

# The genus *Triphora* (Triphoreae, Orchidaceae) in Colombia

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**Abstract:** In Colombia, four species of *Triphora* (Orchidaceae) are recognized. Two species (*Triphora galeanoi* and *T. vichadaensis*) are newly described. As circumscribed here, the two new species occur exclusively in Colombia apart from *T. foldatsii*, being known from Colombia and Venezuela, and *T. gentianoides*, ranging from the USA (Florida) in the north to Colombia in the south. For the species treated, a taxonomic description, synonymy and information about distribution are provided. Additionally, for the two new species, illustrations of flower parts are provided. A key for the determination of the Colombian species of *Triphora* is included.

**Key words:** new species, Neotropics, taxonomy

## 1. Introduction

The tribe Triphoreae Dressler (Orchidaceae) is a group of small, terrestrial, mycotrophic herbs with fleshy herbaceous stems, plicate or convolute, non-articulated leaves, most often terminal inflorescence and three-lobed, basally canaliculate lip with usually distinct longitudinal crests. The group is distributed exclusively in the western hemisphere, in the southern and eastern United States and southern Ontario (Canada) to southeast Brazil. The genera *Triphora* Nuttall and *Psilochilus* Barb. Rodr. are the only representatives of the subtribe Triphorinae (Dressler) Szlachetko. In *Triphora* and *Psilochilus*, the roots are fleshy and the leaves are scattered along the aerial stem or reduced. The inflorescence is terminal. Considering the gynostemium structure, the representatives of Triphorinae have shelf-like, truncate and erect rostellum without or with rudimentary viscidium (Pansarin & Amaral 2008; Ferreira *et al.* 2010) and an anther with fleshy, beak-like apex, set on a prominent filament, stiff to movable. Some authors (i.e. Dressler 1981, 1993; Pridgeon *et al.* 2005) classify the third genus, *Monophyllorchis* Schlechter, within the subtribe. This genus is represented by plants with one large, thin leaf and gynostemium with an incumbent anther, rostellum bent forward and collar-like clinandrium.

The members of *Triphora* are terrestrial, rhizomatous herbs with fleshy roots. Stem is slender, with several, small clasping alternate leaves. The inflorescence is raceme or corymbose, borne in the axils of the uppermost leaves, nodding or erect-spreading, composed of a few small, flowers; sometimes, the inflorescence is reduced to a single flower. The flowers are small, ephemeral, inconspicuous. The gynostemium is elongate, slender, slightly arched or erect in the lower half and then incurved, the column foot is absent, the anther erect, oblong-ellipsoid, motile or immovable with thick connective, more or less elongate apically forming a roof-like structure. There are four oblong and powdery pollinia, no caudiculae, staminodes are completely incorporated into the column part and the stigma is ventral, 3-lobed, confluent, oblong-elliptic to oblong-obovate, flat or more or less concave near the base.

There are twenty one species within the genus *Triphora*, including *Triphora trianthophora* (Sw.) Rydberg, the best known species of the group. Most species are inconspicuous in appearance. Due to delicate habit, small size and inconspicuous flowers they are easily overlooked in dense understory of forest, which they usually inhabit. Hence, *Triphora* collections are poorly represented in most herbaria. The representatives of

the genus are pollinated by halictid bees (Pridgeon *et al.* 2005) and a synchronous blooming strategy may probably enhance the possibility of pollination, however, some species (i.e. *T. gentianoides* (Sw.) Ames & Schlechter) are presumed to be self-fertilizing (Dunsterville & Garay 1965). The name *Triphora* is derived from the Greek and means “three-bearing”, which is probably an allusion to the number of flowers borne on each plant or to the number of crests on the lip (Correll 1978).

The genus ranges widely from eastern North America to subtropical southern Florida and the Caribbean, through Central America and northern South America (Dodson 1992; Garcia Castro *et al.* 1993; Homoya 1993; Jørgensen & León-Yáñez 1999; Carnevali *et al.* 2001; Hokche *et al.* 2008; Martínez Salas *et al.* 2011) to south Brazil and Argentina (Johnson, A.E. 2001. Las orquídeas del Parque Nacional Iguazú).

