

# A new species of *Calea* sect. *Meyeria* (Compositae: Heliantheae: Neurolaeninae), *Calea woodii*, from Santa Cruz, Bolivia

Paola Pozo<sup>1</sup> & D. J. Nicholas Hind<sup>2</sup>

**Summary.** A new purple-flowered discoid *Calea* (Compositae: Heliantheae: Neurolaeninae), *Calea woodii* (*Calea* sect. *Meyeria* (DC.) Benth. & Hook. f.), is described and illustrated from the Serranía de Cochís and the Serranía de Santa Bárbara, Chiquitos, Department of Santa Cruz, Bolivia. The relationship of this species is discussed and a key to the purple-flowered species of *Calea* sect. *Meyeria* is provided. The Brazilian *C. purpurea* G. M. Barroso, is lectotypified together with the *Bidens edentula* G. M. Barroso, *C. nervosa* G. M. Barroso, and *Ichthyothere pruinosa* G. M. Barroso (= *I. connata* S. F. Blake).

**Key Words.** Asteraceae, G. M. Barroso, *Bidens edentula*, *Calea irwinii*, *Calea nervosa*, *Calea purpurea*, *Ichthyothere pruinosa*, lectotypification.

## Introduction

The Province of Chiquitos, Department of Santa Cruz, possesses the largest areas of *cerrado* and *campo rupestre* vegetation in eastern Bolivia, large expanses of which still remain unexplored botanically. Pruski & Urbatsch (1987) have provided a synopsis of the exploration of the region although, since d'Orbigny in c. 1830, few botanists have explored the area in any great detail. Under John Wood's Darwin Initiative project 'Conservation of the *cerrados* of Eastern Bolivia', several expeditions have been made making repeated visits to the eastern parts of the Department. Amongst Wood's collections, a number of new taxa in the Compositae have been recognised and one of them described below represents a new subshrubby purple-flowered species of *Calea* L., the second such species recorded for the Province of Chiquitos, alongside *C. dalyi* Pruski & Urbatsch.

*Calea* contains between 110 – 125 species (cf. Pruski & Urbatsch 1988; Panero 2006; Baldwin 2009) and in Pruski's brief synopsis of the sections of *Calea* (Pruski 1984), and a further review (Pruski 1998), a total of five sections are recognised in the genus. A combination of inflorescence characters and features of the pappus allow fairly ready placement of taxa. Our new species, in possessing short oblong pappus squamellae 'much shorter than the achenes', belongs to sect. *Meyeria* (DC.) Benth. & Hook. f., based on the genus *Meyeria* DC. When described, de Candolle (1836: 670) recognised the genus based on several characters, including amongst others the radiate heterogamous capitula, paleaceous receptacles, and uniseriate oblong-elliptic pappus squamellae.

He divided *Meyeria* into two sections, sect. *Holophyllaea* DC. (= *Meyeria* sect. *Meyeria*  $\equiv$  *Calea* sect. *Meyeria*) and sect. *Gluphiophyllaea* DC. All of the original species are now considered to belong to the '*Calea myrtifolia* complex' (Pruski & Urbatsch 1988). However, our proposed new species, along with several others, in possessing relatively short leaves, and small, short-pedicellate, often discoid, capitula with few florets, belongs to one of the other informal groups, referred to by Pruski & Urbatsch as the '*Calea teucrifolia* complex' (Pruski & Urbatsch 1987). Species in this complex are common in the *cerrados* and *campos rupestres* of Brazil. Within the last three decades or so a number of species within the '*Calea teucrifolia* complex' have been described, including *C. purpurea* G. M. Barroso (Barroso 1975 — Bahia, Brazil), *C. harleyi* H. Rob. and *C. pinheiroi* H. Rob. (Robinson 1979 — Bahia, Brazil), *C. robinsoniana* Pruski (Pruski 1998 — Goiás, Brazil) and *C. dalyi* Pruski & Urbatsch (Pruski & Urbatsch 1987 — Santa Cruz, Bolivia), most of which also possess discoid capitula. *C. purpurea*, *C. dalyi* and our new species all possess purple corollas or purple corolla lobes and purple phyllaries; the new species is described below.

