

consequently more slender shoots, and particularly by the more slender apices; from *L. Parksii* by the straight (not inflexed) and less acuminate leaves. *L. proliferum* Blume, ascribed by Herter to this group and by Baker to that of *L. squarrosum*, is unknown to me.

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## A SYNOPSIS OF ROBINSONELLA

EVA M. FLING ROUSH

*With seven text figures*

A SYNOPTICAL treatment of this group was thought advisable because of the difficulty of specific determination due to the scattered literature, the inadequacy of the original descriptions, the lack of a key to the species, the extreme variation in the form of leaf, the degree of pubescence and the small number or fragmentary nature of the specimens upon which some of the species were founded.

*Robinsonella*, a genus of tree mallows of the American tropics, named in honor of Dr. B. L. Robinson of the Gray Herbarium of Harvard, was established by Rose and Baker in 1897 with three species of which two, *R. cordata*, type of the genus, and *R. divergens*, were new, the third, *R. Lindeniana*, having formerly been referred to *Sida* and *Abutilon*. Only seven species are known at present and all are worthy of cultivation because of their showy flowers; they are, however, suited for subtropical and tropical regions only.

The author is indebted to those in charge of the following herbaria for the privilege of examining their material: the Arnold Arboretum and the Gray Herbarium of Harvard University, the New York Botanical Garden, the United States National Herbarium, the Missouri Botanical Garden and the Field Museum of Natural History.<sup>1</sup> Appreciation is due Mr. Alfred Rehder of the Arnold Arboretum for assistance and suggestions in the preparation of this paper.

**Robinsonella** Rose & Baker in Gard. & For. x. 244 (1897).—K. Schumann in Engler & Prantl, Nat. Pflanzenfam. Nachtr. II. 42 (1900).—Standley in Contrib. U. S. Nat. Herb. XXIII. pt. 3, 760 (Trees & Shrubs Mex.) (1923).

Shrubs or small trees up to 9 m. high, much branched, the younger and more herbaceous parts more or less stellate-pubescent (rarely pilose). Leaves alternate, petiolate, mostly ovate or orbicular in

<sup>1</sup>AA, Arnold Arboretum; F, Field Museum of Natural History; G, Gray Herbarium of Harvard University; M, Missouri Botanical Garden; NY, New York Botanical Garden; US, United States National Herbarium.



outline, palmately 5-7-veined, up to 25 cm. long, cordate, subcordate or rounded at base, acute, acuminate or obtuse at apex, entire, dentate or more or less lobed; the lobes vary much in shape, size, number and dentation; petioles vary in length and pubescence; stipules if present, caducous. Flowers large, showy, in ample panicles or in small clusters on short lateral branchlets; bracts small, lance-linear; pedicels articulated near the middle or toward the apex, pubescent or puberulous; calyx cup-shaped, ebracteolate, deeply 5-parted, open or reflexed in fruit, externally densely stellate-pubescent or tomentose (rarely pilose), on the inner upper part arachnoid-pilose in the young stage; nectaries if present forming a pubescent 5-angled ring at the base of the calyx within; petals obovate, unguiculate, with a tuft of hairs on each side of the claw forming the so-called "weel," rarely pubescent dorsally toward the base; staminal column conic, varying in length with the size of the flower, glabrous or stellate-pubescent, dividing into numerous filaments; cells of the ovary 9-13, uni-ovulate; the ovule pendulous, becoming apparently basal by the rapid growth and inflation of the upper portion of the ovary; style-branches as many as the cells of the ovary, exceeding the stamens; stigmas capitate, papillose. Carpels 9-13, compact or spreading, obtuse at apex, thin, membranous, slightly veined, much inflated at maturity, perhaps tardily dehiscent from the base up along the back, the seed often hanging by a slender thread which runs dorsally along the full length of the carpel; seed very small, dark, glabrous or sparsely stellate-scurfy.

TYPE SPECIES: *R. cordata* Rose & Baker in Gard. & For. x. 244 (1897).

DISTRIBUTION: From the State of Durango in Mexico south to Costa Rica in Central America.

