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Short communication

On the identity of *Oocephalus lythroides* (Hyptidinae, Lamiaceae): a new combination in the genus *Cantinoa*

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ABSTRACT

The name *Hyptis lythroides* was published in early 1800, attached to a specimen member of *H.* sect. *Polydesmia*, collected in Central Goiás, Brazil. After some adjustments, generic in *Hyptis* and subtribal in Hyptidinae over the last 70 years, this species was recently transferred to the genus *Oocephalus*. For years, this name was mistakenly assigned to a species commonly found in the Cerrado of Distrito Federal and eastern Goiás, which turned out to be a distinct species, *Oocephalus grazielae*. Here, we propose a new combination for the name *Oocephalus lythroides* under the genus *Cantinoa*, based on morphological features and redefinition of the species limits. Additionally, a second step lectotypification is proposed.

Keywords: Brazilian flora, Cerrado hotspot, endemism, *Hyptis*, taxonomy

Introduction

Oocephalus currently comprises 23 species occurring mainly in the Brazilian campos rupestres, especially those found in Bahia, Goiás and Minas Gerais states (Harley & Pastore 2012; Soares *et al*. 2022). *Oocephalus oppositiflorus*, however, has a wider distribution, being recorded in Piauí and São Paulo states, in Brazil, and eastern Bolivia (Harley 2014a). *Oocephalus* was segregated from *Hyptis* after molecular studies (Pastore *et al*. 2011) revealed the latter to be highly paraphyletic, leading Harley & Pastore (2012) to divide it into a number of genera. *Cantinoa*, another genus segregated from *Hyptis*, has a taxonomic history connecting it to *Oocephalus*. It is composed of 27 species widely distributed in the Tropics, with two species having been introduced to the Old World: *Cantinoa americana* and *C. mutabilis*. *Cantinoa* was proposed to accommodate eight species from the former *Hyptis* sect. *Mesosphaeria*, and about 16 species from *H.* sect. *Polydesmia*. The five remaining members of the latter, along with those from *H.* sect. *Polydesmia* subsect. *Oocephalus*, were combined in *Oocephalus*.

Not surprisingly, *Oocephalus* and *Cantinoa* share a similar inflorescence structure, which might cause confusion between them. Nevertheless, *Oocephalus* is characterized

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by the short or elongate thyrsoid structure, composed of a sessile or pedunculate cyme, never hemispherical or globose, but slightly ovoid, often enveloped by a pair of ovate or lanceolate bracteoles (except in *O. hagei*, whose bracteoles do not envelope the cyme). The calyx has deltate or subulate lobes and the sinuses between them are obdeltate in shape. The corolla has an elongate tube and short lobes, which are never blotched or marked with any lines, the limb never spreading, the gynoecium lacks a stylopodium and the nutlets are smooth and not mucilaginous when wet (Harley 2014a). On the other hand, *Cantinoa* species are characterized by the elongate, congested or interrupted, thyrsoid, simple or branched inflorescence, usually ovoid and surrounded by rather slender to ovate, rarely scarious bracteoles, which are apparently equal in number to the flowers and sometimes investing them to form an involucre. The calyx has five subequal lobes, these rarely absent or reduced, the sinuses between them rounded or truncated in shape, and the corolla has a well-developed, spreading limb. As in *Oocephalus*, the gynoecium is without a stylopodium and the nutlets smooth (Harley 2014b).

Oocephalus lythroides was described by Bentham (1833), based on the material collected by Johann B. E. Pohl (*Pohl 1483*) in 1819. According to Harley (2015), the type locality of this species is somewhere in western Goiás, near the border with Mato Grosso state, between Fazenda Água Fria and the Rio Claro, which flows in western Goiás. However, according to Pohl's journal, he passed this locality on March 28, 1819, only a few days before he reached the Aldeia Maria, near to which today is the town of Sanclerlândia. In addition, still according to his journal, Pohl traveled westwards through Goiás state about one year after collecting *H. lythroides*, on February 6, 1820 (Pohl 1832), on a 15-day excursion to the Rio Claro. Another example of this species is known, a collection made by W. Burchell, in 1828, apparently in the same locality as the type species, according to Smith & Smith (1967). Therefore, the type locality of *H. lythroides* lies somewhere near the Serra Dourada and the Rio Fartura, between the municipalities of Mossâmedes and Sanclerlândia, Central Goiás. Although the authors had recently gone on to a field trip in the type locality and surrounding areas, aiming to recollect *Oocephalus lythroides*, the species was not found. Perhaps another collection, made by *Queiroz et al. 10411* (HUEFS), of this species was made in the mid 2000s, from Barra do Garças, Mato Grosso state, is very similar to the type specimen collected by Pohl. However, a close analysis is needed to confirm the identity of this collection.

For years, the name *Hyptis lythroides* was mistakenly used to refer to a species frequently found in the Cerrado of Distrito Federal and surrounding areas, until Harley (2015), after carefully examination of many materials of this plant, recognized it as a new species, *O. grazielae*. These two species share some characters, such as the weakly imbricate leaves and a thyrsoid terminal inflorescence composed of ovoid bracteolate cymes, differentiated by the villous indumentum, composed of curved white trichomes, broader leaves (1.5-3.2 cm long), and sinuses of calyx lobes obdeltoid in *O. grazielae* (*vs.* pubescent indumentum, leaves 0.6-1.7 cm long, and the sinuses of the calyx lobes rounded in *O. lythroides*).

During examination of both Burchell and Pohl material housed at the K and W herbaria, while preparing a taxonomic revision of *Oocephalus*, some morphological characters led the first author to suspect that *Oocephalus lythroides* should belong to the genus *Cantinoa*. Therefore, in this paper we discuss the taxonomy of this species proposing a combination and a second step lectotypification.

