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TAXONOMIC STUDY OF THE *STACHYS COCCINEA* (LAMIACEAE) COMPLEX

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ABSTRACT

A taxonomic study of the *Stachys coccinea* complex, a mostly Mexican group with large orange-red to red annulate corollas, is rendered. Six species are recognized in the complex: *S. coccinea*, widespread from the southwestern U.S.A. (Arizona) to Nicaragua; **S. jaimehintonii** B.L. Turner, *sp. nov.*, from eastern Michoacán; *S. lindenii*, from southern México and Guatemala; *S. albotomentosa* (with two varieties: var. *albotomentosa* from northern Hidalgo, and var. **potosina** B.L. Turner, *var. nov.* from San Luis Potosí); **S. pacifica** B.L. Turner, *sp. nov.*, from the western slopes of the Sierra Madre Occidental (Sonora to Michoacán); and **S. torresii** B.L. Turner, *sp. nov.*, from Oaxaca. A key to the taxa is provided and distribution maps for each are presented.

KEY WORDS: Lamiaceae, *Stachys*, México, taxonomy

Epling (1934) provided a treatment of the North American elements of *Stachys*. In this he recognized eight species as belonging to a "Species Group VII", in part characterized by their relatively long, nonsaccate, deep purple or red corollas, the latter internally transversely or obliquely annulate near the base of the tube. Epling listed as first among this group the orange- or red-flowered *S. coccinea* Jacq., a widespread quite variable taxon occurring from the southwestern U.S.A. (westernmost Texas, southern New Mexico, and Arizona) to Guatemala.

The only other taxon having red or orange corollas in his group VII is *Stachys lindenii* Benth.; the remaining species are variously described as having pink to lavender or purple corollas. With study of numerous collections assembled since his publication, I have discerned several new taxa from among this complex which are described below.

This study is based upon 200 or more collections of the complex at LL, TEX and 85 sheets on loan from F and selected types from GH. The distributional maps (Figs. 1-4) are based upon these specimens.

KEY TO SPECIES OF THE *STACHYS COCCINEA* COMPLEX

(Taxa having large orange or red corollas, belong to species group VII of Epling 1934)

1. Leaves densely white-velvety beneath; calyces 11-15 mm long; San Luis Potosí, N Hidalgo. ..... *S. albotomentosa*

1. Leaves variously pubescent beneath, but not velvety; calyces 5-10(-13) mm long. ..... (2)

2. Angles of stems beset with stiff, retrorse, broad-based prickles. ... . *S. lindenii*

2. Angles of stems variously pubescent but prickles absent. .....(3)

3. Bracts of inflorescence thin, broad and leafy, about as wide as long, mostly 15-25 mm wide; calyx lobes markedly ciliate with stiff hairs 0.5-1.0 mm long; Michoacán (vicinity of Zitácuaro). ..... *S. jaimehintonii*

3. Bracts of inflorescence not as described in the above; widespread. ... (4)

4. Midstem leaves large and thin, mostly 8-15 cm long, their petioles mostly (3-)4-10 cm long; calyces with tubes mostly 3-4(-5) mm long; westernmost Pacific slopes. ..... *S. pacifica*

4. Midstem leaves smaller and thicker, mostly 6-10(-12) cm long, their petioles mostly 2-3(-4) cm long; calyces with tubes mostly (5-)6-10 mm long. .....(5)

5. Calyx lobes 6-7 mm long, as long as or longer than the campanulate tube; stems with a mixture of long, broad-based trichomes and short glandular hairs; Oaxaca. ..... *S. torresii*

5. Calyx lobes 2-5 mm long, shorter than the cylindrical tube; stems variously pubescent but broad-based hairs absent; widespread from U.S.A. to Nicaragua. ..... *S. coccinea*

1a. *STACHYS ALBOTOMENTOSA* Ramamoorthy var. *ALBOTOMENTOSA*, An. Inst. Biol. Univ. Nac. Auton. Mex. Bot. 34:158. 1987. TYPE: MEXICO. Hidalgo: Jacala, 9 Sep 1940, *Moore 12* (HOLOTYPE: MEXU).

