111. TROPAEOLACEAE

Family description by K. Sidwell & Y. Balraj.

Vines, herbaceous, scendent. Leaves alternate, peltate, broadly to depressed ovate, circular to oblate or palmatifid, petiolate, stipulate, glabrous; stipules caducous; venation palmately netted; margins entire, unlobed to deeply lobed; petioles slender, longer than the leaves, glabrous. Flowers solitary, axillary, pedicellate; sepals 5, equal to slightly unequal, spurred; petals 5, usually unequal, the upper 2 larger than the lower 3, spathulate, fused to the spur below, entire to ciliate or deeply fringed around the margin; stamens 8, unequal, the anthers yellow; ovary 3-locular. Fruit a 3-merous schizocarp or a 3-winged samara (*Magallana*). 3 gen. Neotropics, in Mesoamerica only *Tropaeolum*.


1. Tropaeolum L.

By K. Sidwell & Y. Balraj.

Vines, herbaceous. Flowers with slender pedicels; sepals narrowly rhombic to widely elliptic, acute to obtuse at the apex, glabrous, green, yellow or reddish; spur tapering to straight or hooked tip, usually yellow to red, occasionally with a green tip; petals entire or ciliate to deeply fringed, from pale yellow to orange, pink, red or deep reddish, with or without violet to black markings. Fruit a 3-lobed schizocarp, each mericarp broadly ovoid to ovoid or globose; seeds 1 per locule. 86 spp. (Sparre & Andersson 1991). Neotropics.

A few species are widely naturalised, and cultivated in North America, Europe, Asia, Africa and Australia.

1. Leaves circular to oblate, entire to slightly undulate, the petioles attached near the centre of the lamina; flowers with the upper petals 2-3 cm. 1. *T. majus*
1. Leaves broadly ovate to depressed ovate or palmatifid, clearly lobed, the petiole attached towards the base of the lamina; flowers with the upper petals 0.5-2 cm (if longer, deeply lobed).

2. Leaves palmatifid, deeply lobed; upper petals clearly deeply lobed.  
2. T. *peregrinum*

2. Leaves broadly ovate to depressed ovate to slightly reniform, shallowly lobed; upper petals entire to serrate to shallowly lobed.

3. Leaf lobes rounded, rarely mucronate; petals shorter than sepals; sepal to spur ratio 1.5-2.5:1, the apex of the upper petals ciliate.  
4. T. *moritzianum*

3. Lateral leaf lobes pointed, mucronate; sepal to spur ratio 1-1.5:1; petals longer than sepals, the apex of the petals without ciliae.  
3. T. *pendulum*


Tropaeolum elatum* Salisb.,* T. hybridum* L.,* T. pinnatum* Andr.,* T. quinquelobum* Berg.,* T. hortense* Sparre ex Huynh.

Leaves 0.8-6.6 x 1-8 cm, orbicular to oblate, the base peltate, the margins entire to undulate; petioles (2.2-)4-15(-22) cm, attached near center of lamina. Flowers with the pedicels 6.2-22 cm; sepals slightly unequal, 10-15(-19) x 3-5(-9) mm, elliptic, yellowish green, the apex obtuse to acute; spur 20-30(-40) x 2-3 cm, the proximal half straight and inflated, the distal half slightly curved, green to yellow; petals markedly unequal, pale yellow to blackish purple, often spotted, the upper petals 2.8-3.6 cm, cuneate, the margin undulate, the lower petals 1.5-1.8 cm, unguiculate, only the claw ciliate. Mericarps 2-3 x 2-3 mm, with rugose ribs. Shrubs and thickets, cultivated ornamentally. Ch (Breedlove, 1986: 190); G (Cominsky 52, F); H (Mejía 18, TEFH); N (Todzia, 2001: 2470); P (Schmalzel 1459, MO). 800-1400m. (Canada, Estados Unidos, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Chile, Jamaica, Bermuda, Europe, Asia, Africa, Australia.)

Tropaeolum majus is easily distinguished from other species in Mesoamerica by the orbicular to oblate leaves with a centrally peltate petiole, the unlobed to shallowly lobed leaf margins, and the large flowers. In their revision of Tropaeolaceae, Sparre & Andersson (1991) noted that there is no known wild population of this species and hypothesised that *T. majus* is the result of spontaneous hybridisation between *T. ferreyrae* Sparre and *T. minus* sensu auct. non L. in the area of Lima, Peru.


Leaves 1.1-3.3 x 1.6-6.7 cm, palmatifid, the base peltate, the margins deeply lobed, the lobes 5, rounded, mucronate; petioles 0.5-7.6 cm, attached near base of lamina. Flowers with the pedicels 3.2-5.0 cm; sepals subequal, 5-7 x 2-4 mm, narrowly ovate, greenish yellow, the apex acute; spur 8-12 x 2-5 mm, straight, stout, green or yellow, the tip hooked, brown or purple; petals unequal, yellow or dark yellow, with darker, often purple, veins, the upper petals 1.5-2 cm, ovate to orbicular, deeply lobed, the lower petals 0.8-1 cm, lanceolate, long-unguiculate, lobed, the lobes long-ciliate, the ciliae purple (measurements from Sparre & Andersson, 1991). Mericarps 6-7 x 4-6 mm, . P (Sparre, 1975: 19). (Mexico, Mesoamerica, Colombia, Peru, Bolivia, Chile, Bermuda; cultivated in Europe.)

