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A REVISION OF *PERIPTERA* DC. (MALVACEAE)

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The small genus *Periptera* DC. is closely allied to *Anoda* Cav. and is sometimes merged with it. Both genera are neotropical in distribution; *Periptera* is wholly Mexican. The characters known to distinguish the two genera are confined in large part to characters of the flower: the petals are erect (vs. spreading in *Anoda*) and red (vs. yellow, white, or violet in *Anoda*); the androecium and gynoecium are greatly elongated and often exserted from the corolla (vs. usually short and included in *Anoda*); and the stigmas are clavate (vs. discoid-capitate in *Anoda*). The generic distinction of *Anoda* and *Periptera* is currently under more detailed investigation by Dr. D. M. Bates (Cornell University) by means of biosystematic studies, the results of which are awaited with interest.

Periptera has previously been discussed by Rose (1899), Bullock (1937), and Kearney (1951). The reasons for a further examination of this small Mexican genus are (a) the discovery of a new species, described herein; (b) a substantial range extension of the type species, *P. punicea*; (c) the necessity for the reduction of *P. macrantha*; and (d) a more detailed characterization of and key to the four species that constitute the genus.

The key presented by Bullock (1937) is satisfactory for flowering but not fruiting specimens. An expanded key follows, with special emphasis on calyx characters that are observable both in flowering and in fruiting specimens.

KEY TO THE SPECIES OF *PERIPTERA*

- A. Calyx 6-7 mm long, basally as broad, with simple hairs (1-2 mm long) in addition to stellate pubescence; petals $1\frac{1}{2}$ times as long as broad (6-9 mm broad) with dark spot on claw; staminal column 35-40 mm long, glabrous, weakly 5-angled; mericarps 6-7, minutely puberulent with spine on dorsal angle up to 0.5 mm long

.... 1. *P. macrostelis*

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AA. Calyx 5-13 mm long, often longer than broad, stellate-pubescent but lacking long simple hairs; petals 2-5 times as long as broad, without basal spot; staminal column 15-35 mm long, with a few minute twisted simple hairs and/or stellate hairs; mericarps 8-12, hirsute.

B. Petals 19-21 mm long, 10-12 mm broad; staminal column included in corolla (1.5-1.8 cm long), stellate-scabrous in lower half; mericarps with single rib on dorsal wall leading to spine 0.5 mm long at dorsal angle

.... 2. *P. grandiflora*

BB. Petals 10-18 mm long, 1-3(-5) mm broad; staminal column 1.5-3 times length of corolla (1.5-3.5 cm long), the stellate hairs not scabrous; mericarps with more than one rib on dorsal wall.

C. Calyx 8-13 mm long, yellowish stellate-tomentose; staminal column 30-35 mm long with at least some stellate hairs throughout length; stamens ca. 40, yellow; mericarps with several ribs on dorsal wall and with spine 1-3 mm long at dorsal angle

.... 3. *P. trichostemon*

CC. Calyx 5-9 mm long, stellate-tomentose (often whitish); staminal column 15-30 mm long with a few minute twisted simple hairs throughout and a few stellate hairs at base; stamens usually fewer than 40, dark purple or pallid; mericarps with divided or branched rib on dorsal wall and with spine up to 0.5 mm long on dorsal angle

.... 4. *P. punicea*

1. PERIPTERA MACROSTELIS Rose, Contr. U. S. Natl. Herb. 5: 174. 1899.

Erect herbaceous or suffrutescent perennial. Stems essentially glabrous (invested with minute crisped hairs and a few stellate hairs in the growing tip, but these quickly lost). Leaves strongly 3-lobed to hastate, the largest (lower) leaves ca. 11 cm long, sometimes as broad, progressively reduced and relatively narrower upward; basally more or less cordate, coarsely but shallowly serrate or crenate, sometimes subentire, acute to acuminate, palmately (5-)7 (-9)-nerved, essentially concolorous, lacking purple blotches along midvein but sometimes with purple veins and hair bases on upper leaf surface (when exposed to sun?), almost glabrous with few (mostly simple) hairs above and very few (mostly stellate) hairs below at maturity (more densely pubescent

