

TURNERACEAE

by

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Herbs, shrubs or rarely trees. Leaves alternate, simple, usually dentate or serrate and often provided with 1 or 2 pairs of discoid glands at the base of the blade or on the petiole. Stipules small or wanting. Flowers solitary or in small groups in the axils of the upper leaves, actinomorphic, hermaphrodite and often heterostylous; pedicels free or partly united with the petiole, often jointed and bi-bracteolate. Receptacle, tubular. Sepals 5, imbricate. Petals 5, thin, contorted, deciduous after anthesis. Stamens 5, alternating with the petals; filaments usually partly free, inserted near the base of the receptacle; anthers oblong, introrse, with longitudinal dehiscence. Ovary superior, 1-celled; styles 3, terminal, slender, simple or more or less deeply divided; stigmas usually divided into a large number of short, flabellately arranged branches. Ovules 3 to numerous on 3 parietal placentas, ascending, anatropous. Fruit a 1-celled, loculicidal capsule, opening with 3 valves at the apex or splitting to the base. Seeds few to many, oblong, cylindrical or obovoid, straight or curved, provided with a membranaceous aril. Embryo large, straight or curved. Endosperm fleshy.

About 100 species in 7 genera in the tropics, mostly in America.

Key to the genera:

Plants covered with stellate hairs; never glands on the petiole or at the base of the blade; pedicels jointed, not united with the petiole, usually without bracteoles; corona always present *Piriqueta*

Plants covered with simple hairs; often one or two pairs of discoid glands at the base of the blade or on the petiole; pedicels not jointed, partly or entirely united with the petiole; bracteoles always present; corona always absent *Turnera*

Turnera Linnaeus, Spec. Plant. 271. 1753

Herbs, shrubs or undershrubs, glabrous, pubescent or tomentose by simple, not glandular hairs. Leaves entire or serrate, often with one or two pairs of discoid glands at the base. Stipules small or wanting. Flowers usually solitary, axillary and sometimes congested at the top of the branches. Pedicels usually short, free, or partly or entirely united with the petiole of the subtending leaf. Bracteoles 2, inserted near the base of the flower. Receptacle short. Sepals 5, caducous, linear to oblong. Petals 5, membranaceous, obovate-roundish or spatulate, usually yellow, rarely (not in the Antillean species) mauve, white, orange or red. Corona wanting. Stamens 5, inserted in the lower half of the receptacle; anthers variable in shape. Ovary sessile; styles 3, simple; stigmas flabellate. Capsule subglobose, glabrous or pubescent, smooth or more or less distinctly reticulate-striate. Seeds many, oblong or globular, curved, tuberculate; aril uni-lateral, about half as long as the seed.

A large genus comprising about 60 species in tropical America from Mexico to Argentine; one species naturalized in the tropics of the Old World.

1. Undershrubs, glabrous or in the younger parts sometimes pubescent; leaves not congested at the top of the branches; flowers solitary in the axils; petals about twice as long as the sepals *T. ulmifolia*
Herbs, tomentose to setulose; leaves and flowers congested at the top of the branches; petals slightly longer than the sepals *T. pumilea*

Turnera ulmifolia L.