## Description

***Calea woodii* Pozo & D. J. N. Hind, sp. nov.**, squamellis oblongis pappi quam acheniis valde brevioribus ad *Caleam* sect. *Meyeriam* (DC.) Benth. & Hook. f. ascribenda et inter species hujus sectionis corollis atropurpureis gaudentes a *C. purpurea* inflorescentiis corymbiformibus (non umbelliformibus) et a *C. dalyi* statura brevioribus (35

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<sup>1</sup> Herbario Nacional de Bolivia, Calle 27, Cota Cota, Correo Postal 10077, Campus Universitario, La Paz, Bolivia. e-mail: paolasarela@yahoo.es

<sup>2</sup> Herbarium, Library, Art & Archives, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, UK. Corresponding author e-mail: n.hind@kew.org

cm, non 50 cm), internodiis brevioribus (5 – 15 mm, non 20 – 40 mm), foliis parvioribus (10 – 16 × 5 – 7.5 mm, non 23 – 35 × 6 – 10 mm), paginis discoloribus (non concoloribus), pilis strigosis antrorsis sparsis (non pilis hispidis longis densis), achaenia c. 4.2 mm longa (non 2.3 – 2.8 mm) et quaque inflorescentia 1 – 6 (non (3 –) 6 – 30) capitulis plerumque compositis differt. Typus: Bolivia, Santa Cruz, Chiquitos, Cochís, Zone of pass across Chochís range climbing up from Chochís-Motacuzal trail. 18°03'S, 59°34'48"W, [700 m], 18 March 2005, Wood & Haigh 21912 (holotypus K; isotypi BOLV, LPB).

<http://www.ipni.org/urn:lsid:ipni.org:names:77128825-1>

Subshrub to 35 cm tall, (rootstock currently unknown — see [Discussion](#) below). *Stems* erect, woody towards base, striate, glabrous and leafless at base and younger stems, herbaceous, scarcely striate, leafy and puberulent at apices, trichomes uniseriate, multicellular, eglandular, whitish, persistent. *Leaves* opposite, petiolate, petiole 2.3 – 4.5 mm long, puberulent, lamina elliptic-lanceolate, 10 – 16 × 5 – 7.5 mm, obscurely 3-veined from near base, base cuneate, margins flat, serrate with (2 –) 4 – 5 pairs of teeth in upper half, apex ± acute, upper surface dull green, puberulent, indumentum strigose, trichomes whitish, antrorse, moderately to densely and conspicuously glandular-punctate, glands yellowish with clear elliptical exudate, lower surface light green, puberulent, glandular-punctate. *Inflorescence* terminal, corymbiform, with 1 – 6 capitula, 7 – 19 mm wide, pedicels 3 – 5 mm long, puberulent, with 1 – 3 pairs of bracteoles, bracteoles foliaceous, narrowly lanceolate, (1.3 –) 4.2 – 7.5 × 0.6 – 1.5 mm. *Capitula* discoid, homogamous; involucre cylindrical, 5 – 7 × 2.5 – 3.9 mm; phyllaries 3-seriate, 10, imbricate, gradate, ovate, 5 – 8-veined, abaxially glabrous, margins ciliate in upper half, apically blackish-purple, basally golden with purple veins, outer phyllaries 4.8 – 6.2 × 2.2 – 4.6 mm, inner 6 – 9.6 × 1.8 – 2.5 mm; receptacle convex, c. 2 mm high, paleaceous, paleae 4.2 – 6.1 × 0.9 – 1.2 mm wide, narrowly elliptic, yellow or purple-tipped, with purple veins, conduplicate, margins lacinate. *Florets* hermaphrodite, 11 – 13, corollas actinomorphic, throat and lobes purple, 3.1 – 3.6 (– 3.9) mm long; tube golden, sparsely glandular-punctate at junction of tube and throat, tube 0.4 – 0.7 (– 0.9) mm × 0.3 – 0.6 mm, throat 0.7 – 0.8 (– 1) mm × 0.5 – 0.9 mm, only slightly wider than tube, lobes 5, erect, 1.9 – 2.3 × 0.5 – 0.9 (– 1.1) mm; anthers not exerted, yellow; style shaft glabrous, cylindrical, style arms relatively short, dark yellow, coiled, with short papillae outside towards apex. *Achenes* prismatic, black, 4.2 – 4.5 mm long, glabrous, curved at base; carpodium well-developed; pappus squamellae, oblong, irregularly lacinate, 0.3 – 0.8 × 0.4 – 0.6 mm, straw-coloured. [Fig. 1](#).

**DISTRIBUTION.** The species is currently only known from two collections from the serranías of Cochís and Santa Bárbara, Department of Santa Cruz, Bolivia.

**SELECTED SPECIMENS EXAMINED:** *Calea woodii*: **BOLIVIA.** Santa Cruz: Prov. Chiquitos: Chochís, 18°03'S, 59°34' 18"W, [700 m], 18 March 2005, Wood & Haigh 21912 (holotype K; isotypes BOLV, LPB); Prov. Chiquitos: Santa Bárbara, 18°14'14"S, 59°42'18"W, 1053 m, 3 May 2008, Wood *et al.* 24693 (paratype: K).