Colombia, Ecuador, Peru, and Bolivia cover approximately 2.5% of the Earth's terrestrial area or 21% of South America but harbour 12–22% of the world's flora (Jørgensen *et al.* 2011). A total of 4,002 vascular plant genera are found in the four countries, 2,944 of which occur in Colombia. The number of vascular plant species found in the country is 24,405 (Jørgensen *et al.* 2011). Orchids are unique element of the Colombian flora. At present, almost 3,600 orchid species are known from Colombia. *Triphora* is represented by four species in the country. The main threats to *Triphora* in Colombia include timber harvest and habitat alteration and collection, what results in changes in canopy composition, changes in light and moisture regimes and disruption of mycoheterotrophic relationships.

The taxonomic studies of the Triphoreae as well as the studies of undetermined herbarium material deposited in the Herbarium of Universidad Nacional de Colombia in 2012 revealed that two species of *Triphora* endemic to Colombia are new to science.

## 2. Materials and methods

The taxonomic studies of the Colombian collection of orchid specimens deposited in Universidad Nacional de Colombia (COL) revealed two new species of *Triphora*. A standard procedure for the herbarium material was applied. The vegetative and floral characters of individual plants were analyzed. Particular parts of the flower were boiled, dissected, measured and drawn under a binocular microscope. The results were then compared with the type material, diagnoses and original illustrations. The studied specimens were photographed. The database of the studied material is available in the first author's archives. The material from six herbaria (AMES, COL, LD, MEXU, MY, PORT) is cited.

## 3. Results

### *Triphora* Nuttall

Gen. N. Amer. Pl. 2: 192. 1818. Generitype: *Triphora trianthophoros* (Sw.) Rydberg

Terrestrial, delicate, small plants with underground, ellipsoid or oblong storage organs. Stem erect, leafy throughout. Leaves decreasing in size up the stem, sessile or sub-petiolate or sessile, blade ovate-cordate or ovate-lanceolate, acuminate, sometimes scale-like. Inflorescence terminal, few-flowered. The lower floral bracts large, leaf-like. Flowers short-lived, pedicellate, rather dull-coloured, whitish or beige. Tepals sub-similar, oblanceolate or linear-lanceolate, more or less spreading. Lip 3-lobed, the basal portion tubular, often with few parallel ridges on the inner surface. Gynostemium elongate, slender, slightly arched or erect, in the lower half and then incurved. Column foot absent. Anther incumbent, oblong-ellipsoid, motile or immovable. Connective thick, rather wide to relatively narrow, more or less elongate apically forming a roof-like structure. Pollinia 4, oblong, powdery. Staminodes absent. Stigma ventral, 3-lobed, confluent, oblong-elliptic to oblong-obovate, flat or more or less concave near the base. The middle stigma lobe usually incurved, thickened along apical margin, but no prominent viscidium was observed.

