
Studies on Colombian Cryptogams. VIII

The genus *Jensenia* Lindb. (Hepaticae)

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Communicated by Prof. F.A. Stafleu at the meeting of April 26, 1980

ABSTRACT

A study of recent material of the dendroid thallose liverwort genus *Jensenia* (Metzgeriales) from the Colombian Andes revealed the existence of three taxa in the area: *J. erythropus* (Gott.) Grolle var. *erythropus*, *J. erythropus* var. *nobandae* van der Gronde var. nov. and *J. florschuetzii* van der Gronde spec. nov. The species occur in the high Andean forests and the páramos in shaded, atmospherically humid, terrestrial habitats, at altitudes ranging from ca. 2200 to 4100 m.

INTRODUCTION

In 1864 Gottsche proposed the new genus *Mittenia* for the reception of two dendroid species of thallose liverworts (Metzgeriales): *Mittenia erythropus* Gottsche from Colombia and *Mittenia zollingeri* Gottsche from Java. Schiffner (1893) included *Mittenia* Gott. in *Pallavicinia* S. Gray 1821.

In 1900 Stephani divided *Pallavicinia* in two sections *Procumbentes* and *Dendroideae*; each section was further subdivided into two subsections: *Dentatae vel ciliatae* and *Integerrimae*. The two species on which Gottsche had based the genus *Mittenia* Gott. were included in the *Dendroideae* subsect. *Dentatae vel ciliatae*. In this group we also find: *P. connivens* Steph., *P. decipiens* (Mitt.) Steph., *P. stephanii* Jack, *P. wallisii* Steph., *P. crassifrons* Steph., *P. subflabellatus* Besch. and *P. difformis* (Nees) Steph.

Hässel de Menendez (1961), in a study of *Pallavicinia* in South America, described four species: *P. lyellii* (Hook.) S. Gray and *P. xiphoides* (Tayl.) Steph. (*Procumbentes*), and *P. pisicolor* (Tayl.) Steph. and *P. erythropus* (Gott.) Steph. (*Dendroideae*). One conclusion of her study was that *P. erythropus* and *P. wallisii* are synonyms.

Grolle (1964), following Gottsche and other authors, recognized the dendroid *Pallavicinia*'s to constitute a separate genus and showed that *Jensenia* Lindb. 1868 is the correct generic name of this group. According to Grolle 6 species belong to *Jensenia*: *J. piscicolor* (Hook. & Tayl.) Grolle, *J. connivens* (Colenso) Grolle, *J. erythropus* (Gott.) Grolle, *J. wallisii* (Steph.) Grolle, *J. zollingeri* (Gott.) Grolle and *J. decipiens* (Mitt.) Grolle. Contrary to Hässel de Menendez (l.c.) *J. erythropus* and *J. wallisii* were being considered two different species. Also Grolle showed that *J. difformis* (Nees) Grolle is possibly identical to *J. wallisii*.

In this study I made a revision of *Jensenia* in Colombia, based on herbarium collections of Geneva (G), Stockholm (S) and unidentified recent material in Utrecht (U) from the high Andes of Colombia, collected by P.A. Florschütz (1972), T. van der Hammen & R. Jaramillo-M. (1975) and A.M. Cleef and collaborators (1972–1978).

Thus far, two species had been recognised in this country: *J. wallisii* and *J. erythropus* (Gradstein & Hekking 1979). The genus is considered a characteristic element of the Colombian paramos (Gradstein *et al.* 1977).

For the recognition of the genus female material is required to distinguish with certainty from dendroid *Symphyogyna*, which also occurs in Colombia. In *Symphyogyna* the involucre is scale like and no pseudoperianth is developed after fertilization, whereas *Jensenia* has a cup-like involucre and a long pseudoperianth.

***Jensenia* Lindb. 1868.**

Synonyms: *Mittenia* Gott. 1864 nom. illeg., non *Mittenia* Lindb. 1862; *Pallavicinia* S. Gray sect. *Dendroideae* Steph. 1900.

Dioicous. Plant with a creeping rhizome which gives rise to several erect, dendroid thalli, each thallus consisting of a stalk and an expanded, branched green lamina. Lamina two or more times bifurcate and differentiated into a midrib and wings. Midrib thickened with a central strand of narrow cells with thickened walls. Margins of the lamina entire or dentate. Rhizome mostly dark red, with colourless rhizoids.

