (District names mentioned in abbreviations), endemic region, conservation status, specimen examination and if possible a note given to the plant taxa documented based on earlier literature and some observations noted in filed.

Study area

The International Coordination Council (ICC) of UNESCO's first meeting in Paris held during 9–19 November 1971 introduced the designation

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Biosphere Reserve” for natural areas to minimize conflict between development and conservation. The Department of Science and Technology had constituted a committee under the Chairmanship of Professor Madhav Gadgil of the Indian Institute of Science, Bangalore to survey and demarcate the exact limits of the proposed biosphere reserve in the Nilgiris (Sathish, 2014). As result, Govt. of India first identified 7 sites in India, among this NBR declared as first Biosphere Reserve. It was set up on 1.9.1986 vide order number 5.22010/6/86.CSC, Government of India. In 2012 it is declared as the World heritage site by UNESCO. NBR is situated in the tri-junction of Karnataka, Kerala and Tamil Nadu. It encompasses a total area of 5,520 km^2. The Biosphere Reserve is spread over ten districts partly surrounding the Nilgiris District. which contains a mosaic of different forest types and habitats, dense flora and fauna including many endemic and endangered species.

NBR forests constitute an excellent habitat for flora, fauna and other microbial forms. The NBR has a remarkable topographic diversity as a result of this topographic complexity, the NBR encompasses a wide range of rainfall zones which receive between 500 and 7000 mm of precipitation annually. The rainfall is generally heavier in the western side averaging 5000 mm. The wet season is June-September though there is summer and occasional winter rains locally within the biosphere reserve. The length of the dry season varies from about a month in the western hills to over six months in the eastern plateau. April- May is the hottest months. Ground temperature below 0^{o}C (frost) is frequent during December–January in the higher hills of Nilgiris. Hence NBR harbours different vegetation types (Plate I).

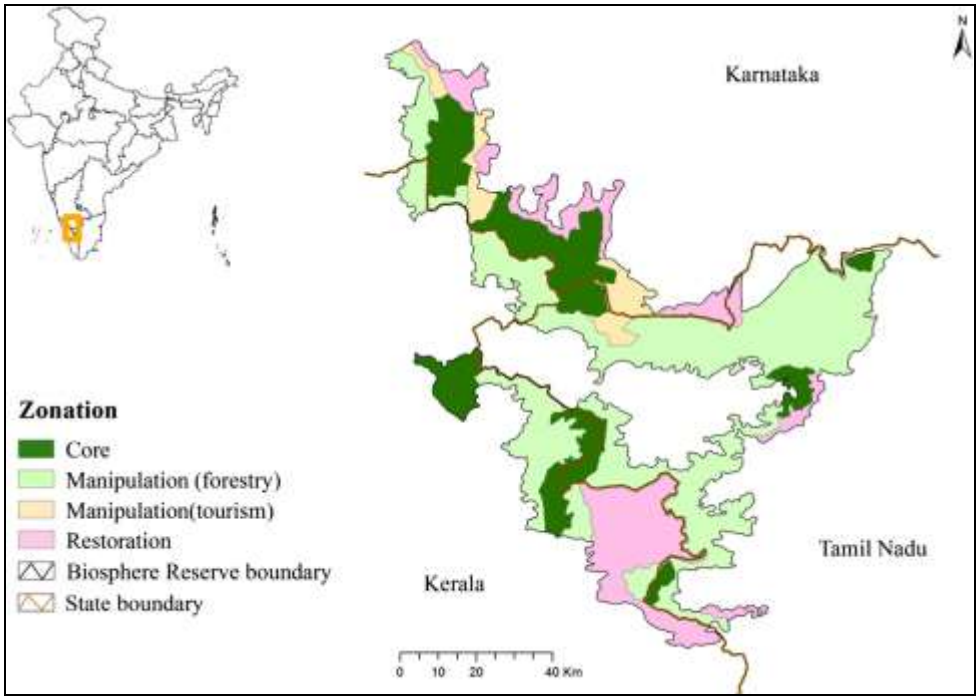

Fig. 1. Map of the study area,The Nilgiri Biosphere Reserve.
(Source: Sathish et. al., 2014)

