



Rhynchosia sousae (Leguminosae, Papilionoideae), a new species from eastern Mexico

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Abstract

Rhynchosia sousae (Leguminosae, Papilionoideae) an endemic species from Veracruz State, in eastern Mexico, is described as new and illustrated. On account of its morphological features, it is assigned to sect. *Rhynchosia*. A table separating it from similar species: *R. amabilis* and *R. precatoria*, is presented, and its relationships and distinguishing characters are discussed.

Resumen

Rhynchosia sousae (Leguminosae, Papilionoideae) una nueva especie endémica del Estado de Veracruz, en el este de México es descrita e ilustrada. Este nuevo taxón por los caracteres morfológicos es asignado a la secc. *Rhynchosia*. Se presenta una tabla de diferenciación entre las especies afines y se discute su relación y caracteres diferenciales.

Key Words: Leguminosae, Papilionoideae, Cajaninae, *Rhynchosia*, Mexico

Introduction

The genus *Rhynchosia* Loureiro (1790: 425) is included in subtribe *Cajaninae* (Lackey 1981) and comprises more than 230 species distributed in warm temperate and tropical regions of the two hemispheres (Gear 1978, Schrire 2005), nearly 56 species being native to the Neotropics (Téllez & Sousa 2000). Fortunato (2000) placed the American species into three sections: *Rhynchosia*, *Copisma* (Meyer 1836: 132) Endlicher (1836–1840: 1300) and *Arcyphyllum* (Elliott 1818: 371–372) Torrey & Gray (1838: 284).

While preparing the treatment of *Rhynchosia* for Flora Mesoamericana as part of a new Neotropical revision, an unnamed species of *Rhynchosia* from eastern Mexico was discovered. It falls within the generic circumscription proposed by Fortunato (2000), and placed in sect. *Rhynchosia*, which is characterized by: stems twining, often flattened, fruits inflated to subinflated, constricted, seeds bicolored red and black or entirely red attached to the placenta by a funicle after dehiscence, the funicle attached at the distal end of the hilum. It is distributed in the Americas from the Greater Antilles, and Mexico to northeastern Argentina; Mexico, including the Mesoamerican region, is an important center of diversification in the American continent, with at present six of the eight reported species (Gear 1978; Fortunato 1982, 2000).

The new species is close to Mexican *R. amabilis* Gear (1978: 56) and endemic to mountains of volcanic origin in Veracruz State, in Mexico.

Materials and methods

Morphological observations of the new species and its similar were made in specimens from the following herbaria: BAB, BM, F, G, GH, K, MEXU, MO, NY, P, RB, SP, US. All measurements are based on morphological features of the vegetative and reproductive structures of the plants analyzed during this study. Flowers were fixed in alcohol to permit detailed descriptions and illustrations with the aid of stereoscopic and light microscopes.

Taxonomy

Rhynchosia sousae Fortunato, *sp. nov.* (Fig. 1. A–N)

Differs from *Rhynchosia amabilis* in having large flowers to 11–15 mm long., short calyx lower lobe to 2.5 mm long., elliptic-oblong to subnavicular, yellowish to yellow-whitish, and large fruits to (2.2) 2.7–3 x 0.9–1.2 cm, position of and smaller fruit beak, red seed and large hilum to 3.5–4 mm long.

Type:—MEXICO. Veracruz: San Andrés, Cerro del Vigía, selva alta perennifolia, 200 m, 18° 35' N, 95° 05' W, 21 October 1974, *Calzada 1597* (holotype MEXU!, isotype MEXU!, BAB!).