*Calea dalyi*: **BOLIVIA.** Santa Cruz: Prov. Chiquitos, S slope of the Serranía de Santiago, 18°23'S, 59°30'W, 800 – 950 m, 20 July 1982, Daly *et al.* 2172 (isotype K); Prov. de Chiquitos, Serranía del lado oeste de Santiago de Chiquitos camino a la zona del Arco, 18.2032°S, 59.3352°W, 805 m, 9 Sept. 2009, Soto & Linneo 1267 (K); Prov. Chiquitos, by track to Serranía de Santiago de Chiquitos, 800 m, 26 Jan. 2001, Wood & Goyder 16989 (K); Prov. Chiquitos, Cerro de Motacú, cerca de Santiago de Chiquitos, 18.2764°S, 59.6905°W, 936 m, 3 April 2009, Wood & Pozo 26016 (K); Prov. Chiquitos, Cerca de La Antena, arriba de San Juanama, 18°20'05"S, 59°07'42"W, 697 m, 9 April 2008, Wood *et al.* 24314 (K); Prov. Chiquitos, Santiago de Chiquitos, cumbre de la serranía de Santiago de Chiquitos en el filo norte de cara al valle de Tucavaca, 18.3382°S, 59.5483°W, 921 m, 22 March 2009, Wood *et al.* 25875 (K).

*Calea pupurea*: **BRAZIL.** Bahia: 'Shrub c. 0.4 m tall; heads dark purplish red. Espigão Mestre, c. 100 km WSW of Barreiras, elev. c. 760 m; sandy campo with scattered trees and shrubs, 6 March 1972, Anderson *et al.* 36632' (isotype K).

**HABITAT/ECOLOGY.** Label data indicates that this species occurs in small colonies on steep rocky slopes amongst large sandstone boulders on a ridge top covered in low shrubs and perennial herbs.

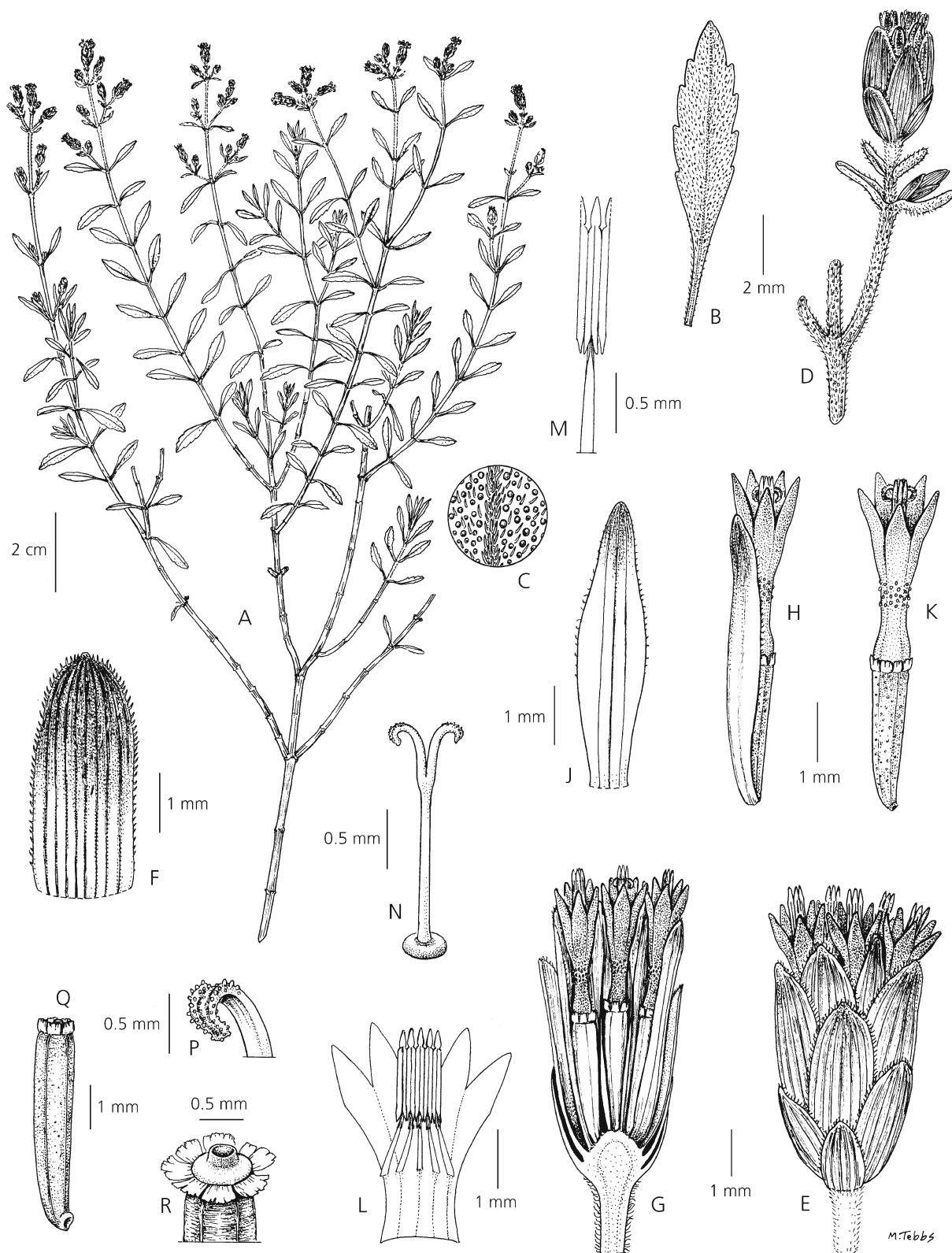
**PHENOLOGY.** Flowering March – May.

