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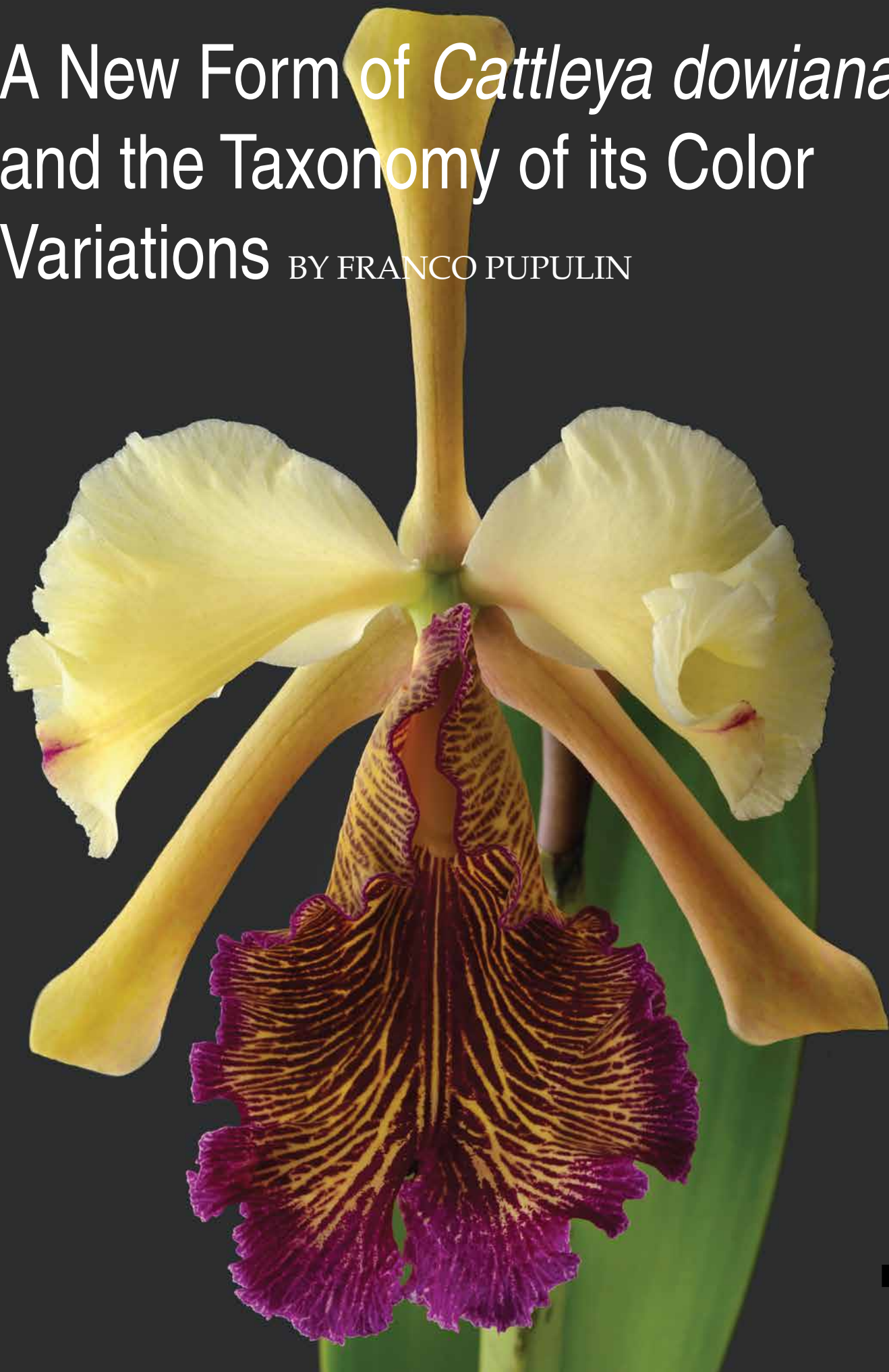
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A New Form of *Cattleya dowiana* and the Taxonomy of its Color Variations

BY FRANCO PUPULIN



THE QUEEN OF ORCHIDS, or the “Guaria de Turrialba,” as it is best known in its native Costa Rica, has long been regarded as one of the most beautiful of all the *Cattleya* species, and many authors have even called it “the world’s most beautiful flower.”

