



## Two New Species of *Scleria* section *Hypoporum* (Cyperaceae) from Espírito Santo, Brazil

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### Abstract

Two species of *Scleria* section *Hypoporum* from the state of Espírito Santo, Brazil, are described, illustrated, mapped, and compared to two similar species, *S. virgata* and *S. variegata*. While most species of sect. *Hypoporum* are small and narrow-leaved, these two species are robust.

**Keywords:** *Scleria*, Cyperaceae, Espírito Santo, taxonomy

### Introduction

The genus *Scleria* Bergius (1765: 142) comprises ca. 250 species with half of them native to the Americas (Core 1936; Reznicek *et al.* 2002). Although there is a treatment of *Scleria* for Mesoamerica (Adams 1994), as well as regional floras (e.g., Affonso 2015, Camelbeke *et al.* 2003, Muniz & Shepherd 1987, Nunes & Prata 2013, Simpson 1995, Thomas 1997) there has been no monographic study of the genus in the Neotropics since Core's (1936) revision of *Scleria* for the Americas recognizing 104 species. In 1952, Core recognized 65 species of *Scleria* as occurring in Brazil. The current estimate of species known for Brazil is 75, 21 of which are known to occur in Espírito Santo (Alves *et al.* 2009, Lista de Espécies da Flora do Brasil 2015).

The two species described here are restricted to Brazil's Atlantic coastal forest biome. This area comprises one of the world's biodiversity "hotspots," areas with high biological diversity, high levels of endemism, and high rates of deforestation (Myers *et al.* 2000, Thomas 2008, Thomas *et al.* 1998). Espírito Santo and adjacent Bahia are home to many recently described Cyperaceae species endemic to the Atlantic forest (Alves & Thomas 2002, Alves *et al.* 2002, Araujo & Brummitt 2011, Koyama 1972, Thomas *et al.* 2013).

While identifying collections received from Espírito Santo, Brazil, it became clear that several collections of *Scleria* (Cyperaceae) could not be assigned to any known species. These collections, all from the area near Santa Teresa, Espírito Santo, pertain to two species, both of which are new to science. Both species lack a hypogynium subtending the fruit and both have spikelets that are all androgynous. These two characteristics place both species in section *Hypoporum* Nees (1834: 303). Both species are described here and compared in Table 1 to each other, and to the similar *S. virgata* Steudel (1855: 176) and *S. variegata* (Nees: 303) Steudel (1855: 176). *Scleria bradei* R. Gross in Pilger (1937: 173) and *S. scabrosa* Maury (1889: 148) were treated by Core (1936, 1952) as being in section *Hypoporum*—they both differ in having all spikelet fascicles borne on the primary or short secondary inflorescence axes.

### Methods

Species descriptions were prepared from dried herbarium specimens received for identification from the herbarium of the Museu de Biologia Prof. Mello Leitão (MBML). Specimens were also compared with specimens in the herbarium of the New York Botanical Garden (NY). Scanning electron microscope photographs were taken at NY using a JEOL

model 5410-LV with low vacuum capability, and with a dedicated digital image capture and analysis system (Orion software ©JEOL USA, Inc. on a MS-Windows based computer).

## Taxonomic Treatment

### *Scleria chasmema* W. Bonet Mayedo and W. W. Thomas *sp. nov.*, Figs. 1, 3 A–B

*Scleria chasmema* is similar to *S. virgata*, but has knotted rhizomes, loose, funnel-shaped leaf sheaths, and shorter, broader leaves, among other differences.

**Type**.—BRAZIL. Espírito Santo: Santa Teresa: Mata Fria [19°55'40"S, 40°42'00"W], *Wilson Boon* [*Wilson Boone*] 237, 19 June 1984. (Holotype: MBML image 001542, Isotypes: ICN n.v., MO n.v., NY, RB online image 417175).