Archegonia on the upper surface of the lamina surrounded by a cup-like involucre and by a long pseudoperianth which develops after fertilization of the sporophyt, the involucre and the pseudoperianth irregularly lacinate or toothed. Calyptra white, thin and fused at the base with the pseudoperianth. Capsule cylindrical, dark brown, 2–3 mm long. Spores brownish with a granular surface. Elaters 2–3-spiralled. Antheridia on the sides of the midrib covered by lacinate scales, which are distant or imbricate.

KEY TO THE SPECIES AND VARIETIES IN COLOMBIA

Thallus wings unistratose over a width of 1–2(–3) cells, the margins with large, irregularly shaped teeth up to 360 µm (10 cells) long 1. *Jensenia florschuetzii* sp. nov.
 Thallus wings unistratose over a width of (3–)5–7(–11) cells, the margins with smaller, regularly shaped teeth up to 290 µm (1–7 cells) long 2. *Jensenia erythropus*

Teeth 1–4 cells long, the apical cell of the teeth rounded or weakly (less than 2 times its width) elongated 2a var. *erythropus*
 Teeth 4–7 cells long, the apical cell of the teeth 2–5 times as long as wide
 2b var. *nobandae* var. nov.

1. *Jensenia florschuetzii* van der Gonde spec. nov. Fig. 1 A-G.

Typus: COLOMBIA. Meta: Páramo de Sumapaz, superpáramo, 4015 m, Cleef 7754 (COL holo, U).

A *Jensenia erythropus* (Gott.) Grolle differt fronde ad apicem saepe brevissime furcato, crassiore, limbo marginale unistrato 1–2(–3) cellulas lato, dentibus marginalibus longioribus saepe latioribusque, usque ad 10 cellulas longis.

Dioicous. Thallus pale green, rigid, the stalk short, pink, the lamina deeply concave, the outer margins of the lamina incurved and overlapping each other like a tooter. Lamina when flattened 7–9 mm wide and 3–5 mm high, up to 250 μm thick, 6–12 cells thick in the centre, gradually thinner towards the margins, the margins thickened or unistratose over a width of 1–3 cells, the apex of the lamina more or less furcate, emarginate, the lobes 1.5–2 mm wide. Margins reddish dentate with many teeth, the teeth directing to all sides, often crowded, made up of thick-walled cells, up to 10 cells long (up to 360 μm). Lamina with strands of thickwalled cells, the lamina cells very irregular, 4–7 angled, their average size $44 \times 22 \mu\text{m}$.

Rhizome dark reddish, the central strand 7 cells across, the cortex cells smaller than the inner cells.

Gynoecea usually at the base of the lamina, the involucre cylindric, 1–2 mm long, mostly reddish, irregularly and deeply laciniate and toothed. Sporophyte not seen.

Distribution: This new species is up till now only known from páramos at about 4000 m in the Eastern Cordillera of Colombia, e.g. the Sierra Nevada del Cocuy and the Nevado de Sumapaz.

Ecology: Damp clayey soil in permanently atmospherically humid, more or less shaded habitats.

In the Sierra Nevada de Cocuy specimens were collected on the periodically inundated, vertical banks of a stream close to the water surface with *Riccardia* sp. In the Nevado de Sumapaz *Jensenia florschuetzii* grows on shallow soil (pH 5.2) over limestone outcrops under open *Loricaria complanata* shrub, in the bryophyte-rich upper condensation zone near the summit. *J. florschuetzii* was found growing here in a dense bryophyte vegetation together with *Rhacocarpus purpurascens* and *Anastrophyllum nigrescens* as the dominant species, and with *Adelanthus lindenbergianus*, *Cephalozia dussii*, *Isotachis multiceps* and *Lepidozia macrocolea*.

Colombian specimens seen: Páramo de Sumapaz, Cleef 7754 (COL holo, U); Boyacá, Florschütz 4131 (COL, U).