LINNAEUS, Spec. Plant. 271. 1753; GRISEBACH, Fl. Br. W. Ind. Isl. 296. 1860; BOLDINGH, Fl. D. W. Ind. Isl. 1: 138. 1909; URBAN, Symb. Ant. 4: 423. 1910; JOHNSTON, Proc. Bost. Soc. Nat. Hist. 34(7): 239. 1909; BOLDINGH, Fl. Ned. W. Ind. Eil. 292. 1913; Fl. D. W. Ind. Isl. 2: 70. 1914; URBAN, Symb. Ant. 8: 450. 1920; BRITTON & WILSON, Sci. Surv. Porto Rico & Virgin Isl. 5: 600. 1924; FAWCETT & RENDLE, Fl. Jamaica 5(3): 228, fig. 91. 1926; ARNOLDO, Zakflora 76, 147, fig. 5. 1954; Zakflora 204, fig. 5. 1964; — *Turnera angustifolia* MILLER, Dict. ed. 8. n. 2. 1768; — *Turnera ulmifolia* L. var. *angustifolia* WILDENOW, Spec. Plant. 1: 1503. 1797; URBAN, Symb. Ant. 4: 424. 1910; Symb. Ant. 8: 450. 1920; — *Turnera acuta* SPRENGEL, Syst. 1: 940. 1825; — *Turnera ulmifolia* L. var. *intermedia* URBAN, Jahrb. Bot. Gart. Berlin 2: 140. 1883; — *Turnera ulmifolia* L. var. *acuta* URBAN, Jahrb. Bot. Gart. Berlin 2: 142. 1883; — *Turnera triglandulosa* MILLSAUGH, Field Colomb. Mus. Bot. 2: 77. 1900.

Var. ulmifolia

Undershrub, up to 140 cm tall; younger stems and branches appressed pubescent, the older ones glabrous. Leaves alternate, especially along the younger branches; petiole 1—1.5 cm long, provided with one, or sometimes two pairs of discoid lateral glands at the top; blade ovate, oblong or obovate to lanceolate, 2—7 × 1—4 cm, acute and mucronate at the apex, cuneate at the base, coarsely and irregularly serrate to dentate, glabrous or with long, white, simple, appressed hairs on both sides. Stipules erect, triangular, pubescent, 1.5 mm

long. Flowers solitary in the axils of the upper leaves; pedicels adnate to the petioles of the subtending leaf. Bracteoles two, lanceolate-linear, 8—30 mm long, dentate, pubescent. Receptacle about 1 cm long, glabrous. Sepals lanceolate, acute or acuminate, up to 2 cm long. Petals suborbicular to spatulate, unguiculate, glabrous, bright yellow, 1—3 cm long and 1—1.5 cm wide. Stamens with filaments united by their margins to the base of the receptacle, about 14 mm long; anthers linear, 4 mm long. Ovary ovoid or subglobose, with six apical tubercles; styles about 1.5 cm long. Capsule ovoid, obtuse, 3-valved at apex, slightly tuberculate, 7—9 mm in diam. Seeds about 2 mm long, slightly curved, obovoid-oblong, reticulate-striate; alveoles without distinct pores; aril membranaceous, lobed, $1/2$ — $3/4$ as long as the seed. Embryo straight or slightly curved.

Continental tropical America from Central America southward to Guiana; West Indies south and east to St. Eustatius; Margarita and Curaçao; introduced into the tropics of the Old World.

CURAÇAO: Klein Santa Marta (Arnoldo 1866, fl. Jan.; Stoffers 75, fl. Sept.); hills to the east of Westpunt (Boldingh 5452, fl. Nov.).

SABA: seashore near Flat Point (Boldingh 2134, fr. July).

ST. EUSTATIUS: White Wall (Boldingh 808, fl. & fr. June; Stoffers 4751, fl. Aug.); gut near Fort de Windt (Boldingh 835, fr. June); near Boven (Boldingh 1237, fr. June).

ST. MARTIN: between Mount Vernon and Orient Bay (Boldingh 2925, fr. Aug.); near airfield (Arnoldo 1240, fl. March; Stoffers 2362, fl. & fr. March; 2391, fl. March); Low Lands (Stoffers 2672, fl. & fr. Ap.); TINTAMARRE (Boldingh 3403, fr. Sept.).

Turnera pumilea L.

LINNAEUS, *Amoen.* 5: 377, 395. 1760; GRISEBACH, *Fl. Br. W. Ind.* Isl. 297. 1860; URBAN; *Symb. Ant.* 4: 423. 1910; BOLDINGH, *Fl. Ned. W. Ind.* Eil. 242. 1913; *Fl. D. W. Ind.* Isl. 2: 69. 1914; URBAN, *Symb. Ant.* 8: 449. 1920; BRITTON & WILSON, *Sci. Surv. Porto Rico & Virgin Isl.* 5: 599. 1924; FAWCETT & RENDLE, *Fl. Jamaica* 5(3): 229. 1926; ARNOLDO, *Zakflora* 147. 1954; *Zakflora* 204. 1964.