when younger). Petioles pubescent distally with mostly stellate hairs and along ventral surface with mostly simple hairs (0.5-1.0 mm long), otherwise glabrate, those of climax leaves sometimes equaling lamina, those of reduced upper leaves proportionately smaller. Stipules filiform, sparsely pubescent to glabrate, 2-6 mm long. Pedicels axillary, solitary, 1.5-5 cm long (at anthesis), articulated above the middle, the inflorescence forming an apical raceme (or sometimes weakly paniculate), densely invested with minute crisped hairs and sometimes also with long pilose hairs (to 1.5 mm). Calyx 6-7 mm long, half-divided into 5 lobes, campanulate, 10-veined, green, sometimes with anthocyanin pigmentation in the lobes, with crisped, stellate, and pilose hairs, the latter patent, 1-2 mm long; calyx veins leading alternately to the sinuses (and dividing below the sinus to become lateral, not marginal veins) and becoming midribs of the calyx lobes; the lobes ovate-lanceolate, 3-4 mm long, 2-3 mm broad, apiculate. Petals erect, broadly obovate, 10-14 mm long, 6-9 mm broad, "red" or "scarlet" according to collectors but appearing rose to orangish *in sicco*, with dark red spot on claw, gradually narrowed to short claw (or subsessile), densely stellate-pubescent without proximally, the hairs tending to be antrorsely oriented, sparsely invested with minute crisped hairs distally, otherwise glabrous. Staminal column greatly exceeding corolla, 3.0-0.4 cm long, stellate-scabrous at base, the hairs tending to be antrorsely oriented, otherwise glabrous, the tube somewhat 5-angled, antheriferous only at apex; free portion of filaments 1-2 mm long; anthers ca. 30, purple. Pollen spherical, yellow. Styles ca. 7, sometimes purplish, gradually swollen upward to clavate stigma. Fruit a schizocarp, 6-8 mm diam.; columella 4 mm long, the surmounting stylar remnant glabrous, mericarps ca. 7, minutely invested with both stellate and simple, crisped hairs; with spine up to 0.5 mm long on dorsal wall near apex, ca. 4.5 mm long; dorsal wall ecostate.

This species is known from western Jalisco, where it is evidently sympatric with *P. punicea*, and from a single locality in Guerrero. Rose cites *Nelson 4086* (the type), to which Bullock adds *Mexia 1393*, and to which I add *Mexia 1403* (MICH, MO, UC, US), *McVaugh 21557* (MICH), *González 133* (ENCB, MICH), and *Hinton 11700* (US) as representative of *P. macrostelia*. The Nelson and Mexia collections were made about 50 km northeast of Puerto Vallarta in the vicinity of San Sebastián; that of McVaugh near Ayutla, about 120 km southeast of Puerto Vallarta; and that of González (entre Cumbre del Tejamanil y Cuale, Munic. de Talpa) in the intervening area. The Hinton plant is disjunct by more than 690 km, having been collected at San Antonio Buenos Aires, Distr. Montes de Oca, Guerrero (Hinton & Rzedowski, 1972).

2. *PERIPTERA GRANDIFLORA* Fryxell, sp. nov.

Herba erecta, 0.5 m alta (vel plus alta?). Caules minute stellati-pubescentes, pilis ca. 0.5 mm diam., persistentibus. Folia 2-3 cm long, interdum ovata, plerumque hastata, lobis basaliter constrictis, marginibus integris vel irregulariter crenulatis, acuta vel obtusa, palmatim 5-7-nervata, quasi concoloria, supra et infra stellato-pubescentia. Petioli stellato-pubescentes, quam lamina dimidio longiores vel laminam aequantes. Stipulae 1-2 mm longae, pubescentes. Pedicelli axillares, solitarii, supra medium articulati, usque ad 5 cm longi, inflorescentia racemosa, dense et minute stellato-pubescenti. Calyces 8-12 mm longi, 0.5-0.7-lobati, obscure nervati, dense pubescentes, pubescentia flavida ad basim et pigmento purpurascenti in lobis; lobi 5, ovato-lanceolato, 5-8 mm longi, 3-5 mm lati, acuminati, marginibus plus minusve involutis tempore fructifero. Petala erecta, late obovata, 19-21 mm longa, 10-12 mm lata, in sicco rubro-purpurea (in vivo rubra?), pilis minutis crispis in laminis petalorum extus dispersis, in unguibus longis 1-15 mm latis gradatim angustata, unguibus pallidis, in marginibus unguium sparse ciliata. Columna staminalis in corolla inclusa, 15-18 mm longa (petala subaequans), in dimidio inferno stellato-scabra, pilis minutis crispis ubique dispersis, columna 5-angulata praecipue ad basem, antherifera non nisi apicem versus; partes liberae filamentorum ca. 2 mm longae; antherae ca. 30, purpurascens. Pollen sphaericum, flavidum. Styli ca. 10, sursum gradatim incrassati in stigmatibus clavatis. Fructus ad instar schizocarpii, 9-13 mm diam.; columellae 2 mm longae, reliquiis stylorum ad apicem glabris; mericarpia 10-12, dense pubescentia, 3-4 mm longa, spinis ad 0.5 mm longis in pariete dorsali prope apicem, parietibus lateralibus ad maturitatem carentibus, pariete dorsali 1-costato, nervo non furcato ad spinam extenso.

