




Nomenclatural novelties in *Lessingianthus* (Asteraceae - Vernonieae): an extraordinary new species, a lectotypification, and a new combination from a resurrected synonym

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ABSTRACT

Lessingianthus spinifolius is here described and illustrated as a new species of the tribe Vernonieae (Asteraceae) from Chapada dos Veadeiros, State of Goiás, Brazil. The new species is thus far known only from the type locality. The characteristics that most differentiate *L. spinifolius* from congeners are: (i) leaf blade strongly revolute; and (ii) leaf blade with spines on the margins. The new species is similar to *L. onopordioides* due to both having a similarly shaped involucre and the involucre being eximbricate with lanceolate phyllaries. Taxonomic and ecological comments, a distribution map, conservation status assessment, and illustrations of the new species are provided. Additionally, *Vernonia araneosa* is resurrected from the synonymy of *L. durus*, and a new combination, *L. araneosus* based on *V. araneosa*, is proposed, a lectotype designated, and its affinities with *L. durus* discussed.

Keywords: Brazil, Compositae, endemism, Lepidaploinae, *Vernonia*

Introduction

The family Asteraceae has approximately 1,600 genera and 25,037 species grouped in 44 tribes, distributed around the globe except for Antarctica (Funk *et al.* 2009; Panero *et al.* 2014; Panero & Crozier 2016). Asteraceae, with 6,316 species in South America, appears as the highest in species number in the continent (Panero & Crozier 2016). In the same way, it is one of the most species-rich in Brazil, where it can be found 2,065 species grouped in 304 genera, and 27 tribes widely distributed throughout the territory according to Flora do Brasil 2020 (2017).

The tribe Vernonieae was established by Cassini (1819), which in turn underwent taxonomic changes, and the main change was the reduction in size and distribution of the genus *Vernonia* Schreb., which for a long time included a

large part of variation within the tribe (Keeley & Robinson 2009). At the moment, Vernonieae comprises approximately 1,500 species and 126 genera (Keeley & Robinson 2009), with pantropical distribution (Robinson 2007).

Lessingianthus belongs to the subtribe Lepidaploinae, and is one of the most representative in species number in the tribe. The genus was established to recognize the species originally described in *Vernonia* sect. *Lepidaploa* series *Macrocephalae*. Currently, the genus has more than 130 species distributed in South America, especially in Argentina and Brazil, in addition to one or two species in Colombia and Venezuela (Robinson 2007; Keeley & Robinson 2009).

In Brazil are reported 114 species of *Lessingianthus*, widely distributed throughout the Brazilian territory, of which 57 are cited to the State of Goiás, according to Flora

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do Brasil 2020 (2017). The genus *Lessingianthus* is distinctive from other genera of Vernonieae by having a combination of characters including capitula generally pedunculate, corolla lobes usually glandular, style with base usually cylindrical (without node), absence of glands in the cypselae wall, and type B pollen grains (Jones 1982; Robinson 1988; 1999; Angulo & Dematteis 2010; 2014). The basic chromosome number of the genus is $x=16$, divergent from the majority of the Vernonieae from the American continent, which have basic chromosome number $x=17$ (Dematteis & Angulo 2010).

A field trip to Chapada dos Veadeiros National Park during the Master degree of the first author resulted in collecting a new species of *Lessingianthus*. The new species is here described and illustrated, and its affinities are discussed. Additionally, *Vernonia araneosa* is resurrected from the synonymy of *L. durus*, and a new combination, *L. araneosus* based on *V. araneosa*, is proposed, a lectotype is designated, and its affinities with *L. durus* are discussed.

Materials and methods

The specimens of the new species were collected following the usual techniques in plant taxonomy (e.g., Mori *et al.* 2011). The holotype and paratypes were deposited in the UFG herbarium and the duplicates of holotype (isotypes) were sent to P, RB, and US herbaria (acronyms according to Thiers 2017). The species was morphologically described with the use of stereomicroscope. Dimensions of vegetative and reproductive structures presented in the description were measured from dried herbarium material (except for floral structures, which were collected and fixed in 70 % alcohol for measurements). The morphological terminologies are in agreement with Roque & Bautista (2008), and Beentje (2012).

The assessment of conservation status was performed using the GeoCAT tool (2017) as described by Bachman *et al.* (2011), with the IUCN (2012) default of Area of Occupancy (AOO) analysis with a grid size 2 km (a cell area of 4 km²).

For the new combination proposed, the type-specimens were examined personally by the second author at K herbarium, and by digital photos available at JStor (2017) for the materials housed at GH, K, and NY herbaria.