### The key to the Colombian species of *Triphora*

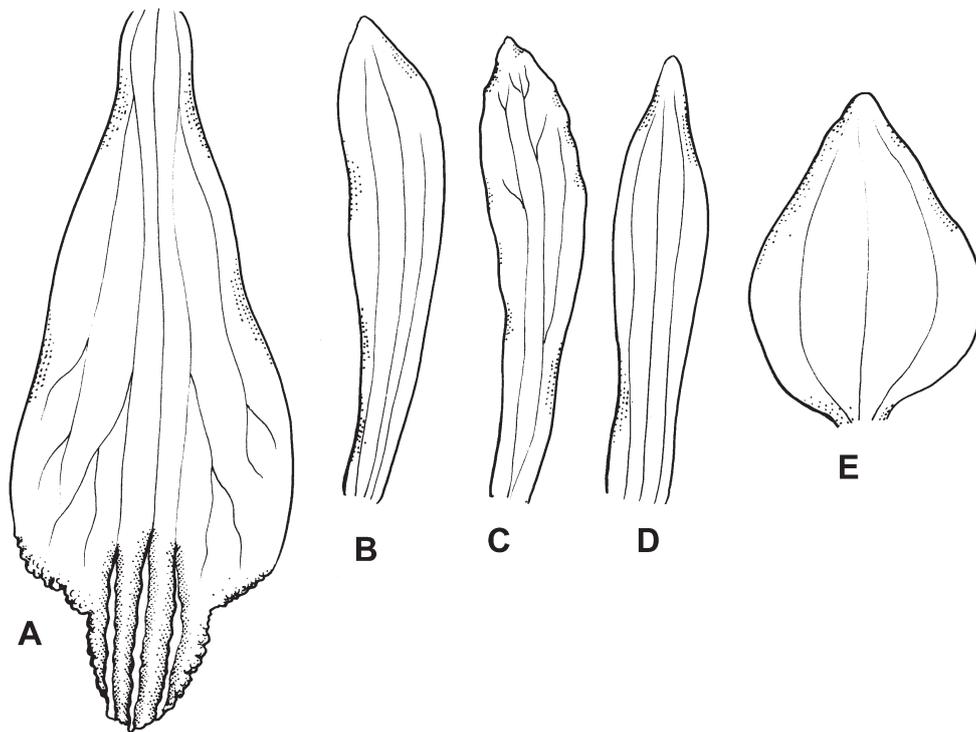
- Leaves scale-like ..... *T. gentianoides*
- Leaves well-developed with prominent blade ..... 2
- 2. Lip obscurely 3-lobed ..... *T. vichadaensis*
- Lip prominently 3-lobed ..... 3
- 3. Lip covered by numerous fleshy projections on the upper surface, lateral lobes oblong-falcate, obtuse .....  
..... *T. galeanoi*
- Lip not as above ..... *T. foldatsii*

*Triphora vichadaensis* Szlach., Baranow & Mytnik, *sp. nov.* (Fig. 1).

*T. vichadaensis* is similar to *T. hassleriana*, from which it differs by the lip form. The basal part of the lip of new species is oblong-ovate in general outline, the middle lobe is obovate-ligulate with crenulate-undulate margins and with 3 crenulate thickenings along nerves. Hypochile of *T. hassleriana* is triangular above cuneate base, obscurely 3-lamellate in the centre and sparsely papillose, epichile is obovate with crenulate-undulate margins.

Type: COLOMBIA. Vichada: Comisaria del Vichada, Cano Urimica, en el suelo bajo penumbra, hojas moradas por el envés y flor morada-amarilla por dentro, 22 June 1972, I. Cabrera R. 2339 (holotype: COL!).

Etymology: In reference to the place of origin of the type specimen.



**Fig. 1.** *Triphora vichadaensis* Szlach., Baranow & Mytnik

Explanations: A – lip, B – lateral sepal, C – petal, D – dorsal sepal, E – floral bract (drawn by J. Mytnik-Ejsmont)

Plants to 7 cm tall, delicate, erect, glabrous. Leaves 2, up to 1.2×0.8 cm, in the upper part of the stem, broadly ovate, subacute, sessile, with main 3 nerves. Inflorescence single-flowered. Flower small, tubular. Floral bracts to 12 mm long, leafy. Pedicel and ovary 8 mm long, slender. Dorsal sepal 10×2 mm, oblong-oblancheolate to ligulate-oblancheolate, subacute, concave above the middle, 3-nerved. Petals 9.5×1.7 mm, linear-oblancheolate, subfalcate, subobtuse, apical margins somewhat undulate, nerves 2, branching. Lateral sepals 9.5×1.8 mm, linear-oblancheolate, subobtuse, subfalcate, 3-nerved. Lip 8.3 mm long in total; hypochile 7×2 mm wide, oblong-ovate in general outline, nerves 3-branching; epichile 1.3×0.8 mm, obovate-ligulate with crenulate-undulate margins and with 3 crenulate thickenings along nerves.

