

STUDIES ON PORELLINEAE: New Taxa of Jubulaceae

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INTRODUCTION

Genus, subgenus and sectional perimeters in the Jubulaceae remain very controversial, in large part because "traditional" criteria, such as used by Stotler (1969) in a revision of neotropical taxa of subg. Frullania, are inadequate for a resolution of existing problems. Thus, under subg. Frullania Stotler treats taxa which in other classifications (as in Verdoorn, 1930, or in Hattori, 1972) would fall into three subgenera! At the same time he excludes taxa (such as F. kunzei) which, in my opinion, are best placed in subg. Frullania.

A resolution of these problems is possible only if careful attention is given to a whole ensemble of criteria that are either unemployed or underemployed in current classifications. Thus the insertion line of the dorsal leaf lobe, which Stotler ignored, serves to eliminate from subg. Frullania certain taxa he placed therein (cf. Hattori, 1972). The significance of leaf insertion in classification of the Jubulaceae was re-emphasized in Schuster (1970) after having been largely neglected as a criterion since Spruce (1884-85) first emphasized it. A series of other criteria, clearly relevant at several levels, includes; (a) Branching -- whether only acroscopic, Frullania type or also basispic; until attention was called to these criteria (Schuster, 1970) the assumption had been that only Frullania-type branching occurred in the genus Frullania, except if plants were decapitated (Crandall, 1969). (b) Position and form of gynoecia. (c) Morphology of the primary branch appendages. (d) Capsule wall anatomy, especially of the internal cell layer. (e) Number of elaters and their orientation on the valves. (f) Seta anatomy. (g) Number of archegonia. An extended discussion of these and other criteria will be found in my forthcoming Vol. V. of The Hepaticae and Anthocerotae of North America (Columbia Univ. Press; in prep.). Utilizing these criteria, I have proposed several new subgenera and sections. The Latin diagnoses follow; more extended discussions will be found in the foregoing work cited.

Subgenus Frullania

Both perimeters and internal classification remain controversial. Thus Evans (1897) placed small, autoecious species into subg. Diastaloba that I place here (following Verdoorn, 1930) into subg. Frullania. As noted above, species that appear to fall into subg. Meteoropsis and Saccophora were placed by Stotler (1969) into subg. Frullania. A clearer understanding must involve at least a first attempt at recognition of sections and subsections; the taxa I am familiar with fall into six sections: sects. Frullania, Serratae Verd., and four new sections, as follows.

Sect. *Intumescentes* Schust., sect. n. Sectio a sect. *Frullania* differens ut (a) ocelli aut vitta nulli; (b) stylus minutus, 1-seriatus; (c) folia exsiccatione convoluta circum cauliculum. A sect. *Magnistylis* differens ut stylus filiformis atque normaliter uniseriatus. Type: *F. intumescens* (L. & L.) L. & L.

Sect. *Magnistylis* Schust., sect. n. Sectio a sect. *Frullania* differens criteriis a-c supra; a sect. *Intumescens* stylo magno, lamellato, foliosoque differens; a sect. *Mirabilis* basi lobi dorsalis auriculata, non, autem, appendiculata differens. Type: *F. pearceana* St.

Sect. *Mirabilis* Schust., sect. n. Sectio a sect. *Frullania* criteriis a-c supra differens, a sects. *Intumescens* atque *Magnistylis* differens (a) basibus folii anticalibus posticalibusque appendiculatis, appendice basis anticalis multiformi; (b) appendice basis posticalis geminata; una erecta et alia pendulosa; (c) cellulis mediis lobi trigones + incrassationes intermediatas confluentes praebentibus, lumina sinuosa amoeboides differens. Type: *F. mirabilis* Jack & St.

