

## Bryophytes from restinga in Setiba State Park, Espírito Santo State, Brazil

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**Abstract:** A total of 34 bryophyte species were identified (25 hepatics, 9 mosses) from restinga at Setiba State Park, Guarapari Municipality, Espírito Santo State, Brazil. Several species reported previously from restinga appear to be erroneous records, based on misidentification.

Restinga is a kind of vegetation growing on quaternary sandy sediments, along the coast of Brazil (Ribas, Hay & Caldas-Soares, 1994). It presents a high floristic and physiognomic diversity; the species composition changes from areas with grass, through dense forests, to swampy dense forests. The restinga vegetation is a ecosystem with a structural complexity and biological diversity, which sustains comparison only with the tropical rain forests (Ribeiro & Monteiro, 1994).

There are only three papers about the bryophytes of Brazilian restingas. Behar et al (1992) reported 15 bryophytes from Setiba State Park; Vital & Visnadi (1994) mentioned 52 bryophytes from Juréia Ecological Station, Peruíbe Municipality, São Paulo State; and Yano & Costa (1994) reported 13 bryophytes from Massambaba,

Arraial do Cabo Municipality, Rio de Janeiro State.

We examined the materials reported by Behar et al. (1992) which are deposited in SP, but we could not study those of these authors in VIES. Therefore, seven species reported by Behar et al. (1992) are not listed in the present paper. Four of them were not collected by Capelari and Vital: *Acrolejeunea torulosa* (Lehm. & Lindenb.) Schiffn., *Frullania caroliniana* Sull., *Rectolejeunea maxonii* Evs. and *Meiothecium revolubile* Mitt. We have asked for the later species from VIES but have not received any answer yet. The other three species are treated here as misidentifications; materials cited as *Lejeunea flava* (Sw.) Nees were reidentified in part as *Cheilolejeunea discoidea* (Lehm. & Lindenb.) Kach. & Schust. and partly as *Rectolejeunea brittoniae* Evs.; of 11

specimens cited as *Mastigolejeunea auriculata* (Wils.) Schiffn., 10 belong to *Schiffneriolejeunea polycarpa* (Nees) Gradst.; and the material reported as *Campylopus arenaceum* (Broth.) Frahm is *C. trachyblepharon*, a species not collected by Capelari and Vital. The remaining eight bryophytes reported by Behar et al. (1992) are listed here: *Frullania ericoides* (Nees) Mont., *Frullania gibbosa* Nees in Mont., *Frullania neesii* Lindenb., *Lejeunea ulicina* (Tayl.) Tayl., ex Gott., Lehm. & Nees [as *Microlejeunea ulicina* (Tayl.) Steph. by Behar et al., 1992], *Isopterygium tenerum* (Sw.) Mitt., *Octoblepharum albidum* Hedw., *Schlotheimia rugifolia* (Hook.) Schwaegr. and *Sematophyllum subpinnatum* (Brid.) Britt. [as *Sematophyllum caespitosum* (Hedw.) Mitt. by Behar et al., 1992]. On the other hand, 26 further bryophyte species (21 hepatics, five mosses) are reported in the present paper, which were not listed by Behar et al. (1992).

Of the 13 bryophytes from restinga reported by Yano & Costa (1994) four are not treated in the present paper: *Chonecolea doellingeri* (Nees) Grolle, *Frullania dusenii* Steph., *Barbula agraria* Hedw. and *Campylopus arenaceum* (Broth.) Frahm. However, all the materials reported as *F. dusenii* Steph. are treated here as misidentifications of *F. gibbosa* Nees in Mont. The single material from SP reported as *C. arenaceum* is treated here as misidentification of *C. trachyblepharon* (C. Müll.) Mitt. It was not observed the other material cited as *C. arenaceum* from Herbarium RB.

The Setiba State Park is localized in Guarapari Municipality, Espírito Santo State, ca. 20°33'S-40°23'W. About the vegetation of Setiba State Park, see Behar & Viégas (1992) and Behar et al. (1992).

The collections were made by Capelari and Vital in October 1992 in four kinds of restinga:

1. Low and sparse restinga: sparse shrubby vegetation of ca. 3m alt.
2. Medium restinga: arboreous-shrubby vegetation of ca. 5-8m alt.
3. High restinga: dense forest with arboreous-shrubby vegetation of ca. 6-15m alt., on sandy-humous soil.
4. High and sandy restinga: similar to high restinga but without humus.

All examined materials are deposited in SP.

## HEPATICAE

*Aphanolejeunea subdiaphana* (Jovet-Ast) Pócs

Low and sparse restinga, on shrub stem base and sandy soil, Capelari & Vital 6.

