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Two new closely related species of *Brongniartia* (Fabaceae, Faboideae) from the Sierra Madre del Sur in Guerrero, México

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Abstract

Two species are described and illustrated of the state of Guerrero, México: *Brongniartia alvarezii* and *B. variabilis* (Fabaceae: Faboideae). They are similar to *B. funiculata* and *B. abbottiae* but have several distinguishing characteristics. All four species have relatively small flowers and grow in the temperate forest. *Brongniartia alvarezii* has yellowish white petals, something very rare on the genus, while *B. variabilis* has pink or pale pink standard and wings.

Resumen

Se describen e ilustran dos especies del estado de Guerrero (México): *Brongniartia alvarezii* y *B. variabilis* (Fabaceae: Faboideae). Estas especies tienen varias características distintivas, así como las otras dos especies conocidas (*B. funiculata* y *B. abbottiae*) con las que son morfológicamente similares, compartiendo las cuatro: flores relativamente pequeñas; y también crecen en el bosque templado; *Brongniartia alvarezii* tiene pétalos de color blanquecinos, ligeramente amarillentos, algo muy raro en el género, mientras que *B. variabilis* tiene pétalos de color rosa o rosa pálido.

Keywords: *Brongniartia*, Endemic, Guerrero, Temperated forest

Introduction

The genus *Brongniartia* (Kunth in Humboldt, Bonpland & Kunth 1823: 465) belongs to subfamily Faboideae Rudd (1968: 496) and has at least nine endemic species in the Rio Balsas Basin (Table 1). There is a wide range of colors of the flowers in the genus, mostly maroon (*Brongniartia montalvoana*) to brick red (*B. bacteolata*), although pink (*B. abbottiae*), lavender (*B. bicornuta*), purple (*B. vazquezii*) and yellow (*B. yahualica* Dorado & D. M. Arias, (2015: 236) are also present in some species. It is important to mention that white or whitish flowers had never been found in any of the species of the genus; however, recently, two species: one white form of *B. vazquezii* (that eventually will be described as a new form), and the other with yellowish white petals is one of the two species described in this paper.

On the other hand, *Brongniartia* species of the Podalyrioides group (Dorado 1988) have large, hemicordate or cordate stipules, minute, linear, linear–subulate, or triangular bracteoles, sometimes deciduous, generally no longer than 4 mm long. Within this group, four species have morphological similarities with four main characteristics: i) endemic to the Balsas River Basin (or sometimes nearby), ii) small flowers, iii) have a standard reflexed ca. 130° to 240° blade of the standard, and iv) they commonly grow in temperate forest (mostly pine and oaks), and sometimes in ecotone with Seasonally Dry Tropical Forests and Woodlands (SDTFW, *sensu* DRYFLOR 2016). Two of them are already described, *B. funiculata,* and *B. abbottiae*, and two more are described in this paper as species new to science: *B. alvarezii* and *B. variabilis*.

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TABLE 1. List of endemic species of *Brongniartia* to the Rio Balsas Basin and those native to the estate of Guerrero, but widespread also found in southern Mexico (*).

B. abbottiae I. M. Johnst. (1938: 120)
B. funiculata L. B. Sm. & B. G. Schub. (1939: 24)
B. guerrerensis J. Jiménez Ram. & J. L. Contr. (1989: 63)
B. podalyrioides Kunth (1824: 468)
B. vazquezii Dorado (1989: 20)
B. zirandarensis Dorado, Bonilla & Burgos (1992: 330)
B. montalvoana Dorado & Arias (1992: 13)
B. balsensis J. Jiménez Ram. & K. Vega. (2009: 360)
B. bicornuta Dorado, D. M. Arias & Jesús-Almonte (2019: 139)
**B. suberea* Rose (1897: 134)
**B. bracteolata* Micheli (1903: 249-250)
**B. intermedia* Moric. (1830: 172)
**B. lupinoides* (Kunth) Taub. (1895: 468)

Material and methods

The concept of species adopted in this work is that of taxonomic species, which is based on a morphological criterion. The definition of species was based on Nixon and Wheeler (1990) "The smallest aggregation of populations (sexual) or lineages (asexual) diagnosable by a unique combination of character states in comparable individuals." The scope of this study was strictly taxonomic.

