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Nomenclatural synopsis of the new *Calea* ser. *Candolleanae* (Asteraceae: Neurolaeneae), a clade endemic to Eastern and Central Brazil

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Abstract

Molecular phylogenetic reconstruction of *Calea* demonstrated that the circumscription of infrageneric groups should be altered or that the description of new sections and series is necessary for recognition of monophyletic taxa. One of these infrageneric groups is *C.* ser. *Candolleanae*, newly proposed here. Previously recognized as an informal complex, this group comprises eight species that occur exclusively in Brazil. Most of its species can be characterized by long-pedunculate radiate capitula, campanulate involucre, epaleaceous or partly paleaceous receptacle, strigose or glabrous cypselae, and pappus scales 0.1–1.5 mm long. In order to improve our understanding of this series, we generated a nomenclatural synopsis, revising protologues and type material. We propose 6 lectotypifications and 1 neotypification. In addition, we record new Brazilian state level occurrences for three species: *C. angusta* (Alagoas), *C. gardneriana* (Maranhão), and *C. martiana* (Bahia).

Key words: Compositae, Gardner, Heliantheae s.l., *Meyeria*, Pohl

Introduction

Calea Linnaeus (1763: 1179) occurs from Mexico to Argentina, including the Caribbean Island countries of Jamaica and Trinidad and Tobago (Bueno *et al.* 2021). The genus is characterized by a shrubby habit, commonly opposite leaves, radiate capitula, striate phyllaries, yellow florets, and pappus elements as scales. Several authors have provided treatments for the classification of *Calea* (Candolle 1836, Bentham & Hooker 1873, Baker 1884, Pruski 1998).

The last infrageneric classification proposed by Pruski (1998) divides the genus into five sections, where *C.* sect. *Meyeria* Bentham & Hooker (1873: 391) has the highest number of species (Bueno *et al.* 2021). Within this section, three species complexes have been recognized, including the "*C. teucriifolia* complex" (Pruski 1987, Bueno 2023), "*C. myrtifolia* complex" (Pruski & Urbatsch 1988, 2005, Bueno 2023), and "*C. pilosa* complex", which are reassessed here (Robinson 1979, Pruski & Hind 1998, Roque & Carvalho 2011, Pruski 2013, Silva & Teles 2018, Bueno 2023).

The first molecular phylogenetic reconstruction for *Calea* (Bueno 2023) tested the monophyly of the infrageneric taxa and species complexes. Following these results (Fig. 1), the composition of several infrageneric taxa and informal groups should be revised to achieve monophyletic groups. According to the circumscription proposed by Pruski & Hind (1998) and Pruski (2013), the "*C. pilosa* complex" is composed of ten species. However, the "*C. pilosa* complex" was not recovered as monophyletic in the phylogenetic analysis by Bueno (2023). All species that belong to this group are nested within *C.* subgen. *Monanthocalea* Lessing (1832: 242) (Bueno 2023). However, eight of these 10 species form a distinct, monophyletic group (Tab. 1), while *C. hatschbachii* Pruski & Hind (1998: 695) and *C. huanchacana* Pruski (2023: 72), formerly considered closely related to them, should be treated within another section (Bueno 2023).

The eight species that comprise part of the *"C. pilosa* complex" are excluded from the latter and placed within *C.* ser. *Candolleanae*, which is newly described here. This series is poorly known and has been recently considered by other taxonomists as part of new species descriptions and their associated taxonomic notes, including a taxonomic key (Robinson 1979, Pruski & Hind 1998, Roque & Carvalho 2011, Pruski 2013, Silva & Teles 2018). The aim of this study is to formally describe *C.* ser. *Candolleanae* and provide a morphological diagnosis as well as an updated synopsis with comprehensive nomenclatural and geographical data.

FIGURE 1. Simplified phylogeny of *Calea* by Bueno (2023), indicating subgeneric groups. The dashed box indicates the phylogenetic position of *Calea* ser. *Candolleanae* (Asteraceae, Neurolaeneae).

Material and methods

The available bibliography for *Calea* was revised for the synopsis (Bentham & Hooker 1873, Baker 1884, Robinson & Greenmann 1896, Malme 1933, Barroso 1975, Robinson 1975, 1979, Pruski & Urbatsch 1983, 1987, 1988, Pruski 1984, 1997, 1998, 2005, 2011, 2013, 2023, Wussow *et al.* 1985, Urbatsch *et al.* 1986, Pruski & Hind 1998, Roque & Carvalho 2011, Diaz-Piedrahita & Rodríguez-Cabeza 2012, Pozo & Hind 2013, Silva 2016, Silva *et al.* 2016, Pruski & Robinson 2018, Silva & Teles 2018, Reis-Silva 2019, Reis-Silva & Nakajima 2020, 2021, Bueno & Heiden 2021, 2022a, 2022b, Bueno *et al.* 2021, 2022, 2023, 2024, Bueno 2023, Reis-Silva *et al.* 2024). All species protologues were analyzed and type specimens of all the names related to the study group were compiled and reviewed, including synonyms.

