WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 12, 388-397. Review Article ISSN 2277–7105

A REVIEW ON HAPLANTHODES VERTICILLATA

Pranav Sonawane*, Saurabh Khairnar, Divya Shinde and Hemangi Aher

Matoshri Institute of Pharmacy Dhanore, Yeola. 423401.

Article Received on
26 April 2024,

Revised on 16 May 2024,
Accepted on 06 June 2024

DOI: 10.20959/wjpr202412-32825

***Corresponding Author**
Pranav Sonawane
Matoshri Institute of Pharmacy Dhanore, Yeola. 423401.

ABSTRACT

One of the 24 families of flowering plants in the mint group (Lamiales) is Acanthaceae. The tall annual plant known as "spiny bottle brush" only reaches a height of almost half a meter. Leaves are oppositely oriented, oval, thin, and 5–10 cm long. The tips of the leaves are tipped with two spinous teeth and covered in long, spreading hairs. In the leaf axils, stalkless flowers are clustered close to the tip of the stem. Although the flowers appear to have five petals, they actually only have two, which are lobed in two and three ways. The flowers are dark blue in hue with a pale green throat. Usually found on steep slopes in the Western Ghats. November–January is flowering time.

KEYWORDS: Acanthaceae, Spiny bottle brush, Haplanthoda, plants, Folwers, etc.

INTRODUCTION

Spiny bottle brush is an erect annual herb, growing to only about half meter high. Oppositely arranged ovate narrow leaves are 5-10 cm long. The leaves have two spinous teeth at the tip and are covered with long spreading hairs. Stalkless flowers occur in the leaf axils, densely concentrated near the top of the stem. The flowers, which appear to have five petals, actually have only two petals which are 2 and 3 lobed. The flowers are dark blue in color and have a light green in the throat. Commonly found on rocky slopes in the western ghats.

Acanthaceae family

The mint order (Lamiales) has 24 families of flowering plants, including the Acanthaceae family. It comprises over 4,000 species and 220 genera, the majority of which are located in tropical and subtropical regions of the globe.[1,2] The Acanthaceae family includes plants and trees in addition to their common members, which are bushes and spices. While humid

tropical woods are home to most of these plants, they can also be found in a variety of habitats, such as marshes, estuaries, and severely arid places.

The members of the Acanthaceae family are diverse and do not share many characteristics. The majority have simple leaves arranged in inverse matching, and the vegetative portions include streaks or protrusion of cystoliths, which are formed cells that contain jewels of calcium carbonate.[5] The sexually indifferent flowers are usually large, often shadowed, and nearly always even. They are also typically surrounded by leaf-like bracts. Tubular structures are frequently formed when the five or four petals fuse together. Usually, there are one to three staminodes (Sterile stamens) and two to four stamens located beyond the entrance of the flower. The pistil is predominant, meaning it is positioned above the point where the other parts of the flower connect, and it is primarily composed of two combined carpels, or ovule-bearing portions, enclosing two locules, or chambers, each of which has two to numerous ovules in two lines along the ovary's focal pivot. The fruits are usually burst capsules that hold seeds that are borne by placental hooks.[6–9] A revision has been made to the endemic Indian genus Haplanthodes (Acanthaceae). There are now four recognized species: Helengherryensis, plumosa, tentaculata, and verticillata; also, a novel variant called Helengherryensis var. toranganensis has been identified. Haplanthodes, Haplanthus plumosus, and H. verticillaris have lectotype designations.

Fig. 1: Haplanthoda verticillata plant.

Common name: Spiny Bottle Brush

- Gujarati: કાળું કરિયાતું kalu kariyatu
- Hindi: काला किरियात kala kiriyat, कस्तुला kastula

- Konkani: काळें किरायतें kalem kiraytem
- Marathi: जकारा jakara
- Tamil: ஒட்டு முடி குறிஞ்சி ottu mudi kurinjiSource

Classification

Kingdom: Plantae – Plants

Phylum: Tracheophyta

Examples: Ferns, gymnosperms, & angiosperms

Vascular plants – have vascular tissue (xylem & Phloem)

Subkingdom: Tracheobionta – Vascular plants

Superdivision: Spermatophyta – Seed plants

Division: Magnoliophyta – Flowering Plants

Class: Magnoliopsida – Dicotyledons

Subclass: Asteridae

Pappus is frequently present in inflorescences of involucrate heads (Capitula) of one to five florets on a shared receptacle encircled by phyllaries. The corolla is unified and has five lobes, and the five stamens form a cylinder around the style. The ovary has two style branches and is uniloculate, containing a single ovule.