The elaboration of the geographical map of *Brongniartia alvarezii* and *B. variabilis* was based on CNA (1998); INEGI (2016); INEGI (2018). The morphological terminology was based on the glossaries of Moreno (1984) and Front Quer (2000). This study was made on the Rio Balsas Basin in central Mexico, especially on the state of Guerrero, on two species of the genus *Brongniartia*: *B. alvarezii* and *B. variabilis* of the Podalyrioides group (Dorado 1988) (Fig. 1). Therefore, we collected them several times on Temperate Forest and sometimes in ecotone with Seasonally Dry Tropical Forests. The morphological description was based on measurement and comparison of vegetative and floral organs of the specimens, which we dissected in the herbarium, using a stereomicroscope (Leica EZ4). Plants of the World Online (POWO 2021) and Tropicos.org were used to check the names of species. The specific epithets of the two taxa included here were also verified in the International Plant Name Index (IPNI). Color photographs were used to elaborate the plates of the two species.

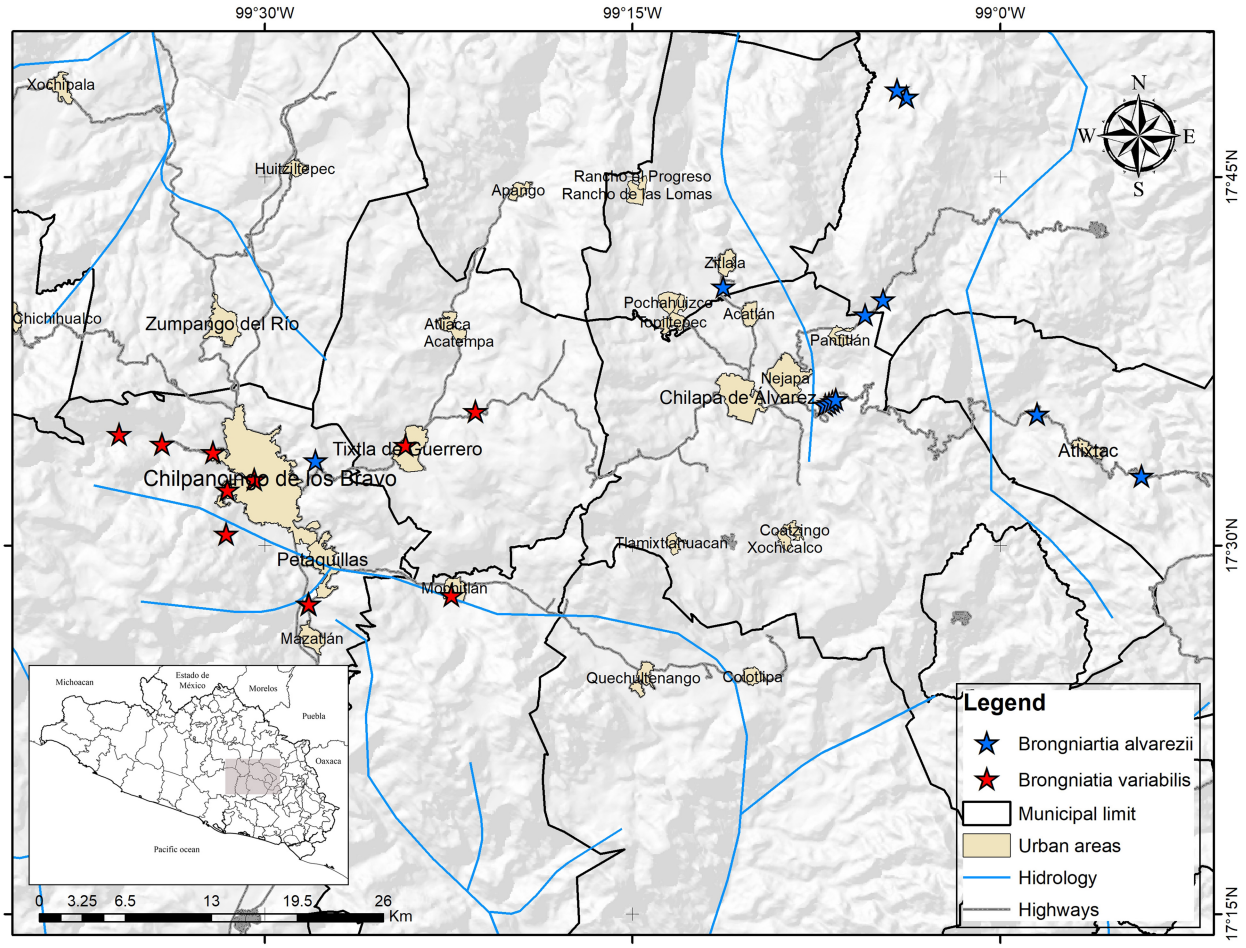

FIGURE 1. Geographical distribution of *Brongniartia alvarezii* and *B. variabilis*, endemic to state of Guerrero (CNA 1998; INEGI 2018; INEGI 2016).