Morphological descriptions were based on specimens studied in person in the herbaria BHCB, BHZB, BM, CEN, CESJ, DIAM, ECT, EFC, ESAL, FLOR, FURB, HBR, HDCF, HDJF, HEPH, HUCS, HUFU, IBGE, ICN, K, MBM, MO, NY, P, PACA, PAMG, PEL, R, RB, RFA, SJRP, SMDB, SP, SPF, SPSF, UB, UEC, UFG, UPCB, US, and VIC (acronyms according to Thiers 2024). High-quality digitized specimen images deposited in herbaria E, F, G, GH, IRAI, LIL, LP, LSU, M, MG, PH, S, and SI (acronyms according to Thiers 2024) were also consulted.

New occurrences were highlighted to include the distribution recognized by Reis-Silva *et al.* (2024). The state level occurrence map of the series was prepared using Quantum GIS v. 3.0 (QGIS Development Team 2015). The symbols in each state of Brazil on the map are not georeferenced points; in fact they indicate the presence of the species in each state. The lectotypifications were proposed following the precepts of the articles 9.11 and 9.12 of the ICN (Turland *et al.* 2018). We prioritize the choice of specimens that best represent the diagnostic features and bear reliable label information in accordance with the protologue.

Nomenclature and taxonomy treatment

Calea ser. ***Candolleanae*** V.R.Bueno, Gostel & G.Heiden, **ser. nov.**

Type species: *Calea candolleana* (Gardner) Baker (1884: 256) ≡ *Meyeria candolleana* Gardner (1848: 414–415).

Description:—Herbs to shrubs up to 1.2 m tall. Leaves opposite, discolorous, sometimes concolorous, sessile or petiolate, petiole 0.2–4.2 (–13.6) mm long; blades 0.9–8.05 × 0.05–3 (–4.8) cm, narrowly elliptical, often lanceolate,

sometimes linear, margins serrate, sometimes entire. Capitulescence cymose, dichasiform, often capitulum solitary, peduncle 1.5–16.3 (–21.7) cm long. Capitulum heterogamous, radiate; involucre campanulate, rarely cylindrical, 5.5–13 × (3.6–) 6.7–13.9 (–16) mm, wider than long, rarely longer than wide, 5–6-seriate, first series of phyllaries foliaceous to slightly foliaceous, the remaining phyllary series scarious; receptacle epaleaceous or partly paleaceous (hemipaleaceous or pauperpaleaceous; same frequency), paleae 4.7–6.5 mm long. Ray florets 5–10, pistillate, corolla yellow, (6–) 9.8–12.6 (–14.2) mm long, tube 1.9–3.5 mm long, limb (3.8–) 6.5–9.9 (–12.1) × (1.3–) 2.4–4.1 (–6.9) mm; style arms 0.5–1.3 mm long. Disc florets (12–) 18–30, bisexual, corolla yellow, 3.5–6 mm long, tube 1.2–1.5 (–2.1) mm long, lobes 0.4–1.2 mm long, tube longer than lobes, rarely equal; anthers 1.8–2.7 mm long, style arms 0.7–1 mm long. Cypselae blackish, (2.6–) 3.2–4.6 mm long, cylindrical; pappus monotypic, sometimes bitypic, (8–) 12–18 scales, 0.2–1.2 mm long, longer scales (when bitypic) 0.6–1.7 mm long, oblong or obovate.

Note:—The new series is characterized by narrow leaves, commonly long-pedunculate radiate capitula, campanulate involucre, epaleaceous or pauperpaleaceous to hemipaleaceous receptacle, and pappus scales 0.2–1.7 mm long.

The "*Calea pilosa* complex", comprising ten species according to Pruski & Hind (1998) and Pruski (2013), is not monophyletic (Bueno 2023). Therefore, this new series is defined here to include eight species and depicted here in a schematic way to show its placement in a phylogenetic context (Fig. 1). The new series comprises fewer species when compared to the former complex, due to the exclusion of *C. hatschbachii* and *C. huanchacana*.

Calea ser. *Candolleanae* is endemic of Eastern and Central Brazil (Fig. 2). This series occurs mostly in open vegetation types such as coastal scrubs, grasslands, and savannas. It comprises the following species: *C. angusta* Blake (1930: 258), *C. bahiensis* (Mattfeld 1925: 390) Robinson (1975: 428), *Calea candolleana* (Gardner 1848: 414) Baker (1884: 256), *C. elongata* (Gardner 1848: 415) Baker (1884: 255–256), *C. gardneriana* (Gardner 1848: 415) Baker (1884: 255–256), *C. martiana* Baker (1884: 256–257) , *C. melissifolia* Baker (1884: 257), and *C. pilosa* Baker (1884: 257). Although some specimens found in Mato Grosso do Sul and Paraguay were previously labeled as *C. candolleana* and *C. pilosa*, they do not correspond to these species and are close to *Calea rupicola* Chodat (1903: 726).

