

Sphagnaceae Dumort.

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This treatment is composed of the following taxa: Sphagnaceae, *Sphagnum*.

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DESCRIPTION

Sphagnum L., Sp. Pl. 2: 1106. 1753. Type: *Sphagnum palustre* L.

Plants dioicous or monoicous, medium to robust, in cushions or tufts, whitish or pale green to yellow or brown, occasionally pink or red. **Stems** erect to suberect, unbranched or sparsely branched, each with a compact terminal tuft or capitulum consisting of short branches, fasciculate branches; **branches** single or commonly in fascicles of 2–6, spirally arranged, distant or crowded along stem; **stems** in cross-section with 2 or more layers of large, thin-walled, hyaline cortical cells, spirally fibrillose and porose on outer (abaxial) walls or not, pores when present retort or not, wood cylinder cells small and thick-walled, often pigmented. **Stem leaves** appressed, broadly oblong or ovate, apex acute, rounded or truncate. **Branch leaves** often differentiated from stem leaves, commonly larger, rarely smaller, broadly elliptic to ovate or ovate-lanceolate, apex narrowly to broadly acuminate, acute to obtuse; margins entire or serrulate, erose or fimbriate; laminal cells alternating between large **leucocysts** (hyaline cells) and linear **chlorocysts** (green cells); **leucocysts** oblong to rhomboidal, vermiculate, with pores on outer (adaxial) or inner (abaxial) or both leaf surfaces, fibrils present or absent, in cross-section plane or convex; **chlorocysts** exposed equally on both surfaces, or exclusively or partially on the outer (abaxial) or inner (abaxial) surface, or completely included, in cross-section typically elliptical, triangular, or trapezoidal. **Perichaetial** branches short, leaves enlarged near apex. **Pseudopodium** elongated at maturity. **Capsule** exserted with **urn** globose or ovoid-cylindrical; **annulus** and **peristome** absent; operculum plane to convex; calyptra with a fragile hyaline membrane. **Spores** tetrahedral.

COMMENTS

Distribution and ecology: The Sphagnaceae family has ca. 300 species in the world and ca. 160 species in the Neotropics. The worldwide treatment carried out by Warnstorf (1911) is the only one for South America, however the most important contributions to the Neotropics were carried out by Crum for Mexico (in Sharp et al. 1994) and Central America (in Allen 1994). The Neotropics is one of the regions of the world rich in diversity in the genus *Sphagnum*, and much of this comes from southeastern Brazil and the tropical Andes. Taxa in Brazil occur in open and humid habitats, with greater diversity in the mountain regions, which has many endemic species.

Comments: Family studies for the country have resulted in a reduction in the number of species (Costa & Fares 2012, Costa Inedita). Currently, are recognized for Brazil, one genus and five subgenera [Acutifolia, Cuspidata, Rigida, Sphagnum, Squarrosum, and Subsecunda].

Life Form

Cushion, foliose, Mat, Tuft

Substrate

Epixilous, Rupicolous, Saxicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest, Caatinga, Central Brazilian Savanna, Atlantic Rainforest, Pampa, Pantanal

Vegetation Types

Caatinga (stricto sensu), Amazonian Campinarana, High Altitude Grassland, Grassland, Highland Rocky Field, Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Inundated Forest (Igapó), Terra Firme Forest, Seasonally Deciduous Forest, Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest, Coastal Forest (Restinga), Amazonian Savanna, Aquatic vegetation, Rock outcrop vegetation

Geographic DistributionConfirmed occurrences

North (Amazonas, Amapá, Pará, Rondônia, Roraima, Tocantins)
 Northeast (Bahia, Ceará, Paraíba, Pernambuco, Sergipe)
 Central-west (Distrito Federal, Goiás, Mato Grosso do Sul, Mato Grosso)
 Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)
 South (Paraná, Rio Grande do Sul, Santa Catarina)

Possible occurrences

Central-west (Distrito Federal)

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Sphagnum L.

This treatment is composed of the following taxa: *Sphagnum*, *Sphagnum aciphyllum*, *Sphagnum acutirameum*, *Sphagnum aequalipunctatum*, *Sphagnum alegrense*, *Sphagnum amazonicum*, *Sphagnum amoenoides*, *Sphagnum amoenum*, *Sphagnum atroligneum*, *Sphagnum billbuckii*, *Sphagnum bocainense*, *Sphagnum brachybolax*, *Sphagnum brasiliense*, *Sphagnum brevirameum*, *Sphagnum capillifolium*, *Sphagnum chi-chiense*, *Sphagnum columniforme*, *Sphagnum contortulum*, *Sphagnum costae*, *Sphagnum cribriforme*, *Sphagnum crumii*, *Sphagnum curicuriariense*, *Sphagnum cuspidatum*, *Sphagnum cyclophyllum*, *Sphagnum delamboyense*, *Sphagnum dimorphophyllum*, *Sphagnum divisum*, *Sphagnum exile*, *Sphagnum exquisitum*, *Sphagnum frahmii*, *Sphagnum garysmithii*, *Sphagnum geraisense*, *Sphagnum globicephalum*, *Sphagnum gracilescens*, *Sphagnum harleyi*, *Sphagnum homophyllum*, *Sphagnum imbricatum*, *Sphagnum irwinii*, *Sphagnum laxulum*, *Sphagnum leoni*, *Sphagnum longicosomum*, *Sphagnum longistolo*, *Sphagnum luetzelburgii*, *Sphagnum magellanicum*, *Sphagnum matogrossense*, *Sphagnum microcuspidatum*, *Sphagnum mirabile*, *Sphagnum molle*, *Sphagnum multiporosum*, *Sphagnum negrense*, *Sphagnum obliquefibrosum*, *Sphagnum ornatum*, *Sphagnum palustre*, *Sphagnum papillosum*, *Sphagnum paranense*, *Sphagnum parcoramosum*, *Sphagnum perforatum*, *Sphagnum perichaetiale*, *Sphagnum platyphylloides*, *Sphagnum pluriporosum*, *Sphagnum pseudoramulinum*, *Sphagnum ramulinum*, *Sphagnum recurvum*, *Sphagnum ripense*, *Sphagnum rotundatum*, *Sphagnum sanguinale*, *Sphagnum scorpioides*, *Sphagnum sehnemii*, *Sphagnum septatoporosum*, *Sphagnum sparsum*, *Sphagnum squarrosum*, *Sphagnum strictum*, *Sphagnum subhomophyllum*, *Sphagnum submedium*, *Sphagnum subsecundoides*, *Sphagnum subsecundum*, *Sphagnum sucrei*, *Sphagnum tabuleirensense*, *Sphagnum tenellum*, *Sphagnum tenerum*, *Sphagnum turgens*, *Sphagnum turgescens*, *Sphagnum vitalii*.

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COMMENTS

Comments *Sphagnum* is one of the most important plant genera in terms of its role in tropical highland ecosystems, and for maintaining landscape characteristics and aiding in water conservation (due to its water-holding capacity). The Brazilian taxa are often found in wet habitats, with their greatest diversity observed in montane areas of the Atlantic Rainforest.

Life Form

Cushion, foliose, Mat, Tuft

Substrate

Epixilous, Rupicolous, Saxicolous, Terrestrial

DISTRIBUTION

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Possible occurrences

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IDENTIFICATION KEY

Key to the Subgenera of *Sphagnum*

1. Branch leaves broad, apex broadly pointed and cucullate-concave, rough at back, margins denticulate, bordered by a resorption furrow; cortical cells in 3–4 layers, large, empty, thin-walled, porose **Subgenus *Sphagnum***
1. Branch leaves generally narrower and often tapered to a slender, apex truncate, neither cucullate nor roughened, margins usually entire, rarely denticulate or bordered by a resorption furrow; cortical cells in 1–4 layers, large, thin-walled, porose or aporse **2**
2. Stem leaves very small (< 1 mm long); branch leaves broadly ovate, concave, apex broadly truncate, and margin denticulate, bordered by a resorption furrow on the distal 1/3 **Subgenus *Rigida* (*Sphagnum strictum*)**
2. Stem leaves usually not particularly small (> 1 mm long); branch leaves usually attenuate to a narrow, truncate apex (rarely rounded or broadly truncate), margin nearly always entire except across the apex, bordered by linear cells **3**
3. Plants green to yellowish, often tinged with orange-yellow; branches of the capitulum usually curved (in fascicles of 2–3); branch leaves often secund; leucocysts of branch leaves usually with numerous pores, more than 8 pores crowded in bead-like rows along the commissures on one or both surfaces; in cross-section chlorocysts central or equally exposed or slightly trapezoidal more on the abaxial surface **Subgenus *Subsecunda***
3. Plants green, yellowish, brown, pink or reddish; branches of the capitulum not or rarely curved (in fascicle of usually 2); branch leaves erect to erect-spreading, not or rarely secund; leucocysts with ringed elliptic and round pores not numerous, not crowded in commissural rows; chlorocysts triangular to trapezoidal, exposed more broadly on the inner (adaxial) surface or on the outer (abaxial) surface **4**
4. Plants commonly reddish, rarely green or brown; chlorocysts of branch leaves triangular to trapezoidal in cross-section, exposed more broadly on the inner (adaxial) surface; cortical cells in 2–4 layers **Subgenus *Acutifolia***
4. Plants variously colored but not reddish; chlorocysts of branch leaves rectangular, triangular to trapezoidal, exposed more broadly on the outer (abaxial) surface; cortical cells in 1–4 layers **5**
5. Stem leaves with leucocysts eroded on the inner (adaxial) surface (sometimes resorbed on both surfaces at the apex); branch leaves often undulate at margins, cells walls of leucocysts smooth **Subgenus *Cuspidata***
5. Stem leaves with leucocysts resorbed on the outer (abaxial) surface (except at the apex); branch leaves squarrose, cells walls of leucocysts finely papillose on faces adjacent to walls of chlorocysts **Subgenus *Squarrosa* (*Sphagnum squarrosum*)**

Key to the species of the subgenus *Acutifolia*

1. Stem leaves bordered by linear cells, the border narrow toward the apex, somewhat broadened toward the base **2**
2. Leucocysts of branch leaves without pores or with few pores on the inner surface **3**
2. Leucocysts of branch leaves with many pores on the inner surface **4**
3. Stem leaves lingulate, apex rounded, somewhat more broadly bordered at base; leucocysts of branch leaves on the outer surface with 2–5 narrowly elliptic, ringed pores contiguous to the commissural and corners, the inner surface without pores or rarely with pores *S. sehnemii*

3. Stem leaves triangular, apex abruptly pointed, abruptly bordered at base; leucocysts of branch leaves on the outer (abaxial) surface with 2–6 elliptic pores at ends and commissures, the inner surface without pores or with 1–3 pores near leaf margins *S. aciphyllum*
4. Leucocysts of branch leaves with few and small pores end at the corners on the inner surface *S. tenerum*
4. Leucocysts of branch leaves with 2–5 pores at cells end on the inner surface *S. capillifolium*
1. Stem leaves not bordered or slightly bordered at base **5**
5. Chlorocysts (in cross-section) oblong, lenticular to fusiform, exposed on both surfaces (abaxial and adaxial) *S. costae*
5. Chlorocysts (in cross-section) triangular to trapezoidal, exposed on inner (adaxial) surface **6**
6. Branch leaves with a marginal resorption furrow, strongly involute-concave, ovate, bordered by 1–2 rows of linear cells, leucocysts on the outer (abaxial) surface with 2–5 large, elliptic ringed pores, contiguous at commissures *S. molle*
6. Branch leaves without a marginal resorption furrow, not strongly concave, oblong-lingulate to triangular-ovate, slightly bordered at base, leucocysts on the outer surface with 3–8 small, ringed, rounded or elliptic pores at commissures *S. sparsum*

Key to the species of subgenus *Cuspidata* (based on Crum 1984, 1987, 1991).

1. Branch leaves plane at the margins; bordered by 2–4 rows of narrow cells; stem leaves relatively large and lingulate to broadly oblong-triangular, moderately to strongly erose across a broadly rounded or truncate flat apex *S. recurvum*
1. Branch leaves strongly undulate at the margins (when dry); bordered by 2–11 rows of linear cells; stem leaves small, oblong-ovate, triangular-ovate to lingulate, broadly acuminate, acute to apiculate at apex, broadly bordered below or above **2**
2. Branch leaves long-lingulate to lingulate-lanceolate, broadly bordered by 4–7(–11) rows of linear cells on the distal part (1/3 or more), margins serrate in the distal part (2/3 or more) *S. microcuspidatum*
2. Branch leaves oblong, oblong-ovate, elliptic, long lanceolate, lingulate, bordered by 2–4 rows of linear cells, margins not serrate **3**
3. Chlorocysts of branch leaves rectangular in cross-section, equally exposed on both surfaces; leucocysts slightly bulging on both surfaces *S. contortulum*
3. Chlorocysts of branch leaves broadly trapezoidal or broadly triangular in cross-section, broadly exposed only on the outer (abaxial) surface; leucocysts slightly to strongly convex on the inner surface **4**
4. Stem leaves ovate to ovate-deltoid; branch leaves long lanceolate to lingulate *S. cuspidatum*
4. Stem leaves oblong or elliptic; branch leaves oblong-ovate to elliptic *S. tenellum*

Key to the species of the Subgenus *Sphagnum*

1. Plants aquatic, branches single (occasionally double) *S. tabuleirensis*
- Obs: Stem and branch leaves similar in number and distribution of pores and pseudopores; chlorocysts of branch leaves trapezoidal, more exposed somewhat on the inner (adaxial) surface.
1. Plants not aquatic, branches single or in fascicles **2**
 2. Branches single **3**
 3. Chlorocysts of branch leaves narrowly triangular in cross-section, exposed on the inner (adaxial) surface; leucocysts of branch leaves convex in cross-section on both surfaces, more strongly on the outer surface *S. subsecundoides*
 3. Chlorocysts of branch leaves elliptic in cross-section, central, and entirely included; leucocysts of branch leaves slightly convex in cross-section on the inner (adaxial) surface, distinctly so on the outer *S. longistolo*
 2. Branches in fascicles of 2–6 **4**
 4. Stem leaves slightly to strongly cucullate **5**
 5. Stem leaves smaller than the branch leaves and distinctly differentiated from them in shape **6**
 6. Stem leaves oblong, apex round-obtuse, roughened at the back, and margin fringed; branches in fascicles of 2; branch leaves ovate, concave; leucocysts of branch leaves with rounded-elliptic commissural pores, especially at angles, in groups of 3 pores at adjacent angles on the inner surface *S. ornatum*
 6. Stem leaves oblong-triangular, apex obtuse, not roughened at the back, and margin entire; branches in fascicles of 3; branch leaves narrowly-ovate to ovate, plane, gradually acuminate; leucocysts of branch leaves with rounded-elliptic commissural pores in groups of 2–3 at adjacent angles on the outer surface *S. dimorphophyllum*
 5. Stem and branch leaves similar, or stem leaves slightly larger, not distinctly differentiated in shape **7**
 7. Chlorocysts of branch leaves in cross-section central and included **8**
 8. Leucocysts of stem leaves septate without fibrils *S. sanguinale*
 8. Leucocysts of stem leaves not septate, with fibrils **9**
 9. Stem leaves larger than the branch leaves *S. submedium p.p.*
 9. Stem and branch leaves similar in length *S. brasiliense*
 7. Chlorocysts of branch leaves (in cross-section) exposed on one or both surfaces **10**
 10. Chlorocysts of branch leaves barrel-shaped in cross-section, exposed on both surfaces **11**
 11. Chlorocysts of branch leaves barrel-shaped *S. amoenoides*
 11. Chlorocysts of branch leaves elliptic to fusiform *S. submedium p.p.*

10. Chlorocysts of branch leaves isosceles-triangular or triangular to triangular-trapezoidal in cross-section, more exposed on the inner (adaxial) surface **12**
12. Branches with only 2 fascicles (many plants must be observed) *S. brachybolax*
12. Branches with 2–4 fascicles (many plants must be observed) **13**
13. Leucocysts of branch leaves on the outer surface with 8–16 small, elliptic, ringed commissural pores, and 3 pores at adjacent angles, toward apex with 1–4 diminutive \pm median rounded pores or pseudopores *S. negrense*
13. Leucocysts of branch leaves on the outer surface with few, small, elliptic pores only at angles (3 at adjacent angles) *S. billbuckii*
4. Stem leaves not cucullate (rarely slightly cucullate) **14**
14. Chlorocysts of branch leaves (in cross-section) central and included **15**
15. Leucocysts of branch leaves with papillose side walls *S. brevirameum*
15. Leucocysts of branch leaves without papillose side walls **16**
16. Leucocysts of branch leaves without pores or pseudopores on the inner surface **17**
17. Branch in fascicles of 4; branch leaves roughened and denticulate-bordered at the back of the apex; leucocysts on the outer surface with 3 elliptic pores at adjacent angles *S. frahmii*
17. Branch in fascicles of 3–4; branch leaves not roughened and denticulate at the back of the apex; leucocysts of branch leaves on the outer (abaxial) surface with few pores (often one pore) at angles *S. alegrense*
16. Leucocysts of branch leaves with pores or pseudopores on the inner surface **18**
18. Branch in fascicles of 4–5(–6); stem leaves plane, apex rounded and finely fringed; branch leaves roughened at the back of the apex and margin denticulate by a resorption furrow; leucocysts of branch leaves on the outer surface with numerous large pores (2–5) elliptic and ringed or occasionally pseudopores at angles and along the commissures *S. magellanicum*
18. Branch in fascicles of 3; stem leaves plane or slightly concave, apex rounded fringed; branch leaves roughened at the back of the apex and bordered by a resorption furrow; leucocysts of branch leaves on the outer surface with 3 robust ringed pores at adjacent angles and few pores or none at commissures *S. amazonicum*
14. Chlorocysts of branch leaves (in cross-section) exposed on one or both surfaces **19**
19. Chlorocysts of branch leaves (in cross-section) exposed on both surfaces **20**
20. Branch in fascicles of 4–5; branch leaves roughened at the back of the apex; leucocysts on the outer surface without membrane pleats *S. perichaetiale*
20. Branch in fascicles of 1–2; branch leaves roughened or smooth at the back of the apex; leucocysts on the outer surface with or without membrane pleats **21**
21. Branch leaves roughened at the back of the apex, margin serrulate by a resorption furrow; leucocysts on the outer surface with membrane pleats at commissures *S. harleyi*
21. Branch leaves smooth at the back of the apex, margin smooth; leucocysts on the outer surface with membrane pleats at commissures *S. vitalii*
19. Chlorocysts of branch leaves (in cross-section) exposed on either the inner or outer surface **22**
22. Chlorocysts of branch leaves (in cross-section) narrowly exposed on the outer surface *S. amoenum*
22. Chlorocysts of branch leaves (in cross-section) narrowly to broadly exposed on the inner surface **23**
23. Chlorocysts of branch leaves (in cross-section) broadly triangular to truncate-elliptic; leucocyst walls ornamented **24**
24. Leucocyst cell walls of branch leaves (in cross-section) ornamented by ridge-like fibrils *S. imbricatum*
24. Leucocyst cell walls of branch leaves (in cross-section) conspicuously ornamented by papillae *S. papillosum*
23. Chlorocysts of branch leaves (in cross-section) narrowly elliptic, narrowly to broadly triangular or barrel-shaped, leucocyst walls not ornamented **25**
25. Branches in fascicles of 4–7; chlorocysts of branch leaves with densely papillose side walls *S. irwinii*
25. Branches in fascicles of 2–5; chlorocysts of branch leaves without papillose side walls **26**
26. Branches in fascicles of 2–3; leucocysts of branch leaves with 3 small, ringed pseudopores at adjacent angles; chlorocysts (in cross-section) barrel-shaped *S. atroligneum*
26. Branches in fascicles of 3–4(–5); leucocysts of branch leaves with commissural pores and/or pores on the adjacent angles of the outer (abaxial) surface **27**
27. Branches in fascicles of 3; stem leaves broadly elliptic, broadly rounded, smooth at the back apex, fringed or bordered by a resorption furrow; leucocysts of branch leaves on the outer (abaxial) surface with 3 pores in grouped at adjacent angles; chlorocysts (in cross-section) elliptic, narrowly exposed on the inner (adaxial) surface *S. multiporosum*
27. Branches in fascicles of 4(–5); stem leaves broadly ovate, linguulate-rounded, fringed at the back of the apex, margin denticulate by a resorption furrow; leucocysts of branch leaves on the outer (abaxial) surface generally with 2–3 robust pores rounded to elliptic, ringed, at angles and along commissures; chlorocysts (in cross-section) triangular *S. palustre*

Key to the species of the subgenus *Subsecunda*

1. Plants with branches single or appearing unbranched but having very short branches (non-fascicled) **2**
2. Stem leaves cucullate **3**
3. Stem leaves broadly elliptic *S. globicephalum*

3. Stem leaves ovate to oblong-ovate or triangular-lingulate **4**
4. Apex of branch leaves cucullate, apex narrow, rounded-obtuse *S. ripense*
4. Apex of branch leaves not cucullate, acuminate *S. exile*
2. Stem leaves not cucullate (rounded, rounded-elliptic, rounded-obtuse, rounded-ovate) **5**
5. Leucocysts of branch leaves with median pores on the outer (abaxial) surface *S. garysmithii*
5. Leucocysts of branch leaves without median pores **6**
6. Leucocysts of branch leaves on the outer (abaxial) surface with many pores along the commissures **7**
7. Stem leaves broadly elliptical *S. cyclophyllum*
7. Stem leaves oblong, oblong-ovate or lingulate **8**
8. Leucocysts of branch leaves with many small, rounded pores in discontinuous commissural rows, convex on both surfaces; chlorocysts (in cross-section) barrel-shaped, equally exposed *S. crumii*
8. Leucocysts of branch leaves with small, rounded-elliptic pores in continuous commissural rows on the outer surface, slightly convex or nearly plane on both surfaces; chlorocysts (in cross-section) narrowly fusiform, somewhat exposed on both surfaces, owing to thickened end walls *S. laxulum*
6. Leucocysts of branch leaves on the outer surface with few pores or pores absent along the commissures **9**
9. Stem leaf broadly rounded to rounded-elliptic; branches single; chlorocysts (in cross-section) triangular to trapezoidal, exposed equally on more on the outer surface *S. parcoramosum*
9. Stem leaf broadly rounded-ovate or rounded; branches absent or single; chlorocysts (in cross-section) narrowly triangular to triangular-trapezoidal, exposed exclusively or more broadly on the outer surface *S. rotundatum*
1. Plants with branches in fascicles of 2–6 **10**
10. Branch in fascicles of 5–6 **11**
11. Branch leaves slightly cucullate *S. subsecundum*
11. Branch leaves not cucullate **12**
12. Stem light brown, leaves oblong-lingulate; branches short, 2–5 per fascicle *S. pseudoramulinum*
12. Stem brown, leaves oblong-ovate to somewhat triangular; branches not short, 2 per fascicle *S. chi-chiense* var. *uidulum*
10. Branch in fascicles of 2–4 **13**
13. Branches only 2 per fascicle (many plants must be observed) **14**
14. Stem leaves triangular-lingulate to lingulate *S. platyphylloides*
14. Stem leaves ovate, oblong, elliptical or triangular **15**
15. Leucocysts of branch leaves with median commissural pores on the outer surface *S. luetzelburgii*
15. Leucocysts of branch leaves without median commissural pores on the outer surface **16**
16. Stem leaves cucullate *S. divisum* p.p.
16. Stem leaves not cucullate **17**
17. Stem leaves triangular; branch leaves larger, ovate, apex rounded, smooth; chlorocysts (in cross-section) barrel-shaped, widely exposed on both surfaces; leucocysts slightly convex on both surfaces *S. delamboiyense* p.p.
17. Stem leaves broadly ovate; branch leaves broadly ovate, apex rounded, toothed; chlorocysts (in cross-section) lenticular, narrowly exposed on both surfaces; leucocysts somewhat convex on both surfaces *S. turgens*
13. Branches 2–5 per fascicle (many plants must be observed) **18**
18. Stem leaves slightly to strongly cucullate (easier to observe in the microscope) **19**
19. Leucocysts of branch leaves on both surfaces with many, ringed pores in continuous commissural rows **20**
19. Leucocysts of branch leaves with many pores only in one surface *S. longicomosum*
20. Leucocysts of branch leaves without median commissural pores and/or pseudopores on the outer surface; stem leaves oblong-ovate, apex rounded *S. divisum* p.p.
20. Leucocysts of branch leaves with median commissural pores and/or pseudopores on the outer surface; stem leaves triangular, apex cucullate *S. aequalipunctatum*
18. Stem leaves not cucullate **21**
21. Chlorocysts (in cross-section) central and included *S. pluriporosum*
21. Chlorocysts (in cross-section) exposed on one or both surfaces **22**
22. Stem leaves lingulate to oblong-lingulate **23**
23. Apex of stem leaves oblong-lingulate and toothed; chlorocysts (in cross-section) of branch leavetriangular and more exposed on the inner surface, leucocysts bulging on the outer surface *S. gracilescens*
23. Apex of stem leaves rounded eroded (not toothed); chlorocysts (in cross-section) of branch leaves barrel-shaped, and leucocysts not bulging (almost flat) *S. ramulinum*
22. Stem leaves ovate, oblong, triangular, elliptic **24**
24. Branch leaves with few pores or pores absent on the outer surface (it is very common for the abaxial surface of the branch leaves to be without pores) *S. acutirameum*
24. Branch leaves with many pores and/or pseudopores on the outer (abaxial) surface **25**
25. Leucocysts of branch leaves on the outer surface commonly connecting fibrils that are often oblique, sometimes in a zigzag series *S. obliquefibrosum*

25. Leucocysts of branch leaves on the outer surface with fibrils not oblique and not in a zigzag series **26**
26. Stem leaves triangular **27**
27. Chlorocysts (in cross-section) with lumen central or near the outer surface but very narrowly and almost equally exposed on both surfaces; leucocysts nearly plane or somewhat convex *S. geraisense*
27. Chlorocysts (in cross-section) barrel-shaped, \pm equally exposed; leucocysts convex on both surfaces *S. delamboyense p.p.*
26. Stem leaves ovate, elliptic or lingulate to oblong **28**
28. Chlorocysts (in cross-section) narrowly rectangular, exposed on both surfaces or more broadly so on the inner (adaxial) surface *S. perforatum*
28. Chlorocysts (cross-section) triangular, narrowly triangular or broadly triangular, exposed on the inner (adaxial) surface **29**
29. Leucocysts of branch leaves septate *S. exquisitum*
29. Leucocysts of branch leaves not septate **30**
30. Stem slender, leaves oblong-lingulate *S. sucrei*
30. Stem very slender, leaves ovate-acuminate *S. curicuriariense*

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum aciphyllum Müll. Hal.

This treatment is composed of the following taxa: *Sphagnum aciphyllum*, .