Taxonomic treatment

Brongniartia alvarezii R. Cruz-Durán, R. Bustamante & Dorado, *sp. nov*. Fig. 2.

Brongniartia alvarezii is similar to *B. abbottiae*, but differs from it by the presence of normally a single main branch; stipules (1.8–)2.3–7.8 mm wide; leaflets (1.7–)2–2.7 cm long; petals yellowish white; standard 9.9–11.6 × 11.7–14.4 mm; wing petals 8.4–11 × 4.2–4.9 mm; keel petals 1.02–1.6 × 0.4–0.56 cm.

Type:—MEXICO. Guerrero: Municipio Chilapa de Álvarez, sobre la carretera Chilapa-Papaxtla km 83.4; 7.5 km después de Los Ajos de Chilapa, en dirección a Tlapa, 17.595489, -99.118956, 24 de junio de 2020, *Ó. Dorado*. 10430, *G. Cuevas*, *A. Florentino*, *J. Florentino*, *E. Leyva* y *F. Ortiz*. (Holotype: MEXU, isotype: FCME and to be distributed).

Shrubs (0.5–)1–1.5 m tall, presence of normally a single main stem, young stems and leaves green with white or brownish hairs 0.8–1.2 mm, especially in older branches; branchlets hirtellous, velutinous to tomentulose. Stipules (4.1–)5.1–16.2 × (1.8–)2.3–7.8 mm, obliquely oblong to obliquely lanceolate, venation commonly conspicuous, on mature and more glabrous stipules; texture rather thin, glabrous or pubescent with strigose or sericeous hairs, margin sometimes revolute; lower lobe slightly developed and forming a -135° to -180° angle with the longitudinal axis of the stipule, the edge of the stipule adjacent to the petiolate excurvate or rarely incurvate, apex acute. Leaves (6–)8–14 cm, imparipinnate; petiole 1–1.3 cm, with (5–)13–19 opposite leaflets, (1.7–)2–2.7 × (0.4–) 0.6–1 cm, oblong to slightly lanceolate, texture rather thin, paler on the abaxial surface; rachis (2.5–)5.8–9.06 cm, hirtelous or glabrous; strigulose or sericeous with hair 0.3–0.6 mm, commonly denser on the abaxial surface, sometimes glabrous, base rounded or

sometimes obtuse, apex rounded, with a mucro 0.2–1(–2) cm, margin revolute, the terminal one elliptic, reticulate venation up to 10 pairs of veins, pubescent on upper side of the leaflet, particularly on the mid vein; base oblique, margin revolute; apex apiculate ca. 1 mm, petiolulate 1.5–2 mm, subulate, glabrate; stipels 0.5–1.5 cm, persistent, subfalcade, with base auriculate, lower and upper side of the leaflet Inflorescences racemose, terminal, up to 12 cm, mature leaves only when the fruits are well developed; rachis, young leaves and flowers with vellose indument brown to black, with 1(–2) flower per node. Pedicels 0.6–1 cm; bracteoles inconspicuous; calyx 1.3–1.4 cm, campanulate, hirtulose, with white hairs, or sometimes glabrous, only hairy inside, two vexillar lobes 3.4–9.2 × 2.4–2.8 mm (both lobes), free 1/5 of their length, lateral lobes 2.6–9.5 × 1.4–2.2 mm, lanceolate to linear-lanceolate, carinal lobe 4.5–9.3 × 0.9–2.2 mm, linear-lanceolate to subulate; flowers with petals yellowish white; standard 9.9–11.6 × 11.7–14.4 mm, macula green with outline reddish, claw 4–6.4 mm long, ca. 220–240° blade of the standard orbiculate and non-auriculate at the base; wing petals 8.4–11 × 4.2–4.9 mm, oblong, claw 2.2–3.6 mm, obliquely oblong to obovate, with an extended auricula ¾ as long as the claw, forming a 25–30° angle with the claw; keel petals 1.02–1.6 × 0.4–0.56 cm, claw 2.2–3.6 × 0.6–0.8 mm, semilunate, ventral edge of the keel plane, auricula of the keel forming a 45–50° angle with the claw; androecium 1.1–1.27 cm, anthers 0.8–1.2 mm; ovary 1.6 cm, with 3(–4) ovules, with a blackish annular disk 1 mm long at the base of the ovary, style 0.9–2.1 cm; ovary 6–7 mm, glabrous. Fruits 3.5–4 × 1.5–2 cm, oblong, stipe 2.6–6.1 mm, mucro 2.6–7.3 cm, with a prominent and apical peak, dehiscent, with up to 3(–4) seeds. Seeds 0.8–0.9 × 0.6–0.7 cm, ellipsoid to circular.

