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Bia manuelii (Euphorbiaceae: Acalyphoideae), a new species from Sierra de Coalcomán, Michoacán, Mexico

Bia manuelii (Euphorbiaceae: Acalyphoideae), una especie nueva de la sierra de Coalcomán, Michoacán, México

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Abstract. The genus *Bia* (Euphorbiaceae-Acalyphoideae) is a small assemblage of 6 species ranging from central Mexico to South America that has until recently been included in the genus *Tragia*. The new species *Bia manuelii* is described and illustrated with photographs. This taxon is a narrow endemic known only from 2 collections in the Sierra de Coalcomán, municipality of Coalcomán, in southwestern Michoacán. It grows in tropical deciduous forest at elevations from 990 to 1 110 m. A key is provided to distinguish this species from *Bia cordata* (= *Tragia bailloniana*), the only other species of the genus in Mexico.

Key words: *Bia*, Euphorbiaceae, Michoacán, new species, Sierra de Coalcomán, *Tragia*.

Resumen. *Bia* (Euphorbiaceae-Acalyphoideae) es un género de 6 especies presentes desde el centro de México hasta Sudamérica que hasta hace poco se incluía en el género *Tragia*. Se describe como nueva especie a *Bia manuelii* y se ilustra con fotografías. Este taxón representa un endemismo estrecho, conocido solamente de 2 recolectas en la sierra de Coalcomán, municipio de Coalcomán, en el suroeste de Michoacán. Crece en bosque tropical caducifolio en elevaciones de 990 a 1 110 m. Se proporciona una clave para distinguirla de *Bia cordata* (= *Tragia bailloniana*), la otra especie del género presente en México.

Palabras clave: *Bia*, Euphorbiaceae, Michoacán, especie nueva, sierra de Coalcomán, *Tragia*.

Introduction

The Sierra de Coalcomán in southwestern Michoacán, Mexico forms part of the western-most region of the Sierra Madre del Sur. It is an extensive range with its southern slopes containing many tributaries that drain directly into the Pacific Ocean and its northern slopes forming part of the Balsas Depression watershed. The highest portions reach elevations of nearly 2 900 m, and vegetation of the massif is varied. At lower elevations tropical deciduous forest prevails, whereas at upper elevations there are extensive stands of pine-oak forest. However, in addition to these dominant vegetation types there are also limited areas with oak forest, cloud forest, fir forest, tropical subdeciduous forest, and wetlands.

The range is considered as one of Mexico's priority regions for conservation due to the presence of extensive, well-preserved areas coupled with high levels of endemism for both animals and plants (Arriaga et al., 2000). Included among the many endemic species of plants are *Cuphea michoacana* R. Foster (Graham, 1988), *Euphorbia coalcomanensis* (Croizat) V. W. Steinm. (Olson et al., 2005), *Mirabilis hintoniorum* Le Duc (Fishbein and Steinmann, 2008), *Pinus rzedowskii* Madrigal and Ceball. Del. (Farjon and Styles, 1997), *Ruellia sarukhaniana* Ramamoorthy (Tripp, 2010), and *Sedum hintonii* Clausen (Anaya, 2005), only to name a few. The range is also home to *Beiselia* Forman, an endemic genus of Burseraceae (Forman, 1987).

During the 1930s and early 1940s the Sierra de Coalcomán was explored extensively by the renowned botanist, George B. Hinton (Hinton and Rzedowski, 1972). Since then, floristic activity in the area has been sporadic and limited, and no detailed studies of its plants have been conducted. Considering the high level of endemism, remoteness of many areas, and the relatively low number of collections from the region, it is not surprising that undescribed species still remain to be discovered in the Sierra de Coalcomán. During a collecting trip in 2008, we encountered a herbaceous, stinging vine of the Euphorbiaceae family. Further study has determined that

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these plants belong to an undescribed species, which is herein proposed as new.

Description

Bia manuelii sp. nov.
Type: **Mexico**. Michoacán: municipio de Coalcomán, 34 km al sur de Coalcomán y 2.4 km al sur de río Ocorla sobre el camino a San José de la Montaña; 18°35'52" N, 103°08'45" W, 1 108 m, 29 ago. 2008, *V. W. Steinmann, Y. Ramírez-Amezcua and J. M. Ramírez-Amezcua 6326* (holotype IEB; isotypes: ARIZ, MEXU, MICH). Figs. 1, 2.

