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Lycaste bruncana

Text by Diego Bogarín and Franco Pupulin/Watercolor by Sylvia Strigari

Tribe Cymbidieae
Subtribe Maxillariinae
Genus Lycaste *Lindl*.

Lycaste bruncana Bogarín, *Lankesteriana* 7:543. 2007. Type: Costa Rica. Puntarenas: Golfito, Golfito, Esquinas, La Gamba, Bosque de Los Austriacos, Tropenstation La Gamba, 8°42'40"N, 83°13'00"W, 100–400 m, 3–4 Julio 2004, M. Blanco 2610 & E. Serrano, floreció en cultivo en el Jardín Botánico Lankester, 19 Julio 2007, *D. Bogarín 3987* (holotype, CR; isotype, JBL-Spirit; illustration of type). *Lycaste crystallina* Wubben ex Oakeley*, Lycaste, Ida and Anguloa: the Essential Guide* 73–75. 2008. Type: Costa Rica. ex Costa Rica cult. Jac Wubben of Wubben Orchideën, The Netherlands, 20 September 1998, *H. Oakeley J7* (holotype, K).

Plant epiphytic, caespitose, up to 60 cm tall. *Roots* slender, up to 3 mm in diameter. Pseudobulbs 5.0–7.0 × 3.0–4.5 cm, ovoid, sulcate, ancipitous. *Leaves* two (rarely three) apical leaves and 2–3 lateral leaves appressed to each young pseudobulb, articulate, persistent during the blooming period, deciduous with age. *Leaf blade* petiolate, 5.5 × 51.0 cm, plicate, obovate, acute to acuminate. *Inflorescence*, 1–6, to 9 cm long, one-flowered, concealed by 2–3 persistent bracts. *Floral bract* 2.5–3.0 × 2.0–2.5 cm, ovate, acute, enclosing the ovary. *Ovary* cylindrical, sulcate, 1.7 cm long. *Flowers* showy, sepals pale green to pinkish, petals white, spotted with pink, lip white with purple dots around the callus and pink dots in the midlobe. *Sepals* equal, oblong-obovate, acute, 4.5 × 1.7 cm, basally tomentulose, entire, straight in natural position. *Petals* ovate, acute, 3.5–4.2 × 1.5–1.7 cm. *Lip* three-lobed, 2.7 × 1.2 cm, attached to the column foot, with a rectangular thick, emarginate callus up to 1.3 cm long, lateral lobes rectangular, obtuse, perpendicular to the callus, 1.2 × 0.5 cm, midlobe spathulate, thin, the isthmus narrow, emarginate, erose at apex, 1.5–1.7 × 0.3 cm. *Column* with a foot, twisted to the left, basally tomentulose, infrastigmatic surface lanulose, the stigma ventral; anther apical, up to 2.5 cm long. *Pollinarium* 6 mm long, with four pollinia; stipe 3.5 mm long. *Anther cap* cucullate, tomentose.