The indefatigable orchid explorer and collector Joseph Rawicz von Warczewicz originally discovered *Cattleya dowiana* in Costa Rica, but the plants he sent to Europe around 1850 died before producing any flowers. For 15 years the horticultural circles could only dream — sometimes obsessively — about the large-flowered, yellow-petaled *Cattleya* species of which Warczewicz claimed the existence in his correspondence from Central America. No other *Cattleya* created such excitement, received more praise and was more sought after than *C. dowiana*, even before it was rediscovered and finally introduced in cultivation in 1865, when James Bateman baptized it in honor of Captain John Melmouth Dow. Since then, despite its reputation of being a difficult species to grow, *C. dowiana* has remained one of the most admired species of the genus and the most prized of all the cattleyas.

Whether the populations from the Darién region in eastern Panama and from northern Colombia should be treated as a distinct subspecies of *C. dowiana* or as a species in its own right under the name *Cattleya aurea* has long been debated, but contemporary botanists tend to agree in considering them conspecific. In Costa Rica, at least, some *Cattleya dowiana* specimens with more diffuse yellow veining on the lip exist, approaching the forms more common in northern South America. From my point of view, a sound solution to this nomenclatural issue would require carrying out genetic studies within and between populations to understand if and when gene flow between Andean and Central American groups was interrupted. *Cattleya dowiana* is an isolated element in southern Central America of an otherwise exclusively South American genus, and it is more than probable that the ancestors of the Guaria de Turrialba migrated from the northern range of the Andes across the land bridge formed in southern Central America less than 3 million years ago. The recent discovery of *C. dowiana* (subsp. *dowiana*) populations in the Bayano region in central Panama may perhaps suggest that

disruption in geographical distribution could be just an artifact of undersampling. In Colombia, growers consider *C. dowiana* subsp. *aurea* to present four main forms. Forma *chrysotoxa* (formally described by Frederick Sander in 1891 as a variety of *C. dowiana*) is restricted to small areas in the Risaralda Department. The form from Antioquia up to the border with Panama is called “dureda,” and with this name it is also known in eastern Panama; this form, and particularly its subform “rosea,” is probably the most similar to forma

carmoniana of subsp. *dowiana* described here. In the coastal region of Baudó, a disjunct population quite similar to the form *chrysotoxa* was recently recorded (Misas Urreta 2006). Finally, a particularly showy form, with the lip almost completely yellow, inhabits the Chado-Sinú area, but further data about this population have not been revealed to avoid the risk of overcollection of this special plant.

Botanists have often used the terms “subspecies” and “variety” in quite an interchangeable way (see the detailed