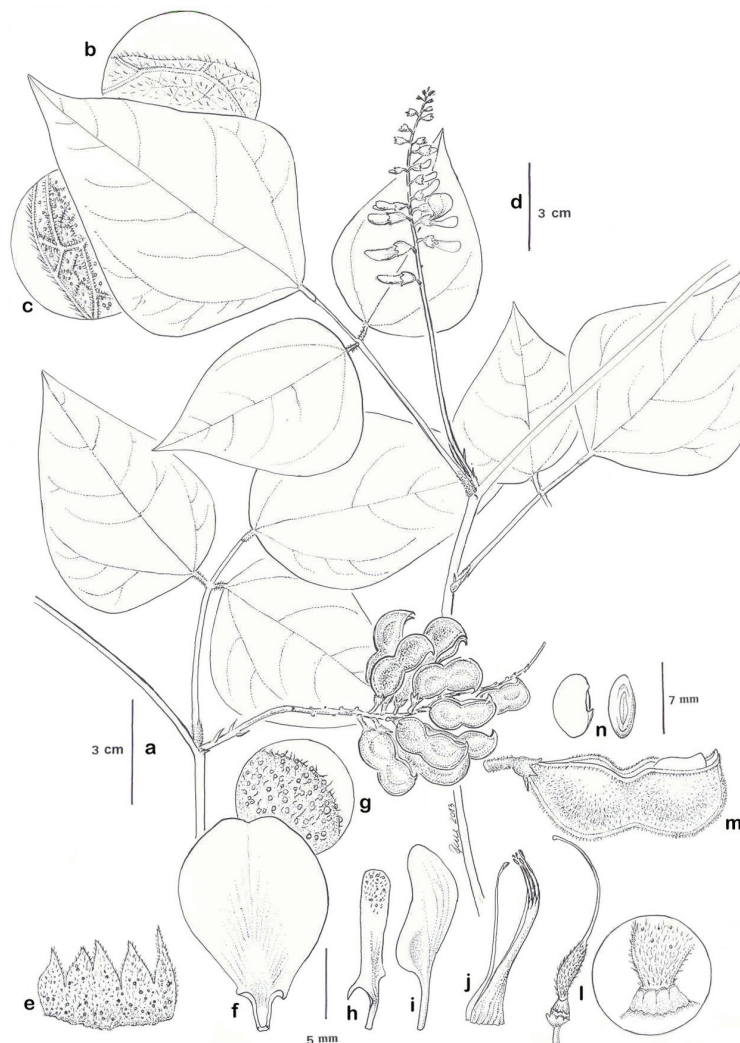


FIGURE 1. a–n. a. Habit. b. Upper leaf surface. c. Lower leaf surface. d. Inflorescence. e. Sepals. f. Standard. g. Detail of the gland-dotted. h. Wings. i. Claw. j. Androecium. l. Gynophore. m. Fruit. n. Seed, hilar view and side view.

Suffrutescent to woody climbing vine; stems one to several from woody rootstock, simple or few branched, gland-dotted, sericeous to tomentulose, hairs silvery. Stipules 2–4.5 x 1–1.25 mm, ovate-acuminate, caducous; petioles 1.8–8 cm long. Leaves 3–foliolate; leaflets 3.5–13.5 x 2.5–11.6 cm, ovate-rhombic to rhombic or deltoid, acute to acuminate,

concolorous to discolorous in dry specimens, chartaceous to thin-coriaceous, upper surface puberulous to glabrate, lower surface gland-dotted and sparsely sericeous to tomentulose; stipels 0.75–2.25 mm long, filiform, usually lacking (caducous); rachis 0.9–3.5 cm long; petiolule 3–6(–6.25) mm long. Inflorescence pseudoracemose, axillary, 2.5–14 cm long, multiflorous, simple, equalling or not surpassing the caulinar leaves; peduncle 0.5–1 cm long. Flowers 11–15 cm long, lax; bracts 4–5 x 1–1.25 mm, lanceolate to ovate-acuminate, caducous; pedicels 1.5–2 mm long; calyx 4.5–6.5 mm long, not exceeding the corolla, gland-dotted and pubescent, 5-lobed, lobes lanceolate, subequal, the two laterals subequalling the tube in length, vexillary sinus 1–1.2 mm long, lower lobe (carinal) 2.25–2.5 mm long; corolla greenish-yellow to yellow, some with purple to brown veins; standard 10–15 x 6–9 mm, obovate to elliptic, obtuse to emarginate, gland-dotted and puberulous, claw 2–2.25 mm long; wings 9–11 x 1.25–1.5 mm, obtuse, claw 2.25–2.75 mm long, gland-dotted and puberulous at apex; carinal petals (keel) 11.5–14 x 3–3.5 mm, falcate, glabrous to glabrescent and sparsely gland-dotted at the apex, claw 3.5–4 mm long; androecium and gynoecium 10–14 mm, ovary ± 3 mm, sericeous and gland-dotted, gynophore ± 1 mm, nectary appendices 0.75–1 mm long, short and ± fleshy. Fruits (2.2–)2.7–3 x 0.9–1.2 cm, elliptic-oblong to subnavicular, inflated and constricted, constriction 0.8–1 mm, densely villous and gland-dotted, yellowish to yellow-whitish, sometimes mixed with viscid-hirsute glandular pubescence (multicellular hairs)*, beak in the suture of the upper side (persistent style-base) 1–1.5(–2) mm long, ascending. Seeds 8–9 x 5.5–6.25 mm, subreniform to ovoid, red, radicular lobe to 0.5 mm long; hilum 3.5–4 mm long, oblong to oblong-elliptic, funicle attached to distal end, strophiole lobes lanceolate to linear.