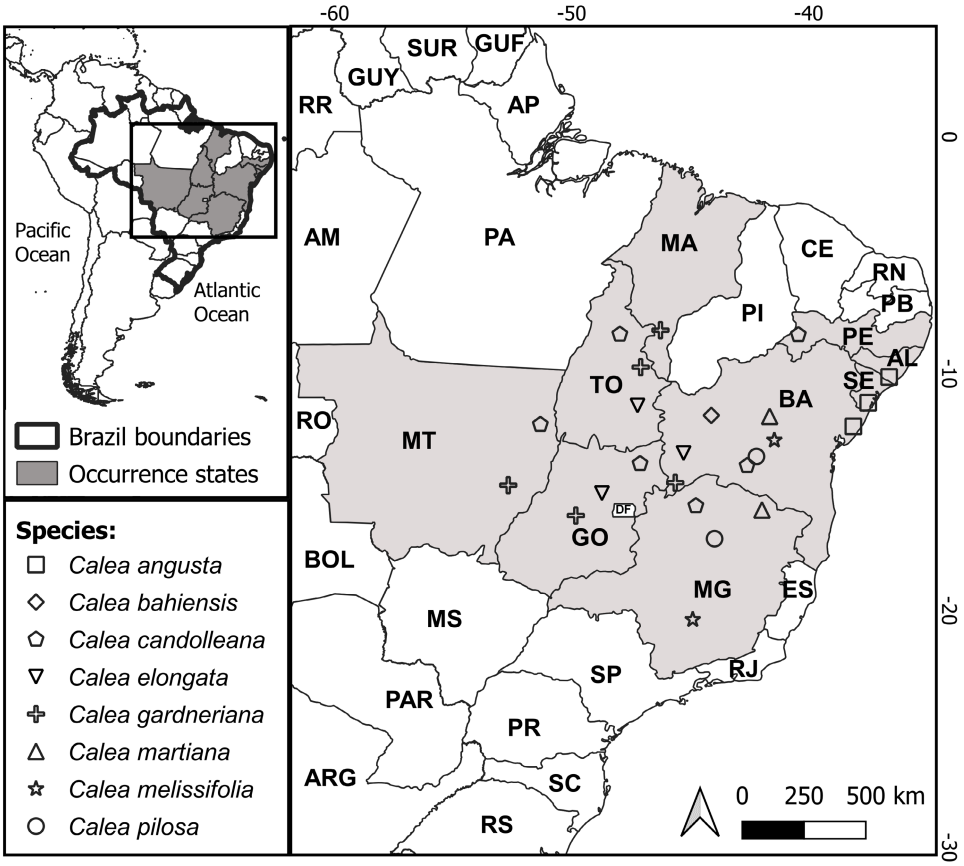

FIGURE 2. Occurrence map of *Calea* ser. *Candolleanae* (Asteraceae, Neurolaeneae) in Brazil; each symbol represents state level species occurrences. Brazilian states: AM—Amazonas, AL—Alagoas, AP—Amapá, BA—Bahia, CE—Ceará, DF—Distrito Federal, ES—Espírito Santo, GO—Goiás, MA—Maranhão, MG—Minas Gerais, MS—Mato Grosso do Sul, MT—Mato Grosso, PA—Pará, PE—Pernambuco, PB—Paraíba, PI—Piauí, PR—Paraná, RJ—Rio de Janeiro, RN—Rio Grande do Norte, RO—Rondônia, RS—Rio Grande do Sul, SC—Santa Catarina, SE—Sergipe, SP—São Paulo, TO—Tocantins. Countries or territories: ARG—Argentina, GUY—Guyana, GUF—French Guyana, BOL—Bolivia. PAR—Paraguay, SUR—Suriname.

Calea angusta S.F.Blake (1930: 258) ≡ *Galinsoga angustifolia* Sprengel (1821: 138)

Protologue:—"E Brasilia. *Otto*".

Neotype (designated here):—BRAZIL. Bahia: Nazaré, 1818, *F. Sellow s.n.* (K [K000323196]!; isoneotype P [P00117059]!).

= *Ageratum angustifolium* Sprengel (1826: 446) ≡ *Trichophyllum angustifolium* (Sprengel) Lessing (1831: 519) ≡ *Bahia angustifolia* (Sprengel) Candolle (1836: 656). ≡ *Calea angustifolia* (Sprengel) Schultz-Bipontinus ex Baker (1884: 256), non *Calea angustifolia* Gardner (1848: 417).

Protologue:—"Monte Video. Sello".

Lectotype (designated here):—BRAZIL. Bahia: Nazaré, 1818, *F. Sellow s.n.* (P [P00117060]!).

Note:—The names *Galinsoga angustifolia* Sprengel and *Calea angustifolia* Gardner (a synonym currently accepted as *C. multiplinervia* Lessing (1830: 159) were published earlier than *C. angusta*. As the specific epithet "*angustifolia*" was already occupied by Gardner (1848), Blake (1930) proposed the new name *C. angusta* for *G. angustifolia*. The protologue of *G. angustifolia* indicated one collection of *C.F. Otto*; however, Otto only worked in Germany and this specimen was actually collected in Brazil by F. Sellow (Moraes 2020).

