Sarcoglottis C.Presl

The genus *Sarcoglottis* was named in 1827 by Czech botanist Carl Borivoj Presl, a professor at the University of Prague. The name comes from the Greek *sarkos*, meaning flesh, and *glotta*, tongue, in reference to the texture and appearance of the labellum. Presl (1827) based the genus on the Andean *Sarcoglottis speciosa*, the type species of the genus.

Sarcoglottis is a monophyletic neotropical genus belonging to the Spiranthinae, but its phylogenetic relationships with other genera of the subtribe are still not completely understood. Preliminary biogeographic analyses suggest that *Sarcoglottis* originated in eastern South America, with later migrations to Mesoamerica (Salazar *et al.* 2018).

The genus comprises about fifty species ranging from Mexico through Central America to most of South America down to Argentina (except Chile), Trinidad and Tobago, and the Lesser Antilles. South America harbors the highest species diversity, with about 35 species.

Six species are known from Costa Rica: *Sarcoglottis acaulis* (Sm.) Schltr., *S. calcicola* Bogarín & Pupulin, and *S. sceptrodes* (Rchb.f.) Schltr. from the northern Pacific region of the country, at 300–500 m of elevation; and *S. hunteriana* Schltr., *S. neglecta* Christenson and *S. smithii* (Rchb.f.) Schltr. from both slopes of the continental divide at elevations varying from sea level to 2300 m. *Sarcoglottis calcicola* was recently described as a new species to science, and it is known only from Barra Honda National Park (Bogarín & Pupulin 2021). Plants of *Sarcoglottis* grow on soft, fertile soils in shaded understory or organic substrate in rocky areas. Populations of the Costa Rican species may be found from the tropical, deciduous habitats of dry forests in the Guanacaste region to the rain and cloud lower montane forests along all the main cordilleras of the country.

Sarcoglottis orchids are recognized by a combination of characters. The plants are terrestrial with fasciculate, fleshy roots, abbreviated stem, and several rosulate leaves with broad, flat blades. The terminal, erect, racemose inflorescences bear large and fragrant, tubular, fleshy flowers. These have the lateral sepals basally connate and decurrent on the ovary to form a conspicuous nectary; the labellum is basally adnate to the lateral sepals, clawed, spatulate, channelled, with the apical lobe recurved, provided at the base with two retrorse, horn-shaped nectar glands; the column is clavate, with a triangular rostellum, becoming truncate after removal of the wishbone-shaped pollinia.

The coloration of the leaves of *Sarcoglottis* may be variable in different individuals of a given species, even in the same population. For example, in *Sarcoglottis sceptrodes* the leaves are generally green, but some plants have white dots or spots on the blades. *Sarcoglottis* are mostly deciduous (lose their leaves) during the dry season when they are in bloom. This strategy allows the orchid to translocate nutrients from the leaves to the stem before they wither. They contribute to the development and maturation of the inflorescence, flowers and eventually the fruits. When the rainy season begins, the plants develop new photosynthetic leaves, continuing their phenological cycle under appropriate resources, when a suitable habitat and the proper weather conditions are available.

The flowers of *Sarcoglottis* are pollinated by male and female euglossine bees (also known as orchid bees) attracted by the scent produced by the flowers. Once they land on the flower and accommodate on the lip, the bees insert their proboscis at the base of the corolla to suck the nectar. By doing so they touch the apex of the column, where the viscid disc is exposed on the dorsal surface of the rostellum, removing the pollinia from the anther to later pollinate another flower by depositing them on the stigmatic surface. *Sarcoglottis acaulis*, a broadly distributed species in the Americas, despite having a self-compatible reproductive system (i.e., orchid flowers can self-fertilize with their own pollen), requires pollinators such as *Eulaema atleticana* Nemésio, *E. cingulata* Fabricius and *E. niveofasciata* Friese to be pollinated and produce fruit (Ackerman 1995, Albuquerque *et al*. 2021).

Due to their striking rosulate growth with green leaves that are often ornamented with greenish, white, or silvery dots or stripes, and the showy large, fragrant, colorful flowers, species of *Sarcoglottis* (mainly *S. hunteriana*) are sometimes seen cultivated in botanical gardens or home gardens, amateur collections, and orchid exhibitions.

Plants of *Sarcoglottis* may be grown in a warm greenhouse in pots or any wide container with openings underneath for water to drain. A well-draining substrate should be used for cultivation, such as the soil where the plant originally grew in the field, or a mixture of moss (*Sphagnum*), charcoal, stone, bark chips, or even styrofoam shreds. When collecting *Sarcoglottis* in the field for scientific studies, a good horticultural practice is to extract the plant from the ground without damaging the roots, leaving soil adhering to the roots, and then growing the plants in the pot, adding the remaining substrate mixture. In the dry season, the irrigation should be reduced when the orchids lose their leaves to not alter their natural phenological cycle, since it seems that water stress derived from the change of season is a factor that induces the flowering of *Sarcoglottis*.

