A New Species of *Condalia* (Rhamnaceae) from Sonora, Mexico

James Henrickson
Department of Biology, California State University, Los Angeles, California 90032

Abstract: **Condalia sonorae** is described as a new species from north central Sonora, Mexico. The taxon was previously considered part of *Condalia correllii,* but differs in having bicolored leaves, denser young-stem and leaf vestiture, petaloid flowers, and more spheroidal fruit endocarps. In contrast, *C. correllii,* has concolorous, abaxially glabrous leaves, shorter stem vestiture, apetalous flowers, and more ovoid fruit endocarps. Comparisons are also made with *C. velutina, C. mexicana* and *C. hookeri.*

Resumen: Se describe a **Condalia sonorae** como una especie nueva del norte-centro de Sonora, México. Este taxon anteriormente se consideró como parte de *Condalia correllii,* pero difiere de ésta en presentar: hojas con las dos superificias de colores diferentes; una pubescencia más marcada en los tallos jóvenes y las hojas; la presencia de pétalos en las flores; y los endocarpios más esferoides. Por contraste, *P. correllii* presenta hojas de color verde claro en ambas superficies; una pubescencia poco notable en el envés de la hoja, y tallos hirtelos con pelos más cortos; flores sin pétalos; y endocarpios más ovoides. Se contrasta la especie nueva también con *C. velutina, C. mexicana* y *C. hookeri.*

Keywords: *Condalia,* Rhamnaceae, flora of Mexico, flora of Sonora.

While reviewing manuscripts for the Flora of the Chihuahuan Desert Region, problems arose with diversity found in material identified at TEX-LL as *Condalia correllii* M. C. Johnst. from the states of Sonora and Chihuahua, México. Some of the specimens differed strongly from the apetalous *C. correllii* in having petaloid flowers, bicolored leaves that tend to be olive-brown above, with a fine-venation pattern marked with a similar color beneath (Figs. 1–2), a stronger young-stem vestiture and more spheroidal fruit endocarps. In contrast, the apetalous *C. correllii* leaves are uniformly light green on both surfaces, the stem vestiture, while hirtellous, is shorter, and the fruit endocarps are ovoid.

The New World genus *Condalia* Cav. was last monographed by M. C. Johnston (1962), in which he recognized 16 species and 2 varieties. In his treatment he submerged *Microrhamnus* A. Gray into *Condalia* and *Condaliopsis* (Weberb.) Suesseng. into *Ziziphus* Mill. and listed a series of floral and vegetative characteristics that distinguish the largely apetalous *Condalia* from the closely related petaloid *Ziziphus.* In 1964 he added a rare petaloid variety to the otherwise apetalous *C. mexicana* Schltdl. named *C. mexicana* var. *petalifera* M. C. Johnst. and in so doing, noted that he did not consider the presence or absence of petals significant. Within North American *Condalia,* petals are known only from *C. velutina* I. M. Johnst., *C. ericoides* (A. Gray) M.C.Johnst. and the above-mentioned variant of *C. mexicana.*

The material here separated from *Condalia correllii* in Sonora, while petaloid, is clearly a *Condalia* having constricted (not broadly attached) ovary bases, styles that are terete and entire (not tapered and forked), leaves that are entire, with a single (not three) basal veins, and the main stems bear thorn-tipped lateral branches, all features that Johnston (1962) lists as characterizing *Condalia.*

In Johnston's 1962 treatment, the new Sonoran species keys directly to *Condalia velutina.* However, with its obovate-elliptical, often apically pointed, bicolored leaves and its rather strongly hirtellous-villous

stems and hirtellous leaves, the Sonora material also shares characteristics with the central Mexican *C. mexicana,* as well as the Texan *C. hookeri* M. C. Johnst. Of the three petaloid taxa of *Condalia, C. ericoides* strongly differs in low growth habit, has narrow xeromorphic leaves with a broadened midrib, and longer fruit and is not considered a potential close relative of the Sonoran material.