Roque & Carvalho (2011) indicated that the type specimen of *G. angustifolia* is *Sellow* 1001 and for *Ageratum angustifolium* is *Sellow* 590. The protologue of *A. angustifolium* indicates that the collector was "Sello" and indicates that the specimen would have been collected in Uruguay. However, this species is endemic to Northeastern Brazil, suggesting that the locality information provided in the label is erroneous or misleading.

There is no indication of a collection number associated with the *Sellow* specimens associated with the names *C. angusta*, *G. angustifolia*, *A. angustifolium*, *Bahia angustifolia*, and *Trichophyllum angustifolium*, at either Kew (K) or the Paris (P) herbaria. According to Herter (1955), these specimens were collected in 1818, probably in the first half of the year, when Sellow was in the Nazaré region, Bahia state. *Galinsoga angustifolia* was described on the material different from the type of *Ageratum angustifolium*, despite having been collected by Sellow in the same region.

Calea angusta occurs in Alagoas, Bahia and Sergipe states in Brazil (Fig. 2). The occurrence in Alagoas [MAC7171] is highlighted here as the first occurrence of the genus for the state.

Calea bahiensis (Mattfeld) Robinson (1975: 428) ≡ *Geissopappus bahiensis* Mattfeld (1925: 390)

Protologue:—"Bahia, Rio de Contas: Casa de Pedra, Campo, *P.H.V. Luetzelburg 1*, vii 1913".

Holotype:—BRAZIL. Bahia: Rio das Contas, Casa de Pedra, 1919, *P.V. Luetzelburg 1* (M [M0030094], digital image!).

Note:—The type specimen collection date indicated in the protologue is July 1913. The year of 1925 written on the specimen's label may be a later annotation referring to the publication year, since Luetzelburg would have gone to Germany in 1924 and returned to Brazil only in 1927 (Paiva 2003). According to Paiva (2003), Luetzelburg was in Bahia only in 1919, therefore this year is indicated here as the most accurate collection date.

Roque & Carvalho (2011) proposed that *C. bahiensis* is a synonym of *C. candolleana*. Here we follow the concepts of Pruski (2013) and Reis-Silva *et al.* (2024) who accepted this name. It is the only species of *C.* ser. *Candolleanae* endemic to Bahia (Fig. 2) (Reis-Silva *et al.* 2024).

Calea candolleana (Gardner) Baker (1884: 256) ≡ *Meyeria candolleana* Gardner (1848: 414)

Protologue:—"In marshy Campos on the Serra da Batalha, district of the Rio Preto, province of Pernambuco, Sept. 1839 (2903), and in similar situations near São Domingos, Province of Goyaz, May, 1840 (4242)".

Lectotype (designated here):—BRAZIL. Pernambuco [Bahia]: Formosa do Rio Preto, Batalha, Sep. 1839, *G. Gardner 2903* (K [K000895290]!; isolectotypes M [M001009797], digital image!; E [E00417446], digital image!; E[E00417447], digital image!; G [G00222764], digital image!; G [G00222766], digital image!; GH [GH00589152], digital image!; GH [GH00589153], digital image!; GH [GH00589154], digital image!; GH [GH00010104], digital image!; GH [GH00589155], digital image!; K [GH00054475]!; K [K000895291]!; K [K000895292]!; NY [NY00215072]!; NY [NY 00215073]!; NY [NY 00215074]!; P [P02140694]!; P [P02140696]!; P [P02140695]!; P [P02140697]!; P [P02140698]).

Remaining syntypes:—BRAZIL. Goiás, São Domingos, 1 May 1840, *G.Gardner 4242* (BM [BM 001009796]!; E [E00417446], digital image!; E [E00417447], digital image!; G [G00222765], digital image!; GH [GH00589152], digital image!!; GH [GH00589153], digital image!!; GH [GH00589154], digital image!!; GH [GH00589155], digital image!!; K [K 000895292]!; NY [NY00215072]!; NY [NY00215073]!; NY [NY00215074]!; P [P02140694]!; P [P02140695]!; P [P02140696]!).

Note:—When Gardner (1848) published *Meyeria candolleana*, he indicated two collections as types, *Gardner 2903* and *Gardner 4242*. We designate the specimen *Gardner 2903* at K (K000895290) as lectotype because this specimen

is in better condition than its duplicates and the duplicates of *Gardner 4242*. According to the label information, this latter collection is probably from the adjacent São Domingos municipality, Goiás state, Brazil.

Gardner (1849) mentioned that, after leaving Parnaguá (today Piauí state), he went to the state of Pernambuco towards the town of Rio Preto (today Formosa do Rio Preto, Bahia state), passing over the Batalha mountains. This locality is currently part of the state of Bahia. Therefore, this locality is clarified as the place of origin for the type specimen. *Calea crenata* (non *Calea crenata* Chodat 1906: 726) and *Wedelia oblongifolia* are recognized as names pro synonymo by K.H.B. Schultz and J.B.E. Pohl, respectively and considered by Baker (1884) under *C. candolleana*. According to Reis-Silva *et al.* (2024), *C. candolleana* is the most broadly distributed species in this series. It occurs in Bahia, Goiás, Minas Gerais, Mato Grosso, Pernambuco, and Tocantins states in Brazil (Fig. 2).