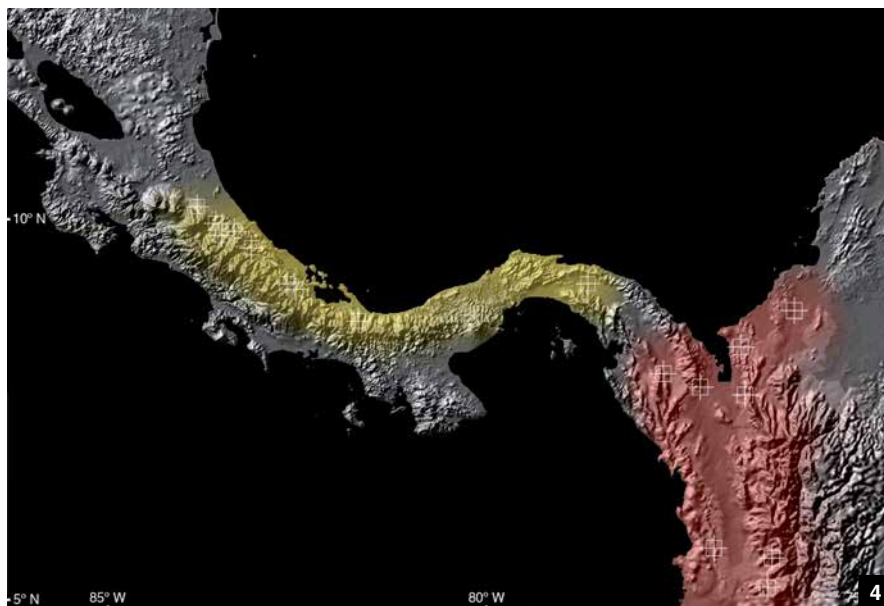
[1] A flower of the typical form of *Cattleya dowiana* from Costa Rica, with its unmistakable contrast between the clear yellow sepals and petals and the deep burgundy lip, striped with fine golden yellow lines. It is no wonder that it has been considered the world’s most beautiful flower.

[2] With frequently four to five flowers per inflorescence, and for the influence it had in the breeding of cattleya hybrids, *Cattleya dowiana* was considered the queen of cattleyas. This plant was grown in Atenas, where it flowered in March of 2000. Courtesy of the Editorial de la Universidad de Costa Rica.

[3] A near *aurea* form of *Cattleya dowiana* from Costa Rica, photographed in the collection of Lankester Botanical Garden in June 1999. Courtesy of the Editorial de la Universidad de Costa Rica.

survey by Hamilton and Reichard 1992). Even though the International Code of Nomenclature, which rules the use of scientific nomenclature for plants, does not specifically indicate the correct use of the two terms, Articles 4.1 and 4.2 conclusively state that the category of subspecies occupies a higher rank, and is therefore more general, than a variety (i.e., we could have a single subspecies with several varieties, but not the other way around) (McNeill et al. 2012). In botany, subspecies and varieties are usually defined as being coherent evolutionary subsets, which require some integrity — geographic, ecologic or phylogenetic — beyond the morphological (Hamilton and Reichard 1992). Commonly, organisms belonging to different subspecies of the same species are capable of interbreeding and producing fertile offspring, even though they do not interbreed in nature due to geographic isolation or other factors. So, in general, subspecies are used to indicate greater geographic/ecologic distinctness than varieties, with less morphological overlap, and with evolutionary/ecologic integrity that is not required for varieties. The use of the rank of subspecies as proposed by Pipoly (1987), for “groups of populations within a single lineage of ancestor-descendant populations, correlated with biogeography and/or ecology,” well synthesizes the extramorphological implications that should be implied in the use of this term. So, even when the two ranks have been often used as interchangeable, without adequate evidence to infer the hierarchical relationships among the taxa within a species, the term variety has been more frequently employed — mainly in the past — without any extramorphological coherence, in a sense that most taxonomists would simply consider “formae.” The formae, on the other hand, almost exclusively refer to individual, nonisolated variations occurring within an otherwise typical population of a species (i.e., occupying the same habitat at the same time) and lacking any geographic, ecologic or genetic integrity.

Now, the two geographically separate contingents of *C. dowiana* are, in my opinion, perfect candidates to be treated as evolutionary subspecies, unless the finding of new intermediate populations that connect the two main groups, allowing for





[4] Distribution map of *Cattleya dowiana* subsp. *dowiana* (yellow) and subsp. *aurea* (red). On the basis of the available records, subsp. *aurea* is restricted to South America, whereas subsp. *dowiana* ranges from Panama to Costa Rica in the southern portion of the Central American isthmus. Map prepared by F. Pupulin.

[5] *Cattleya dowiana* var. *chrysotoxa*. The original illustration published by Sander in the second volume of *Reichenbachia* (pl. 80, 1889).

