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Short Communication

First record of *Heterosperma* for Brazil and an updated generic key for tribe Coreopsideae (Asteraceae)

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Abstract

We present the first record of *Heterosperma* (*H. ovatifolium*, Asteraceae) for Brazil as a result of the taxonomic study of tribe Coreopsideae for Northeastern Brazil. The genus currently comprises 11 species, occurring from southwestern United States to South America and the West Indies. We present a complete morphological description, a photo plate, and a distribution map with the updated distribution for *H. ovatifolium*. Additionally, we present an updated identification key for the genera of Coreopsideae for Brazil.

Key words: Heliantheae Alliance, Compositae, Northeastern Brazil, Bahia.

Resumo

Como resultado dos nossos estudos em Coreopsideae no Nordeste do Brasil, apresentamos o primeiro registro de *Heterosperma* (*H. ovatifolium*) para o País. O gênero atualmente é composto de 11 espécies com distribuição do sudoeste dos Estados Unidos até a América do Sul, incluindo a região do Caribe. Neste trabalho apresentamos uma descrição completa, imagens, e um mapa com a distribuição atualizada da espécie, além de uma chave de identificação atualizada para os gêneros de Coreopsideae para o Brasil.

Palavras-chave: Aliança Heliantheae, Compositae, Bahia, Nordeste do Brasil.

Tribe Coreopsideae is currently included in the Heliantheae Alliance, one of the most diverse clades of Asteraceae (Susanna *et al*. 2020). The tribe is mainly characterized by its dimorphic involucral bracts, arranged in 1–6 series, with the outer series green and linear to ovate, and the inner with few to many brownish-orange striations and scarious margins (Panero 2007; Crawford *et al*. 2009). According to Panero & Crozier (2016), over 98% of the Alliance is placed within the PF Clade (Phytomelanic Fruit Clade), where most genera have blackened cypselae due to the deposition of phytomelanin on the fruit wall. Coreopsideae is currently represented by 24 genera, mostly distributed in North and South America (Crawford *et al*. 2009). In Brazil, seven genera and 37 species are recorded (Magenta *et al*. 2017; Flora e Funga do BrasiL 2022).

As a result of the taxonomic study of Coreopsideae from Northeastern Brazil, we present the first record of *Heterosperma*, the eighth genus of this tribe for Brazil. *Heterosperma ovatifolium* Cavanilles (1802: 204) was collected in an anthropized area in the municipality of Piatã, state of Bahia. This species is found on montane slopes and anthropized areas from Ecuador, Peru, Chile, Bolivia, and Argentina (Arisa Espinar & Lizarazu 2015). *Heterosperma* was initially proposed by Cavanilles (1795) as a monospecific genus based on *H. pinnatum* Cavanilles (1795: 34). The genus currently comprises 11 species distributed from southwestern United States to Argentina and the West Indies (Lizarazu & Freire 2019). *Heterosperma* is recognized by its herbaceous habit, entire to pinnatisect leaves, radiate heads, and heteromorphic cypselae (Crawford *et al*. 2009; Lizarazu & Freire 2019).

We present a description and taxonomic comments for *H. ovatifolium*, an identification key for the genera of Coreopsideae in Brazil and an

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updated distribution map for the species in South America, with emphasis on the new record (Fig. 1). This study was based on the analysis of specimens deposited at ALCB and HUEFS herbaria (acronyms according to Thiers, continuously updated), specialized literature (Panero 2007; Lizarazu & Freire 2019), analysis of type specimens and protologues, and additional collections from online platforms (JSTOR; Tropicos.org; Biodiversity Heritage Library; SpeciesLink; Jabot).