Erect or prostrate annual herb; branches up to 25 cm long, villose, tomentose or setulose with white, woolly hairs. Leaves alternate, congested at the top of the branches and surrounding the flowers; petiole 2—4.5 mm long, tomentose, without a gland on the upper side; blade oblong to obovate, 1.5—4 cm long and 0.5—2 cm wide, acute at the apex, cuneate at the base, pubescent to tomentose, rarely with one pair of discoid glands at base; margin serrate to dentate. Stipules wanting. Flowers solitary in the leaf-axils, forming a terminal leafy head; pedicels entirely united with the petiole of the subtending leaf. Bracteoles two, 4—8 mm long, entire, linear to filiform. Receptacle 3—4 mm long, outside glabrous at the base, pubescent upwards. Sepals 5, pubescent, 3—4 mm long, acuminate. Petals 5, obovate to suborbicular, yellow, 4—4.5 mm long, slightly longer than the sepals. Stamens with filaments 3—5 mm long,

united with the receptacle at the base; anthers auriculate at the base. Styles 3; stigmas flabellate or handshaped. Ovary subglobose to obovate, pubescent. Capsule smooth, on the top pubescent. Seeds about 2 mm long, sickle-like curved, reticulate-striate, alveoles without pores. Aril membranaceous, entire. Embryo curved.

Tropical continental America, Greater Antilles, Curaçao, Aruba, and Bonaire.

ARUBA: calcareous hills near Savaneta (Boldingh 6543, st. Jan.); Rooi Taki (Arnoldo 257, fr. Dec.); slope of Miralamar (Boldingh 6453c, fr. Jan.).

BOINAIRE: Soebi Blanco (Arnoldo 384, fr. Jan.).

CURAÇAO: Rooi Beroe (Stoffers 1287, fr. Dec.); hills near Barber (Boldingh 5172, st. Nov.); hofje of Valentijn (Boldingh 5097b, fr. Nov.); rocky hills between Wacao and Playa Grande (Britton & Shafer 3049, fl. March); Santa Cruz (Stoffers 1181, flb. Dec.); foot of Seroe Christoffel (Arnoldo 1832, fr. Jan.).

Piriqueta Aublet, Pl. Guian. 1: 298. 1775

Herbs or shrubs, covered with patent simple and usually also with stellate, ferruginous or gold-coloured hairs. Leaves alternate, serrate, crenate or dentate, of various form, sometimes provided with glands, but never on the petiole or at the base of the blade. Stipules present or wanting. Flowers solitary, rarely in groups, in the axils of the leaves; pedicels not united with the petioles, jointed. Bracteoles present or wanting. Receptacle obconic-campanulate. Corona hardly visible, fimbriate or lacerate, forming a continuous band below the insertion of the corolla. Sepals 5, imbricate. Petals very shortly clawed, yellow or purple, contorted. Filaments somewhat flattened, glabrous or pubescent. Styles glabrous; stigmas 2-cleft or obsolete fimbriate. Capsule subglobose-elliptic, opening by 3 valves. Seeds straight or slightly curved, reticulate-striate; aril at the concave side, entire or sublacerate, as long as or shorter than the seed.

About 22 species, mostly in America; one species in Africa, and two in Madagascar; 2 species in the Antilles.

1. Flowers pink to red *P. viscosa*
 Flowers white or yellow 2
2. Leaves linear-lanceolate; petiole 1—3 mm long; stems less hairy than the
 receptacle; stellate hairs up to 2.5 mm long *P. cistoides*
 Leaves ovate; petiole 2—10 mm long; stems and pedicels as hairy as the
 receptacle; hairs up to 4 mm long *P. ovata*

Piriqueta cistoides (L.) Griseb.

