Punctelia (*Parmeliaceae*, lichenized *Ascomycota*) from roadsides and slopes in the Serra Geral of Rio Grande do Sul, Brazil

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RESUMO

Sete espécies de Punctelia *Krog, coletadas nos barrancos e peraus da Serra Geral, região central do Rio Grande do Sul, Brasil, são descritas, ilustradas e comentadas. Uma chave para identificação é fornecida. Pela primeira vez neste gênero, é documentada a reação medular à* para-*fenilenodiamina.*
Palavras – Chave: Punctelia, Parmeliaceae, *liquens, Brasil, florística.*

ABSTRACT

Seven species of Punctelia *Krog from the roadsides and slopes of Geral Range, Rio Grande do Sul State central region, Brazil, are described, illustrated, and keyed, including comments about a positive medullary reaction to para-phenylenediamine, recorded for the first time in this genus.*
Keywords: Punctelia, Parmeliaceae, *lichens, Brazil,floristic.*

INTRODUCTION

Krog (1982) proposed the genus *Punctelia* as a segregate of the collective genus *Parmelia* Ach., including those species characterized by atranorin (subgenus *Punctelia*) or usnic acid (subgenus *Flavopunctelia*) as cortical substances. *Flavopunctelia*, which has additionally bifusiform conidia, was recognized as a genus by Hale (1984). Therefore, *Punctelia*, with a mainly tropical distribution, remained to include those species with a green-gray upper cortex (atranorin), pseudocyphellae mainly orbicular, conidia unciform or, less commonly, filiform, and marginal cilia lacking (Elix 1993). Kirk *et al.* (2001) and Egan & Aptroot (2004) accepted about 30 species of *Punctelia*, 16 already recorded for Brazil (Marcelli 2004), and 14 of them listed for Rio Grande do Sul State (Spielmann 2006).

This paper presents the species of *Punctelia* found during a *Parmeliaceae* survey of the slopes and cliffs of the Serra Geral (Geral Range), a central mountainous region of Rio Grande do Sul, the southernmost Brazilian state, which has a subtropical climate. The area is about 28°57′–29°41′S and 52°26′–53°01′W and is covered by several types of grasslands and subtropical forest vegetation, chiefly the decidual stational forest (Rambo 1956). A more detailed overview of the studied area can be found in Spielmann (2005)..

MATERIAL AND METHODS

The specimens were studied through classical lichenological methods. Lichen substances were identified by TLC and spot tests following Huneck & Yoshimura (1996), Orange *et al*. (2001) and Bungartz (2001).

We use here the term boundary to describe the underside part where the color change between the marginal and central portion of the thallus occurs. Boundaries are defined as clear-cut or attenuate (when a gradual color change is observed).

RESULTS AND DISCUSSIONS

KEY TO THE SPECIES OF *PUNCTELIA* FOUND IN SERRA GERAL

1 Thallus with soredia, isidia or lobulae …..... 2
Thallus without soredia, isidia and lobulae 4

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2(1) Thallus with soredia ..... *P. reddenda*
Thallus with isidia or lobulae 3

3(2) Thallus isidiate, conidia filiform ……. ..... *P. colombiana*
Thallus lobulate, conidia unciform …… ..... *P. constantimontium*

4(1) Medulla with an orange pigment, reacting K+ purplish ……..…….. *P. purpurascens*
Medulla entirely white 5

5(4) Lower surface brown, medulla with lecanoric acid (C+ red) ..... *P. graminicola*
Lower surface black or mottled white, medulla with gyrophoric acid (C+ rose or reddish) ….... 6

6(5) Medulla with fatty acids and variable concentrations of gyrophoric acid (C+ rose or C–); ascospores 20.0–26.5 × 12.5–16.0 µm …… ..... *P. riograndensis*
Medulla with gyrophoric acid only; ascospores 11.0–15.0 × 7.5–12.0 µm ..... *P. subpraesignis*

Punctelia colombiana Sérus.
Nordic Journal of Botany **4** (5): 717. 1984.

Type: Colombia, Dept. Antioquia, Medellín, ca. 1800 m alt., October 1930, *Archer* 1380 (holotype: S), fide Sérusiaux (1984).