Condalia velutina is known from the Mexican states of Guanajuato, Michoacán, México, Querétaro, and San Luis Potosí. As the name implies, *C. velutina* is more velutinous on young stems and inflorescences having long (to 0.5 mm), erect to curved hairs. Leaves, however, are sparsely hirtellous to subglabrous except near the petiole. The lower hypanthium and sepals are densely canescent-velutinous outside, the ovaries are strongly velutinous and the fruit endocarps are oblong-ovoid, to 10 mm long. In the type, and in some additional specimens, the triad of cupped bracts subtending the flowers tend to be very large (to 1.5 mm long) with very broad, thin-membranous margins. But the large-bract characteristic is not consistent in the taxon, as in many collections the bracts are considerably smaller and without broad, membranous margins.

Condalia velutina, however, shares several characteristics with the new Sonora collections. Both have relatively large leaves, and a similar, rather robust stem and inflorescence vestiture, (usually to 0.3, only occasionally to 0.5 mm long in the Sonoran material). The leaves in both are also bicolored, olive-brown above with the fine venation brownish and the midvein raised and yellowish beneath and the flowers in both are petaloid. But in the Sonoran collections, flowers are only hirtellous (not canescent-velutinous) externally, the ovaries and fruit are usually glabrous, though sometimes puberulent-hirtellous [*Van-Devender et al. 82-33* (ARIZ, TEX), *Martin s.n.* (specimens from Palm Canyon, and W of Nacozari, ARIZ), and *Bowers et al. 2808* (ARIZ, TEX)] not densely villous, and the leaves are typically uniformily hirtellous throughout, while in most specimens of *C. velutina* the leaves are sparsely hirtellous to glabrous except near the abaxial midrib and petiole. In addition the fruit endocarps are more spheroidal, 5–6 mm in diameter in the Sonoran material, not oblong-ovoid and to 10 mm long as in *C. velutina.*

Condalia mexicana occurs in central and southern México (states of Guanajuato, Hidalgo, Querétaro, México, San Luis Potosí, Tamaulipas, Oaxaca, and Puebla). It is similar to the Sonoran taxon in habit, foliage, flowers, but while its typical small leaves are brownish above, the lower surface is more uniformly light green—there is no brownish pattern reflecting the fine venation as in the Sonoran taxon. The flowers typically lack petals (except in the variety mentioned above) and the fruit endocarps again are oblong-ovoid not spheroidal in shape.

Condalia hookeri occurs from central Texas to Nuevo León, Tamaulipas, México. It is also similar to the new Sonoran taxon in having moderately large, bicolored, obovate, moderately thin leaves with long petioles, but while the leaves are often brownish above, they are usually uniformly light green beneath; although some collections show a brownish fine-venation pattern beneath. The leaves in *C. hookeri* also tend to be more rounded to truncate, sometimes emarginate at the tip, usually lacking a marked terminal apiculation as in the Sonoran material, and the basal midveins of dried leaves do not remain raised on the abaxial surface as they do in the new taxon. The stems, leaves and hypanthia-sepals and ovaries are all typically glabrous, although young stems in some specimens are short hirtellous and the leaves are often hirtellous along the petiole margins. Also unlike the new species, flowers lack petals, but as in the Sonoran material, fruits are more spheroidal to ovoid-spheroidal in shape.

The Sonoran material shares characteristics with each of the taxa discussed above,