**ETYMOLOGY.** The species is named after the principle collector, John R. I. Wood, with whom we have both enjoyed rewarding fieldtrips, introducing one of us (DJNH) to the riches of the Bolivian Compositae flora and the delights of Bolivian cuisine!

**CONSERVATION STATUS.** Since this species is only known from two collections it is perhaps premature to assign a conservation status rating. However, the label data on the type suggests that the species was only found in one small colony at the type locality. The authors would prefer to record it as DD (Data Deficient) until more field data can be collected in this difficult terrain.

## Discussion

Unfortunately, even following discussions with John Wood, it is unknown if this species possesses a xylopodiaceous rootstock or a penetrating taproot system. The type material was cut a distance above the base of the plant and did not include any basal portions. *Calea dalyi* possesses a deep taproot which grows down



**Fig. 1.** *Calea woodii*. A habit; B leaf; C detail of lower leaf surface above midrib showing glandular-punctate surface and short antrorse strigose hairs; D flowering branch with subtending bracts; E capitulum; F middle phyllary; G l.s. capitulum; H floret with accompanying palea; J palea; K floret; L corolla opened out showing attachment point of filaments; M portion of anther cylinder showing one stamen; N style with basal nectary; P apex of style arm; Q achene; R apex of achene showing pappus squamellae. All from the holotype, Wood & Haigh 21912, except for M drawn from Wood et al. 24693 (K). DRAWN BY MARGARET TEBBS.

amongst the cracks of the metamorphosed sandstone on which it grows, alongside *Bidens herzogii* (Sherff) D. J. N. Hind (Compositae: Heliantheae: Coreopsidinae) and a number of other endemics of this region (Hind 2013).

The trio of purple-flowered species in the '*Calea teucrifolia* complex' has an interesting distribution. *C. purpurea* is still only known from the type collection made in a relatively poorly explored region of Espigão Mestre in the northwest of Bahia State, Brazil, on the eastern side of the Serra Geral de Goiás. Collections of *C. woodii* and *C. dalyi*, both Bolivian endemics from Santa Cruz, are slightly more numerous, *C. dalyi* being in more accessible localities around the Serranía de Santiago and

the town of Santiago, with an additional collection from the Cerro de Motacú, whereas *C. woodii* is on the somewhat more inaccessible Serranía de Chochís and the Serranía de Santa Bárbara. The distance between the type locality of *C. purpurea* and those of *C. dalyi* and *C. woodii* is approximately 1600 km; the distance between the localities of *C. dalyi* and *C. woodii* 50–60 km.

Hind (2009) has previously reported 10 species of *Calea* from Bolivia; with the description of *C. woodii* 11 are now recorded.

A key to this trio of species would replace the relevant couplet (4) to *Calea purpurea* and *C. dalyi* in Pruski & Urbatsch's key (Pruski & Urbatsch 1987: 204).