Checklist of Endemic Asclepiads

1. Boucerosia diffusa Wight, Icon. Pl. Ind. Orient. 4(4): 14, t. 1599. 1850
Habit: Herb
Fl. & Fr.: April–December
Habitat: Rocky localities in hills, 300–600 m
Distribution: NBR: Tamil Nadu (CBE)
Endemic to Southern India
Specimen examined: C.P. Sreemadhavan 957 (MH)
Note: The succulent stems are used as vegetable by local people

2. Boucerosia indica (Wight & Arn.) Plowes, Haseltonia 3: 59. 1995.
Hutchinia indica Wight & Arn. in Wight, Contr. Bot. India: 34. 1834.
Habit: Herb
Fl. & Fr.: November–July
Habitat: Scrub jungles and dry rocky hillslopes, 300–600 m
Distribution: NBR: Tamil Nadu (CBE)
Endemic to Southern India
Specimen examined: K. Ramamurthy 14787 (MH)
Note: The succulent stems are used as vegetable by local people

3. Brachystelma maculatum Hook.f., Fl. Brit. India 4: 65. 1883.
Habit: Herb
Fl. & Fr.: July–September
Habitat: Among clumps of grasses in dry deciduous forests, 500–600 m
Distribution: NBR: Karnataka (MYS); **Tamil Nadu** (ERD)
Endemic to Western Ghats and Eastern Ghats
Critically Endangered (Prasad & Venu, 2020)
Specimen examined: C.E.C. Fischer 61 (CAL)
Note: It is recently rediscovered from type locality after a lapse of 100 years

4. Brachystelma mahajanii Kambale & S.R. Yadav, Kew Bull. 69(1)-9493: 2. 2014.
Habit: Herb
Fl. & Fr.: March–June
Habitat: Soils accumulated on rocks at an elevation of c. 1792 m
Distribution: NBR: Tamil Nadu (NLG)
Endemic to NBR
Critically Endangered (Prasad & Venu, 2020)
Specimen examined: Sharad S. Kambale & S.R. Yadav 49 (MH)
Note: It is described on 2014 by Kambale & al., from Ebbenad in Nilgiris District, Tamil Nadu.

5. Brachystelma rangacharii Gamble, Bull. Misc. Inform. Kew 1922: 120. 1922.
Habit: Herb
Fl.: March–June. **Fr.:** Unknown
Habitat: Rocky hillslopes and crevices in dry deciduous forests, 700–800 m
Distribution: NBR: Tamil Nadu (ERD)
Endemic to NBR
Critically Endangered (Prasad & Venu, 2020)
Specimen examined: K. Rangachari 10654 (MH)
Note: It is known only by its type; not rediscovered yet.

6. Brachystelma swarupa Kishore & Goyder, Kew Bull. 56(1): 210. 2001.
Habit: Herb
Fl. & Fr.: March–July
Habitat: Amidst grasses, open rocky slopes in moist deciduous forests, ± 600
Distribution: NBR: Tamil Nadu (CBE)
Endemic to Western Ghats
Critically Endangered (Prasad & Venu, 2020)
Specimen examined: MM & KB 161803 (MH)
Note: It is an addition to the flora of NBR.

7. Caralluma adscendens (Roxb.) Haw. var. **bicolor** (V.S. Ramach., S. Joseph, H.A. John & Sofiya) Karupp., Ugraiah & Pull., Caralluma Antiobesity Pl.: 116. 2013.
Caralluma bicolor V.S. Ramach., S. Joseph, H.A. John & Sofiya, Nordic J. Bot. 29: 447. 2011.
Habit: Herb
Fl. & Fr.: August–December
Habitat: Open rocky areas in scrub jungles, 300–600 m
Distribution: NBR: Kerala (PLK); **Tamil Nadu** (CBE, NLG)
Endemic to Southern India
Specimen examined: MM & KB 157460 (MH)
Note: The succulent stems are used as vegetable by local people