Thallus greenish gray or brownish in herbarium, lobate, adnate, 18 cm broad; *lobes* irregularly branched, laterally overlapping, 1.5–8.0 mm wide, with rounded apices; *margin* smooth to crenate; distal *surface* smooth to rugose or sometimes foveolate, lustrous, pruinose close to the margin, becoming rugose and foveolate in the center. *Lacinulae*, *maculae*, *pustulae* and *soredia* lacking. *Isidia* concolorous with the thallus or with brown apices, cylindrical to coralloid or squamiform, 0.05–0.50 × 0.05–0.60 mm, erect, firm, abundant, marginal and on pseudocyphellae, with eciliate apices. *Pseudocyphellae* conspicuous, although normally covered by isidia, abundant, punctiform to irregular, elongated when on the wrinkles crests, convex to plane, not distinctly margined, (0.05–) 0.10–0.4 (–1.4) mm in diameter, laminal, originating isidia. *Medulla* white. *Lower surface* black, lustrous, smooth, rugose or papillate; *margin* brown, lustrous, 1–4 mm wide, naked, smooth, rugose or papillate, boundary clear-cut to attenuate; *rhizinae* black to pale brown, simple to irregularly branched, 0.10–1.40 × 0.02–0.20 mm, abundant, evenly dispersed.
Apothecium very immature in our material, urceolate, stipitate, 1.6 mm of diameter, laminal, with smooth margin, amphithecium with pseudocyphellae, disc concave, epruinose, imperforate. *Ascospores* lacking [according to Sérusiaux (1984), ascospores ellipsoid, 14–16 (–17) × (9–) 10–12 (–13) µm, epispore 1 µm thick].
Pycnidia laminal to submarginal, rare, conspicuous, with or without prominent margin, ostiole black. *Conidia* filiform, 9–13 × ca. 1 µm.
Chemistry. Cortex K+ yellow, UV–; medulla K–, C+ intense rose, KC+ intense rose, P–, UV–; containing atranorin (cortex) and gyrophoric acid (medulla).

Specimen examined. Brazil, Rio Grande do Sul State, Sinimbu Municipality, Cava Funda, 29°27′33.4″S, 52°31′05.1″W, 520 m alt., saxicolous, on roadside, open place, 05 January 2004, *A.A. Spielmann* & *L.S. Canêz* 1000 (SP).

Notes. The presence of isidia, black lower surface, filiform conidia, and gyrophoric acid (C+ intense rose) characterize *Punctelia colombiana*. *Punctelia constantimontium* Sérus. also has a black lower surface and produces gyrophoric acid, but its conidia are unciform and the lobulae are always flat, never developing into isidia. *Punctelia stictica* (Delise ex Duby) Krog differs by the presence of granular soredia, sometimes mixed with "isidioid structures" (Adler 1996). *Punctelia colombiana* was recently found in Brazil (Canêz 2005), and this is the second record for this country.

Distribution. Argentina (Adler 1989, Calvelo & Liberatore 2002), Brazil (Canêz 2005) and Colombia (Sérusiaux 1984). In Brazil, it is known from Rio Grande do Sul State (Canêz 2005, Spielmann 2005).

Punctelia constantimontium Sérus.
Nordic Journal of Botany **3** (4): 517. 1983.

Type: Zimbabwe, Inyanga, Little Connemara, 2300 m alt., épiphyte, *Bamps*, *Symoens* & *Vanden Berghen* 204 (holotype: LG), fide Sérusiaux (1983).

Thallus greenish gray or brownish in herbarium, lobate, adnate, corticolous or saxicolous, 8.5–13.5 cm broad; *lobes* irregularly branched, laterally overlapping, 1–7 mm wide, with rounded apices; *margin* crenate to incised; *surface* smooth to rugose and foveolate, pruinose on the lobe apices. *Lacinulae*, *maculae*, *pustulae*, *soredia* and *isidia* lacking. *Lobulae* laminal to marginal, irregularly incised, numerous and covering most of the thallus, become imbricate and erect with ageing, 0.05–2.00 × 0.05–1.50 mm, lower cortex entire or soon becoming eroded and showing the medullary tissue, upper surface usually pruinose and sometimes with small pseudocyphellae. *Pseudocyphellae* conspicuous, more dense in the distal areas, abundant, punctiform, ellipsoid or irregular to elongated, especially along ridges, plane to concave or rarely little convex, 0.10–10.00 × 0.10–0.40 mm, laminal, on the thallus ridges, and marginal on the lobulae, becoming lobulate toward the thallus center. *Medulla* white. *Lower surface* black, lustrous, smooth to papillate or rugose; *margin* pale brown to dark brown, sometimes white variegated, lustrous, 1–3 mm wide, naked, smooth, rugose or slightly foveolate, boundary clear-cut to attenuate; *rhizinae* black, cream, white or white with a black base, simple to irregularly branched, 0.10–1.50 × 0.02–0.20 mm, abundant, evenly dispersed.
Apothecia urceolate, 0.5–4.2 mm in diameter, stipitate, laminal, with crenate margin, amphithecia pseudocyphellate and verruculose, disc brown, epruinose,