### Key to the purple-flowered species of *Calea* sect. *Meyeria* (DC.) Benth.

1. Receptacle epaleaceous; inflorescence umbelliform; capitula 3-flowered; phyllaries 5; Brazil (Bahia) ..... *C. purpurea* G. M. Barroso  
 Receptacle paleaceous; inflorescence corymbiform; capitula 11–13-flowered; phyllaries 9 or 10; Bolivia (Santa Cruz) ..... 2
2. Leaves 2.5–3.5 × 0.6–1 cm, concolorous, densely hispid beneath (with long erect hairs); inflorescence c. 1–3.5 cm wide with (3–) 6–30 capitula; achenes 2.3–2.8 mm long; plants to 50 cm tall; internodes 2–4 cm long; axils frequently with short shoots giving leaves a ternate appearance ..... *C. dalyi* Pruski & Urbatsch  
 Leaves 1–1.6 × 0.3–0.75 cm, discolorous, sparsely strigose (hairs usually short and antrorse); inflorescence 0.7–2 cm wide with 1–6 capitula; achenes 4.2–4.5 mm long; plants to 35 cm tall; internodes 0.5–1.5 cm long; axils lacking short shoots; ..... *C. woodii* Pozo & D. J. N. Hind

### Lectotypification of several names proposed by Barroso

Barroso (1975) described a number of new species of Compositae where, although the word 'HOLOTYPE' was used before the citation of the type material, she cited two or three institutions where duplicate material existed; no distinction was made between them. Although validly published, according to Art. 37.1 of the present Code (McNeill *et al.* 2006), these names can be lectotypified, following Art. 37.2 Note 1, Ex. 2, since the duplicates are to be considered as syntypes. The use of the term 'holotype' is seen as an 'error to be corrected' (Art. 9.8). The lectotypifications of these names are made below:

***Bidens edentula*** G. M. Barroso, *Sellowia* 26: 103 (1975).  
 Types: 'Brasil, Goiás, Chapada dos Veadeiros, cerrado on rocky slopes and adjacent campo, c. 42 km N of Alto Paraiso, elev. c. 1250 m s.m. leg. Irwin 33170 [25 March 1971] (UB, RB, NY)'. Lectotype (selected here): RB (166204); isolectotypes: K, NY, UB. Note: The sheet in RB was determined by Barroso on '22/IV/974'

***Calea nervosa*** G. M. Barroso, *Sellowia* 26: 109 (1975).  
 Types: 'Brasil, Goiás, Serra Geral do Paraná, cerrado.

Gallery forest adjacent, c. 3 km of São João da Aliança, near riacho, c. 850 m s.m. leg. Irwin 31796 [15 March 1971] (UB, RJ, NY)'. Lectotype (selected here): RB (166206); isolectotypes: K, NY, UB. Note: R. L. Esteves (pers. comm.) has indicated that there is apparently no material in 'R' (≡ RJ). The material in RB possesses a determination label by Barroso, dated '24/4/974' and is marked with a red type label upon which 'ISOTYPUS' is written; this appears to be a relatively recent addition to the sheet.

***Calea purpurea*** G. M. Barroso, *Sellowia* 26: 111 (1975).  
 Types: 'Brasil, Bahia, Serra do Espigão Mestre a 100 km WSW de Barreira e a c. de 750 m s.m., campo arenoso com árvores e arbustos esparsos. Leg. W. R. Anderson *et al.* 36632 (6.3.1972) (UB, RB, NY)'. '[Brasil: Bahia: Shrub c. 0.4 m tall; heads dark purplish red. Espigão Mestre, c. 100 km WSW of Barreiras; elev. c. 760 m; sandy campo with scattered trees and shrubs. 6 March 1972, Anderson *et al.* 36632.]' NB. The original label data is in square brackets. Lectotype (selected here): Anderson *et al.* 36632 — RB (166207); isolectotypes: K, NY, UB. Note: The lectotype sheet selected here is marked as 'Holotypus' on a determinavit label (dated '22/IV/974') by Barroso herself and the sheet has the characteristic 'HOLOTYPE' label of the institute attached.

*Ichthyothere pruinosa* G. M. Barroso, *Sellowia* 26: 102 (1975). Types: 'Brasil, Goiás, Chapada dos Veadeiros, leg. *Graziela [Barroso] et al.* s. nr. RB. UB'. Lectotype (selected here): RB; isolectotype: UB. = ***Ichthyothere connata*** S. F. Blake

***Calea irwinii*** G. M. Barroso, *Sellowia* 26: 108 (1975). Types: 'Brasil, Goiás, Alto Paraiso, Chapada dos Veadeiros campo and rocky slopes, elev. 1000 m s.m. leg. *Irwin* 25002 [24 March 1969] (UB. RB. NY)'. Lectotype (effectively selected by Urbatsch *et al.* 1986: 500, as 'holotype'): UB; isolectotypes: C, F, HB, K, MO, NY, RB × 2 (166205). Note: The two duplicates in RB were determined as isotypes by Pruski, one possesses a type-written label, the other has the habitat details written in blue ink on a piece of newspaper in Barroso's hand.

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