[6] Variations in color patterns of selected clones of *Cattleya dowiana* subsp. *aurea*, as presented on plates 598–599 of *Lindenia, Iconographie des Orchidées* (1897).

gene flow between them, would eventually suggest treating *C. dowiana* as a single, variable species. Because the Colombian *C. dowiana* has never been treated at the subspecific rank, I propose it here:

***Cattleya dowiana* subsp. *aurea* (Linden) Pupulin, comb. et stat. nov.**

Bas.: *Cattleya aurea* Linden, Ill. Hort. t. 493. 1883.

Syn.: *Cattleya dowiana* var. *aurea* (Linden) B.S. Williams & Moore, Orchid Album 2: t. 84. 1883. *Cattleya labiata* subvar. *aurea* (Linden) Schltr., Orchideen 221. 1914.

According to the rules of botanical nomenclature, the autonym *C. dowiana* subsp. *dowiana* is automatically created for the typical subspecies.

It is noteworthy that the existence of specific mutations in the color of the flowers of selected clones, which have received nomenclatural recognition in the past, is often common to both the southern

and northern contingents of *C. dowiana* (Talley 1977). These horticulturally desirable forms, which promise to increase and diversify the influence of *C. dowiana* in hybridization, are not commonly encountered. Between 1883 and 1900, 15 subspecies and varieties of *C. dowiana* (and *C. aurea*) were named, both formally and informally. Despite the sensation they created, and the beautiful lithographs in which they were portrayed in the best horticultural magazine of the time, most of these variations did not find their way into the modern collections of cattleyas, and have disappeared from cultivation. Nevertheless, the influence of *C. dowiana* in breeding has been more important than any other large-flowered species, being responsible of darkening and enriching the lavender color of other *Cattleya* species, while the yellow of sepals and petals is recessive.

It is a fortunate circumstance that

a new and interesting form of *Cattleya dowiana* subsp. *dowiana* (or the Costa Rican and western Panamanian “race”) appeared in one of the greatest and best-grown collections of this species in Costa Rica. I am glad to name it in honor of its grower, Julio Carmona, who has dedicated his life to maintaining an impressive selection of *C. dowiana* specimens in his native Turrialba, the cradle of the Guaria de Turrialba.

***Cattleya dowiana* subsp. *dowiana* forma *carmoniana* Pupulin, fma. nov.**

TYPE. Costa Rica. Limón: Talamanca, Telire, probably originally collected in the Telire indigenous reserve, cultivated by J. Carmona in Turrialba, prepared 5 May 2010, F. Pupulin 8616 (holotype, CR).

Cattleyae dowianae forma nova, forma statteriana Rolfe similis, sed sepalis petalisque bene luteis, labelli macula lutea majore striis purpureis destituta

The habit of *C. dowiana* f. *carmoniana*

is typical for the species, with pseudobulbs 8–14 × 2.6–2.9 cm and leaves 15–20 × 5–6 cm. The inflorescence, over 20 cm in length, is produced from a spathaceous bract about 13 cm long, and bears three flowers subtended by broadly rectangular, short bracts (4 × 9 mm) and pedicellate ovaries 7 cm long. The flowers are fragrant, held horizontally. The sepals are yellow, spreading, with the margins strongly revolute, 7.5–9.0 × 2.1–2.7 cm. The petals are subporrect, pale yellow, with margins strongly ruffled, 7.5–8.8 × 4.7–5.5 cm. The lip is spreading, bright yellow, with the ruffled apical margin purple-wine, the margin fading toward the apex of the lateral lobes, the disc with a deep purple-wine blotch decurring toward the apex of the midlobe, the base of the lateral lobes boldly striped with purple; entire lip 8.2–9.5 × 5.7–6.8 cm. The white column, completely enclosed by the inrolled lateral lobes of the lip, is 3.6–3.9 cm long.

With the clonal name “Turrialbeña,” the plant of *C. dowiana* f. *carmoniana* that served to prepare the holotype was awarded a Judges Commendation by the American Orchid Society during the orchid Exhibition of Cartago, Costa Rica, on May 1, 2014.