imperforate; *epithecium* 7-10 µm; *hymenium* 35–50 µm; *subhymenium* 12–25 µm. *Ascospores* ellipsoid to subglobose, 13.0–16.5 × 7.5–10.0 µm, epispore ca. 1.0 µm.
Pycnidia submarginal, ostiole black. *Conidia* unciform, 4.0–6.5 × ca. 1.0 µm.
Chemistry. Cortex K+ yellow, UV–; medulla K–, C+ rose, KC+ rose, P–, UV–; containing atranorin (cortex), gyrophoric acid and an unidentified substance with Rf 22 (orcinyl lecanorate?) in solvent C (medulla).

Specimens examined. Brazil, Rio Grande do Sul State. Boqueirão do Leão Municipality, Linha Sinimbuzinho, Perau da Nega, 29°20′02.2″S, 52°26′27.9″W, 440 m alt., saxicolous, on roadside, slightly shaded, 24 January 2004, *A.A. Spielmann* & *L.S. Canêz* 720 (SP); idem, on boulder, close to the stream and the street, slightly shaded, 24 February 2004, *A.A. Spielmann* & *L.S. Canêz* 936 (SP), 1321 (SP). Idem, Herveiras Municipality, next to "Balneário Tio Juba", corticolous, on roadside, shaded, 06 February 2004, *A.A. Spielmann* & *L.S. Canêz* 1370 (SP). Idem, Sinimbu Municipality, Cava Funda, 29°27′33.4″S, 52°31′05.1″W, 520 m alt., saxicolous, on roadside, open place, 05 January 2004 *A.A. Spielmann* & *L.S. Canêz* 978 (SP).

Notes. *Punctelia constantimontium* is characterized by the abundant flat lobulae, black lower surface, gyrophoric acid (C+ rose) and unciform conidia. *Punctelia colombiana* differs by the isidiate thallus (with some flattened isidia) and filiform conidia.
In the specimens Spielmann & Canêz 720 and 978 the lobulae under margin is decorticated. However, in Spielmann & Canêz 720 the underside has shiny dark brown margins, while in Spielmann & Canêz 978 the underside has a wide pale brown opaque margin. The only specimen with apothecia (Spielmann & Canêz 1370) has crowded lobes, pruinose at lobe tips, and the lobulae generally rise as small isidia, soon becoming flatted.
Distribution. Africa and South America (Sérusiaux 1983, Swinscow & Krog 1988). In South America it is known from Argentina (Sérusiaux 1983, Calvelo & Liberatore 2002), Brazil (Marcelli 2004) and Uruguay (Osorio 1992a; Sérusiaux 1983). In Brazil it was recorded in the States of Mato Grosso do Sul (Osorio 1992b), Mato Grosso (Sérusiaux 1983), Paraná (Eliasaro 2001), Rio Grande do Sul (Spielmann 2006) and Santa Catarina (Sérusiaux 1983).

Punctelia graminicola (B. de Lesd.) Egan
The Bryologist **106** (2): 315. 2003.
Basionym: *Parmelia graminicola* B. de Lesd., *Revue Bryologique et Lichénologique* **12**: 59. 1942.

Type: United States, New Mexico, Chimayo Dam, 1.900 m alt., 18 July 1935, *Arsène* 22533 (lectotype: ASU), fide Egan (2003).

Synonym: *Punctelia semansiana* (W.L. Culb. & C.F. Culb.) Krog, *Nordic Journal of Botany* **2** (3): 291, 1982, fide Egan (2003).

Thallus greenish gray or brownish in herbarium, lobate, adnate, corticolous or saxicolous, 3.0–14.5 cm broad; *lobes* irregularly branched, laterally overlapping to crowded, 1.0-4.5 mm wide, with rounded apices; *margin* crenate to incised-crenate (sublacinulate); *surface* smooth to rugose and foveolate. *Lacinulae* present or lacking. *Maculae*, *pustulae*, *soredia* and *isidia* lacking. *Pseudocyphellae* conspicuous, abundant, punctiform, rounded to irregular, generally concave, 0.03–0.60 × 0.03–0.40 mm, laminal and on the amphithecium. *Medulla* white. *Lower surface* brown to olivaceous brown, lustrous, smooth, rugose, veined or papillate; *margin* usually indistinct or pale brown to beige, lustrous, naked, papillate; *rhizinae* brown, white, beige or grayish, simple to irregularly branched, often flattened, 0.10–3.50 × 0.01–0.20 mm, abundant, evenly dispersed.
Apothecia urceolate, 1–9 mm of diameter, stipitate, laminal, margin crenate to smooth, amphithecium pseudocyphellate, striate and areolate, disc brown, epruinose, imperforate. *Ascospores* ellipsoid to subglobose, 10.0–14.0 × 6.5–10.0 µm, epispore 0.8–1.2 µm.
Pycnidia submarginal, ostiole black. *Conidia* unciform, 4.0–7.0 × ca. 1.0 µm.
Chemistry. Cortex K+ yellow, UV–; medulla K–, C+ red, KC+ red, P–, UV–; containing atranorin (cortex, not detected in TLC, but indicated by spot test) and lecanoric acid (medulla).