**Phenology:** Flowering in June.

**Distribution:** The species is known so far from single localization in the Vichada Department in Colombia.

***Triphora galeanoi*** Szlach., Baranow & Mytnik, *sp. nov.* (Fig. 2).

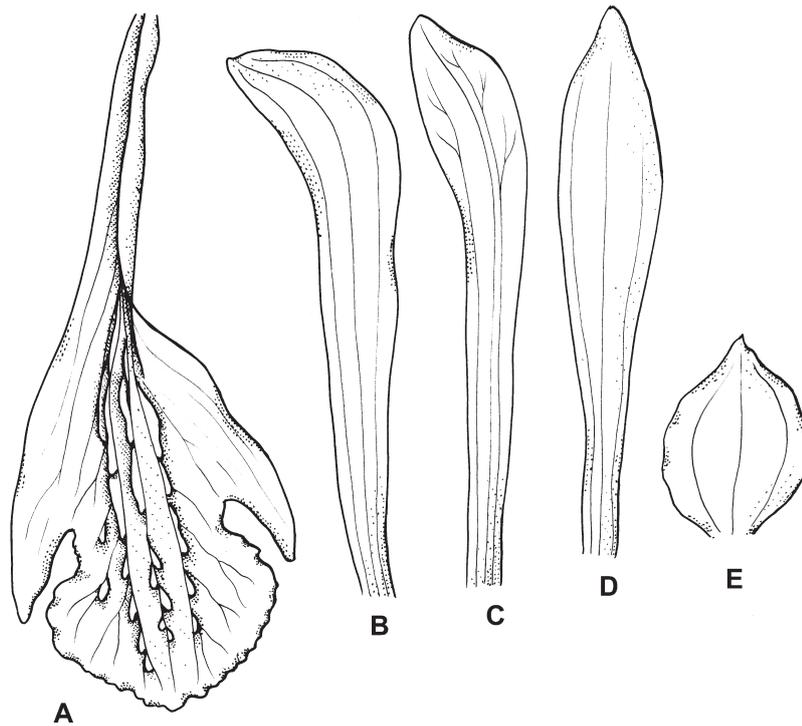
*The species is similar to Ecuadorian congener T. wagneri. Triphora galeanoi is characterized by some-leaved stem and lip lateral lobes distinctly shorter than middle lobe. Stem of T. wagneri is 1-leaved and lip lateral lobes*

*are as long as epichile. The lip of new species is covered by numerous fleshy projections on the upper surface.*

**Type:** COLOMBIA. Antioquia: Mpio de Cocorna, Vereda la Roca (autopista Medellin-Bogota, km 62), Quebrada La Roca, 2000 m, 3 May 1980, G. Galeano & R. Bernal 190 (holotype: COL!).

**Etymology:** Dedicated to G. Galeano, a co-collector of the type specimen.

Plants to 6 cm tall, very delicate, erect. Leaves 7, distributed along the stem, up to 1×0.7 cm, rhombic-elliptic to suborbicular, acute, subsessile, 3-nerved. Inflorescence laxly 3-4-flowered. Flowers large for the plant size. Floral bracts to 9 mm long, leafy, acute. Pedicel 8 mm long. Ovary 5 mm long. Dorsal sepal 18×3 mm, oblong-lanceolate above linear basal third, subacute, concave above the middle, 3-nerved. Petals 18×3.5 mm, oblong-linear in the basal two-third, oblong-lanceolate and strongly falcate above, obtuse, nerve 1, branching. Lateral sepals 18×3.5 mm, oblong-linear in the lower two-third, strongly falcate, ligulate-lanceolate, above, subobtuse, 3-nerved. Lip 18 mm long, covered on the upper surface by numerous, fleshy projections, especially along 3 main nerves; hypochile triangular above oblong-linear lower half, lateral lobes oblong-falcate, obtuse, distinctly shorter than epichile; epichile 5×6.5-7 mm, transversely elliptic-subcordate in outline, undulate on margins, obtuse. Gynostemium 17 mm long.



**Fig. 2.** *Triphora galeanoi* Szlach., Baranow & Mytnik

Explanations: A – lip, B – lateral sepal, C – petal, D – dorsal sepal, E – floral bract (drawn by J. Mytnik-Ejsmont)

**Phenology:** Flowering in May.

**Distribution:** The species is known so far from single localization in the Antioquia Department in Colombia.

***Triphora foldatsii* Carnevali**

Ernstia 22: 10. 1984.

