

L. L. NARAYANA* & Digamber RAO*: **Contributions to the
floral anatomy of the Humiriaceae 2**

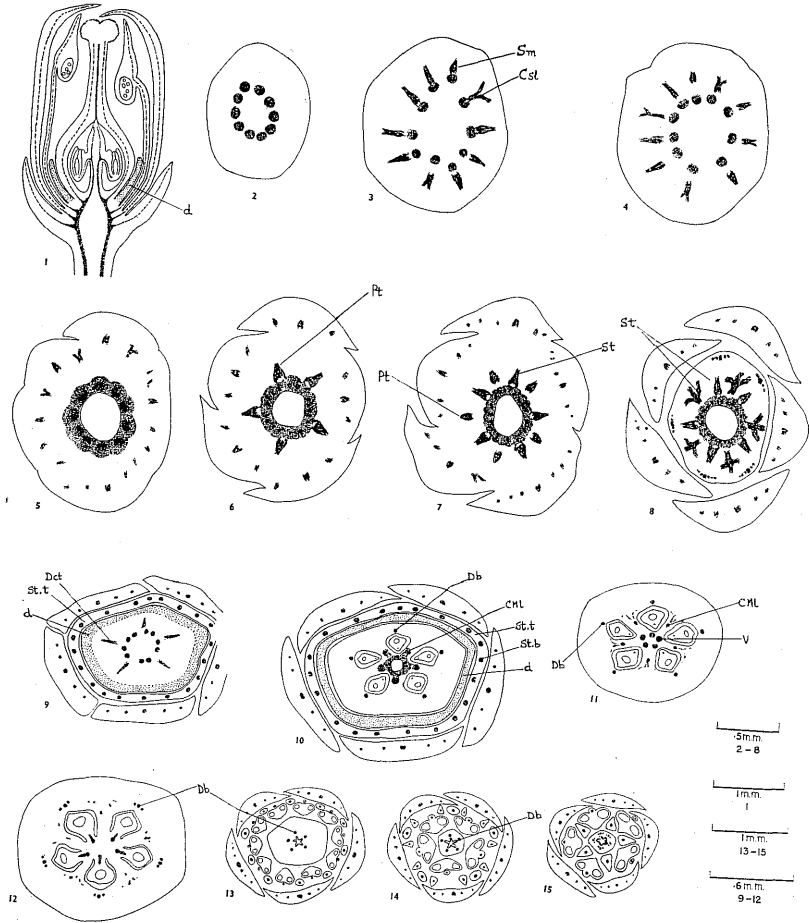
L. L. ナラヤナ*・D. ラオ*: Humiriaceae の花部解剖学的研究 2

In an earlier paper the authors described the floral anatomy of three species of *Vantanea* (Narayana and Rao, 1969). The present paper, the second in the series, deals with the floral morphology and anatomy of *Humiriastrium dentatum* (Urb.) Cuatr.

Material and methods Herbarium material of the flower buds were obtained from the Director, Botanic Gardens, Rio de Janeiro. The material was processed for microtomy according to the procedure described previously by Narayana (1964). Sections were cut at between 9-12 microns and were stained in crystal violet-erythrosin combination.

Morphology of the flower The flower is pedicellate, pentacyclic, pentamerous, heterochlamydeous, regular, bisexual and hypogynous (Figs. 1, 8, 10). The free sepals and petals show quincuncial aestivation (Figs. 8-10, 13-15). The monadelphous androecium consists of twenty stamens, of which fifteen belong to the antisepalous whorl and five to the antipetalous whorl (Fig. 9, 10, 13-15). Among the twenty stamens, five on the sepal radii are the longest (Fig. 15), five on the petal radii are of intermediate height (Fig. 14) while the alternating ten stamens are the shortest (Fig. 13). The anthers are dorsifixed, introrse (Figs. 1, 13-15), and possess only two unilocular thecae at the base along the outer side (Figs. 1, 13-15). The massive, vascularized connective extends in the form of an appendage (Fig. 1). The ovary is superior, 5-carpellary, syncarpous (Figs. 10-12). It is 5-locular at the base and unilocular above (Figs. 10-13). The carpels are antisepalous (Fig. 10). There is one pendulous, anatropous, bitegmic ovule in each loculus, with the micropyle pointing upwards (Fig. 1). The common style encloses a star shaped stylar canal lined by transmitting tissue (Figs. 13-15). The stigma is 5-lobed. The annular disc is non-vascularized and is adnate to the base of the ovary (Fig. 1, 9, 10).

* Department of Botany, Post-Graduate Centre, Osmania University. Warangal-1. A. P., India.



Figs. 1-15. *Humiriastrum dentatum*. 1. Semidiagrammatic L. S. of flower showing the course of the vascular bundles to the different floral parts. 2-15. Serial transverse sections of flower showing the origin and distribution of the traces to the different floral parts. Abbreviations. d=disc, Sm=Sepal midrib, Csl=Common sepal laterals, Pt=Petal trace, St=Staminal trace, St. t=Staminal tube, St. b=Staminal bundle, Dct=Dorsal carpellary trace, Db=Dorsal bundle, CML=Common median laterals, V=Ventral.