Specimens examined. Brazil, Rio Grande do Sul State. Boqueirão do Leão Municipality, Cascata do Gamelão, 29°18′13.7″S, 52°26′51.7″W, 500 m alt., in a tree branch with mosses, on the edge of a stream, diffuse light, 01 February 2004, *A.A. Spielmann* & *M.A. Sulzbacher* 747 (SP). Idem, Herveiras Municipality, 29°27′12.5″S, 52°37′57.7″W, 540 m alt., on trunk of *Eucalyptus*, on roadside, open place, 24 January 2004, *A.A. Spielmann*, *L.S. Canêz* & *C. Trentin* 730 (SP), 1309 (SP); idem, 29°25′53.7″S, 52°40′19.6″W, 570 m alt., on trunk of *Eucalyptus*, on roadside, open place, 24 January 2004, *A.A. Spielmann*, *L.S. Canêz* & *C. Trentin* 1326 (SP). Idem, Sinimbu Municipality, Cava Funda, 29°27′41.8″S, 52°31′11.7″W, 500 m alt., saxicolous, on roadside, open place, 12 February 2003, *A.A. Spielmann* 73 (SP); idem, 29°27′33.4″S, 52°31′05.1″W, 520 m alt., saxicolous, on roadside, open place, 05 January 2004, *A.A. Spielmann* & *L.S. Canêz* 721 (SP). Idem, Sobradinho Municipality, margin of RST-481, next to the crossroad, 29°24′20.2″S, 53°01′25.9″W, 375 m alt., saxicolous, on roadside, open place, 17 July 2003, *A.A. Spielmann* 358 (SP).

Notes. *Punctelia graminicola* is a species with or without lacinulae, characterized by the brown lower surface, presence of lecanoric acid (medulla C+ red), and unciform conidia. *Punctelia hypoleucites* (Nyl.) Krog is differentiated by the 11–12 µm long filiform conidia (Culberson & Culberson 1980). *Punctelia riograndensis* (Lynge) Krog and *P. subpraesignis* (Nyl.) Krog have a black or white variegated lower surface and gyrophoric acid in the medulla (C+ rose or red). It must be noted, however, that the concept of *Punctelia graminicola*

currently in use is very broad, since it includes specimens without lacinulae (Fig. 04) as well as completely lacinulate ones (Fig. 05).
Punctelia graminicola was formerly widely known as *P. semansiana* (W.L. Culb. & C.F. Culb.) Krog, until Egan (2003) discovered an older name. The epithet *graminicola* suggests that the lichen was collected on some *Gramineae*, but Bouly de Lesdain (1942) asserted that the substrate consisted of mosses and *Selaginella* (a spikemoss).

Distribution. Africa (Swinscow & Krog 1988, as *Punctelia semansiana*), North America (Lamb 1963; Esslinger 2007; Egan & Aptroot 2004), and South America (Marcelli 2004, as *P. semansiana*). In South America it is known from Argentina (Adler 1989, Calvelo & Liberatore 2002, both as *P. semansiana*) and Brazil (Marcelli 2004, as *P. semansiana*). In Brazil it was recorded in the States of Minas Gerais (Ribeiro 1998, as *P. semansiana*), Paraná (Eliasaro 2001, as *P. semansiana*), Rio Grande do Sul (Spielmann 2006), and São Paulo (Ribeiro 1998, Marcelli 1998, both as *P. semansiana*).

Punctelia purpurascens Marcelli & Canêz
Mycotaxon **99**: 214. 2007.
Type: Brazil, Rio Grande do Sul State, Municipality of Vacaria, Fazenda da Estrela, open field, 28º04′01,8″S, 50º57′45,4″W, 920 m alt., on a basaltic rock in a open place, leg. *L. S. Canêz & A. A. Spielmann 869*, 13-I-2004 (holotype: SP), fide Canêz & Marcelli (2007).

