

L. L. NARAYANA* & Digamber RAO*: **Contributions
to the floral anatomy of Humiriaceae 3**

L. L. ナラヤナ*・D. ラオ*: Humiriaceae の花部解剖学的研究 3

The present paper is the third in the series dealing with the floral morphology and anatomy of *Humiria balsamifera* Jaume St. Hil.

Material and methods Herbarium material of *Humiria balsamifera* was kindly sent to us by the Director, Royal Botanic Gardens, Kew; Director, Botanic Gardens, Rio de Janeiro; and Dr. J.C. Lindeman, Holland. The material was processed for microtomy according to the procedure previously described (Narayana, 1964). Sections were cut at 9-12 microns thickness 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, 14). Some epidermal cells of the pedicel and sepals enlarge into thin-walled balloon-shaped unicellular outgrowths (Figs. 2-11) enclosing dense contents. The basally connate sepals show quincuncial aestivation (Figs. 8-12, 14) and the free petals also show a similar arrangement (Figs. 20-23). The androecium consists of twenty stamens united into a staminal tube (Figs. 11-14, 17, 19) nearly as long as the style (Figs. 1, 19). The lobed vascularised disc is adnate to the base of the staminal tube (Figs. 1, 10, 11). It becomes ten lobed at the region of its separation from the staminal tube (Figs. 12, 13) and each of these in turn divides further into two (Figs. 12-14). The staminal tube splits into twenty stamens (Figs. 19, 20); of these, five along the antisepalous radii are the longest (Fig. 23), ten on either side of the antisepalous stamens are the shortest (Fig. 21), while the antipetalous stamens are of intermediate height (Fig. 22). The anthers are dorsifixed and introrse (Figs. 1, 21-23). The inner pair of sporangia are fertile (Figs. 1, 21-23). The connective is prolonged into an appendage (Figs. 1, 21-23). The ovary is 5-carpellary, syncarpous, 5-locular, with two superposed, anatropous, bitegmic, pendulous ovules in each loculus. (Figs.

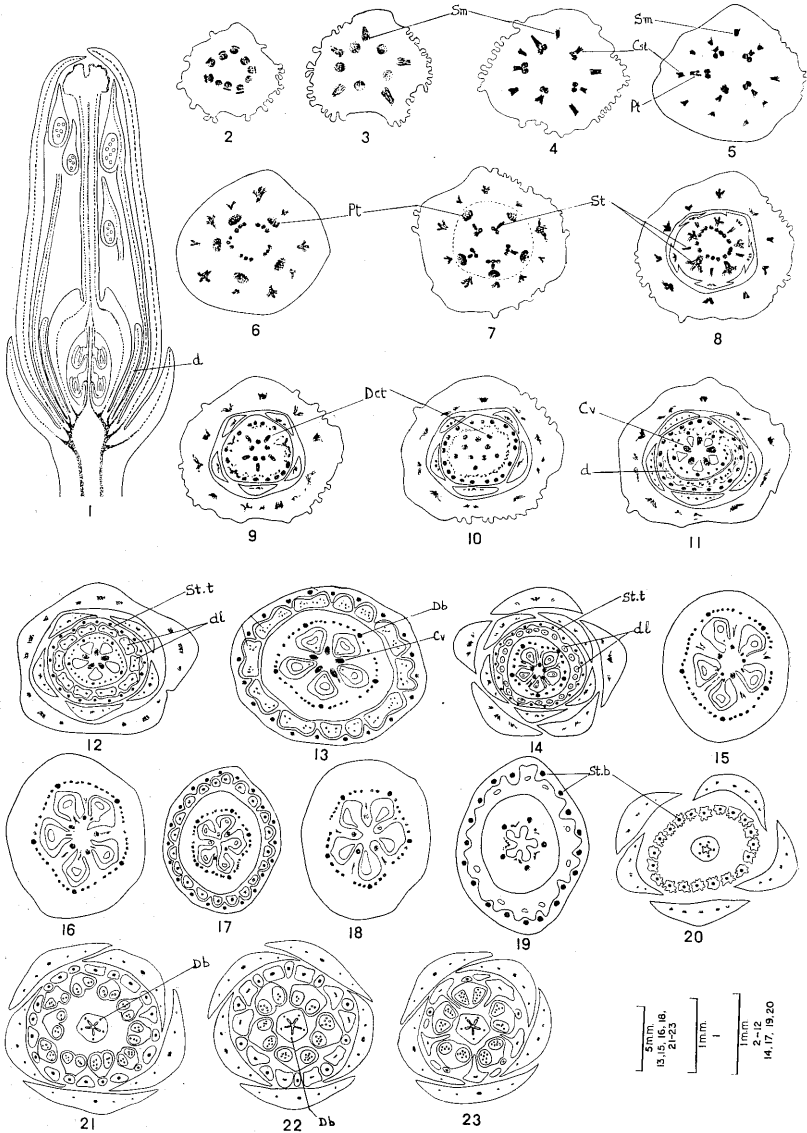
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1, 11-17). The ovary wall projects above the base of the style and encircling it (Fig. 1). The semisoild style shows a star-shaped styler canal lined by transmitting tissue (Figs. 1, 20-23). The five lobes of the stigma expand and are covered by glandular hairs (Fig. 1).