Has as synonym

heterotypic *Sphagnum brunnescens* Warnst.
 heterotypic *Sphagnum hymenophyllophyllum* Müll. Hal.
 heterotypic *Sphagnum itatiaiae* var. *purpurascens* Müll. Hal.
 heterotypic *Sphagnum itatiaiae* var. *versicolor* Müll. Hal.
 heterotypic *Sphagnum itatiaiae* Müll. Hal. & Warnst.
 heterotypic *Sphagnum mosenii* Warnst.
 heterotypic *Sphagnum oxyphyllum* Warnst.
 heterotypic *Sphagnum pendulirameum* H.A.Crum
 heterotypic *Sphagnum triporosum* H.A.Crum

DESCRIPTION

Sphagnum aciphyllum Müll. Hal., Flora 70: 419. 1887. Tipo: Brazil, Santa Catarina, colonia Blumenau, 1874, *E. Odebrech s.n.* (Holotype: H).

Plants robust, slender, in dense mats, reddish, pinkish or brownish. Stem leaves broadly triangular to oblong-triangular, apex abruptly pointed, concave-cuspidate, abruptly broad-bordered at base; leucocysts efihrillose to weakly fibrillose above, largely resorbed on both surfaces, with pore-like and membrane gaps on both surfaces. Branches in fascicles of 3–6 (1–3 pending and 2–3 ascending). Branch leaves spreading, lanceolate, slender-acuminate; leucocysts with 2–7 elliptic, ringed pores at ends and commissures on the outer surface, in 3's at adjacent angles, and without pores or with 1–3 large pores at margins on the inner surface; chlorocysts in cross section broad-triangular or triangular-trapezoidal, narrowly exposed on the outer surface, leucocysts strongly convex on the outer surface and moderate or nearly plane on the inner surface.

COMMENTS

Distribution and ecology: tropical america (Crum 1987). In Brazil, occurs in the amazon Forest, Restinga, atlantic rainforest, Savanna (Gallery Forest), and Campo Rupestre, between 0–2800 m, on humid rocks and soil, at base of waterfalls, or on wet banks along stream margins.

Comments: Until now only the type collection of *S. triporosum* is known, and all of its morphological characteristics included in the characteristic observed in *S. aciphyllum*, so Costa (2018) considered it as being a new synonym of the latter.

Life Form

foliose, Mat

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Atlantic Rainforest, Pampa

Vegetation Types

Highland Rocky Field, Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest, Coastal Forest (Restinga)

Geographic Distribution

Confirmed occurrences

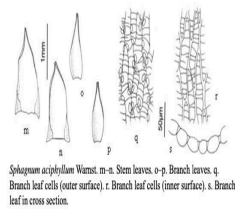
Northeast (Bahia)

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)
 South (Paraná, Rio Grande do Sul, Santa Catarina)

HERBARIUM MATERIAL

R. Marquete, 3072, RB, Minas Gerais
 C. Baez, 1773, RB,  (RB01423638), Rio de Janeiro
 Buck, W.R., 26853, NY, Bahia
 Missão Belga, s.n., RB, 245619,  (RB00684322), São Paulo
 Gonzatti, F., 1490c, FURB (FURB60282), Rio Grande do Sul
 Gonzatti, F., 1490a, FURB (FURB60285), Rio Grande do Sul
 A. Sehnem, 7321, HUICS:, Rio Grande do Sul
 Andrade, B.O., 42, RB, Paraná
 Costa, D.P. et al., 2992, RB, Espírito Santo
 Costa, D.P. et al., 4746, RB, Rio de Janeiro
 Odebrecht, E., s.n., H, Santa Catarina, **Typus**

FIELD IMAGES / ILLUSTRATIONS



Denise Pinheiro da Costa

Figure 1: *Sphagnum aciphyllum* Müll. Hal.

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum acutirameum H.A.Crum

DESCRIPTION

Sphagnum acutirameum H.A.Crum, Bryologist 95: 423. 1992. Tyoe: Brazil, Minas Gerais, PARNA Itatiaia, vicinity of Brejo da Lapa, at km 8 along entry road near border of Rio de Janeiro, 2120 m, -44.750000W, -22.366667S, large *Sphagnum* marsh and surrounding moist montane forest, 5 Jul 1991, *D.M. Vital and W.R. Buck 19692* (holotype: MICH; isotypes: NY, SP).

Plants robust, brownish. **Branches** in fascicles of 4–5 (2 spreading and 2–3 pendent). **Stem leaves** oblong, concave; leucocysts fibrillose to the base, divided, on the outer surface with pores in commissural rows at the apex, on the inner surface with numerous pores. **Branches leaves** broadly oblong-ovate, concave; in cross-section **leucocysts** convex on both surfaces, on the outer surface with few pores or none, on the inner surface with many pores in continuous commissural rows; **chlorocysts** elliptic, equally exposed on both surfaces, sometimes more exposed on the outer (abaxial) surface.

COMMENTS

Distribution and ecology: Endemic to Brazil (MG, RJ), encountered in the Atlantic Rainforest, 2000–2100 m, on swampy soils. This taxon is apparently rare and restricted to the high mountains at Itatiaia, in Serra da Mantiqueira (southeastern Brazil).

Comments: According to Crum (1992b), the stem leaves are fibrillose throughout, but pores are present only near the apex on the outer (abaxial) surface, and over a larger area on the inner (adaxial) surface. The branch leaves are unusual in having no pores on the outer (abaxial) surface but abundant pores in commissural rows on the inner (adaxial) surface. In the collection from Brejo da Lapa, made by *Costa (5976)*, branch leaves without pores are very common.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest)


Geographic Distribution

Confirmed occurrences

Southeast (Minas Gerais, Rio de Janeiro)

HERBARIUM MATERIAL

Costa, D.P. et al., 5976, RB, Rio de Janeiro

Vital, D.M. & Buck, W.R., 19692, NY,  (NY00226753), MICH, NY, SP, Minas Gerais, **Typus**

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 11: 1-142.

Sphagnum aequalipunctatum H.A.Crum

DESCRIPTION

Sphagnum aequalipunctatum H.A. Crum, Bryologist 98: 589. 1995. Type: Brazil, Paraná, Município de Balsa Nova, Serra de Puruã, along road between Palmeiras and Curitiba, on wet rock, 20 Jun 1974, D. Griffin & D.M. Vital 118 (Holotype: MICH; Isotypes: DUKE, FLAS).

Plants small, pale yellowish. **Stem leaves** triangular, bordered, leucocysts occasionally septate, efihrillose or not. Fascicles with 3-4 branches (2 spreading and 2-3 pendent). Branches leaves concave, broadly ovate, pores and pseudopores on the outer surface (occasionally median pores); leucocysts fibrillose, pores in commissural rows on both surfaces, chlorocysts (in cross section) narrowly exposed on both surfaces (dorsal and ventral) sometimes more exposed on the outer surface, thickened walls.

COMMENTS

Distribution and ecology: Endemic to Brazil. Encountered in the Atlantic Rainforest (MG, PR), 850-1100 m, on wet rocks or soil.

Comments: In Brazil is similar to *S. homophyllum* H.A. Crum differing by the stem leaves bluntly triangular with leucocysts septate and branch leaves broadly ovate.

Life Form

Cushion, foliose, Mat

Substrate

Rupicolous

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Highland Rocky Field


Geographic Distribution

Confirmed occurrences

Southeast (Minas Gerais)

South (Paraná)

HERBARIUM MATERIAL

Griffin III, D., 118, MICH, DUKE, FLAS, Paraná, **Typus**
R.C. Forzza, 6333, RB, RB, 511810,  (RB00640101), Minas Gerais

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 11: 1-142.

Sphagnum alegrense Warnst.

Has as synonym

heterotypic *Sphagnum bahiense* var. *sincorae* Warnst.

DESCRIPTION

Sphagnum alegrense Warnst., Hedwigia 47: 83. 1908. Type: Brazil, Paraná, Serra do Mar, Monte Alegre, 1200 m, 8 Feb 1904, *P. Dusén 3920* (Holotype: B?; Isotype: KRYPTO-S).

Plants median to robust. **Branches** in fascicule of 3-4. **Branch** leaves with chlorocysts central and included, with the walls of leucocysts adjacent finely vermiform (appearing to be papillose), not roughened and denticulate at the apex; leucocysts on the outer surface with few pores at angles.

COMMENTS

Distribution and ecology: Guadeloupe, Dominica, Venezuela, and Brazil (Allen 1996, Crum 1990, 1993). In Brazil occurs in the states of BA, MG, PR, RJ, RR, in Amazon Forest, Atlantic Forest and Savanna, 600-2300 m, on moist soils or rocks on cliffs or along streams.

Comments: In Brazil is similar to *Sphagnum frahmii* H.A. Crum differing by the branches in fascicule of 3-4; branches leaf is not roughened and denticulate at the apex; and the leucocysts of branch leaf on the outer surface with few pores at angles. Its actual distribution, probably, does not reflect the real one, being expected to be found in other mountains from northern, northeastern, and southern regions.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest, Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Cerrado (lato sensu), Terra Firme Forest, Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

North (Amazonas, Roraima)

Northeast (Bahia)


Central-west (Goiás)

Southeast (Minas Gerais, Rio de Janeiro)

South (Paraná, Rio Grande do Sul)

HERBARIUM MATERIAL

D.F. Peralta, 6492, RB,  (RB00921045), Minas Gerais

D.P. Costa, 5996, RB,  (RB01099060), Rio de Janeiro

Bôas-Bastos, S.V., 2389, RB,  (RB01186859), ALCB, Bahia

Barros, A.A.M., 1249, RFFP, Minas Gerais

Silva, M.A., 2104, UB, Goiás

Dusén, P.K.H., 3920, HBR, KRIPTO-S., Paraná, **Typus**
Costa, D.P. et al., 5990, RB, Rio de Janeiro

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum amazonicum H.A.Crum & W.R.Buck

DESCRIPTION

Sphagnum amazonicum H.A. Crum & W.R. Buck, Brittonia 44: 449. 1992. Type: Brazil, Amazonas: Summit of Serra do Curicuriari, from Igarapé Arabú of the Rio Curicuriari along the Rio Negro, 00°20'S, 66°50'W, 450 m, growing in hummock, 9-12 Jul 1979, W.R. Buck 2501 (Holotype: MICH; Isotypes: B, DUKE, E, F, HBR, MO, NY).

Plants small, yellowish. Branches in fascicles of 3 (2 spreading and 1 pendent). **Stem** leaves oblong to lingulate, plane or slightly concave, apex rounded, fringed. **Branch** leaves ovate, cucullate, concave, roughened at the back of the apex and bordered; **leucocysts** with 3 robust ringed pores at adjacent angles on the outer surface and few pores or none at commissures, on the inner surface with 2-4 small, elliptic pseudo pores at the commissures; **chlorocysts** central and included, smooth, plane on the upper surface and convex on the outer.

COMMENTS

Distribution and ecology: Endemic to Brazil. occurring in the Amazon Forest, 450-1230 m, on soil or rocks, growing in wall rocks on the cliffs and in hummock at summit.

Comments: Crum & Buck (1992), considered this species similar to *S. sanguinale* Warnst., but the plants are pale and tawny, not reddish-brown; and the leucocysts of stem leaves are not or sometimes once-divided, rather than divided once to several times and having walls largely resorbed, as in *S. sanguinale*. In Brazil is restricted to the mountains of the Amazon Forest being expected to be found in other mountains of the Guiana Shield.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Amazon Rainforest

Vegetation Types

Riverine Forest and/or Gallery Forest, Terra Firme Forest


Geographic Distribution

Confirmed occurrences

North (Amazonas)

HERBARIUM MATERIAL

Costa, D.P. & Martinelli, G., 5387, RB, Amazonas

Buck, W.R., 2501, F, NY, HBR, E,  (E00007257), MICH, Amazonas, **Typus**

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum amoenoides H.A.Crum

DESCRIPTION

Sphagnum amoenoides H.A. Crum, Contr. Univ. Michigan Herb. 21: 147. 1997. Type: Brazil, São Paulo, Serra da Mantiqueira, Município de Pindamonhangaba, Pico do Itapeva, 22°46'S, 45°35'W, 2000 m, 18 Oct 1994, W.R. Buck 26422 (Holotype MICH; Isotypes NY, SP).

Plants small, pale green. **Branches** in fascicle of 3 (1 pendent). **Stem leaves** oblong-ovate, cucullate, concave, with small, ringed pores at angles on the outer surface, without pores on the inner surface. **Branch leaves** oblong-lanceolate, chlorocysts barrel-shaped, exposed on both surfaces, leucocysts convex on both surfaces.

COMMENTS

Distribution and ecology: Endemic to Brazil, occurring in the Atlantic Rainforest, *Campo Rupestre*, 780-2000 m, on rocks or soil.

Comments: According to Crum (1997), the plants are small, with short branches and spreading leaves, being similar to *S. amoenum* Warnst. differing by having larger stem and branch leaves, stem and branch leaves with small, ringed pores on the outer surface, but none on the inner surface, and the leucocysts of stem leaves fibrillose throughout. It is considered a rare species in Brazil, being known only by three collections, presenting a discontinuous distribution that probably not represents the real distribution, being expected more collections from other places in Brazil.

Life Form

Cushion, foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences


Northeast (Bahia)

Southeast (São Paulo)

South (Rio Grande do Sul)

HERBARIUM MATERIAL

Buck, W.R., 26422, SP, MICH, MO (MO406739), NY, São Paulo, **Typus**

C.N. Fraga, 2697, RB, 488617,  (RB00573577), RB, Bahia

Yano & Bordin, 29188, HUCCS, Rio Grande do Sul

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum amoenum Warnst.

DESCRIPTION

Sphagnum amoenum Warnst., Bot. Jahrb. 27: 252. 1899.—TYPE: BRAZIL. Rio de Janeiro: an einer Felswand der Tijuca, Sep–Dec 1894, E. Ule 1930 (lectotype: PC 0100144; isolectotypes: NY, PC).

Stem leaves not cucullate (rarely slightly cucullate), fibrillose without pores or with few pores on the outer surface, small to large membrane gaps on the inner surface. Branch leaves with numerous pseudopores on the outer surface and both pseudopores and membrane pleats on the inner surface, chlorocysts, in cross section, narrowly exposed on the outer surface.

COMMENTS

Distribution and ecology: Endemic to Brazil, occurring in the Atlantic Rainforest, ca. 500 m, on rock.

Comments: According to Crum (1995), it is close to *S. sanguinale* Warnst. since both species have numerous commissural pseudopores on the outer surface of branch leaves, the chlorocysts are narrowly exposed on the outer surface, but they are not central and included.

Life Form

foliose, Tuft

Substrate

Rupicolous

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Southeast (Rio de Janeiro)

HERBARIUM MATERIAL

E.H.G. Ule, 1892, NY, HBR, Rio de Janeiro, **Typus**

Sphagnum atroligneum H.A.Crum

DESCRIPTION

Sphagnum atroligneum H.A. Crum, Contr. Univ. Michigan Herb. 21: 147. 1997. Type: Brazil, Paraná, Bergland bei Lapa, 70 km SW von Curitiba, Gruta do Monge, ca. 25°47'S, 49°42'W, 590-1000 m, NN, 17-18 Dec 1991, A. Schäfer-Verwimp & Verwimp 15214 (Holotype MICH; Isotype Herb. Schäfer-Verwimp).

Plants small, brown, stem black. Branches in fascicle 2-3 (2 spreading, 1 pendent). Stem leaves lingulate, fringed at apex, concave, with 2-5 pores at side angles and commissures in addition to those in 3's at adjacent corners on the outer surface, 1-2 large round pores on the inner surface. Branch leaves oblong-ovate, cucullate, concave with large, ringed pseudopores in 3's at adjacent corners on the outer surface and fewer smaller, ringed pseudopores on the inner surface; chlorocysts in cross section barrel-shaped.

COMMENTS

Distribution and ecology: Endemic to Brazil, occurring in the Amazon Forest and Atlantic Rainforest, 0-1000 m, on rocks.

Comments: According to Crum (1997), the stem and branch leaves are similar except that the stem leaves have a fair number of pores (2-5) at side angles and commissures. In Brazil the fragmented distribution of this taxa probably does not reflect the real one, and the study of more collections can improve the knowledge of this taxa and expand the geographical range of it.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Amazon Rainforest, Atlantic Rainforest

Vegetation Types

Amazonian Campinarana, Terra Firme Forest, Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest

Geographic Distribution

Confirmed occurrences

North (Amazonas)

Southeast (São Paulo)

South (Paraná)

HERBARIUM MATERIAL

Schäfer-Verwimp, A., 15214, MICH, SV, Paraná, **Typus**

Makino et al., 7A, SP, São Paulo

C.E. Zartman, 7878, RB,  (RB01187929), Amazonas

Zartman, C., 7878, RB, Amazonas

C.E. Zartman, 7878, RB,  (RB01187929), Amazonas

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum billbuckii H.A.Crum

DESCRIPTION

Sphagnum billbuckii H.A. Crum, Contr. Univ. Michigan Herb. 21: 150. 1997. Type: Brazil, Minas Gerais, Serra do Espinhaço, Município de Santa Bárbara, Parque Natural do Caraça to Pico da Carapuça, 20°02'S, 43°30'W, 1300-1460 m, 22 Oct 1994, W.R. Buck 26642 (Holotype MICH, Isotypes NY, SP).

Plants small, slender, pale green. Branches in fascicles of 2-3 (1 spreading, 1-2 pendent). Stem and branch leaves large, isophyllous. Stem leaves ovate, cucullate, concave, bordered by a resorption furrow. Branch leaves ovate, acuminate, leucocysts fibrillose, with small, elliptic pores on the outer surface, with large pores only on the outer surface, **chlorocysts** (in cross section) narrowly triangular and exposed on the inner surface.

COMMENTS

Distribution and ecology: Endemic to Brazil, occurring in *Restinga* and Atlantic Rainforest, 0-1600 m, on moist soil.

Comments: The species can be recognize by the stem and branch leaves larger and isophyllous, the stem leaves without pores, and the branch leaves with pores only on the outer surface. The chlorocysts (in cross section) of branch leaves are narrowly triangular and exposed on the inner surface. In Brazil this species occurs since restinga sand soil until vegetation over sandstone in the Atlantic Rainforest, being restricted to southeastern and southern regions.

Life Form

Cushion, foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Seasonally Semideciduous Forest, Coastal Forest (*Restinga*)

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum bocainense H.A.Crum

DESCRIPTION

Sphagnum bocainense H.A. Crum, Contr. Univ. Michigan Herb. 21: 153. 1997. Type: Brazil, São Paulo, Serra da Bocaina bei São José do Barreiro, ca. 22°47'S, 44°38'W, 16 Apr 1988, A. Schäfer-Verwimp & Verwimp 9588 (Holotype: MICH; Isotype: SP).

Plants orange-brow. **Branches** short, in fascicles of 2 spreading. **Stem and branch leaves** similar, oblong-ovate to ovate-lanceolate, concave, obtuse, with abundance of strongly ringed pores in continuous commissural rows on the outer surface, few or none pores on the inner surface. **Branch** leaves with **leucocysts** fibrillose, with elliptic pores in continuous commissural rows on the outer surface, **chlorocysts** in cross section barrel-shaped to triangular, more broadly exposed on the inner surface.

COMMENTS

Distribution and ecology: Endemic to Brazil, occurring in the Atlantic Rainforest, 400-1750 m, on humid soil or rock.

Discussion: It is apparently restricted to submontane and montane Atlantic Rainforest of southeastern Brazil. In Brazil, is similar to *S. longicomosum* differing by having branch leaves ovate-lanceolate (not oblong-ovate) and chlorocysts in cross section barrel-shaped to triangular-trapezoidal, more broadly exposed on the inner surface (not lenticular to barrel-shaped, exposed on both surfaces or slightly more on the outer surface).

Life Form

Cushion, foliose, Tuft

Substrate

Saxicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest), Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

Southeast (Rio de Janeiro, São Paulo)

HERBARIUM MATERIAL

D.P. Costa, 4519, RB, 534868,  (RB00684888), Rio de Janeiro

Schäfer-Verwimp, A., 9588, MICH, SV, São Paulo, **Typus**

Silva, J.C et. al., 4951, RB, Rio de Janeiro

Costa, D.P. et al., 4951, RB, Rio de Janeiro

D. Sucre, 5081, RB, Rio de Janeiro

D.P. Costa, 4519, RB, 534868,  (RB00684888), Rio de Janeiro

Sphagnum brachybolax Müll. Hal. ex Warnst.

DESCRIPTION

Sphagnum brachybolax Müll. Hal. ex. Warnst., Bot. Jahrb. 27: 253. 1899. Type: Brazil, Santa Catarina, in Sümpfen der Campos bei Laguna, Nov 1889, *E. Ule* 633; Insel St. Catarina, Mar 1887, *E. Ule* 153 (syntypes: NY, PC).

Plants small, capitula small, branches short. Branches with only 2 fascicles. **Stem** leaves slightly to strongly cucullate. **Branch** leaves in cross section with **chlorocysts** isosceles-triangular, triangular to triangular-trapezoidal, more exposed on the inner surface.

COMMENTS

Distribution and ecology: Endemic to Brazil (AP, AM, BA, MG, PR, RJ, RS, SC, SP), occurring in the Atlantic Rainforest, Amazon Forest, and *Restinga*, 0-1270 m, on humid soil (swamp). The actual distribution of this taxon in Brazil is disjunct between Amazon Forest and Atlantic Rainforest, and probably does not reflect the real distribution, being expected new collections from other Brazilian states in northern, middle-western, and southern regions

Comments: According to Crum (1995), it can be recognized by its small size, small capitula, short branches, and large stem leaves that resembling branch leaves except because the latter has pseudopores on both surfaces (not pores).

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Amazon Rainforest, Atlantic Rainforest

Vegetation Types

Amazonian Campinarana, Terra Firme Forest, Ombrophyllous Forest (Tropical Rain Forest), Coastal Forest (*Restinga*)

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum brasiliense Warnst.

DESCRIPTION

Sphagnum brasiliense Warnst., Hedwigia 30: 150. 1891. Type: Brazil, Minas Gerais, Caraça, Apr 1885, *E. Wainio s.n.* (Holotype: H-BR; syntype: PC).

Plants small and columnar, brownish. **Branches** very short, fascicles of 2–3 (rarely 4). **Stem leaves** oval or lingulate, slightly or not cucullate, rarely strongly cucullate, bordered by a resorption furrow. **Branch leaves** erect or erect-spreading, ovate; **leucocysts** in cross-section convex on both surfaces, with side walls finely papillose or smooth, on the outer surface with ringed pores at commissures and 2's and 3's at adjacent cell angle, on the inner surface with few pores and pseudopores, larger and rounded; **chlorocysts** in cross-section trapezoidal, narrowly triangular or fusiform, more exposed on the inner surface.

COMMENTS

Distribution and ecology: Endemic to Brazil (MG, PR, RJ, SP), occurring in the Atlantic Rainforest, 410-2300 m, on moist soil or rocks. This species is restrict to Atlantic Rainforest of southeastern and southern regions. According to its current distribution is expected to be found in other areas of the Atlantic Rainforest in northeastern to southern Brazil, with wider altitudinal and latitudinal ranges. *Restinga* vegetation is highly vulnerable in Brazil due to strong human pressure, and new efforts will be needed to obtain new collections of that taxon (which can be considered threatened).

Comments: Crum (1990) considered this species as synonymous of *S. brevirameum*, although the same author in 1993, considered *S. brasiliense* as a good species. Here I considered *S. brasiliense* a valid species.

Life Form

Cushion, foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

High Altitude Grassland, Cerrado (lato sensu), Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest), Coastal Forest (*Restinga*), Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

North (Tocantins)

Northeast (Bahia)

Southeast (Minas Gerais, Rio de Janeiro, São Paulo)


South (Paraná)


HERBARIUM MATERIAL

Wainio, E.A., 1885, PC, HBR, Minas Gerais, **Typus**


Buck, W.R., 26625, 26633, DUKE, NY, Minas Gerais

N.D. Santos, 759, RB, 454108,   (RB00503284), Rio de Janeiro

L. Damazio, 1280, RB, 245659,  (RB00684373), Minas Gerais

L. Damazio, 1280, RB, 245659,  (RB00684373), Minas Gerais

Boom, B.M. et al., 715, NY, Bahia

N.D. Santos & D.P. Costa, 759, RB, Rio de Janeiro
C.B. Poliquesi and J. Cordeiro, 482, MBM, Paraná
E.P. Fernandez, 32, RB, São Paulo
T. Messina et al., 30, RB, Minas Gerais
M.C. Vaughan Bandeira, s.n., RB, 245662,  (RB00684430), Rio de Janeiro

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum brevirameum Hampe

DESCRIPTION

Sphagnum brevirameum Hampe, Vid. Medd. Dansk Naturh. Foren. Kjøbenh. 3, 6: 129. 1874. Type: Brasilia, in humid turfos prope Rio de Janeiro, A. Glaziou 6389 (syntypes: BM 000964630; PC 0116028, LE).

Plants robust, purple-redish. Branches in fascicle 2-6 (2 pendent, 3 spreading). Stem leaves lingulate, apex rounded and fringed, not cucullate. Branch leaves ovate, concave, apex roughened at back, margin serrulate-bordered, leucocysts convex on both surfaces, with large, elliptic pores in 3's adjacent angles on the outer surface, few, small, ringed pseudo pores at the commissures on the inner surface, **chlorocysts** elliptic, central and included, with papillose side walls.

COMMENTS

Distribution and ecology: Tropical America (Crum 1989). In Brazil is encountered in Savanna and Atlantic Rainforest (Distrito Federal and BA, MG, and RJ states), between 1000-1500 m, occurring on moist soil or rock.

Comments: The types of *S. perichaetiale*, *S. erythrocalyx* and *S. brevirameum* are all from Hampe's herbarium and are housed at BM herbarium and I found in the same sheet two specimens from A. Glaziou 4538 labelled as *S. erythrocalyx*, one from Hampe's herbarium and the other from Bescherelle's herbarium, and the type of *S. erythrocalyx* (collected by Beyrich). When Crum (1989) studied these materials he commented "It is, unfortunately, a mixture consisting of thirteen pasted-down plants referable to *S. perichaetiale*, three scraps of a very different species referred to here as *S. brevirameum*, and three fragments of some member of the Subsecunda".

According to Crum (1989), this interesting species is in many ways similar to *S. magellanicum* Brid., that had been confused with *S. perichaetiale* Hampe and *S. erythrocalyx* Hampe (nowadays a synonym of *S. perichaetiale*), commenting that the original descriptions of those species are chiefly concerned with perichaetial bracts and quite useless in species definitions.