Thallus greenish gray or pale brownish in herbarium, lobate, adnate, corticolous, 13 cm broad; *lobes* irregularly branched, laterally overlapping to crowded, 1.5–6.0 mm wide, with rounded apices; *margin* crenate to incised-crenate (sublacinulate); *surface* rugose. *Lacinulae* simple to branched, 0.5–4.0 × 0.3–2.0 mm, with rounded to slightly acute apices. *Maculae*, *pustulae*, *soredia* and *isidia* lacking. *Pseudocyphellae* inconspicuous, abundant, punctiform to ellipsoid or elongated, concave to convex, 0.05–0.30 × 0.05–0.20 mm, laminal, often raising in cortical protuberances. *Medulla* white or with orange pigment, K+ purplish on the central and lower parts of the medulla, in the proximal part of the thallus. *Lower surface* beige to dirty white, lustrous, smooth, rugose, or veined; *margin* concolorous with the center of the thallus, naked; *rhizinae* concolorous with the lower surface, simple to irregularly branched, 0.10–2.00 × 0.01–0.20 mm, abundant, evenly dispersed.
Apothecia lacking (description in Canêz & Marcelli 2007).
Pycnidia usually submarginal, sometimes reaching the margin, with or without prominent margin, ostiole black. *Conidia* unciform, 4.0–6.5 × ca. 1.0 µm.
Chemistry. Cortex K+ yellow, UV–; white medulla K–, C–, KC–, P–, UV–; orange medulla K+ lilac to purple; containing atranorin (cortex, not detected by TLC) and caperatic acid (medulla).

Specimen examined. Brazil, Rio Grande do Sul State, Herveiras Municipality, 29°25′53.7″S, 52°40′19.6″W, 570 m alt., at the base of a shrub, on roadside, open place, 24 January 2004, *A.A. Spielmann*, *L.S. Canêz* & *C. Trentin* 1007 (SP).

Notes. *Punctelia purpurascens* is characterized by the lower surface beige to dirty white, medulla white or with an orange pigment, K+ purplish, and unciform conidia. This recently proposed (Canêz & Marcelli 2007) species is the second *Punctelia* described with a medullary pigment, the first one noted being *P. neutralis* (Hale) Krog (Krog & Swinscow 1977, Krog 1982).

Distribution. Known only from Rio Grande do Sul State, southern Brazil (Canêz & Marcelli 2007 and the present report).

Punctelia reddenda (Stirton) Krog
Nordic Journal of Botany **2** (3): 291. 1982.
Basionym: *Parmelia reddenda* Stirton, *Scottish Naturalist* **4**: 298. 1877-78.

Type: Scotland, near New Galloway, M' Andrew (holotype: BM, isotype: GLAM), fide Hale (1965).

Thallus brownish in herbarium, lobate, adnate, saxicolous, 5.0–7.5 cm broad; *lobes* irregularly branched, laterally overlapping, 1.0–5.5 mm wide, with rounded apices; *margin* crenate to incised-crenate (sublacinulate); *surface* smooth to rugose. *Lacinulae*, *maculae*, *pustulae* and *isidia* lacking. *Soralia* capitate, laminal or marginal to submarginal, usually rising from pseudocyphellae, commonly confluent in the older parts; *soredia* coarse granular. *Pseudocyphellae* conspicuous, abundant, punctiform, ellipsoid to irregular, usually convex, 0.05–0.80 × 0.05–0.40 mm, laminal to marginal, giving rise to soredia, lobes or lacinulae. *Medulla* white. *Lower surface* black, lustrous, smooth to rugose or veined; *margin* brown, lustrous, 1–3 mm wide, naked, smooth, rugose, veined or papillate, boundary clear-cut to attenuate; *rhizinae* black to pale brown, often with paler apices, simple, sometimes coalescing, 0.10–1.00 × 0.02–0.15 mm, frequent, evenly dispersed.
Apothecia unknown.
Pycnidia lacking [according to Canêz (2005), pycnidia submarginal, ostiole black, 0.05–0.10 mm of diameter; *conidia* unciform, 5.0–7.0 × 1.0 µm].
Chemistry. Cortex K+ yellow, UV–; medulla K–, C–, KC–, P–, UV–; containing atranorin (cortex), praesorediosic acid, protopraesorediosic acid, protolichesterinic acid, and an unidentified fatty acid with Rf 44 in solvent C (medulla).

Specimen examined. Brazil, Rio Grande do Sul State, Sinimbu Municipality, Cava Funda, 29°27′33.4″S, 52°31′05.1″W, 520 m alt., saxicolous, on roadside, open place, 05 January 2004, *A.A. Spielmann* & *L.S. Canêz* 977 (SP).