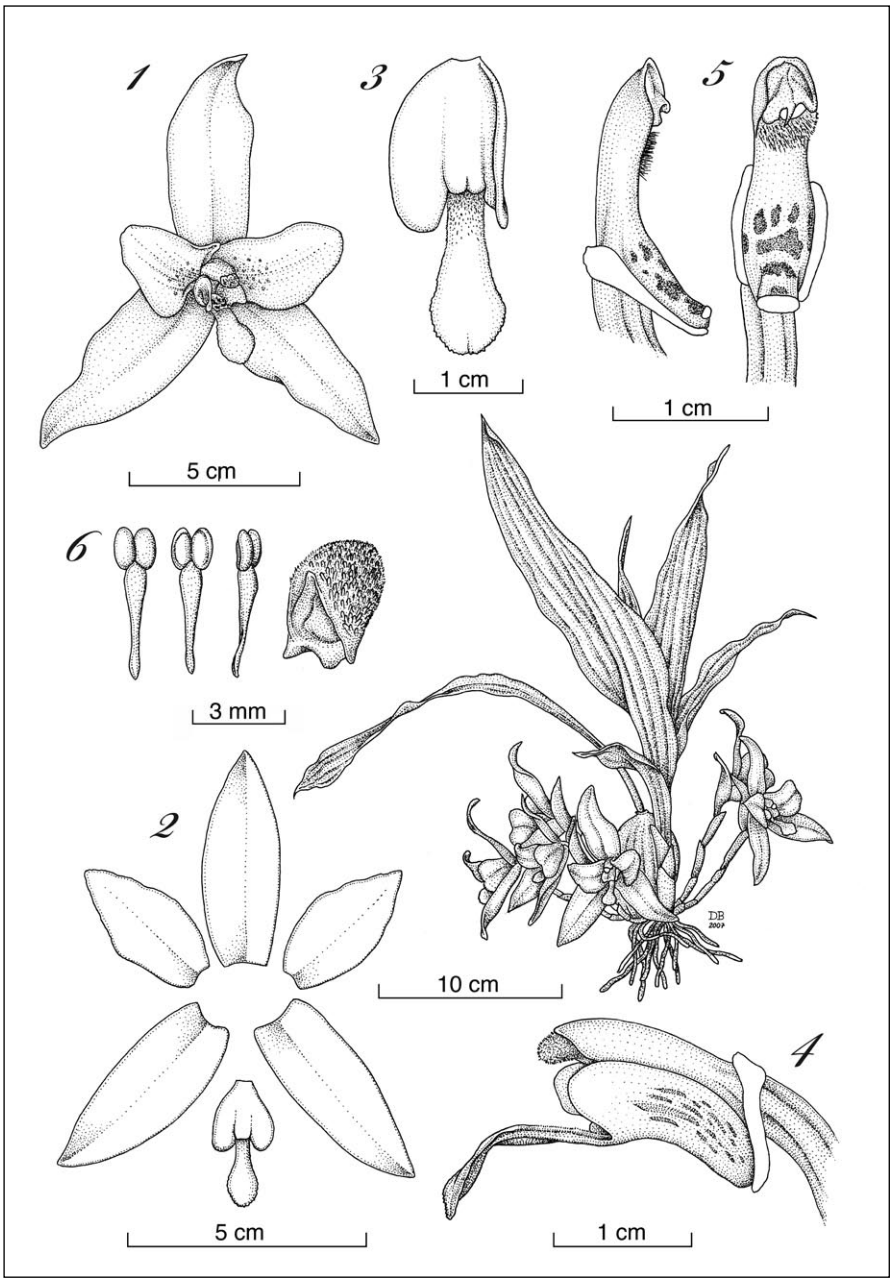
Although *Lycaste bruncana* has been known and cultivated in the greenhouses of the Lankester Botanical Garden for over 10 years, after we obtained the first specimen from the southern Pacific forests of Costa Rica, it was not until 2007 when we proposed the species as distinct from its closest relative, *Lycaste tricolor* (Bogarín 2007). According to Fowlie (1970) and following his classification of *Lycaste*, both species should be placed in the section *Deciduosae* subsection *Paradeciduosae* Fowlie. Although the similarities between both species (i.e., the three-lobed lip, the deciduous pseudobulbs without conspicuous spines, the similar size of the plant and the gross flower morphology) could have confused taxonomists in the past, *Lyc*. *bruncana* is easily recognized on the basis of a consistent set of morphological features and molecular data. *Lycaste bruncana* is distinguished from its sister species by the lip shape with a narrow isthmus and spathulate midlobe, the callus facing downward, the lanulose infrastigmatic surface, the pollinarium with a longer stipe (up to 3.5 mm long), the subrectangular pollinia and the tomentose anther cap. Molecular data using the *matK* chloroplast region also support the clustering of the accessions of *Lyc*. *tricolor* apart from those of *Lyc*. *bruncana* (Lahaye et al. 2008).

The genus *Lycaste* is treated today as comprising some 35 species, most of them occurring from Mexico to Panama. While the center of diversity of the genus is Central America, species in section *Lycaste*, such as *Lycaste macrophylla* (Poepp. & Endl.) Lindl., extend southward to Peru and Brazil. Analyses of DNA sequences (Ryan et al. 2000) showed that *Lycaste* in the broadest sense, as it was mostly used in the past, is not monophyletic, and that the species of section *Fimbriatae* are strongly supported as sister to *Anguloa*. This group has subsequently been transferred to *Sudamerlycaste* (Archila 2002) or alternatively to the synonym *Ida* (Ryan and Oakeley 2003), even though the effective priority of the prior name is debatable. True species of the monophyletic genus *Lycaste* are scattered among sections *Lycaste*, *Deciduosae* and *Longisepalae* Fowlie.