Life Form

Cushion, foliose

Substrate

Saxicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Cerrado (lato sensu), Seasonally Semideciduous Forest, Ombrophylous Forest (Tropical Rain Forest), Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

Central-west (Distrito Federal)

Southeast (Minas Gerais, Rio de Janeiro)

HERBARIUM MATERIAL

A.F.M. Glaziou, 4548, BM, Distrito Federal

Buck, W.R., 26844, DUKE, NY, Bahia

P.I. Braga, 2455, RB, Rio de Janeiro

F.C. Hoehne, 395, SP, Minas Gerais

A.F.M. Glaziou, 6389, LE, PC, BM, Rio de Janeiro, **Typus**

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum capillifolium (Ehrh.) Hedw.

Has as synonym

homotypic *Sphagnum palustre* var. *capillifolium* L.
 heterotypic *Sphagnum aciphyllum* var. *brunnescens* Müll. Hal.
 heterotypic *Sphagnum acutifolium* Schwägr.
 heterotypic *Sphagnum capillaceum* (Weiss.) Schrank
 heterotypic *Sphagnum densum* Müll. Hal.ex Warnst.
 heterotypic *Sphagnum oxyphyllum* var. *nanum* Warnst.
 heterotypic *Sphagnum parvulum* Warnst.
 heterotypic *Sphagnum pulvinatum* H.A.Crum
 heterotypic *Sphagnum usterii* var. *viride* Warnst.
 heterotypic *Sphagnum versicolor* Warnst.

DESCRIPTION

Sphagnum capillifolium (Ehrh.) Hedw., Fund. Hist. Nat. Musc. Frond. 2: 86. 1782. *Sphagnum palustre* subsp. *capillifolium* Ehrh., Hannover. Mag. 1780: 235. 1780. TYPE: Europe (lectotype: OXF; designated by Flatberg [1983]).

Plants slender to robust, in cushions or tufts, reddish or greenish. Stem leaves oblong, lingulate to lingulate-triangular, apex acute, concave-pointed, margins weakly broadened at base; leucocysts fibrillose on the outer surface, with scattered to many pores and membrane gaps, on the inner surface mostly resorbed; strong border sometimes occupying the entire leaf. Branches in fascicles of 3–4 (1–2 pending and 2 ascending). Branch leaves wide-spreading, narrow, ovate-lanceolate, apex involute-pointed and toothed; leucocysts with several large, ringed, elliptic pores on the outer surface, and 2–5 pores at cells end on the inner surface; chlorocysts in cross section triangular to trapezoidal, broadly exposed on the inner surface, leucocysts moderate to strongly convex on the outer surface and nearly plane on the inner surface.

COMMENTS

Distribution and ecology: widespread throughout the world (Crum 1984, 1989, 1990). In Brazil encountered in the Amazon Forest, Atlantic Rainforest, Savanna, *Restinga*, and *Campo rupestre*, 0–2400 m, on moist soil, in swamp, at margin of streams and lakes, or wet soil.

Discussion: According to Crum (1985), *S. pulvinatum* shows the same characteristics as *S. capillifolium*, a common species in Brazil, being characterized by the stem leaves oblong and acute, with leucocysts largely resorbed on both surfaces, and a strong border sometimes occupying the entire leaf; and the branch leaves narrow. Based on these characteristics, Costa (2018) reduced it to a synonym of *S. capillifolium*.

Comments: I could not confirm the record of Yano *et al.* (1985) to Amazonas State because I could not study the sample *Griffin et al.* 395 (SP) cited by them. Based on the distribution of this taxa, possibly this collection was misidentified.

Life Form

Cushion, foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest, Atlantic Rainforest, Pampa

Vegetation Types

Grassland, Highland Rocky Field, Cerrado (lato sensu), Seasonally Deciduous Forest, Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest, Coastal Forest (*Restinga*)

Geographic DistributionConfirmed occurrences

Northeast (Bahia)

Central-west (Mato Grosso do Sul)

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)

South (Paraná, Rio Grande do Sul, Santa Catarina)

HERBARIUM MATERIAL

Yano, O. et al., 12585, SP, Espírito Santo

J. Ballejas, 52, RB,  (RB01355982), BahiaJ. Ballejas, 52, RB,  (RB01355982), Bahia

Amaral, M.C., s.n., SP, Bahia

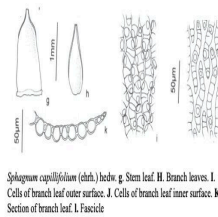
D. M. Vital, 1237, SP, Minas Gerais

A. Sehnem, 3214, RB, Santa Catarina

V.J. Pott, 9512, SP, Mato Grosso do Sul

Ristow, R., 1595, IRAI, Paraná

Molon, R. et al., 12188, MO, Rio Grande do Sul

FIELD IMAGES / ILLUSTRATIONS

Maria Alice de Rezende

Figure 1: *Sphagnum capillifolium* (Ehrh.) Hedw.**REFERENCE**

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum chi-chiense H.A.Crum

DESCRIPTION

Sphagnum chi-chiense H.A.Crum var. *ulvidulum* H.A.Crum, J. Hattori Bot. Lab. 77: 236. 1994.—TYPE: BRAZIL. Bahia: Município Rio de Contas, Pico das Almas, vertente leste, Campo do Queiroz, -41.9500W, -13.533333S, 1500 m, 27 Nov 1988, R.D. Harley and D.J. Hind 26644 (holotype: NY; isotype: CEPEC, HUEFS).

Plants robust, pale brown. **Branches** in fascicles of 2 (1 spreading and 1 pendent). **Stem leaves** oblong-ovate to triangular, 1.2–1.6 mm long; leucocysts one-divided, fibrillose in the distal 1/3–1/2, on the outer (abaxial) surface with numerous large, round, median pores in a single row, on the inner (adaxial) surface without pores. **Branches leaves** broadly ovate, ca. 2 mm long, concave; **leucocysts** in cross-section slightly bulging on both surfaces (abaxial and adaxial), on the outer (abaxial) surface with pores in continuous commissural rows, on the inner (adaxial) surface without pores; **chlorocysts** in cross-section barrel-shaped, equally exposed on both surfaces.

COMMENTS

Distribution and ecology: Endemic to Brazil, encountered in the Atlantic Rainforest, ca. 1500 m, on rock, and only known from two collections from Bahia state.

Comments: According to Crum (1994a), the variety *ulvidulum* is notable because the stem cortex is generally 2-layered, branches are 4–5 per fascicle, stem leaves are fibrillose throughout, and leucocysts with rounded pores are arranged in a median row. In *Sphagnum chi-chiense* H. A. Crum var. *chi-chiense* was described by Crum (1994a) to Guyana, Cuyuni–Mazaruni, Chi–Chi Mountain, Chi–Chi Falls, on rock in waterfall. It has the stem cortex is 1-layered, branches are in fascicles of 2, stem leaves are fibrillose only in the upper 1/3–1/2, and the leucocysts have many pores in continuous commissural rows. While the variety *ulvidulum* was described to a mountain slope.

Life Form

foliose, Tuft

Substrate

Rupicolous

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Seasonally Deciduous Forest

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

HERBARIUM MATERIAL

E.B. Valente, 854, HUCCS, Bahia

R.M. Harley, 26644, NY, Bahia, **Typus**

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 11: 1-142.

Sphagnum columniforme H.A.Crum

DESCRIPTION

Sphagnum columniforme H.A. Crum, J. Hattori Bot. Lab. 77: 233. 1994. Type: Brazil, Bahia, Municipality of Ilhéus, road from Olivença to Una, 2 km S of Olivença, restinga forest, 19 Apr 1981, *B.M. Boom, S.A. Mori & A.M. de Carvalho 715* (Holotype: NY 00226784; Isotype: CEPEC).

Plants short and columnar, crowded branches grouped in pairs; cells of the stem cortex efibrillose and uniporose; branch cortex efibrillose (rarely has fibrils), with only an occasional cell porose at the upper end. **Stem** leaves fibrillose and porose as are the branch leaves; chlorocysts of the **branch** leaves (in cross section) triangular and exposed only on the inner surface.

COMMENTS

Distribution and ecology: Endemic to Brazil, occurring in *Restinga* and Savanna, 50-400 m, on moist sandy soil along river bank in partial shade.

Comments: According to Crum (1994), the species has the following characters: the plants are short and columnar, crowded branches are grouped in pairs; the cells of the stem cortex are efibrillose and uniporose (sometimes fibrillose); the branch cortex is efibrillose, with only an occasional cell porose at the upper end; the stem leaves are fibrillose and porose as in the branch leaves; the chlorocysts of the branch leaves are triangular and exposed only on the inner surface.

Conservation: Considered threatened in Brazil because *Restingas* and Savanna vegetation are vulnerables in Brazil by the strong human pressure, and then new efforts are need to try to get new collections of this taxa in the country.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Coastal Forest (*Restinga*)

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

HERBARIUM MATERIAL

Boom, B.M. et. al., 715, CEPEC, NY, Bahia, **Typus**

FIELD IMAGES / ILLUSTRATIONS



Figure 1: *Sphagnum columniforme* H.A.Crum



Figure 2: *Sphagnum columniforme* H.A.Crum

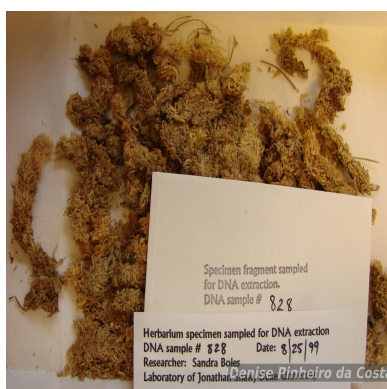


Figure 3: *Sphagnum columniforme* H.A.Crum

Sphagnum contortulum H.A.Crum

DESCRIPTION

Sphagnum contortulum H.A. Crum, Bryologist 94: 301. 1991. Type: Brazil, Bahia, Jacobina, 11°06'S, 40°49'W, on a dripping cliff, 19 May 1978, *D.M. Vital 8080* (Holotype: MICH; Isotypes: ALTA, DUKE, SP).

Plants small, yellowish. **Branches** in fascicles of 1-2 (pendent). **Stem leaves** oblong-ovate, cucullate, acuminate, leucocysts with few small pores at ends on the outer surface, and small rounded pores on the inner surface. Branch leaves squarrose at tips, oblong, concave, cucullate, bordered (2 linear cells), leucocysts convex and with small pores on both surfaces, chlorocysts rectangular, equally exposed on both surfaces.

COMMENTS

Distribution and ecology: Endemic to Brazil, occurring in the Atlantic Rainforest, ca. 460 m, on dripping rocky cliff along road.

Comments: The most unusual feature in this species is the presence of a resorption furrow near the apex of branch leaves; being characteristic the plants slender, loose branching, and lax, squarrose-contorted leaves; the stem and branch leaves different in structure being both cucullate-concave. According to Crum (1991), the cucullate leaf tips and the chlorocysts of the branch leaves rectangular, equally exposed, the relationship is obscure, but the dripping wet habitat, yellowish color, and apical "window pore", make an assignment the subgenus *Cuspidata* reasonable.

Conservation: In Brazil is considered a rare and restrict species, and also endangered because is known for a locality considered threatened and efforts must be taken to resample this taxa around the type locality.

Life Form

foliose, Tuft

Substrate

Rupicolous

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Seasonally Deciduous Forest

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

HERBARIUM MATERIAL

D. M. Vital, 8080, DUKE, MICH, ALTA, SP, Bahia, **Typus**

E.B. Valente, 1142, HUEFS, Bahia

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum costae H.A.Crum & D.P.Costa

This treatment is composed of the following taxa: *Sphagnum costae*, *Sphagnum costae* var. *confertorameum*, *Sphagnum costae* var. *costae*, *Sphagnum costae* var. *seriatum*.

DESCRIPTION

Sphagnum costae H.A. Crum & D. Pinheiro da Costa, Cryptogamie: Bryol. Lichénol. 15: 111. 1994. Type: Brazil, Rio de Janeiro, Município Nova Friburgo, Morro do Curuzu, no solo humoso e úmido da mata, protegido pela vegetação herbácea, umbrófila, ca. 1300 m, 15 Jul 1987, D.P. Costa et al. 290 (Holotype: MICH, Isotype: RB).

Plants small, pale green. **Branches** in fascicle of 2-4 (1-2 spreading, 1-2 pendent). **Stem leaves** concave, oblong-ovate, to oblong-obovate, bordered, leucocysts fibrillose in the upper 1/3-2/3 on the outer surface, with groups of 3 pores at adjacent corners on the inner surface. **Branch leaves** concave, oblong-ovate, denticulate, bordered, **leucocysts** with tiny pores on the outer surface and 3's pores at adjacent angles on the inner surface, **chlorocysts** in cross section exposed on both surfaces by thickened end walls.

COMMENTS

Distribution and ecology: Endemic to Brazil, encountered in the Atlantic Rainforest and *Campo Rupestre* (rocky outcrop) vegetation, 1000-2020 m, occurring on moist soils in shaded places in mountainous regions.

Comments: *Sphagnum costae* is similar to *S. molle*, the former differing by having both stem and branch leaves denticulate-bordered by resorption furrows, stem leaves fibrillose and porose, and chlorocysts equally exposed on both surfaces.

Life Form

foliose, Mat, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest), Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

Southeast (Espírito Santo, Rio de Janeiro)

IDENTIFICATION KEY

Crum & Costa (1994) - This species has three varieties: *S. costae* var. *costae*, var. *confertorameum* and var. *seriatum*, with all of them having resorbed margins on the stem and branch leaves, with three pores on the outer surface of the branch leaves.

The varieties differ from one another in their appearances and structural details, but as they are from the same locality and show intergradations, they are better regarded as varieties of the same species. They differ by the following:

- 1) **typical variety** is small and slender with well-spaced fascicles of 2-4 branches, branch leaves narrow, leucocysts with small, round pores grouped at adjacent angles on the outer surface of stem and branch leaves;
- 2) **var. seriatum** is tall and slender, with 3-4 fasciculate branches, narrow branch leaves with large, elliptic pores on the outer surfaces of the stem and branch leaves, and small, elliptic pores on the outer surfaces of branch leaves;
- 3) **var. confertorameum** has plants that are stout, crowded fascicles of 1-2 branches, broad branch leaves, with large, elliptic pores on the outer surfaces of the stem and branch leaves, except towards the tip.

HERBARIUM MATERIAL

Costa, D.P., 290, RB, MICH, Rio de Janeiro, **Typus**

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum costae H.A.Crum & D.P.Costa

var. *costae*

DESCRIPTION

Sphagnum costae H.A. Crum & D. Pinheiro da Costa, Cryptogamie: Bryol. Lichénol. 15(2): 111. 1994. Type: Brazil, Rio de Janeiro, Município Nova Friburgo, Morro do Curuzu, no solo humoso e úmido da mata, protegido pela vegetação herbácea, umbrófila, ca. 1300 m, 15 Jul 1987, *D.P. Costa et al.* 290 (Holotype: MICH, Isotype: RB).

COMMENTS

Distribution and ecology: Endemic to Brazil occurring in the Rio de Janeiro and Espírito Santo states, in the Atlantic Rainforest, 1000-2020 m, on moist soil in shaded places at mountainous region.

Discussion: This species has three varieties, *S. costae* var. *costae*, var. *confertorameum* and var. *seriatum*, all presenting resorbed margins of stem and branch leaves, and three pores on the outer surface of branch leaves. They differ by the following characteristics: **the typical variety** is small and slender with well-spaced fascicles of 2-4 branches, branch leaves narrow, leucocysts with small, round pores grouped at adjacent angles on the outer surface of stem and branch leaves. The **var. seriatum** is tall and slender, with 3-4 fasciculate branches, narrow branch leaves, with large, elliptic pores on the outer surface of stem and branch leaves, and small, elliptic pores on the outer surface of branch leaves. The **var. confertorameum** the plants are stout, crowded fasciculus of 1-2 branches, broad branch leaves, with large, elliptic pores on the outer surface of stem and branch leaves, except toward tip. The varieties differ from another in appearance and structural detail but as they are from the same locality and show an intergradation, it is better regarded as varieties of the same species.

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Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophylous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Southeast (Rio de Janeiro)

HERBARIUM MATERIAL

Costa, D.P., 290, MICH, RB, Rio de Janeiro, **Typus**

Sphagnum costae var. *confertorameum* H.A.Crum & D.P.Costa

DESCRIPTION

Sphagnum costae var. *confertorameum* H.A. Crum & D. Pinheiro da Costa, Cryptogamie: Bryol. Lichénol. 15: 112. 1994.
Type: Brazil, Rio de Janeiro, Município Nova Friburgo, Morro do Curuzu, no solo da mata protegido pela vegetação herbácea, umbrófila, ca. 1450 m, 15 Jul 1987, D.P. Costa et al. 301 (Holotype: MICH, Isotype: RB).

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Southeast (Rio de Janeiro)

HERBARIUM MATERIAL

Costa, D.P. et al., 301, MICH, RB, Rio de Janeiro, **Typus**

Sphagnum costae var. *seriatum* H.A.Crum & D.P.Costa

DESCRIPTION

Sphagnum costae H.A. Crum & D. Pinheiro da Costa, *Cryptogamie: Bryol. Lichénol.* 15(2): 111. 1994. Type: Brazil, Rio de Janeiro, Município Nova Friburgo, Morro do Curuzu, no solo humoso e úmido da mata, protegido pela vegetação herbácea, umbrófila, ca. 1300 m, 15 Jul 1987, *D.P. Costa et al. 602* (Holotype: MICH, Isotype: RB)

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Southeast (Rio de Janeiro)

HERBARIUM MATERIAL

Costa, D.P. et al., 602, MICH, RB, Rio de Janeiro, **Typus**

Sphagnum cribriforme H.A.Crum

Has as synonym

heterotypic *Sphagnum perforatum* var. *rotundifolium* Warnst.

DESCRIPTION

Sphagnum cribriforme H.A. Crum, Bryologist 96: 458. 1993. Type: Brazil, Goiás, Serra dos Pirineus, Aug 1892, E. Ule 1528 (CHR lectotype designated by Crum 1993, isolectotype: R).

Species only known by the type collection, being excluded here.

COMMENTS

Distribution and ecology: Endemic to Brazil, Goiás State, occurring in Savanna, ca. 800 m, occurring on rocks, being only known from the type collection (*E. Ule 1528*). It is very similar to *S. subsecundum*.

Life Form

foliose, Tuft

Substrate

Rupicolous

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna

Vegetation Types

Cerrado (lato sensu)

Geographic Distribution

Confirmed occurrences

Central-west (Goiás)

HERBARIUM MATERIAL

E.H.G. Ule, 1528, CHR, Goiás, **Typus**

Sphagnum crumii Schäf.-Verw.

DESCRIPTION

Sphagnum crumii Schäf.-Verw., Nova Hedwigia 67: 410. 1998. Type: Brazil, Paraná, Hochland vo Paraná nordlich Ponta Grossa, PR151 zwischen Jaguariava und Piraí do Sul, 24°25'S, 49°50'W, 1140 m, 15 Dec 1991, A. Schäfer-Verwimp & Verwimp 15129 (Holotype: MICH; Isotypes: SP, herb. Schäfer-Verwimp).

Plants small, green, in fragile mats. **Branches** single. **Stem leaves** oblong-ovate or lingulate, apex concave, rounded, obtuse, leucocysts with many small pores on the outer surface and few pseudopores and pores on the inner surface. **Branch leaves** broadly ovate, in cross section leucocysts convex on both surfaces, with many small, rounded pores in discontinuous commissural rows; **chlorocysts** barrel-shaped, equally exposed on both surfaces.

COMMENTS

Distribution and ecology: Endemic to Brazil, occurring in the Atlantic Rainforest and Savanna (DF, PR, RJ, SC), 0-1140 m, growing on moist rock or soil. Endemic to Brazil.

Comments: It is considered a species not well known in Brazil.

Life Form

foliose, Mat

Substrate

Rupicolous

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Cerrado (lato sensu), Mixed Ombrophyllous Forest

Geographic Distribution

Confirmed occurrences

Central-west (Distrito Federal)

Southeast (Rio de Janeiro)

South (Paraná, Santa Catarina)

HERBARIUM MATERIAL

Schäfer-Verwimp, A., 15129, SV, SP, MICH, Paraná, **Typus**

C.G. Pereira, 545, UB, Distrito Federal

A. Sehnem, 6747, PACA, Rio de Janeiro

O. Yano, 2200, RB, Santa Catarina

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 11: 1-142.

Sphagnum curicuriariense H.A.Crum & W.R.Buck

DESCRIPTION

Sphagnum curicuriariense H.A. Crum & W.R. Buck, Brittonia 44: 458. 1992. Type: Brazil, Amazonas, Rio Negro entre Manaus and São Gabriel, slopes and summit of Serra Curicuriari, from Igarapé Arabú of the Rio Curicuriari to the summit, 450 m at summit, 00°20'S, 66°50'W, pendent from dripping cliff at summit, 9-12 Jul 1979, W.R. Buck 2500 (Holotype: MICH; isotypes: F, NY).

Plants delicate, whitish-green, slender, pendent. **Branches** in fascicle of 3. **Stem leaves** ovate-acuminate, concave, bordered (2 rows of liner cells), leucocysts fibrillose with many pores in commissural rows on the outer surface. **Branch leaves** concave, ovate-lanceolate, acuminate, bordered, (2-3 rows of linear cells) with many pores on the outer surface, with few or none on the inner surface, in cross section **leucocysts** convex on both surfaces, with many ringed pores in commissural rows on the outer surface, and few pores or none on the inner surface; chlorocysts triangular and broadly exposed on the inner surface.

COMMENTS

Distribution and ecology: Endemic to Brazil (AM, RR), occurring in the Amazon Forest, 450-1200 m, pendent on rock of cliffs at summit (Serra do Curicuriari and Serra Parima). It is considered restricted to Amazon Forest (northern Brazil).

Comments: The pendent habitat is remarkable in this species.

Life Form

foliose, Mat

Substrate

Rupicolous

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Amazon Rainforest

Vegetation Types

Terra Firme Forest, Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

North (Amazonas, Roraima)

HERBARIUM MATERIAL

G.T. Prance, 21579, NY, Roraima

Buck, W.R., 2500, MICH, NY, Amazonas, **Typus**

FIELD IMAGES / ILLUSTRATIONS



Figure 1: *Sphagnum curicuriariense* H.A.Crum & W.R.Buck

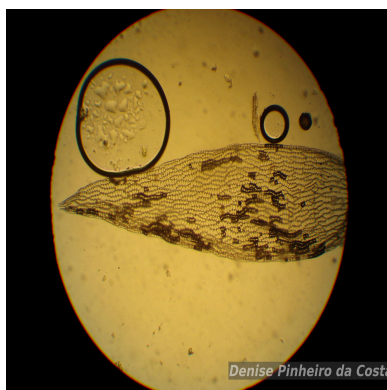


Figure 2: *Sphagnum curicuriariense* H.A.Crum & W.R.Buck

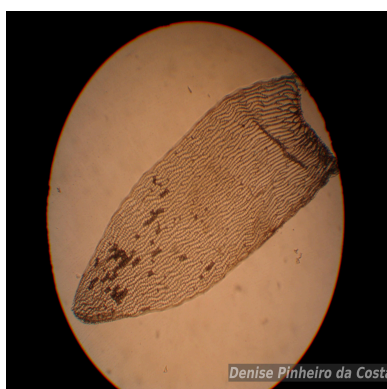


Figure 3: *Sphagnum curicuriariense* H.A.Crum & W.R.Buck

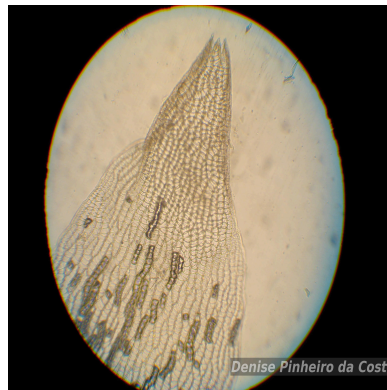


Figure 4: *Sphagnum curicuriariense* H.A.Crum & W.R.Buck

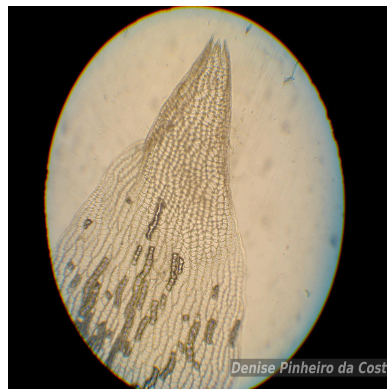


Figure 5: *Sphagnum curicuriariense* H.A.Crum & W.R.Buck

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 11: 1-142.

Sphagnum cuspidatum Ehrh. ex Hoffm.

Has as synonym

heterotypic *Sphagnum lonchophyllum* Müll. Hal.

heterotypic *Sphagnum sordidum* Müll. Hal. ex Warnst.

heterotypic *Sphagnum subundulatum* Müll. Hal. ex Warnst.

DESCRIPTION

Sphagnum cuspidatum Ehrh. ex Hoffm., Deutsch. Fl. 2: 22. 1796. Type: Germany, *Anon s.n.* (Holotype: LINN ?).

Plants slender, median-sized, branches spreading often falcate, green to yellow, often tinged with red, red-brown or brown. **Branches** 5 per fascicle (2 spreading and 2-3 pendent). **Stem leaves** triangular-ovate, acute to apiculate, **leucocysts** rarely septate or porose. **Branch leaves** ovate-lanceolate to lanceolate, rarely weakly serrulate along the margins, on the outer surface surface with small round pores at apex; **chlorocysts** in cross section triangular to trapezoidal, broadly exposed on the outer surface and slightly exposed on the inner surface.

COMMENTS

Distribution and ecology: It presents a wide distribution in the world and in Brazil, occurring from norther to southern region (AM, BA, ES, GO, MG, PR, RJ, RS, SC, SP) in four Brazilian biomes, moist or rocks.

Comments: It is characteristic for this species the pairing of the branches-young shoots between the rays of the chapter, as well as the branch leaves waved when dry and serrulate near the apex. It is similar to *Sphagnum recurvum* differing by the stem leaves eroded and fringed at apex, by the radiated arrangement of the branches in the chapter, and wavy branch leaves.

Life Form

foliose, Mat

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest, Central Brazilian Savanna, Atlantic Rainforest, Pampa

Vegetation Types

Grassland, Highland Rocky Field, Cerrado (lato sensu), Seasonally Deciduous Forest, Ombrophyllous Forest (Tropical Rain Forest), Coastal Forest (Restinga)

Geographic Distribution

Confirmed occurrences

North (Amazonas)

Northeast (Bahia)

Central-west (Goiás)

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)

South (Paraná, Rio Grande do Sul, Santa Catarina)


HERBARIUM MATERIAL

Carmem L.F. Ichaso, 187, RB, 133559,   (RB00684304), Rio de Janeiro

D.F. Peralta, 11907, RB,  (RB01188688), Minas Gerais

A.R. Reitz, 4660, NY, Santa Catarina

H.S. Irwin, 32375, DUKE, NY, Bahia

Santos, N.D. & Costa, D.P., 751, 752, RB, Rio de Janeiro
Wasum, R.A. et al., 2572, HUCCS, Rio Grande do Sul
Yano, O. & T. Yano, 10525, SP, São Paulo
A.C. Brade, 19987, RB, Espírito Santo
Costa, D.P. et al., 4139, RB, Minas Gerais
Costa, D.P. et al., 5932, RB, Amazonas
D.P. Costa, 5992, RB,  (RB01099056), Rio de Janeiro

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum cyclophyllum Sull. & Lesq.