Floral anatomy There are ten vascular bundles in the pedicel arranged in the form of a ring (Fig. 2). The sepal midrib traces and the common sepal lateral traces arise at the same level from the receptacle (Figs. 3-5). The petals are single traced and the traces arise independently from the

main stele (Fig. 6).

The main stele after supplying the perianth parts, organizes into a closed ring (Figs. 6, 7). From this, the antisepalous and antipetalous staminal traces arise as two close alternating whorls (Figs. 7, 8). Whereas each of the five antisepalous traces branches into three, the antipetalous staminal traces do not (Fig. 8).

At a higher level the five dorsal carpellary traces are demarcated along the sepal radii (Fig. 9). The stele at this level shows a ring of bundles (Fig. 9), which soon form a closed ring. As loculi appear, five common median lateral traces are demarcated along the petal radii (Fig. 10) and their branches supply the ovary wall (Figs. 11, 12), and after traversing for some distance gradually disappear (Figs. 12, 13). The remaining vascular tissue organizes into five inversely oriented ventral bundles opposite the loculi (Fig. 11). The dorsal carpellary bundles branch into three at about the middle region of the ovary (Fig. 12). The ventral bundles after supplying the ovules extend further for a short distance and finally fade away (Fig. 1). The style is traversed by the dorsal bundles (Figs. 1, 14, 15).

Summary and conclusions The pentamerous flowers are regular, bisexual and hypogynous. The three traced, quincuncial sepals are free; while in other investigated species they show basal connation (Rao & Narayana, 1965; Narayana and Rao, 1969, 1972). There is connation between the lateral traces of adjacent sepals. The single traced, free petals are also quincuncial.

The monadelphous androecium shows twenty stamens of three different heights; the five antisepalous are the longest, the five antipetalous are of intermediate height, while the alternating ten are the shortest. The traces for the stamens arise in two whorls of five each. The antisepalous traces branch into three each and supply the fifteen stamens. The antipetalous traces do not show branching. There is a massive, vascularized staminal appendage as in other investigated species (Rao and Narayana, 1965; Narayana & Rao, 1969, 1972). The disc is annular, and non-vascularized.

The five carpellary ovary is syncarpous. The uniovulate carpels are five traced. The placentation is axile. The style shows a stylar canal lined by transmitting tissue; it is traversed by dorsal bundles.

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Literature cited

Narayana, L. L. 1964. A contribution to the floral anatomy and embryology of Linaceae. J. Indian Bot. Soc. 43: 344-357. Narayana, L. L. & Rao, D. 1969. Contributions to the floral anatomy of Humiriaceae 1. J. Jap. Bot. 44(11): 328-335. — 1972. Contributions to the floral anatomy of Humiriaceae 3. (in Press). Rao, D. & Narayana, L. L. 1965. Vascular anatomy of Humiriaceae. Curr. Sci. 34: 383-384.

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Humiriastrum dentatum の花を解剖学的に観察した。5輪5数性。萼片は研究ずみの他属と異り、基部に融合が見られない。萼片に関係する葉跡は10個あり、交互に5個は中脈跡となり、他の5個は側脈跡となる。花弁は1葉跡。雄ずいの葉跡は2輪性で各5個。外輪の対萼位置の葉跡は各3個に分れ、15個の雄ずいに入る。中央の対萼位置の5個の雄ずいが最も長く、その左右の10個の雄ずいは最も短い。内輪の対花弁位置の葉跡5個はそれぞれ5個の雄ずいに入り、雄ずいの長さは中間。以上20個の雄ずいは単体であり、この内側に輪状の花盤があり、これには葉跡がない。子房は5心皮性、心皮には5葉跡があり、胚珠は1個、中軸性である。心皮の背部管束が花柱脈となる。

○高等植物分布資料 (80) Materials for the distribution of vascular plants in Japan (80)

○ヒモヅル *Lycopodium casuarinoides* Spring 国立衛生試験所の佐竹元吉氏が長崎県西彼杵半島でヒモヅルを発見された由を聞いた。さっそく同氏に連絡したところ、詳細な略図を添えて発見地を示された。佐竹氏は昨秋、長崎大学での生薬学会に出席された際、西彼杵半島に行って、10月31日にこれを発見されたとのことである。1973年3月3日、示された略図をたよりに出かけて、現地をみることができた。氏の好意に深く感謝するしだいである。産地は西彼杵半島の北部で、大村湾に注ぐ大明寺川の左岸で西彼杵郡西彼町の雑木林内で、山間の廢田に沿うて200m余にわたってみられる。林床にはウラボシが密生している。ヒモヅルはリュウブ・コナラなどの裸木の樹上、高いところでは高さ5mばかりのところまでからみついて登っている。まさに大群落といえるほどである。 (外山三郎)