The two varieties of *Tropaeolum peregrinum* recognised by Sparre & Andersson (1991) are not recognised as separate taxa in this treatment. They were separated using indumentum and leaf characters, var. *peregrinum* being glabrous with 5-7 leaf lobes and var. *weberbaueri* pilose with 3 leaf lobes. *Tropaeolum peregrinum* is easily distinguished from other species of *Tropaeolum* in Mesoamerica by its palmatifid leaf shape and deeply fringed petals. This species is widely cultivated and was reported for Panama by Sparre (1975), without citing a voucher. The description above was written based on specimens from Mexico, as we have seen no Mesoamerican specimens.


Leaves (0.6-)3.5-7.2 x (1-)4.5-9.3 cm, broadly ovate to reniform, the base peltate, slightly convex, the margins shallowly 3-lobed, the middle lobe rounded, obtuse and mucronate at apex, the lateral 2 lobes pointed; petioles 4.2-10.4 cm, attached near base of lamina. Flowers with the pedicels 2.5-7 cm; sepals subequal, 7-13 x 2-6 mm, narrowly rhomboid to narrowly ovate or lanceolate, yellowish, the apex acute; spur 8-18 x 2-7 mm, straight, slender, yellow; petals unequal, the upper petals 0.4-0.5 cm, obovate, shallowly
lobulate, pale yellow to yellow with darker veins, sometimes with violet or brown markings near the apex, the lower petals 0.7-0.8 cm, spatulate, shallowly serrate, yellow. Mericarps 3-7 x 2-4 mm, elongate, ribbed. *Roadside thickets and often at the edges of denser vegetation.* CR (*Smith 9299*, F); P (*White 70*, MO). 1200-2000 m. (Mesoamerica, Colombia, Ecuador.)

*Tropaeolum pendulum* can be confused with *T. moritzianum* on the basis of leaf shape. Usually *T. pendulum* has shallower, slightly straighter, pointed leaf lobes rather than the rounded lobes more commonly found in *T. moritzianum*. In flower the two species can be distinguished by upper petal apex ciliae and ration of sepal to spur length: *T. pendulum* lacks ciliae on the upper petal apex, and the ratio of the sepals to spur is 1-1.5:1, while *T. moritzianum* has ciliate upper petals and a ratio of sepals to spur to 1.5-2.5:1.


Leaves (0.4-)3-7.8 x 0.5-9.9 cm, broadly ovate to depressed ovate, occasionally glaucous below, the base peltate, slightly convex to hastate, the margins shallowly 5-7 lobed, the lobes rounded, sometimes mucronate; petioles 1.3-14.4 cm, attached near base of lamina. Flowers with the pedicels 2.7-23 cm; sepals equal, 7-11 x 3-7 mm, narrowly to broadly elliptic, red to orange, often green at the apex, sometimes yellow with a hint of purple, the apex acute to obtuse; spur (10-)17-23(-27) x 2-7 mm, straight or slightly curved upwards, somewhat stout, red to orange with a green tip; petals unequal, yellow, sometimes orange or red with yellow tips, the veins red or purplish, the upper petals c. 0.8 cm, spatulate, serrate and long ciliate at the apex, the lower petals 0.6-0.8 cm, narrowly spatulate, serrate and long ciliate. Mericarps (5-)8-14 x 4-11 mm, triangular, ribbed. *Steep slopes in moist or wet forest, river floodplains and steep open hillsides, usually climbing or hanging in shrubs and tall trees.* Ch (*Raven 20036*, F); G (*Standley 85660*, BM); H (*Williams & Molina R. 13758*, BM); ES (*Linares & Martinez 1092*, MO); N (*Förther 10023*, BM); CR (*Grayum, Schatz & Sleeper 4130*, F); P (*Davidse et al. 25470*, MO). 600-3200 m. (Mesoamerica, Colombia, Venezuela, Ecuador, Peru.)
Sparre (1975) and Sparre & Andersson (1991) separated *Tropaeolum moritzianum* into 2 separate species, *T. moritzianum* and *T. emarginatum* Turcz. based on differences in leaf venation and petal characteristics. The leaf venation character was based on the number of principal nerves and whether or not the nerves were forked. *Tropaeolum moritzianum* was described with 5 principal nerves, the middle 3 unforked; and *T. emarginatum* with 3 principal nerves, the lateral nerves forked. The problem with this character is the undefined nature of the term ‘principal vein’, and this character is ambiguous on many specimens. Sparre (1975) also distinguished between the two species on whether the cilia on the petals were confined to the apex or whether they continued around the margin to the base of the petals. We found this character problematic as specimens were encountered that had flowers with both morphologies.

The name *T. warscewiczii* Buchenau (Type: “Costa Rica et Veragua”, Warsciwicz 2-15 [holotype B, destroyed, isotypes G, K]) has been widely used on Mesoamerican specimens. Sparre & Anderson (1991) considered the type specimen at K (consisting of fragments only) unidentifiable, but similar to their concept of *T. emarginatum* based on leaf morphology. They also suggested a similarity to the South American *T. fintelmannii* Wegener ex Schltdl. based on petal morphology (non-cilate upper petals fide Buchenau in original description). We are confident, however, that this taxon belongs within the widely variable *T. moritzianum* group and consider it a synonym of *T. moritzianum* s.l.

**Bibliography**