Has as synonym

heterotypic *Sphagnum caldense* var. *scorpioides* Müll. Hal.

heterotypic *Sphagnum caldense* Müll. Hal.

DESCRIPTION

Sphagnum cyclophyllum Sull. & Lesq., *Man. Bot. Northern United States, Sec. Ed.* 611. 1856 (Sullivant 1856). Type: USA, in arenosis humidis per montes Alabamae, *Sullivant & Lesquerelle* 5, Ex. Musci Boreali-Americani no5 (syntypes: BM, NY).

Plants small, erect or procumbent, green or yellowish, capitulum not developed. **Branches** generally single (sometimes sparsely branched). **Stems** brown to black. **Stem and branch leaves** very similar, broadly ovate, apex rounded and toothed, bordered by 1-2 rows of linear cells, in cross section **leucocysts** on the outer surface with small round pores along the commissures, on the inner surface uniporose or aporose.

COMMENTS

Ecology and distribution: Occurs in the Americas (Crum 1984). In Brazil is encountered in *Campo Rupestre*, Savanna, and Atlantic Rainforest, 250-1400 m, on swampy soils or humid rocks.

Comments: According to Crum (1984), the species has this name because of the leaves broad, almost circular. The species has the stem not fasciculate, most single or sometimes sparsely branched, the branches are generally single, and the leucocysts in the outer surface, the pores occasional may be inclosed by a partition, following the curved outline of the pores but connecting cross fibrils.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

Central-west (Goiás, Mato Grosso)

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)

South (Paraná, Santa Catarina)

HERBARIUM MATERIAL

R.M. Harley, 24663, SP, Bahia

Penha, L.T., 592, HUEFS, Espírito Santo

H.S. Irwin, 32727, PC, Goiás

Imaguie, N., 581, MBM, Paraná

D.M.Vital, 7613, SP, Minas Gerais

G. Hatschbach, 59158, CEPEC, Santa Catarina

Lindberg, s.n., PC (PC0099980)
A.F.M. Glaziou, 7040, PC, Rio de Janeiro

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 11: 1-142.

Sphagnum delamboeyense Schäf.-Verw.

DESCRIPTION

Sphagnum delamboeyense Schäf.-Verw., *Nova Hedwigia* 67: 412. 1998. Type: BRAZIL. Mato Grosso, Chapada dos Guimarães, NE von Cuiabá, Schluchtwald bei der "Cachoeirinha", an sickerfeuchter Felswand, 15°28'S, 55°49'W, 600 m, 4 Jul 1989, A. Schafer-Verwimp & Verwimp 11319 (Holotype: MICH, Isotypes: NY, Herb. Schäfer-Verwimp, SP).

Plants slender, light green. **Branches** in fascicles of 2-3 (1-2 spreading and 1 pendent). **Stem** dark red-brown.

Stem leaves triangular, rounded-obtuse, shorter than the branch leaves, with few pores. **Branch leaves** larger, ovate, apex rounded, smooth, in cross section **chlorocysts** barrel-shaped, widely exposed on both surfaces, **leucocysts** slightly convex on both surfaces, many pores rounded-elliptical in continuous commissural rows on both surfaces.

COMMENTS

Distribution and ecology: Endemic to Brazil, occurring in Savanna, between 600-1000 m, on moist rock in cliff or shade soil.

Comments: It is characterized by the plants slender, scarcely forming a capitulum, branches tapered, stem leaves triangular shorter than the ovate branch leaves, branch leaves with many pores on both surfaces, and stem leaves with fewer, larger, rounded pores. In the original description, the stem present 3 branches per fascicule, but the isotype showed only 2 branches per fascicle.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna

Vegetation Types

Cerrado (lato sensu)

Geographic Distribution

Confirmed occurrences

North (Tocantins)

Central-west (Distrito Federal, Mato Grosso)

HERBARIUM MATERIAL

C.G. Pereira, 558, UB, Distrito Federal

A. Schafer-Verwimp & I. Verwimp, 11317, SP, Mato Grosso

J. Cordeiro, 2653, SP, Tocantins

Schäfer-Verwimp, A., 11319, MICH, SP, NY, SV, Mato Grosso, **Typus**

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. *Syst. Bot. Monograph* 11: 1-142.

Sphagnum dimorphophyllum H.A.Crum & W.R.Buck

DESCRIPTION

Sphagnum dimorphophyllum H.A. Crum & W.R. Buck, *Brittonia* 44: 451. 1992. Type: Brazil, Amazonas, Rio Negro, between Manaus and São Gabriel, along shores of the Rio Curicuriari and Igarapé Branco (Rio Cariua), from the Rio Curicuriari to Cachoeira de Bôto (Cachoeira Piraiuara), 00°20'S, 66°55'W, on soil bank of Rio Curicuriari, 14 Jul 1979, W.R. Buck 2561 (MICH, holotype; INPA, NY, isotypes).

Plants small, yellow. **Branches** in fascicle of 3. **Stem leaves** oblong-triangular, concave, roughened at the apex, bordered, **leucocysts** undivided, fibrillose on the outer surface, with many rounded oblong pores in the upper and few to the base on the inner surface without fibrils and pores or gaps. **Branch leaves** concave, ovate, acuminate, bordered, **leucocysts** with many rounded-elliptic commissural pores on the outer surface, without pores on the inner surface, occasionally 1-2 pseudopores, chlorocysts in cross section convex on the outer surface and almost plane in the inner surface.

COMMENTS

Distribution and ecology: Endemic to Brazil, occurring in the Amazon Forest and Savanna, 0-2800 m, growing on soil banks. This species seems to be restricted to the Amazonia domain, being common in the *tepui* mountains.

Comments: In Brazil, is similar to *S. ornatum* differing by the stem leaves oblong-triangular (not oblong), with apex obtuse, not roughened at the back (roughened at the back), and margin entire (not fringed); the branch leaves narrowly ovate to ovate, gradually acuminate (not ovate and concave); the leucocysts with pores grouped of 2-3 at adjacent angles on the outer surface (not on the inner surface).

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Amazon Rainforest

Vegetation Types

Riverine Forest and/or Gallery Forest, Terra Firme Forest

Geographic Distribution

Confirmed occurrences

North (Amazonas, Pará, Roraima)

HERBARIUM MATERIAL

A. DUCKE, s.n., RB, Pará

D.P. Costa et al., 6039, RB, Roraima

Costa, D.P. & Martinelli, G., 5372, RB, Amazonas

Costa, D.P. et al., 5573, RB, Amazonas

Buck, W.R., 2561, MICH, NY, INPA, Amazonas, **Typus**

FIELD IMAGES / ILLUSTRATIONS

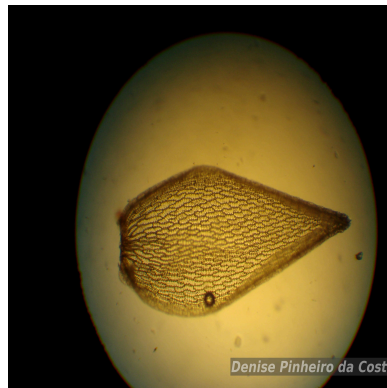


Figure 1: *Sphagnum dimorphophyllum* H.A.Crum & W.R.Buck



Figure 2: *Sphagnum dimorphophyllum* H.A.Crum & W.R.Buck

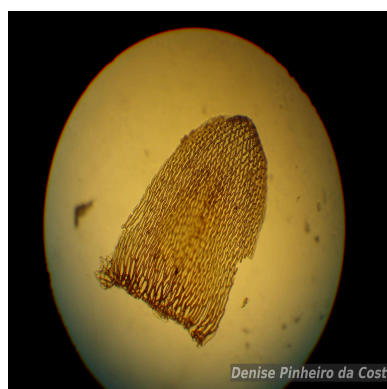


Figure 3: *Sphagnum dimorphophyllum* H.A.Crum & W.R.Buck

REFERENCE

Crum, H.A. & Buck, W.R. 1992. *Sphagna* of the 1979 Projeto Flora Amazônica expedition. *Brittonia* 44: 448-460.

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum divisum H.A.Crum

DESCRIPTION

Sphagnum divisum H.A. Crum, *Bryologist* 95: 424. 1992. Type: BRAZIL. Goiás, rooted in soil-filled crevices among rocks, shade, Gallery Forest, Córrego Itaquera, ca. 30 km N of Formosa, 850 m, 2 May 1966, *H.S. Irwin, R. Souza, J.W. Grear & R. Reis dos Santos 15562* (Holotype: MICH, isotypes: NY, SP, UB).

Plants slender, pale-yellowish. **Branches** well spaced, 3 per fascicle (2 spreading and 1 pendent). **Stem leaves** concave, oblong-ovate, rounded, cucullate, leucocysts with many poros on the inner surface. **Branch leaves** erect, concave, oblong-ovate, bordered by 1-3 rows of linear cells; in cross section **leucocysts** convex on both surfaces, with many ringed commissural pores; **chlorocysts** triangular to trapezoidal, equally exposed on both surfaces or more on the outer surface.

COMMENTS

Distribution and ecology: Endemic to Brazil, occurring in Savanna, *Campo Rupestre*, and Atlantic Rainforest, 200-2350 m, growing on humid rock or soil along streams.

Comments: According to Crum (1992), the species presents branch leaves with full-sized, ringed pores in continuous commissural rows on both surfaces, and stem leaves with leucocysts consistently divided, and pores more numerous on the inner surface than on the outer. In the original description, the plant presents 3 branches per fascicle, although studying the isotypes (NY, UB) and other collections from Brazil, it was found 2-4 branches per fascicle.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

Central-west (Distrito Federal, Goiás)

Southeast (Minas Gerais, Rio de Janeiro)

South (Paraná, Santa Catarina)

HERBARIUM MATERIAL

H.S. Irwin, 33211, NY, Goiás, **Typus**

Schäfer-Verwimp, A., 11441, RB, SV, Minas Gerais

Costa, D.P. et al., 5803, RB, Bahia

D.M. Vital, 13486, SP, Distrito Federal

A. Schäfer-Verwimp & I. Verwimp, 15125, SP, Paraná

P.I. Braga, 2797, RB, Rio de Janeiro

T.Messina, 17, RB,  (RB00930753), Minas Gerais

T.Messina, 17, RB,  (RB00930753), Minas Gerais

REFERENCE

- Crum, H.A. 1992. Miscellaneous notes on the genus *Sphagnum*. 3. New species from Brazil. *The Bryologist* 95: 419–429.
Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. *Syst. Bot. Monograph* 11: 1-142.

Sphagnum exile H.A.Crum

Has as synonym

heterotypic *Sphagnum laxiramosum* H.A.Crum

DESCRIPTION

Sphagnum exile H.A. Crum, *Contr. Univ. Michigan Herb.* 20: 135. 1995. Type: BRAZIL. Minas Gerais, km 58 an der Strasse BR-135 zwischen Jusselino Kubitschek und Diamantina, Serra do Espinhaço, 1100 m, 29 Jul 1977, *J.-P. Frahm 1841* (Holotype: MICH, isotype; ALTA).

Plants small, pale-green. **Branches** single. **Stem leaves** oblong to oblong-ovate, concave, narrowly bordered (2 rows of liner cells), **leucocysts** fibrillose with many pores on both surfaces, in continuous commissural rows on the outer surface. **Branch leaves** concave, ovate, in cross section **leucocysts** with many pores on both surfaces in continuous commissural rows, **leucocysts** convex on both surfaces, chlorocysts triangular-trapezoidal, narrowly exposed on the inner surface, more exposed on the outer surface, sometimes equally exposed on both surfaces.

COMMENTS

Distribution and ecology: Endemic to Brazil, occurring in Savanna and Atlantic Rainforest, 600-1260 m, growing at the bank road or moist rock.

Comments: According to Crum (1997), the plants are small and short, with well-spaced, laxly foliate branches that are mostly single, the stem and branch leaves are very similar with numerous pores on both surfaces, often in continuous commissural rows toward the tips. In the holotype was observed branches single or with 2 per fascicle; stem and branch leaves are not similar (ovate to oblong and cucullate, ovate, concave and acuminate-dentate, respectively); pores disposed in discontinuous commissural rows on both surfaces.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

High Altitude Grassland, Cerrado (lato sensu), Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Central-west (Goiás, Mato Grosso)

Southeast (Minas Gerais)

HERBARIUM MATERIAL

T.Messina, 32, RB,  (RB00930707), Minas Gerais

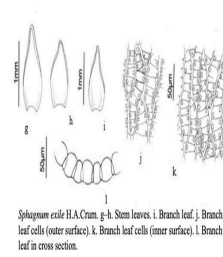
Frahm, J.P., 1865, MICH, ALTA, Minas Gerais, **Typus**

N.R. Bijos et al., 127, UB, Goiás

Schäfer-Verwimp, A. & Verwimp, 8591, MICH, Mato Grosso

T. Messina & D.P. Costa, 32, RB, Minas Gerais

FIELD IMAGES / ILLUSTRATIONS



Sphagnum exile H.A.Crum. g-h. Stem leaves. i. Branch leaf. j. Branch leaf cells (outer surface). k. Branch leaf cells (inner surface). l. Branch leaf in cross section.

Denise Pinheiro da Costa

Figure 1: *Sphagnum exile* H.A.Crum

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 11: 1-142.

Sphagnum exquisitum H.A.Crum

DESCRIPTION

Sphagnum exquisitum H.A. Crum, Bryologist 95: 420. 1992. Type: BRAZIL. Serra da Mantiqueira, nahe Serra das Agulhas Negras, 2300 m, 28 Feb-1 Mar 1984, K. Kubitzki 84-8 (Holotype: NY, Isotype: MICH).

Plants very small, yellowish. **Branches** very short in fascicles of 3-4 (2 spreading and 1-2 pendent). **Stem and branch leaves similar**. **Stem leaves** broadly elliptic, rounded, bordered by 1-2 rows of linear cells toward base. **Branch leaves** elliptic to ovate, concave, acute to broadly pointed, bordered (1-2 rows of linear cells); in cross section **leucocysts** fibrillose, pores elliptic in continuous commissural rows on the outer surface, few pores on the inner surface; **chlorocysts** triangular, exposed on inner surface.

COMMENTS

Distribution and ecology: Endemic from southeastern and southern of Brazil (ES, MG, PR, RJ, SP), occurring in the Atlantic Rainforest and *Campo Rupestre*, 400-2890 m on soil, rocks or rocky hillside with streams.

Comments: According to Crum (1992), the species resembles *S. ramulinum* Warnst., but in the latter the chlorocysts of branch leaves are barrel-shape and exposed on both surfaces and the leucocysts of stem and branch leaves fibrillose only in upper portions.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)

South (Paraná)


HERBARIUM MATERIAL

Schäfer-Verwimp, A. & Verwimp, 10028, RB, DUKE, Minas Gerais

Kubitzki, K., 84-8, MICH, NY, Rio de Janeiro, **Typus**

Schäfer-Verwimp, A., 9020, RB, São Paulo

Schäfer-Verwimp, A., 9020, RB, São Paulo

M.C. Vaughan Bandeira, s.n., RB, 245653,  (RB00684351), Rio de Janeiro

T.Messina, 2, RB,  (RB00930738), Minas Gerais

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 11: 1-142.

Sphagnum frahmii H.A.Crum

DESCRIPTION

Sphagnum frahmii H.A. Crum, Contr. Univ. Michigan Herb. 21: 159. 1997. Type: Brazil, São Paulo: an der Küstenstrabe SP 55 zwischen Peruibe und Itahaem, feuchter Restingawald und anschließende offene Sandflächen, ca. 5 m, 17 Jul 1977, *J.-P. Frahm 1874* (holotype: MICH, isotype: ALTA).

Plants with the wood cylinder very dark red-brown, almost black. **Stem leaves** rounded and planar, som times slightly cucullate, with leucocysts e fibrillose. **Branch leaves** not roughened and denticulate at that back of the apex, **chlorocysts** central and included, narrowly exposed on the inner surface (slight thickening of the end walls), and leucocytes with few pores on the outer surface.

COMMENTS

Distribution and ecology: Endemic to Brazil, encountered in the *Restinga*, Atlantic Rainforest and *Campo Rupestre*, 0-1310 m, on moist soil along rivers or on rocks. According to the current distribution of this species, is expected to be found in other areas of the Atlantic Raniforest in Brazil.

Comments: Crum (1995) described this taxon based on three collections without designated the holotype or the herbarium (publication not considered valid). Then, Crum (1997) published a new protologue designating the holotype (*J.-P. Frahm 1874*) and the herbarium (MICH). In Brazil, is similar to *S. alegrense*, differing from it by having branch leaves not roughened and denticulate at the back of the apex, and the leucocysts on the outer surface with few pores (often one pore) at angles.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest), Coastal Forest (Restinga)

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)


Southeast (Minas Gerais, São Paulo)

South (Paraná)

HERBARIUM MATERIAL

Assis, E.L.M., 1107, RB, Bahia

Gomes, M., 3396, RB, Minas Gerais

T. Messina, 19, RB,  (RB00930755), Minas Gerais

O.S. Ribas, 1113, MBM, Paraná

Frahm, J.-P., 1874, MICH, São Paulo, **Typus**

Geraldo C. Pinto, s.n., RB,  (RB01355978), Bahia

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum garysmithii H.A.Crum

DESCRIPTION

Sphagnum garysmithii H.A. Crum, J. Hattori Bot. Lab. 63: 85. 1987. Type: BRAZIL. Goiás: in wet sedge meadow at margin of gallery, gallery bordered by wet campo (brejo), ca. 10 km N of Alto do Paraíso, Chapada dos Veadeiros, ca. 1100 m, 24 Mar 1971, H.S. Irwin, R.M. Harley & G.L. Smith 33181 (Holotype MICH, syntype NY!).

Plants robust, brownish, in dense cushions. **Branches** single. **Stem and branch leaves similar** (shape and cells detail). **Stem leaves** elliptic, rounded, narrowly bordered by linear cells, leucocysts with many ringed, elliptic pores along the commissures, 3-7 unringed pores in a medium row, and pseudopores and pores in continuous commissural rows on the inner surface. **Branch leaves** elliptic, rounded, in cross section **leucocysts** plane, with ringed, elliptic pores along the commissures and median rows of unringed pores on the outer surface, and ringed pseudopores and pores and ringed pores in commissural rows on the inner surface; chlorocysts rectangular and exposed on both surfaces.

COMMENTS

Distribution and ecology: Endemic of Brazil (DF, GO, MG), occurring in Savanna (Gallery Forest), 1000-1250 m, on moist soil.

Comments: In Brazil, this taxon is restricted to Savanna vegetation, occurring above 1000 m.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna

Vegetation Types

Cerrado (lato sensu), Riverine Forest and/or Gallery Forest

Geographic Distribution

Confirmed occurrences

Central-west (Distrito Federal, Goiás)

Southeast (Minas Gerais)

HERBARIUM MATERIAL

Pinheiro, E.M.L., 57, UB, Goiás

D.F. Peralta, 11690, RB,  (RB01188683), Minas Gerais

D.F. Peralta, 11690, RB,  (RB01188683), Minas Gerais

T.Messina, 40, RB,  (RB00930715), Minas Gerais

Novelino, R., s.n., SP, Distrito Federal

H.S. Irwin, 33181, NY, MICH, Goiás, **Typus**

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 11: 1-142.

Sphagnum geraisense H.A.Crum

DESCRIPTION

Sphagnum geraisense H.A. Crum, Bryologist 95: 424. 1992. Type: BRAZIL. Minas Gerais: Município São Roque de Minas, PARNA da Serra da Canastra, Cachoeira Casca D'Anta, ca. 20°18'S, 46°31'W, along river and top of waterfall, 1200 m, 19 Sep 1984, D.M. Vital & W.R. Buck 11917 (Holotype: MICH, isotypes: NY, SP).

Plants slender, reddish-brown. Stem leaves triangular, concave, bordered, leucocysts fibrillose or not. Branches in fascicle of 3 (2 spreading, 1 pendent). Branch leaves oblong-ovate, concave, bordered, with many pores and/or pseudopores on the outer surface, in cross section **chlorocysts** with lumen central or near the outer surface, narrowly and almost equally exposed on both surfaces, **leucocysts** with many pores in continuous commissural rows on both surfaces, nearly plane or somewhat convex.

COMMENTS

Distribution and ecology: Endemic of Brazil (MG, RJ, SC), occurring in Savanna and Atlantic Rainforest, 200-2500 m, on humid rock, rock along river, and rock of waterfall. The current distribution may not reflect the real one in Brazil, being expected new collections from SE and S regions.

Comments: According to Crum (1992) in this species the stem leaves are triangular-concave, with leucocysts fibrillose and porose on both surfaces near the apex, and by the beadlike rows of commissural pores on both dorsal and ventral surfaces of branch leaves.

Life Form

foliose, Tuft

Substrate

Saxicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest

Geographic Distribution

Confirmed occurrences

Southeast (Minas Gerais, Rio de Janeiro)

South (Santa Catarina)

HERBARIUM MATERIAL

A.R. Reitz, 2457, HBR, F, Santa Catarina

Pontual, I., 71-1072, SP, Rio de Janeiro

D. M. Vital, 11971, SP, MICH, NY, Minas Gerais, **Typus**

A.R. Reitz, 2457, MBM, PACA, BM, Santa Catarina

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 11: 1-142.

Sphagnum globicephalum Müll. Hal. ex Warnst.

DESCRIPTION

Sphagnum globicephalum Müll. Hal. ex Warnst., Das Pflanzenreich 51: 398. 1911 (Sphagnol. Univ. 398. 65 D).

Type: BRAZIL. Santa Catarina: Serra do Oratório, *E. Ule 814* (lectotype designated by Costa (2021): PC 0100140, isolectotype B).

Plants slender, yellow-bronw. **Branches** single or ending in a globose terminal bud formed by crowded and imbricated leaves. **Stem and branch leaves** similar. **Stem leaves** imbricate, broadly elliptic, crownled at the apex, cucullate, concave, bordered. **Branch leaves** rounded, cucullate, bordered, in cross section **leucocysts** almost plane on both surfaces, with few to numerous pores on both surfaces; **chrorocysts** triangular to trapezoidal, included in the inner surface and exposed on the outer surface.

COMMENTS

Distribution and ecology: Endemic to southeastern and southern of Brazil (RJ, RS, SC), occurring in the Atlantic Rainforest (Ombrophyllous Dense Forest and Ombrophyllous Mixed Forest), 900-2500 m, on wet soil.

Comments: This taxon is restricted to the southern region and considered rare because it was only known from old collections from Santa Catarina and Rio de Janeiro states, being cited here after ca. 100 years for the states of Rio Grande do Sul and Santa Catarina.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest


Geographic Distribution

Confirmed occurrences

Southeast (Rio de Janeiro)

South (Santa Catarina)

HERBARIUM MATERIAL

Schafer-Verwimp, 10506, RB, 534776,  (RB00684333), Santa Catarina

Ule, E., 137, B, Santa Catarina, **Typus**

Schafer-Verwimp, A., 10506, RB, Santa Catarina

Ule, E., s.n., B, Santa Catarina, **Typus**

Ule, E., 184, B, PC, Santa Catarina, **Typus**

A.F.M. Glaziou, 7043, 7043:, Rio de Janeiro

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum gracilescens Hampe ex. Müll. Hal.

This treatment is composed of the following taxa: *Sphagnum gracilescens*, *Sphagnum gracilescens* var. *gracilescens*.

Has as synonym

homotype *Sphagnum submolluscum* Hampe

DESCRIPTION

Sphagnum gracilescens Hampe ex. Müll. Hal., Bot. Zeit. 20: 327. 1862. Type: BRASILIA. prope Petrópolis, H. Döring s.n. (syntypes BM?, NY, PC).

Plants greenish or brownish, in tufts. **Branches** short, 2-4 per fascicle (2 spreading and 1-2 pendent). **Stem and branch leaves** vary in length, with pores on the dorsal surface, mainly near leaf tips. **Stem leaves** oblong-lingulate, narrowly truncate and toothed apex, narrowly bordered. **Branch leaves** oblong-lanceolate, with ringed pores crowded in commissural rows on the outer surface and without pores or only few pores at corners on the inner surface; in cross section **chlorocysts** narrowly to broadly triangular to trapezoidal, exposed on both surfaces, more or less triangular and broadly exposed on the inner surface, **leucocysts** plane on the inner surface and bulging on the outer surface.

COMMENTS

Distribution and ecology: Tropical America (Colombia, Venezuela, and Brazil). Brazil (AM, BA, CE, DF, ES, MG, PR, RJ, RS, SC, SP) in the Amazon Forest (tepui vegetation), Savanna (Gallery Forest), *Campo Rupestre*, and Atlantic Rainforest, 200-2500 m, on humid soil or rock.

Comments: In Brazil this species is common presenting a widespread distribution and occurring in almost all biomes and regions.

Life Form

foliose, Mat, Tuft

Substrate

Rupicolous, Saxicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Amazon Rainforest, Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest, Amazonian Savanna

Geographic Distribution

Confirmed occurrences

North (Amazonas)

Northeast (Bahia, Ceará)

Central-west (Distrito Federal)

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)

South (Paraná, Rio Grande do Sul, Santa Catarina)

HERBARIUM MATERIAL

Döring, H., s.n., BM, Rio de Janeiro, **Typus**

G. Hatschbach, 52128, NY, Paraná
L.B. Smith, 9065, R, Santa Catarina
Wasum, R.A. et al., 7460, NY, Rio Grande do Sul
D.F. Peralta, 6426, RB,  (RB00921039), Minas Gerais
Bandeira, 159, RB, 259536, , , ,  (RB00684412), Rio de Janeiro
J.M.A. Braga, 5223, RB, 339689,  (RB00684411), Rio de Janeiro
Buck, W.R., 27034, 27056, NY, Minas Gerais
S.A. Mori, 16687, NY, Distrito Federal
H.S. Irwin, 32593, NY, Bahia
M.C. Vaughan Bandeira, 787, RB, 245630,  (RB00684332), Rio de Janeiro
Schäfer-Verwimp, A., 6919, MO, São Paulo

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum gracilescens Müll. Hal. var. *gracilescens*

Has as synonym

heterotypic *Sphagnum gracilescens* var. *submolluscum* (Hampe) Warnst.

DESCRIPTION

Sphagnum gracilescens Hampe ex. Müll. Hal., Bot. Zeit. 20: 327. 1862. Type: BRASIL, prope Petrópolis, H. Döring s.n. (Holotype BM?).