The description of the new species, the new combination, and the lectotypification were proposed according to McNeill (2006) and Turland (2013). Abbreviations for the works cited in this study were based on Stafleu & Cowan (1981), whereas those of authors of genera and species followed IPNI (2017).

Results and discussion

Lessingianthus spinifolius* Neves & A. Teles, *sp. nov.
(Figs. 1, 2). Type: BRAZIL. Goiás: Cavalcante. Parque

Nacional da Chapada dos Veadeiros, ca. 200 m da GO 118, campo limpo. 13°55'07,3"S 47°25'28,2"W, 1.421m, 20 May 2016, R.N. Ribeiro & D.O. Diniz 523 (holotype UFG, isotypes P, RB, US).

Shrubs erect, 0.6-1.5 m tall, stem terete, striate, glabrous, leafy on the apex. *Leaves* alternate and spirally, sessile, blade lanceolate to ovate, 1.7-3.5 × 0.5-1 cm, apex acute, pungent, base truncated, margin spinose and strongly revolute, glandulose and sericeous in both faces, venation camptodrome, leaves caducous to the touch. *Capitula* homogamous, discoid, sessile, solitary or grouped in dichasiform capitulescence, terminal. *Involucre* campanulate, eximbricate, 2-3 × 3-4.5 cm; phyllaries 90-110, 6-9-seriate, lanceolate, 7-40 × 2-4 mm, apex acute, pungent, base truncate, margin serrate, glabrous, innermost phyllaries vinaceous; receptacle plane, epaleaceous. *Florets* 60-85, bisexual, corolla tubulose, actinomorphic, tube 5-9 mm long, glabrous, lobes 5-8 mm long, glabrous on both sides; anthers 3-3.5 × 0.2-0.3 mm, apical anther appendage 0.3-0.5 × 0.2-0.3 mm, style 1-1.6 mm long, base cylindrical, glabrous, branches 2-3 mm long, acute, papillose. *Cypselae* 2.2-3 mm long, cylindrical, 5-costate, pubescent, discreetly glandulose. *Pappus* 2-seriate, outer series with paleae 2-2.2 mm long, base whitish, apex vinaceous, inner series with bristles 1-1.2 cm, base whitish, apex vinaceous, both series persistent.

Paratypes: BRAZIL. Goiás: Parque Nacional da Chapada dos Veadeiros, ca., 200 m da GO 118, campo limpo. 13°55'07,3"S 47°25'28,2"W, 1.421m, 20 November 2015, R.N. Ribeiro *et al.* 292 and 293 (UFG); *ib.*, 29 April 2016, R.N. Ribeiro *et al.* 486, 487, 488 and 489 (UFG).

Distribution and ecology: The new species is so far known only from Chapada dos Veadeiros National Park, in the municipality of Cavalcante, northern State of Goiás, a nuclear area of the Cerrado biome (Fig. 3). Although the Chapada dos Veadeiros exhibits all the phytophysiognomies of the Cerrado, the population of *Lessingianthus spinifolius* was found growing exclusively in an area of dry grassland known in Brazil as *campo limpo* ("clean field"). The species grows among specimens of *Microlicia vestita* DC. camouflaging in the vegetation and fenced by rocks at 1421m a.s.l.

Etymology: The specific epithet is an allusion to the spines present on the margin of the leaf blade, an unusual feature for the species of the genus.

Conservation status: *Lessingianthus spinifolius* is known for a single population composed of 15 individuals, where each individual occupies an area of about 1 m², and the population occupies a total area of approximately 15 m² in the Chapada dos Veadeiros National Park. According to results obtained through GeoCAT (2017), the analysis of extent of occurrence (EOO) = 0 km² and the area of occupancy (AOO) = 4 km², and still following the IUCN Red list guidelines (IUCN 2017), the new species is considered Critically Endangered [criteria B1, B2(a), and D]. Although the species occurs inside a National Park, the population is