Geographic distribution and Ecology:—*Rhynchosia sousae* is an endemic apparently restricted to Los Tuxtlas region (Veracruz, Mexico), in mountains of volcanic origin. The species occurs in high evergreen forest and tropical rain forest on steep slopes, up to 700 m above sea level, showing a patchy distribution, with only a slight disturbance over the area (Fig. 2.).

Etymology:—The specific epithet is a tribute to Dr. Mario Sousa, a distinguished botanist responsible for the training of many taxonomists in Mexico and other countries around the world, recognized specialist of the Legume family and coordinator of that family for Flora Mesoamericana. His knowledge allowed him to point out that this new species was probably different from others described from the same region.

Phenology:—Flowering from April to September fruiting from September to March.

Taxonomic notes:—Within sect. *Rhynchosia*, *R. sousae* is similar to *R. amabilis* Grear and has been confused in the region with *R. precatoria* (Humb. & Bonpl. ex Willdenow 1809: 755–756) De Candolle (1825: 385). The three species have ovate-rhombic to rhombic or deltoid to rhombic-lanceolate, sometimes ovate leaflets; inflorescence equalling or not surpassing the caulinar leaves; fruits densely ferruginous-puberulous or villosulose, remaining brown and yellowish-ferruginous with age, and seeds red or bicolor variable to the red and black area at one end. The distinguishing characters between these taxa are summarized in Table 1.

TABLE 1. Morphological characters and distribution to distinguish *Rhynchosia sousae* and the similar species

	<i>R. sousae</i>	<i>R. amabilis</i>	<i>R. precatoria</i>
Inflorescences	Equaling or not surpassing the caulinar leaves	Equaling or not surpassing the caulinar leaves	Equaling to surpassing, rarely not surpassing the caulinar leaves
Flowers length	11–15 mm	8.5–11 mm	(6–) 7–9 mm
Calyx and standard	Without multicellular hairs and bulbous gland base	Without multicellular hairs and bulbous gland base	Gland-dotted or/and multicellular hairs and bulbous gland base
Calyx lower lobe length	2.25–2.5 mm	3–4 mm	2.5–4 mm
Fruits form	Elliptic-oblong to subnavicularis	Widely elliptic to ovate	Oblong ovate to oblong elliptic
Fruits size	(2.2) 2.7–3 x 0.9–1.2 cm	2.5–3 x 1.1–3 cm	1–2.5 x 0.8–1.3 cm
Fruits beak position	Eccentric and ascending	Central to subcentral	Central to subcentral
Fruits beak size	1–1.5 (–2) mm	3–4 mm	1–2.5 mm
Seed color	Red	Bicolored red with small black area at the funicular end	Bicolored red with black area ± equal
Hilum length	3.5–4 mm	2.5–3 mm	1.75–2 mm
Geographic distribution	Central southern Veracruz state, in Tuxtlas regions, Mexico	Southern Mexico, Guatemala and Belize	Mexico, Central America to northwestern Colombia