*Robinsonella* belongs in the tribe Malveae because the carpels are of the same number as the style-branches and the staminal column is antheriferous at the summit; to the subtribe Sidinae because of the capitate stigmas. It is most closely related to *Sida* and *Gaya* by the uni-ovulate cells of the ovary in which the seed is pendulous. It is distinguished from *Sida* by the more tree-like habit, by the thin, membranous, non-reticulated and much inflated carpels which are obtuse (erostrate) and more or less divergent and separable, by the seed which occupies only a small space in the base of the carpel, by the sepals being smaller than the petals and open or reflexed at maturity. The species of *Gaya*, on the other hand, are herbaceous or suffruticose with undivided leaves, and chiefly yellow, sometimes purplish flowers which are pedunculate and solitary in the axils, often racemose; the apices of the mature carpels are



connivent, but separate from the persistent axis and are dorsally dehiscent into two valves at maturity.

#### KEY TO THE SPECIES

Inflorescence cymose-paniculate, terminal or axillary; leaves more or less lobed.

Leaves 3-5-lobed.

Leaves deeply 3- or 5-lobed, lobes ovate-oblong, constricted at base.....1. *R. Lindeniana*

Leaves more or less 3-lobed, lobes blunt or obtuse.....2. *R. divergens*

Leaves only slightly and irregularly lobed, often unequally-sided

3. *R. edentula*

Inflorescence not paniculate, flowers solitary or in 2's or 3's on short lateral branchlets; leaves obscurely or not at all lobed.

Leaves discolorous, with a fine, dense, appressed silvery tomentum beneath, more or less coarsely dentate.....4. *R. discolor*

Leaves green on both sides.

Leaves furfuraceous-tomentose beneath, ferrugineous on the veins, shortly acuminate.....5. *R. subcordata*

Leaves loosely stellate-pubescent beneath.

Leaves pilose on the veins and petioles.....6. *R. cordata*

Leaves not pilose on the veins or petioles, glabrescent.

7. *R. pilosa*

**1. *Robinsonella Lindeniana* (Turcz.) Rose & Baker in Gard. & For. x. 245 (1897).—Standley in Contrib. U. S. Nat. Herb. xxiii. pt. 3, 760 (Trees & Shrubs Mex.) (1923).—Fig. 1.**

*Sida Lindeniana* Turczaninow in Bull. Soc. Nat. Moscou, xxxi. pt. 1, 200 (1858).—Hemsley, Diag. Pl. Nov. ii. 24 (July 1879); Biol. Cent. Am. i. t. 9, 105 (Nov. 1879).—Gray in Proc. Am. Acad. Arts Sci. xxiii. 295 (1888).—Baker in Jour. Bot. xxx. 139 (1892); Syn. Malveae, 53 (1894).

*Sida Ghisbreghtiana* Turczaninow in Bull. Soc. Nat. Moscou, xxxi. pt. 1, 200 (1858).

*Abutilon ? ambiguum* Turczaninow in Bull. Soc. Nat. Moscou, xxxi. pt. 1, 205 (1858).

Shrub 2.5-3 m. high or larger, branchlets stellate-pubescent, often furfuraceous. Leaves large, up to 27 cm. long, dark green, sparsely stellate-pubescent or scabrous above, paler, densely and softly stellate-pubescent beneath; lower leaves deeply 5-lobed, the uppermost usually 3-lobed, the lobes ovate-oblong, constricted at the base, acute or shortly acuminate, entire or dentate; petiole up to 15 cm. long, stellate-pubescent, often furfuraceous or merely puberulous. Flowers in ample, open cymose panicles up to 3 dm. long and 2-3 dm. broad, branches and pedicels slender, usually furfuraceous-pubescent or puberulous; pedicels 2-4 cm. long, articulated a little below the flower; sepals broadly ovate-oblong, acute or slightly obtuse, pubescent or puberulous, nectaries present; petals white, 1-1.4 cm. long; staminal column short (4 mm.), conic, glabrous. Carpels 11-13, small, compact, about 1 cm. long, coarsely stellate-pubescent.