Type: MEXICO: *México*: Texcoco, C. de Purificación, en ladera seca, rocosa, volcánica, en alt. 2,520 mm, 11 Nov. 1951, *Dudley Gold* s. n. (holotype: MEXU).

This species is known only from the type specimen. Attempts to gather further material at the type locality in October 1972 were unsuccessful. The new species is distinguished by its large corolla and scabrous staminal column. Although its staminal column is greatly elongated, as is typical of *Periptera*, *P. grandiflora* is distinctive in that the androecium is not exerted from the corolla but is subequal to it.

3. *PERIPTERA TRICHOSTEMON* Bullock, Kew Bull. 77. 1937.

Erect herbaceous or suffrutescent perennial. Stems minutely stellate-pubescent, the hairs < 1 mm diam., relatively persisten. Leaves triangular to hastate, the largest (lower) leaves ca. 10 cm long, 7 cm broad, progressively reduced and relatively narrower upward; basally rounded or truncate, coarsely and shallowly crenate-serrate, acute, palmately 5-nerved, somewhat discolourous, sometimes with purple blotches along midrib, stellate pubescent on lower leaf surface, somewhat more sparingly so above, the hairs frequently reduced to one or two arms. Petioles stellate-pubescent, those of climax leaves nearly equaling lamina, those of reduced upper leaves proportionately smaller. Stipules filiform, pubescent, 4-8 mm long. Pedicels axillary, solitary, 1-3 cm long, articulated near or above the middle, the inflorescence forming an apical raceme, minutely pubescent with both twisted simple hairs and rigid stellate hairs. Calyx 8-13 mm long, deeply 5-parted, broadly rounded at base (5-7 mm diam.), 10-ribbed, yellowish, with indumentum like the pedicel; calyx ribs alternately leading to the sinuses and dividing to become marginal veins and becoming midribs of the calyx lobes; the lobes ovate-lanceolate, to 9 mm long, 3 mm broad, 1-ribbed, often purplish, apiculate. Petals erect, narrowly spatulate, red, 10-13 mm long, 3 mm broad apically, narrowed to long claw 1 mm broad, stellate-pubescent on claw, essentially glabrous on blade. Staminal column greatly exceeding corolla, to 3.5 cm long, with minute, twisted, simple hairs and some stellate hairs throughout length, antheriferous only at apex; free portion of filaments 1-2 cm long; anthers numerous (ca. 40), yellow. Fruits ca. 10-carpellate, hirsute (hairs 0.5-0.75 mm); columella ca. 3 mm, carpels 1-seeded with lateral walls absent at maturity, with several prominent parallel costae longitudinally on dorsal wall, and with prominent spine (1-3 mm long) near apex of dorsal wall; carpels ca. 4 mm long excluding spine.

This species is evidently endemic to Sinaloa. The following specimens may be added to those cited by Bullock.

Sinaloa: 3 Nov. 1904, *Brandegee s. n.* (UC); NW base of Cerro Colorado, *Gentry 5193* (MICH, MO, UC); Capadero, Sierra Tacuichamona, *Gentry 5538* (ARIZ).

4. *PERIPTERA PUNICEA* (Lag.) DC Prodr. 1: 459. 1824.

BASIS: *Sida periptera* Sims, Bot. Mag. t. 1644. 1814.

BASIONYM: *Anoda punicea* Lag. Gen. Sp. Nov. 21. 1816.

Note: Title of species wissing of this point in the M.S.?

To the synonymy given by Bullock (1937) the following names may be added:

Sida stenopetala M. E. Jones, Contr. W. Bot. 18: 58. 1935.

TYPE: Guadalajara, La Barranca, Jones 27142 (HOLOTYPE: POM).

Anoda periptera var. *macrantha* Hochr. Ann. Cons.

Jard. Bot., Genève 20: 43. 1916. (LECTOTYPE: *Arsène* 64, G-Del).

Periptera macrantha (Hochr.) Bull. Kew Bull. 1937: 77. 1937.

Hochreutiner described *Anoda periptera* var. *macrantha* Hochr. which Bullock (1937) elevated to specific rank as *Periptera macrantha* (Hochr.) Bull. I find this taxon to differ consistently from *P. punicea* in no character other than in size of floral parts. Moreover, these differences form an almost continuous range. I therefore relegate *P. macrantha* to the synonymy of *P. punicea*.