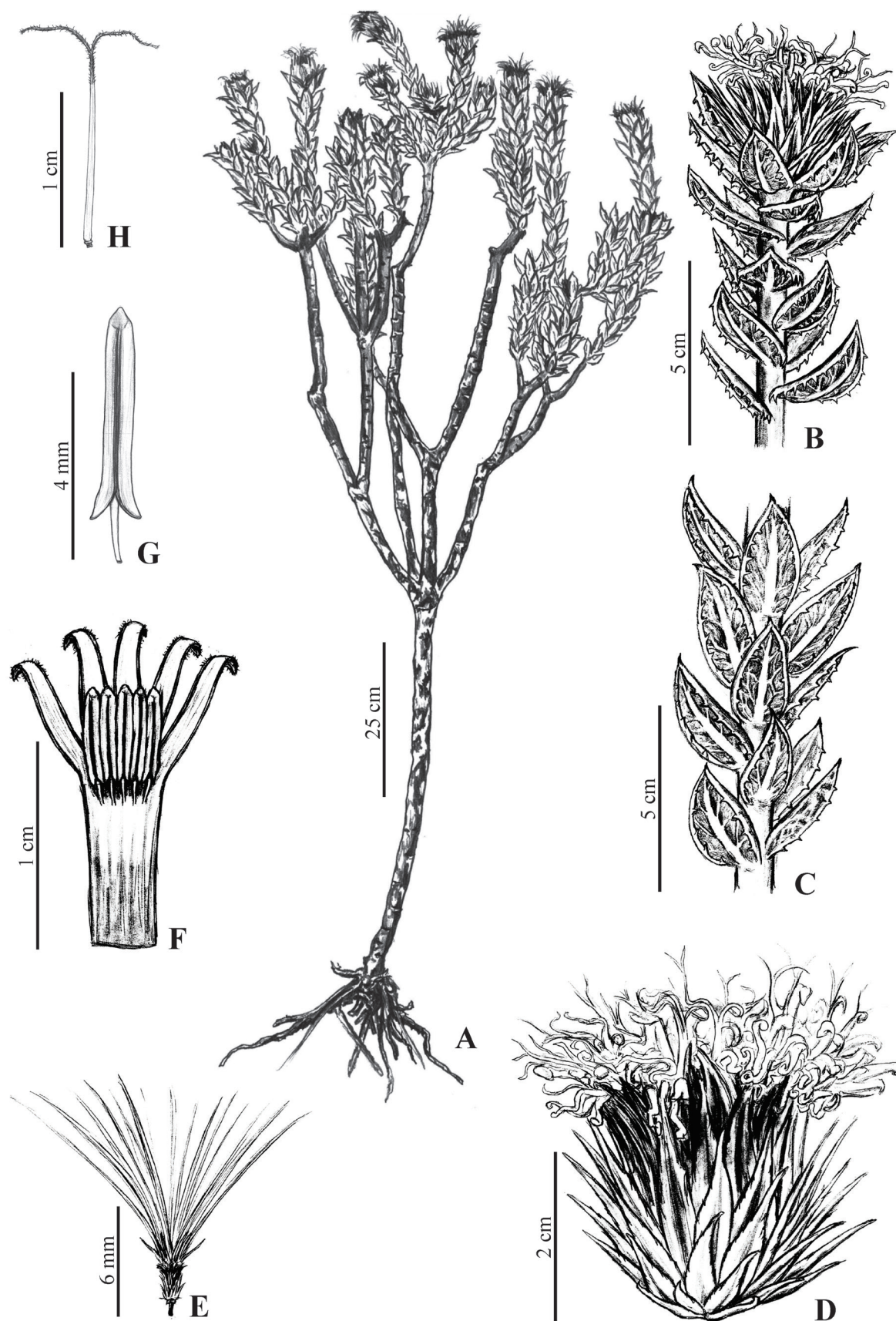


Figure 1. *Lessingianthus spinifolius*. **A.** Habit. **B.** Flowering branch. **C.** Phyllotaxy. **D.** Capitulum. **E.** Cypsel with pappus. **F.** Detail of corolla with stamen insertion. **G.** Stamen. **H.** Style (All illustrations made from the holotype. Drawings by Renato Araújo Dias).