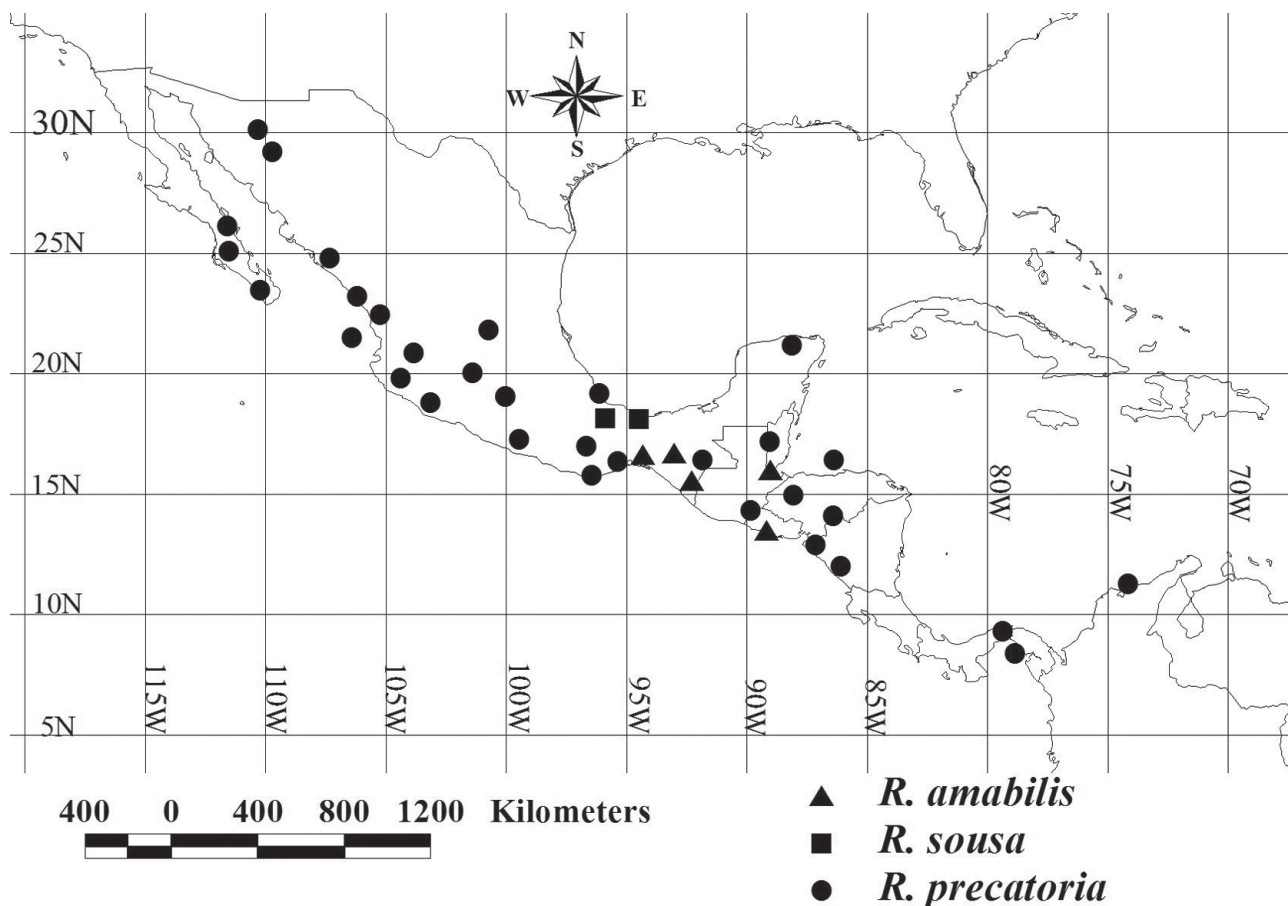


FIGURE 2. Map distribution of *Rhynchosia amabilis*, *R. precatória* and *R. sousae*.

The specimen *Nee & Calzada 22769* * (MEXU) has fruits with viscid-hirsute glandular pubescent (multicellular hairs and bulbous gland base), a characteristic only present in *R. quercetorum* Standl. (1937: 555) of the sect. *Rhynchosia*. This last species is found in Costa Rica, Panama to western Colombia. This pubescent type probably should be associated to environmental conditions of mountains of volcanic origin. In Mesoamerica and Central America this type of pubescence can be observed in different species not taxonomically related to each other: i.e. *R. monticola* Grear (1978: 92), *R. discolor* M. Martens & Galeotti (1843: 199), *R. potosina* Brandege (1911: 181), *R. edulis* Griseb. (1874: 123). In the latter species, this type of pubescence has been detected in some Central American and Bolivian specimens.