Lycaste is a typical bee-pollinated flower, and the available data and floral morphology are consistent with pollination by medium-sized bees. Species of *Lycaste* and *Anguloa* are fragrant during the day (in contrast to the night-scented *Sudamerlycaste* with pale green-white flowers), and at least some taxa may be pollinated by fragrance-collecting euglossine bees. Only a few of the specific scents by mean of which the flowers attract their pollinator have been analyzed in detail (Gerlach and Schill 1991, Kaiser 1993), and they are rich in both methyl cinnamate and methyl p-methoxycinnamate, two powerful attractants common in androeuglossophilous orchids and particularly for certain male *Euglossa* bees. One bee was photographed by R. Pemberton with two *Lycaste* pollinaria attached to the dorsum of the abdomen and not to the scutellum (Whitten 2009).

The most remarkable character of *Lyc*. *bruncana* is the left-twisted column, which is also indicative of a reproductive barrier. *Lycaste bruncana* deposit the pollinarium near the base of the wing of the pollinating euglossine bees and *Lyc*. *tricolor*, with its straight column, would deposit the pollinarium on the thorax. Pollination studies by Santiago Ramírez at La Gamba Tropical Field Station in the southern Pacific of Costa Rica (the type locality of *Lyc*. *bruncana*) revealed that *Lyc*. *bruncana* is pollinated by *Euglossa dodsonii*. A bee was collected carrying a pollinarium placed close to the base of the right wing (the side of the bee that touches the left side apex of the column) being consistent with the flower anatomy of *Lyc*. *bruncana*. Stipe elongation is another feature that might be correlated with the evolution of the twisted column in *Lyc*. *bruncana*. The pollination of *Lyc*. *tricolor* is still unknown and more observations are needed in order to understand the evolution of these species. This is of special interest since the two species overlap their flowering season, so differences in both flower morphology and the way in which these species use the pollinator to carry the pollinarium ensure reproductive isolation.

In addition, both species are geographically isolated by the Cordillera de Talamanca in Costa Rica and Panama suggesting that allopatric speciation took place during the formation of the Talamanca and the final closure of the Isthmus of Panama. *Lycaste bruncana* is



Lycaste bruncana. The plant.
1. Flower in natural position.
2. Dissected perianth.
3. Lip.
4. Column and lip, lateral view.
5. Column, lateral and front views.
6. Pollinarium and anther cap.
All drawn by D. Bogarín from *D. Bogarín 3987* (CR).

only known from the Pacific watershed of the Cordillera de Talamanca and Cordillera Costeña in Costa Rica and the slopes of Volcán Barú in Chiriquí, Panama, between 2,300 and 4,260 feet (700–1,300 m) elevation. Recently, a population was found along the shores of Río Gariché in Panama, extending the range of the species southward. Plants grow epiphytically in primary and secondary vegetation in premontane rainforest and tropical wet forest. Populations of its sister species, *Lyc*. *tricolor*, are known at similar elevation range but are restricted to the Atlantic slopes of the Cordillera de Talamanca in Costa Rica and Panama. Analogous examples of sister orchid species in the Atlantic and Pacific regions of the Talamanca range have been documented in *Kefersteinia*, *Maxillaria* and *Oncidium* as well as many other genera of the Pleurothallidinae. These examples support the role of the Cordillera de Talamanca as a geographic isolation barrier, where these sister species have evolved separately.

The specific epithet "brunca" is derived from the emblematic name "Brunka," a group of indigenous people who live in the southern Pacific lands of the Cordillera de Talamanca. Brunca is also the name of the Región Brunca, one of the socioeconomic regions of Costa Rica that occupies most of the distribution range of *Lyc*. *bruncana*. We have splendid specimens in cultivation at Lankester Botanical Garden, where it is possible to observe them in full profusion of flower from May to August, with some plants extending the flowering season to October–November.

Epiphytic plants of *Lycaste* occur in light woodland, but they are also found growing as lithophytes or terrestrial in leaf litter, often associated with limestone boulders. Cultural requirements are similar to *Lyc*. *tricolor*. They grow best in humid warm environments with plenty of air circulation. Compost can be prepared with perlite, charcoal, bark, sphagnum and coconut fiber and should be free-draining. Provide water freely until the new pseudobulbs are fully developed. Then, a dry rest with only little water given from time to time is necessary. Mature plants become magnificent specimens when they produce many flowers opening at the same time, surrounding the cluster of pseudobulbs. Because of this tendency to produce magnificent specimens, it is advisable not to divide plants often.

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