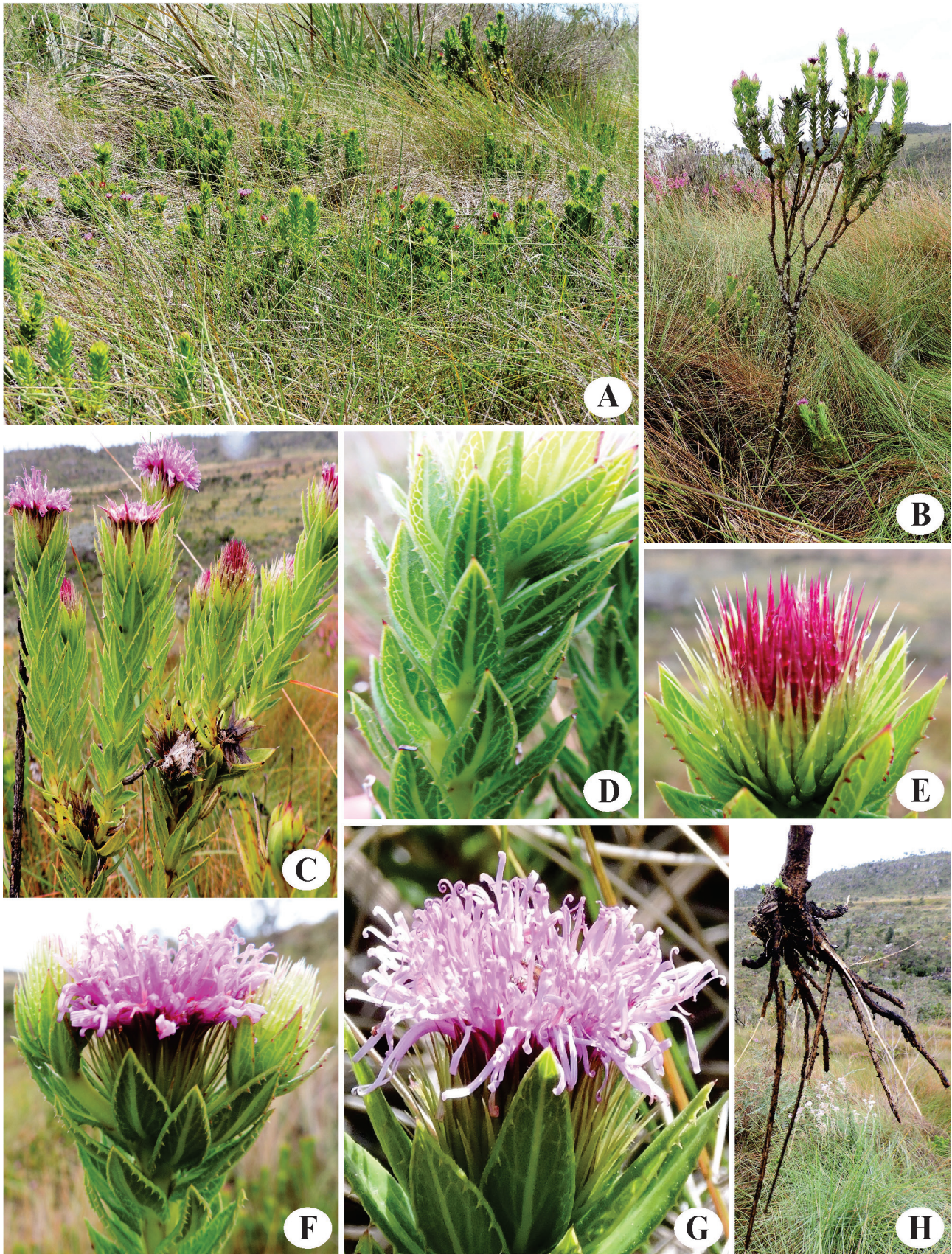


Figure 2. *Lessingianthus spinifolius* **A.** Environment. **B.** Habit. **C.** Flowering branches. **D.** Phyllotaxy. **E.** Phyllaries with vinaceous apex. **F.** Dichasiform capitulescence. **G.** Solitary capitulum. **H.** Root system. (A-H: Photos by R.N. Ribeiro).