Sect. *Pseudodiastaloba* Schust., sect. n. Taxa parva (surculo 450-750 μ m lat.) ab omnibus aliis sectionibus (sect. *Serratis* Verd. exceptis) in subg. *Frullania* differentia inflorescentiis autoeciis. A sect. *Serratis* distincta ut gynoecea in $\pm$ elongatis (raro brevibus) ramis, et absentia cellularum magnorum basilium loborum, et amphigastria maiora. Type: *F. kunzei* (L. & L.) L. & L.

This species and its American allies (e.g., *F. donnellii* Aust.) are excluded from subg. *Frullania* in Stotler (1969).

Sectio *Frullania*

Sect. *Frullania* subsect. *Microphyllae* Schust., subsect. n. Subsectio a subsect. *Frullania* differens ut (a) gynoecea in axibus foliaceis $\pm$ elongatis nata; (b) folia ad basim anticalem numquam auriculata, et stylus minutus. Type: *F. microphylla* (G.) Pears.

Sect. *Frullania* subsect. *Pycnophyllae* Schust., subsect. n. Subsectio a subsect. *Frullania* et *Microphyllis* differens ut (a) amphigastria latiora quam longa, lateribus dentatis, basibus attenuatis, non-auriculatis, et (b) ocelli basales 5-6, magnitudine amplificati. Type: *F. pycnophylla* Hatt.

Subgenus *Diastaloba*

I have noted above that perimeters of this subgenus remain ill-defined vis à vis subg. *Frullania*. They are equally ambiguous as regards the separation from subg. *Microfrullania* Schust. (*Schusterella* Hatt. et al.). In general, however, subg. *Diastaloba* includes plants with lobules remote from the stem, elongated, and lying obliquely oriented, mostly at 45-60° ($\pm$ 15°). The lobes are usually not reduced,

so that lobules are rarely more than 0.5 the lobe length. The species fall into at least five sections, sect. *Diastaloba* (including the *Lucidae* Verd.), *Meijeria* Hatt., *Graciles* Verd., and two new sections, as follows:

Sect. *Sinuatae* Schust., sect. n. Sectio similis *Gracilibus* parva magnitudine cellularum (ca. 8-12 μ m in marginibus, minore quam 15-18 μ m media in parte); differens ut (a) aggregatio 10-20 cellularum basali-um permagna (25-35 x 35-55 μ m), ocellos formantibus; (b) stylus magnus lamelliformisque; (c) lobi ad basim valde ampliata auriculatique. Type: *F. sinuata* Sde.-Lac.

Sect. *Ocellatae* Schust., sect. n. Sectio *Gracilibus* atque *Sinuatis* similis cellulis parvis; differens ab ambobus ut ocelli numerosi (25-60 in folio caulicali), bene definiti a cellulis adjacentibus, e cellulis magnis compositi (25-42 x 30-50 μ m), trigonas grossas atque subconfluentes. Type: *F. ocellata* Hatt. & Kamimura.

Subgenus *Trachycolea*

Although the abbreviated, often subquadrate lobule usually easily identifies this subgenus, its classification into sections (and subsections or series) remains forbiddingly difficult. Until, however, this is accomplished, digesting the innumerable species in this group will remain nearly impossible.

Sect. *Campanulatae* Schust., sect. n. Sectio a sect. *Trachycolis* differt ut (a) omni perianthia in ramis lateribus simplicibus abbreviatisque nata; (b) folia cauliculi lobulos brevi-cylindricos habentia. Type: *F. campanulata* Sde.-Lac. of Indonesia. Although placed by Verdoorn (1930) in sect. *Dilatatae* (= sect. *Trachycolea*), it differs from all "normal" species of that group in the short, simple, lateral female branches and in lobule form.

Sectio *Trachycolea*

Typical taxa bear very short lobules and have perianths on long axes that bear normal leaves and secondary branches; they all have underleaves with obcuneiform bases, usually as long or longer than wide, with a conspicuous V-shaped sinus. Deviating from "normal" taxa are three complexes, here separated as subsections, which may need treatment as autonomous sections:

Subsect. *Ericoides* Schust., subsect. n. Subsectio similis subsectioni *Trachycolibus* differens, autem, ut folia valde squarrosa; gynoecia semper in ramis lateralibus brevibus simplicibusque nata. Type: *F. ericoides* (Nees) Nees.