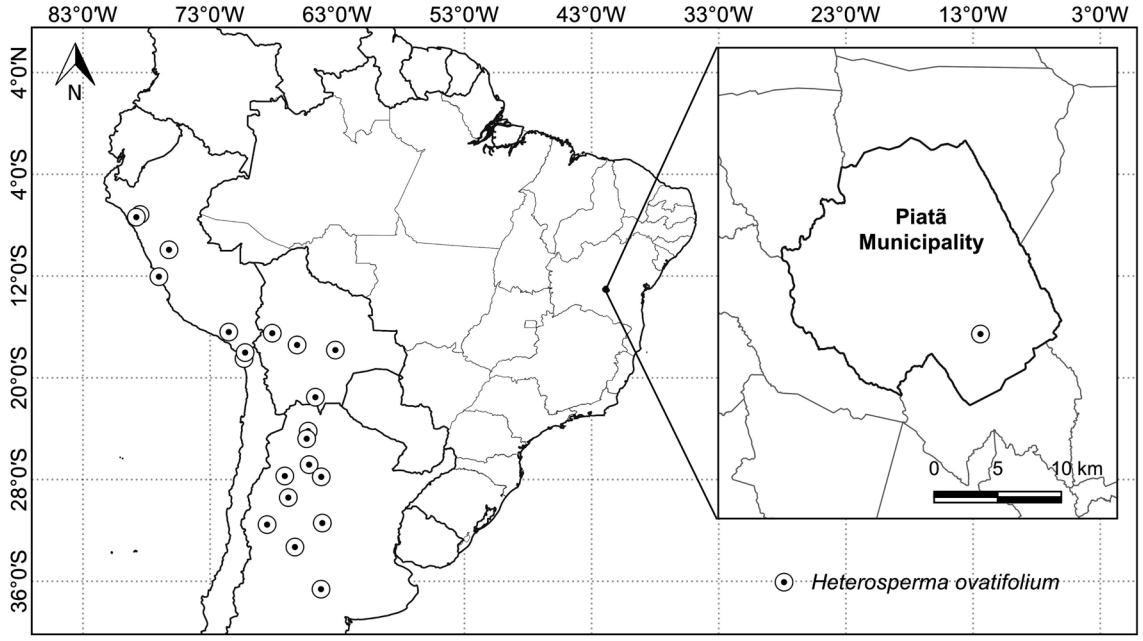

Figure 1 – Distribution of *Heterosperma ovatifolium* in South America with the first register on the municipality of Piatã, Bahia, Brazil.

Generic identification key for Coreopsideae (Asteraceae) in Brazil

1. Branches prostrate; cypselae heteromorphic 2
1'. Branches erect; cypselae isomorphic 3
2. Leaves opposite, blades entire, ovate; heads with 3 ray flowers ..... *Heterosperma*
2'. Leaves rosulate, blades pinnatisect; heads with 13 ray flowers ..... *Chrysanthellum*
3. Involucre 3-seriate, outer 2 series foliaceous, bracts orbicular ..... *Staurochlamys*
3'. Involucre 2-seriate, the outer series foliaceous, bracts lanceolate to ovate 4
4. Leaves alternate (sometimes rosulate at the base); ray flowers' corolla purplish-yellow, dull red-purple, purplish-black, sometimes white-silvery on adaxial surface ..... *Isostigma*
4'. Leaves opposite at base; ray flowers' corolla yellow, orange, pink or lilac 5
5. Cypselae generally winged, rugose or papillose, pappus with deciduous scale or antrorsely barbed awns ..... *Coreopsis*
5'. Cypselae wingless, sulcate or striate, pappus absent or with retrorsely barbed awns 6
6. Ray flowers in more than 3 series; pappus absent or with 2 delicate and deciduous bristles ..... *Dahlia*
6'. Ray flowers absent or in 1–2 series; pappus with retrorsely barbed awns, rarely absent 7
7. Ray flowers sometimes present, when present 3–5(–8), yellow or white; filaments glabrous; cypselae erostrate ..... *Bidens*
7'. Ray flowers always present, 7–8, yellow, orange, lilac or pink; filaments pilose; cypselae rostrate ..... *Cosmos*