Order: Scrophulariales

The figwort family, Scrophulariaceae, is made up of about 1,800 species and 65 genera. Genera including Verbascum (Mullein, with roughly 360 species), Scrophularia (200 species), and Buddleja (Butterfly bush, with 125 species) are among these herbs and shrubs. There are certain of them that have the same number of stamens as petals, such mulleins.

Native to Australia and the Pacific, the genera Eremophila (215 species) and Myoporum (approximately 30 species) comprise trees and shrubs. A comparable ornamental plant from the Caribbean is called Bontia daphnoides. Members of these three genera are distinguished by extremely bilaterally symmetric blooms; they were once classified as members of the Myoporaceae family. Most have pellucid spots on their leaves.

Family: Acanthaceae – Acanthus family

One of the 24 families in the mint order (Lamiales) of flowering plants, the Acanthaceae is home to about 4,000 species and 220 genera that are mostly found in tropical and subtropical climates worldwide. Although there are some trees and vines in the Acanthaceae family, herbs and shrubs make up the majority of the species.

Genus: Haplanthodes

A genus within the Acanthaceae family of plants is called Haplanthodes. India is home to it endemic.

Species: Haplanthodes verticillata.

Pharmacognostic characteristics

Botanical name

Haplanthodes verticillata (Roxb.) R.B. Majumdar (=Haplanthus verticillata(Roxb.) Nees, = Justicia verticillatus, Bremekampia verticillata(Roxb.)

Vernacular name

Jakara, Kateri.

Family

Acanthaceae.

Threatened category

Low risk (Gaikwad & Yadav, 2004)

Key characters

Flowers clustered in the midst of axillary cladodes, Corolla-lobes imbricate in bud, Cladodes Quadrangular, more than 1 cm long, capsules Compressed, glabrous.

Chemical constituents

- Vanillic acid
- Andrographolide
- 4-hydroxybenzoic acid
- Vitexin
- Isovitexin

Local name

Pankenar.

Part(S) used

Root.

Plant Parts and Methods of its useroots

Extracts taken orally.