Left

Sarcoglottis smithii (Rchb.f.) Schltr.

Cartago: Cartago-La Unión, Guadalupe-San Rafael, Coris, Cerros de la Carpintera, behind Cartago Industrial Park, 9°52'16.7" N 83°58'42.0" W, 1500-1650 m, 30 Oct. 2008, *F. Pupulin 7452, D. Bogarín, R.L. Dressler, R. Gómez & R. Trejos.*
Photographed: 18 March 2016. Reproduction ratio: 1:1.

Sarcoglottis hunteriana Schltr.

Alajuela: Upala, Dos Ríos, between Dos Ríos and Liberia, ca. 2 km after Dos Ríos, along the roadside, 10°52'46.36"N 85°23'29.15"W, 638 m, 22 May 2016, flowered in cultivation at Jardín Botánico Lankester *A. P. Karremans 7198, N. Davin & J.E. Jiménez.*
Photographed: 25 November 2017. Reproduction ratio: 3.5:1.

Left

Sarcoglottis acaulis (J.E.Sm.) Schltr.

Guanacaste: Nicoya, San Antonio, Barra Honda National Park, 10°10'08.3"N 85°21'49.7"W, 423 m, 3 Oct. 2014, flowered in cultivation at Jardín Botánico Lankester, *D. Bogarín 11207, N. Belfort & A. Karremans.*
Photographed: 18 January 2022. Reproduction ratio: 2:1.

Top

Sarcoglottis sceptrodes (Rchb.f.) Schltr.

Guanacaste: Nicoya, Mansión, Zona Protectora Cerros de Jesús, 10°05'41.71"N 85°18'59.58"W, 370 m, along a seasonal stream with high trees, 23 Feb. 2012 *F. Pupulin 8194 & D. Bogarín.* Photographed: 17 September 2007. Reproduction ratio: 1.5:1.

Bottom

Sarcoglottis sceptrodes (Rchb.f.) Schltr.

Guanacaste: Nicoya, San Antonio, Parque Nacional Barra Honda, Cerro Corralillo, Sector Las Delicias, in forest at the upper end of bean plantations, 10°11'11.19"N 85°21'08.46"W, 438 m, 24 Feb. 2012, flowered in cultivation at Jardín Botánico Lankester, *F. Pupulin 8198, D. Bogarín & S. Villagra.* Photographed: 26 February 2012. Reproduction ratio: 1.5:1.

Top

Sarcoglottis calcicola Bogarín & Pupulin

Guanacaste: Nicoya, San Antonio, Barra Honda National Park, Cerros Barra Honda, rocky hill in *Cactus* forest toward La Mantequilla, 10°10'34.48"N 85°21'19.08"W, 368 m, 21 Feb. 2012, *F. Pupulin 8186 & D. Bogarín.* Photographed: 26 February 2012. Reproduction ratio: 1.5:1.

Bottom

Sarcoglottis valida Ames

Cartago: San Blas, collecten by R.L. Dressler, D.E. Mora & M. Flores, 27 Aug. 1997, flowered in cultivation at Jardín Botánico Lankester, *F. Pupulin 1416.* Photographed: 16 March 1999. Reproduction ratio: 1.2:1.

Sarcoglottis sceptrodes (Rchb.f.) Schltr.

Guanacaste: Nicoya, Mansión, Zona Protectora Cerros de Jesús, 10°05'41.71"N 85°18'59.58"W, 370 m, along a seasonal stream with high trees, 23 Feb. 2012, flowered in cultivation at Jardín Botánico Lankester, *F. Pupulin 8195 & D. Bogarín.*
Photographed: 16 April 2016. Reproduction ratio: 2.5:1.

Sarcoglottis neglecta Christenson

Cartago: Cartago-La Unión, Guadalupe-San Rafael, Coris, Cerros de la Carpintera, behind Cartago Industrial Park, 9°52'16.7" N 83°58'42.0" W, 1500-1650 m, 30 Oct. 2008, flowered in cultivation at Jardín Botánico Lankester, *F. Pupulin 7452bis, D. Bogarín, R.L. Dressler, R. Gómez & R. Trejos.*
Photographed: 8 April 2017. Reproduction ratio: 1:1.

Right

Sarcoglottis valida Ames

Heredia: Barva, Buenavista, Río Macarrón, 10°03'N 84°06'W, 1800 m, *legit* A. Quesada-Chanto, flowered in cultivation at Jardín Botánico Lankester, *F. Pupulin 8818.*
Photographed: 20 March 2016. Reproduction ratio: 2:1.