Floral anatomy The pedicel shows ten distinct vascular bundles (Fig. 2). In the receptacular region five traces pass off as sepal midribs (Fig. 3). The alternating five larger bundles at a higher level give off five common sepal lateral traces which divide radially and demarcate the lateral traces of adjacent sepals (Figs. 4-11). The sepal lateral and the sepal midrib traces divide and these bundles traverse each sepal. As the sepal traces reach the peripheral region of the receptacle, the five petal traces arise from five bundles of the main stele (Fig. 5).

After the demarcation of the petal traces, the main stele shows fifteen bundles arranged in five groups of three each (Fig. 6). At this level five traces arise, one from each group (Fig. 7) and these are the antipetalous staminal traces. Now, the bundles in the stele divide further to form a ring (Fig. 8). Five antisepalous staminal traces arise from this ring. (Fig. 8). Each of these, divides further into three branches as it reaches the periphery of the thalamus (Figs. 8, 9); the median branch supplies the longer stamen and the laterals supply the shorter stamens arranged on either side of the longer stamen (Figs. 8-12). At the same time branches are also produced by the staminal traces on the inside and these enter the disc and the ovary wall (Figs. 9-12).

At a higher level five dorsal carpellary traces are organised along the petal radii (Fig. 9). The dorsal carpellary bundles traversing in the ovary wall are distinct from the other bundles found here and derived from the staminal traces (Figs. 11-18). After the origin of the dorsal carpellary traces the remaining stele organises into five bundles (Fig. 10) which function as the common ventral bundles (Figs. 11-14). Branches arising from these traverse the septa and enter the ovary wall (Figs. 13, 14-16, 18, 19). All the bundles in the ovary wall except the dorsal carpellary bundles fade away towards the top of the ovary (Figs. 19, 20). After supplying the common ventral bundles extend upwards and towards the tip of the ovary (Figs. 1, 17-19). The style is traversed by the dorsal carpellary bundles which finally terminate below the stigmas (Figs. 1, 20-23).



Figs. 1-23: *Humiria balsamifera*. 1: Semidiagrammatic L. S. of flower showing the course of the vascular bundles in the different floral parts. 2-23: Serial transverse sections of flower bud showing the origin and distribution of the traces to the different floral parts. For explanation see text.