8. Caralluma attenuata Wight, Icon. Pl. Ind. Orient. 4(4): 15, t. 1268. 1848.
Habit: Herb
Fl. & Fr.: April–December
Habitat: Open rocky areas in scrub jungles, 300–700 m
Distribution: NBR: Karnataka (MYS); **Tamil Nadu** (CBE, NLG)
Endemic to southern India
Specimen examined: K. Subramanyam 246 (MH)
Note: The succulent stems are used as vegetable by local people

9. Ceropegia barnesii E.A. Bruce & Chatterjee, Kew Bull. 3(1): 62. 1948.
Habit: Twiner
Fl. & Fr.: May–August
Habitat: Evergreen forests
Distribution: NBR: Tamil Nadu (NLG)
Endemic to Western Ghats
Endangered (Nayar & Sastry, 1987)

Specimen examined: *s.coll., s.n.* (Acc. No.: 32832) (MH)
Note: It is not rediscovered more than 45 years.

10. Ceropegia ciliata Wight, Icon. Pl. Ind. Orient. 4(1): 15, t. 1262. 1848.
Habit: Twiner
Fl. & Fr.: July–September
Habitat: Grows amidst grasses on hillslopes, 1000–2200 m
Distribution: NBR: Karnataka (KDU); **Kerala** (PLK); **Tamil Nadu** (NLG)
Endemic to Western Ghats
Critically Endangered (Kambale & Yadav, 2019)
Specimen examined: MM & KB 157355 (MH)

11. Ceropegia ensifolia Bedd., Madras J. Lit. Sci., ser. 3, 1:52. 1864.
Habit: Twiner
Fl. & Fr.: August–November
Habitat: Grows amidst grasses and other herbs in grasslands on hillslopes
Distribution: NBR: Kerala (MPM, PLK); **Tamil Nadu** (CBE, NLG)
Endemic to Western Ghats
Specimen examined: E. Vajravelu 48769 (MH)

12. Ceropegia fimbriifera Bedd., Madras J. Lit. Sci., ser. 3, 1: 53. 1864.
Habit: Herb
Fl. & Fr.: June–November
Habitat: Rocky hillslopes in evergreen forests, 1500–1850 m
Distribution: NBR: Karnataka (CMN, MYS); **Kerala** (PLK); **Tamil Nadu** (CBE, NLG)
Endemic to Western Ghats and Eastern Ghats
Vulnerable (Nayar & Sastry, 1987)
Specimen examined: MM & KB 157366 (MH)

13. Ceropegia intermedia Wight, Icon. Pl. Ind. Orient. 4(1): 12, t. 1263. 1848.
Habit: Twiner
Fl. & Fr.: June–January
Habitat: On slopes, roadsides in evergreen forests, 1775–1950 m
Distribution: NBR: Karnataka (KDU, MYS); **Kerala** (PLK); **Tamil Nadu** (CBE, NLG)
Endemic to Western Ghats and Eastern Ghats
Endangered (Nayar & Sastry, 1987)
Specimen examined: G.V. Subba Rao 36643 (MH)

14. Ceropegia manoharii Sujanapal, P.M. Salim, Anil Kumar & Sasidh., J. Bot. Res. Inst. Texas 7: 342. 2013.
Habit: Twiner
Fl. & Fr.: August–February
Habitat: Grasslands, 1500–1850 m
Distribution: NBR: Kerala (WND).
Endemic to NBR
Specimen examined: P. Sujanapal & P.M. Salim 0428 (MSSH)

15. Ceropegia metziana Miq., Anal. Bot. Ind. 3: 11. 1852.
Habit: Twiner
Fl. & Fr.: September–December
Habitat: On roadsides and open places in evergreen forests, ± 900 m
Distribution: NBR: Kerala (PLK); **Tamil Nadu** (CBE, NLG).
Endemic to Western Ghats
Specimen examined: MM & KB 157114 (MH)

16. Ceropegia pusilla Wight & Arn. in Wight, Contr. Bot. India: 81. 1834.
Habit: Herb
Fl. & Fr.: June–October
Habitat: Grows amidst grasslands on hillslopes, 1500–2400 m
Distribution: NBR: Karnataka (MYS); **Tamil Nadu** (CBE, NLG)
Endemic to Western Ghats
Specimen examined: MM & KB 157598 (MH)

17. Ceropegia spiralis Wight, Icon. Pl. Ind. Orient. 4(1): 15, t. 1267. 1848.
Habit: Herb
Fl. & Fr.: August–February
Habitat: On hillslopes amidst grasses
Distribution: NBR: Kerala (PLK)
Endemic to Western Ghats and Eastern Ghats
Vulnerable (Nayar & Sastry, 1987)
Specimen examined: R. Wight, *s.n.* (K000894294, image!)