Slender, left-twining herb to 3 m tall, monoecious, strongly urticating. Stems with 2 types of indumentum, one layer puberulent with short hairs 0.1-0.3 mm long, the other layer hispid with stiff, urticating hairs 2.5-4 mm long. Leaves alternate; stipules flanking each side of the petiole base, ovate, 1-1.2 cm long, 0.5-1 cm wide, glabrescent or hispidulose along the margin, with 5-7 conspicuous parallel veins; petiole 3-15 cm long, hispidulose; blade broadly elliptic to broadly ovate, strongly 3-lobed, rarely with additional pair of smaller lobes at the base, 6.5-24 cm long, 5.5-23 cm wide, base cordate, main apex and those of the lobes acuminate, palmately 3 or 5 veined, margin coarsely doubly serrate with 2-4 teeth per cm, both surfaces hispid with long, stiff urticating hairs, those of the upper leaf surface often with swollen bases. Inflorescences 3-33 cm long, erect, with a primary staminate axis of 15-30 flowers in an elongate raceme and a short lateral pistillate axis with a single or 2-4 flowers in a densely congested spike 1-1.8 cm long; rachis hispidulous with a shorter puberulent indumentum also present, peduncles 1.3-8.5 cm long. Staminate flowers with bracts narrowly elliptic or lanceolate, 2-3.5 mm long, 0.5-0.8 wide, glabrous except for the ciliate-hispidulose margin, apex acute; pedicels 2-4 mm long, puberulent; tepals 6, linear-lanceolate to narrowly elliptic, 2.5-3 mm long, 0.6-1.1 mm wide, glabrous, apex acute; stamens 17-24, filaments 1.5-2.0 mm long, anthers 0.4-0.5 mm long, apiculate with a minute tuft of hairs at the apex. Pistillate flowers with bracts elliptic, 3 mm long, 1.7 mm wide, margin strigulose-ciliate, apex trilobed, flowers subsessile; tepals 6, ovate to rhomboid, with a narrow claw at the base, unequal, imbricate, 0.4-0.9 cm long, 0.2-0.4 cm wide, inner and outer surfaces glabrous, margin erose with scattered stiff erect hairs interspersed with minute stipitate glands; ovary papilose, globose-trilobed, hispidulose along the keels; styles 3, 4-5 mm long, united into a slender column 1/2 to 3/4 their length, undivided, recurved at the apex, stigmatic surface papillose. Capsules obloid, trilobed (rarely tetralobed), 0.5-0.7 cm, 0.7-1.3 cm wide, hispid with the hairs concentrated mostly along the keels; columella 0.3-0.5 cm long. Seeds subglobose, 0.5-0.6 cm long, 0.4-0.5 wide, smooth, mottled dark-brown to black, with a conspicuous light brown ventral scar.
Taxonomic summary
Paratype: **Mexico.** Michoacán: municipio de Coalcomán, 18 km al sur de Coalcomán y 1.4 km al sur de Los Ocotes sobre el camino a San José de la Montaña; 18°39'08" N, 103°09'17" W, 990 m, 29 ago. 2008, *V. W. Steinmann, Y. Ramírez-Amezcua and J. M. Ramírez-Amezcua 6303* (IEB; MEXU).
Distribution, habitat and phenology: *Bia manuelii* is known only from 2 collections in the Sierra de Coalcomán, municipality of Coalcomán, in southwestern Michoacán, at elevations from 990 to 1 110 m. The 2 localities are separated by 6 km (aerial straight line), and the vegetation at both sites is tropical deciduous forest. Flowering and fruiting times overlap and occur from at least August to September.
Etymology: this species is named in honor of the biologist José Manuel Ramírez-Amezcua, who accompanied us during the expedition in which this species was discovered and assisted with its collection.
Remarks. The genus *Bia* Klotzsch was first proposed to accommodate 2 species closely related to the genus *Tragia* L., but was distinguished by possessing bifurcate inflorescences with the staminate and pistillate portions on separate axes (Klotzsch, 1841). In addition to these features, the genus is characterized by a twining habit, monoecious sexuality, urticating hairs, alternate leaves, pistillate and staminate flowers without petals, undivided styles, and ecarunculate seeds. Shortly after its description, it was relegated to a synonym of *Tragia* (Müller-Agroviensis, 1866), and most subsequent treatments of the Euphorbiaceae family similarly treated it as such (e.g., Pax and Hoffmann, 1912; Webster, 1994; Gillespie, 1994a; Govaerts et al., 2000; Radcliffe-Smith, 2001).