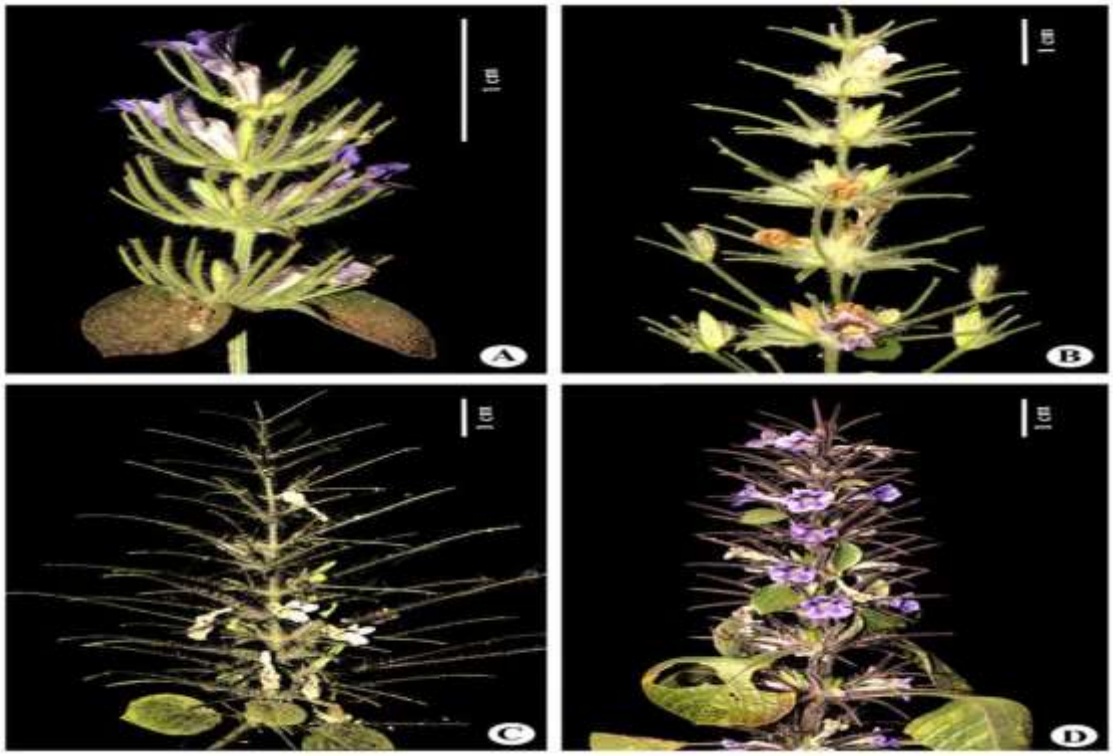

Fig. 2: Morphology of the inflorescence of Haplanthodes species. A. H. neilgherryensis, B. H. plumosa, C. H. tentaculata and D. H. verticillata.

Distribution

Of the four, H. neilgherryensis is the most prevalent. The states of Goa, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Rajasthan, and Tamil Nadu are home to the genus (Fig. 2). Near forest edges, roadsides, plateaus, forest walks, lateritic slopes or bunds, and under shade plants in deciduous woods are where all species are primarily found. They grow in open spaces, between 204 □ 668 m in elevation. Haplanthodes and Andrographis share some physical characteristics as well as a common biogeographical distribution. But in a number of morphological characteristics, it is different from the latter (Table 1). In the Western Ghats, Haplanthodes inhabits the arid and semi-arid ecological niches. Its cladode, densely hairy trichomes, and hygroscopic seeds set it apart from the other Members of the

Andrographideae tribe. These traits seem to have developed separately within this genus and could be an adaptation to its current.

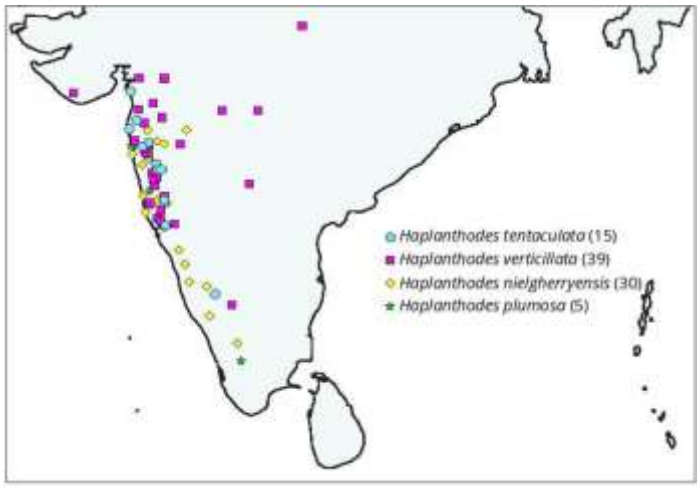

Fig. 3: Distribution of haplanthodes species.

Additional research has connected the development of cladode to a response to arid environments (Fukuda et al 2005; Pimienta-Barrios et al 2005; Nakayama et al 2012). Furthermore, the prolate form of pollen grain that was the ancestral characteristic of Haplanthodes has given way to an oblate type. According to some research, ecological variables like water availability and a change in the pollination process may have an impact on the size and form of pollen (Crisp et al., 2009; Torres, 2000).

Description

Growing to a height of only approximately half a meter, Spiny Bottle Brush is an erect annual herb. Ovate, slender leaves grouped in opposition are 5–10 cm long. The tips of the leaves are tipped with two spinous teeth and covered in long, spreading hairs. Stalkless blooms are densely packed close to the top of the stem in the leaf axils. Although the flowers seem to have five petals, they fact only have two, which are lobed in pairs of two and three. The flowers have a pale green throat and a dark blue tint throughout. Usually found in the Western Ghats on stony slopes. Blooming Season: November–January.

Strong, pubescent, glandular plants with axillary branches that are reduced to cladodes. Cladodes: pubescent, 4-angled, with two small spinous teeth at the apex. Sessile flowers. Corolla violet-blue. Stamen 2 is present. Capsules are sharp, somewhat compressed, glandular, and hairy at the tip. Humorous and hygroscopically hairy seeds.

Applications

A vast array of illnesses are treated by traditional remedies, which mostly rely on plants. This study chose Haplanthodes neilgherryensis (Wight) R.B. Majumdar (H. neilgherryensis) from the endemic Western Ghats flora in search of a bioactive chemical.19, 20 One of the 49 known endemic genera of angiosperms in India, the family Haplanthodes is primarily distributed in the Western Ghats region. The herb H. neilgherryensis is characterized by its slender, glandular stems with quadrangular top ends. The leaves have an oval (5–10_3-5 cm) shape that is acuminate at the apex and decurrent at the base.