Heterosperma ovatifolium Cav., Descr. Pl.: 204. 1802. Fig. 2

Herbs prostrate 10–20 cm tall; branches laterally compressed, longitudinally striate, villose. Leaves opposite, simple; petioles 0.4–1.5 cm long; blades 1.6–3.5 × 1.1–1.4 cm, ovate, membranous, discolorous, base attenuate, margin serrate, ciliate, apex acute or obtuse, adaxially glabrescent or sparsely strigose, abaxially glabrous. Capitulescence terminal or axillary; peduncle 1.7–3 cm long, villose. Heads 0.5–0.7 × 0.3–0.5 cm, radiate, involucre campanulate, involucral bracts 2-seriate, outer bracts 4–5, ca. 6 × 1 mm, narrowly elliptic, glabrous, green, margin setose, apex acute, inner bracts 5, ca. 8.5 × 2 mm, ovate, glabrous, hyaline with purple striations, margin entire, apex acute; receptacle flat to convex, paleaceous, palea ca. 7 × 1 mm, lanceolate, glabrous, margin entire, apex acute. Ray flowers 3, pistillate, corolla ligulate, ca. 3 mm long, yellow, tube ca. 0.5 mm long, pubescent; disc flowers 8, bisexual, tubular, ca. 2 mm long, yellow, tube ca. 1 mm long, glabrous; anthers 1 mm long, black, apical connective appendage ca. 0.4 mm long, ovate, apex acute, brown, basal appendage sagittate, filaments 1.5 mm long, collar present, hyaline, glabrous; style ca. 1 mm long, stylopodium present, yellow, style branches ca. 0.8 mm long, deltate in cross-section, apex apiculate, papillose. Cypselae heteromorphic; ray cypselae ca. 5 × 2 mm, obovoid, laterally compressed, black, winged, glabrous, tuberculate, apex rostrate, ca. 1,5 mm long, pappus with 2 awns, retrorsely barbed; disc cypselae 8–9 mm long, fusiform, black, glabrous, slightly tuberculate, apex rostrate, ca. 1,5 mm long, pappus with 2 awns, retrorsely barbed.

Specimen examined: Piatã, 41º77’06’’S, 13º15’39’’W, 1,269 m above sea level, 10.XII.2013, fl. and fr., *M. Alves et al. 303* (ALCB, HUEFS, US).

The species can be recognized by its leaf blade ovate and heteromorphic cypselae (cypselae obovoid and compressed in the ray flowers and fusiform in the disc flowers). *Heterosperma ovatifolium* differs from *H. ovale* Blake (1915: 322) by its inner involucral bracts glabrous (*vs.* pilose), the ray flowers with the corolla tube pilose (*vs.* glabrous) and disc cypselae fusiform and not winged (*vs.* obovoid and winged), respectively (Lizarazu & Freire 2019).

Although Lizarazu & Freire (2019) have described *H. ovatifolium* with ray cypselae epappose, this character is variable as verified by Ariza-Spinar & Lizarazu (2015) who represented the species with cypselae eppapose and pappus biaristate.

Heterosperma ovatifolium occurs in dry regions of South America with annual precipitation between 50–1,200 mm, temperature ranging from 8.5 to 23 °C and altitudes of 1,000–4,500 m (Cabrera & Willink 1973; Lizarazu & Freire 2019). In Brazil, the species was collected in Piatã municipality, the highest (1,280 m) and coldest (13.4 to 21.7 °C) city in the Northeastern region of the country, with annual precipitation around 1,154 mm and sub-humid warm climate (IBGE 2002; Vieira *et al.* 2005). We believe that the invasive characteristic of the species (Ariza-Espinar & Lizarazu 2015) and the similarity between the environments can be a probable answer for the development of the species in Brazil.

In Brazil, *H. ovatifolium* is been considered an alien species. We believe the species was introduced in the region through anthropic activities, such as urbanization and tourism (Richardson *et al.* 2000; Nievas *et al.* 2019).

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References

Ariza-Espinar L & Lizarazu MA (2015) *Heterosperma*. *In*: Zuloaga FO, Belgrano MJ & Anton AM (eds.) Flora Argentina: flora vascular de la República Argentina. Dicotyledoneae. Asteraceae: Cichorieae, Helenieae a Mutiseae. Vol. 7. Tomo 2. Instituto de Botánica Darwinion e Instituto Multidisciplinario de Biología Vegetal, San Isidro. Pp. 219-222.

Biodiversity Heritage Library (2021) Available at <https://www.biodiversitylibrary.org/>. Access on 12 February 2021.