Suffruticose herbs 30-50 cm high. Midstems 2-4 mm across, densely tomentose. Midstem leaves thick, mostly 4-8 cm long, 1.5-3.5 cm wide; petioles 1-3 cm long; blades ovate to deltoid, bicolored, densely velvety-tomentose beneath, the margins finely crenulate. Flowers axillary, sessile or nearly so, 4-6 to a node, arranged along the upper portions of the stem, the subtending leaves much-reduced, thick, lanceolate, 2-3 times as long as wide. Calyces mostly 12-14 mm long, tubular or only slightly flaring; tubes (7-)10-12 mm long, evenly silky-pilose throughout with short hairs; lobes 2.5-3.5 mm long, their apices narrowly acuminate. Corollas "salmon-colored" to red; tubes 14-20 mm long, annulate within ca. 4 mm above the base; lower lip ca. 9 mm long; upper lip ca. 6 mm long. Anthers exserted ca. 4 mm beyond the tube. Nutlets ca. 2.2 mm long, 1.8 mm wide, the surfaces minutely rugulose (×40).

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Hidalgo: Jacala, 13 Nov 1937, *Kenoyer 639* (F); 10 mi SW of Jacala, on moist cliffs, ca. 9000 ft., 23 Jul 1940, *Hitchcock & Stanford 72678* (F); 6.5 air km ENE of Jacala between Cuesta Colorado and El Pinalito along México hwy 85, "limestone boulders covered with cacti and many ferns in woodland of pine and oaks", 1700 m, 13 Jul 1991, *Mayfield et al. 815* (TEX); near Jacala, 8 Apr 1939, *Perkins & Hall 3329* (F); 10 km by road NE of Jacala along hwy 85, pine-oak woodlands, ca. 1030 m, 12 Jul 1965, *Roe et al. 234* (LL).

Two morphogeographical varieties are recognized for this recently described species, which was known to its original author by only the holotype. The numerous collections assembled since that time speaks to its biological reality; the plants concerned, all from the vicinity of Jacala, are remarkably uniform. The description of var. *albotomentosa* (above) includes only those collections from Hidalgo, México.

1. Midstem leaves mostly 8-12 cm long; stems silky-pilose, scarcely tomentose; San Luis Potosí. ..... var. *potosina*

1. Midstem leaves mostly 3-5 cm long; stems densely tomentose; N Hidalgo. ..... var. *albotomentosa*

1b. **STACHYS ALBOTOMENTOSA** Ramamoorthy var. **POTOSINA** B.L. Turner, *var. nov.* TYPE: MEXICO. San Luis Potosí: 30 mi E of San Luis Potosí along hwy 86 to Río Verde, rocky open oak-wooded hillside, 13 Jul 1963, *R.L. McGregor 631*, with L.J. Harms, A.J. Robinson, R. del Rosario, and R. Segal (HOLOTYPE: LL!).

Stachydi albotomentosa Ramamoorthy var. *albotomentosa* similis sed foliis midcaulinis majoribus (plerumque 8-12 cm longis vs.

3-8 cm longis) et caulibus laxe sericei-pilosis (vs. dense tomentosis) differt.

Resembling var. *albotomentosa* but the midstem leaves larger (mostly 8-12 cm long vs. 3-8 cm) and the stems loosely silky-pilose (vs. densely tomentose).

ADDITIONAL SPECIMENS EXAMINED: MEXICO. San Luis Potosí: ca. 21 m E of San Luis Potosí along hwy 70 to Río Verde, 23 Jul 1981, *Poole 2375* (TEX); ca. 40 km E of San Luis Potosí along hwy 70, then along side road to microwave tower, near crest, oak woodlands, 2700 m, 30 May 1974, *Sanders 74036* (TEX).