MEXICO. Vera Cruz: Orizaba, *M. Botteri*, no. 1134 (G, US); Barranca of Metlac near Orizaba, alt. 900 m., *C. G. Pringle*, no. 5906, Jan. 29, 1895 (G, US); Mirador, Orizaba, *F. M. Liebmann*, no. 430, March 1842 (AA, NY, US); Valley of Cordova, *M. Bourgeau*, no. 1501, Dec. 15, 1867 (G, US); Cordova, *J. M. Greenman*, no. 166, Jan. 25, 1906 (F); Canton de Huatusco, alt. 1200 m., *C. Conzatti*, no. 833, Dec. 1898 (G, US); Barranca de Tenampa, Zacuapan and vicinity, *C. A. Purpus*, no. 2210, Nov. 1906 (F, G, M, NY, US).



FIG. 1. *ROBINSONELLA LINDENIANA* (Turcz.) Rose & Baker.—Typical leaf, and smaller leaves from the upper part of flowering branches ( $\times \frac{1}{2}$ ).

*Robinsonella Lindeniana* was first described by Turczaninow in 1858 in the same paper as three different species, the two flowering specimens were referred to *Sida* and the fruiting one questionably to *Abutilon*. This species resembles *Sida* only in the solitary pendulous seed in each carpel. Superficially the fruits resemble those of *Abutilon*, section *Gayoides* A. Gray (*S. crispum* Sweet), but differ in being uni-ovulate. Dr. Asa Gray created a separate section for this species in *Sida* and called it *Abutilastrum*. E. G.



Baker retained this section in his Synopsis Malveae and added other species of *Sida*. Later Rose and Baker removed this species from *Sida* and placed it in their new genus *Robinsonella*, which they had established upon *R. cordata*.

*Robinsonella Lindeniana* may be confused with *R. divergens*, but it has larger palmately 5-parted lower leaves with ovate-oblong constricted lobes, and slenderer and less furfuraceous branches and pedicels in the inflorescence. The sepals of *R. Lindeniana* are ovate-oblong and not reflexed in fruit.

**2. *Robinsonella divergens*** Rose & Baker in Gard. & For. x. 245 fig. 32 (1897).—Standley in Jour. Arnold Arb. xi. 34 (1930).—Fig. 2.

Small tree up to to 6 m. high, branchlets with coarse, furfuraceous stellate pubescence (rarely more or less puberulous). Leaves orbicular, cordate, up to 15 cm. long, slightly scabrous above, with dense short stellate pubescence beneath; the lower leaves 3-lobed,



FIG. 2. *ROBINSONELLA DIVERGENS* Rose & Baker.—Typical leaf, and small leaf from upper part of flowering branches ( $\times \frac{1}{2}$ ).

the lobes acute or obtuse (in extreme forms very large, ovate-oblong, constricted at the base), entire or dentate; the uppermost leaves lanceolate, petioles up to 10 cm. long, coarsely stellate-pubescent (often furfuraceous). Flowers in large cymose-panicles up to 4 dm. long, branches and pedicels stout (if slender more or

less puberulous) covered with a furfuraceous stellate pubescence; pedicels up to 2 cm. long, articulated just below the flower; sepals lanceolate, acute, reflexed in fruit, stellate-pubescent, nectaries prominent; petals white, rarely striped with reddish purple, 0.5–1.5 cm. long; staminal column short (4 mm.), very slender, conic, glabrous. Carpels 9–10, large, spreading and widely separated at apex, strikingly stellate-pubescent or merely puberulous.