Webster (2007) resurrected the genus on the basis of molecular phylogenetic data (see Wurdack et al., 2005), as well as morphological evidence, i.e., the staminate flowers possessing 8-40 stamens and inflorescences composed of a primary axis bearing staminate flowers and a single lateral axis bearing pistillate flowers. Following his circumscription, *Tragia* is restricted to those species with unbranched inflorescences and staminate flowers with fewer stamens (although it should be mentioned that *Tragia affinis* B. L. Rob. and Greenm. of central Mexico possesses staminate flowers with 9-14 stamens). Webster placed 5 species within the genus *Bia*. Four of these are restricted to South America (*B. alienata* Didr., *B. fallax* (Müll.Arg.) G. L. Webster, *B. fendleri* (Müll.Arg.) G. L. Webster, *B. lessertiana* Baill.), and an additional species is found in Mexico and Central America (*B. cordata* (Baill.) G. L.

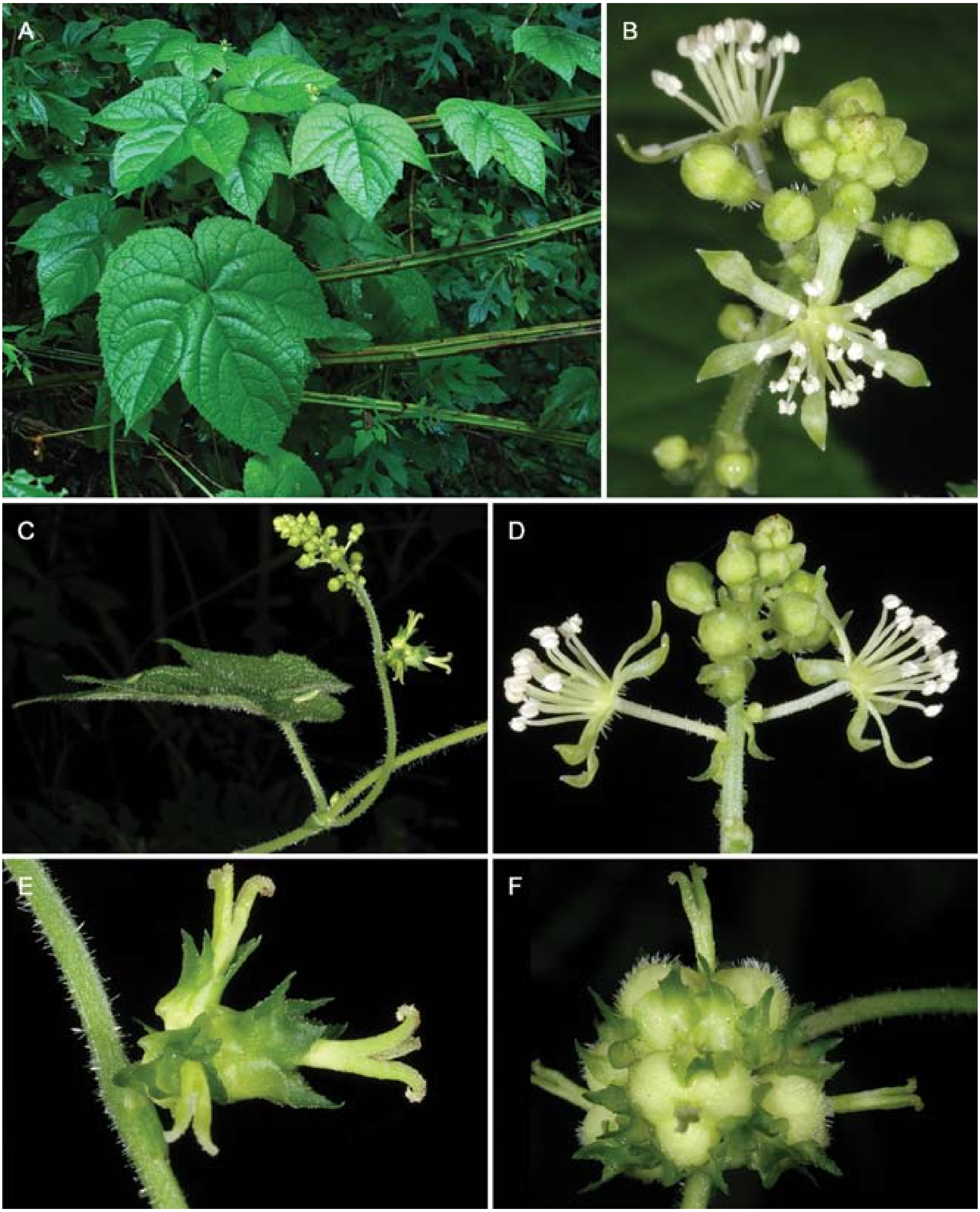

Figure 1. A, flowering branch; B, staminate flowers; C, inflorescence; D, staminate flowers; E, pistillate flowers; F, fruits. All from *Steinmann, Ramírez-Amezcua and Ramírez-Amezcua 6303*.