Calea elongata (Gardner) Baker (1884: 255–256) ≡ *Meyeria elongata* Gardner (1848: 415)

Protologue:—"In boggy places on the Serra de Natividade, Province of Goyaz. Jan. 1840, *G. Gardner 3856*".

Lectotype (designated here):—BRAZIL. Goiás [Tocantins]: Natividade, in boggy places on the Serra de Natividade, Jan. 1840, *G. Gardner 3856* (BM [BM00100975], digital image!; isolectotypes E [E00417444], digital image!; E [E 00417445], digital image!; F [F974764], digital image!; F [F1022548], digital image!; G [G00222850], digital image!; G [G00222851], digital image!; K [K000895287]!; K [K000895298]!; NY [NY00215066]!; NY [NY00215067]!; P [P02140711]!; P [P02140712]!; P [P02140713]; US [US1066823]!; US [US1802955]!; W [W18890006666]).

Note:—Gardner (1848) mentioned the collection number "3856" in the publication of the basionym *Meyeria elongata*. The specimen deposited in BM [00100975] is a representative of the species and is in accordance with the protologue because it is the only specimen that has the collection data from January 1840 at Serra da Natividade indicated on the label, in accordance with the date when Gardner (1848) was in Natividade.

Baker (1884) synonymized "*Wedelia scaberrima* Pohl" and "*Calea scaberrima* Schultz" pro synonymo under *C. elongata*. This species occurs in Bahia, Goiás, and Tocantins (Fig. 2).

Calea gardneriana Baker (1884: 255) ≡ *Meyeria angustifolia* Gardner (1848: 414)

Protologue:—"Bushy places near Villa de Natividade, Province of Goyas. April, 1840, *G. Gardner 3282*".

Lectotype (designated here):—BRAZIL. Goiás [Tocantins]: Natividade, bushy places, Jan. 1840, *G. Gardner 3282* (BM [BM001009793], digital image!; isolectotypes P [P020140718]!; P [P020140719]!; P [P020140720]!; US [US1802953]!; W [W0043959], digital image!).

Note:—Baker (1884) published the new name *C. gardneriana*, based on *Meyeria angustifolia*, since the specific epithet "*angustifolia*" was already preoccupied by *Calea angustifolia* Gardner (1848: 417). There are several duplicate specimens from the gathering *Gardner 3282*. The specimen BM [001009793] was chosen as a lectotype because, among the syntypes, this is one of the few that contains a label indicating that the material was collected in Natividade. The other is a specimen that was kept in the herbarium at K [000895286], however the material deposited in the BM herbarium was prioritized because the label has information more consistent with the protologue as to the date of collection.

Calea gardneriana occurs (Fig. 2) in Bahia, Goiás, Maranhão, Mato Grosso, and Tocantins states (Reis-Silva *et al.* 2024). We recorded the occurrence of this species in Maranhão state [EAC5924] for the first time.

Calea martiana Baker (1884: 256–257)

Protologue:—"Minas Geraes, in campis Chapadão do Parana: *K. F. P. Martius!; praeterea: Sello 595!*".

Lectotype (designated here):—BRAZIL. Minas Gerais: *K.F.P. Martius 1739* (M [M0147049], digital image!; isolectotype M [M0030078], digital image!).

Note:—Baker (1884) indicated as type specimens the collections by *K.F.P. Martius* and *F. Sellow*. The collection number by *Martius* was not cited in the protologue, but since the chosen lectotype has this number, this data was amended in the type specimen information.

There are two duplicates in the M herbarium. The specimen M0147049 is designated as lectotype because it has more complete label data in agreement with the protologue in comparison to M0030078. The *Calea* specimen *Sellow 595* has not been found.

Reis-Silva *et al.* (2024) pointed out that *C. martiana* occurs in Minas Gerais and may possibly occur in Bahia, another state in Brazil. After analyzing several herbaria, we confirm that the species is also found in Bahia [US3031234] (Fig. 2).

Calea melissifolia Baker (1884: 257) [as *melissaefolia*]

Protologue:—"Minas Geraes, in campis sicciusculis Serra de S. Antonio, *K. F. P. Martius*".

Holotype:—BRAZIL. Minas Gerais: [Andrelândia,] Serra de Santo Antônio, *Martius s.n.* (M [M000323320], digital image!).

Note:—The protologue does not indicate the year of collection, but according to Ossenbach (2018), it can be assumed that *K.F.P. Martius* collected it in 1818 in the state of Minas Gerais, since in 1819 he was already in other states following his journey through the interior of Brazil. Martius' label data references to the Serra de Santo Antônio, in Minas Gerais. This locality is currently in the municipality of Andrelândia. *Calea melissifolia* occurs in Bahia and Minas Gerais states, Brazil (Fig. 2).

Calea pilosa Baker (1884: 257)

Prologue:—"In campis Brasiliae, *J.E.B. Pohl 326*".

Lectotype (designated here):—BRAZIL. [Minas Gerais,] inter Pirapora x Jenipapo de Minas, 1819–1820, *J.E.B. Pohl 3089* (K [K000323320]!; isolectotypes K [K000323378]!; W [W0043964], digital image!).