Perennial, ca. 1.8 m tall. Roots fibrous. Rhizome 1–1.2 cm diameter, knotted, scaled with reddish cataphylls. Stems erect, 1–1.6 m × 0.7–1 cm, becoming narrower distally, trigonous, the angles retrorsely scabrous, the faces scabrous, longitudinally striated, the distal portion of each node pubescent, the hairs pale castaneous to whitish. Leaves basal and cauline, ca. 15 per culm, the basal 2–3 bladeless, the rest with well-developed blades and sheaths; sheaths 6–8 cm long, funnel-shaped, 1.5–2 cm wide distally, scaberulous along the angles, pubescent on the faces, green to pale castaneous; ligule absent; contraligule prominent, rounded, 5–7 × 10–15 mm, pubescent, the margins ciliate, not auriculate; blades linear-lanceolate, 13–25 × 2–4.2 cm, increasing in size distally, glabrate above and beneath but puberulent along major nerves, the margin scaberulous and ciliate, the hairs whitish to pale castaneous, the apex long-acuminate, not pseudopremorphous (not contracting abruptly). Inflorescence terminal, paniculate, 21–35 cm long, comprising 10–11 synflorescences with lax, well-spaced branches disposed spirally along the principal axis; neither branches nor spikelets subtended by obvious bracts; terminal synflorescences sessile or subsessile, contracted; proximal synflorescences with branching reaching the third, rarely the fourth order; axis supporting each group of spikelets filiform and lax; prophyll at the base of the inflorescence tubular, 2–4 mm long, reddish. Spikelets all androgynous, 3–4 × 1–1.2 mm, ovoid, laterally compressed, sessile, spirally disposed, well-spaced, single or rarely two together, erect, pale castaneous or reddish; the primary axis angled, scaberulous and pubescent, the hairs transparent; spikelet scales 2–2.2 × 1–1.5 mm, broadly lanceolate, the four basal scales sterile and distichous, glabrous, chartaceous, pale castaneous with elongate reddish spots along the margins, the central nerve prominent and terminating in an apiculus; more distal glumes fertile, decreasing in size distally, helicoidally or spirally arranged, hyaline, glabrous, not apiculate, the abaxial face pale castaneous, the central nerve reddish. Pistillate flower single, subtended by the 5<sup>th</sup> spikelet scale, the single style filiform, flexuous, divided halfway into 3 stigmas. Staminate flowers several, subtended by the 6<sup>th</sup> and more distal scales, comprising two stamens. Fruit comprising a cupule subtending an achene; cupule flat, trigonous, 0.5 mm high, reddish, not dispersing with the achene; hypogynium absent; achene subglobose-trigonous, 3–3.2 × 1.8–2 mm, apiculate, gray to whitish, the base trigonous, the surface tuberculate-rugose, glabrous, the style base normally not persistent.

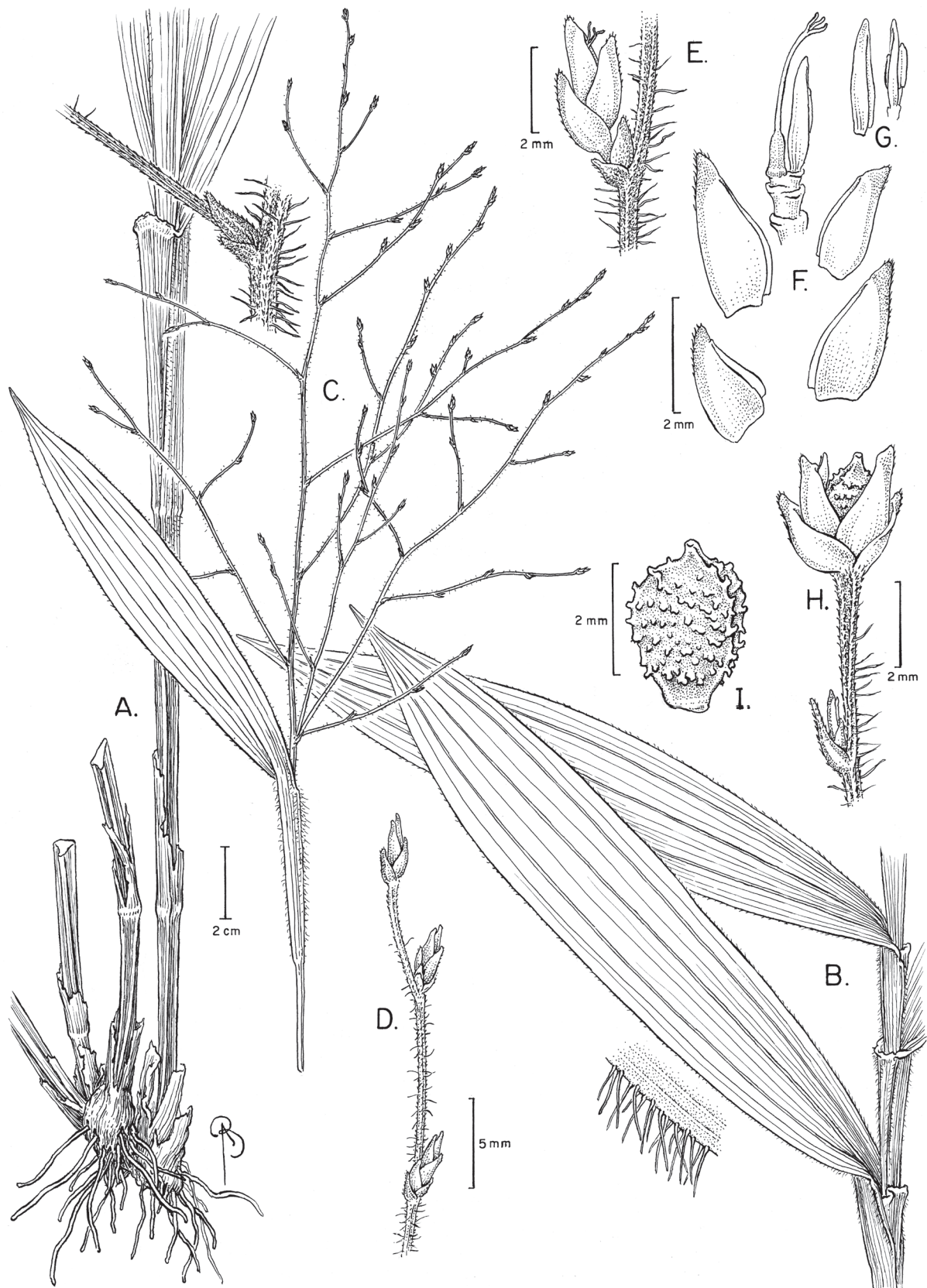
**Distribution and Ecology**.—Both known collections are from an area called Mata Fria, at 700–800 m, 19°55'40"S, 40°42'00"W, in the municipality of Santa Teresa, Espírito Santo, Brazil (Fig. 4). The collections were made in partially shaded forest in dark soil, in an area that is naturally tropical submontane or montane moist forest.