*Ceratolejeunea laetefusca* (Aust.) Schust.

High restinga, on live tree trunk base, Capelari & Vital 24.

*Cheilolejeunea discoidea* (Lehm. & Lindenb.) Kach. & Schust.

High and sandy restinga, on trunk and roots of a live tree, Capelari & Vital 39.

Behar et al. (1992) reported Yano, Behar, Pereira & Vallandro 12528 p.p. (SP227404) as *Lejeunea flava* (Sw.) Nees. However, it is a misidentification of the material which we consider to be *Ch. discoidea*. The other three materials of Intra et al. from Herbarium VIES, which were also cited as *L. flava*, were not observed.

*Cheilolejeunea exinnovata* E.W. Jones

High restinga, on live tree trunk base, Capelari & Vital 27. High and sandy restinga, on decayed log, Capelari & Vital 31; on live tree trunk, Capelari & Vital 33. Medium restinga, on live tree trunk, Capelari & Vital 46.

*Cheilolejeunea rigidula* (Nees ex Mont.) Schust.

High and sandy restinga, on trunk and roots of a live tree, Capelari & Vital 39.

*Chonecolea doellingeri* (Nees) Grolle

Low and sparse restinga, on live shrub stem base and sandy soil, Capelari & Vital 7, 9.

*Cololejeunea cardiocarpa* (Mont.) Schust.

Low and sparse restinga, on shrub stem base and sandy soil, Capelari & Vital 6.

*Cololejeunea minutissima* (Sm.) Schiffn.

High restinga, on live tree trunk base, Capelari & Vital 27. Medium restinga, on live tree trunk, Capelari & Vital 5.

*Frullania caulisequa* (Nees) Nees

High and sandy restinga, on decayed log, Capelari & Vital 31; on trunk and roots of a live tree, Capelari & Vital 40. Medium restinga, on live tree trunk, Capelari & Vital 11.

*Frullania ericoides* (Nees) Mont.

High restinga, on fallen tree branches, Capelari & Vital 22; on decayed log, Capelari & Vital 28. High and sandy restinga, on live tree trunk, Capelari & Vital 32, 36, 50; on trunk and roots of a live tree, Capelari & Vital 40. Low and sparse restinga, on shrub stem base, Capelari & Vital 2. Medium restinga, on live tree trunk, Capelari &

Vital 3.

*Frullania gibbosa* Nees

High restinga, on fallen tree branches, Capelari & Vital 22. High and sandy restinga, on live tree trunk, Capelari & Vital 36. Low and sparse restinga, on shrub stem base, Capelari & Vital 2.

Yano & Costa (1994) reported Yano, Sugiyama & Costa 15768 (SP240946), 15781 (SP240957), 15891 (SP240962) as *Frullaniaduse-nii* Steph. However, we consider it to be *F. gibbosa*. *Frullania neesii* Lindenb.

High and sandy restinga, on trunk and roots of a live tree, Capelari & Vital 40. Medium restinga, on live tree trunk, Capelari & Vital 3, 4, 5. *Frullanoides tristis* (Steph.) van Slageren

High and sandy restinga, on live tree trunk, Capelari & Vital 37.

*Lejeunea caespitosa* Lindenb.

High restinga, on live tree trunk base, Capelari & Vital 23. High and sandy restinga, on decayed log, Capelari & Vital 31. Low and sparse restinga, on shrub stem base and sandy soil, Capelari & Vital 7.

*Lejeunea glaucescens* Gott.

High and sandy restinga, on decayed log, Capelari & Vital 31, 42. Medium restinga, on dead trunk, Capelari & Vital 18.

*Lejeunea laetevirens* Nees & Mont.

High restinga, on live tree trunk base, Capelari & Vital 27; on trunk, Capelari & Vital 29. Medium restinga, on live tree trunk, Capelari & Vital 44, 46.

*Lejeunea ulicina* (Tayl.) Tayl. ex Gott. et al.

High restinga, on dead trunk, Capelari & Vital 28. High and sandy restinga, on decayed log, Capelari & Vital 31; on live tree trunk, Capelari & Vital 32, 36; on trunk and roots of a live tree, Capelari & Vital 39.

*Leucolejeunea conchifolia* (Evs.) Evs.

Medium restinga, on live tree trunk, Capelari & Vital 3, 4.

*Lopholejeunea subfusca* (Nees) Steph.

High restinga, on trunk, Capelari & Vital 29. High and sandy restinga, on decayed log, Capelari & Vital 31, 42; on live tree trunk, Capelari & Vital 35; on trunk and roots of a live tree, Capelari & Vital 39. Low and sparse restinga, on shrub stem base and sandy soil, Capelari & Vital 8. Medium restinga, on live tree trunk, Capelari & Vital 13, 46.