Note:—The material cited as type specimen in the protologue does not indicate the locality or collection year. According to Ossenbach (2018), *J.E.B. Pohl* was collecting in Brazil between 1818 and 1820. The available data points out that this specimen was collected in northern Minas Gerais or Bahia, in regions that were visited by Pohl by the end of his botanical expedition. Therefore, the specimen was likely collected between 1819 and 1820. According to the label information from W0043964, the specimen was collected in Minas Gerais, between Pirapora and Jenipapo de Minas.

Despite the indication in the protologue of the specimen *Pohl 326* as the type of *C. pilosa*, in fact this specimen is the type of a Poaceae species: *Vilfa adusta* Trinius (1840: 80) (Boechat & Longhi-Wagner 1995). In the lectotype, as well as in the other isolectotypes, the number 326 probably refers to the numbering of the Vienna herbarium (W), from where K0043964 was collected according to notes on the specimen. In the label of W0043964, the number *3089* is written indicating that this is the correct collection number. The specimen K000323320 is the best-preserved specimen among the *Calea pilosa* syntypes and is here indicated as lectotype. *Calea pilosa* occurs in Bahia and Minas Gerais states, Brazil (Fig. 2).

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References

Baker, J.G. (1884) Compositae: Helianthoideae. *In*: Martius, C.F.P. & Eichler, A.W. von (Eds.) *Flora brasiliensis*, vol. 6(3). Oldenbourgh, Munchen & Leipzig, pp. 138–298.

Barroso, G.M. (1975) De Compositarum Novitatibus. *Sellowia* 26: 102–118.

Bentham, G. & Hooker, J.D. (1873) *Genera Plantarum*, vol. 2. Reeve and Co, London, 533 pp.

Blake, S.F. (1930) Notes on certain type specimens of American Asteraceae in European herbaria. *Contributions from the United States National Herbarium* 26: 227–263.

Boechat, S.C. & Longhi-Wagner, H.M. (1995) O gênero *Sporobolus* (Poaceae: Chloridoideae) no Brasil. *Acta Botânica Brasilica* 9 (1): 149–156.

https://doi.org/10.1590/S0102-33061995000100002
Bueno, V.R. (2023) *Neurolaeneae Systematics*. Unpublished Ph. D. thesis. Universidade Federal do Rio Grande do Sul, Porto Alegre, 377 pp.
Bueno, V.R. & Heiden, G. (2021) *Calea funkiana* (Compositae, Neurolaeneae), a new species endemic from Serra do Cipó, Minas Gerais, Brazil. *Systematic Botany* 46: 470–475.
https://doi.org/10.1600/036364421X16231782047497
Bueno, V.R. & Heiden, G. (2022a) Novelties in *Calea* sect. *Meyeria* (Asteraceae, Neurolaeneae) from Brazil. *Systematic Botany* 47: 575–585.
https://doi.org/10.1600/036364422X16512564801632
Bueno, V.R. & Heiden, G. (2022b) *Calea sessilifolia* (Asteraceae, Neurolaeneae), a new species from the Diamantina Plateau, Minas Gerais, Brazil. *Systematic Botany* 47: 586–592.
https://doi.org/10.1600/036364422X16512564801687
Bueno, V.R., Gostel, M.R. & Heiden, G. (2021) An overview of Neurolaeneae (Compositae). *Capitulum* 1: 36–43.
https://doi.org/10.53875/capitulum.01.1.03
Bueno, V.R., Cassol, A.P.V., Leroy, C.J., Bueno, M.L. & Heiden, G. (2023) Two noteworthy new *Calea* (Asteraceae: Neurolaeneae) from contact areas of the Atlantic Forest and Cerrado of Brazil. *Phytotaxa* 579 (3): 143–161.
https://doi.org/10.11646/phytotaxa.579.3.1
Bueno, V.R., Gostel, M.R. & Heiden, G. (2022) *Calea repanda* (Asteraceae: Neurolaeneae), a new species and novel characters for the taxonomy of the genus. *Phytotaxa* 544 (3): 280–288.
https://doi.org/10.11646/phytotaxa.544.3.2
Bueno, V.R., Silva, G.H.L., Reis-Silva, G.A., Teles, A.M., Nakajima, J.N., Gostel, M.R. & Heiden, G. (2024) Synopsis of *Calea* subgen. *Teucriifoliae* (Asteraceae: Neurolaeneae), a new subgenus endemic to the Cerrado. *Phytotaxa* 637 (1): 62–72.
https://doi.org/10.11646/phytotaxa.637.1.4
Candolle, A.P. (1836) *Prodromus Systematis Naturalis Regni Vegetabilis*, vol. 5. Treuttel & Würtz, Paris & Strasbourg, 706 pp.
Chodat, R.H. (1903) Plantae Hasslerianae, soit énumération des plantes recoltées au Paraguay. *Bulletin de l'Herbier Boissier* 2 (3): 701–732.
Díaz-Piedrahita, S. & Rodríguez-Cabeza, B.V. (2012) Novedades en asteráceas colombianas—II. *Revista de la Academia Colombiana de Ciéncias Exactas, Físicas y Naturales* 36: 501–515.
https://doi.org/10.18257/raccefyn.36(141).2012.2510
Gardner, G. (1848) Contributions toward a Flora of Brazil. *London Journal of Botany* 7: 395–425.
Gardner, G. (1849) *Travels in the Interior of Brazil: Principally through the northern provinces, and the gold and diamond districts, during the years 1836–1841*. Rleve Brothers, King William Street, Strand, London, 562 pp.
Linnaeus, C. von (1763) *Species plantarum*, ed. 2, vol. 2. Salvius, Stockholm, 1684 pp.
https://doi.org/10.5962/bhl.title.11179
Lessing, C.F. (1830) Synanthereae. Plantarum Mexicanarum a cel. viris Schiede et Deppe collectarum recensio brevis. *Linnaea* 5: 72–174.
Lessing, C.F. (1831) De plantis in expeditione Romanzoffiana. Synanthereae addendae. *Linnaea* 6: 501–526.
Lessing, C.F. (1832) *Synopsis Generum Compositarum XI*. Sumtibus Dunckeri et Humblotii, Berlin, 473 pp.
Malme, G.O.A. (1933) Compositae paranenses. *Kongliga Svenska Vetenskaps Academiens Handlingar* 12: 1–122.
Mattfeld, J. (1925) Plantae Luetzelburgianae brasilienses VI. *Notizblatt des Botanischen Gartens und Museums zu Berlin-Dahlem* 9: 377–402.
https://doi.org/10.2307/3994387
Moraes, P.L.R. de (2020) The taxonomic identity of two neglected Sprengel names, *Galinsoga megapotamica* and *G. uniflora* (Asteraceae), with remarks upon Friedrich Sellow's collections galore. *Phytotaxa* 438 (3): 163–181.
https://doi.org/10.11646/phytotaxa.438.3.1
Ossenbach, C. (2018) Orchids in the era of Grigory Von Langsdorff: Two golden decades in the history of the botanical exploration of Brazil (1813–1830). *Lankesteriana* 18: 111–149.
https://doi.org/10.15517/lank.v18i2.34106
Paiva, M.P. (2003) Os naturalistas e o Ceará: IX—Philipp Von Luetzelburg (1880–1948). *Revista do Instituto do Ceará* 117: 41–63.
Pozo, P. & Hind, D.J.N. (2013) A new species of *Calea* sect. *Meyeria* (Compositae: Heliantheae: Neurolaeninae), *Calea woodi* from Santa Cruz, Bolivia. *Kew Bulletin* 68: 1–5.
https://doi.org/10.1007/s12225-013-9463-z
Pruski, J.F. (1984) *Calea brittoniana* and *Calea kristiniae*: Two New Compositae from Brazil. *Brittonia* 36: 98–103.
https://doi.org/10.2307/2806617