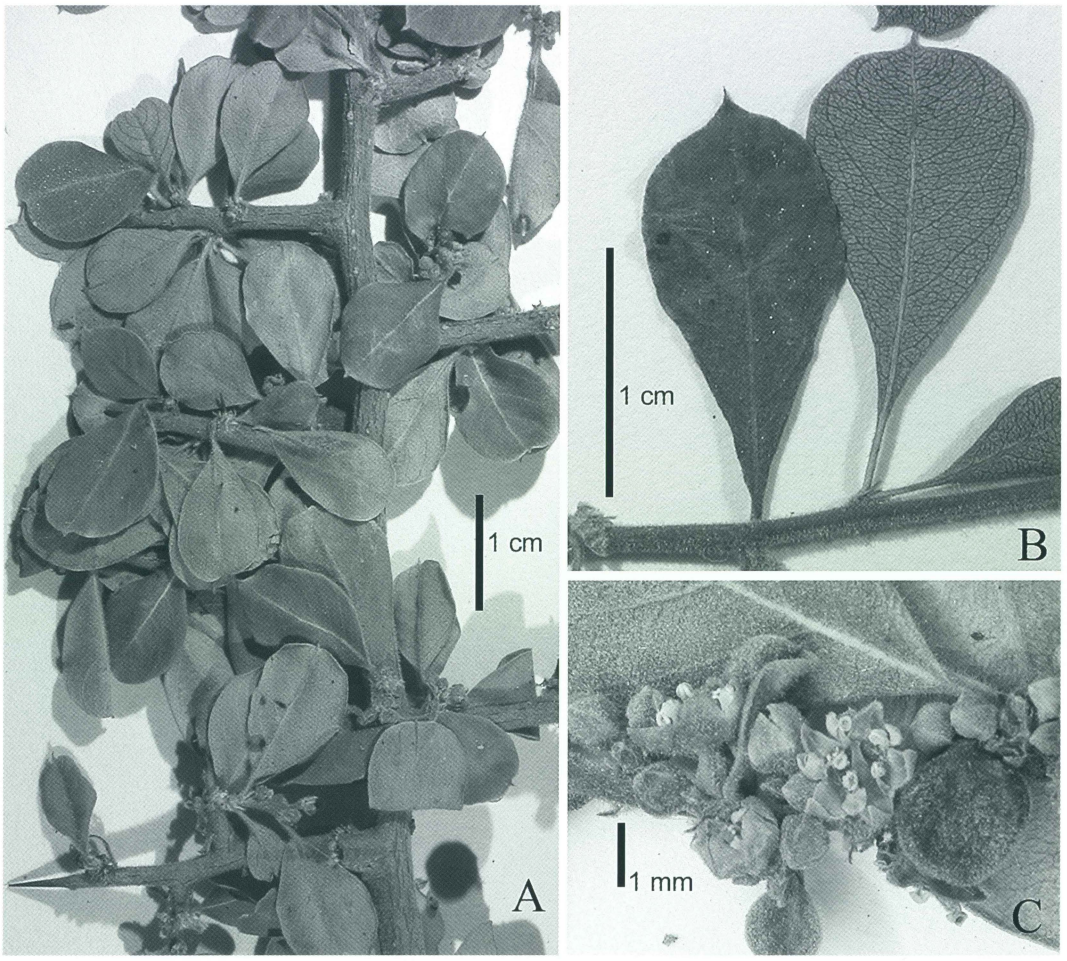

FIG. 1. *Condalia sonorae.* A. Young stem showing thorns and leaves. (*Turner 76-11,* LL). B. Contrasting adaxial (left) and abaxial (right) dried leaf surfaces, note the fine venation is marked by brown on the abaxial surface. (*Bowers 2808,* ARIZ). C. Young stem showing flowers and developing fruit. Note five stamens and petals. (*Webster 21456,* TEX). Magnifications as indicated.

but with each there are significant differences. The Sonoran material also is disjunct from all three species discussed. But problems exist with all of these taxa in that many of the characteristics used to define the taxa exhibit variation from collection to collection. This is particularly true with vestiture characteristics and to some degree with the development of brownish coloration of the dried leaf surfaces. While most specimens show the expected characteristics of a taxon, some collections fail to exhibit typical vestiture or consistent leaf coloration. In *Condalia velutina,* as noted above, the species was initially characterized by enlarged membranous bracts, but this characteristic is not present in many specimens otherwise attributable to that taxon.