This taxon is clearly related to var. *albotomentosa* but differs in several characters, as noted in the key. It appears to be more variable than var. *albotomentosa*, the leaves on their undersurfaces varying from merely loosely silky-pilose beneath (*Poole 2375*) to densely tomentose (*Sanders 74036*); the former collection also has glandular-pilose stems, suggesting possible contamination with genes from *Stachys coccinea* but, so far as known, elements of the latter have not been collected in San Luis Potosí.

2. *STACHYS COCCINEA* Ort., *Nov. Pl. Descr.* Dec. 20, 1797. TYPE: CUBA(?). Grown in Spain from seed reportedly collected in Cuba by Sessé (HOLOTYPE: MA; Probable isotype: F! [Ex antiguo herbaria generali, Hort Madrid ex "Nova Hispania"]). Epling (1935) listed *S. coccinea* Jacq., *Hort. Schoenb.* 3:18, t. 284. 1798, as the preferred citation for this name, apparently not certain of the typification of Ortega's earlier name. Seed was apparently collected in México by Sessé, presumably in the vicinity of what is now México City, and shipped secondarily from Cuba.

?*Stachys cardinalis* Kunze, Bot. Zeit. 2:645. 1844. TYPE: MEXICO(?). Grown in garden at Leipzig. Not examined, but from the description probably *S. coccinea.*

Stachys oaxacana Fernald, Proc. Amer. Acad. Arts 35:564. 1900. TYPE: MEXICO. Oaxaca: Papico, Cuicatlán, 5400 ft, 9 Dec 1895, *Gonzáles 47* (LECTOTYPE: GH! [designated by Epling 1934]).

Stachys limitanea A. Nels., Amer. J. Bot. 25:115. 1938. U.S.A. Arizona: Massacre Camp, between Ruby and Tucson, *Nelson & Nelson 1471* (HOLOTYPE: RM, not examined).

Perennial erect herbs 0.4-1.5 m high. Roots forming short rhizomes. Midstems 2.0-4.8 mm across, variously pubescent, but most often pilose with spreading hairs. Midstem (primary) leaves mostly 6-10(-12) cm long, 3-4(-5) cm wide; petioles mostly 1-3 cm long, much shorter than the blades; blades

thick, ovate to ovate-cordate, 3-5 nervate from the base, variously pilose beneath, but usually moderately so, the margins crenulate. Flowers mostly 4-6 to a node, forming a lax terminal bracteate inflorescence. Calyces mostly tubular, (6-)7-12 mm long, minutely glandular-pubescent to pilose, the lobes 2-4(-5) mm long, apiculate. Corollas orange to red, mostly 15-25 cm long, the upper lips 4-6 mm long, the lower lips 6-9 mm long, annulate within 3-4 mm above the base. Stamens exserted for 4-6 mm, the anthers ca. 1 mm long. Nutlets brown, ovoid, ca. 2.5 mm long, 2 mm wide, the surfaces minutely rugulose (×40).

The type material of *Stachys oaxacana* (5 sheets, GH!) differs somewhat from most specimens of *S. coccinea* in having shorter calyces (mostly 5-6 mm long vs. 6-12 mm long) and longer thinner leaves, approaching those of *S. pacifica* B.L. Turner, otherwise it seems to match well material of *S. coccinea.* Additional study, however, may show that populations from the region concerned (northcentral Oaxaca) are worthy of formal recognition.

3. **STACHYS JAIMEHINTONII** B.L. Turner, *sp. nov.* TYPE: MEXICO. Michoacán: Zitácuaro, Salto de Nandio, bushy bank by orchard, 1500 m, 26 Dec 1938, *Jaime Hinton 13489* (HOLOTYPE: LL!; Isotypes: TEX! [2]).

Label data indicate that the type material was collected by "J.H.", in reference to Jaime Hinton, the son of G.B. Hinton. Jaime collected with his father over an extended period during the 1930's (*cf.*, Hinton & Rzedowski 1972).

Stachydi coccineae Jacq. similis sed floribus in spica congesta foliacea terminalique dispositis, bracteis tenuibus plerumque 15-25 mm latis, et calycibus ad maturitatum late sursum factis lobis sigillatum ciliatis differt.