Material and methods

The specimens here cited were examined by the authors in person at the herbaria K and W (acronyms according to Thiers (2022, continuously updated)), which are annotated with an exclamation mark. The terminologies used for species description follows Harris & Harris (2001) and for specific ones we used Epling (1949), Harley (2014a, 2014b) and Soares *et al.* (2022). Nomenclatural decisions follow the rules and recommendations of International Code of Nomenclature for algae, fungi, and plants (Turland *et al.* 2018).

Results and discussion

Taxonomic treatment

Cantinoa lythroides (Pohl ex Benth.) A.Soares & Harley, comb. nov. *Hyptis lythroides* Pohl ex Benth. Labiat. Gen. Spec. 1883, 118. Lectotype: BRAZIL. Goiás: Fazenda Agua Fria, Pohl, J. 1483 (First step lectotypification designated by Epling (1936: 252). Second step lectotypification here designated: W (W0052024)!; Isolectotype: W (W0052023)!, K (K000488290)!). (Fig. 1).

≡ *Mesosphaerum lythroides* (Pohl ex Benth.) Kuntze, Revis. Gen. Pl. 1891, 2: 526 (as "lythrodes").

≡ *Oocephalus lythroides* (Pohl ex Benth.) Harley & J.F.B.Pastore, Phytotaxa. 2012, 58: 34. synon. nov.

Non-viscid, erect shrub, root system not observed. Branches slightly pubescent, covered with white, short hairs and scattered sessile glands. Leaves opposite, decussate, subsessile, the petiole 1.3-1.4 mm long, lamina 1.1-2.5 × 0.6-1.7 cm, ovate to slightly elliptic, margin serrate, becoming entire from leaf lower half, membranous, venation craspedodromous, adaxial surface covered with scattered sessile glands and short white hairs concentrated on the veins, similar on both surfaces, apex acute, base cordate. Inflorescence a long unbranched thyrse, 2.1-11.1 × 1.1-1.6 cm, congested, peduncle 1.2 mm long, cyme ovoid, 9.0-

Figure 1. Lectotype of *Cantinoa lythroides* (Benth.) A.Soares & Harley (*Pohl 1483*, W0052024). Image used with consent of Naturhistorisches Museum Wien.

9.2 × 4.0-7.2 mm, bracteoles forming an involucre at the base of the cyme, outer bracteole 7.0 × 2.0 mm, ovate to elliptic, acute apex, green, becoming purple towards apex, outer surface covered with short white hairs, inner surface glabrous with scattered sessile glands; inner bracteole 6.2 mm long (most external ones 6.9 mm long), lanceolate, flat, outer surface covered with scattered sessile glands and short white hairs, inner surface glabrous with scattered sessile glands. Flower subsessile, with pedicel 0.3 mm long; calyx at anthesis truncate or 5-lobed, tube 2.0-2.1 mm long, tubular, membranous, covered with short white hairs and sessile glands, inner surface indumentum not observed, lobes, when present, 2.6-2.7 mm long, lanceolate, membranous, covered with long white hairs, sinuses between lobes rounded or truncate, with a ring of short white hairs between the lobes; fruiting calyx not observed; corolla tube ± 4.7 mm long, lobes up to 2 mm long, apex rounded; stamens and gynoecium not observed. Nutlets not observed.

Additional specimen examined - BRAZIL. Goiás: Along caminho do Bacopary, buds, 3/IV/1828, *Burchell 6886* (K!).

Potential area of distribution - *Oocephalus lythroides* was collected only two times in the 19th century, in relatively closely localities, in an area that extends from municipality of Sanclerlândia to the Serra Dourada, passing through the town of Mossâmedes, in Central Goiás, Brazil.

Remarks - Although phylogenetically distant (Pastore *et al.* 2011; 2021), *Oocephalus* species are morphologically similar to species belonging to *Cantinoa*, especially those from Central Brazil. This could be a result of convergent evolution driven by similar environmental or biological constraints, such as similar pollinators. Despite sharing similar characters with *Oocephalus* species, the sample collected by Pohl has a leaf with margin entire in the lower half, the sinuses between the calyx lobes are rounded or truncate, and the corolla throat is widened, features absent in *Oocephalus* species but present in members of *Cantinoa*, justifying the new combination proposed here.

Cantinoa lythroides resembles two other species from the Central Brazil Cerrado, which were also members of *Hyptis* sect. *Polydesmia* subsect. *Glomeratae*: *Cantinoa subrotunda* (Pohl ex Benth.) Harley & J.F.B.Pastore (≡ *Hyptis subrotunda* Pohl ex Benth.) and *Cantinoa indivisa* (Pilg.) Harley & J.F.B.Pastore (≡ *Hyptis indivisa* Pilg.). However, leaves in *Cantinoa lythroides* are ovate to elliptic with cordate base, the inflorescence is a long unbranched thyrse, 2.1-11.1 × 1.1-1.6 cm, with (3-)5-flowered, slightly ovoid cymes, , often enveloped by a pair of bracteoles, 7.0 × 2.0 mm, ovate to slightly elliptic, the calyx lobes green, never purple (*vs.* leaves obovate or elliptic with rounded to attenuate base, branched thyrse, 4.6-10.5 × 1.8-2.3 cm, 11-22-flowered, cyme enveloped by a number of lanceolate bracteoles and calyx lobes absent in *C. subrotunda*, and elliptic leaves with cuneate to rounded base, branched thyrse, 11–15 × 5.0–5.8 cm, 9-flowered cyme enveloped by a pair of ovate bracteoles and calyx lobes green becoming purple at the apex in *C. indivisa*).

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