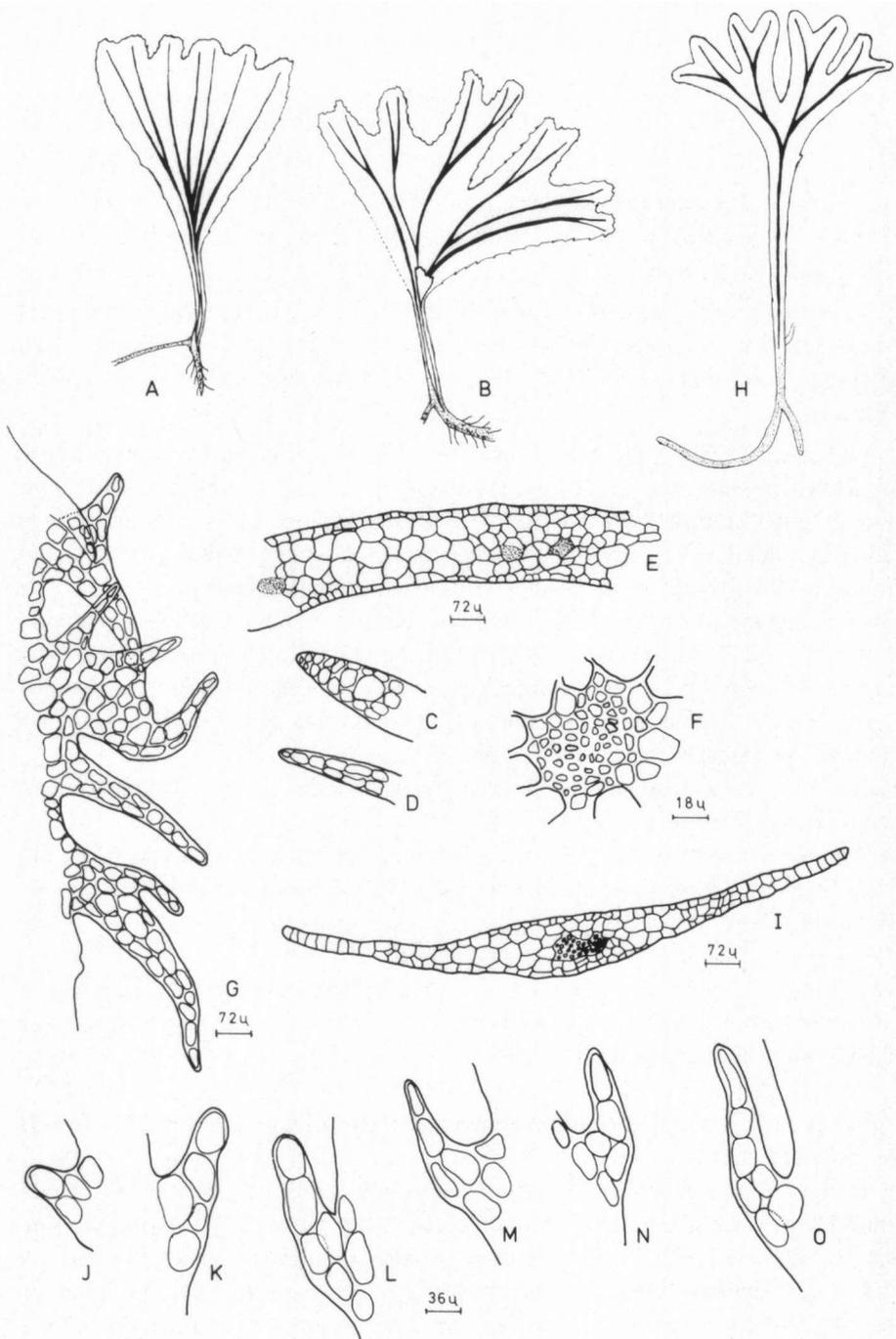


Fig. 1. *Jensenia* species of Colombia. A-G. *J. florschuetzii* van der Gronde spec. nov. A-B. thallus, ventral view (ca. 4×). C-D. portion of thallus wings across. E. portion of lamina. F. central strand, cross section. G. portion of thallus margin, showing teeth. H-L. *J. erythropus* (Gott.) Grolle var. *erythropus*. H. thallus, ventral view (ca. 4×). I. lamina across. J-L. marginal teeth. M-O. *J. erythropus* var. *nobandae* van der Gronde var. nov., marginal teeth. A-G. from the type of *J. florschuetzii*. H from Cleef 3054. I from Cleef 9541. J-L from Lindig 1746. M-O from Dusén s.n., V. 1902.

Differentiation: *Jensenia florschuetzii*, thus far only known from two páramo sites in Colombia, is easily distinguished from the common *J. erythropus* by the more shallowly lobed, fleshier thallus, which is more than one layer of cells thick almost over the entire width, the unistratose wings being very narrow, c. 1–3 cells wide. Also, *J. florschuetzii* has coarser marginal teeth, which are directing to all sides.