Notes. *Punctelia reddenda* is distinguished by the sorediate thallus, black lower surface and medulla with only fatty acids (negative with all spot tests). *Punctelia appalachensis* (W.L. Culb.) Krog has also a black lower

surface and a medulla negative to spot tests, but forms abundant laminal and marginal lobulae instead of soredia (Culberson 1962, Hale 1965). *Punctelia borreri* (Sm.) Krog, a sorediate species with a black lower surface, produces gyrophoric acid (medulla C+ rose; Swinscow & Krog 1988).

Distribution. Africa (Krog & Swinscow 1977, Swinscow & Krog 1988), Europe (Culberson 1962, Krog 1970, Purvis *et al*. 1992), North America (Esslinger 2007), and South America (Feuerer 2005). In South America it is known from Brazil (Marcelli 2004), Chile and Venezuela (Feuerer 2005). In Brazil it was recorded in the States of Minas Gerais (Ribeiro 1998), Rio Grande do Sul (Spielmann 2006) and São Paulo (Marcelli 1998, Jungbluth 2006).

Punctelia riograndensis (Lynge) Krog
Nordic Journal of Botany **2** (3): 291. 1982.
Basionym: *Parmelia riograndensis* Lynge, *Arkiv för botanik* **13** (13): 26. 1914.

Type: Brazil, Rio Grande do Sul State, Porto Alegre Municipality, 25-IX-1892, *Malme* 461 (lectotype: S), fide Hale (1960).

Thallus greenish gray, lobate, adnate, corticolous, 6.0–8.5 cm broad; *lobes* irregularly branched, laterally overlapping to crowded, 1.5–6.0 mm wide, with rounded apices; *margin* smooth to irregularly crenate or erose in older parts; *surface* smooth to rugose or scrobiculate, covered by numerous nodules (starting apothecia?); *lacinulae* lacking, except for some adventitious irregular projections unevenly distributed along the older margins. *Maculae*, *pustulae*, *soredia* and *isidia* lacking. *Pseudocyphellae* conspicuous, abundant, punctiform to ellipsoid or irregular, plane, 0.05–0.25 × 0.05–0.15 mm, laminal, usually at the thallus ridges, and on the amphithecium. *Medulla* white. *Lower surface* black to white variegated, lustrous, smooth, rugose, papillate or veined; *margin* brown to dark reddish brown, usually white variegated, lustrous, 1–3 mm wide, naked, smooth, rugose, papillate or veined, boundary clear-cut to attenuate; *rhizinae* black to grayish or concolorous with the lower surface, usually with pale apices, or entirely white, simple to irregularly branched, cylindrical or sometimes flattened, sometimes coalescing, 0.10–1.00 × 0.01–0.30 mm, frequent, evenly dispersed.
Apothecia urceolate, 0.5–3.7 mm in diameter, stipitate, laminal to submarginal, *margin* smooth to crenate or dentate, amphithecium pseudocyphellate, sometimes slightly escrobiculate, stipe longitudinally rugose, disc brown, entire or incised, epruinose, imperforate; *epithecium* 7–14 µm; *hymenium* 50–70 µm; *subhymenium* 25–35 µm. *Ascospores* ellipsoid to ovoid, with one or two slightly spiky apices, 20.0–26.5 × 12.5–16.0 µm, epispore 1.5–2.0 µm.
Pycnidia submarginal to laminal, usually with a prominent margin, ostiole black. *Conidia* unciform, 4–7 × ca. 1 µm.
Chemistry. Cortex K+ yellow, UV–; medulla K–, C–, KC+ rose or KC– in the same thallus, P–, UV–; containing atranorin (cortex, not detected by TLC), gyrophoric acid (trace) and a unidentified fatty acid Rf 42 in solvent C (medulla).

Specimens examined. Brazil, Rio Grande do Sul State. Herveiras Municipality, 29°27′12.5″S, 52°37′57.7″W, 540 m alt., on trunk of *Eucalyptus*, on roadside, open place, 24 January 2004, *A.A. Spielmann*, *L.S. Canêz* & *C. Trentin* 1369 (SP). Idem, Sobradinho Municipality, edge of RST-481 road, next the crossroad, 29°24′20.2″S, 53°01′25.9″W, 375 m alt., corticolous, on roadside, open place, 17 July 2003, *A.A. Spielmann* 328 (SP).