Additional specimens examined (paratypes):—MEXICO. Veracruz: Catemaco, 1 km al S de la Estación Biológica Los Tuxtlas, 3 August 1986, *R. Cedillo 364* (MEXU); Las Cabañas a 5 km al N de la desviación de la carretera a Jicacal, 22 October 1974, *C. Calzada 1600* (MEXU); Playa Escondida and environs, remnants of Selva Alta, 18° 35' N, 95° 04' W, 27 January 1984, *S. Solheim & S. Reisfield 1419* (MEXU). Coatzacoalcos, Zona de Salvaguarda-Pemex-La Cangrejera, a 8 km al S-SE de Coatzacoalcos, 1 April 1999, *A. Hanan Alipi et al. 1283* (MEXU). Pajapan, 5 km NW of Pajapan, SE slopes of Cerro San Martín Pajapan, 18° 17' 30" N, 94° 43' W, 3 November 1981, *M. Nee & J.I. Calzada 22769* * (MEXU). San Andrés Tuxtla, cerro El Vigía, Estación de Biología Tropical Los Tuxtlas, 21 October 1982, *G. Ibarra Manríquez 337*, (MEXU); Estación de Biología Tropical Los Tuxtlas, 18° 34' N, 95° 04'/95° 09' W, lote 67, 22 March 1984, *G. Ibarra Manríquez 1393* (MEXU); cima cerro El Vigía, Estación de Biología Tropical Los Tuxtlas, 18° 34' N, 95° 04'/ 95° 09' W, 23 June 1986, *G. Ibarra Manríquez & S. Sinaca Colín 2910* (MEXU); entre La Palma y desviación a Playa Escondida, carr. Catemaco-Montepío, 14 August 1998, *A. Campos & C. León 5347* (MEXU); 4 September 1983, *R. Cedillo Trigos & G. Ibarra Manríquez 2553* (MEXU); 18° 35' N, 95° 05' W, 21 October 1974, *J.I. Calzada 1597* (MEXU 309676); 1 km al S de la Estación Biológica Los Tuxtlas, 3 August 1986, *R. Cedillo 3643* (MEXU); Tropical rain forest on ridge above UNAM Bio Reserve Headquarters, ca. 20 km by air NNK of Sontecomapan, Los Tuxtla regions, 11 September 1975, *G. Webster et al. 20392* (MEXU).

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References

- Brandegee, T.S. (1911) *University of California Publications in Botany IV*. Berkeley University of California, California, 418 pp.
- de Candolle, A.P. (1824) *Prodromus Systematis Naturalis Regni Vegetabilis* 1. Treuttel & Würtz, Paris, 748 pp.
- Endlicher, S.F.L. (1836–1840) *Genera Plantarum II*. Apud Fr. Beck Universitatis Bibliopolam, Vindobonae, 1484 pp.
- Fortunato, R.H. (1982) Una especie nueva del género *Rhynchosia*. *Darwiniana* 24: 497–501.
- Fortunato, R.H. (2000) Systematic relationship in *Rhynchosia* (Cajaninae-Phaseoleae-Papilionoideae-Fabaceae) from neotropic regions. In: Herendeen, P. & Bruneau, A. (Eds.) *Advances in Legume Systematics*, Vol. 9. The Royal Botanic Gardens, Kew, pp. 339–353.
- Grear, J.W. Jr (1978) A revision of the New World species of *Rhynchosia* (Leguminosae-Faboideae). *Memoirs of the New York Botanical Garden* 31: 1–168.
- Grisebach, A. (1874) *Plantae Lorentzianae. Abhandlungen der Königlichen Gesellschaft der Wissenschaften zu Göttingen* 19: 123.
- Loureiro, J. de (1790) *Rhynchosia*. In: Loureiro, J. de (Ed.) *Flora Cochinchinensis* 2: 425–460.
- Lackey, J.A. (1981) *Phaseoleae*. In: Pohill, R.M. & Raven, P.H. (Eds.) *Advances in Legume Systematics*, Vol. 1. Royal Botanical Garden, Kew, Richmond, pp. 301–327.
- Martens, M. & Galeotti, H.G. (1843) *Rhynchosia*. *Bulletin de l'Academie Royale des Sciences et Belles-lettres de Bruxelles* 10: 199.
- Schrire, B.D. (2005) *Rhynchosia*. In: Lewis, G., Schrire, B., Mackinder, B. & Lock, M. (Eds.) *Legumes of the World*. Royal Botanical Garden, Kew, Richmond, England, 410 pp.
- Standley, P.C. (1937) *Rhynchosia*. In: Standley, P.C. (Eds.) *Flora of Costa Rica*. Publications of the Field Museum of Natural History Botanical Series, Chicago, 555 pp.
- Téllez, V.O. & Sousa, S.M. (2000) Una nueva especie del género *Rhynchosia* (Leguminosae: Papilionoideae) de Jalisco, México. *Novon* 10: 57–59.
<http://dx.doi.org/10.2307/3393109>
- Torrey, J. & Gray, A. (1838) *Rhynchosia*. In: Torrey, J. & Gray, A. (Eds.) *A flora of North America*, Vol. 1. Wiley and Putnan, New York, 284 pp.