GRISEBACH, Fl. Br. W. Ind. Isl. 298. 1860; BOLDINGH, Fl. Ned. W. Ind. Eil. 291. 1913; FAWCETT & RENDLE, Fl. Jamaica 5(3): 230. 1926; — *Turnera cistoides* LINNAEUS, Spec. Plant. ed. 2. 387. 1762; — *Piriqueta villosa* AUBLET, Pl. Guian. 1: 298, t. 117. 1775;

BOLDINGH, Fl. D. W. Ind. Isl. 1: 137. 1909; — *Piriqueta cistoides* MEYER var. *genuina* URBAN, Jahrb. Bot. Gart. Berl. 2: 73. 1883; — *P. cistoides* MEYER var. *latifolia* URBAN, Jahrb. Bot. Gart. Berl. 2: 74. 1883; — *P. cistoides* MEYER var. *foliosa* URBAN, Jahrb. Bot. Gart. Berl. 2: 74. 1883; — *P. cistoides* MEYER var. *bracteolata* URBAN, Jahrb. Bot. Gart. Berl. 2: 74. 1883.

Erect herb, up to 60 cm tall, but the Antillean specimens commonly only 15 cm, often woody at the base, branched; shoots covered with spreading simple and stellate hairs. Leaves petiolate; petiole 1—3 mm long; blade very varying in shape and size, but in one plant more or less the same type: linear-lanceolate, elliptic or ovate-lanceolate, 1.5—5 (-8) cm long and 0.4—1 (-3) cm wide, acute at the apex, cuneate-obtuse at the base, the margin sinuate-dentate; glands absent. Stipules wanting. Flowers solitary; pedicels 1—1.5 (-2.5) cm long, jointed above the middle. Bracteoles wanting. Receptacle 4—8 mm high, up to half the length united, outside covered with stellate hairs. Sepals 3—5 mm long; corona up to 0.5 mm high. Petals 5—7 mm, as long as or twice as long as the sepals, yellow. Staminal filaments with a gland at the base, 3—4 (-5) mm long, glabrous, inserted 0.7 mm above the receptacle base; anthers subrectangular, 0.8—1.7 × 0.5—1 mm. Ovary densely hairy; styles all or in part cleft or parted, glabrous, 1.5—2 mm long, each branch ending in a flabellate stigma. Ovules 15—60. Capsule subglobose 4.5—7 mm, pubescent; valves with a longitudinal furrow at the back. Seeds straight or slightly curved, obovoid, 1.8 mm long and 0.8 mm wide; alveoles arranged regularly in longitudinal rows; yellow-brown with a prominent reddish chalaza; aril membranaceous, as long as the seed or slightly shorter, with an entire or fringed margin.

Tropical America from Mexico to Brazil.

ST. EUSTATIUS: near Oranjestad (Boldingh 998a, fl. & fr. June); slope of The Quill (Boldingh 1135, fl. June).

***Piriqueta ovata* Urb.**

URBAN, Jahrb. Bot. Gart. Berl. 2: 76. 1883; BOLDINGH, Fl. Ned. W. Ind. Eil. 291. 1913; Fl. D. W. Ind. Isl. 2: 69. 1914; ARNOLDO, Zakflora 78, fig. 77. 1954; Zakflora 204, fig. 77. 1964.