In Johnston's (1962) monograph, species distinctions were very tightly drawn. He used the rank of variety for differences in vestiture (in *Condalia globosa* I. M. Johnst.) differences in leaf and stem width (*C. warnockii* M. C. Johnst., *C. hookeri*), and the presence or absence of petals. Several of his species were distinguished only by different combinations of characters. Inasmuch as the Sonoran material represents a unique

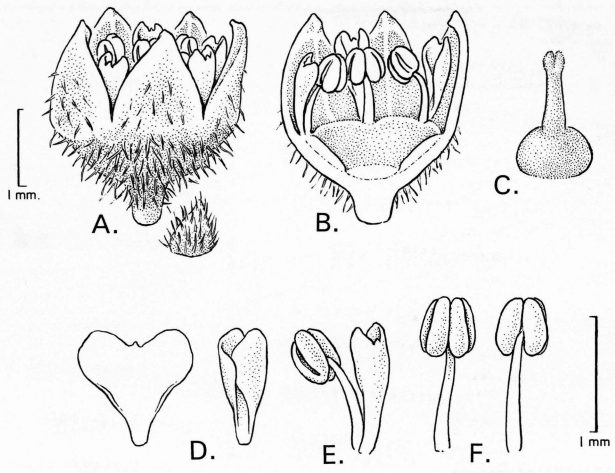

FIG. 2. Line drawings of flowers of *Condalia sonorae*. A. Flower, note hypanthium-sepal vestiture, petals, and anthers. B. Flower, with ovary removed, showing hypanthium, nectary, petals, and stamens. C. Glabrous ovary showing style. D. Petal, open and as normally closed. E. Side view of petal and stamen. F. Anther adaxial (left) and abaxial views. Delination by Bobbi Angell.

combination of characteristics and geographically stands apart from other taxa with similar characteristics, I herein recognize the taxon as a distinct species in this complex of closely related species.

Condalia sonorae Henrickson sp. nov. (Fig. 1–3).

TYPE: MEXICO. **Sonora**: 7 mi. W of [Rancho] Agua Fria, 30°22′N, 110°38′W, 3000 ft, 21 Mar 1976, *G. L. Webster 21456* (HOLOTYPE: TEX!, ISOTYPES: DAV, MO, MEXU).

Ab *Condalia correllii* differt foliis bicoloribus, rami juniores fortioribus, foliis hirtellosis, floribus cum petalis, endocarpo sphaericiore; ab *Condalia velutina* differt ovario glabro a puberulo, sed non dense velutino; foliis moderate hirtellosis ubique, tantum subglabratis ad petiolum, et endocarpo sphaericiore, non oblong-ovoido.

Irregularly branched, ± globose SHRUBS, 1–3 m tall. PRIMARY STEMS 10–27 cm long, with internodes 11–20 mm long. SECONDARY STEMS (thorns) straight, perpendicular, 2–4 cm long, with internodes 0.2–0.5(–10) mm long. YOUNG STEMS hirtellous(-velutinous) with erect, straight to slightly curved hairs 0.1–0.4(–0.5) mm long, rarely glabrous, the distal 5 mm of each thorn, brown, glabrous. STIPULES acicular, tan, keeled, 1–2 mm long, ciliate. LEAVES present on both long shoots and on short shoots on lateral branches. LEAF BLADES elliptical, spatulate, obovate to suborbicular, 8–17(–26) mm long, 4–9(–14) mm wide, obtuse, rounded to emarginate, but usually with deflexed acuminate tips 0.4–0.6 mm long at the apices, broadly to narrowly cuneate at the bases, with the entire margins extending onto the petioles for 1–3(–6) mm, sparsely to moderately hirtellous throughout with erect hairs 0.1–0.3(–0.4) mm long on both surfaces, the hairs more dense near the petioles, the surfaces bicolored, with the upper surface ± olivaceous to brownish (in dried leaves) with a yellow midvein (the other veins obscure), the lower surfaces more gray or yellowish green, with the yellowish midvein rounded and to 0.3 mm broad above the petiole and tapering distally, with 4–5 arcuate secondary veins, the finer venation often marked with an often conspicuous brownish coloration. INFLORESCENCES clustered at the nodes borne on slender, hirtellous, long shoots that develop from short shoots of the sec-