**Preliminary Conservation Status**.—The species is known from only two collections, both from Mata Fria, a forest fragment of the critically endangered Atlantic montane forest (Ribeiro *et al.* 2009). Since it occurs in an area that is relatively well collected, near the town of Santa Teresa, the lack of collections from other localities suggests that it has a very limited distribution. Its limited occurrence in an endangered habitat suggests that it deserves consideration as an Endangered species.

**Etymology**.—The specific epithet refers to the loose, open leaf sheath characteristic of this species.

**Additional Specimen Examined (Paratype)**.—BRAZIL. Espírito Santo: Santa Teresa: Mata Fria [19°55'40"S, 40°42'00"W], entrada para Tabócas, 18 Sept 1985, *H. Q. Boudet Fernandes 1513* (MBML-001448 image, MO online image 3717835, NY).

**Notes**.—*Scleria virgata* differs from *S. chasmema* by having a slender elongate rhizome, constricted, glabrous leaf sheaths, a large, pubescent contraligule, inflorescence branches to 80 cm long, fascicles with 1–15 spikelets, and an achene surface with transversely elongate warts (Table 1). Notes on the holotype indicate that duplicates were distributed to both ICN and MO, but those isotypes could not be found.



**FIGURE 1.** Illustration of *Scleria chasmema*. A. Base of plant. B. Leaf sheath and blade. C. Inflorescence. D. Detail of inflorescence. E. Spikelet. F. Opened spikelet showing scales and pistillate flower. G. Staminate flower and subtending scale. H. Terminal spikelet with fruit. I. Achene. A, I from *Boon [Boone] 237* (NY); B–H from *Fernandes 1513* (NY). Illustration by Bobbi Angell.

**TABLE 1.** Comparison of *Scleria chasmema*, *S. didina*, *S. virgata* and *S. variegata* (Nees) Steud. Data for *S. virgata* taken from personal observation; data for *S. variegata* taken from personal observation and Core (1936).