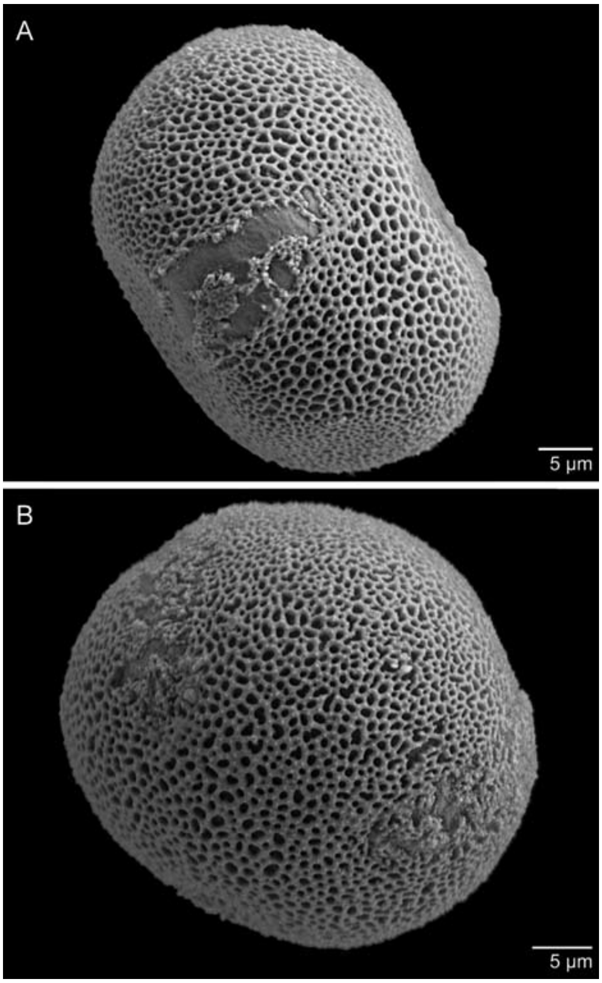

Figure 2. A, B, pollen of *Bia manuelii*. Both from *Steinmann, Ramírez-Amezcua and Ramírez-Amezcua 6303*.

Webster). We follow Webster's proposal to recognize *Bia* as a distinct genus, and with the description of *B. manuelii*, the number of species in the genus increases to 6, therefore bringing the number of Mexican species to 2.

Webster (2007) proposed 2 sections of *Bia*: sect. *Bia* and sect. *Zuckertia* (Baill.) G. L. Webster. Section *Bia* is a South American taxon characterized by staminate flowers with a dissected disk, 8-20 stamens, muticous anthers, and inaperturate, spheroidal to ellipsoid-spheroidal pollen. In contrast, sect. *Zuckertia* occurs in Mexico and Central America and possesses staminate flowers without a disk, 30-40 stamens, apiculate anthers, and tricolpate, oblate-spheroidal pollen. The pollen features were examined in detail by Gillespie (1994b), and pollen of both sections were illustrated. *Bia manuelii* has staminate flowers without a disc, apiculate anthers, and tricolpate pollen (Fig. 2), features that corresponds to sect. *Zuckertia*. However, the stamen number of *B. manuelii* better matches that of sect. *Bia*. In our opinion, stamen number is generally a characteristic of lesser phylogenetic importance, and we place our new species in a sect. *Zuckertia*. The only other species of the genus occurring in Mexico is *B. cordata* (= *Tragia bailloniana* Müll.Arg.), also of sect. *Zuckertia*, and the following key provided will distinguish these 2 taxa:

1. Leaves unlobed or rarely with a pair of short inconspicuous lobes; stamens 28-35(40); pistillate portion of the inflorescence elongate, racemose with 10-12 flowers; styles 6.5-10.5 mm long; ovary and capsule uniformly pubescent; evergreen rain forest from southern Mexico (Chiapas, Oaxaca, Veracruz, Tabasco) south to Costa Rica . . . . *Bia cordata*

1. Leaves consistently trilobed with a pair of pronounced, conspicuous lateral lobes; stamens 17-24; pistillate portion of the inflorescence with a solitary flower or subcapitate with 2-4 flowers; styles 4-5 mm long; ovary and capsule with the pubescence concentrated mostly along the keels; tropical deciduous forest in western-central Mexico (Michoacán) . . . . *Bia manuelii*

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