Notes. The absence of vegetative propagules, medulla C–, KC– or KC+ rose in a same thallus (amount of gyrophoric acid small and variable), large ascospores (20.0–26.5 × 12.5–16.0 µm), unciform conidia and a black or white variegated lower surface identify *P. riograndensis*. Other morphologically similar *Punctelia* species without vegetative propagules and with a black lower surface can be distinguished in the following way: *Punctelia subpraesignis* (Nyl.) Krog is similar by the unciform conidia, however has a constant amount of gyrophoric acid (medulla always C+ rose or red) and smaller ascospores (11.0–15.0 × 7.5–12.0 µm). *Punctelia negata* (Nyl.) Krog has ascospores of similar size, 22–25 × 10–13 µm on the type specimen (Krog & Swinscow 1977). Nevertheless, gyrophoric acid is lacking and the conidia are filiform (Krog 1982, Ribeiro 1998, Eliasaro 2001). However Lynge (1914), on the basis of Nylander's description, claimed that *P. negata* is an isidiate species, both the holotype (H!, a small fragment of a central portion of thallus) and isotype (M! several fragments) have no isidia at all, but many small marginal vegetative lobulae. In *P. microscticta* (Müll. Arg.) Krog, gyrophoric acid is lacking (Hale 1960), the ascospores are smaller (16.0–20.0 × 10.5–14.0 µm), and the conidia filiform, 16–20 µm long (Lynge 1914).
The type of *P. borrerina* (Nyl.) Krog, described from Rio Grande do Sul State, is a mixture of C+ and C– thalli with two distinct ascospore sizes (Krog & Swinscow 1977). According the original description of Nylander (1896), this species is C–, KC–, and should have long filiform conidia, since he describes the presence of "spermatia sicut is *Parmelia stictica* Del. … 10.0–18.0 × 0.5 µm", information confirmed by Canêz (15.0–19.0 µm long, pers. comm.), who is studying the type material, and by Adler (1996) based upon material from South and North America. Both these characters distinguish *Punctelia borrerina* from *P. riograndensis*. However, Krog (1982) keyed out *P. borrerina* based in the presence of unciform conidia, without stating the source of this information.
The specimen *Spielmann* 328 (Fig. 09) has a thallus covered by nodules (apothecia primordia?) and the underside margin usually white variegated, features not mentioned in the literature on *Punctelia riograndensis* (Eliasaro 2001, Ferraro 1986, Krog & Swinscow 1977, Lynge 1914, Ribeiro 1998, Sérusiaux 1983). However, as ascospores and conidia agree with the published descriptions, and since it was not possible to decide the nature of the nodules, the specimen is treated provisionally as a variation of *P. riograndensis*.

Distribution. Africa (Sérusiaux 1983) and South America (Feuerer 2005). In South America it is known from Argentina (Sérusiaux 1983, Ferraro 1986, Calvelo & Liberatore 2002), Brazil (Marcelli 2004), and Uruguay (Osorio 1972, Sérusiaux 1983). In Brazil it was recorded for the States of Minas Gerais (Ribeiro 1998), Mato Grosso do Sul, Paraná [Osorio 1973, as *Parmelia microsticta* Müll. Arg. var. *riograndensis* (Lynge) Lynge; Eliasaro 2001], Rio Grande do Sul (Spielmann 2006) and São Paulo (Ribeiro 1998, Marcelli 1998).

Punctelia subpraesignis (Nyl.) Krog
Nordic Journal of Botany **2** (3): 291. 1982.

Basionym: *Parmelia subpraesignis* Nyl., *Les Lichens des Environs de Paris*: 36. 1896.

Type: Argentina, F. Kurtz, misit Stizenb., may 1894 (holotype: H-NYL 35066), fide Krog & Swinscow (1977).

Thallus greenish gray, lobate, adnate to loosely adnate, corticolous or saxicolous, 4.5–14.0 cm broad; *lobes* irregularly branched, laterally overlapping, 1.0–5.5 mm wide, with rounded usually pruinose apices; *margin* smooth, crenate, incised or erose; *surface* smooth to more often rugose and scrobiculate. *Lacinulae*, *maculae*, *pustulae*, *soredia* and *isidia* lacking. *Pseudocyphellae* conspicuous, abundant, punctiform, usually rounded or ellipsoid, at times more elongated, plane to concave or sometimes convex, 0.05–0.60 × 0.05–0.30 mm, laminal to marginal, commonly on small protuberances, and on the amphithecium. *Medulla* white or sometimes slightly rose. *Lower surface* black, lustrous to opaque, smooth, papillate or rugose; *margin* pale brown or beige to dark brown, sometimes white variegated, lustrous or almost opaque, 0.5–2.5 mm wide, bare or papillate, smooth to rugose, boundary clear-cut to attenuate; *rhizinae* black, brown, beige or brown with beige apices, simple to irregularly branched, 0.10–2.00 × 0.02–0.20 mm, frequent to abundant, evenly dispersed to somewhat aggregate.
Apothecia urceolate to concave, 0.3–12 mm in diameter, stipitate, laminal, margin smooth to finely crenulated or crenate, amphithecium pseudocyphellate and verruculose, sometimes foveolate when old; disc brown, epruinose, imperforate; *epithecium* 5–12 µm; *hymenium* 50–70 µm; *subhymenium* 15–25 µm. *Ascospores* ellipsoid to subglobose, 11.0–15.0 × 7.5–12.0 µm, epispore ca. 1.0 µm.
Pycnidia submarginal to laminal, ostiole black. *Conidia* unciform, 4–7 × ca. 1.0 µm.
Chemistry. Cortex K+ yellow, UV–; medulla K–, C+ rose or red, KC+ rose or red, P–, UV–; containing atranorin (cortex, traces) and gyrophoric acid (medulla).