CENTRAL AMERICA. Guatemala: Santa Rosa, Dept. of Santa Rosa, alt. 900 m., *Heyde & Lux*, no. 4326, Jan. 1893 (F, G, NY); Cuajiniquilapa, Dept. of Santa Rosa, alt. 750 m., *Heyde & Lux*, no. 6299, Nov. 1893 (F, G). Honduras: vicinity of Siguatepeque, Dept. of Comayagua, alt. 1080–1400 m., *P. C. Standley*, no. 55975, Feb. 14–27, 1928 (AA, F, US); El Salvador: Santa Tecla, *S. Calderon*, no. 1515, March 1923 (G); vicinity of Santa Tecla, Dept. de La Libertad in Cafetal, alt. 790–950 m., *P. C. Standley*, no. 23021, April 10, 1922 (F, G, NY). Nicaragua: between Jinotega and Pantasma, *A. S. Oersted*, Jan. 1848 (F). Costa Rica: environs de San José, alt. 1200 m., *H. Pittier*, no. 2186, Dec. 1902 (US); San José, bords du rio Torres près San Francisco de Guadalupe, alt. 1135 m., *H. Pittier* (also *Ad. Tonduz*), no. 8471, Dec. 1892–93 (F, US; *syntype*); San José, bord d'un ruisseau, *Ad. Tonduz*, no. 1425, Nov. 28, 1880 (US; *syntype*); San José, alt. 1135 m., *Ad. Tonduz*, no. 7311, Jan. 1893 (F, G, US; *syntype*); San José, alt. 1080 m., *J. D. Smith*, no. 4751, April 1894 (G); vicinity of La Verbena, Prov. of San José, alt. about 1200 m., *P. C. Standley*, no. 32216, Jan. 29, 1924 (F); foothills south of San José, *J. M. & M. T. Greenman*, no. 5500, Feb. 8, 1922 (M); vicinity of San José, alt. about 1130 m., *P. C. Standley*, no. 47333, Dec. 4, 1925–Feb. 10, 1926 (F); mole de San Rafael (plaine du San Carlos), *H. Pittier*, no. 2600, June 1890 (US; *syntype*); environs of San Rafael, *Ad. Tonduz*, no. 1977, Feb. 13, 1890 (US; *syntype*).

Honduran forms of *Robinsonella divergens* resemble *R. Lindeniana* in having very large leaves with ovate-oblong lobes, more open panicles, more slender and less furfuraceous-pubescent branches and pedicels of the inflorescence, but the always three-lobed leaves, lanceolate and reflexed sepals and the larger, more widely separated carpels place them specifically with *R. divergens*.

3. *Robinsonella edentula* Rose & J. Donnell Smith in Bot. Gaz. xxxvii. 417 (1904).—Rose in Contrib. U. S. Nat. Herb. viii. 519 (1905).—Fig. 3.

Shrub or small tree, branchlets stellate-pubescent. Leaves sub-orbicular in outline, 3–9 cm. long, cordate at base with a deep



sinus, irregularly lobed and somewhat unequally-sided, shortly and sparsely stellate-pubescent above, densely and coarsely pubescent beneath, the lobes acute, obtuse or rounded, entire, undulate or slightly dentate, petioles 0.5–3 cm. long, coarsely stellate-pubescent. Flowers very abundant, in short axillary panicles up to 8 cm. long, pedicels slender 8–16 mm. long, stellate-pubescent, articulated near the apex; bracts when present lance-linear; sepals ovate-



FIG. 3. *ROBINSONELLA EDENTULA* Rose & Donn. Sm.—Leaf ( $\times \frac{1}{2}$ ).

lanceolate, acute, stellate-pubescent, nectaries present; petals violaceous (pale lilac), 1 cm. long; staminal column very short (6 mm.), slender, glabrous. Carpels about 10, small, delicately veined, sparsely pubescent.

CENTRAL AMERICA. Guatemala: Cobán, Dept. Alta Verapaz, alt. 1300 m., *H. von Tuerckheim* no. 665 (Donn. Smith, Pl. Guatem. etc., no. 8382), Nov. 1902 (F, G, NY, US; *holotype*).

4. *Robinsonella discolor* Rose & Baker in Contrib. U. S. Nat. Herb. v. 181 (1899).—Standley in Contrib. U. S. Nat. Herb. XXIII. pt. 3, 370 (Trees & Shrubs Mex.) (1923).—Fig. 4.

Slender tree 6–9 m. high, branchlets glabrous with yellowish-gray bark. Leaves broadly ovate, up to 12 cm. long, cordate or subcordate at base, often unequally-sided, entire, coarsely dentate or obscurely lobed toward the acute or acuminate apex, discolorous, green above, covered with a fine, densely appressed, silvery tomentum beneath, with a tuft of long soft hairs at the base of the main veins; petioles up to 10 cm. long, puberulous. Flowers borne toward the apex of short lateral branchlets, solitary or in pairs on puberulous pedicels about 2 cm. long, pedicels articulated near the middle; sepals ovate, acute, covered with a fine tomentum, nectaries not evident; petals white, 6–10 mm. long; staminal column short (5 mm.), conic, glabrous. Carpels about 12, more or less compact, minutely stellate-tomentose.