Clambering succulent herbs (according to label data) to 50 cm high (the lower portions absent on most sheets examined). Midstems 2-4 mm across, minutely pubescent with a vestiture of glandular hairs ca. 0.1 mm high, scattered among these an array of stiffly erect multiseptate trichomes 0.5-2.0 mm long. Midstem leaves large and thin, 8-15 cm long, 4-7 cm wide; petioles mostly 2.5-5.0 cm long, pubescent like the stem; blades cordate, sparsely pubescent above and below with appressed hairs, mostly along the major veins, the margins crenulodentate. Inflorescence a congested terminal bracteate columnar spike 8-15 cm long, 3.0-4.5 cm across, the bracts markedly thin and leafy, mostly 15-25 mm long and about as wide, their margins ciliate with stiff hairs. Flowers mostly 6 to a node, their pedicels 2-3 mm long. Calyces 12-14 mm long, broadly flaring upwards at maturity; tubes 8-10 mm long, pubescent

throughout with stiff multiseptate trichomes 0.5-2.5 mm long; lobes ca. 4 mm long, 2-3 mm wide at base, their apices apiculate. Corollas orange; tubes 15-18 mm long, annulate within ca. 4 mm above the base; lower lip ca. 8 mm long; upper lip ca. 7 mm long. Anthers exserted ca. 4 mm beyond the tube. Nutlets ca. 2 mm long, 1.9 mm wide, smooth, their surfaces minutely rugulose (×40).

This species is remarkable for its congested leafy-bracteate terminal spikes and flaring calyces with markedly ciliate lobes.

4. *STACHYS LINDENII* Benth. *in* DC., *Prodr.* 12:467. 1848.

My circumscription of this taxon is the same as Epling's. *Stachys lindenii* is readily distinguished by its sprawling vine-like habit and stems which are beset with very broad-based recurved prickles. It is adequately described by both Epling (1935) and Standley & Williams (1973).

5. **STACHYS PACIFICA** B.L. Turner, *sp. nov.* TYPE: MEXICO. Michoacán: Distr. Apatzingan, Aguililla, on cliffs, 12 Oct 1939, *Hinton et al. 15319* (HOLOTYPE: LL!; Isotype: F!).

> *Stachydi coccineae* Ort. similis sed foliis plerumque tenioribus majoribusque (8-15 cm longis vs. 6-10 cm longis) petiolis longioribus (3-6 cm longis vs. 1-3 cm longis), calycibus minoribus (plerumque 4-7 mm longis vs. 7-12 mm longis), et corollarum labio supero longiore (7-10 mm longis vs. 4-6 mm longis) differt.

Perennial erect brittle-stemmed herbs 0.4-1.5 m high. Roots at first forming a slender tap root, but soon developing slender rhizomes. Midstems 1.5-3.0 mm across, sparsely to moderately pilose with spreading hairs 0.7-1.5 mm long, these often somewhat broad-based, below these a shorter vestiture of shorter glandular hairs 0.1-0.3 mm, or else an underlayer of hairs absent. Midstem (primary) leaves mostly 7-11 cm long, 3-5 cm wide; petioles (3-)4-5(-6) cm long; blades thin, cordate, sparsely pilose beneath, especially along the veins, the margins crenulodentate. Flowers (2-)4-6 to a node, arranged in a lax terminal interrupted inflorescence. Calyces mostly 4-6(-7) mm long, the lobes linear-lanceolate to narrowly triangular, mostly 2-4 mm long, the tube minutely glandular-pubescent. Corollas red, mostly 2.5-3.5 cm long, the tube relatively narrow, 20-25 mm long, 2.0-3.5 mm wide at mid-portion, the lower lip 4-5 mm long, the upper lip 7-10 mm long, annulate within ca. 2 mm above the base. Stamens 4, subequal, extending from the throat for 7-10 mm; filaments pilose; anthers ca. 0.7 mm long. Nutlets brown, obovoid to ovoid, ca. 1-3 mm long, 2 mm wide, the surfaces minutely "pitted" or rugulose (×40), often secondarily encrusted with scablike wellings.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Jalisco: Mpio. Talpa, entre Cumbre del Tejamani y Cuale, pine-oak woodlands on side of hill, 1660 m, 8 Mar 1971, *Gonzáles T. 132* (TEX); Hacienda del Ototal, W of San Sebastián, Arroyo de los Palos Blancos, slope in densely wooded canyon, 1500 m, 9 Mar 1927, *Mexia 1844* (TEX); Trail from San Sebastián to Las Mesitas, 1500 m, 10 Mar 1927, *Mexia 1855-a* (TEX); Mpio. Zapotitlán, ca. 22 km NNW of Colima, N of Cerro El Campanario along Arroyo Cordoban, ca. 1375 m, 1 Nov 1990, *Phillips 1043* (TEX). Nayarit: Mpio. Tepic, 5 km NE of Cuarenteno, 15 Sep 1990, *Flores F. 2344* (TEX). Sinaloa: w/o locality, 1933, *Ortega 7105* (F). Sonora: Río Mayo watershed, San Bernardo and vicinity, Chorijoa, short-tree forest, 400-1000 m, Sep 1961, *Arguelles 135* (LL).