Unusual variations in the yellow color in the lip are not restricted to the northern distributional range of the species (the subsp. *dowiana*). Robert Allen Rolfe described *C. dowiana* (subsp. *aurea*) var. *statteriana*, with an almost completely bright yellow lip, provided with a central band of purple lines and the margins edged with lilac-rose, on the basis of a plant grown by J. Statter in Manchester, originally collected in the vicinity of Frontino, in Colombia (Rolfe 1892). Both the description and the fine illustration present the sepals and petals of a bright yellow shade. A plant from the same collection, presented by Williams in the *Orchid Album* for 1893, has, however, sepals and petals of a soft creamy white and two enlarged yellow eyes on a lip mostly dark purple (Warner et al. 1893). This may perhaps represent intrapopulation variation, or even individual color plasticity of the same plant at different flowerings.

I take the opportunity of publishing this paper to also give a new formal status to the “peloric” form of *C. dowiana*, which is unusual in the large amount of lavender



[7] Inflorescence of *Cattleya dowiana* subsp. *dowiana* f. *carmoniana*, grown and flowered at Turrialba, the cradle of the Guaria de Turrialba. A flower of this plant was preserved as the holotype.

[8] The thin golden-yellow lines, which cover the lip in the forma *typica* of *C. dowiana*, are replaced in f. *carmoniana* by large blotches of bright yellow, the purple being restricted to the gorge and the margin of the lip.

[8] *Cattleya dowiana* subsp. *dowiana* f. *carmoniana* received a Judges' Commendation by the AOS when exhibited by Julio Carmona at the Cartago Orchid Show in May 2014.

[10] *Cattleya dowiana* subsp. *aurea* f. *statteriana*, as illustrated in *Lindenia*, pl. 356 (Rolfe 1892).

[11] Another illustration of *C. dowiana* subsp. *aurea* f. *statteriana*, coming from the same collection of Mr. J. Statter, as published in *The Orchid Album*, pl. 468 (Warner et al. 1893).

[12] Cover of Pfau's catalog of Costa Rican orchids, published in San José in 1895. Note, in the upper part of the illustration, three symbolic orchids from Costa Rica: *Cattleya dowiana*, *Psychopsis krameriana* and *Phragmipedium humboldtii*. Courtesy of the Costa Rican National Library.