18. Ceropegia thwaitesii Hook., Bot. Mag. 80: t. 4758. 1854.
Habit: Twiner
Fl. & Fr.: February–November
Habitat: Shola forests
Distribution: NBR: Kerala (PLK); **Tamil Nadu** (NLG)
Endemic to Western Ghats
Specimen examined: N.C. Nair 64452 (MH)

19. Ceropegia vincifolia Hook., Bot. Mag. 66: t. 3740. 1839.
Habit: Twiner

Fl. & Fr.: August–September
Habitat: Lateritic soil and on hillslopes in evergreen forests
Distribution: NBR: Kerala (PLK)
Endemic to Western Ghats
Endangered (Nayar & Sastry, 1987)
Specimen examined: A.R. Kulavmode & S.S. Kambale 3132 (SUK)

20. Cryptolepis grandiflora Wight, Icon. Pl. Ind. Orient. 3(1): 4, t. 831. 1845.
Habit: Twiner
Fl. & Fr.: August–March
Habitat: Margins of dry deciduous forests, 600–1000 m
Distribution: NBR: Karnataka (MYS); **Tamil Nadu** (CBE, NLG)
Endemic
Specimen examined: C.P. Sreemadhavan 420 (MH)
Note: The latex yields good quality rubber comparable to Hevea-rubber (Jayanthi & al., 2022)

21. Cynanchum sahyadricum (Ansari & Hemadri) Liede & Khanum, Taxon 65(3): 480. 2016.
Seshagiria sahyadrica Ansari & Hemadri, Indian Forester 97: 126. 1971.
Habit: Twiner
Fl. & Fr.: May–December
Habitat: Scrub jungles and moist deciduous forests
Distribution: NBR: Tamil Nadu (NLG)
Endemic to WG
Note: It is included here based on earlier report by Jayanthi & al. ()
22. Cynanchum sarcomedium Meve & Liede, Kew Bull. 67: 753. 2012.
Habit: Twiner
Fl. & Fr.: June–December
Habitat: Scrub jungles, 300–500 m
Distribution: NBR: Tamil Nadu (CBE, NLG)
Endemic
Specimen examined: K. Subramanyam 1984 (MH)

23. Decalepis hamiltonii Wight & Arn. in Wight, Contr. Bot. India: 64. 1834.
Habit: Climber
Fl. & Fr.: March–October
Habitat: Dry deciduous forests, 600–700 m
Distribution: NBR: Karnataka (MYS); **Tamil Nadu** (ERD, NLG)
Endemic to Western Ghats and Eastern Ghats
Endangered (Nayar & al., 2014)
Specimen examined: G.V. Subba Rao 37329 (MH)
Note: Tubers pickled and eaten, also traded in crude drug markets (Narasimhan & Sheeba, 2021).

24. Decalepis nervosa (Wight & Arn.) Venter, Taxon 46: 712. 1997.
Brachylepis nervosa Wight & Arn., Contr. Bot. Ind. 63. 1834.
Habit: Climber
Fl. & Fr.: March–September
Habitat: Margins of evergreen forests, 1500–2200 m
Distribution: NBR: Kerala (PLK); **Tamil Nadu** (CBE, NLG).
Endemic to NBR
Specimen examined: MM & KB 157713 (MH).