	<i>Scleria chasmema</i>	<i>Scleria didina</i>	<i>Scleria virgata</i>	<i>Scleria variegata</i>
Rhizome	compact and knotted	Unknown	Slender and elongated	thick, woody
Sheath	loose, funnel-shaped, and pubescent	loose, funnel-shaped, glabrous	constricted, glabrous	constricted, nearly glabrous
Contraligule	short, 1–2 mm high, glabrous	large, 5–10 mm high, glabrous	large, 5–7mm high, pubescent	short, ca. 1–2 mm high, pubescent
Leaf blade	13–25 x 2–4.2 cm, pubescent	10–25 x 0.7–2 cm, glabrous or pubescent	50–80 x 0.7–1.5 cm, glabrous	20–40 x 0.4–0.8 cm, glabrous
Inflorescence	less branched, to 35 cm long.	less branched, to 16 cm long	more branched, to 80 cm long	Rachis 8–12 cm long
Fascicles	1–2 spikelets	1–2 spikelets	1–15 spikelets	1–5 spikelets
Spikelets	compressed	compressed or terete	terete	terete
Achene surface	tuberculate-rugose	tuberculate-rugose	tuberculate-rugose	muricate-tuberculate

***Scleria didina* W. Bonet Mayedo & W. W. Thomas, sp. nov., Figs. 2, 3 C–D**

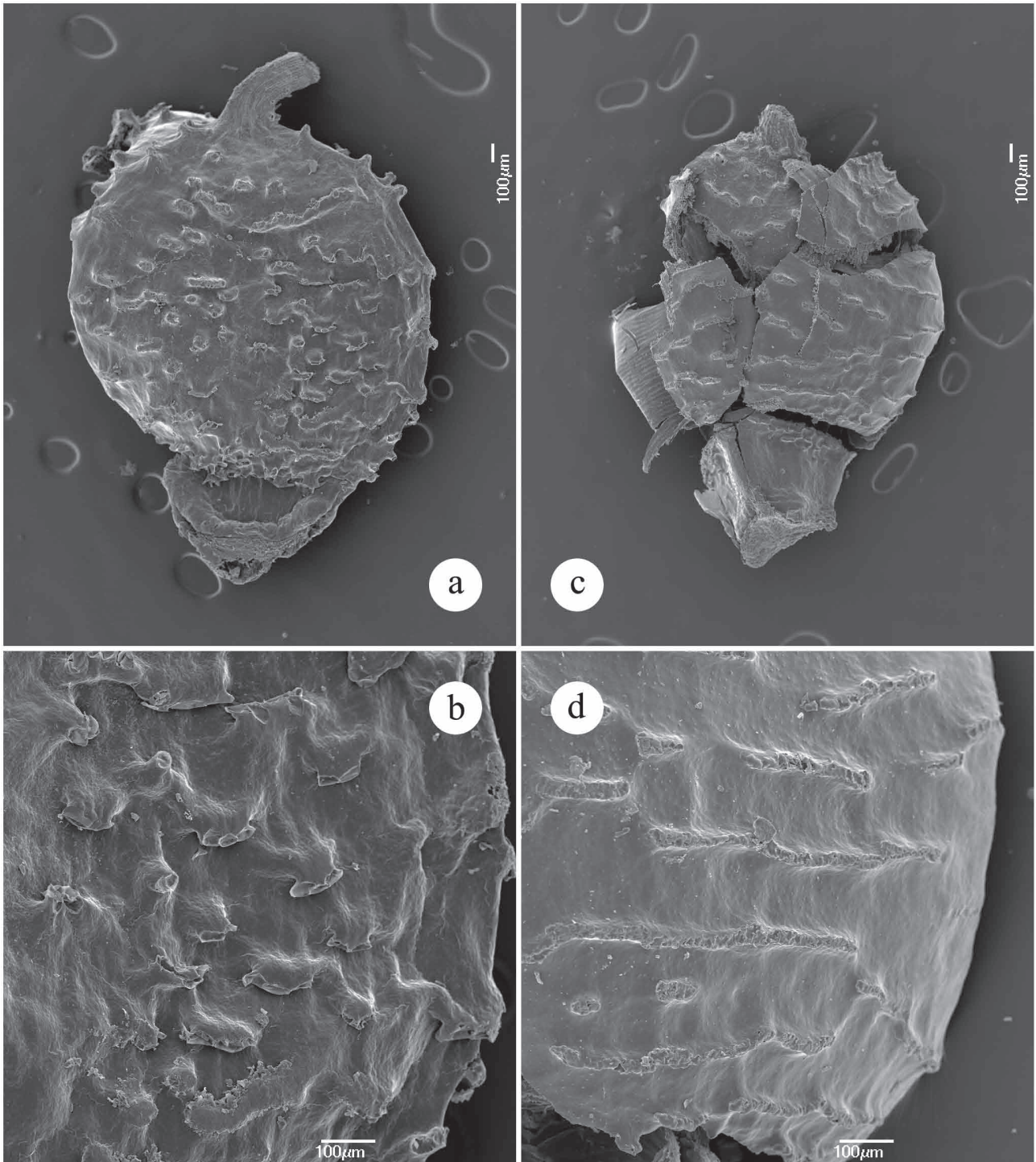
*The broad leaves and distinctive contraligule of Scleria didina are rare in section Hypoporum, and its small achene suggests a close relationship to S. virgata and S. variegata Steud.*