Additional material examined:—MEXICO. Guerrero: municipality Atlixtac, al O de Atlixtac, camino a Tlatlauquitipec, 29 June 2013, *R. Cruz* 9088, *A. Alcántara* & *E. Hernández* (FCME, IEB); Zoyapezco, carretera a Petatlán, 27 June 2002, *S. Saucedo* 12 (FCME). Municipality Chilapa de Álvarez; Petatlán, 3.29 km al ONO, bosque de pino, 2 July 2002, *O. Silva* 19 (FCME); Parque Nacional General Juan N. Álvarez, 17º35´48.7" N, 99º5´24.8" W, 6 March 2011, *R. Bustamante* & *J. Rojas 808* (FCME); sobre la carretera Chilapa-Papaxtla km 83.4; cueva Pantitlán, 4.5 km al NE de Santa Cruz, 21 June 2014, *R. Cruz* & *E. Hernández* 9193, 9203 (FCME). 7.5 km después de Los Ajos de Chilapa, en dirección a Tlapa, 17.595489, -99.118956, 24 June 2020, *Ó. Dorado*. 10431, 10432, 10433, *G. Cuevas*, *A. Florentino*, *J. Florentino*, *E. Leyva & F. Ortiz* (MEXU, FCME); carretera Chilapa-Tlapa Km 104.3; 4 km antes del poblado de Atlixtac, 17.589289, -98.975142. 1 July 2017, *Ó. Dorado*. 9965, 9966, *G. Cuevas*, *Florentino*, *J. López*, *M. López & F. Ortiz* (MEXU, FCME). Municipality Chilpancingo de Los Bravo, cerro del Naranjo, Chilpancingo, 18 October 2005, *L. F. A. Victoriano* 3573 (FCME). Municipality Zitlala, 8 km al N de Santa Cruz, 20 km al N de carretera Chilapa-Tlapa, hacia San Juan, 1 June 1987 *J. L. Contreras* 2026 (FCME); 7 km al N de Santa Cruz por el camino a San Juan Las Joyas, 29 September 1987, *J. L. Contreras 2113* (FCME, IEB); 6 km al N de Santa Cruz, camino a San Juan Joyas, 16 October 1987, *J. L. Contreras 2191* (FCME).

Distribution and habitat:—***Brongniartia alvarezii*** is presently known mainly from the vicinity of Chilapa de Álvarez. The elevation ranges from 1500 to 2007 m above sea level, in Oak and Pine and Oak forest, including *Brahea dulcis* (Kunth) Mart. (1838: 244), *Bursera copallifera* (Sessé & Moc. ex DC.) Bullock (1936: 357), *Comocladia engleriana* Loes. (1895: 615), *Fraxinus purpusii* Brandegee (1910: 90), *Lonchocarpus chavelasii* Cruz & Andrade (2021: 1), *Lysiloma acapulcense* (Kunth) Benth. (1844: 83), *Quercus elliptica* Née (1801: 278), *Q. liebmannii* Oerst. ex Trel. (1924: 66), *Ulmus mexicana* (Liebm.) Planch. (1873: 156), *Vachellia farnesiana* (L.) Wight & Arn. (1834: 272), *V. pennatula* (Schltdl. & Cham.) Seigler & Ebinger (2005: 164) and species of *Eysenhardtia* Kunth (1824: 489) and *Pinus* L. (1753: 1000); often in clay and rocky red soil. Also occurring in ecotones between tropical and temperate forest.

Phenology:—Flowers have been found in March to June; young fruits in June and mature fruits in September and October.