*Plagiochila guilleminiana* Mont.

On live tree trunk: high restinga, Capelari & Vital 30; medium restinga, Capelari & Vital 47.

*Rectolejeunea beteroana* (Gott.) Evs.

High and sandy restinga, on live tree trunk, Capelari & Vital 32.

*Rectolejeunea brittoniae* Evs.

High restinga, on live tree trunk base, Capelari & Vital 27. High and sandy restinga, on decayed log, Capelari & Vital 31, 42; on live tree trunk, Capelari & Vital 34, 36; on trunk and roots of a live tree, Capelari & Vital 39. Low and sparse restinga, on shrub stem base, Capelari & Vital 2; on shrub stem base and sandy soil, Capelari & Vital 6. Medium restinga, on live tree trunk, Capelari & Vital 3, 46.

Behar et al. (1992) reported Yano, Behar, Pereira & Vallandro 12529 (SP227405) as *Lejeunea flava* (Sw.) Nees. However, it is a misidentification of the material which we consider to be *R. brittoniae*. The other three materials of Intra et al. from Herbarium VIES, which were also reported as *L. flava*, were not observed.

*Rectolejeunea phyllobola* (Nees & Mont.) Evs.

Low and sparse restinga, on shrub stem base and sandy soil, Capelari & Vital 8. Medium restinga, on live tree trunk, Capelari & Vital 12; on decayed log, Capelari & Vital 15.

*Schiffneriolejeunea polycarpa* (Nees) Gradst.

High restinga, on decayed log, Capelari & Vital 28. High and sandy restinga, on live tree trunk, Capelari & Vital 32; on trunk and roots of a live tree, Capelari & Vital 39; on decayed log, Capelari & Vital 42.

Behar et al. (1992) reported 11 specimens as *Mastigolejeunea auriculata* (Wils.) Schiffn. However, only Yano, Behar, Pereira & Vallandro 12547 (SP227423) presents this species. The remaining ten specimens: Yano, Behar, Pereira & Vallandro 12525 (SP227401), 12526 (SP227402), 12535 (SP227411), 12536 (SP227412), 12541 (SP227417), 12543 (SP227419), 12544 (SP227420), 12545 p.p. (SP227421), 12562 (SP227438), 12566 p.p. (SP227441), we consider to be *Schiffneriolejeunea polycarpa*. The other ten materials of Vallandro et al. and Intra et al. from Herbarium VIES identified as *M. auriculata*, were not observed. *Taxilejeunea pterigonia* (Lehm. & Lindenb.) Schiffn.

High and sandy restinga, on live tree trunk,

Capelari & Vital 38.

#### MUSCI

*Bryum capillare* Hedw.

Low and sparse restinga, on shrub stem base and sandy soil, Capelari & Vital 9.

*Calymperes palisotii* Schwaegr.

High restinga, on fallen tree branches, Capelari & Vital 21; on trunk, Capelari & Vital 50. High and sandy restinga, on decayed log, Capelari & Vital 31, 42; on live tree trunk, Capelari & Vital 35; on trunk and roots of a live tree, Capelari & Vital 41; on trunk of *Clusia* sp., Capelari & Vital 51. Medium restinga, on live tree trunk, Capelari & Vital 44, 48.

*Campylopus pilifer* Brid.

Low and sparse restinga, on sandy soil, Capelari & Vital 1.

*Campylopus trachyblepharon* (C. Müll.) Mitt.

Capelari and Vital have not found *C. trachyblepharon* (C. Müll.) Mitt. However the species occurs in Setiba. Behar et al. (1992) reported Yano, Behar, Pereira & Vallandro 12555 (SP227431) as *C. arenaceum* (Broth.) Frahm, but it belongs to *C. trachyblepharon*. The other two materials of Vallando et al. and Intra et al. from Herbarium VIES, which were also reported as *C. arenaceum*, were not observed. Yano & Costa (1994) reported Yano, Sugiyama & Costa 15770 (SP240948) as *C. arenaceum*, but it is also *C. trachyblepharon*. The other material reported as *C. arenaceum* from Herbarium RB was not observed.

*Groutiella apiculata* (Hook.) Crum & Steere

High restinga, on fallen tree branches, Capelari & Vital 20; on live tree trunk, Capelari & Vital 30.

*Isopterygium tenerum* (Sw.) Mitt.

High restinga, on a live tree trunk base with dead parts, Capelari & Vital 25; on termite, Capelari & Vital 49. High and sandy restinga, on trunk and roots of a live tree, Capelari & Vital 41; on decayed log, Capelari & Vital 42. Low and sparse restinga, on shrub stem base and sandy soil, Capelari & Vital 7, 10. Medium restinga, on trunk of a live tree, Capelari & Vital 48; on decayed log, Capelari & Vital 16, 18.