**Type:**—BRAZIL. Espírito Santo. Mun. Santa Leopoldina: Rio das Farinhas, beira da estrada próximo do mata burro, afloramento rochoso granítico, 478 m, 20°05' 214S, 40° 36.112W [written as 20°05'214"S, 40°36'112"W], 14 April 2008, *A.P. Fontana, L. Kollmann & A. Brahim 4911* (Holotype: MBML-035591 image; Isotype: NY).

Perennial, 0.50–1 m tall. Rhizomes and roots unknown. Stems erect, 60–80 cm x 3–5 mm, trigonous, hidden by the leaf sheaths, the faces longitudinally lined, smooth, the angles smooth or distally scaberulous. Leaves cauline and probably basal; no basal leaves seen; cauline leaves 8–10, closely spaced, the basal 3–5 with only a rudimentary blade, the rest with well-developed blades; sheaths funnel-shaped, loose, 3–8 cm long, 0.7–1.7 cm wide higher on the stem, completely covering the enclosed stem, the angles scabrous, the faces glabrous, green to pale castaneous; ligule absent; contraligule prominent, rounded, 5–10 x 10–15 mm, glabrous, auriculate with whorled venation, pale castaneous or reddish, the margin irregular; blades linear-lanceolate, 10–25 x 0.7–2 cm, glabrous to pubescent on both sides, the adaxial face with median nerve and secondary nerves scaberulous, the abaxial face with a prominent, scabrous median nerve, the margins scabrous, the apex acute, not pseudopremorphous (not abruptly contracted). Inflorescence a single terminal panicle, comprising only staminate spikelets or only androgynous spikelets; subtended by a single leaf-like bract and a peduncle 5–12 cm long; bract 6–13 x 1–2 cm, glabrous or glabrate on both sides, the median nerve scaberulous above and prominent and scabrous beneath, the margins scabrous, the apex acute; panicle 8–16 cm long, comprising 10–19 synflorescences spirally disposed on the central axis, the synflorescence axes reaching the third order of branching, winged, glabrous or puberulent, the angles scaberulous, the terminal synflorescences sessile or subsessile, contracted; scale-like bracts subtending fascicles of spikelets filiform, 1–1.5 cm long, reddish, the bases dilated, the median nerve and margins scabrous; prophylls tubular, pilose, reddish, 1 mm long. Staminate inflorescences compact, with more than 5 spikelets per branch, sessile or subsessile, the spikelets ovoid, dark red, 3.5–4 x 0.8–1 mm, with scales 3–3.5 x 0.7–1 mm, the two basal scales dark, long-aristate, glabrous and distichous, the remaining scales hyaline, spirally arranged, decreasing in size distally; staminate flowers 8–10 per spikelet, comprising 3 stamens; androgynous inflorescences more open, with up to 3 spikelets per branch, the spikelets ovoid, laterally compressed, 4.5–6 x 0.7–1 mm, sessile, pale castaneous or reddish, the spikelet scales 4.5–5 x 0.6–1 mm, lanceolate, the three basal scales sterile, distichous, glabrous, chartaceous, the median nerve prominent, terminating in a long arista scabrous along its margins, the remaining scales spirally arranged, becoming smaller distally, hyaline, glabrous, apiculate; pistillate flower usually subtended by the fifth spikelet scale, the single style divided halfway into three stigma branches, each of these filiform and flexuous; staminate flowers several, subtended by the sixth and higher scales, with three stamens. Fruit comprising a cupule subtending the achene; cupule flat, trigonous, white, remaining when the achene falls; hypogynium absent; achene subglobose, trigonous, 1.7–2 x 0.8–1 mm, exceeding the scales, glabrous, white, apiculate, the base trigonous, the surface rugose with transversely elongated warts, the base of the style normally not persistent.