Plants erect, greenish, yellowish or brownish tufts. **Branches** short, in fascicle of 2–4 (2 spreading and 1–2 pendent). **Stem leaves** oblong–lingulate, 1.3–1.8 mm long, narrowly truncate and toothed apex, narrowly bordered by linear cells; **leucocysts** on the outer surface with numerous ringed pores in continuous commissural rows, on the inner surface with few pores or none. **Branch leaves** oblong–lanceolate, 1.1–3.0 mm long; **leucocysts** on the outer surface with ringed pores in continuous or discontinuous commissural rows, on the inner surface without pores or with few pores at corners; **chlorocysts** in cross section narrowly to broadly triangular to trapezoidal, exposed on both surfaces, broadly exposed on the inner surface; **leucocysts** in cross section plane on the inner surface and bulging on the outer surface

COMMENTS

Distribution and ecology: Tropical America (Colombia, Venezuela, and Brazil). In Brazil is encountered in the Amazon Forest, Savanna, *Campo Rupestre*, and Atlantic Rainforest, 200–2500 m, on humid soils or rocks, in the states of AM, BA, CE, DF, ES, MG, PR, RJ, RS, SC, SP.

Comments: This species is common in Brazil, with widespread distribution in almost all biomes and regions.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Amazon Rainforest, Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest, Amazonian Savanna

Geographic Distribution

Confirmed occurrences

North (Amazonas)

Northeast (Bahia, Ceará)

Central-west (Distrito Federal)

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)

South (Paraná, Rio Grande do Sul, Santa Catarina)

HERBARIUM MATERIAL

Döring, H., s.n., BM, Rio de Janeiro, **Typus**

S.A. Mori, 16687, NY, Distrito Federal

Buck, W.R., 26417, NY, São Paulo

Sphagnum harleyi H.A.Crum

DESCRIPTION

Sphagnum harleyi H.A. Crum, J. Hattori Bot. Lab. 63: 80. 1987. Type: BRAZIL. Bahia: Serra do Tombador, forming cushions on soil beneath projecting, sandstone ledges above brink of nearly dry fall of Rio Ferro Doido, ca. 18 km E. of Morro do Chapéu, ca. 1100 m, 21 Feb 1971, *H.S. Irwin, R.M. Harley and G.L. Smith 30752* (Holotype NY, syntypes RB, UB, US).

Plants small and slender, pale-brown. **Branches** in fascicles of two. **Branch leaves** roughened at the apex back and serrulate-bordered by resorption furrow, with large, rounded pores grouped in 3's at the adjacent angles, as well as commissural pseudopores, on the outer surface.

COMMENTS

Distribution and ecology: Endemic to Brazil (BA), occurring in the *Campo Rupestre*, 600-1100 m, on soil in cushions above brink of nearly dry falls.

Comments: In Brazil is considered a rare species, restricted to the Bahia State, but is expected to be found in other areas or other states with *Campos Rupestre* vegetation.

Life Form

Cushion, foliose

Substrate

Rupicolous

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Highland Rocky Field

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

HERBARIUM MATERIAL

H.S. Irwin, 30752, RB, NY, US, Bahia, **Typus**

E.B. Valente, 823, HUEFS, Bahia

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum homophyllum H.A.Crum

DESCRIPTION

Sphagnum homophyllum H.A.Crum (Subgenus *Subsecunda*), Bryologist 95: 425. 1992.—TYPE: BRAZIL. Santa Catarina, North of Curitiba, km 215.3 of BR 116, 24 km north of junction with SC-453 to Leblon Regis, 26°52'S, 50°17'W, 1010 m, along hwy. on seepy sandstone outcrops with east aspect – mats of *Sphagnum* prevalent – and above on level area, disturbed, on sandy soil, 4 Sep 1977, D.H. Vitt 21020 (holotype: MICH!).

According to Crum (1997), *Sphagnum homophyllum*, *S. subhomophyllum* and *S. pluriporosum* are similar, with *S. homophyllum* and *S. pluriporosum* having median pores, not pseudopores; in *S. homophyllum*, the branch leaves show chlorocysts exposed on both surfaces in cross section, while the chlorocysts in *S. pluriporosum* are central and included.

COMMENTS

Comments: Encountered in the Atlantic Rainforest, ca. 1000 m, on sandy soils. Endemic to Brazil and only known from the type collection.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Mixed Ombrophylous Forest

Geographic Distribution

Confirmed occurrences

South (Santa Catarina)

HERBARIUM MATERIAL

Vitt, D.H., 21020, MICH, Santa Catarina, **Typus**

REFERENCE

Crum, H. A. 1992. Miscellaneous notes on the genus *Sphagnum*. 3. New species from Brazil. *The Bryologist* 95: 419–429

Crum, H. A. 1997. Miscellaneous notes on *Sphagnum*. 10. *Contributions from the University of Michigan Herbarium* 21: 147–159.

Sphagnum imbricatum Hornsch.

DESCRIPTION

Sphagnum imbricatum Hornsch. ex Russ., Arch. Naturk. Liv-Ehst-Kurlands ser. 2, Biol. Naturk. 7: 99. 1865. Type: CHILE. Chiloé (Holotype B ?, presumed destroyed).

Plants medium to robust, green to pale-green. **Stem leaves** flat, lingulate, fringed at the upper region of the rounded apex.

Branches in fascicles of 4 (2 pendent and 2 spreading). **Branch leaves** broadly-ovate, strongly cucullate above (1/3 upper), apex rough at back, denticulate-bordered, with elliptic, rounded pores along the commissures on the upper cells of the outer surface and large rounded medium pores on upper cells of the inner surface; **chlorocysts** in cross section broadly-triangular, broadly exposed on the inner surface; **leucocysts** flat on the inner surface, bulging on the outer surface, with side walls ornamented by comb fibrils.

COMMENTS

Distribution and ecology: widespread throughout the world. In Brazil occurring in PR and SP, in the Atlantic Rainforest, 650-850 m, on humid soil or rocks along streams.

Comments: It is a widespread species in the world, being recently cited to Central and South America (Crum 1990). In Brazil is considered a rare and possible threatened species, because it is restricted to São Paulo and Paraná states, being only known by three collections done between 1982 and 1993, in localities of the Atlantic Rainforest, that nowadays are urban areas.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest

Geographic Distribution

Confirmed occurrences

Southeast (São Paulo)

South (Paraná)

HERBARIUM MATERIAL

Yano, O., 5201a, RB, São Paulo

Yano, O., 5244, SP, Paraná

FIELD IMAGES / ILLUSTRATIONS



Figure 1: *Sphagnum imbricatum* Hornsch.

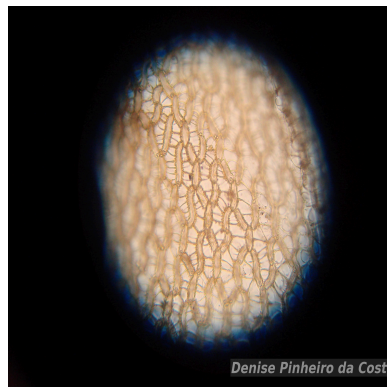


Figure 2: *Sphagnum imbricatum* Hornsch.

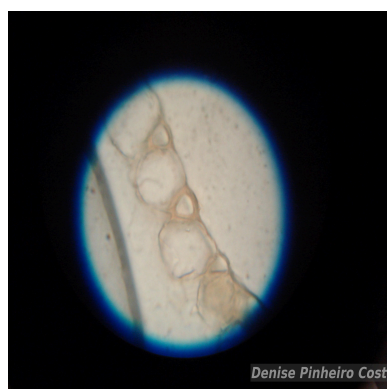


Figure 3: *Sphagnum imbricatum* Hornsch.

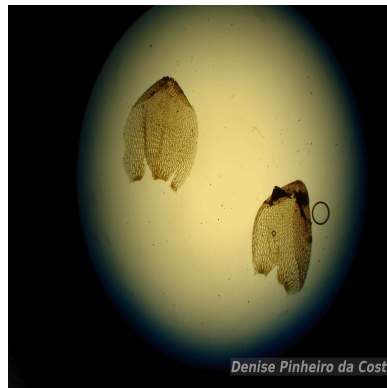


Figure 4: *Sphagnum imbricatum* Hornsch.

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum irwinii H.A.Crum

DESCRIPTION

Sphagnum irwinii H.A. Crum, J. Hattori Bot. Lab. 63: 77. 1987. Type: BRAZIL. Goiás: Chapada dos Veadeiros, on sand in seep area beside riacho, gallery forest and adjacent wet campo (*brejo*), ca. 20 km N of Alto do Paraíso, ca. 1250 m, 19 Mar 1971, H.S. Irwin, R.M. Harley & G.L. Smith 32684 (Holotype MICH, syntypes NY, UB).

Plants slender and yellowish. **Branches** with many fascicles (4-7). **Branch leaves** with chlorocysts (in cross section) triangular and exposed only on the inner surface, being bulging on the outer surface with the side walls densely papillose, sometimes with small median pores and many commissural or pseudopores on the inner surface.

COMMENTS

Distribution and ecology: Endemic to Brazil (GO, MG), occurring in Savanna (Gallery Forest) and *Campo Rupestre*, 1000-1250 m, on sand soil on gallery forest or rocky slope.

Comments: In Brazil is restricted to Savanna and *Campo Rupestre* vegetation, and according to its actual distribution is expected new collections from middle-western and southeastern regions with these vegetations types.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Riverine Forest and/or Gallery Forest

Geographic Distribution

Confirmed occurrences

Central-west (Goiás)

Southeast (Minas Gerais)

HERBARIUM MATERIAL

H.S. Irwin, 32684, MICH, NY, Goiás, **Typus**

D.M. Vital, 7695, SP, Minas Gerais

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum laxulum H.A.Crum

DESCRIPTION

Sphagnum laxulum H.A. Crum, Contr. Univ. Michigan Herb. 20: 136. 1995. Type: BRAZIL. Minas Gerais: an der Straße MG 55 zwischen Morro do Pilar und São Sebastião, Ufer des Rio Peixe, 650 m, 31 Jul 1977, J.-P. Frahm 1865 (Holotype MICH, isotype NY).

Plants medium-sized, pale brownish, with stem very slender and **branches single**, well-spaced and loosely foliate. **Stem and branch leaves** similar. **Stem leaves** lingulate, concave, rounded at the apex, bordered. **Branch leaves** broadly oblong-ovate, strongly concave, in cross section **leucocysts** convex or plane on both surface, with many small rounded-elliptic pores in commissural rows on the outer surface, with 1-2 pseudopores at angles or commissures or none pores on the inner surface; chlorocysts narrowly fusiform, exposed on both surfaces.

COMMENTS

Distribution and ecology: Endemic to Brazil, occurring in the Atlantic Rainforest (Semi-deciduous Forest) and Savanna (Gallery Forest), 650-1160 m, on banks soil, sometimes submerged on small lagoons.

Comments: This taxon is not common in Brazil, but according its actual distribution (BA, GO, MG, TO) it is expected to be found in other regions of Brazil.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Seasonally Semideciduous Forest

Geographic Distribution

Confirmed occurrences

North (Tocantins)

Northeast (Bahia)

Central-west (Goiás)

Southeast (Minas Gerais)

HERBARIUM MATERIAL

T.B. Cavalcanti, 3001, ALCB, Tocantins

Frahm, J.P., 1865, NY, MICH, Minas Gerais, **Typus**

J. Ballejos, 2140, ALCB, Bahia

D.F. Peralta et al., 12214, SP, Goiás

T.B. Cavalcanti, 3001, RB,  (RB01355837), Tocantins

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum leoni H.A.Crum

DESCRIPTION

Sphagnum leonii H.A. Crum, *Pabstia* 4: 1. 1994. Type: Brazil, Minas Gerais, Parque Estadual do Brigadeiro, Serra Araponga, Fazenda Neblina, 20°43'S, 42°29'W, 1300 m, 25 Mar 1993, L.S. Leoni 2170 (Holotype: GFJP; syntypes: CEPEC, MICH, NY, RB, SP).

Characterized by narrow, distinctly secund branch leaves and narrowly triangular stem leaves. **Leucocysts** of the stem leaves have fibril thickenings near the leaf apex and on the outer surface, with numerous, round, median, pore-like gaps. **Leucocysts** of the branch leaves have pores in commissural rows only on the outer surface.

COMMENTS

Comments: I only study the type specimens, and no other collections were found of this taxa, so I could not judge variations, and I preferred to not include it in the synopses. Encountered in the Atlantic Rainforest, ca. 1300 m, on soil, forming soft tufts. It is endemic to Brazil.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Seasonally Semideciduous Forest

Geographic Distribution

Confirmed occurrences

Southeast (Minas Gerais)

HERBARIUM MATERIAL

L.S. Leoni, 2170, CEPEC, SP, RB, MICH, Minas Gerais, **Typus**

Sphagnum longicomosum Müll. Hal. ex Warnst.

DESCRIPTION

Sphagnum longicomosum Müll. Hal. ex Warnst., Bot. Jahrb. 27: 257. 1900. Type: Brazil, Rio de Janeiro, restinga de Jacarepaguá, Apr 1895, E. Ule 2031 (Holotype: B, presumed destroyed).

Plants medium sized, slender, yellowish. **Branches** in fascicles of 2(–4). **Stem leaves** elliptic to oblong–ovate, 1.3–2.0 mm long, slightly cucullate, rounded, obtuse, bordered by linear cells (3–4 rows); **leucocysts** undivided, on the outer surface with small, ringed pores or pseudopores, few or numerous in discontinuous commissural rows, on the inner surface with few small pseudopores at angles and commissures. **Branch leaves** erect–spreading, ovate–lanceolate to oblong–ovate, 1.1–2.0 mm long, broadly pointed; **leucocysts** on the outer surface with small, ringed pores in commissural rows, on the inner surface with numerous small, ringed pseudopores at commissures; **chlorocysts** in cross section barrel–shaped, or slightly triangular–trapezoidal, more exposed on the inner surface or equally exposed on both surfaces.

COMMENTS

Distribution and ecology: Endemic to Brazil (DF, GO, MG, ES, PR, RJ, RS, SP), occurring in Savanna, *Restinga* and Atlantic Rainforest, 0–2320 m, on rocks and soil.

Comments: This species is common in Brazil, and new collections are expected from the mid–western, southeastern, and southern regions of that country.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

High Altitude Grassland, Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Seasonally Semideciduous Forest, Ombrophylous Forest (Tropical Rain Forest), Coastal Forest (*Restinga*)

Geographic Distribution

Confirmed occurrences

Central-west (Distrito Federal, Goiás)

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)

South (Paraná, Rio Grande do Sul)

HERBARIUM MATERIAL

L.T. Penha, 592, RB,  (RB01355969), Espírito Santo

Vitt, D.H., 21523, NY, Rio de Janeiro

Schäfer-Verwimp, A., 106016, SV, Rio Grande do Sul

Schäfer-Verwimp, A. & Verwimp, 9626, RB, São Paulo

Schäfer-Verwimp, A., 11453, RB, Minas Gerais

Ule, E., 2031, B, Rio de Janeiro, **Typus**

H.S. Irwin, 14151, NY, Distrito Federal
N.D. Santos, 720, RB, 454084,  (RB00503260), Rio de Janeiro

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum longistolo Müll. Hal.

Has as synonym

heterotypic *Sphagnum weddelianum* Besch. ex Warnst.

DESCRIPTION

Sphagnum longistolo Müll. Hal. ex Warnst., Hedwigia 36: 169. 1897. Type: Brazil, Rio de Janeiro: in Sümpfen, Dec 1891, *E. Ule 1227* (lectotype: HBG designated by Lange [1979], isolectotype: CHR).

Plants with single branches, wood cylinder red-brown, and cortical cells of stems and branches apically porose and efrilllose. **Stem leaves** (like the branch leaves) concave, bordered by a resorption furrow, with **leucocysts** porose and fibrillose throughout. **Leucocysts** of the branch leaves moderately convex on both surfaces.

COMMENTS

Distribution and ecology: Brasil and Peru (Crum 1990, 1993). In Brazil is encountered in the Atlantic Rainforest, *Campo Rupestre* vegetation, 100-2500 m. On moist soils or rocks with small amount of humus.

Comments: In Brazil is similar to *S. subsecundoides* from the Amazon Forest, differing by having the chlorocysts of the branch leaves elliptic, central, and entirely included (not exposed on the inner surface), and leucocysts slightly convex on the inner surface, distinctly so on the outer surface (not convex on both surfaces and more strongly on the outer surface). It is widespread in the Atlantic Rainforest of Brazil, occurring from the northeastern to southern region and also in *Campos Rupestre* vegetation, being more common above 700 m.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Seasonally Deciduous Forest, Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)

South (Paraná, Santa Catarina)

HERBARIUM MATERIAL

Yano, O. et al., 4940, SP, Espírito Santo

Schäfer-Verwimp, A. & Verwimp, 8415, SV, São Paulo


Costa, D.P. et al., 355, RB, Rio de Janeiro







Valente, E.B., 1468, HUEFS, Bahia

Silva, J.M. et al., 1364, MBM, Paraná

Vital, D.M., 821, SP, Minas Gerais

Yano, O. et al., 8596, SP, São Paulo

C. Baez, 695, RB,  (RB01181440), Rio de Janeiro

Ule, E., 1227, HBG, Rio de Janeiro, **Typus**
D.F. Peralta, 6815, RB,  (RB00920806), Minas Gerais
D.F. Peralta, 6815, RB,  (RB00920806), Minas Gerais
C. Baez, 695, RB,  (RB01181440), Rio de Janeiro
C. Baez, 695, RB,  (RB01181440), Rio de Janeiro
C. Baez, 695, RB,  (RB01181440), Rio de Janeiro
C. Baez, 695, RB,  (RB01181440), Rio de Janeiro

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum luetzelburgii H.K.G.Paul ex H.A.Crum

DESCRIPTION

Sphagnum luetzelburgii H.K.G. Paul ex H.A. Crum, Contr. Univ. Michigan Herb. 23: 109. 200. Type: Brazil, Rio de Janeiro: Serra dos Órgãos, Schlucht auf der Südseite des Morro Assu, Jul 1915, *P. Luetzelburg 7012* (holotype MICH; isotype M).

Plants short, dark brown, with spreading branches. **Stem leaves** with broad pores on the outer surface, both commissural and median, the median pores are nearly as wide as the cells and often arranged in short rows. **Branch leaves** with smaller pores in continuous commissural rows on the outer surface and few median pores, with few or no pores on the inner surface and sometimes short rows of pseudopores partitioned off at the commissures.

COMMENTS

Distribution and ecology: Endemic to Brazil (RJ, SC). Encountered in the Atlantic Rainforest, 1600-2000 m, on soil and rocks.

Comments: *Sphagnum luetzelburgii* appears to be restricted to high altitudes in the Atlantic Rainforest of southeastern and southern Brazil, with new collections being expected from mountains in those regions.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Southeast (Rio de Janeiro)

South (Santa Catarina)

HERBARIUM MATERIAL

D.F. Peralta et al., 7973, SP, Santa Catarina

D.P. Costa, 4173, RB, Rio de Janeiro

P. Luetzelburg, 7012, MICH, M, Rio de Janeiro, **Typus**

P. Luetzelburg, 7068, HBR, F, Rio de Janeiro

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum magellanicum Brid.

Has as synonym

heterotypic *Sphagnum medium* Limpr.

heterotypic *Sphagnum tursum* Müll. Hal.

heterotypic *Sphagnum vesiculare* Müll. Hal. ex Warnst.

DESCRIPTION

Sphagnum magellanicum Brid., Musc. Recent. 2: 24. 1798. Type: Chile, "in Fretto Magellanico habitat unde a Commerfono allatum in Phytophylacio Parifienci vidi" (lectotype designated by Hassel et al.: E 00826825; syntypes: BM, PC 0105092).

Plants reddish-purple when growing directly sunlight. **Branch leaves** broad, cucullate, concave, rough at the back of the apex, and narrowly denticulate-bordered owing to marginal resorption, in cross section **leucocysts** flat on both surfaces and **cholrocysts** central and entirely included.

COMMENTS

Distribution and ecology: Widespread in South America and the Northern Hemisphere (Crum 1993). In Brazil is encountered in the Amazon Forest, Atlantic Rainforest, Savanna, *Campo Rupestre*, *Restinga*, and Steppe vegetation, 0-2350 m, on moist soil, in swamps, along stream margins and banks, or on sandstone.

Comments: *Sphagnum magellanicum* is a widespread species in Brazil, occurring in almost all of its biomes (except the *Caatinga* and *Pantanal*), and common in *Campo Rupestre* vegetation in the southeastern region of that country.

Life Form

Cushion, foliose, Tuft

Substrate

Saxicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest, Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

High Altitude Grassland, Grassland, Highland Rocky Field, Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Terra Firme Forest, Seasonally Semideciduous Forest, Ombrophylloous Forest (Tropical Rain Forest), Coastal Forest (*Restinga*), Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

North (Amazonas, Rondônia, Roraima)

Northeast (Bahia)

Central-west (Mato Grosso do Sul)

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)

South (Paraná, Rio Grande do Sul, Santa Catarina)

Possible occurrences


Central-west (Distrito Federal)

HERBARIUM MATERIAL

A.R. Reitz, 2279, HBR, F, Santa Catarina

Nelson, B., 21587, SP, Roraima

Yano, O., 1269, RB, São Paulo

Sehnem, A., 2892, NY, Rio Grande do Sul
Buck, W.R., 26854, NY, Bahia
Buck, W.R., 26651, NY, Minas Gerais
Dusén, P., 15483, NY, HBR, Paraná
V.J. Pott, 8306, SP, Mato Grosso do Sul
J.F. Ramos, 16100, NY, Amazonas
Vitt, D.H., 21454, NY, Rio de Janeiro
Ule, 7-b, PC (PC0101651)
E. Guimarães, 89, RB,  (RB00684420), Rio de Janeiro

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum matogrossense H.A.Crum

DESCRIPTION

Sphagnum matogrossense H.A.Crum, Novon 12: 441. 2002. TYPE: BRAZIL. Mato Grosso: Ponte da Pedra, Jun 1909, F.C. Hoehne 2147 (holotype: M; isotype: R).

Plants small, pale brown, dense tufts. **Branches** single or in fascicles of 1–2 (1 spreading and 1 pendent). **Stem leaves** lingulate, apex rounded and fringed; **leucocysts** not divided, porose, on the outer surface with few round, ringed pores at commissures and small gaps or pores, on the inner surface with small, unringed pores and gaps. **Branch leaves** concave-pointed, ovate-acuminate, cucullate, concave, margin denticulate; **leucocysts** in cross-section bulging on both surfaces, on the outer surface with 3–5 small, rounded, ringed pores at ends and commissures, grouped in 3's adjacent angles, on the inner surface with 1–5 rounded-elliptic pores at ends, corners and commissures, and small gaps; **chlorocysts** in cross-section lenticular, exposed on both surfaces.

COMMENTS

Comments: It is only known from the type collection and it is very similar to *S. vitalii*.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna

Vegetation Types

Cerrado (lato sensu)

Geographic Distribution

Confirmed occurrences

Central-west (Mato Grosso)

HERBARIUM MATERIAL

F.C. Hoehne, 2147, R, M, Mato Grosso, **Typus**

Sphagnum microcuspidatum H.A.Crum

DESCRIPTION

Sphagnum microcuspidatum H.A. Crum, J. Hattori Bot. Lab. 63: 82. 1987. Tipo: Brasil. Rio Grande do Sul, Taimbé, São Francisco de Paula, in campo paludoso, 900 m, 14 Fev 1956, A. Sehnem 6816 (holotype: MICH, syntypes: MO, PACA). Plants small, slender, yellowish. Stem leaves triangular to lingulate, apex acute, broadly-bordered above, not broad at base. Branches in fascicles of 4 (1 short pendent and 3 spreading). Branch leaves undulate when dry, lingulate to lanceolate, pointed, broadly bordered by 4-11 rows of linear cells above; leucocysts convex, with 3-5 small rounded pores at ends, corners and middle cells; chlorocysts in cross section retangular, exposed on both surfaces.

COMMENTS

Distribution and ecology: Endemic to Brazil (RJ, RS), occurring restinga and steppe, between 0-900 m, growing submerged at lagoa margins, being considered rare in Brazil, since was described by Crum (1987) based on a collection made by Sehnem in 1956 in southern region. Cited to other localities in the Rio Grande do Sul state, and for the first time to Rio de Janeiro State, in *Restinga* vegetation, at sea level. Its current known distribution may not reflect its true distribution.

Comments: It is similar to *Sphagnum cuspidatum*, differing by the smaller plants; branch leaves plane, long-triangular to triangular-lingulate, strongly bordered above, planar; 4 branches per fascicle, 3 spreading and 1 pendent.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest, Pampa

Vegetation Types

Grassland, Coastal Forest (Restinga)

Geographic Distribution

Confirmed occurrences

Southeast (Rio de Janeiro)


South (Rio Grande do Sul)

HERBARIUM MATERIAL

M.L. Lorscheiter, s.n., RB, Rio Grande do Sul

A. Sehnem, 6816, PACA, MO, MICH, Rio Grande do Sul, **Typus**

Imbassahy, C.A.A. et al., 338p.p, RB, Rio de Janeiro

M.L. Lorscheiter, s.n., RB,  (RB00922852), Rio Grande do Sul

REFERENCE

Crum, H.A. 1987. New species of Sphagnuj from South America. J. Hattori Bot. Lab. 63: 82.

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum mirabile Müll. Hal. & Warnst.

DESCRIPTION

Sphagnum mirabile Müll. Hal. and Warnst., Hedwigia 36: 161. 1897. Type: Brazil, Minas Gerais, Serra do Caraça, 1400 m, Mar 1892, E. Ule 1287 (Holotype: CHR, holotype; syntype: LE).

— Endemic to Brazil and only known from the type specimen. **Stem leaves** more or less triangular or oblong-triangular, with rounded and eroded apex, and **leucocysts** with few pores and variously reduced fibrils in the upper one-third or less, leucocysts of the **branch leaves** have fibrils reduced or lacking, and pores crowded in commissural rows on the outer surface, discontinuous on the inner surface; **chlorocysts** narrowly lenticular, few exposed on both surfaces.

COMMENTS

Comments: Species that I could only study the types and as I could not judge variations, I preferred not include it in Flora of Brazil. When Müller (1897) described *S. mirabile* he considered it a form of *S. rotundifolium* Müll. Hal. in Warnst., a species described for Rio de Janeiro State, Serra do Itatiaia, 2100 m, by the same author in the same paper. Both taxa are endemic to Brazil and only known from the type collections, with the recent efforts to find those species in their type localities (Serra do Caraça and Serra do Itatiaia) did not result in new collections.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Seasonally Semideciduous Forest

Geographic Distribution

Confirmed occurrences

Southeast (Minas Gerais)

HERBARIUM MATERIAL

E.H.G. Ule, 1287, CHR, LE, Minas Gerais, **Typus**

Sphagnum molle Sull.