MEXICO. San Luis Potosi: Las Palmas, Limestone hills, alt. 90–120 m., *C. G. Pringle*, no. 5767 (F, G, US; *syntype*) and no. 8007 (AA, F, G, M, NY, US; *syntype*), April 27, 1894 and March 2, 1899.

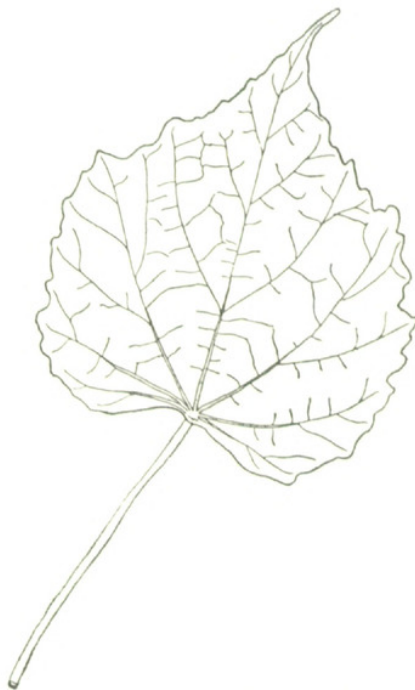


FIG. 4. *ROBINSONELLA DISCOLOR* Rose & Baker.—Leaf ( $\times \frac{1}{2}$ ).

5. *Robinsonella subcordata* Hochreutiner in Ann. Conserv. Jard. Bot. Genève, xxi. 449 (1920).—Standley in Contrib. U. S. Nat. Herb. xxiii. pt. 5, 1674 (Trees & Shrubs Mex.) (1926).—Fig. 5.

Tree, branchlets with ferrugineous and furfuraceous tomentum. Leaves thick, ovate, 2–2.7 cm. long (young?), subcordate or rotund at base, almost entire, shortly acuminate, slightly tomentose above,



FIG. 5. *ROBINSONELLA SUBCORDATA* Hochreut.—Leaf ( $\times \frac{1}{2}$ ).

densely furfuraceous-tomentose beneath, more or less ferrugineous on the veins; petioles 0.5–1.5 cm. long, densely tomentose, more or less furfuraceous and ferrugineous. Flowers many, congested on short lateral branchlets, pedicels up to 3 cm. long, tomentose, articulated near the middle; sepals ovate, 8 mm. long, acute, prominently one-nerved, gray-tomentose; nectaries evident; petals



pale lilac [?], 2.5 cm. long; staminal column attenuate-conic (8 mm.), stellate-pubescent. Carpels about 13, appressed tomentose when young (mature carpels not seen).

MEXICO. O a x a c a : Jayacatlan, *H. H. Rusby*, without no. (NY, *holotype*).

6. *Robinsonella cordata* Rose & Baker in Gard & For. x. 244, fig. 31 (1897).—Hochreutiner in Ann. Conserv. Jard. Bot. Genève, xxi. 450 (1920).—Standley in Contrib. U. S. Nat. Herb. xxiii. pt. 3, 761 (Trees & Shrubs Mex.) (1923); pt. 5, 1674 (Trees & Shrubs Mex.) (1926).—Fig. 6.

Tree 4–9 m. high, much branched, branchlets pilose or glabrescent. Leaves up to 15 cm. long, cordate or subcordate at base, long acuminate, dentate or slightly lobed toward the apex, softly