2. *Jensenia erythropus* (Gott.) Grolle, Rev. Bryol. Lichén. 33: 228, 1964.
See under the varieties for synonyms, literature and type specimens.

Differentiation: The distinguishing characters of *J. erythropus* include the teeth at the margin, which are very variable in size and number, and the thallus which is \pm formed like a tooter. The teeth are shorter than in *J. florschuetzii* and not directing to all sides. The species is very close to *J. connivens* (Colenso) Grolle from New Zealand but is less rigid.

Note: Grolle (1964) separated *J. erythropus* and *J. wallisii* on the basis of the dentation of the thallus margin: *J. erythropus* with big teeth which are erect, curved or noddled to the apex of the thallus and consist of several elongated cells; *J. wallisii* with small erect teeth of which only the apical cell is elongated.

From my study of the type specimens of *J. erythropus* and *J. wallisii* it appears that the type of *J. erythropus* has rather small teeth, hardly different from those in *J. wallisii*; consequently these two taxa are being considered synonyms. However, subsequent studies of a whole series of recent Colombian collections showed that considerable variation is present in marginal dentation, and it proved possible to distinguish two taxa on the basis of this character. Since other distinguishing characters could not be detected, varietal rank (following Gottsche, 1864!) seems most appropriate for the two taxa involved: *J. erythropus* var. *erythropus* (= *J. wallisii*) and *J. erythropus* var. *nobandae* van der Gronde var. nov. The two varieties were already recognised by Gottsche (1864) but not yet validly named. As has been shown earlier (Hässel de Menendez 1961, Grolle 1964) the type material of *J. difformis* (Nees) Grolle, the only other neotropical species in *Jensenia*, is too poor to determine its taxonomic status. The type material that I examined (Brasilia, Sellow (G012116)) was a sterile fragment with badly conserved thallus margins, showing a few broken teeth. Possibly *J. difformis* is identical with *J. erythropus* var. *erythropus*, of which *J. difformis* seems best treated as a doubtful synonym. If this identity is shown to be correct, the nomenclature of the taxa involved should be changed since *J. difformis* is the oldest name in this complex.

2a *Jensenia erythropus* var. *erythropus* fig. 1 H-L.

Mittenia erythropus Gott. var. α , in Triana et Planchon, Ann. Sci. Bot., Ser. 5, 1: 178, 1864.

Pallavicinia erythropus (Gott.) Steph., Spec. Hep. 1: 322, 1900.

Pallavicinia wallisii Jack et Steph., Hedwigia 31: 23, 1892.

Jensenia wallisii (Jack et Steph.) Grolle, Rev. Bryol. Lichén. 33: 228, 1964.

Doubtful syn.:

Jungermannia difformis Nees, in Martius, Fl. Bras. I: 329, 1830.

Jensenia difformis (Nees) Grolle, Rev. Bryol. Lichén. 33: 228, 1964.

Marginal teeth of the lamina up to 4 cells long (up to 180 μm), the cells of the teeth more or less rounded, the apical cell of the teeth sometimes slightly elongated. Other characteristics as in var. *nobandae* (see below).

2b *Jensenia erythropus* var. *nobandae* van der Gronde var. nov. Fig. 1 M-O. *Mittenia erythropus* Gott. var. β , in Triana et Planchon, Ann. Sci. Bot., Ser. 5, 1: 178, 1864.

Typus: COLOMBIA. Boyacá: al NW de Belén, cabeceras Quebrada Minas, 3800 m, Cleef 1882 (COL holo, U).

A varietate *erythropus* differt dentibus marginalibus longioribus, (2-)4-7 cellulas longis, cellula ultima dentium magis elongata, 2-5plo longiore quam latiore.

Dioicous. Lamina, when flattened, 6-8 mm high and 7-15 mm wide, two or more times bifurcate, the apex of the lobes obtuse-emarginate, the margins dentate, the teeth up to 7 cells long and at the base 2-5 cells wide, the apical cell of the teeth mostly longer than broad, curved to the apex of the lobe, the walls thickened. Midrib up to 4-7 cells thick, with a central strand of 5 rows of narrow cells with thickened walls; unistratose wings 3-12 cells broad, lamina cells 4-7 angled, variable in size: marginal cells 21-64 \times 12-25 μm , with thickened walls, the cells of the midrib elongated, 36-60 \times 10-25 μm , and thinwalled. Oilbodies (observed in Cleef 656b, fide Dr. S.R. Gradstein) 2-10 per cell, rather few in outer lamina cells but more numerous in inner cells, finely granulose-papillose, often with a "central body", variable in size and shape, large and ellipsoid (15-20 \times 6-9 μm) to smaller, subspherical (6-12 \times 5-9 μm).