DESCRIPTION

Sphagnum molle Sull., *Musci Allegh.* 205. 1846. Type: USA. Carolina superior: ad summum scopulum, mirabilem, Devil's Court House dictum, W.S. Sullivant 205, 1845 (Holotype MO 406774, syntypes BM, NY).

Plants green or yellowish, growing in cushions. **Stem leaves** oblong-ovate and flat except at the broad, apex almost rounded; weakly bordered at the base; leucocysts without fibrils but with membrane pleats on the outer surface and large gaps on the inner (with one gap occupying most of the cell, or sometimes with two to three smaller ones). **Branch leaves** very concave and broadly pointed, marginal resorption remarkable, leucocysts conspicuously bulging on the outer surface and perforated by large, "half-elliptic" pores adjoining the commissures.

COMMENTS

Distribution and ecology: widespread throughout the world. In Brazil, it is known for Rio de Janeiro State, fort Atlantic Rainforest, ca. 2000 m, growing on soil, humid areas of high-altitude fields vegetation.

Comments: According to Crum (1984), this taxon grows in soft, low, whitish, yellowish, green or sometimes pinkish cushions, or in more extensive carpets. In Brazil is considered one species rare and restricted to the high-altitude fields of Atlantic Rainforest.

Life Form

Cushion, foliose, Tuft

Substrate

Rupicolous

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest), Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

Southeast (Rio de Janeiro, São Paulo)

HERBARIUM MATERIAL

F.C. Hoehne, 133a, SP, São Paulo

G. Martinelli, s.n., RB, Rio de Janeiro

Sphagnum multiporosum H.A.Crum

DESCRIPTION

Sphagnum multiporosum H.A. Crum, J. Hattori Bot. Lab. 63: 78. 1987. Type: Brazil: Rio Grande do Sul, Taimbé prope São Francisco de Paula, in campo paludoso, 900 m, 14 Fev 1956, A. Sehnem 6818 (holotype: MICH, isotypes: MO, PACA).

Branches in fascicle of 3. **Stem leaves** flat and smooth at back, different from the branch leaves, margins fringed or bordered with a resorption furrow, leucocysts porose on the outer surface, pores are only numerous on the lower portion of the stem leaf.

Leucocysts of the branch leaves with three pores at adjacent angles on the outer surface and 2-4 pseudopores on the inner surface, elliptic and narrowly exposed on the inner surface.

COMMENTS

Distribution and ecology: Endemic to Brazil (BA, MG, PR, RS, SC, SP), occurring in Steppe and Atlantic Rainforest, 400-1700 m, on moist soil.

Comments: It is similar to *S. palustre* in Brazil, differing by the branches with fascicles of 3 (not 4-5 as in *S. multiporosum*), stem leaves flat and smooth at the back of the apex (not broad-ovate and fringed at the back of the apex), margins of the stem leaves fringed or bordered by a resorption furrow (not denticulate), and chlorocysts of the branch leaves elliptic and narrowly exposed on the inner surface (not triangular).

Life Form

Cushion, foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest, Pampa

Vegetation Types

Grassland, Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

Southeast (Minas Gerais, Rio de Janeiro, São Paulo)

South (Paraná, Rio Grande do Sul, Santa Catarina)

HERBARIUM MATERIAL

A.B. Joly, 1130, SP, São Paulo

M. Santos, 2084, ALCB, Bahia

A. Sehnem, 6818, MO, MICH, PACA, Rio Grande do Sul, **Typus**

Krüger, L., 2, SP, Paraná

Barros, A.A.M., 1194, RFFP, Minas Gerais

A. Sehnem, 6992, PACA, Santa Catarina

Bastos, C.J.P., s.n., SP, Bahia

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum negrense Mitt.

DESCRIPTION

Sphagnum negrense Mitt., J. Linn. Soc. London Bot. 12: 624. 1869. Type: Brazil, Amazonas, Rio Negro, in rupibus humidis cataractarum de São Gabriel, 1852, R. Spruce 1507 (lectotype: NY 00226884 designated by Crum [1990]; isolectotype: BM 000724284).

Stem leaves similar to branch leaves, oblong to elliptic, slightly cucullate and roughened at the back of the apex. Branches in fascicle of 3 (2 spreading and 1 pendent). Branch leaves ovate to oblong-ovate, leucocysts with 8-16 small commissural pores on the outer surface and few to numerous round pores at the corners and commissures on the inner surface, chlorocysts (in cross section) triangular to trapezoidal and more exposed on the inner surface.

COMMENTS

Distribution and ecology: Brazil (Amazonas State: Rio Negro); Venezuela, Guiana (Monte Roraima), and Colombia. In Brazil is found in the Amazon Forest, at sea level, on exposed soil and rocks.

Comments: *Sphagnum negrense* is restricted to Amazonas State, on the Negro River, being only known by old collections made by Spruce, and is considered a rare and Endangered species (EN - B1ab (i, ii, iv)), as a taxon with a restricted geographic range, a small extent of occurrence (less than 5000 km²), and small numbers of localities (four collections undertaken in the type locality more than 100 years ago).

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest

Vegetation Types

Terra Firme Forest

Geographic Distribution

Confirmed occurrences

North (Amazonas)

HERBARIUM MATERIAL

R. Spruce, 1508, BM, PC, Amazonas

R. Spruce, 1510, PC (PC0100387), **Typus**

R. Spruce, 1510, PC (PC0100388), **Typus**

R. Spruce, 1507, NY, Amazonas, **Typus**

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum obliquefibrosum H.A.Crum

DESCRIPTION

Sphagnum obliquefibrosum H.A. Crum, *Bryologist* 95: 426. 1992. Type: Brazil, Santa Catarina: 14 km E of Ponta Serrada on BR 282, km 107, 26°55'S, 51°56'W, 1110 m, in swampy lowlands with thick, tall tussock grasses and sedges, *Sphagnum* spp. in depressions between and at base of tussocks, also on exposed soil along edge of swamp where grasses were burned, 6 Sep 1977, D.H. Vitt 21148 (MICH holotype; NY isotype).

Plants small to medium-sized, pale, yellowish or green, with branches tapering, stem and branch leaves similar, with broad borders and minute, rounded pores in abundance on the inner surfaces. **Stem and branch leaves similar.** **Stem leaves** oblong to oblong-triangular, bordered, fibrillose throughout, with numerous, rounded and diminute pores on the inner surface. **Branch leaves** oblong-ovate, apex dentate and broadly truncate, bordered by 4-6 rows of linear cells, in cross section leucocysts plane on the outer surface and slightly convex on the inner surface, triangular and narrowly exposed on the outer surface, without pores and pseudopores, on the inner surface with numerous minute pores at angles and commissures; chlorocysts triangular, narrowly exposed on the outer surface.

COMMENTS

Distribution and ecology: Endemic to Brazil, encountered in the Atlantic Rainforest and *Campo Rupestre*, 1110-2200 m, in swamps or on rocks.

Comments: This species has a discontinuous distribution in the mountains of the Atlantic Rainforest in Brazil, considered here to be rare and restricted to high elevations (above 1100 m). Its occurrence is expected in other mountains of other states.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

Southeast (Minas Gerais)

South (Rio Grande do Sul, Santa Catarina)

HERBARIUM MATERIAL

H.S.Irwin et al., 32595, NY, Bahia

Frahm, J.P., 1843, MO, Rio Grande do Sul

Vitt, D.H., 21148, MICH, NY, Santa Catarina, **Typus**

D. Sucre, 5795, RB, Minas Gerais

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum ornatum H.A.Crum

DESCRIPTION

Sphagnum ornatum H.A. Crum, Cryptog. Bryol. Lichénol. 6: 181. 1985. Type: Brazil, Cerro da Neblina, Venezuelan-Brazilian Frontier, Planície de Zuloaga, Rio Titirico, terrestrial, around small weathered sandstone outcrops above swampy savanna, 2300 m, 10-15 Oct 1970, J.A. Steyermark 103890 (holotype: MICH, isotype: NY).

Plants reddish-brown or purplish-brown, stem dark brown. **Branches** in fascicles of 2-3 (1-2 spreading and 1 pendent). **Stem leaves** smaller than branch leaves, differentiated in shape and structure, elliptic to oblong, concave, cucullate, fringed and roughened at the back of the apex. **Branch leaves** loosely arranged, ovate or oblong-lanceolate, cucullate, in cross section **chlorocysts** elliptic to barrel-shaped, central and included or narrowly exposed on both surfaces, often more broadly exposed on inner surface.

COMMENTS

Distribution and ecology: Brazil (AM, BA, RR), Guyana, and Venezuela (Crum 1985). In Brazil is encountered in the Amazon Forest and *Campo Rupestre* vegetation, 600-2300 m, occurring on soil near stone outcrops above swamps or rocky granitic seeps.

Life Form

Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest

Vegetation Types

Highland Rocky Field, Riverine Forest and/or Gallery Forest, Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

North (Amazonas, Roraima)

Northeast (Bahia)

HERBARIUM MATERIAL

J.A. Steyermark, 103890, MICH, NY, Amazonas, **Typus**

C.E. Zartman, 7628, RB,  (RB01187934), Amazonas

Zartmann, C., 7628/7633/7672/7673, RB, Amazonas

Costa, D.P., 5809, RB, Bahia

Boom, B.M. et. al., 1167, NY, Bahia

J. Ballejas, 2065, RB,  (RB01355959), Bahia

D.P.Costa, 5384, RB,  (RB00650724), Amazonas

Sphagnum palustre L.

This treatment is composed of the following taxa: *Sphagnum palustre*, .

Has as synonym

heterotypic *Sphagnum biforme* Warnst.

heterotypic *Sphagnum brachycladum* Müll. Hal. ex Warnst.

heterotypic *Sphagnum cymbifolium* (Ehrh.) Hedw.

DESCRIPTION

Sphagnum palustre L., Sp. Pl. 2: 1106. 1753. Type: Europe, paludibus profundis sylvaticis, *Linnaeus* (holotype: S).

Plants yellowish or brownish, with broad branch leaves, hooded and roughened at the apex, denticulate along a marginal resorption furrow. **Branch in fascicles** of 4(-5). Cortical cells of the **stems and branches** are spirally fibrillose, cells of the stem cortex with 2-7 pores or more. **Stem leaves** broad-ovate, lingulate-rounded, fringed at the back of the apex, margin denticulate by a resorption furrow. **Chlorocysts** of the branch leaves, in cross section, narrowly triangular, more exposed on the inner surface; **leucocysts** on the outer surface with 2-3 robust pores rounded to elliptic, ringed at angles and along commissures.

COMMENTS

Distribution and ecology: Widespread globally. In Brazil is encountered in the Amazon Forest, Atlantic Rainforest, *Restinga*, Savanna, *Campo Rupestre*, and Steppe, 0-1950 m, occurring on soil, in swamps, submerged in lagoons and streams, on moist rocks, or in bogs.

Comments: *Sphagnum palustre* is a widespread species in Brazil, occurring in almost all biomes and regions of that country, expected to be found in other states in the mid-western region and in the northeastern region.

Life Form

Cushion, foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest, Central Brazilian Savanna, Atlantic Rainforest, Pampa, Pantanal

Vegetation Types

High Altitude Grassland, Grassland, Highland Rocky Field, Cerrado (lato sensu), Seasonally Deciduous Forest, Seasonally Semideciduous Forest, Ombrophylous Forest (Tropical Rain Forest), Mixed Ombrophylous Forest, Coastal Forest (*Restinga*), Amazonian Savanna, Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

North (Amazonas, Amapá, Pará, Rondônia, Roraima)

Northeast (Bahia, Ceará, Paraíba, Pernambuco, Sergipe)

Central-west (Goiás, Mato Grosso do Sul)





Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)

South (Paraná, Rio Grande do Sul, Santa Catarina)

HERBARIUM MATERIAL

W.A. Egler, 1448, MG, Amapá

G.T. Prance, 4517, MG, Roraima

Kozera, C., 3418, NY, Paraná
Gonzatti, F, Gonzatti, F, FURB (FURB55336), Santa Catarina
D.A. Lima, s.n., SP, Pernambuco
D.P. Costa et al., 6087, RB, Roraima
G.T. Prance, 5417, SP, Amazonas
Gonzatti, F., 747, FURB (FURB60281), Rio Grande do Sul
D.F. Peralta, 6813, RB,  (RB00920891), Minas Gerais
D.F. Peralta, 11836, RB,  (RB01188681), Minas Gerais
T.Messina, 10, RB,  (RB00930746), Minas Gerais
Wasum, R., s.n., HUCS, Rio Grande do Sul
Wasum, R., s.n., HUCS, Pará
Costa, D.P., 5994, RB, Rio de Janeiro
T. Messina & D.P. Costa, 10, RB, Minas Gerais
Ballejos, J., 1582, ALBC, Bahia
F. Gonzatti, 747, RB,  (RB01376472), Rio Grande do Sul

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum papillosum Lindb.

Has as synonym

heterotypic *Sphagnum itacolumitis* Müll. Hal. ex Warnst.

DESCRIPTION

Sphagnum papillosum Lindb., Acta Soc. Sci. Fenn. 10: 280. 1872. Type: Finland, Helsingfors, Fredriksberg, 14 Aug 1867, *S.O. Lindberg s.n.* (lectotype: H-SOL, isolectotypes: KRYPTO-S, S-PA).

Plants small to medium, yellowish or brownish, in dense clumps. *Branches* in fascicles of 2 (1 spreading and 1 pendent). **Stem leaves** oblong-elliptic, cucullate, concave. Branch leaves oblong-ovate, in cross section with chlorocysts narrowly elliptic to narrowly trapezoidal or triangular, equally exposed on both surfaces (inner and outer surface), sometimes more exposed on the inner surface; leucocysts are bulging and more exposed on the outer surface, adjacent walls densely to finely papillose, with elliptic pseudopores at commissures and adjacent angles, on the inner surface with 2-6 small pseudopores along the commissures and larger, round pores toward margins.

COMMENTS

Distribution and ecology: Widespread globally. In Brazil is encountered in the Atlantic Rainforest and *Campo Rupestre* of Minas Gerais State, ca. 1000 m, occurring on rocks with humus, on wet soils, frequent in highland areas.

Comments: Yano et al. (1985) cited different collections for Bahia, Minas Gerais, and Rio de Janeiro states, but they belong to other species: 1) Minas Gerais State, Serra do Caraça, *Vital 7695*, is *S. irwinii*, and *Hoehne 395*, is *S. brasiliense*; 2) Rio de Janeiro State, PARNA Itatiaia, *Pontual 21-I-1971*, is *S. geraisense*, and *Pontual 71-1079* is *S. longicomosum*.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Ombrophylous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Southeast (Minas Gerais)

HERBARIUM MATERIAL

Amaral, M.C.E., s.n., SP, Minas Gerais

Ule, E., 1302, RB, B, Minas Gerais

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum paranense H.A.Crum

DESCRIPTION

Sphagnum paranense H.A. Crum, J. Hattori Bot. Lab. 77: 244. 1994. Type: Brazil, Paraná, Município de Porto Amazonas, along between Palmeiras and Curitiba, plants on wet stream bank, 20 Apr 1974, D. Griffin and D.M. Vital 114 (Holotype: MICH, syntypes: FLAS, SP).

According to Crum (1994), it is similar to *S. longicomosum*, differing by its small stature, dark stems, single branch, stem leaves larger than branch leaves, broad-elliptic, eroded at the apex, with an abundance of commissural pores on the outer surface of the leucocysts but rather few on the inner surface.

COMMENTS

Comments: Only the type could be studied, making it difficult to evaluate if this taxon is a new synonym of *S. longicomosum*, a widespread species in Brazil and here it is excluded.

Distribution and ecology: Endemic to Brazil and only known from the type collection, encountered in the Atlantic Rainforest, ca. 790 m, on humid soil banks.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Mixed Ombrophylous Forest

Geographic Distribution

Confirmed occurrences

South (Paraná)

HERBARIUM MATERIAL

Griffin III, D., 114, MICH, SP, FLAS, Paraná, **Typus**

Sphagnum parcoramosum H.A.Crum

DESCRIPTION

Sphagnum parcoramosum H.A. Crum, *J. Hattori Bot. Lab.* 63: 87. 1987. TYPE: Brazil, Rio Grande do Sul: Cambará do Sul, Fortaleza, ad terram udam fere in aqua, 1200 m, 27 Dec 1977, A. Sehnem 15690 (MO holotype; MICH, PACA isotypes).

Plants small, with a tumid appearance because of the crowded leaves at the ends of short, pale yellowish. **Branches** single and short. **Stem and branch leaves** similar in size and structure. **Stem leaves** broadly rounded to rounded elliptic, strongly concave, bordered by 1-2 rows of linear cells. **Branch leaves** strongly concave, in cross section leucocysts plane on the outer surface and convex on the inner surface, with few rounded pseudofores on the outer surface; **chlorocysts** triangular to trapezoidal, exposed equally or more broadly on the outer surface.

COMMENTS

Distribution and ecology: Endemic to Brazil (RS, SC) is encountered in the Atlantic Rainforest, 0-1200 m, on moist soil.

Comments: This species seems to be restricted to southern region in Brazil.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophylous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

South (Rio Grande do Sul, Santa Catarina)

HERBARIUM MATERIAL

A. Sehnem, 15690, MICH, MO, PACA, Rio Grande do Sul, **Typus**

A.R. Reitz, 2887, PACA, Santa Catarina

R. Bueno, 3292, ICN, Rio Grande do Sul

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. *Syst. Bot. Monograph* 111: 1-142.

Sphagnum perforatum Warnst.

This treatment is composed of the following taxa: *Sphagnum perforatum*, .

DESCRIPTION

Sphagnum perforatum Warnst., *Hedwigia* 30: 23. 1891. Type: Brazil, Minas Gerais: Caldas, A.F. Regnell s.n. (H-BR holotype).

Plants medium-sized, pale, with stem and branch leaves similar, ovate, elliptic to oblong. **Branch leaves** oblong-ovate, with pores in continuous commissural rows on the outer surface, with pores and pseudopores on the inner surface, in cross section **leucocysts** in cross section almost rectangular, exposed on both surface or more broadly on the inner surface, chlorocysts narrowly rectangular, exposed on both surfaces, or more exposed on the inner surface.

COMMENTS

Distribution and ecology: Endemic to Brazil, encountered in the *Campor Rupestre*, Savanna, and Atlantic Rainforest (GO, MG, PR, RJ), 600-2500 m, on humid soil or rocks.

Comments: In Brazil this species is disjunct between mid-western and southeaster/southern regions.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Seasonally Semideciduous Forest, Ombrophylous Forest (Tropical Rain Forest), Mixed Ombrophylous Forest

Geographic Distribution

Confirmed occurrences

Central-west (Goiás)

Southeast (Minas Gerais, Rio de Janeiro, São Paulo)

South (Paraná)

HERBARIUM MATERIAL

Costa, D.P. et al., 5017, RB, Rio de Janeiro

A.F. Regnell, s.n., HBR, Minas Gerais, **Typus**

E. Ule, 1296, CHR, Goiás

Weis, J., s.n., PC, Paraná

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum perichaetiale Hampe

Has as synonym

heterotypic *Sphagnum bahiense* Warnst.
 heterotypic *Sphagnum carneum* Müll. Hal. & Warnst.
 heterotypic *Sphagnum erythrocalyx* Hampe
 heterotypic *Sphagnum heterophyllum* Warnst.
 heterotypic *Sphagnum negrescens* Warnst.
 heterotypic *Sphagnum orgaosense* Warnst.
 heterotypic *Sphagnum ouopretense* Müll. Hal. ex Warnst.
 heterotypic *Sphagnum paranae* Warnst.
 heterotypic *Sphagnum puiggarii* Müll. Hal.
 heterotypic *Sphagnum santosense* Warnst.
 heterotypic *Sphagnum subbrachycladum* Müll. Hal.
 heterotypic *Sphagnum suberythrocalyx* Müll. Hal. ex Warnst.
 heterotypic *Sphagnum subtursum* Müll. Hal.

DESCRIPTION

Sphagnum perichaetiale Hampe, Linnaea 20: 66. 1847. Type: Brazil, Rio de Janeiro: *Beyrich s.n.* (syntypes: BM 000918524, BM 000918525)

Plants moderate-size, pale reddish to orange-brown, tinged with pink or red, in dense cushions. **Stem leaves** lingulate, apex rounded and fringed. **Branch** in fascicles of 4-5 (2 spreading and 2-3 pendent). **Branch leaves** ovate, pointed, roughened at the back of the apex, in cross section **leucocysts** convex on both surfaces, without membrane pleats on the outer surface, with 2-3 pseudopores in groups at adjacent angles, **chlorocysts** narrowly rectangular or lenticular, equally exposed on both surfaces or more on inner surface.

COMMENTS

Distribution and ecology: widespread globally (Crum 1993). In Brazil is encountered in the Amazon Forest, Atlantic Rainforest, Savanna, *Campo Rupestre*, *Restinga*, and Steppe, 0-2500 m, on wet soils, rocks, and in swamps.

Comments: It is a widespread species in Brazil, occurring in almost all its biomes and regions. According to Crum (1980), it is similar to *S. magellanicum* differing from the latter by having papillae on the inner walls of leucocysts, adjacent to the chlorocysts.

Life Form

Cushion, foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest, Central Brazilian Savanna, Atlantic Rainforest, Pampa

Vegetation Types


Grassland, Highland Rocky Field, Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Terra Firme Forest, Seasonally Semideciduous Forest, Ombrophylous Forest (Tropical Rain Forest), Mixed Ombrophylous Forest, Coastal Forest (*Restinga*), Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

North (Amazonas, Amapá, Pará, Rondônia, Roraima)
Northeast (Bahia, Ceará, Paraíba, Pernambuco, Sergipe)
Central-west (Distrito Federal, Mato Grosso do Sul, Mato Grosso)
Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)
South (Paraná, Rio Grande do Sul, Santa Catarina)

HERBARIUM MATERIAL

C. C. Berg, PI9558, NY, Amazonas
G.T. Prance, 21587, NY, Roraima
Bandeira, M.C.V., 610, RB, Rio de Janeiro
Wasum, R. et al., 8606, HUCCS, Rio Grande do Sul
Reese, W.D., 13573, NY, Rondônia
Vitt, D.H., 21146, NY, Santa Catarina
Buck, W.R., 26444, NY, São Paulo
Smith, G.L. et. al., 32337, HBR, F, DUKE, Bahia
A.F.M. Glaziou, 4548, PC (PC0116027)
A.F.M. Glaziou, 3537, PC (PC0741897)
Vital, D.M., 37, UB, Distrito Federal
Vital, D.M. & Buck, W.R., 11914, NY, Minas Gerais
Pires, J.M., 6047, NY, UB, Pará
Beyrich, H.C., s.n., BM, Rio de Janeiro, **Typus**
Reese, W.D., 16539, NY, Mato Grosso
R. Wasum, 3097, HUCCS, Paraná
J. Ballejas, 2108, RB,  (RB01355889), Bahia

Sphagnum platyphylloides Warnst.

Has as synonym

heterotypic *Sphagnum turgescens* var. *caldense* Warnst.

DESCRIPTION

Sphagnum platyphylloides Warnst., *Hedwigia* 30: 21. 1891. Type: Brazil, Minas Gerais: Caraça, April 1885, E. Wainio s.n. (Holotype: CHR; syntypes: BM 000890630, JE).

Plants medium-sized, green, with stem and branch leaves similar in porosity, with small, rounded or rounded-elliptic pores in discontinuous commissural rows on the outer surfaces of the leucocysts, which are relatively long, narrow, and mostly septate. **Stem leaves** triangular-lingulate to lingulate. **Branches** only (1-)2 per fascicles (1 short, spreading and 1 small, pendent). **Stem and branch leaves** similar in porosity, with small, rounded or rounded-elliptic pores in discontinuous commissural rows on the outer surface. **Stem leaves** triangular-lingulate to lingulate. **Branch leaves** broadly ovate, obtuse or truncate; **leucocysts** in cross-section convex on both surfaces or more convex on the inner surface, divided, on the outer surface with numerous small, round, ringed pores in commissural rows, on the inner surface with few to numerous, small, round, unringed pores in commissural rows; **chlorocysts** in cross-section equally exposed on both surfaces or more exposed on the outer surface

COMMENTS

Distribution and ecology: Brazil and Bolivia (Herman 1976). In Brazil is encountered in the Atlantic Rainforest, *Campo Rupestre*, and Savanna (DF, ES, GO, MG, RJ), 1000-2890 m, on humid soils or shaded banks, rotting wood along rivers, or on moist rocks.

Life Form

foliose, Tuft

Substrate

Epixilous, Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Seasonally Deciduous Forest, Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Central-west (Distrito Federal, Goiás)

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro)

HERBARIUM MATERIAL

Vital, D.M. & Buck, W.R., 19813, NY, Rio de Janeiro

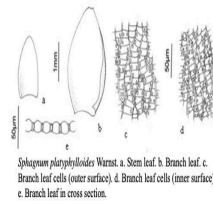
Costa, D.P. et al., 3264, RB, Goiás

D.M. Vital & W.R. Buck, 11771, NY, Espírito Santo

Schäfer-Verwimp, A., 15196, RB, Paraná

Wainio, E.A., s.n., CHR, Minas Gerais, **Typus**

FIELD IMAGES / ILLUSTRATIONS



Denise Pinheiro da Costa

Figure 1: *Sphagnum platyphylloides* Warnst.

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum pluriporosum H.A.Crum

DESCRIPTION

Sphagnum pluriporosum H.A. Crum, J. Hattori Bot. Lab. 77: 246. 1994. Type: Brazil, Minas Gerais, Município de Conceição do Mato Dentro, on rocky bank along a river, 19°04'S, 43°25'W, 31 Jul 1977, *D.M. Vital* 7578 (Holotype: MICH, isotype: SP).

Plants slender, brownish distally, wood cylinder brown. **Branches** in fascicles of 3 (1 spreading and 2 pendent). **Stem leaves** concave, narrowly triangular, bordered. **Branch leaves** ovate to oblong-lanceolate, in cross section **leucocysts** bulging on both surfaces, on the outer surface with an abundance of seriate commissural pores, and scattered median pores along the commissures, on the inner surface with numerous pores along the commissural rows; **chlorocysts** central and included.

COMMENTS

Distribution and ecology: Endemic to Brazil, encountered in Savanna, *Campo Rupestre*, Atlantic Rainforest, and *Caatinga*, 700-1250 m. In swamps, or disturbed soils, or on moist rocks along river or near waterfalls.

Comments: According to Crum (1994), this species is interesting because the leucocysts of the branch leaves have an abundance of serial commissural pores on the outer surface, with scattered median pores, and chlorocysts central and included.