The blue or lilac flowers are sessile, with axillary spines clustered at the tips of branches. Only a few species of Haplanthodes are used in traditional medicine to treat wounds and increase stamina.21, 22 Haplanthin, a flavanone glycoside, has been extracted from this plant and is also thought to be present in Haplanthus tentaculatus, a different species. This paper describes the flavonoids that were isolated from H. neilgherryensis, their structure, and their capacity to improve glucose absorption in L6 rat skeletal muscle cells.

REFERENCES

1. Nephazahayo, F; Liu B. Axilary bud proliferation approach for biodiversity conservation and restoration. Int. J. biodivers, 2014. doi:10:1155/2014/727025
2. Corral, P.; Mallón, R.; Rodríguez-Oubiña, J.; González, M.L. Multiple shoot induction and Plant regeneration of the endangered species Crepis novoana. Plant Cell Tissue Organ Cult, 2011; 105: 211–217, doi:10.1007/s11240-010- 9854-x 7.
3. grawal, V.; Prakash, S.; Gupta, S. Effective Protocol for in vitro shoot production through Nodal explants of Simmondsia chinensis. Biol. Plant, 2002; 45: 449–453, Doi:10.1023/A:1016238205522.
4. Crisp MD, Arroyo MTK, Cook LG, et al. Phylogenetic biome conservatism on a global scale. Nature, 2009; 458: 754–756. Doi: 10.1038/nature07764CrossRefPubMedWeb
5. Malda, G.; Suzán, H.; Backhaus, R. In vitro Culture as a potential method for the Conservation of endangered plants possessing Crassulacean acid metabolism. Sci. Hortic, 1999; 81: 71–87, doi:10.1016/S0304- 4238(98)00250-7.
6. Daniels RR Geographical distribution patterns of amphibians in the Western Ghats, India. Journal of Biogeography, 1992; 521–529. Google S

7. Krishna, H.; Alizadeh, M.; Singh, D.; Singh, U.; Chauhan, N.; Eftekhari, M.; Sadh, R.K. Somaclonal variations and their applications in Horticultural crops improvement. Biotech, 2016; 3, 6: 54. doi:10.1007/s13205-016-0389-7.
8. grawal, V.; Prakash, S.; Gupta, S. Effective Protocol for in vitro shoot production through Nodal explants of Simmondsia chinensis. Biol. Plant, 2002; 45: 449–453, Doi:10.1023/A:1016238205522.
9. Gamburg, K.Z.; Vysotskaya, E.; Gamanets, L. Microtuber formation in micropropagated Jerusalem artichoke (Helianthus tuberosus). Plant Cell Tissue Organ Cult, 1998; 55: 115– 118, doi:10.1023/A:1006127319351
10. Paterson, K.E. Shoot tip culture of Helianthus Annuus—Flowering and development of Adventitious and multiple shoots. Am. J. Bot, 1984; 71: 925–931, doi:10.1002/j.1537-2197. 1984. tb14158.x
11. S. Surveswaran and N. Tiwari and Praveen Karanth and P. Deshmukh and M. Lekhak bioRxiv, Journal = Molecular phylogenetics and character evolution in Haplanthodes (Acanthaceae), an endemic Genus from peninsular India, Year, 2020.
12. W. Baker and S. Dodsworth and F. Forest and S. Graham and Matthew G. Johnson and Angela J. McDonnell and L. Pokorny and J. Tate and S. Wicke and N. Wickett Journal = American journal of botany, Exploring Angiosperms: an open, community toolkit for collaborative phylogenomic research On flowering plants, Year, 2021; 353.
13. Reappraisal and lectotypification of justicia tanalensis s. moore (acanthaceae), rediscovered from central madagascar more than 100 years since the last collection. Phytotaxa, 2022; 573(2): 293-300. https://doi.org/10.11646/phytotaxa.573.2.9
14. Effect of integrated nutrient management on growth and yield of kalmegh (andrographis paniculata wall. Ex. Nees.): a review. International journal of current microbiology and applied sciences, 2018; 7(09): 2616-2619. https://doi.org/10.20546/ijcmas.2018.709.325
15. Plant-based bone grafting: the future of bone healing, 2023. https://doi.org/10.20944/preprints202301.0462.v1
16. Mexican plants and derivates compounds as alternative for inflammatory and neuropathic pain treatment—a review. Plants, 2021; 10(5): 865. https://doi.org/10.3390/plants10050865
17. Anatomical characterization of strobilanthes (acanthaceae) species from the northern western ghats of india and its implication for identification at vegetative state. Nordic journal of botany, 2019; 37(11). https://doi.org/10.1111/njb.02550