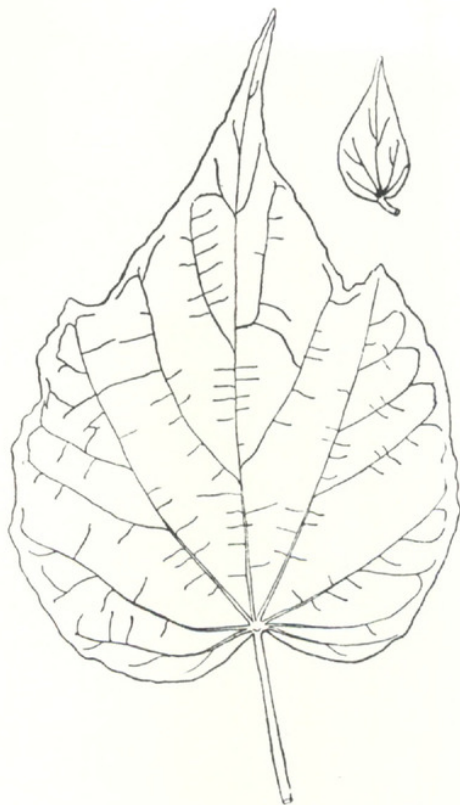


FIG. 6. *ROBINSONELLA CORDATA* Rose & Baker.—Typical leaf, and small leaf from the upper part of flowering branches ( $\times \frac{1}{2}$ ).

pilose or glabrescent above, loosely stellate-pubescent beneath, pilose on the veins, petioles up to 5 cm. long, pilose. Flowers in 2's or 3's on short lateral branchlets; pedicels 1.5–2.5 cm. long, mostly densely pilose or rarely short stellate-pubescent, articulated near the middle; sepals large, ovate-lanceolate, gray-tomentose, not conspicuously nerved, nectaries evident; petals pale lilac

(sometimes white), about 1.5–2.5 cm. long, stellate-pubescent externally near the base; staminal column 5–8 mm. long, minutely and densely stellate-tomentose. Carpels 12–13, distinct nearly to the base, stellate-pubescent or rarely pilose.

MEXICO. Durango: San Ramon, *Edw. Palmer*, no. 54, April 21–May 18, 1906 (G, M, NY, US). Oaxaca: Hacienda de Guadalupe, alt. 1600 m., *C. Conzatti*, no. 2322, Dec. 6, 1908 (F, G, M); Cerro San Felipe, alt. 2000–3000 m., *Gonzales & Conzatti*, no. 881, Aug. 7, 1898 (G, US); alt. 2100 m., *Gonzales & Conzatti*, no. 671, March 7, 1898 (G, US); Tamazulpam, alt. 2000–2135 m., *E. W. Nelson*, no. 1955, Nov. 16, 1894 (US; *syntype*); San Luis Tultitlanapa, Puebla near Oaxaca, *C. A. Purpus*, no. 3251, April–May 1908 (F, G, M, NY, US); Sierra de San Felipe, alt. 2300 m., *C. G. Pringle*, no. 6244, Dec. 11, 1895 (AA, G, F, NY, US; *syntype*) (distributed as *Malva subtriflora* or *Malvastrum subtriflorum*); S. J. del Estado, Rancho de Calderon, alt. 1830 m. *L. C. Smith*, no. 529, Feb. 11, 1895 (G, US); without definite locality: *F. M. Liebmann*, no. 1090, 1841–43 (US); Hacienda de Riego, Tehue (?), cultivated, *C. Patini*, no. 7204a, March 13, 1917 (US).

Considerable variation in this species is shown in the kind and degree of pubescence, dentation and acumination of the leaves, in the size and color of the petals, and in the shape of the sepals. The presence of pilose hairs on veins, petioles, pedicels, calyx and branchlets, with the absence of furfuraceous or ferrugineous pubescence anywhere, are the most distinctive characters which separate this species from *R. subcordata*.

7. **Robinsonella pilosa** Rose in Contrib. U. S. Nat. Herb. VIII. 320 (1905).—Fig. 7.

Shrub or small tree, branchlets grayish-yellow, glabrous. Leaves ovate, up to 10 cm. long, cordate at base, not lobed, glabrescent above, loosely stellate-pubescent beneath, petioles up to 5 cm. long,



FIG. 7. ROBINSONELLA PILOSA ROSE.—Leaf ( $\times \frac{1}{2}$ ).

glabrescent. Flowers clustered on short lateral branchlets, pedicels pilose; sepals ovate, obtuse, long pilose in the bud. Carpels 13 (?) fairly long stellate-pubescent, obscurely pilose in the younger stage.





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