Life Form

foliose, Tuft

Substrate

Rupicolous

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Caatinga, Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Caatinga (stricto sensu), Highland Rocky Field, Riverine Forest and/or Gallery Forest, Seasonally Semideciduous Forest, Mixed Ombrophylous Forest

Geographic Distribution

Confirmed occurrences

Northeast (Ceará)

Central-west (Goiás)

Southeast (Minas Gerais, Rio de Janeiro)

South (Paraná, Rio Grande do Sul, Santa Catarina)

HERBARIUM MATERIAL

D. Sucre, 4673, RB, MO, MICH, Rio de Janeiro


Costa, D.P. et al., 5147-5154, RB, São Paulo

Schäfer-Verwimp, A., 15196, RB, Paraná

H.C. Oliveira, 453, HUEFS, Ceará

D.P. Costa et al., 3252, RB, Goiás

D.M. Vital, 7578, MICH, SP, Minas Gerais, **Typus**

Schäfer-Verwimp, 15196, RB, 534751,  (RB00684261), Paraná

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum pseudoramulinum H.A.Crum

DESCRIPTION

Sphagnum pseudoramulinum H.A. Crum, *J. Hattori Bot. Lab.* 63: 88. 1987. Type: Brazil, Rio de Janeiro: Município de Itatiaia, Planalto de Itatiaia, subida das Agulhas Negras, entre 2400-2500 m, rupícola, crescendo perto de córrego, 6 Fev 1969, D. Sucre 4673 (holotype: MICH, syntypes: MO, RB 142701).

Plants slender, light brown, in loose tufts, wood cylinder brown or red-brown. **Branches** short, 4-5 per fascicle (2 spreading and 2-4 pendent), secondary branches borne near the base. **Stem and branch leaves** with large pores, closely arranged in bead-like commissural rows. **Stem leaves** oblong-ovate to oblong-lingulate, blunt or rounded concave apex, bordered by linear cells. **Branch leaves** ovate, concave, shortly pointed, narrowly bordered; in cross section **leucocysts** plane on the inner surface and convex on the outer surface, with few pores or pseudopores at ends and corner on the inner surface; **chlorocysts** elliptic, exposed on both surfaces.

COMMENTS

Distribution and ecology: Endemic to Brazil, encountered in the Atlantic Rainforest, 800-2890 m, on moist rocks or soil along small streams, and on road banks. This taxon appears to be restricted to the mountains of the Atlantic Rainforest of southeastern and southern Brazil.

Comments: According to Crum (1987), is similar to *S. ramulinum* Warnst. a species with pores on the outer surfaces of the stem and branch leaves, relatively large and closely arranged in bead-like commissural rows; the leucocysts of the stem leaves are once-divided; secondary branches borne near the base.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest), Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)

South (Rio Grande do Sul)








HERBARIUM MATERIAL


D. Sucre, 4673, MO, MICH, RB, Rio de Janeiro, **Typus**


D.M. Vital & W.R. Buck, 11761, NY, Espírito Santo

D.P. Costa et al., 5623, RB, Minas Gerais

D.P. Costa et al., 5779, RB, Rio Grande do Sul

D. Sucre, 6529, RB, 207052,        (RB00684737), Rio de Janeiro

D.P. Costa, 5152, RB, 489037,  (RB00577324), São Paulo

D.P. Costa, 5152, RB, 489037,  (RB00577324), São Paulo

Costa, D.P. et al., 5147, RB, São Paulo

Costa, D.P. et al., 5779, RB, Rio Grande do Sul
Bandeira, s.n., RB, 245713,  (RB00684878), Rio de Janeiro

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum ramulinum Warnst.

DESCRIPTION

Sphagnum ramulinum Warnst., Bot. Centralb. 76: 5. 1898. Type: Brazil, Minas Gerais: Serra de Ouro Preto, Mar 1892, E. Ule 1304 (Holotype: B presumed destroyed, syntype: LE)

Plants small to medium-sized, green or yellowish; wood cylinder yellowish-brown. **Branches** short, in fascicles of 4 (2 spreading and 2 pendent). **Stem leaves** lingulate to oblong-lingulate, cucullate, apex rounded eroded (not toothed). **Branches leaves** ovate, in cross section **leucocysts** flat, on the outer surface with numerous small, ringed commissural pores, on the inner surface with very small pores at end, and toward margin with very small ringed pores; **chlorocysts** barrel-shaped or trapezoidal.

COMMENTS

Distribution and ecology: Brazil and Peru (Crum 1987). In Brazil is encountered in Savanna and Atlantic Rainforest, 750-1200 m, on moist soils or rocks.

Comments: The species epithet refers to the secondary branches borne near the bases of the normal spreading branches. It is similar to *S. exquisitum* H.A. Crum, which has chlorocysts of the branch leaves triangular and exposed only on the inner surface. In Brazil, this species has a discontinuous distribution in the Atlantic Rainforest and Savanna, being restricted to elevations above 700 m.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

Central-west (Distrito Federal, Goiás)

Southeast (Minas Gerais, Rio de Janeiro)

HERBARIUM MATERIAL

E.H.G. Ule, 1304, LE, B, Minas Gerais, **Typus**

Vital, D.M. & Buck, W.R., 19750, NY, Rio de Janeiro

Costa, D.P., s.n., RB, Goiás

Alves, L., s.n., ALCB, Bahia

Senna et al., 6, UB, RB, Distrito Federal

C.F. Sá, 199, RB,  (RB01355843), Bahia

C.F. Sá, 199, RB,  (RB01355843), Bahia

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum recurvum P.Beauv.

This treatment is composed of the following taxa: *Sphagnum recurvum*, .

Has as synonym

heterotypic *Sphagnum pulchricoma* Müll. Hal.
 heterotypic *Sphagnum recurvum* var. *pulchricoma* P. Beauv.
 heterotypic *Sphagnum subpulchricoma* Müll. Hal.

DESCRIPTION

Sphagnum recurvum P. Beauv., Prodr. Aethéog. 88. 1805. Type: USA, South Carolina, *Bosc s.n.* (Holotype:: MICH; Isotype: NY).

Plants quite robust, pink, with a radiate arrangement of the branches in the capitulum (5-radiate). **Stem leaves** relatively large and lingulate to broadly oblong-triangular, rounded truncate, moderately to strongly erose-fringed apex. **Branch leaves** undulate at the margins when dry, bordered by 2-4 rows of narrow cells, with numerous large pores at the upper ends of leucocysts.

COMMENTS

Distribution and ecology: widespread globally (Crum 1980). In Brazil is encountered in the Atlantic Rainforest, Savanna, and *Restinga*, 0-2380 m, occurring along stream, lagoon, and cascade margins, in swamps, on moist rocks or soil.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Cerrado (lato sensu), Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest, Coastal Forest (*Restinga*)

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

Central-west (Mato Grosso)

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)


South (Paraná, Rio Grande do Sul, Santa Catarina)

HERBARIUM MATERIAL

Schnell, 8386, RB, 169887,  (RB00684414), Rio de Janeiro

M. Grizzon, 171, RB,  (RB01376469), Paraná

A.R. Reitz, 5010, NY, F, HBR, Santa Catarina




R. Wasum, s.n., RB,  (RB01355991), Rio Grande do Sul

Buck, W.R., 27060, NY, Bahia

E. Ule, s.n., MG, NY, Rio de Janeiro

Dusén, P., 15482, NY, Paraná

Wasum, R. et al., 240, NY, Rio Grande do Sul

Costa, D.P., 5627, RB, Minas Gerais
F.C. Hoehne, 2149, RB, Mato Grosso
D.M. Vital, 3129, RB, São Paulo
M.L. Lorscheitter, s.n., RB,  (RB00922855), Rio Grande do Sul
R. Wasum, s.n., RB,  (RB01355991), Rio Grande do Sul
M. Grizzon, 171, RB,  (RB01376469), Paraná
A.F.M. Glaziou, 7324, PC (PC0741894)

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum ripense H.A.Crum & W.R.Buck

DESCRIPTION

Sphagnum ripense H.A. Crum & W.R. Buck, Brittonia 44: 457. 1992. Type: Brazil, Amazonas, Rio Negro entre Manaus e São Gabriel, along the shores of the Rio Curicuriari and Igarapé Branco (Rio Cariua) from the Rio Curicuriari to Cachoeira do Bôto (Cachoeira Piraiuara), 00°20'S, 66°55'W, on seasonally submerged soil bank of Igarapé Branco, 14 Jul 1979, W.R. Buck 2544 (Holotype: MICH, isotypes: INPA, MICH, NY).

Plants very small, pale green or yellowish. Branches single. Stem and branch leaves similar. Stem leaves oblong-ovate, concave, cucullate, apex rounded. Branch leaves spreading to subsquarrose, oblong-ovate, concave, cucullate, rounded-obtuse at apex, bordered by 1-2 rows of linear cells, in cross section **leucocysts** convex on both surfaces, with 5-9 elliptic ringed pores at commissures on the outer surface, with 2-4 small elliptic pores and pseudopores at commissures on the inner surface; **chlorocysts** rectangular to trapezoidal, equally exposed on both surfaces.

COMMENTS

Distribution and ecology: Endemic to Brazil, encountered in the Amazon Forest and Atlantic Rainforest, 100-1390 m, on soils of seasonally submerged river banks. It has an apparently discontinuous distribution in Brazil and appears to be rare, occurring in seasonally submerged localities.

Comments: Crum & Buck (1992) found it surprising that five species of *Sphagnum* were described in just this small area (São Gabriel da Cachoeira), although that site is considered an area rich in higher plants species (Ducke 1938).

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Amazon Rainforest, Atlantic Rainforest

Vegetation Types

Riverine Forest and/or Gallery Forest, Inundated Forest (Igapó)

Geographic Distribution

Confirmed occurrences

North (Amazonas)

Southeast (Minas Gerais)

HERBARIUM MATERIAL

Buck, W.R., 2544, NY, INPA, MICH, Amazonas, **Typus**

D.M. Carmo et D.F. Peralta, 834, SP, Minas Gerais

A.E. Soares, 1237, RB, Amazonas

O. Yano et al., 2112, SP, Amazonas

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum rotundatum Müll. Hal. & Warnst.

This treatment is composed of the following taxa: *Sphagnum rotundatum*, .

Has as synonym

heterotypic *Sphagnum rotundatum* var. *subsimplax* Müll. Hal. & Warnst.

DESCRIPTION

Sphagnum rotundatum Müll. Hal. & Warnst., Hedwigia 36: 162. 1897. Type: BRAZIL, Serra do Itatiaia, 2000 m, Mar 1894, E. Ule 1760 (syntypes: CHR, LE).

Plants small to robust, pale green, yellowish or brownish, ending in a large terminal bud; wood cylinder orange or yellow. **Branches** none or single. **Stem and branch leaves** similar. **Stem leaves** broadly rounded-ovate or rounded, concave. **Branch leaves** similar, in cross section **leucocysts** convex on both surfaces, with few pores on the outer surface, especially at the cell corners, and numerous small, round pores in short commissural rows of 2-3 on the inner surface; **chlorocysts** narrowly triangular to trapezoidal, exposed exclusively or more broadly on the outer surface.

COMMENTS

Distribution and ecology: Endemic to Brazil, encountered in Savanna and Atlantic Rainforest, 700-2500 m, on humid soil, submerged along creeks, or moist rocks.

Comments: It appears to be restricted to the mountainous of Savanna and Atlantic Rainforest in Brazil.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Seasonally Semideciduous Forest, Ombrophylous Forest (Tropical Rain Forest), Mixed Ombrophylous Forest

Geographic Distribution

Confirmed occurrences

Central-west (Goiás)

Southeast (Minas Gerais, Rio de Janeiro, São Paulo)

South (Paraná, Santa Catarina)

HERBARIUM MATERIAL

Bandeira, s.n., RB, 259528,  (RB00684409), Rio de Janeiro

E. E. Ule, 1760, CHR, LE, Rio de Janeiro, **Typus**

Ferreira, S., 481, SP, São Paulo

Schäfer-Verwimp, A. & Verwimp, 10585, NY, Santa Catarina

D.M. Vital, 1155, SP, Goiás

FIELD IMAGES / ILLUSTRATIONS



Figure 1: *Sphagnum rotundatum* Müll. Hal. & Warnst.



Figure 2: *Sphagnum rotundatum* Müll. Hal. & Warnst.



Figure 3: *Sphagnum rotundatum* Müll. Hal. & Warnst.

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum sanguinale Warnst.

DESCRIPTION

Sphagnum sanguinale Warnst., Bot. Centr. 76: 385. 1898. Type: British Guayna, Mount Roraima, 1894, *J.J. Queich and R.M. McConnell 350* (holotype: H, syntype: NY).

Plants moderate-sized, dark red-brown. Branches in fascicles of 3 (2 spreading and 1 pendent). **Stem leaves** oblong to oblong-ovate, with leucocysts septate, without fibrils. **Branches leaves** oblong-ovate, in cross section with leucocysts large, plane on the inner surface, and slightly convex on the outer surface, on the outer surface with large, ringed pores in three at adjacent angles, numerous pores and pseudopores on both surfaces, **chlorocysts** elliptic, central and included.

COMMENTS

Distribution and ecology: Guyana, and Venezuela (Crum and Buck 1992). In Brazil is encountered in the Amazon Forest and Atlantic Rainforest, 1000-2240 m, on rocks or soil.

Comments: According to Crum & Buck (1992) this species is similar to *S. amazonicum* Crum & Buck.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest, Atlantic Rainforest

Vegetation Types

High Altitude Grassland, Terra Firme Forest, Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest

Geographic Distribution

Confirmed occurrences

North (Amazonas, Roraima)

Northeast (Bahia)

Southeast (Rio de Janeiro)

South (Rio Grande do Sul)

HERBARIUM MATERIAL

Costa, D.P. et al., 5781, RB, Rio Grande do Sul

J.M.A. Braga, 5296, RB, Rio de Janeiro

D.M. Vital, 1313, RB,  (RB00920894), Rio de Janeiro

Schäfer-Verwimp, A., 9589, SV, Bahia

Queich, J.J. & McConnel, R.M., 350, NY, Amazonas, **Typus**

D.M. Vital, 1313, RB,  (RB00920894), Rio de Janeiro

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum scorpioides (Hampe) H.A.Crum

DESCRIPTION

Sphagnum scorpioides (Hampe) H.A. Crum, Fragm. Flor. Geob. 40: 173. 1995. Type: Brazil, Rio de Janeiro, A. Glaziou 7042 *parce lectum* (Holotype: PC 0709587, Isotypes: NY, PC). Endemic to Brazil and only known from the type specimen from Rio de Janeiro Stat, encountered in the Atlantic Rainforest, sea level, in water.

Plants small, erect or procumbent, green, yellowish, reddish or brown; capitulum not developed. Chlorocysts in cross section lenticular, very narrowly exposed on both surfaces, **leucocysts** somewhat convex on both surfaces, 1-2 septate lengthwise into 2-3 compartments on the outer surface, with rather numerous elliptic pores scattered or seriate along the commissures, on the inner surface, with 4-10 rather sizable, elliptical pores at ends, corners, and commissures.

COMMENTS

Comments: This species is excluded here because only the type collection is known and no other collections were found in Brazil, being impossible to judge the variations. Crum (1995) proposed the new status and combination of *S. caldense* var. *scorpioides* to *S. scorpioides*, commenting that he disagreed with the synonymization proposed by Warnstorf (1890) with *S. cyclophyllum* Sull. and Lesq. and considered *S. caldense* var. *scorpioides* worthy of specific rank because of the porose cortical cells of the stem, narrow, scarcely exposed chlorocysts, and pores larger and less continuously distributed along both surfaces of leaves than in *S. cyclophyllum*. In the same paper that author commented that he doubted the record of *S. cyclophyllum* for Brazil because of numerous inaccuracies in Warnstorf's description. I studied two collections of *S. caldense* housed at the PC herbarium (*S. caldense* var. *normale* Hampe and *S. caldense* var. *scorpioides* Hampe), both have the same collection number (*Glaziou 7042*) and were described by Hampe (1874), appearing with the descriptions "parce lectum". It is a rare species in Brazil, occurring in the Atlantic Rainforest only by two old collections, and more efforts will be needed to find more samples.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Southeast (Rio de Janeiro)

HERBARIUM MATERIAL

A.F.M. Glaziou, 1042, NY, Rio de Janeiro, **Typus**

Sphagnum sehnemii H.A.Crum

DESCRIPTION

Sphagnum sehnemii H.A. Crum, J. Hattori Bot. Lab. 63: 97. 1987. Type: BRAZIL. Rio Grande do Sul, in campo paludoso, 850 m, Potreiro Novo, São Francisco de Paula, 22 Feb 1978, A. Sehnem 15965 (Holotype MICH, syntypes MO, PACA). Plants slender, pink. Branches in fascicle of 4 (2 spreading and 2 pendent). Stem leaves lingulate, apex rounded, narrowly bordered above and broadly bordered at the base, with rounded membrane gaps in the upper portion on the outer surface. Branch leaves oblong-lanceolate, concave, bordered by two rows of linear cells, leucocysts convex on both surfaces, with large and elliptic, ringed pores (2-5 per cell) on the outer surface and none or one pore on inner surface, chlorocysts in cross section triangle-trapezoidal to sub rectangular, more exposed on the inner surface.

COMMENTS

Distribution and ecology: Endemic to Brazil (PR, RJ, RS, SC), occurring in the Atlantic Rainforest, 850-2000 m, growing on marsh, swamp, and streams.

Comments: *Sphagnum sehnemii* is very similar to *S. aciphyllum* differing by the stem leaves lingulate (not triangular) with apex rounded (not pointed), and more broadly bordered at base (not abruptly bordered at base); leucocysts of branch leaves on the inner surface without pores or rarely pores (not without pores or with 1-3 pores near leaf margins). In Brazil, this taxon is restricted to high mountains of the Atlantic Rainforest from southeastern and southern regions.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest

Geographic Distribution

Confirmed occurrences

Southeast (Rio de Janeiro)

South (Paraná, Rio Grande do Sul, Santa Catarina)

HERBARIUM MATERIAL

Dusén, P., 13376, F, HBR, Paraná

Schäfer-Verwimp, A. & Verwimp, I., 9183, RB, Santa Catarina

P. Luetzelburg, 6162, F, HBR, Rio de Janeiro

A. Sehnem, 15965, MICH, MO, PACA, Rio Grande do Sul, **Typus**

Schnell, s.n., RB, 169888,  (RB00684422), Rio de Janeiro

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum septatoporosum H.A.Crum

DESCRIPTION

Sphagnum septatoporosum H.A.Crum, J. Hattori Bot. Lab. 77: 247. 1994.—TYPE: BRAZIL. Minas Gerais: Município de Passos, ca. 1.5 km NE of Represa de Furnas, 20°38'S, 46°17'W, in a swampy place, 17 Sep 1977, *D.M. Vital 7641* (holotype: MICH; syntype: SP).

Sphagnum septatoporosum is endemic to Brazil and only known from the type collection. The species was described by Crum (1994a) in the same publication of *S. pluriporosum*, considering both similar, differing the latter by having branches in fascicles of 3 (not 2), stem leaves concave, narrowly triangular (not oblong-ovate, rounded-obtuse), branch leaves ovate (not broadly ovate), and leucocysts on the outer (abaxial) surface with pores crowded into commissural rows (not with fibrils few or none, small pores enclosed in cross-fibrils, scattered median pores, and few pseudopores).

COMMENTS

Comments: It is endemic to Brazil and only known from the type collection from Minas Gerais State, and the plant is very similar to *S. pluriporosum*.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna

Vegetation Types

Cerrado (lato sensu), Riverine Forest and/or Gallery Forest

Geographic Distribution

Confirmed occurrences

Southeast (Minas Gerais)

HERBARIUM MATERIAL

D. M. Vital, 7641, MICH, SP, Minas Gerais, **Typus**

REFERENCE

Crum, H. A. 1994. Miscellaneous notes on the genus *Sphagnum*. 5 New and notable species of South America. *The Journal Hattori Botanical Laboratory* 77: 233–253.

Sphagnum sparsum Hampe

Has as synonym

heterotypic *Sphagnum pseudoacutifolium* Müll. Hal. & Warnst.

heterotypic *Sphagnum roseum* Warnst.

DESCRIPTION

Sphagnum sparsum Hampe, Vidensk. Meddel. Dansk. Naturhist. Foren. Kjøbenhavn ser. 3, 2: 259, 267. 1870. Type: BRAZIL. Rio de Janeiro: A. Glaziou 3535 (Lectotype designated by Costa et al (2016) BM 000964640, isolectotype BM 000964641).

Plants small, growing in dense pink cushions. **Stem leaves** having leucocysts with a poor development of fibrils. **Branch leaves** oblong-lingulate to triangular-ovate, slightly bordered at base, not strongly concave, with small strongly ringed, elliptic commissural pores on the outer surface (near apex) and sometimes minute, ringed pores and pseudopores on the inner surface (toward the apex), **leucocysts** on the outer surface with 3-8 small ringed, rounded or elliptic pores at commissures.

COMMENTS

Distribution and ecology: tropical America. In Brazil occurring in the Atlantic Rainforest (PR, RJ), 0-2600 m, on moist soil along streams and marsh.

Comments: In Brazil this taxon is common in high elevations above tree line.

Life Form

Cushion, foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Southeast (Rio de Janeiro, São Paulo)

South (Paraná)

HERBARIUM MATERIAL

D. M. Vital, 1058 p.p., SP, Rio de Janeiro

A.F.M. Glaziou, 4/47, NY, Rio de Janeiro, **Typus**

A.F.M. Glaziou, 4547, PC (PC0116048)

Dusén, P., 1902, NY, Paraná

A.F.M. Glaziou, 4547, PC (PC0741903)

D. M. Vital, 633, SP, São Paulo

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum squarrosum Crome

DESCRIPTION

Sphagnum squarrosum Crome, Samml. Deut. Laubm. 24-25. 1803. Type: Germany, 6 Oct 1884, *J. Röhl 61* (Holotype: S-PA; isotype: JE).

Plants robust plant, pale- to yellow-green. **Stem** leaves shorter than branch leaves, slightly concave, large, ovate-lingulate to oblong-lingulate, fringed at a rounded apex, bordered or not; leucocysts undivided and without fibrils. **Branches** long and tapering with squarrose spreading leaves. **Fascicle** with 4 or 5 branches (2 spreading and 2-3 pendent). **Branch** leaves larger than stem leaves, strongly squarrose, (“spiky”), broadened at base and abruptly contracted at middle to an involute-concave apex, curved away from the branch, bordered by 1–3 rows of linear cells, in cross section **leucocysts** slightly convex on both surfaces, on the inner surface with 1–3 rounded to elliptic pores at ends and non-ringed pores on the outer surface, walls smooth or slightly papillose, in cross section, **leucocysts** concave and **chlorocysts** triangular or trapezoidal, equally exposed on both surfaces or more exposed on the outer surface.

COMMENTS

Distribution and ecology: A circumboreal species, widespread throughout the Northern Hemisphere from the sub-arctic to the warm temperate zones of Europe, Asia and North America and the new records reported by Costa (2017) shown a disjunction distribution for this taxon. In Brazil it is now known from the Southeastern Region, in the Atlantic Forest of (SP) and in the Southern Region, in the steppe (RS), 0-1100 m, occurring on humid soil near creeks.

Comments: *Sphagnum squarrosum* is unmistakable because has a typical robust form with strongly squarrose branch leaves giving to this species a “spiky” look.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Atlantic Rainforest, Pampa

Vegetation Types

Grassland, Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Southeast (São Paulo)

South (Rio Grande do Sul)

HERBARIUM MATERIAL

O. Yano & J. Bordin, 29404, SP, São Paulo

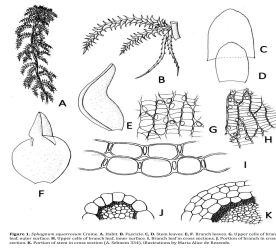
R. Wasum & E. Valduga, 4949, MBM, Rio Grande do Sul

A. Sehnem, 334, PACA, Rio Grande do Sul

A. Sehnem, s.n., PACA, 952, Rio Grande do Sul

R. Bueno, 872, ICN, Rio Grande do Sul

FIELD IMAGES / ILLUSTRATIONS



Maria Alice de Rezende

Figure 1: *Sphagnum squarrosum* Crome

REFERENCE

- Costa DP (2017) *Sphagnum squarrosum* Crome, subgenus *Squarrosa* (Russow) Schimp. (Bryophyta: Sphagnaceae), in South America. Check List 13 (4): 147–151. <https://doi.org/10.15560/13.4.147>
- Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum strictum Sull.

DESCRIPTION

Sphagnum strictum Sull., Musci Allegh. 201. 1845. Type: USA. North Carolina: in Carolina Superiore, ad summum scopulum mirabilem *Devil's Court House* dictum, *Sullivant 201* (Holotype: BM, syntypes: MO 256038, NY, RB).

Plants pale-brown or yellowish, in dense, compact and cushions. **Stem leaves** very small, deltoid, and much smaller than the branch leaves. **Branches** in fascicle of 5 (2 spreading and 2-3 pendent). **Branch leaves** spreading to squarrose, broadly truncate, concave, with margins denticulate-bordered above because of resorption; **leucocysts** with 2-6 elliptic pores on the outer surface and 2-4 smaller elliptic pores in corners on the inner surface; **chlorocysts** in cross section triangular exposed on the outer surface; leucocysts convex with walls fine papillae adjacent to the chlorocysts.

COMMENTS

Distribution and ecology: Europe, North, Central America and South America. In Brazil occurring in Bahia State, in the *Campo Rupestre* (rocky outcrop), ca. 700 m, on humus on bank rivers, sometimes submerged.

Comments: In Brazil, only one collection is known and is considered a rare species, restricted to the northeastern region, although the current distribution may not reflect the real distribution in Brazil, and the taxon probably occurs in other states from southeastern region with the same environmental.

Life Form

Cushion, foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Highland Rocky Field

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

HERBARIUM MATERIAL

B.M. Boom, 1181, SP, Bahia

Sullivant, W.S., 201, RB, MO, NY, BM, **Typus**

FIELD IMAGES / ILLUSTRATIONS



Figure 1: *Sphagnum strictum* Sull.



Figure 2: *Sphagnum strictum* Sull.

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum subhomophyllum H.A.Crum

DESCRIPTION

Sphagnum subhomophyllum H.A. Crum, Contr. Univ. Michigan Herb. 21: 156. 1997. Type: Brazil, Rio de Janeiro: Serra de Itatiaia bei Visconde de Mauá, Triefstelle na der Strasse nach Maromba, 1400 m, 17 Jul 1987, A. Schäfer-Verwimp and Verwimp 8323 (Holotype: MICH, syntype: herb. Schäfer-Verwimp).