Pruski, J.F. (1987) *Calea dalyi* (Compositae: Heliantheae), a new species from the Serranía de Santiago, Bolivia. *Brittonia* 39: 201–204. https://doi.org/10.2307/2807375

Pruski, J.F. (1997) *Calea* L. *In*: Steyermark, J.A., Berry, P.E. & Holst, B.K. (Eds.) *Flora of the Venezuelan Guayana*. Missouri Botanical Garden, St. Louis, pp. 221–236.

Pruski, J.F. (1998) Novelties in *Calea* (Compositae: Heliantheae) from South America. *Kew Bulletin* 53: 683–693. https://doi.org/10.2307/4110487

Pruski, J.F. (2005) Studies of Neotropical Compositae–I. Novelties in *Calea*, *Clibadium*, *Conyza*, *Llerasia*, and *Pluchea*. *Sida* 21: 2023–2037.

Pruski, J.F. (2011) Compositae of the Guayana Highland–XIV. Four new species of *Calea* (Neurolaeneae) from Tepui summits in Venezuela. *Phytoneuron* 52: 1–9.

Pruski, J.F. (2013) Studies of Neotropical Compositae–IX. Four new species of *Calea* (Neurolaeneae) from Bolivia, Brazil and Paraguay. *Phytoneuron* 72: 1–4.

Pruski, J.F. (2023) The new genera *Laceanthos, Podocalea, Tepuipappus*, the resurrected genera *Lemmatium, Meyeria, Tonalanthus* and other novelties in the *Calea* Alliance I. *Phytoneuron* 42: 1–171.

Pruski, J.F. & Hind, D.J.N. (1998) Two new species of *Calea* (Compositae: Heliantheae) from Serra do Grão Mogol and Vicinity, Minas Gerais, Brazil. *Kew Bulletin* 53: 695–701. https://doi.org/10.2307/4110488

Pruski, J.F. & Robinson, H.E. (2018) Asteraceae. *In*: Davidse, G., Sánchez, M.S., Knapp, S. & Cabrera, F.C. (Eds.) *Flora Mesoamericana* vol. 5. Missouri Botanical Garden, Saint Louis, pp. 1–608.