This taxon is readily distinguished from *Stachys coccinea* by its very thin leaves with relatively long petioles; additionally, it has smaller calyces and mostly narrower corolla tubes.

Stachys pacifica is a relatively widespread taxon occurring from southern Sonora to Michoacán (Figure 2) along the Pacific slopes, hence its name.

6. **STACHYS TORRESII** B.L. Turner, *sp. nov.* TYPE: MEXICO. Oaxaca: Distr. Mixe, "En los primeros 5 km de el camino a Villa Alta, entrado por la desviación que esta aprox. a 10 km de Totontepec ... Veg. Ruderal de bosque mesófilo con neblina"., 13 Dec 1985. *R. Torres C. 7925* (HOLOTYPE: F!; Isotype: MEXU).

Stachydi coccineae Ort. similis sed differt calycis lobis tubum longitudine aequantibus vel superantibus (vs. lobis 2-plo vel plus brevioribus) et caulibus pubescentibus trichomatibus longi-patentibus basis latae ac trichomatibus brevioribus glandulosis (vs. trichomatibus basis latae carentibus).

Perennial herbs ca. 40 cm high. Midstems ca. 3 mm across, sparsely pubescent with spreading, somewhat broad-based, trichomes 1.0-1.5 mm long, below these a moderately dense vestiture of glandular hairs ca. 0.25 mm high. Midstem leaves ca. 10 cm long, 5 cm wide; petioles ca. 3.5 cm long; blades relatively thin, cordate, 3-5 nervate, sparsely pilose beneath, especially along the veins, the margins crenulate. Flowers 4-6 to a node, arranged in a lax terminal interrupted leafy inflorescence. Calyces 13-14 mm long, the tube crenulate, 6-7 mm long, glandular-pubescent with hairs ca. 0.5 mm long, the lobes linear-lanceolate, 6-7 mm long, pubescent with glandular hairs ca. 0.5 mm long. Corollas orange-red, 3.0-3.5 cm long, the upper lip ca. 9 mm long, the lower lip ca. 12 mm long, the inner portion annulate ca. 3 mm from the base. Nutlets ovoid, ca. 2.5 mm long, 2 mm wide, the surfaces minutely rugulose (×40).