Stalk 10 mm long and 0.5-1 mm wide, the central strand 10 cells across. Rhizome reddish-brown, the central strand 8-15 cells across. Rhizoids mostly colourless. Involucre 1-1.75 mm long, cylindrical and irregularly toothed; pseudoperianth 7-8 mm long, dark brown with teeth up to 460 μm long. Antheridia on and besides the thickest part of the midrib, in large numbers, covered by scales which are more or less lacinate, dentate (4-6 cells) and directed to the apex of the thallus. Spores pale brown, 25-28 μm in diam., the surface granular. Elaters bispiralled, 6-8 μm wide, up to 360 μm long.

Distribution of J. erythropus: The species occurs in the humid mountains of tropical South America from Colombia to Bolivia, Mt. Roraima in Venezuela (Stephani, 1900) and Mt. Itatiaia in Southeastern Brasil.

In Colombia, the species is known from a large number of localities in the Central and Eastern Cordillera, ranging in altitude from the Andean cloud forests at about 2200 m up to the lower limits of the superpáramo at about 4100

m. Var. *nobandae* seems to be the more common variety of *J. erythropus* in this country.

Ecology: The main environmental requirements of *J. erythropus* seem to be 1. cool macroclimate, 2. shade and high humidity. In the zonal grass-páramo it grows under the bunches of *Calamagrostis effusa* with the bryophytes *Isotachis multiceps*, *Cephalozia dussii*, *Neesioscyphus paramicola*, *Riccardia* spp. and *Telaranea nematodes*, etc. *J. erythropus* also occurs in various azonal páramo vegetation types and is particularly common in *Xyris acutifolia* bogs (at about 3300–3650 m). It is further recorded from *Arcytophyllum caracasenum* thickets at 3800 m, *Diplostephium revolutum* shrub at 3350 m and from ditches in moist páramo. pH values of the substrate layer are about 4.1–5.7.

Apparently there is no essential difference in habitat preference between the two varieties of *J. erythropus*, although the var. *erythropus* seems to grow on slightly wetter soils.

Specimens seen: var. *nobandae*: COLOMBIA: Boyacá: al NW de Belén, Cleef 1882 (COL holo, U), 1764, 1964a, 2141, 7250, 9780 (COL, U); Meta: Páramo de Sumapaz, Cleef 8192 (COL, U); Cundinamarca: Páramo de Palacio, Cleef 3983 (COL, U); Feuchter Boschgürtel über Bogota, 3000–3200 m, Troll 1929 (S); Tolima: Nevado del Tolima, Van der Hammen & Jaramillo-M. 3332, 3238 (COL, U); Boyacá: Cleef, Cuatrecasas & Jaramillo-M. 9243 (COL, U); Cauca: Volcán Puracé, Cleef & Fernandez-P. 656b (COL, U); Santander: Páramo de Almorzadero, Aguirre, Cleef & Hooghiemstra 1029 (COL, U). BOLIVIA: Bachränder an der Waldgrenze über Tablas, 3400 m, Herzog 2805 (S). BRAZIL: In terra umbrosa ad rivulum, c. 2200 m, Dusén s.n. (S).

var. *erythropus*: COLOMBIA: Páramo S. Fortunato, 2900 m, A. Lindig 1746 (G 19905, holotype of *J. erythropus* (Gott.) Grolle); Antioquia: Abriquia, 8000 ft, Gustav Wallis s.n. 1874 ex. herb. Jack (G 8002, holotype of *J. wallisii* (Jack et Steph.) Grolle); Cauca: Volcán Puracé, Cleef 7030a, 7405, 9541 (COL, U); Páramo de Cruz Verde, Cleef 3363, 3054 (COL, U).

ACKNOWLEDGEMENTS

I am grateful to Dr. S.R. Gradstein for his guidance and for revising the manuscript; to Dr. P.E. Geissler (Geneva) and Dr. T. Engelmark (Stockholm) for the loan of type material; to Drs. A.M. Cleef for providing ecological data and to Mr. A. Scheepmaker for inking the drawings.

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