25. Decalepis salicifolia (Bedd. ex Hook.f.) Bruyns, Taxon 65: 499. 2016.
Utleria salicifolia Bedd. ex Hook.f., Fl. Brit. India 4: 7. 1883.
Habit: Subshrub
Fl. & Fr.: April–October
Habitat: Grasslands, 1500–1800 m.
Distribution: NBR: Kerala (PLK).
Endemic to Western Ghats
Endangered (Nayar & al., 2014).
Note: It is included here based on the earlier report by Anilkumar (2015).

26. Gymnema decaisneanum Wight, Icon. Pl. Ind. Orient. 4(1): 16, t. 1271. 1850.
Habit: Climber
Fl. & Fr.: March–September
Habitat: Moist deciduous and evergreen forests, 500–1000 m.
Distribution: NBR: Karnataka (MYS); **Tamil Nadu** (NLG).
Endemic.
Specimen examined: K.M. Sebastine 3321 (MH).

27. Gymnema indicum (M.A. Rahman & Wilcock) Karthik. & Moorthy, Fl. Pl. India: 170. 2009.
Bidaria indica M.A. Rahman & Wilcock, Blumea 34: 99. 1989.
Habit: Climber
Fl. & Fr.: June–December
Habitat: Moist deciduous and evergreen forests.
Distribution: NBR: Kerala (PLK)
Endemic to Western Ghats
Specimen examined: MM & KB 150073 (MH).

28. Gymnema montanum (Roxb.) Hook.f., Fl. Brit. India 4: 31. 1883.
Asclepias montana Roxb., Hort. Bengal.: 85. 1814.
Habit: Climber
Fl. & Fr.: May–March
Habitat: Dry deciduous and semi-evergreen forests, 600–1200 m.
Distribution: NBR: Kerala (PLK); **Tamil Nadu** (NLG).
Endemic to southern India
Specimen examined: E. Vajravelu 38204 (MH).

29. Heterostemma beddomei (Hook.f.) Swarupan. & Mangaly, Bot. J. Linn. Soc. 101: 254. 1989.
Oianthus beddomei Hook.f., Fl. Brit. India 4: 49. 1883.
Habit: Twiner
Fl.: August–September
Habitat: Moist deciduous forests.
Distribution: NBR: Kerala (WND).
Endemic to NBR
Possibly extinct (Nayar, 1997).
Note: It is included here based on the earlier report by Gamble (1923). It is known only by its type (illustration); not rediscovered yet.

30. Heterostemma deccanense (Talbot) Swarupan. & Mangaly, Bot. J. Linn. Soc. 101(2): 255. 1989.
Oianthus deccanensis Talbot, Forest Fl. Bombay 2: 260. 1911.
Habit: Twiner
Fl. & Fr.: August–January
Habitat: Moist deciduous forests, 500–800 m.
Distribution: NBR: Tamil Nadu (CBE).
Endemic to southern India
Specimen examined: MM & KB 150025 (MH).
Note: Based on the above cited collection it was reported as an addition to the flora of Tamil Nadu by Murugesan & al. (2023).

31. Hoya wightii Hook.f., Fl. Brit. India 4: 59. 1883.
Habit: Twiner
Fl. & Fr.: March–December
Habitat: Grows on tree trunks and branches in evergreen forests, streamsides, 1200–2200 m.
Distribution: NBR: Karnataka (KDU, MYS); **Kerala** (PLK, WND); **Tamil Nadu** (CBE, NLG).
Endemic to Western Ghats
Specimen examined: MM & KB 157740 (MH).

32. Marsdenia raziana Yogan. & Subr., Proc. Indian Acad. Sci., B 83: 147. 1976;
Habit: Climber
Fl. & Fr.: January–March
Habitat: Semi-evergreen forests.
Distribution: NBR: Kerala (WND).
Endemic to Western Ghats
Vulnerable (Nayar, 1997).
Note: It is included here based on earlier report by Narayanan (2009).

33. Toxocarpus concanensis Hook.f., Fl. Brit. India 4: 14. 1883.
Habit: Climber
Fl. & Fr.: March–July
Habitat: Semi-evergreen forests.
Distribution: NBR: Karnataka (KDU).
Endemic to Western Ghats
Note: It is included here based on earlier report by Manikandan & Lakshminarasimhan (2013).