Pruski, J.F. & Urbatsch, L.E. (1983) *Calea bucaramangensis* (Asteraceae), a new species from the Colombian Andes. *Systematic Botany* 8: 93–95. https://doi.org/10.2307/2418567

Pruski, J.F. & Urbastch, L.E. (1988) Five new species of *Calea* (Compositae: Heliantheae) from Planaltine Brazil. *Brittonia* 40: 341–356. https://doi.org/10.2307/2807644

QGIS Develpment Team (2015) QGIS Geographic Information System, Open Source Geospatial Foundation Project. Available from: http://qgis.osgeo.org (accessed 10 December 2021)

Reis-Silva, G.A. & Nakajima J.N. (2020) A new species of *Calea* (Neurolaeneae, Asteraceae) from the Espinhaço Range, Minas Gerais, Brazil. *Phytotaxa* 432 (2): 199–205. https://doi.org/10.11646/phytotaxa.432.2.9

Reis-Silva, G.A. & Nakajima, J.N. (2021) A new species of *Calea* (Neurolaeneae, Asteraceae) from the Atlantic Forest, Minas Gerais, southeastern Brazil. *Phytotaxa* 490 (1): 129–136. https://doi.org/10.11646/phytotaxa.494.1.9

Reis-Silva, G.A., Silva, G.H.L., Roque, N. & Bueno, V.R. (2024) *Calea* in Flora e Funga do Brasil. Jardim Botânico do Rio de Janeiro. Available from: https://floradobrasil.jbrj.gov.br/FB103751 (accessed 15 April 2024)

Reis-Silva, G.A. (2019) *The Genera Calea L. (Neurolaeneae, Asteraceae) in Minas Gerais. Brazil*. Universidade Federal de Viçosa, Viçosa, 181 pp.

Robinson, B.L. & Greenman, J.M. (1896) Revision of the Mexican and Central American Species of the Genus *Calea*. *Proceedings of the American Academy of Arts and Sciences* 32: 20–30. https://doi.org/10.2307/20020653

Robinson, H.E. (1975) Studies in the Heliantheae (Asteraceae). VI. Additions to the genus *Calea*. *Phytologia* 32: 426–430.

Robinson, H.E. (1979) Studies in the Heliantheae (Asteraceae). XIX. Four new species of *Calea* from Brasil. *Phytologia* 44: 270–276.

Roque, N. & Carvalho, V.C. (2011) Estudos taxonômicos do gênero *Calea* (Asteraceae, Neurolaeneae) no estado da Bahia, Brasil. *Rodriguésia* 62: 547–561. https://doi.org/10.1590/2175-7860201162308

Silva, G.H.L. (2016) *Estudos Taxonômicos do Gênero Calea L. (Asteraceae: Neurolaeneae) na região Centro-Oeste do Brasil*. Unpublished Master's thesis Universidade Federal de Goiás, Goiânia, 165 pp.

Silva, G.H.L. & Teles, A.M. (2018) *Calea* (Asteraceae, Neurolaeneae) no estado de Goiás, Brasil. *Rodriguésia* 69: 1851–1875. https://doi.org/10.1590/2175-7860201869422

Silva, G.H.L., Bringel, J.B. & Teles, A.M. (2016) A new species of *Calea* (Asteraceae–Neurolaneae) from Goiás State, Brazil. *Phytotaxa* 265 (3): 279–284. https://doi.org/10.11646/phytotaxa.265.3.9

Sprengel, C. (1821) Species plantarum minus cognitae. *Neue Entdeckungen im Ganzen Umfang der Pflanzenkunde* 2: 95–175.

Sprengel, C. (1826) *Systema Vegetabilium*, vol. 3. Sumtibus Librariae Dieterihianae, Gottingae, 936 pp.

Thiers, B.M. (2024) [updated continuously] Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. Available from: http://sweetgum.nybg.org/science/ih/ (accessed 10 March 2024)

Trinius, C.B. (1840) Genera Graminum. V. Agrostidea. *Mémoires de l'Académie Impériale des Sciences de Saint-Pétersbourg. Sixième Série. Sciences Mathématiques, Physiques et Naturelles. Seconde Partie: Sciences Naturelles* 6: 1–80.

Turland, N.J., Wiersema, J.H., Barrie, F.R., Greuter, W., Hawksworth, D.L., Herendeen, P.S., Knapp, S., Kusber, W.H., Li, D.Z., Marhold, K., May, T.W., McNeill, J., Monro, A.M., Prado, J., Price, M.J. & Smith, G.F. (Eds.) (2018) *International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code)*. Koeltz Botanical Books, Glashütten, 254 pp.
https://doi.org/10.12705/Code.2018

Urbatsch, L.E., Zlotsky, A. & Pruski, J.F. (1986) Revision of *Calea* sect. *Lemmatium* (Asteraceae: Heliantheae) from Brazil. *Systematic Botany* 11: 501–514.
https://doi.org/10.2307/2419029

Wussow, J.R., Urbatsch, L.E. & Sullivan, G.A. (1985) *Calea* (Asteraceae) in Mexico, Central America and Jamaica. *Systematic Botany* 10: 241–267.
https://doi.org/10.2307/2418590