Erect herb, 15—50 cm tall, often woody at the base, branched, with 4 mm long spreading stellate and simple hairs, rufescent to gold-coloured. Leaves petiolate; petiole 2—10 mm long; blades ovate, 2—5 cm long and 1.5—3.5 cm wide, obtuse at the apex, the margin crenate; glands wanting. Stipules wanting. Flowers solitary; pedicels 2—7 (-10) mm long. Bracteoles wanting. Receptacle 6—7 mm high. Sepals 4.5—5 mm long outside covered with stellate hairs. Corona 0.5—0.8 mm long. Petals 10 mm, glabrous, white, twice as long as the sepals. Stamens with filaments 4—4.5 mm long, glabrous, inserted 0.8 mm above the receptacle base; anthers elliptic-oblong, 1.5—2 × 0.6—0.8 mm. Ovary densely hairy; styles 2.5—3.5 mm long, all or in part cleft or parted, each branch ending in a flabellate stigma. Capsule subglobose, 7—9 mm long

and 6—8 mm wide, pubescent. Seeds 2.5 mm long, 1 mm in diam., without a prominent chalaza, curved, obovoid; alveoles arranged in a rough reticulum; aril membranaceous, up to 1 mm long, with an entire or fringed margin.

Antilles.

BONAIRE: neighbourhood of Rincón (Boldingh 7030, fr. Jan.; 7382, st. Jan.); road from Fontein to Seroe Grandi (Boldingh 7350, fl. Feb.); Soebi Blanco (Arnoldo 378, fr. Jan.).

CURAÇAO: from Veeris Berg to Piscadera Baai (Boldingh 4744, fr. Oct.); hofje of Siberie (Boldingh 5059, fr. Nov.); rocky hills near Willemstad (Britton & Shafer 2967, st. March); road near Anthony Berg (Boldingh 5164a, fr. Nov.); hofje of Valentijn (Boldingh 5097a, fr. Nov.); Mahoema (Boldingh 4816f, fl. Oct.); Mundo Nobo (Arnoldo 1181, fr. Sept.); Parera (Stoffers 445, fr. Oct.); Ronde Klip (Arnoldo 1807, fl. Dec.); Julianadorp (Stoffers 309, fr. Oct.); Santa Barbara (Stoffers 398, st. Oct.).

***Piriqueta viscosa* Gris.**

GRISEBACH, Cat. Pl. Cub. 114. 1866; URBAN in MARTIUS, Fl. Bras. 13(3): 99. 1883; URBAN, Jahrb. Kgl. bot. Gart. und bot. Mus. Berlin 2: 68. 1883; LEON in LEON & ALAIN, Fl. Cuba 3: 344. 1953.

Erect, annual herb, 15—40 cm tall, simple or sometimes branched at the base, covered with spreading simple and stellate hairs; stems terete or slightly striate in the lower part, angular in the upper part. Leaves petiolate; petiole 4—8 cm long; blade ovate, oblong or lanceolate, 1.5—5 × 0.7—2 cm, acute or obtuse at the apex, cuneate at the base, the margin crenate or serrate, glands absent. Stipules absent. Flowers solitary; pedicels slender, 1.5—2.5 cm long. Bracteoles wanting. Receptacle 1.5—2 mm high, outside covered with simple hairs about 0.5 mm long. Sepals 3—4 mm long, lanceolate to oblong, acuminate, strongly 3—5 veined. Corona about 0.6 mm long. Petals 6—8 mm long and 3—4 mm wide, obovate, pink to pale red, or purple, the veins prominent. Staminal filaments 2.5 mm long, glabrous, inserted about 0.6 mm above the receptacle base; anthers subrectangular to short-ovate, 0.5—0.8 × 0.3—0.7 mm. Ovary densely hairy, 1.5 × 1 mm; styles 2—2.5 mm long, glabrous, all cleft and each branch ending in a flabellate stigma. Ovules 20—60. Capsule subglobose, 4—5 mm long and 5—6 mm wide; valves with a longitudinal furrow at the back, hairy. Seeds oblong, straight or slightly curved, 1.8—2 mm long and 0.6 mm wide, yellowish to pale brown, without prominent chalaza; alveoles regularly arranged in longitudinal rows; aril membranaceous, entire.

Tropical South America, Cuba and St. Thomas.

CURAÇAO: between Seroe Christoffel and Hieronymus Berg (Arnoldo 2156, fr. Jan.); Wacao (Stoffers 5118, fl. Dec.).