**FIGURE 2.** Illustration of *Scleria didina*. A. Upper portion of plant showing leaves and inflorescence, with detail of summit of leaf sheath. B. Detail of inflorescence. C. Spikelets with exserted styles. D. Spikelet with fruit. E. Opened spikelet showing scales and pistillate flower. F. Staminate flower and subtending scale. G. Achene. A–G from *Fontana et al. 4911* (NY). Illustration by Bobbi Angell.



**FIGURE 3.** A–B. SEM photos of *Scleria chasmema* achene. A Whole achene. B Achene surface. (A–B, A.P. Fontana et al. 4911). C–D. SEM photos of *Scleria didina* achene. C Whole achene. D Achene surface. (C–D, W. Boon [Boone] 237).

**Distribution and Ecology:**—Known only from the region of Santa Teresa in the state of Espírito Santo, Brazil (Fig. 4). Found in moist areas on rock outcrops usually at elevations of 200–500 m.

**Preliminary Conservation Status:**—The habitat of this species is very limited, found only in moist areas on rock outcrops between 200 and 500 m elevation in four municipalities in the state of Espírito Santo. In addition, relative to other Cyperaceae, these plants are conspicuous and less likely to go unnoticed and uncollected. The lack of collections in similar habitats to the north or south suggests that it may really be limited to the area around Santa Teresa. We suggest, therefore, that *Scleria didina* deserves the status of Vulnerable due to its very limited distribution.

**Etymology:**—The epithet refers to the two distinctive whorls found on the large contraligule.

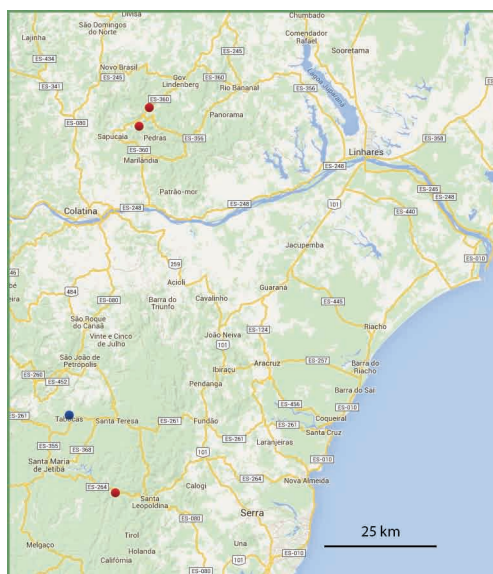


FIGURE 4. Distribution of *Scleria chasmema* (blue dot) and *S. didina* (red dots) in the state of Espírito Santo, Brazil.

**Notes:**—Although the broad leaves and distinctive contraligule of *Scleria didina* are rare in section *Hypoporum*, its small achene with no hypogynium leaves little doubt as to its close relationship with *S. virgata* (Table 1).

**Additional Specimens Examined (Paratypes):**—BRAZIL. Espírito Santo: Mun. Colatina, Alto de Moacir, Pedra de Cruzeiro, propr. Landislau, 150–850 m, 19°18'39"S, 40°31'45"W, 22 Feb 2006, *L.F.S. Magnago, V. Demuner, M. Belizário, E. Bausen 718* (MBML-028425 image, NY); androgynous specimen. Mun. Marilândia, Pedra de Cruzeiro. Aguilar, 200–830 m, 19°20'54"S, 40°33'04"W, 12 Sep 2007, *R.R. Vervloet, V. Demuner, E. Bausen, T.A. Cruz 3460* (MBML-031641 image, NY); staminate specimen; Mun. Santa Teresa, Vale do Canãa, 15 Aug 1985, *H.Q. Boudet Fernandes 1409* (MBML-001480 image, NY); androgynous specimen; Mun. Viana, Pedra na estrada do sítio Cantinho do Cée, próximo à Igreja de São Paulo de Biriricas, 18 Jun 1995, *C.N. Fraga 215* (MBML-012805 n.v., NY), Androgynous specimen.

## Acknowledgements

We thank the curator of the Herbarium of the Museu de Biologia Prof. Mello Leitão (MBML) for providing the specimens for our study. We thank the curators of MBML, MO, and RB for providing images of specimens. WBM thanks the Christopher Reynolds Foundation for enabling him to visit The New York Botanical Garden and carry out this study.

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