18. Ethnomedicinal, phytochemical, and pharmacological aspects of genus acanthus. International journal of pharmacy and pharmaceutical sciences, 2017; 9(12): 18. https://doi.org/10.22159/ijpps.2017v9i12.22386
19. Transcriptome analysis of the holly mangrove acanthus ilicifolius and its terrestrial relative, acanthus leucostachyus, provides insights into adaptation to intertidal zones. Bmc genomics, 2015; 16(1). https://doi.org/10.1186/s12864-015-1813-9
20. Therapeutic use of adhatoda vasica. Asian journal of medical and biological research, 2016; 2(2): 156-163. https://doi.org/10.3329/ajmbr.v2i2.29005
21. Angiosperms in gobindaganj upazila of gaibandha district, bangladesh. Bangladesh journal of plant taxonomy, 2019; 26(2): 285-298. https://doi.org/10.3329/bjpt.v26i2.44595
22. Andrographis theniensis (Acanthaceae), a new species from the southern western ghats of india. Nordic journal of botany, 2024; 2024(3). https://doi.org/10.1111/njb.04218
23. Floral neighborhood and pollination success in four hummingbird-pollinated cloud forest plant species. Ecology, 1986; 67(2): 449-464. https://doi.org/10.2307/1938589
24. Effects of paclobutrazol and flurprimidol on water stress amelioration in potted red firespike. Horttechnology, 2016; 26(1): 26-29. https://doi.org/10.21273/horttech.26.1.26
25. Evaluation of antidiabetic activity of various extract of peristrophe bicalyculata (r.) nees. International journal of pharmaceutical quality assurance, 2023; 14(03): 559-560. https://doi.org/10.25258/ijpqa.14.3.16
26. Efficacy and safety of add-on plant-based drugs for covid-19 patients: a review of the randomized control trials. Infection and drug resistance, 2023; 16: 3879-3891. https://doi.org/10.2147/idr.s417727
27. Antioxidative and antibacterial potentials of fungal endophytes from justicia wynaadensis heyne: an ethnomedicinal rain forest species of western ghats. Asian journal of pharmaceutical and clinical research, 2017; 10(6): 203. https://doi.org/10.22159/ajpcr.2017.v10i6.18106
28. Origin of african physacanthus (acanthaceae) via wide hybridization. Plos one, 2013); 8(1): e55677. https://doi.org/10.1371/journal.pone.0055677
29. Biotic resistance to tropical ornamental invasion. Journal of ecology, 2016; 104(2): 518-530. https://doi.org/10.1111/1365-2745.12534
30. Nectar in hummingbird-pollinated neotropical plants i: patterns of production and variability in 12 species. Biotropica, 2004; 36(2): 196-215. https://doi.org/10.1111/j.1744-7429.2004.tb00312.x

31. Predator satiation and recruitment in a mast fruiting monocarpic forest herb. Annals of botany, 2011; 107(3): 379-387. https://doi.org/10.1093/aob/mcq262
32. Cockroaches interact with night-blooming flowers in the caatinga dry forest. Frontiers in ecology and the environment, 2024; 22(4). https://doi.org/10.1002/fee.2743
33. Gymnostachyum warrieranum (acanthaceae), a new species from the western ghats of india, based on morphological and molecular data. Kew bulletin, 2015; 70(3). https://doi.org/10.1007/s12225-015-9590-9
34. Untitled. International journal of pharmaceutical sciences and research, 2015; 2(6). https://doi.org/10.13040/ijpsr.0975-8232.ijp.2(6).310-14
35. What determines the evolutionary trajectories of wild plant species? Approaches to the study of quantitative fitness-related traits. American journal of botany, 2022; 109(11): 1673-1682. https://doi.org/10.1002/ajb2.16097
36. Molecular phylogenetics and character evolution in haplanthodes (acanthaceae), an endemic genus from peninsular india, 2020. https://doi.org/10.1101/2020.11.08.373605