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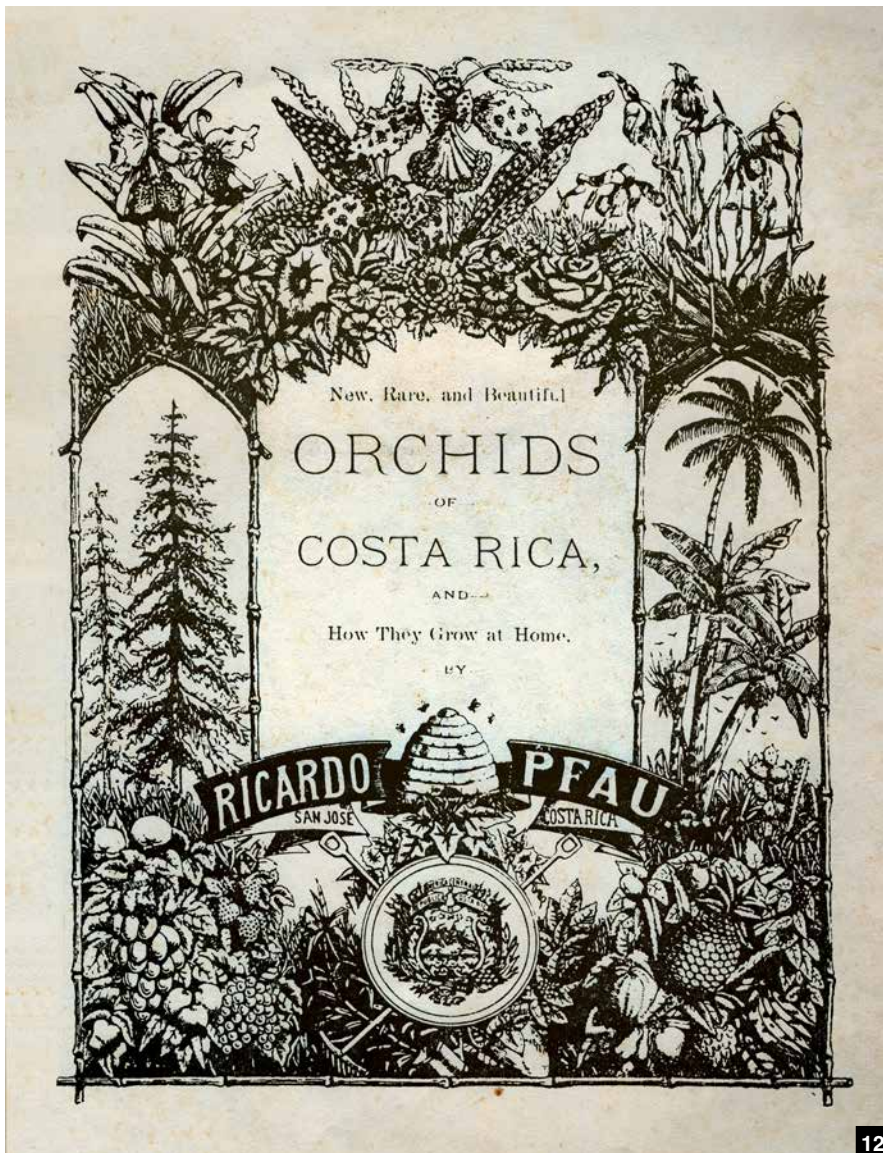


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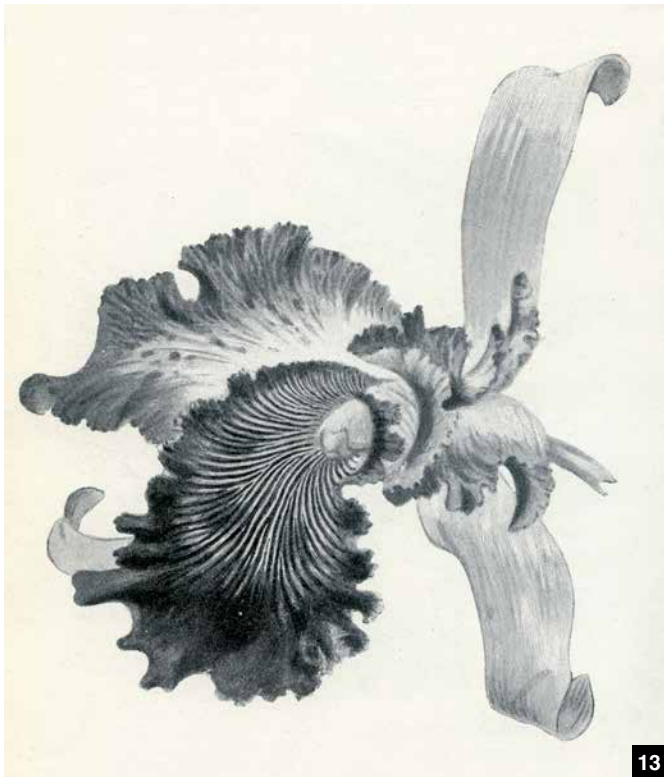
in the sepals and in the petals heavily marbled with rose-purple.