Specific epithet:—The name of the species refers to the General Juan N. Álvarez National Park, located near the city of Chilapa de Álvarez, Guerrero, in the Sierra Madre del Sur. The site was decreed a national park on May 14, 1964, by Adolfo López Mateos. Juan Nepomuceno Álvarez Hurtado (January 27, 1790–August 21, 1867), was a military man from Guerrero who participated in armed conflicts of Mexico, especially in the war of independence until the overthrow of Emperor Maximiliano during the second French Intervention. He was also President of the Republic for a brief period in 1855.

FIGURE 2. *Brongniartia alvarezii* (Illustration by Óscar Dorado and Gerardo Cuevas). A. Branch with fruits and flower, B. Foliole, C. Stipule, D. Flowers, E. Standard (front and lateral view), F. Wings petals, G. Keel petals, H. Calyx and androecium, I. Ovary, J. Fruit, K. Indument of the stem.

Brongniartia variabilis Dorado, R. Cruz-Durán & R. Bustamante, *sp. nov*. Fig. 3.

Brongniartia variabilis is similar to *B. alvarezii* but differs from it by the petals pink or pale pink, to salmon (in older herbarium flowers); standard 6.3–6.9 × 8.5–11.1 mm; wing petals 7.1–7.6 × 3.4–3.9 mm; keel petals 7.3–7.7 mm.

Type:—MÉXICO. Guerrero: Municipio de Chilpancingo, Carretera Mazatlán-Petaquillas 3.6 km después de la entrada a Mazatlán, siguiendo 500 m por camino de terracería. Al sur del poblado de Petaquillas, 17.460356, -99.470164, 16 junio 2017, *Ó. Dorado.* 9960, *G. Cuevas*, *J. de Jesús-Almonte*, *A. Florentino & J. López* (holotype: MEXU, FCME, isotype RSA).

Shrub to 1.5 m tall with one to several main stems, branches beige, light brown or grayish; branchlets hirtellous, velutinous to tomentulose, hairs 0.8–1.6 mm, erect or sometimes retrorse, brown and white. Stipules (0.5–)0.9–2(–2.8) × (0.3–)0.4–1(–1.8) cm, obliquely oblong to obliquely lanceolate, commonly deciduous in older leaves, venation commonly conspicuous, on mature and more glabrous stipules; texture rather thin, glabrous or pubescent with strigose or sericeous hairs, margin sometimes revolute, lower lobe slightly developed and forming a -135° to -180° angle with the longitudinal axis of the stipule, the edge of the stipule adjacent to the petiolate excurvate or rarely incurvate, apex acute. Leaves (3.7–)6–15 cm, glabrous or pubescent with white or brown hairs; petiole (0.4–)0.8–1.6 cm, often markedly striate, hirtellous or glabrous; rachis (1.2–)3–12 cm, with (7–)9–7 opposite or subopposite leaflets, hirtellous or glabrous; stipels 0.5–2.4 × 0.2–0.3 mm at the base, yellowish red, thick and stout or thin and slender; leaflets 1.1–3(–4.3) × 0.4–1.3(–1.4) cm, petiolule (0.6–)1–3 mm, hirtellous or glabrous, lamina oblong or rarely elliptic or lanceolate, texture rather thin, paler on the abaxial surface, strigulose or sericeous with hair 0.3–0.6 mm, sometimes brownish, commonly denser on the abaxial surface, sometimes glabrous, base rounded or sometimes obtuse, apex rounded, with a mucro 0.2–1(–2) cm, margin revolute. Flowers borne solitary or pair at base of leafy nodes; peduncles 1.2–2.6 cm, erect, hirtellous with either white or brown hairs, more densely distributed adjacent to the bracteoles, or sometimes glabrous; bracteoles 0.3–0.5 × 0.1–0.2 mm, triangular to subulate, persistent or not, normally opposite, beige or yellowish; calyx 0.9-1.4 × 0.35–0.5 cm, campanulate, strigose, with white hairs, or sometimes glabrous, two vexillar lobes 7–8.5 × 2.2–2.5 mm (both lobes), free 1/5 of their length, lateral lobes 5.3–8 × 1.3–2 mm, lanceolate to linear-lanceolate, carinal lobe 4–7 × 1–2.1 mm, linear–lanceolate to subulate; petals pink or pale pink (specially the standard and wings petals), to salmon (in older herbarium flowers); standard 6.3–6.9 × 8.5–11.1 mm, macula yellowish-green with outline dark red, claw 4–4.6 mm, ca. 130°-180°, blade of the standard orbiculate and non-auriculate at the base; wing petals 7.1–7.6 × 3.4–3.9 mm, claw 2.3–2.8 mm, obliquely oblong, with an extended auricula almost as long as the claw, forming a 25° to 30° angle with the claw; keel petals 0.73–0.77 × 0.4–0.49 cm, claw 2–2.4 mm, mostly yellowish, being pink or pale pink towards the ventral edge; semilunate, ventral edge of the keel plane, claw 3–3.2 × 0.5–0.8 mm, auricula of the keel forming a 45° to 50° angle with the claw; androecium 1.5 cm, anthers 0.8 mm; ovary 1.6 cm, with 3(–4) ovules, with a blackish annular disk 1 mm at the base of the ovary, style 6 mm. Fruit 3.8–4.5(–5.7) × 1.5–2.1 cm, obovate or rarely oblong, stipe 4.5–6 mm, mucro 1.5–3.3 cm, one seed maturing per fruit. Seeds 9 × 4.9 mm, 2 mm thick, ellipsoidal, brown mottled with black, or dark brown.