Summary and conclusions The flower is regular, bisexual, hypogynous, pentamerous and pentacyclic. The quincuncial, gamosepalous sepals are three-traced. There is connation between laterals of adjacent sepals. The free, quincuncial, petals are single traced. The androecium of twenty stamens is monadelphous and the stamens are of three heights. The massive connective is prolonged into a vesicularized appendage as in the other investigated species (Rao & Narayana, 1965; Narayana & Rao, 1969). Though there are twenty stamens, the traces for the five antipetalous stamens arise earlier; followed by the five antisepalous traces, each of which branches into three and these supply the fifteen stamens. Thus the androecium may be looked upon as obdiplostemonous. The intrastaminal disc is vascularized, by the branches derived from the emerging staminal traces. The carpels are three-traced; the biovulate locules are antipetalous and the placentation is anatomically parietal. The semi-solid style shows a stylar canal lined by transmitting tissue and only the dorsal carpellary bundles extend right upto the base of 5-lobed, glandular stigma.

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Abbreviations d=disc dl=disc lobes Sm=Sepal midrib Csl=Common sepal laterals Pt=Petal trace St=Staminal trace St. t.=Staminal tube St. b=Staminal bundles Dct=Dorsal carpellary traces Db=Dorsal bundle Cv=Common ventrals

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Humiria balsamifera の花の解剖学的観察を行なった。花は5輪5数性。花柄お

よび萼の表皮には風船状の単細胞が突出する。萼片は基部で融合。萼片に関しては、下部で5葉跡が主脈跡となり、次にこれと交互する5個の側脈跡を發出する。花卉は1葉跡。雄ずいは20個、単体をなし、長さの異なる3種がある。対花卉位置の葉跡5個が下方で現われて5個の雄ずいに到り、次に対萼位置の葉跡5個が現われる。後者は3個に分裂して15個の雄ずいに至る。3個の中、中央のものに関する雄ずいが最も長く、他は最も短い。対花卉位置の雄ずいは中間。雄ずい筒内部の花盤には20個の裂片がある。花盤には雄ずいの葉跡の分枝による管束がある。心皮は3葉跡性、2個の胚珠があり、解剖学的には側膜性である。心皮の背部管束のみが花柱脈となる。

○高等植物分布資料 (82) Materials for the distribution of vascular plants in Japan (82)

○ヘゴ *Cyathea spinulosa* Wall. 1973年2月11日、田辺高等学校生徒の米本憲市君が、和歌山県田辺市上秋津左向谷でクサマルハチらしいシダを採ったと、同校の後藤伸教諭に聞き、採集品を見たところ、葉柄基部に刺があるので不審に思い、自生地を訪れて調べた。自生地は海岸から約6km山へ入った南向きの小さな谷で、海拔150m くらいのスギ植林地の平坦な林床に唯1株だけあって、50cm くらいの葉と、数対の下方羽片だけをつけた葉3枚とを叢生していた。京都大学の岩槻邦男教授、大阪市立自然科学博物館の瀬戸剛学芸員に標本を見て頂いて、ヘゴであることが確認された。ヘゴの本州での産地には、三重県尾鷲市で現在までに2株発見されているが、樹状に成長したヘゴは発見されておらず、南方より飛来した孢子が定着、発芽してこの大きさにまでなったものかもしれない。なお、標本は大阪市立自然科学博物館に納めた。

(田辺市 ██████████ 真砂久哉)

□J. D. Dickson: *Bryophytes of the Pleistocene*. 256 pp, Cambridge University Press, 1973. £12.80 (¥11,520). 日本では化石コケ類の記録はごくまれであるが、欧米ではいろいろな報告がでている。上記の本は、イギリスの第三紀を中心とする化石または半化石 (subfossils) の記録の集録である。まず現在のイギリスにおけるコケ類 (蘚類) の分布を述べて、イギリスに Oceanic element が多いことを明らかにし、このようなフロラ成立が、第三紀の化石からどのように説明できるかを論じてある。第三紀以降の花粉分析などで、コケ類の孢子が充分解析されていないとして、孢子の Scanning electronmicroscope による形態学的な研究もおこなっている。化石記録をもとにしてイギリスのコケフロラの成立を4期に分けて論じてあるが、この部分は面白い論議になっている。日本でもこのような面での研究が今後必要ではないかと思いいこの本を紹介する。

(井上 浩)