Specimens examined. Brazil, Rio Grande do Sul State. Herveiras Municipality, 29°25′53.7″S, 52°40′19.6″W, 570 m alt., on roadside *Eucalyptus* trunk, open place, 24 January 2004, *A.A. Spielmann*, *L.S. Canêz* & *C. Trentin* 1329 (SP); idem, next to "Balneário Tio Juba", corticolous, on roadside, shaded place, 06 February 2004, *A.A. Spielmann* & *L.S. Canêz* 691 (SP). Idem, 29°27′12.5″S, 52°37′57.7″W, 540 m alt., roadside, saxicolous in open place, 24 January 2004, *A. A. Spielmann*, *L. S. Canêz* & *C. Trentin* 939 (SP). Idem, Sinimbu Municipality, Cava Funda, 29°27′33.4″S, 52°31′05.1″W, 520 m alt., saxicolous, on roadside, open place, 05 January 2004, *A.A. Spielmann* & *L.S. Canêz* 686 (SP), 756 (SP), 975 (SP). Brazil, Rio Grande do Sul State, Herveiras Municipality,

Notes. The absence of vegetative propagules, the black lower surface, medulla with gyrophoric acid (C+ rose or red), and unciform conidia characterize *P. subpraesignis* (see other species with a black lower surface and without vegetative propagules under the *P. riograndensis*).
The specimen *Spielmann* 939 (SP) is C+ red → orange, KC+ red → orange, P+ orange, and has the following chemistry: atranorin [minor], chloroatranorin [trace], gyrophoric acid [major], orcinyl lecanorate [major], lecanoric acid [trace], orcinyl orsellinate [trace] (Elix, pers. comm.). This is the first *Punctelia* species reported with a positive medullary reaction with P. At first, we thought this would be a new species, but more specimens are required to confirm this.

Distribution. Africa (Krog & Swinscow 1977, Swinscow & Krog 1988), North America (Culberson 1962, Wilhelm & Ladd 1992, Esslinger 2007) and South America (Feuerer 2005). In South America it is known from Argentina (Zahlbruckner 1930, Culberson 1962, Calvelo & Liberatore 2002), Bolivia (Feuerer et al. 1998), Brazil (Marcelli 2004) and Uruguay (Osorio 1992a). In Brazil it was recorded in the States of Paraná (Eliasaro 2001), Rio Grande do Sul (Ferraro 1986, Spielmann 2006) and São Paulo (Marcelli 1998).

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Figure 1: *Punctelia colombiana* (A.A. Spielmann & L.S. Canêz 1000).Scale in milimeters.

Figure 2: *Punctelia constantimontium* (A.A. Spielmann & L.S. Canêz 1370). Scale in milimeters.

Figure 3: *Punctelia graminicola* (A.A. Spielmann 73). Scale in milimeters.

Figure 4: *Punctelia graminicola*, thallus with lacinulae (A.A. Spielmann & M.A. Sulzbacher 747). Scale in milimeters.

Figure 5: *Punctelia purpurascens* (A.A. Spielmann, L.S. Canêz & C. Trentin 1007). Scale in milimeters.

Figure 6: *Punctelia reddenda* (A.A. Spielmann & L.S. Canêz 977). Scale in milimeters.

Figure 7: *Punctelia riograndensis* (A.A. Spielmann, L.S. Canêz & C. Trentin 1369). Scale in milimeters.

Figure 8: *Punctelia riograndensis*, with arrows indicating the nodules (A.A. Spielmann 328). Bar = 1 cm.

Figure 9: *Punctelia subpraesignis* (A.A. Spielmann & L.S. Canêz 686). Scale in milimeters.

Figure 10: *Punctelia subpraesignis* (A.A. Spielmann, L.S. Canêz & C. Trentin 939), specimen P+ orange. Scale in milimeters.