34. Toxocarpus palghatensis Gamble, Bull. Misc. Inform. Kew 1922: 119. 1922.
Habit: Climber
Fl. & Fr.: September–March
Habitat: Evergreen forests.
Distribution: NBR: Karnataka (KDU, MYS); **Kerala** (PLK).
Endemic to Western Ghats
Vulnerable (Nayar, 1997).
Specimen examined: E. Vajravelu 33255 (MH).

35. Vincetoxicum balakrishnanii (P.M. Salim & J. Mathew) Kottaim., Int. J. Curr. Res. Biosci. Pl. Biol. 6(10): 37. 2019.
Tylophora balakrishnanii P.M. Salim & J. Mathew, NeBIO 8(3): 130. 2017.
Habit: Twiner
Fl. & Fr.: June–September
Habitat: Margins of evergreen forests, 1400–1800 m.
Distribution: NBR: Kerala (WND); **Tamil Nadu** (CBE).
Endemic to NBR.
Specimen examined: MM & KB 157284 (MH).
Note: Based on the above citated collection it was reported as an addition to the flora of Tamil Nadu by Murugesan & al. (2023).

36. Vincetoxicum capparidifolium (Wight & Arn.) Kuntze, Revis. Gen. Pl. 2: 424. 1891.
Tylophora capparidifolia Wight & Arn. in Wight, Contr. Bot. India: 51. 1834.

Habit: Twiner
Fl. & Fr.: May–January
Habitat: Roadsides in evergreen forests, 1000–1800 m.
Distribution: NBR: Karnataka (MYS); **Kerala** (WND); **Tamil Nadu** (CBE, NLG).
Endemic to Western Ghats and Eastern Ghats
Specimen examined: MM & KB 157720 (MH).

37. Vincetoxicum dalzellii (Hook.f.) Kuntze, Revis. Gen. Pl. 2: 424. 1891.
Tylophora dalzellii Hook.f., Fl. Brit. India 4: 43. 1883.
Habit: Twiner
Fl. & Fr.: Febuary–December
Habitat: Moist deciduous forests.
Distribution: NBR: Karnataka (KDU, MYS); **Kerala** (WND); **Tamil Nadu** (NLG).
Endemic to Peninsular India.
Note: It is included here based on earlier report by Manikandan & Lakshminarasimhan (2013) who reported it from Kodagu district.

38. Vincetoxicum rotundifolium (Buch.-Ham. ex Wight) Kuntze, Revis. Gen. Pl. 2: 425. 1891.

Tylophora rotundifolia Buch.-Ham. ex Wight, Contr. Bot. India: 50. 1834.

Habit: Twiner
Fl. & Fr.: April–December
Habitat: Dry and moist deciduous forests, 700–1000 m.
Distribution: NBR: Karnataka (MYS); **Kerala** (WND); **Tamil Nadu** (ERD, NLG).
Endemic to Peninsular India
Specimen examined: V. Narayanaswami 3459 (MH).

Results and discussion

Floristic analysis shows that NBR harbours 38 endemic plant taxa, belonging to 13 genera and 37 species and 1 infraspecific taxa (Plate II to IV). Among these 27 (47%) were Twiners 18 (17%) Climbers 8 (21%), Herb 11 (29%), subshrubs, 1 (3%) (Fig.2)