Distribution:—***Brongniartia variabilis*** is presently known only from the vicinity of Chilpancingo, Guerrero. The elevation ranges from 1366 to 1850 m above sea level.

Habitat and phenology:—***Brongniartia variabilis*** is a species found on slopes of Oak forest with *Quercus* L. (1753: 994) and *Juniperus* L. (1753: 1038) and open temperate forest, with species commonly also found in sclerophyllous woodland such as *Astianthus viminalis* (Kunth) Baill. (1888: 44), *Rhus chondroloma* Standl. (1936: 164), *Ipomoea arborescens* (Humb. & Bonpl. ex Willd.) G. Don (1838: 267), *Bursera glabrifolia* (Kunth) Engl. (1896: 251)*, B. copallifera, Bocconia arborea* S. Watson (141: 1890)*, Brahea dulcis, Pithecellobium dulce* (Roxb.) Benth. (1844: 44)*, Dodonaea viscosa* (L.) Jacq. (1760: 19), *Spondias purpurea* L. (1762: 613)*, Heliocarpus terebinthinaceus* (DC.) Hochr. (1914: 125), among others, and species of *Ptelea* L. (1753: 118). The flowering and fruiting period is mostly in the beginning of the rainy season (May and June).

Additional material examined:—Mexico: Guerrero: Municipality Chilpancingo: slope of Culebrado Hill, W of Chilpancingo, 30 May 1967, *Chavelas Es-1804* (MEXU); Along Chilpancingo, 9 Jun. 1974, *Sanders 74064* (MICH, TX); Salto de Valadez, 1 km N of Tejocote, 3 August 1978, *T. German & O. Téllez 910* (MEXU); Amojileca, 8 km N de Chilpancingo, 15 July 1979, *A. Delgado & J. García 1072* (MEXU); 5 km W of Amojileca, along dirt road Chilpancingo-Amojileca, 7 May 1982, *D. Rodríguez* & *E. Martínez 43* (MEXU, RSA); 4.5 km W of Chilpancingo by the dirt road toward Amojileca, 5 January 1988, *Ó. Dorado & R. Torres 1845* (MEXU, RSA); 1 km W of Chilpancingo, above Colonia Zapata, 11 July 1988, *Ó. Dorado*, *S. Zona*, *R. Torres & E. Sandoval 1733*, *1734*, *1734b* (MEXU, RSA); 6 km al oeste de Amojileca siguiendo la carretera en dirección a Omiltemi, 17.569417, -99.609594, 11 July 2014, *Dorado 9265*, *G. Cuevas*, *J. M.* de *Jesús-Almonte*, *E. Gacía*, *E. Leyva* (MEXU); Carretera Mazatlán-Petaquillas 3.6