Blake SF (1915) Four new Heterospermas. The Journal of Botany, British and Foreign 53: 322-324.

Cabrera A L & Willink A (1973) Biogeografía de América Latina. Monografía 13, Serie de Biología. OEA, Washington, D.C. 120p.

Cavanilles AJ (1795) Icones et Descriptiones Plantarum. Vol. 3(2). Typographia Regia, Madrid. 158p.

Cavanilles AJ (1802) Descripción de las Plantas. Imprenta Real, Madrid. 625p.

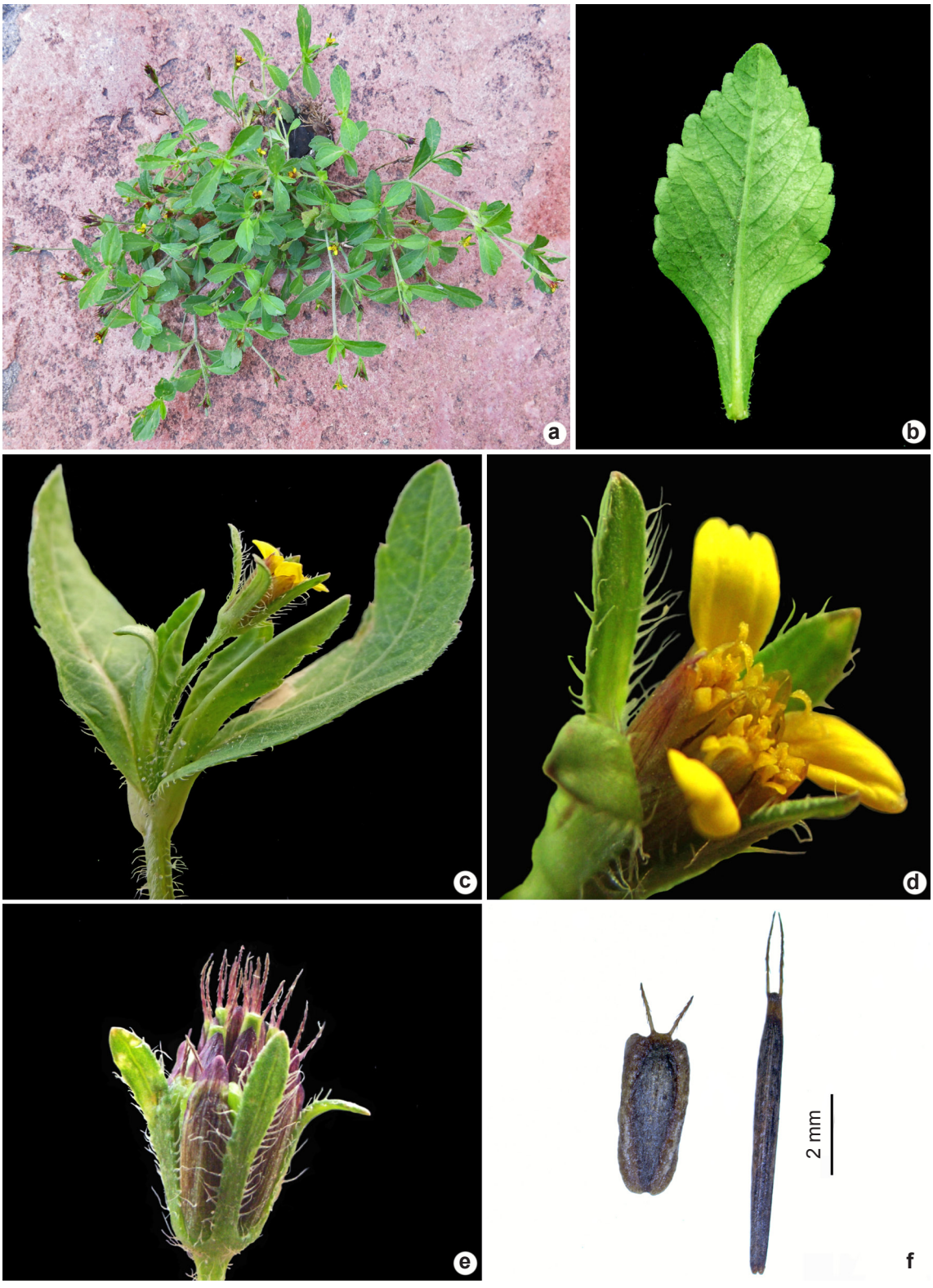

Figure 2 – a. habit herbaceous of *Heterosperma ovatifolium*. b. leaf. c. head enclosed by foliaceus bracts. d. head with outer involucral bracts with margin setose. e. head with cypselae. f. ray cypsela (left) and disc cypsela (right). (photographs by: a. *M. Alves*; b-e. *R.F. Almeida*; f. *M.L. Barbosa*).

Crawford DJ, Tadesse M, Mort ME, Kimball RT & Randle CP (2009) Coreopsideae. *In*: Funk V, Susanna A, Stuessy TF & Bayer RJ (eds.) Systematics, evolution and biogeography of Compositae. IAPT, Vienna. Pp. 713-730.

Flora e Funga do Brasil (2022) Jardim Botânico do Rio de Janeiro. Available at <http://floradobrasil.jbrj.gov.br/>. Acess on 29 September 2022.

IBGE (2002) Mapa de clima do Brasil. Instituto Brasileiro de Geografia e Estatística. Available at <https://geoftp.ibge.gov.br/informacoes_ambientais/climatologia/mapas/brasil/Map_BR_clima_2002.pdf>. Access on 19 November 2021.

JABOT (2021) Available at <http://jabot.jbrj.gov.br/v3/consulta.php>. Access on 12 February 2021.

JSTOR (2021) Available at <https://www.jstor.org/>. Access on 12 February 2021.

Lizarazu MA & Freire SE (2019) A taxonomic revision of *Heterosperma* (Asteraceae: Coreopsideae). Annals of the Missouri Botanical Garden 104: 633-663.

Magenta MAG, Alves M & Bringel Junior JBA (2017) Tribo Coreopsideae Lindl. *In*: Roque N, Teles AM & Nakajima JN (eds.) A família Asteraceae no Brasil: classificação e diversidade. Edufba, Salvador. Pp. 165-170.