Plants pale-brown or yellowish, in dense and compact cushions. **Stem leaves** very small, deltoid, much smaller than the branch leaves. **Branches** in fascicle of 5 (2 spreading and 2-3 pendent), **branch leaves** spreading to squarrose, broadly truncate, concave, with margins denticulate-bordered above because of resorption; **leucocysts** with 2-6 elliptic pores on the outer surface, and 2-4 smaller elliptic pores in corners on the inner surface; **chlorocysts** triangular in cross section, exposed on the outer surface; **leucocysts** convex, the walls with fine papillae adjacent to the **chlorocysts**.

COMMENTS

Comments: Endemic to Brazil, encountered in the Atlantic Rainforest, ca. 1400 m, in a marsh, and only known from the type collection. According to Crum (unpubl. data), this species shows median pseudopores on the outer surface of the stem and the branch leaves toward the apex, while *S. homophyllum* has median pores (not pseudo pores) and as I could only study the type specimens, and no other collections, I could not judge variations and preferred not include it in the synopsis.

Life Form

Cushion, foliose

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Southeast (Rio de Janeiro)

HERBARIUM MATERIAL

A. Schäfer-Verwimp and Verwimp, 8323, MICH, SV, Rio de Janeiro

Sphagnum submedium Warnst.

Has as synonym

heterotypic *Sphagnum buckianum* H.A.Crum

DESCRIPTION

Sphagnum submedium Warnst., Beih. Bot. Centralb. 20: 134. 1906. Type: Brazil, Minas Gerais, Caldas, prope amnem Rio Verdinho ad terram abruptam umbrosam, 15 Dec 1873, C.W.H. Mosén 332 (Holotype: KRYPTO-S, syntypes: F, HBR, NY). **Plants** medium-sized, pinkish-brown. **Branches** 3 per fascicle (2 spreading and 1 pendent). **Stem leaves** bigger than the branch leaves, broad, almost rounded-ovate, cucullate, apex bordered by a resorption furrow all around. **Branch leaves** broadly ovate, in cross section with **leucocysts** bulging on both surfaces, very small, ringed pores 3's at adjacent angles on the outer surface; chlorocysts elliptic or fusiform, usually central and included.

COMMENTS

Distribution and ecology: Endemic to Brazil, encountered in the Atlantic Rainforest and *Campo Rupestre*, 1000-2300 m, occurring on soils in shaded or exposed areas, or on moist rocks, being restricted to high elevations areas of the Atlantic Rainforest in the southeastern regions.

Comments: Eddy (1977) considered *S. submedium* a synonymy of *S. perichaetiale*, but Andrews (1947) and Crum (1990) considered this taxon to be quite distinct, being similar only by the chlorocysts in cross section. Based on studies of Brazilian collections, I agree with those two authors, and *S. submedium* is considered here as a valid species.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Highland Rocky Field, Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)


Southeast (Minas Gerais, Rio de Janeiro, São Paulo)

HERBARIUM MATERIAL

Schäfer-Verwimp, A. & Verwimp, 8519, SV, São Paulo

Vitt, D.H., 21538, F, NY, HBR, Rio de Janeiro

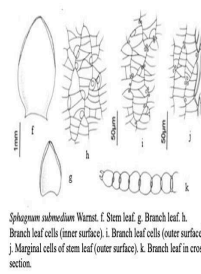
Mosen, C.W.H., s.n., HBR, S, NY, F, Minas Gerais, **Typus**

D.P. Costa, 5988, RB,  (RB01099052), Rio de Janeiro

T. Messina, 8, RB,  (RB00930744), Minas Gerais

J. Ballejos, 2007, ALCB, Bahia

FIELD IMAGES / ILLUSTRATIONS



Sphagnum submedium Warnst. f. Stem leaf, g. Branch leaf, h. Branch leaf cells (inner surface), i. Branch leaf cells (outer surface), j. Marginal cells of stem leaf (outer surface), k. Branch leaf in cross section.

Denise Pinheiro da Costa

Figure 1: *Sphagnum submedium* Warnst.

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum subsecundoides H.A.Crum & W.R.Buck

DESCRIPTION

Sphagnum subsecundoides H.A. Crum & W.R. Buck, Brittonia 44: 453. 1992. Type: Brazil, Amazonas, along the Rio Marié at Manaúna, primary forest with large rocks over white sand, 00°40'S, 66°45'W, on soil on river bank, 5 Jul 1979, W.R. Buck 2413 (Holotype: MICH, isotypes: INPA, NY).

Plants small, yellowish. **Branches** single. **Stem leaves** oblong-ovate, concave, cucullate, bordered by linear cells, **leucocysts** fibrillose, with many small elliptic pores in continuous commissural rows on the outer surface, occasional median pores, pseudopores at angles and commissures. **Branch leaves** oblong-ovate, concave, cucullate, roughened at back of the apex, in cross section **leucocysts** with many small elliptic pores in continuous commissural rows, **clorocysts** narrowly triangular, exposed on the inner surface.

COMMENTS

Distribution and ecology: Endemic to Brazil, encountered in the Amazon Forest and Atlantic Rainforest, 0-1240 m, occurring on sandy soils along rivers or culverts.

Comments: According to Crum & Buck (1992), it is similar to *S. negrense*, and were very surprised to find such closely related species in the Rio Negro region, but *S. subsecundoides* is smaller with reduced branching, and adequately distinguishable from *S. negrense*. Although is necessary more collections and more ecological information because the morphological characters may give evidence for environmental response and then a conservative species concept.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Amazon Rainforest, Atlantic Rainforest

Vegetation Types

Riverine Forest and/or Gallery Forest, Terra Firme Forest

Geographic Distribution

Confirmed occurrences

North (Amazonas, Rondônia)

Northeast (Bahia)

Southeast (Minas Gerais)

South (Rio Grande do Sul)



HERBARIUM MATERIAL

Buck, W.R., 2413, NY, MICH, Amazonas, **Typus**

O. Yano et al., 1966, SP, Amazonas

C.F. Sá, 183, ALCB, Bahia

T. Messina and D.P. Costa, 41, RB, Minas Gerais

R. Bueno, 3159, ICN, Rio Grande do Sul
C.F. Sá, 183, RB,  (RB01355983), Bahia
Gonzatti, F., 1109a, FURB (FURB60284), Rio Grande do Sul
T. Messina, 31, RB,  (RB00930706), Minas Gerais

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum subsecundum Nees

DESCRIPTION

Sphagnum subsecundum Nees ex Sturm, Deutsch. Fl. Crypt. 2: 3. 1819. Type: Germany, *H.C. Funk s.n.* (Holotype: JE?).

Plants small to medium, slender, green, yellow-brown, golden brown or orange. **Branches** short and blunt, in fascicles of 4-6 (2-3 spreading and 2-3 pendent). **Stems leaves** small, triangular-lingulate or elliptic, concave, apex rounded, entire or denticulate. **Branch leaves** subsecund, ovate-lanceolate to broadly ovate, concave, apex truncate, toothed, bordered by 2-3 rows of linear cells, in cross section **leucocysts** convex on both surface, with numerous small elliptic, ringed pores in continuous commissural rows on outer surface, few small pores at the ends and corners on the inner surface; **chlorocysts** rectangular, equally exposed on both surfaces or slightly exposed on the outer surface.

COMMENTS

Distribution and ecology: widespread globally (Crum 1984). In Brazil is encountered in the Atlantic Rainforest, Savanna, between 700-2400 m, occurring on moist soils, on rocks, and swamps, along stream and lagoons margins.

Comments: According to Crum (1984), this species represents a complex of intergrading forms that must be viewed with suspicious conservatism, although some of the many names that have fallen into its synonymy need recognition at some taxonomic level. I confirmed this because many samples were found to be misidentified. All of the collections cited by Yano *et al.* (1985) from **Roraima** State, for example, belong to *S. curicuriariense*; part of the collections cited by those authors to other states also belong to different species, as follow: 1) **Goiás** State, *D.M. Vital 1155* (SP) is *S. rotundatum*; 2) **Minas Gerais** State, *D.M. Vital 7578* (MICH, SP) is the type of *S. pluriporosum*; *D.M. Vital 7613* (SP), is *S. cyclophyllum*; and *D.M. Vital 7641* (SP) is the type of *S. septatoporosum*. Thus, according to the collections studied, this species is not as widespread in Brazil as cited earlier, being distributed from mid-western to southern regions of that country.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest

Vegetation Types

High Altitude Grassland, Cerrado (lato sensu), Riverine Forest and/or Gallery Forest, Seasonally Deciduous Forest, Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest)

Geographic Distribution

Confirmed occurrences

North (Tocantins)

Northeast (Bahia)

Central-west (Distrito Federal, Goiás, Mato Grosso)

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)





South (Paraná, Rio Grande do Sul, Santa Catarina)

HERBARIUM MATERIAL

C. Baez, 1806, RB,  (RB01423669), Minas Gerais

Cardorin, J.J., 2203, FURB, Santa Catarina

J. Cordeiro, 2653, MBM, Tocantins

Valente, E.B., 1576, HUEFS, Bahia
M. Nadruz, 3071, RB,  (RB01112251), Rio de Janeiro
M. Nadruz, 3071, RB,  (RB01112251), Rio de Janeiro
Vaz-Imbassahy, T.F., 100, RB, 441097,  (RB00684393), Rio de Janeiro
Imaquire, N., 2427, HUCS, Paraná
Wasum, R.A. et al., s.n., HUCS, Rio Grande do Sul
Vital, D.M., 261, RB, UB, Distrito Federal
D. M. Vital, 7578, MICH, SP, Minas Gerais
T.Messina, 23, RB,  (RB00930759), Minas Gerais

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum sucrei H.A.Crum

Has as synonym

heterotypic *Sphagnum guanabarae* H.A.Crum

DESCRIPTION

Sphagnum sucrei H.A. Crum, J. Hattori Bot. Lab. 63: 91. 1987. Type: Brazil, Rio de Janeiro, Pedra da Gávea, no alto da pedra, 800 m, saxícola, umbrófila, crescendo na mata, 5 Jan 1969, *D. Sucre 4328 and P.I.S. Braga 1281* (Holotype: MICH, isotypes: MO, RB).

Plants small, slender, pale green or yellowish, pinkish distally, wood cylinder yellowish to brown. **Branches** in fascicle of 3 (2 spreading and 1 pendent). **Stem leaves** large, oblong-lingulate, blunt apex, bordered by linear cells, leucocysts undivided, numerous pores in commissural rows on the outer surface, none on the inner surface. **Branch leaves** ovate, concave, narrowly bordered, in cross section **leucocysts** on the inner surface almost plane, with numerous ringed pores along the commissures, on the outer surface, bulging; **chlorocysts** narrowly trapezoidal to triangular, more exposed on the inner surface.

COMMENTS

Distribution and ecology: Endemic to Brazil, widespread in the Atlantic Rainforest, 0-2300 m, on sunny and wet rocks, or moist rocks.

Comments: *Sphagnum guanabarae* and *S. sucrei* were described by Crum (1987) in the same paper (where the author already considered them to be very similar), Studies by Costa & Fares (2012) of the type collections of *S. sucrei*, sampled from the same type locality as *S. guanabarae*, as well as collections from different localities of Rio de Janeiro State confirmed that those characteristics are included in the variations observed in *S. sucrei*.

Life Form

Cushion, foliose, Mat

Substrate

Rupicolous, Saxicolous

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types





High Altitude Grassland, Ombrophyllous Forest (Tropical Rain Forest)



Geographic Distribution

Confirmed occurrences

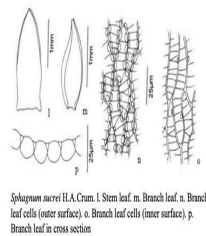
Southeast (Minas Gerais, Rio de Janeiro, São Paulo)

HERBARIUM MATERIAL

Costa, D.P. et al., 4947, RB, Rio de Janeiro
 Eduardo P. Fernandez, 35, RB, 584669,  (RB00809192), São Paulo
 Costa, D.P. et al., 662, RB, Rio de Janeiro
 D. Sucre, 4328, MICH, RB, MO, Rio de Janeiro, **Typus**
 Denise P. Costa, 702, RB, 276092,  (RB00684347), Rio de Janeiro
 D.P. Costa, 5989, RB,  (RB01099053), Rio de Janeiro
 D. Sucre, 6882, RB, Minas Gerais
 Schenck, 5438, RB, 245596,  (RB00684316), Rio de Janeiro

Schenck, 5438, RB, 245596,  (RB00684316), Rio de Janeiro
M.C. Vaughan Bandeira, 588, RB,  (RB00684331), Rio de Janeiro

FIELD IMAGES / ILLUSTRATIONS



Denise Pinheiro Costa

Figure 1: *Sphagnum sucrei* H.A.Crum

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum tabuleirense O.Yano & H.A.Crum

DESCRIPTION

Sphagnum tabuleirense O. Yano & H.A. Crum, Bryologist 95: 343. 1992. Type: Brazil, Paraíba, Município de Santa Rita, at Tabuleiro de Santa Rita, dentro do riacho, 22 May 1985, L. Xavier Filho s.n. (Holotype: SP 231902, syntype: MICH).

Plants aquatic, slender, yellowish. **Branches** widely spaced, single (occasionally double). **Stem and branch leaves** similar, large, lingulate, rounded at apex, bordered, similar in the numbers and distributions of the pores and pseudopores. **Branch leaves** ovate, cucullate, concave, bordered by a resorption furrow, in cross section **leucocysts** convex on both surfaces, with large, ringed pseudopores at adjacent angles, occasionally pores at corners and commissures, chlorocysts trapezoidal and more exposed on the inner surface.

COMMENTS

Distribution and ecology: Brazil and Guyana (Zielman 2011). In Brazil is encountered in the Atlantic Rainforest, Savanna, *Campo Rupestre*, *Restinga*, 0-1100 m, aquatic plant occurring on rocks, in streams, or on soils along lagoon margins, submerged.

Comments: Zielman (2011) established a new combination for this taxon, *S. perichaetiale* var. *tabuleirense* (Yano & Crum) Zielman, commenting that it is quite distinct, that the characters mentioned by Yano & Crum (1992) are gradual, and that the type shows fascicles of 2 branches while the Guyana collection is without (or single) branches. I disagree with this author because all the Brazilian collections studied are in accordance with the original description (plants aquatic, slender, having single or rarely paired branches; stem and branches leaves large, bordered, and similar in porosity; and chlorocysts in cross section trapezoidal), so that the new combination is not accepted here.

Sphagnum tabuleirense is similar to *S. billbuckii* by having stem and branch leaves larger and isophyllous, and the chlorocysts of the branch leaves narrowly triangular in cross section and exposed on the inner surface, differing by having stems with a single branch and not with 3 branches per fascicle as in *S. billbuckii*.

Life Form

foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna, Atlantic Rainforest, Pampa

Vegetation Types

Highland Rocky Field, Riverine Forest and/or Gallery Forest, Seasonally Semideciduous Forest, Coastal Forest (*Restinga*), Aquatic vegetation

Geographic Distribution



Confirmed occurrences

North (Tocantins)

Northeast (Bahia, Paraíba, Pernambuco, Sergipe)

Southeast (Minas Gerais)

HERBARIUM MATERIAL

J.R. Pirani, 4584.p.p., SP, Minas Gerais
Xavier-Filho, L., s.n., ALCB, SP, MICH, Pará, **Typus**
J. Ballejas, 2355, RB,  (RB01355993), Bahia
J. Ballejas, 2355, RB,  (RB01355993), Bahia
Bastos, C.J.P., 898, ALCB, SP, Bahia
D.A. Lima s.n., s.n., RB, Pernambuco
P. Gomes et al., 799 a,b, UFPE, Sergipe
Leite, R.N., RB, Tocantins

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum tenellum Ehrh. ex Hoffm.

Has as synonym

homotype *Sphagnum cymbifolium* var. *tenellum* Brid.

DESCRIPTION

Sphagnum tenellum (Brid.) Bory, Voy. Îles Afr. 3: 107. 1804. Basiônimo: *Sphagnum cymbifolium* var. *tenellum* Brid., Musc. Recent. 2: 24. 1798. Tipo: Europe (not located).

Plants small, delicate, yellow-green to brown. **Branches** in fascicle of 3-5 (1-2 spreading and 2-4 pendent). **Stem and branch leaves** similar in shape and structure. **Stem leaves** oblong or elliptic, concave, broadly acute. **Branch leaves** oblong-ovate to elliptic, concave, acute, apex toothed, bordered by 2-3 rows of linear cells, **chlorocysts** broadly trapezoidal or broadly triangular, broadly exposed only on the outer surface; **leucocysts** slightly to strongly convex on the inner surface.

COMMENTS

Distribution and ecology: widespread globally (Crum 1980). In Brazil is encountered in the Amazon Forest and Atlantic Rainforest, 2200-2700 m, occurring on moist rocks, in bogs.

Comments: According to Crum (1980), the plants are characteristically small, delicate, and grow in loose, pale carpets, with its stem and branch leaves similar in shape and structure, with the retort cells of the branch cortex being remarkably long-necked .

Life Form

foliose, Tuft

Substrate

Rupicolous

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest, Atlantic Rainforest

Vegetation Types

Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

North (Amazonas)

Southeast (Rio de Janeiro)

HERBARIUM MATERIAL

B. Maguire, 60468M, NY, Amazonas

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum tenerum Sull. & Lesq.

Has as synonym

heterotypic *Sphagnum campicola* Müll. Hal. ex Warnst.
 heterotypic *Sphagnum purpuratum* Müll. Hal. ex Warnst.
 heterotypic *Sphagnum usterii* var. *versicolor* Warnst.
 heterotypic *Sphagnum usterii* Warnst.

DESCRIPTION

Sphagnum tenerum Sull. & Lesq., Manual (Gray). Ed. 2. 611. 1856. Type: USA. ad margines rivulorum per montes Raccoon Alabamiae, W.S. *Sullivant 11* [Musci Boreali-Americani no. 11] (Holotype: FH, syntypes: BM, MO 406797, NY).

Plants small, yellow-green. Branches 3-4 per fascicles (2 spreading and 1-2 pendent). Stem leaves oblong-ovate, slightly bordered at base, leucocytes with numerous elliptic, ringed commissural pores on the outer surface, few large, rounded pores on the inner surface. Branch leaves crowded and imbricate, broadly pointed, ovate, chlorocysts (cross section) narrowly triangular to trapezoidal, broader exposed on the inner surface, leucocysts (cross section) convex on the outer surface, with many pores on the outer surface and few and small pores end at the corners on the inner surface.

COMMENTS

Distribution and ecology: widespread throughout the world (Crum 1984). In Brazil occurring in BA, ES, MG, PR, RJ, RS, SC, SP, in the Atlantic Rainforest, *Restinga*, Steppe, 0-1200 m, on soil along margin of lagoon or rocks.

Comments: In Brazil, is similar to *S. capillifolium* and can be distinguished by the leucocysts of branch leaves with few and small pores end at the corners on the inner surface (not with 2-5 pores at cells end on the inner surface).

Life Form

Cushion, foliose, Tuft

Substrate

Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Grassland, Seasonally Deciduous Forest, Seasonally Semideciduous Forest, Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest, Coastal Forest (*Restinga*)

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo)

South (Paraná, Rio Grande do Sul, Santa Catarina)

HERBARIUM MATERIAL

Schiffner, V., 297, F, São Paulo

H.S. Irwin, 32378, NY, HBR, F, Bahia

W.R. Anderson, 11731, NY, Espírito Santo

A.R. Reitz, 2281, NY, R, Santa Catarina

A. Sehnem, 237, R, Rio Grande do Sul

P. Dusén, 4157, R, BM, Paraná
V. Schiffner, 297, BM, Rio de Janeiro

FIELD IMAGES / ILLUSTRATIONS



Figure 1: *Sphagnum tenerum* Sull. & Lesq.

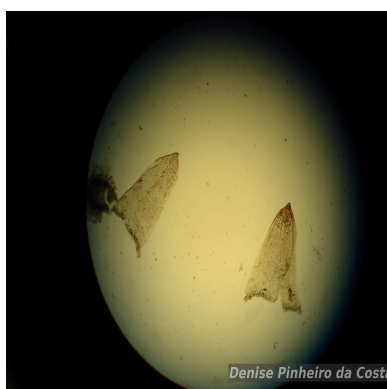


Figure 2: *Sphagnum tenerum* Sull. & Lesq.

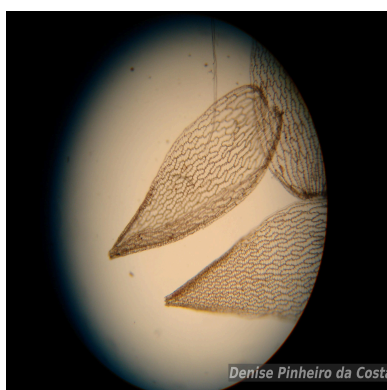


Figure 3: *Sphagnum tenerum* Sull. & Lesq.

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.

Sphagnum turgens Warnst.

DESCRIPTION

Sphagnum turgens Warnst., *Beih. Bot. Centralb.* 20: 132. 1906. Type: Brazil, Minas Gerais, Caldas in campo humido apricot inter gramina alta, 5 Nov 1873, C.W.H. Mosén s.n. (Holotype: B presumed destroyed, syntypes: F, NY).

Plants robust, yellowish. Branches 2 per fascicles (1 spreading and 1 pendent). **Stem** leaves broadly ovate, concave, not cucullate, apex rounded, narrowly bordered. **Branch** leaves imbricate, concave, broadly ovate, apex rounded, toothed, **chlorocysts** (cross section) lenticular, narrowly exposed on both surfaces, with small, ringed pores in commissural rows on the outer surface and numerous commissural pores on the inner surface, **leucocysts** (cross section) somewhat convex on both surfaces without median commissural pores on the outer surface.

COMMENTS

Distribution and ecology: Endemic to southeastern and southern Brazil (MG, SC, SP), encountered in the Atlantic Rainforest, 800-1100 m, on moist soil. It is restricted to the mountains of the Atlantic Rainforest in southeastern region.

Comments: According to Crum (1995), this species can be differentiated by its stem and branch leaves large and having similar porosity, except near the apex of the stem leaves, sometimes with 1-3 diminutive median pores on the outer surface.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Ombrophyllous Forest (Tropical Rain Forest), Mixed Ombrophyllous Forest

Geographic Distribution

Confirmed occurrences

Southeast (Minas Gerais, São Paulo)

South (Santa Catarina)

HERBARIUM MATERIAL

Schäfer-Verwimp, A. & Verwimp, I., 10460, SV, Santa Catarina

Mosén, C.W.H., s.n., B, F, NY, Minas Gerais, **Typus**

V. Schiffner, 84, BM, São Paulo

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. *Syst. Bot. Monograph* 111: 1-142.

Sphagnum turgescens Warnst.

This treatment is composed of the following taxa: *Sphagnum turgescens*, *Sphagnum turgescens* var. *turgescens*.

DESCRIPTION

Sphagnum turgescens Warnst. var. *turgescens*, Hedwigia 34: 130. 1895. Type: Brazil, Goiás, Serra dos Pirineus, Aug 1893, *E. Ule 1530* (type: B, presumed destroyed, syntype: S).

Notes: This is species I could not study the type material and it is considered very similar to *Sphagnum rufescens* (Nees & Hornsch.) Warnst., one taxon synonymous of *Sphagnum denticulatum* Brid. (Ignatov & Afonina, 1992).

COMMENTS

Comments: Species that I could not study the type and then I did not include in this monograph.

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Unknown

Phytogeographic Domains

Central Brazilian Savanna

Vegetation Types

Cerrado (lato sensu)

Geographic Distribution

Confirmed occurrences

Central-west (Goiás)

HERBARIUM MATERIAL

E. Ule, 1530, B, S, Goiás, **Typus**

REFERENCE

Sphagnum turgescens Warnst. var. *turgescens*, Hedwigia 34: 131. 1895. Type: Brazil, Goiás, Serra dos Pirineus, Aug 1893, *E. Ule 1530* (B, holotype; S, syntype) - Warnstorf (1895) considered this species very similar to *S. rufescens* (Nees and Hornsch.) Warnst.

Sphagnum turgescens Warnst. var. *turgescens*

DESCRIPTION

Sphagnum turgescens Warnst. var. *turgescens*, Hedwigia 34: 130. 1895. Type: Brazil, Goiás, Serra dos Pirineus, Aug 1893, E. Ule 1530 (type: B, presumed destroyed, syntype: S).

Notes: This is species I could not study the type material and it is considered very similar to *Sphagnum rufescens* (Nees & Hornsch.) Warnst., one taxon synonymous of *Sphagnum denticulatum* Brid. (Ignatov & Afonina, 1992)

Life Form

foliose, Tuft

Substrate

Terrestrial

DISTRIBUTION

Native, Unknown

Phytogeographic Domains

Central Brazilian Savanna

Vegetation Types

Cerrado (lato sensu)

Geographic Distribution

Confirmed occurrences

Central-west (Goiás)

HERBARIUM MATERIAL

E. Ule, 1530, B, S, Goiás, **Typus**

Sphagnum vitalii H.A.Crum

DESCRIPTION

Sphagnum vitalii H.A. Crum, Bryologist 94: 301. 1991. Type: Brazil, Bahia, Jacobina, on dripping rocky cliffs along road, 11°06'S, 40°39'W, 19 May 1978, D.M. Vital 8081 (Holotype: MICH, syntypes: ALTA, SP).

Plants small, pale-brown. **Stem** leaves flat, lingulate, apex rounded and fringed, leucocytes not divided, fibrillose or porose, small gaps or pores on the inner surface. Fascicles with 1-2 branches (1 spreading and 1 pendent). **Branch** leaves concave-pointed, ovate-acuminate, cucullate, not roughened at back, margin denticulate by a resorption furrow, **leucocysts** smooth, bulging on both surfaces, with 3-5 small, rounded and ringed pores at ends and commissures on the outer surface, 1-5 rounded-elliptic pores at the ends and commissures on the inner surface, small gaps on the inner surface, **chlorocysts** lenticular, exposed on both surfaces.

COMMENTS

Distribution and ecology: Endemic to Brazil (BA), encountered in *Caatinga* and Savanna, 450-500 m, on bank soils, in swamps, or on rocky cliffs.

Comments: According to Crum (1991), *S. vitalii* is similar to *S. perichaetiale*, but the stem leaves are small, fibrillose, and porose on their outer surface, with small gaps or pores on the inner surface; the branch leaves are rather concave-pointed and not roughened at the back, with numerous small pores on the outer surface and small gaps on the inner surface.

Life Form

foliose, Tuft

Substrate

Rupicolous

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Atlantic Rainforest

Vegetation Types

Caatinga (stricto sensu), Cerrado (lato sensu)

Geographic Distribution

Confirmed occurrences

Northeast (Bahia)

HERBARIUM MATERIAL

D. M. Vital, 8081, MICH, SP, Bahia, **Typus**

Valente, E.B., 2109, HUEFS, Bahia

REFERENCE

Costa, D.P. 2021. A synopsis of the family Sphagnaceae in Brazil. Syst. Bot. Monograph 111: 1-142.