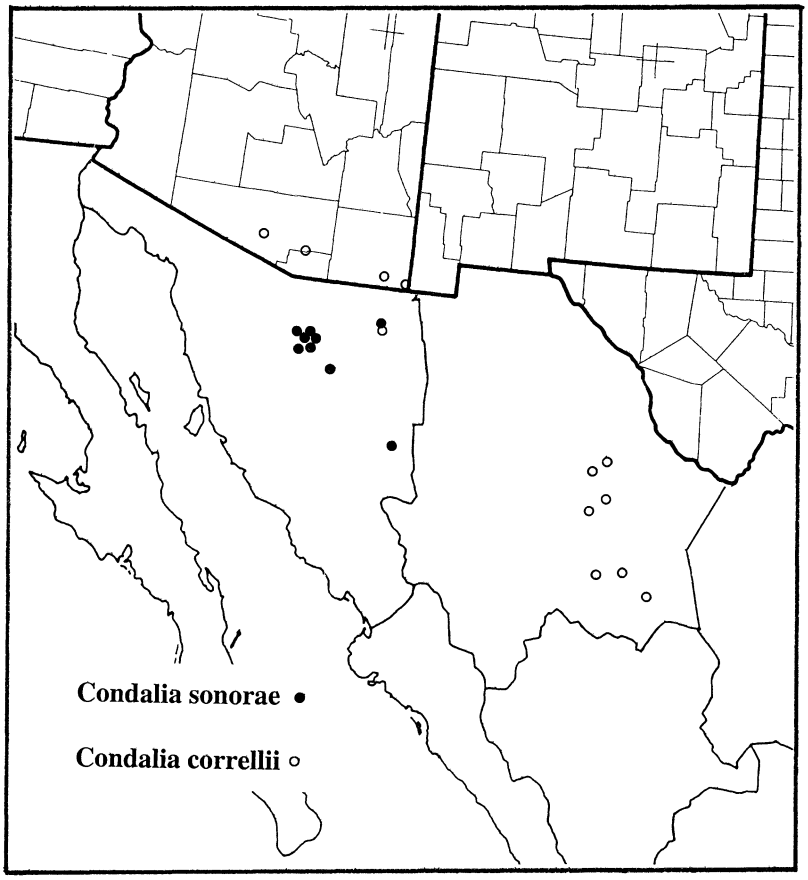

FIG. 3. Distribution of *Condalia sonorae* and *C. correllii* in the state of Arizona in the U.S.A., and Sonora and Chihuahua in Mexico.