Subsect. *Semivillosae* Schust., subsect. n. Subsectio subsectionibus et *Trachycoleis* et *Ericoideis* differens ut (a) amphigastria magna, ad apicem haud incisa; (b) basis posticalis lobi dorsalis valde expansa-

auriculata; (c) ♀ bracteola utrique bractee connata. Type: F. semivillosa Lindenb. & G.

Subsect. Inflatae Schust., subsect. n. Subsectio a subsect. Trachycoleis et subsect. Ericoidibus differens (a) inflorescentiis autoeciis; (b) carinis perianthii omnium taxorum aequae levibus; (c) androeciis abbreviatis subrotundatisque. Type: F. inflata G.

Sect. Planae Schust., sect. n. Sectio sect. Trachycoleis similis amphigastriis subtransverse insertis, ad apicem manifeste bifidis; differens ut (a) perianthia, semper leve trigona, in ramis tantummodo lateralibus, brevibus, simplicibusque nata; (b) amphigastria lata, basibus lateralibus subcordatis cordatisve. Type: F. plana Sulliv.

Sect. Coniferae Schust., sect. n. Sectio sectioni Acutilobis Verdoorn similis forma loborum (angulis exterioribus valde rostratis, parte inflata lageniformi); distincta ut (a) perianthium longi-pedicellatum, excrescentiis foliaribus subcircularibus, confertis tectum quae strobilum Pini imitantur; (b) gynoecia in ramis lateralibus, brevibus, simplicibusque semper nata. Type: F. nicholsonii Hodgs. (1949; nom. n. for F. berggrenii Nicholson). I know of no allied taxa.

Sect. Cladogynae Schust., sect. n. Sectio Ornithocephalis Verdoorn similis insertione amphigastrii (arcuata, in forma litterae U invertae, atque facies; basibus valde auriculatis atque forma folii; basibus lobi dorsalis insigniter auriculatis cordatisve; differens ut (a) amphigastriis non-lobatis aut retusis; (b) gynoecia ramis lateralibus semper simplicibus, abbreviatisque nata. Type: F. yuennanensis St.

F. inflata var. communis Schust., var. n. Varietas var. inflatae similis, differens, autem, ut (a) os perianthii cellulis papilliformibus non oclusum; (b) lobuli plerumque explanati. Type: North Carolina: E. of Whiteville, Columbus Co. (RMS & H. L. Blomquist 29231).

This represents the plant formerly called F. inflata, but the type of this species has the perianth mouth occluded with papilliform cells, hence is identical to what has been formerly called F. saxicola.

Subgenus Chonanthelia

Divided by Spruce (1884-85) into two sections (Acrocarpicae = sect. Chonanthelia, and Cladocarpicae); other taxa fall into at least three other sections.

Sect. Holostipulae Schust., sect. n. Sectio ramis ♀ variabiliter longis ut in sect. Chonantheliis, differens, autem, ut: lobuli Trachycolea-formes ad lobum per carinam brevem arcuatamque affixi. Type: F. holostipula Hatt. & Griffin.

Sect. Spinilobae Schust., sect. n. ♀ Rami variabiliter longi ut in sect. Chonantheliis differens, autem, ut perianthium 6-10-plicatum, carin-

ae supra tuberculatae; ♀ bractae bracteolaeque, in 4-6 gyris visae, valde lacerato-laciniatae. Type: *F. spiniloba* St.

Sect. Pluriplicatae Schust., sect. n. Sectio ramis ♀ variabiliter longis, ut in sect. Chonanthelia, differens, autem, ut: perianthium 10-12-plicatum, plicis levibus, ♀ bracteae in sect. Spinilobis, in 4-6 gyris visae, valde lacerato-laciniatae. Type: *F. hians* Lehm. & Lindenb.

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