**Type:** VENEZUELA. Estado Aragua: Dtto. Girardot. Parque Nacional Henry Pittier. Carretera Maracay-Choroni. Alt. 950 m a.s.l. Aug 1981. Carnevali & Hernandez 1186 (type: MY).

Plants to 11 cm tall, delicate, glabrous, clustered, usually 2-4 plants growing in clumps. Leaves 2 to 7 distributed along stem, gradually decreasing in size upwards, transforming into floral bracts, 1 or 2 basal sheath-like, usually 2 or 3 normally developed, sessile, up to 0.7-1.1×0.5-1 cm, transversely elliptic, shortly apiculate, basal sheath cup-like. Inflorescence 1-flowered. Floral bracts to 5 mm long, elliptic-ovate, apiculate, cup-like. Pedicel to 7 mm long, very slender, delicate, Ovary to 5 mm long, glabrous, somewhat pendent. Dorsal sepal 17×1.5 mm, linear-oblongate, obtuse, 1-nerved. Petals 18×2.1 mm, linear, subfalcate, subacute. Lateral sepals slightly wider than dorsal sepal, oblongate-linear, subfalcate, subacute. Lip 16×7 mm in total, 3 longitudinal nerves prominent; hypochile triangular,

lateral lobes acute; epichile 4×4.5 mm, set on prominent claw, suborbicular, truncate at the apex. Gynostemium 13 mm long.

**Phenology:** Flowering in August.

**Distribution:** Venezuela, Colombia. Alt. 1000-1500 m a.s.l.

**Representative specimens:** Colombia. Choco. Bosque al lado derecho del rio Condoto, frente a Condoto. Alt. 70 m a.s.l. 24 Aug. 1955. *J.M. Idrobo 1862* (COL!).

***Triphora gentianoides* (Sw.) Ames & Schlechter**

Orchidaceae 7: 5. 1922. ≡ *Limodorum gentianoides* Sw., Prodr.: 119. 1788.

**Type:** JAMAICA. *Swartz s.n.* (type: LD!). ≡ *Arethusa gentianoides* Sw., Fl. Ind. Occid. 3: 1436. 1806. ≡ *Pogonia gentianoides* (Sw.) Sprengel, Syst. Veg. 3: 706. 1826.

Plants to 30 cm tall, relatively stout, erect. Leaves 2 to 6, up to 1.5×0.9 cm, semiaplicaul, scale-like. Inflorescence to 10 cm long, racemose, laxly 3-10-flowered. Flowers erect. Floral bracts 5 mm long, ovate. Pedicel 8 mm long, erect, to 70 mm long after fertilization. Ovary 6 mm long. Dorsal sepal to 10×10.8 mm, oblong-lanceolate, subacute to subobtuse, 3-nerved. Petals 8×1.8 mm, oblong-ligulate, subfalcate, subobtuse, nerves 3,

branching. Lateral sepals 9×2 mm, oblong-lanceolate, subfalcate, subacute, 3-nerved. Lip 8.5 mm long in total, distinctly divided into hypochile and epichile, covered by numerous, clavate projections in the center; hypochile 6×3 mm, broadly ovate above cuneate base, with two crests along lateral nerves, slightly thickened along main nerve, lateral lobes obliquely triangular, acute; epichile 2.6×2.2 mm, elliptic, margins irregularly undulate-crenulate, truncate. Gynostemium 7 mm long. **Phenology**: Flowering from January to August. **Distribution**: USA (Florida), Honduras, Mexico, Guatemala, el Salvador, Costa Rica, Panama, Ecuador, Venezuela, Colombia.

**Representative specimens**: Colombia. Dept. Magdalena. *Renz* 3287 (AMES!). Mexico. Campeche. Mpio. Calakmul. Narciso Mendoza. 16°08'24"N, 092°46'40"W. Alt. 240 m a.s.l.? 8 Jul 1997. *D. Alvarez M.* 146 (COL!, MEXU).

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