km después de la entrada a Mazatlán, siguiendo 500 m por camino de terracería. Al sur del poblado de Petaquillas, 17.460356, -99.470164, 16 June 2017, *Ó. Dorado 9961*, *G. Cuevas*, *J. M. de Jesús-Almonte*, *A. Florentino & J. López* (MEXU, FCME); 3 km al Suroeste de Petaquillas, por la carretera Petaquillas-Mazatlán, 5 km después de Petaquillas, después 500 m por camino de terracería, 17.460422, -99.470128, 1 July 2017, *Ó. Dorado 9969*, *9970*, *9971*, *9972*, *9973*, *9974*, *9975*, *9976*, *G. Cuevas*, *A. Florentino*, *J. López*, *M. López & F. Ortiz.* (MEXU, FCME). Municipality Tixtla de Guerrero, Tixtla Chilapa, 16 June 1946, *Miranda 3977* (MEXU); sobre la carretera Tixtla-Chilapa, a la altura del poblado Plan de Guerrero, 17.591200, -99.356743, 24 June 2020, *Ó. Dorado 10427*, *10428*, *10429*, *G. Cuevas*, *A. Florentino*, *J. Florentino & E. Leyva* (MEXU, FCME).

Specific epithet:—As its specific epithet denotes, this is a species with an extensive range of variation in both vegetative and floral features. The pubescence of the branches varies from tomentulose, hirtellous or sericeous to completely glabrous. The color of the hairs is either white or brown, sometimes drying to a yellowish color in herbarium specimens. Most of the hairs are erect, but on one collection (*Dorado & Torres 1845*), a conspicuous, retrorse pubescence occurs. The pubescence of the leaflets is mostly strigose, but some specimens have a sericeous layers of hairs, particularly on abaxial surface. It is worth to mention that leaflets of some of the collections are complete glabrous (from either young or mature leaves). The number of leaflets is also variable; some leaves bear only 7 leaflets while most of them range from 11 to 17. The stipules are both persistent and not uncommonly deciduous in some individuals of the same population. The calyx can be either strigose with white or brown hairs, or completely glabrous. The size of the calyx is also variable, ranging from 9 mm to 14 mm long. I have been seen most of the above-mentioned variation in a single population. We have observed that the density of pubescence of vegetative structures in several species of the genus varies seasonally, according to the age of the structure, being very dense when the leaves are still young; once the leaves become older, the density of pubescence diminishes, and the leaves may become completely glabrous. However, variation in the type of pubescence seen in *B. variabilis* is not very common in the genus.

Discussion:—These two species, *B. alvarezii* and *B. variabilis* have morphological similarities: i) small flowers, ii) a standard reflexed ca. 130° to 240° blade of the standard. Besides these morphological features, they are also found in temperate forest in the Balsas River Basin, sometimes in ecotone with seasonally dry tropical forests woodlands (SDTFW, *sensu* DRYFLOR 2016) or sometimes-sclerophyllous woodlands. Therefore, we consider that these couple of species are the closest relative of each other, probably been closer to *Brongniartia abbottiae*, an endemic species from the vicinity of Taxco, Guerrero (Table 2).

TABLE 2. *Brongniartia abbottiae, B*. alvarezii and *B. variabilis*.

	B. abbottiae	*B. alvarezii*.	*B. variablis*
Color of petals	pink or pale pink.	yellowish white	pink or pale pink, to salmon (in older herbarium flowers)
Size of standard	9–11 × 8–10 mm	9.9–11.6 × 11.7–14.4 mm	6.3–6.9 × 8.5–11.1 mm
Size of wing petals	9 × 2.5-3 mm	8.4–11 × 4.2–4.9 mm	7.1–7.6 × 3.4–3.9 mm
Length of keel	9–10 mm	10.2–16 mm	7.3–7.7 mm

Key for identification of this group of species of the Podalydioides group of *Brongniartia*.

1. Branches and foliage glabrous or hirtelous with whitish hairs; southeastern Estado de Mexico..... *B. funiculata*
- Branches and foliage hirtelous with whitish or brownish hairs or rarely glabrous; northern and central Guerrero. 2
2. Multi-stemmed shrub, several branched from the base; stipules (1.5–)3–5 mm wide; leaflets 6–12(–16) × (3–)4–8 mm; southern face of the Neovolcanic Transversal Belt in the vicinity of Taxco, Guerrero ..... *B. abbottiae*
- Single-stemmed shrub, normally with only a single main branch; stipules (3–)4–10(–18) mm wide; leaflet 11–30(–43) × 4–13(–15) mm; Sierra Madre del Sur in the vicinity of Chilpancingo and Eastern ward 3
3. Petals yellowish white; standard 9.9–11.6 × 11.7–14.4 mm; wing petals 8.4–11 × 4.2–4.9 mm; keel petals 1.02–1.6 cm ..... *B. alvarezii*
- Petals pink or pale pink, to salmon (in older herbarium flowers); standard 6.3–6.9 × 8.5–11.1 mm; wing petals 7.1–7.6 × 3.4–3.9 mm; keel petals 0.73–0.77 cm..... *B. variabilis*