ondary branches, these with internodes 1–3 mm long, associated with leaves (or not) and often not persisting as branches. BRACTS-BRACTEOLES in groups of three, 0.5–1 mm long, reddish brown, keeled, pubescent, the margins narrowly membranous. PEDICELS to 1 mm long, 0.3 mm in diameter. FLOWERS 5-merous, ca. 1.8–2 mm long and wide (wetted, with sepals erect), to 3–4 mm wide (with sepals spreading), the hypanthium ± rounded above the pedicels. SEPALS valvate, ovate-deltate, ± erect, greenish outside, yellowish inside, 1.2–1.3 mm long, to 1.0–1.2 mm wide at the base, glabrous and with a medial ridge inside, the sepals and hypanthia both hirtellous-pubescent outside with hairs 0.07–0.12 mm long, occasionally glabrous outside. PETALS light yellow, 0.7–0.9 mm long, the basal claw ± 0.25 mm long, the blade 2-lobed, 0.5–0.6 mm long, to 1.1 mm wide (flattened), the lobes extending above the medial point of the petal and curved inwardly around the stamens. ANTHERS whitish, 0.35–0.5 mm long, latrorse-introrse, the filaments white, tapered, 0.5–0.7 mm long. INNER HYPANTHIAL DISKS deep yellow, ca. 0.4 mm wide, broadly funnelform, slightly impressed at the stamens. OVARY globose, 0.6–0.8 mm in diameter, glabrous to puberlent-hirtellous, 2-carpelled, 2-ovuled. STYLES 0.6–0.7 mm long, to 0.3 mm in diameter. FRUITS glabrous; occasionally puberulent-hirtellous, endocarps sphaeroidal-ovoid, 4–6 mm long and wide.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. **Sonora**: Toro Muerto Canyon, 2.5 rd mi. W of Toro Muerto bridge on Hwy. 118, 30°19′N, 110°15′W, 890 m, 30 Mar 1984, *Bowers, Burgess, & Turner 2808,* (ARIZ, TEX); 2 mi. N of Rancho La Brisca on Río Santo Domingo, (tributary of Río Sarachachi/Río San Miguel), 7 km. N of Rancho Aqua Fría, 30°25′30″N, 110°33′W, 1000 m, 2 July 1978, *Martin s.n.* (TEX—1 branch with some leaf margins serrated); road to Cucurpe, 18.2 road mi. SE of Magdalena, 30°30′N, 110°50′W, 1000 m, 17 Jan 1976, *Ducote, Wiseman, Perrill, & Turner 76-11* (LL); Palm Canyon, 17.7 mi. SSE of Magdalena, Cerro Cinta de Planta (=Sierra Babiso), 8 Apr 1977, *VanDevender s.n.* (LL-2); Palm Canyon, 17 mi. SE of Magdalena, 18 May 1980, *Martin s.n.* (ARIZ); same location, 14 Mar 1982, *Thompson & Davis 82-37* (ARIZ); Palm Canyon, 17 mi SE of Magdalena, road to Cucurpe, Sierra Braviso, 30°28′N, 110°48′W, 19 Mar 1978, *McCarten & Bittman 2689* (ARIZ); ± 8 road mi. E of turnoff of Sonora Hwy 12 at Esqueda on road to El Tigre, 30°39′N, 109°25′W, 3250 ft, 30 Jan 1982, *VanDevender, Forbes, Gallagher & Yatskievych 82-33,* (ARIZ, TEX—with ovary short hirtellous); near summit of steep grade E of Guasavas, 29.9°N, 109.2°W, 1200 m, 18 Mar 1972, *Turner & Duek 79-19* (ARIZ, TEX—young stems, leaves mostly glabrous); 5 mi W Nacozari, 4200 ft, 18 Jun 1983, *Martin s.n.* (ARIZ).

DISCUSSION

Specimens of the new species are known from three areas within Sonora. Most collections come from an area about 15–18 miles southeast of Magdalena in the Palm Canyon region, but specimens are also known from northeast and southeast Sonora (Fig. 3). *Condalia correllii* is also recorded from the Palm Canyon area, its main distribution is in southern Arizona, central and northeast Sonora, through south-central Chihuahua, east into Coahuila (Fig. 3).

Regarding variation within *Condalia sonorae,* two outlying collections from eastern and northeastern Sonora and one from the Palm Canyon area have pubescent ovaries and fruit. In one branch of *Martin s.n.* (2 Jul 1978—TEX) the leaves are serrate distally. In the specimen *Turner & Duek 79-19* (TEX), the stems and leaves are glabrous or nearly so. The remaining specimens conform well to the protologue. Whether the variation found in the new taxon is the product of past introgression between *C. velutina* and some other taxon, such as *C. hookeri* is not known, but the new species is distinct from *C. correllii,* with which it was previously confused.

ACKNOWLEDGEMENTS

I thank Bobbi Angell for the line drawing, Neil Harriman for the Latin translation, Tom Wendt for the Spanish translation of the abstract, and ARIZ for a loan of specimens, and the Plant Resources Center of the University of Texas for use of facilities.

LITERATURE CITED

M. C. Johnston. 1962. Revision of *Condalia* including *Microrhamnus* (Rhamnaceae). Brittonia 14: 332–368.

———. 1964. *Condalia mexicana* Schlecht. var. *petalifera* M. C. Johnston, var. nov. Madroño 17: 280.