*Neckeropsis undulata* (Hedw.) Reichardt

High and sandy restinga, on decayed log, Capelari & Vital 43. Medium restinga, on live tree trunk, Capelari & Vital 44.

*Octoblepharum albidum* Hedw.

High restinga, on live tree trunk base with dead parts, Capelari & Vital 26. Medium restinga, on decayed log, Capelari & Vital 17.

*Schlotheimia rugifolia* (Hook.) Schwaegr.

High restinga, on fallen tree branches, Capelari & Vital 19.

*Sematophyllum subpinnatum* (Brid.) Britt.

High restinga, on live tree trunk base with dead parts, Capelari & Vital 25; on trunk, Capelari & Vital 50. High and sandy restinga, on decayed log, Capelari & Vital 31, 42; on trunk and roots of a live tree, Capelari & Vital 41; on trunk of *Clusia* sp., Capelari & Vital 51. Medium restinga, on live tree trunk, Capelari & Vital 3, 14.

According to Table 1, the low and sparse restinga has the smallest number of bryophytes, the high and sandy restinga, the largest one, while the medium and high restingas have intermediate numbers of bryophytes species. Five species were found only in low and sparse restinga; three only in medium restinga; three only in high restinga; and five only in high and sandy restinga. The bryophytes of the four kinds of restingas seem to be essentially similar, although Capelari and Vital have visited the Setiba State Park only once. The few differences found may be due to the small number of collections made there.

The second author collected 52 bryophytes from restinga at the Juréia Ecological Station (Vital & Visnadi, 1994) and 34 bryophytes from restinga at Setiba State Park. However, the bryoflorulas from restingas seems to differ between these two places - only 10 species (seven hepatics, three mosses) are common between them. *Isopterygium tenerum* (Sw.) Mitt., is common to the low and sparse restingas from these two places. Also only *Isopterygium tenerum* (Sw.) Mitt. is common to the medium restingas of these two places. Six bryophytes occur in high restinga at Setiba and in the transition area with the Atlantic forest at Juréia; and nine species occur in high and sandy restinga at Setiba and in the transition area with the Atlantic forest at Juréia.

#### Literature cited

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**Table 1:** Bryophytes collected in four kinds of restingas at Setiba State Park, Guarapari Municipality, Espírito Santo State, Brazil.

	Low and sparse restinga	Medium restinga	High restinga	High and sandy restinga
<b>Hepaticae</b>				
<i>Aphanolejeunea subdiaphana</i>	X			
<i>Ceratolejeunea laetefusca</i>			X	
<i>Cheilolejeunea discoidea</i>				X
<i>Cheilolejeunea exinnovata</i>		X	X	X
<i>Cheilolejeunea rigidula</i>				X
<i>Chonecolea doellingeri</i>	X			
<i>Cololejeunea cardiocarpa</i>	X			
<i>Cololejeunea minutissima</i>		X	X	
<i>Frullania caulisequa</i>		X		X
<i>Frullania ericoides</i>	X	X	X	X
<i>Frullania gibbosa</i>	X		X	X
<i>Frullania neesii</i>		X		X
<i>Frullanoides tristis</i>				X
<i>Lejeunea caespitosa</i>	X		X	X
<i>Lejeunea glaucescens</i>		X		X
<i>Lejeunea laetevirens</i>		X	X	
<i>Lejeunea ulicina</i>			X	X
<i>Leucolejeunea conchifolia</i>		X		
<i>Lopholejeunea subfusca</i>	X	X	X	X
<i>Plagiochila guilleminiana</i>		X	X	
<i>Rectolejeunea berteroana</i>				X
<i>Rectolejeunea brittoniae</i>	X	X	X	X
<i>Rectolejeunea phyllobola</i>	X	X		
<i>Schiffneriolejeunea polycarpa</i>			X	X
<i>Taxilejeunea pterigonia</i>				X
<b>Musci</b>				
<i>Brum capillare</i>	X			
<i>Calymperes palisotii</i>		X	X	X
<i>Campylopus pilifer</i>	X			
<i>Groustiella apiculata</i>			X	
<i>Isopterygium tenerum</i>	X	X	X	X
<i>Neckeropsis undulata</i>		X		X
<i>Octoblepharum albidum</i>		X	X	
<i>Schlotheimia rugifolia</i>			X	
<i>Sematophyllum subpinnatum</i>		X	X	X
Total: 34	12	17	18	20
Hepatics: 25	9	12	12	16
Mosses: 9	3	5	6	4

Sér.) 1: 39-59.

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