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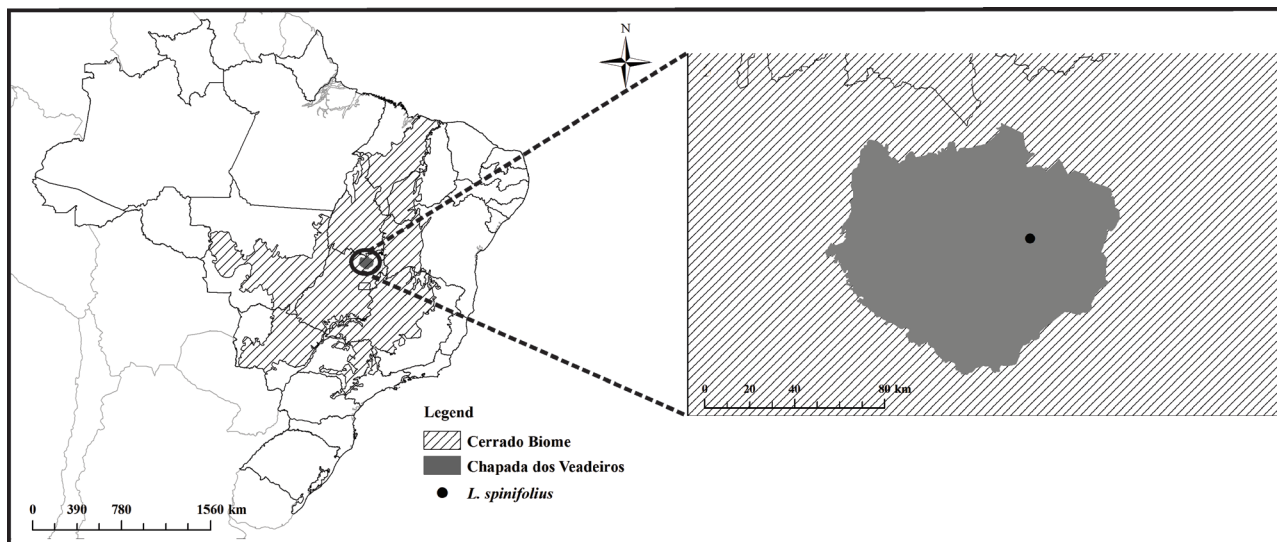


Figure 3. Distribution of *Lessingianthus spinifolius* in Chapada dos Veadeiros, State of Goiás, Brazil.

very small and with a geographic range (extend of occurrence and area of occupancy) critically limited.

Phenology: Flowering and fruiting specimens were collected in November, April, and May, period of the rainy season in the Cerrado biome.

Discussion: *Lessingianthus spinifolius* apparently is the only species of the genus with spinose leaf margins. However, the new species seems to be closely related to the sympatric species *L. onopordioides* (Baker) H. Rob. The species share features as involucre with phyllaries lanceolate with apex acute and pungent, florets number, and characteristics from de cypselae. Both species can be distinguished from each other through the selected characters presented in Table 1.

Lessingianthus araneosus* (Baker) A. Teles, *comb. nov.
Vernonia araneosa Baker, Fl. Bras. 6(2): 32. 1873. *Cacalia araneosa* (Baker) Kuntze, Revis. Gen. Pl. 2: 969. 1891. Type: BRAZIL. *s.l., s.d.*, Pohl 670 (lectotype K! (K000485904) here designated, isolecotypes GH (GH00013652) photo!, K! (K000485903), NY (NY00274557) photo!).

Distribution and habitat: Species endemic to Brazil found

in the State of Goiás and Distrito Federal. *Lessingianthus araneosus* is characteristically found in the Cerrado *sensu stricto*, more specifically in sparse vegetation locally known as “cerrado ralo”, a subtype of phytophysognomy of the Cerrado biome, according to Ribeiro & Walter (2008).

Discussion: Baker (1873) described *Vernonia araneosa* based on a specimen collected by Pohl (Pohl 670). This species was placed under the synonymy of *Lessingianthus durus* (Mart. ex DC.) H. Rob. by Robinson (1999). However, *V. araneosa* (here treated as *Lessingianthus araneosus*) seems to be similar to *L. durus* only superficially, and this similarity is limited to vegetative organs, mainly the leaves. Nevertheless, the two species differ in some aspects, especially in the size of the involucre, number of series of phyllaries, and florets number as listed in Table 1. As a result, we are proposing to resurrect *V. araneosa* from the synonymy of *L. durus*, and its new combination in *Lessingianthus*.

Note: The exsiccate housed at GH herbarium (GH00013652) has a fragment and a drawing of *Vernonia araneosa* mounted on the left side of the sheet, and a non-type collection of *Lessingianthus durus* (Gardner 4291) on the right side of the sheet.

Table 1. Selected differences between *Lessingianthus spinifolius* and *L. onopordioides*, and between *L. araneosus* and *L. durus*.

Character	Species	
	<i>L. spinifolius</i>	<i>L. onopordioides</i>
leaves distribution	leafy on the apex	leafy throughout
leaf-blade	lanceolate to ovate	ovate-cordate
leaf-margin	spinose and strongly revolute	sparsely serrate and plane
phyllaries	6-9- seriate	5-6- seriate
	<i>L. araneosus</i>	<i>L. durus</i>
involucre size	1.8-2×2-2.2 cm	0.8-1×1.2-1.6 cm
phyllaries	5-6- seriate	3-4- seriate
florets number	60-80	30-50
capitula arrangement	solitary or dichasiform capitulescence	corymbiform capitulescence



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