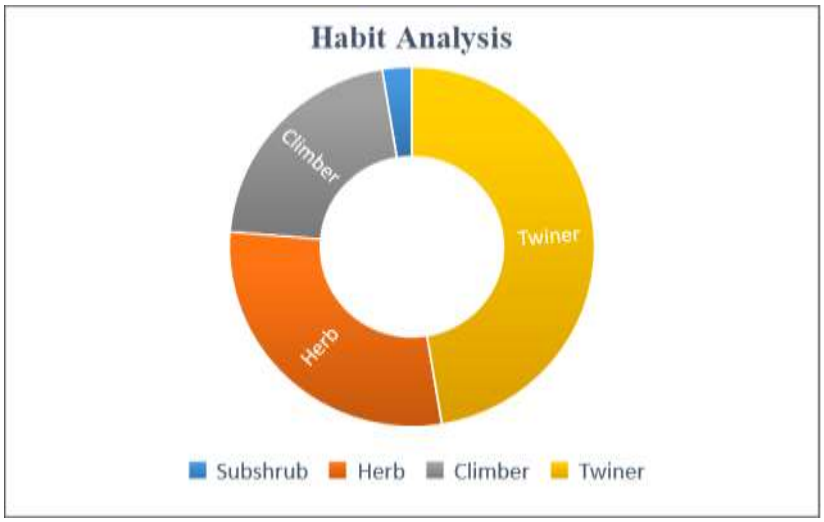

Fig.2. Habit analysis

From these documented 13 genera *Ceropegia* has high number of species diversity with 11 species, followed by *Brachystelma* and *Vincetoxicum* each with 4 species, *Decalepis* and *Gymnema* each with 3 species. The endemic diversity was observed to be highest in the moist deciduous and semi-evergereen forests, followed by evergreen and scrub jungles. Endemic plants are further categeriosed as per the locality where it is distributed, 2 species are present throughout India, 2 species are restricted to peninsular India, 6 are restricted to southern India these may present in hills as well as in scrub jungles. 15 are only distributed in Western Ghats, 15 are shares

its distribution in Western and Eastern Ghats. 6 are species strictly restricted to NBR namely, *Brachystelma mahajanii* Kambale & S.R. Yadav, *Brachystelma rangacharii* Gamble, *Ceropegia manoharii* Sujanapal, *Decalepis nervosa* (Wight & Arn.) Venter, *Heterostemma beddomei* (Hook.f.) Swarupan. & Mangaly and *Vincetoxicum balakrishnanii* (P.M. Salim & J. Mathew) Kottaim. Documented plants are categeriosed based on its conservation or threat status (Fig.3) mentioned by various authors previously in their studies, it resulted as, 5 are Critically Endangered, followed by 5, Endangered, 4 Vulnerable and 1 Possibly extinct namely, *Heterostemma beddomei* (Hook.f.) Swarupan. & Mangaly. This plant and *Brachystelma rangacharii* Gamble not rediscovered after its type collection.

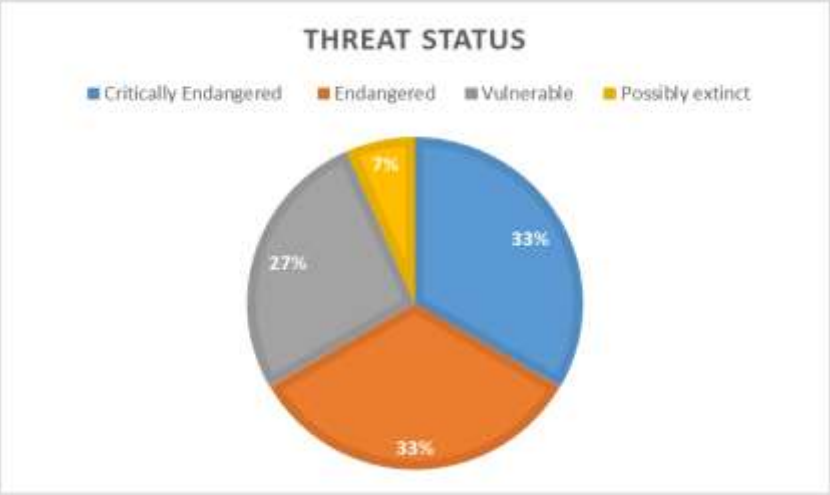

Fig.3. Threat status

Conclusion

Members of Asclepiadaceae are sparsely distributed and do not form pure vegetation. Asclepiads flowers are very difficult to study after getting dry because of its fleshy flowers and floral organs and dried flowers do not provide clear three dimensional picture of flower structure.

Hence photography is very important to study it in details and because of its slender habit sometimes it may overlook during surveys, Among the total 84 taxa of Asclepiadaceae in NBR 38 are endemic, and many of them are Rare or occasionally distributed in forests. 15 endemic plants are categerised under threatened categeory. So, it is very important to conserve it and need further study for better understanding.

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