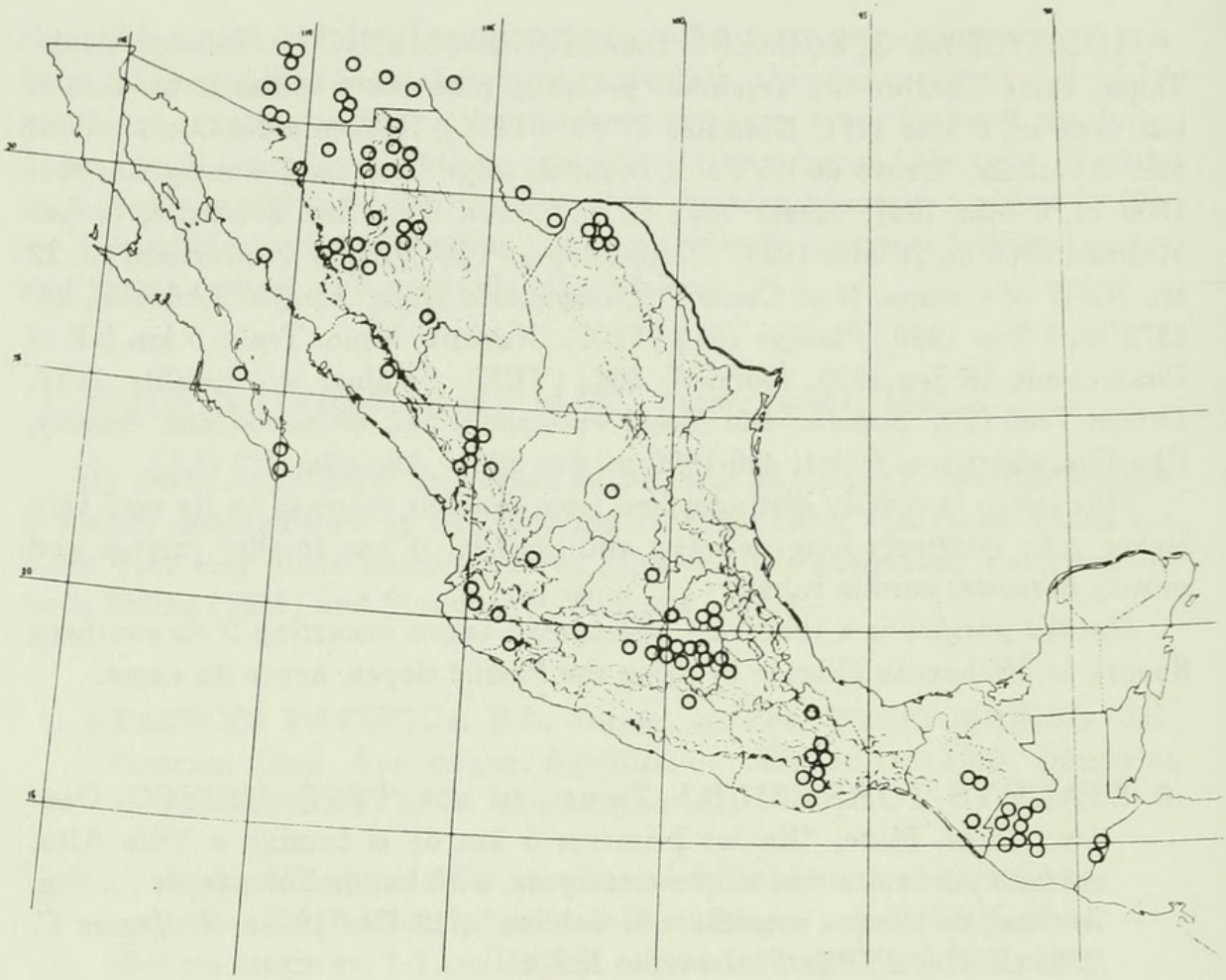

Figure 1. Distribution of *Stachys coccinea*.

Figure 2. Distribution of *Stachys lindenii*.

Figure 3. Distribution of *Stachys* species: *S. jaimehintonii* (open circle); *S. albotomentosa* (open triangles var. *albotomentosa*; closed triangles var. *potosina*); *S. pacifica* (closed circles); and *S. torresii* (open squares).

This taxon combines characters of *Stachys lindenii* (at least some of the stem-hairs broad-based, leaves cordate and thin, and the corollas with exceptionally well-developed lips) and *S. coccinea* (erect herbs with large well-developed calyces). *Stachys torresii* differs from both in having very large calyces, the lobes as long as or longer than the tubes.

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