Erect herbaceous or suffrutescent perennial. Stems minutely stellate-pubescent, the hairs < 1 mm diam., persistent. Leaves sometimes ovate, more commonly triangular to hastate, the largest leaves 9 cm long, 5-6 cm broad, progressively reduced and relatively narrower upward; basally subcordate to truncate, shallowly crenate or serrate, acute, palmately 5-7 nerved, somewhat discolorous, sometimes with purple blotches along midrib and/or purple-margined, stellate-pubescent, more densely so below than above. Petioles stellate-pubescent, usually shorter than lamina, much shorter in upper leaves. Stipules filiform, pubescent, 3-6 mm long. Pedicels axillary, usually solitary, articulated above the middle, the inflorescence often developing into a terminal panicle, invested with both twisted simple hairs and rigid stellate hairs. Calyx 5-8 mm long, 0.5-0.7-divided into 5 lobes, campanulate, 10-veined, yellowish green, sometimes with anthocyanin pigmentation on veins and apices of lobes, with indumentum like the pedicel; calyx veins leading alternately to the sinuses (and dividing to become submarginal veins) and becoming midribs of the calyx lobes; the lobes ovate-lanceolate, ca. 5 mm long, 2-3 mm broad, apiculate, Petals erect, narrowly spatulate, 12-18 mm long, 1-5 mm broad apically, narrowed to long claw < 1 mm broad, stellate-pubescent on claw, essentially glabrous on blade, "scarlet" when fresh but reddish purple *in sicco*. Staminal column greatly exceeding corolla, 1.5-3 cm long at anthesis, minutely stellate-pubescent at base (the arms more or less erect relative to surface of staminal column), sparsely invested with twisted hairs throughout length, antheriferous only at apex; free portion of filaments 1-1.5 mm long; anthers 30-40, purple. Pollen spherical, yellow. Styles ca. 12, pallid, gradually swollen upward to

clavate stigmas which are purplish. Fruit 7-9 mm diam., stellate-pubescent (hairs < 0.5 mm), a schizocarp; columella ca. 1 mm, the surmounting stylar remnant pubescent; mericarps 10-12, with spine up to 0.5 mm long on dorsal wall near apex; carpels 3 mm long excluding spine, with single dorsal vein at base branching below spine, the lateral walls disintegrating at maturity.

Bullock states that *P. punicea* "is apparently confined to Jalisco," but it is evidently much more widespread than that. Indeed, it is more widespread than the other three species combined, extending from southern Sonora to Chiapas. The following specimens may be cited in addition to those cited by Bullock from Jalisco.

Sonora: Sierra Chiribo, Río Mayo, *Gentry 1424* (MICH); Cañón Saucito, Distr. Alamos, *Gentry 700M* (MICH).

Sinaloa: Munic. de Badiraguato: 2 miles S of El Triquito, near La Ciénega along road to Surutato, *Breedlove & Kawahara 17012* (CAS).

Zacatecas: 20 km WSW of Valparaíso, *Dieterle 3071* (MICH).

Nayarit: Cerro San Juan, cerca de Tepic, *Paray 3439* (ENCB, MEXU); 10 miles SE of Ahuacatlán, *McVaugh & Koelz 785* (ENCB, MICH).

Jalisco: Guadalajara, *Palmer 604* (MICH); near Lake Chapala, *Pringle 4356* (MICH); arriba de Ajijic, *Villarreal de Puga 108* (ENCB); along road to Mascota, 7-8 mi NW of Los Volcanes, *McVaugh 13708* (MEXU, MICH); N of Mascota on road to San Sebastián, *Anderson & Anderson 5970* (ENCB, MICH); 5 mi SW of Tecalitlán, *Koelz 34135* (MICH); 15 km E of Pihuamo, *Dieterle 3019* (MICH).

Michoacán: between Zamora & Tangancicuaro, *Bates, Blanchard, & Fryxell 1625* (BH, CTES); 8-10 km SW of Jiquilpan, *Feddema 212* (MICH); W of Jiquilpan, *McVaugh 13208* (MEXU, MICH, US); Sierra Torrecillas, Distr. Coalcomán, *Hinton 12804* (US); 22 mi S of Jiquilpan, *King & Soderstrom 4609* (US).

Hidalgo: 18 km W de Ixmiquilpan, *González Q. 3182* (ENCB).

Distrito Federal: Pedregal de San Angel, *Rzedowski 1725* (ENCB), *Lyonnet 360* (US).

México: Temascaltepec, *Paray 2229* (ENCB, MEXU), *Hinton 6808* (MEXU).

Morelos: near Cuernavaca, *Pringle 7375* (MEXU, US); Valle de Tepeite, *Lyonnet 2436* (US).

Guerrero: 2 km N de Taxco, *Rzedowski 21504* (ENCB); between Ayusinapa & Petatlán, *Nelson 2115* (US).

Veracruz: Orizaba: F. Müller 327 (NY).

Chiapas: 2 miles NW of Pinola Las Rosas along road to Teopisca, Breedlove & Raven 13159 (CAS, MEXU).

LITERATURE CITED

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