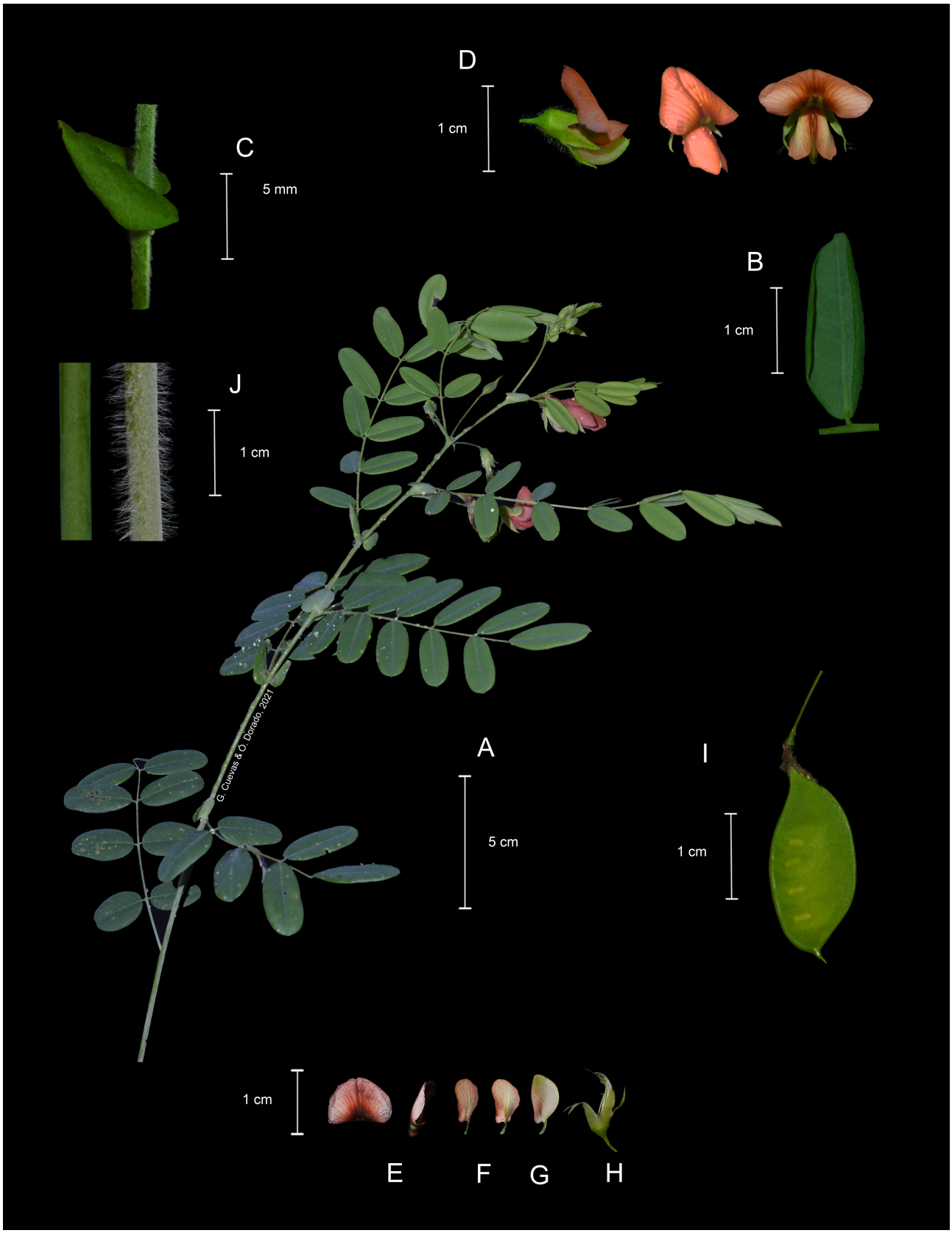

FIGURE 3. *Brongniartia variabilis* (Illustration by Óscar Dorado and Gerardo Cuevas). A. Branch with flowers, B. Foliole, C. Stipule, D. Flowers, E. Standard (front and lateral view), F. Wings petals, G. Keel petals, H. Calyx and androecium, I. Fruit, J. Indument of the stem.

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