Nievas RP, Calderon MR & Moglia MM (2019) Environmental factors affecting the success of exotic plant invasion in a wildland-urban ecotone in temperate South America. Neotropical Biology and Conservation 14: 257-274.

Panero JL (2007) Tribe Coreopsideae Lindl. *In*: Kadereit JW & Jeffrey C (eds.) The families and genera of vascular plants. Vol. VIII: Flowering plants eudicots: Asterales. Springer, Berlin. Pp. 406-417.

Panero JL & Crozier BS (2016) Macroevolutionary dynamics in the early diversification of Asteraceae. Molecular Phylogenetics and Evolution 99: 116-132.

Richardson DM, Pysek P, Rejmanek M, Barbour MG, Panetta FD & West CJ (2000) Naturalization and invasion of alien plants: concepts and definitions. Diversity and Distributions 6: 93-107.

SpeciesLink (2021) Available at <http://www.splink.org.br>. Access on 12 February 2021.

Susanna A, Baldwin BG, Bayer RJ, Bonifacino JM, Garcia-Jacas N, Keeley SC, Mandel JR, Ortiz S, Robinson H & Stuessy TF (2020) The classification of the Compositae: a tribute to Vicki Ann Funk (1947-2019). Taxon 69: 807-814.

Thiers B (continuously updated) Index Herbariorum: a global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. Available at <http://sweetgum.nybg.org/science/ih/>. Access on 12 February 2021.

Tropicos.org (2021) Missouri Botanical Garden. Available at <http://www.tropicos.org>. Access on 12 February 2021.

Vieira AT, Melo F, Lopes HBV, Campos JCV, Guimarães JT, Costa JM, Bomfim LFC, Couto PAA & Benvenuti SMP (2005) Projeto Cadastro de Fontes de Abastecimento por Água Subterrânea. Diagnóstico do município de Piatã, Estado - Bahia. CPRM/PRODEEM, Salvador. 25p.

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