The first mention of this particular form appeared in an account on Costa Rican orchids published in San José in 1895 by Richard (Ricardo) Pfau, the Swiss heir of a dynasty of stove setters based in Winterthur (Jenny 2014). Richard Pfau (1856–1897) visited Costa Rica for the first time around 1880, and permanently resided in the Central American country from 1885, where he established himself as a “nurseryman, florist, seedman and landscape gardener,” as well as an “exporter of Central American orchids, bulbs and seeds” (Pfau 1895). He was furthermore dedicated to apiculture and also prepared a “Manual for the tropical apiculturist” to be distributed with his honey and wax products. Pfau established the first commercial Costa Rican orchid firm, with nurseries near the capital city, San José. In 1895 he gave to the press in San José a catalogue of orchids he had for sale and export, with introductory chapters including advice on their cultivation and exportation (Pfau 1895). Here, under the treatment of *C. dowiana*, Pfau mentions for the first time the existence of a “*C. Dowiana. Rosita* [... with a] more or less pronounced pink, instead of yellow, of the sepals” (Pfau 1895, p. 5). He considered “*Rosita*” to be a hybrid between *C. dowiana* and *Cattleya* (now *Guarianthe*) *bowringiana* or *Cattleya skinneri autumnalis* (now *Guarianthe patinii*), suggesting that the individual variation was the result of backcrossing of the original hybrid.

The following year, a note in the *Orchid Review* (Anonymous 1896) acknowledging the receipt of Pfau’s catalogue, is the first reference to the existence of “*Rosita*” ever published in an orchid journal. When Alfred Cogniaux prepared his treatment of



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[13–14] Two drawings of two different flowers of *Cattleya dowiana* subsp. *dowiana* f. *rosita*, as received from R. Pfau from Costa Rica and exhibited by Mr. C. Maron in December 1900. They represent the form's lectotype. Courtesy of Gustavo Romero, Harvard University Herbarium.

Cattleya labiata var. *dowiana* for the flora of Brazil, he made reference to this note to establish a date for the validation of the horticultural name “*rosita*” at the varietal rank (Cogniaux 1902).

Meanwhile, a plant sent by Pfau from Costa Rica and exhibited by the French grower Charles Maron received a First Class Certificate during a meeting of the Royal Horticultural Society’s Orchid Committee chaired by Harry J. Veitch, held in Westminster on December 18, 1900. In the report of this meeting, published by the *Journal of the Royal Horticultural Society*, *C. dowiana rosita* was illustrated for the first time with two lithographic drawings (Anonymous 1901a). In 1901, the *Orchid Review* published a detailed description of the awarded plant, recording its “sepals cream white, tinged with purple, the petals mostly rose-purple, tinged with yellow at the base, and veined with whitish throughout, and the lip crimson-purple with golden veining” (Anonymous 1901b). An obvious characteristic of the Central American *rosita* form of *C. dowiana* is the amount of purple present in the sepals, while the petals may be tinged and marbled with rose to various degrees.

According to the International Code of Nomenclature (McNeill et al. 2012), the publication in trade catalogues before January 1, 1953, is effective (Article 30.6) and a diagnosis published in any language before January 1, 1935, is sufficient to validate a Latin name (Article 39.1). Therefore, the name *Cattleya dowiana rosita* (pro hybr.), was effectively published by Pfau (1895) in his catalogue of “New, rare, and Beautiful Orchids of Costa Rica,” where it is validated by a short English description of its salient features. Even though he did not use the name *rosita* at any explicitly designated rank, Pfau consistently referred to these unranked names, throughout the text of his publication, as varieties or subvarieties, and this allows us to establish a modern taxonomy of this name:

***Cattleya dowiana* subsp. *dowiana* f. *rosita* (Pfau) Pupulin, stat. nov.**

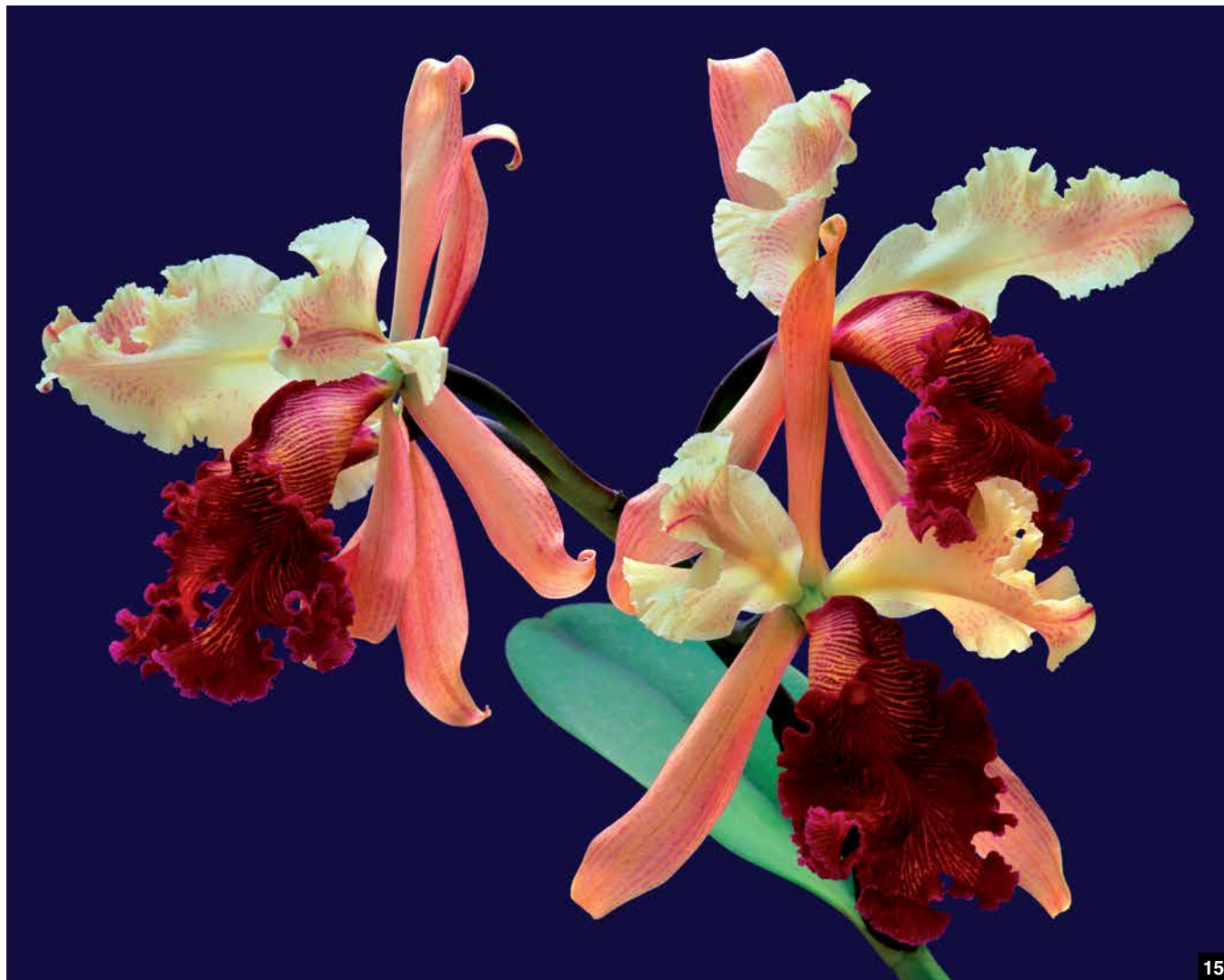
Bas. *Cattleya dowiana* var. *rosita* Pfau, *New Rare Beautiful Orchids* 5. 1895.

TYPE: not designated in the original protologue. Neotype, designated here, the illustrations of two flowers published in *J. Roy. Hort. Soc.* 25: figs. 210–211, based on a specimen sent from Costa Rica by

Richard Pfau. Figs. 13–14.

The two drawings chosen as the neotype of forma *rosita* were prepared from material sent from Costa Rica by R. Pfau, and they well represent the type of flowers to which Pfau alluded in proposing the name in his catalogue.

A “peloric” form of *C. dowiana* also exists in South America. In the late 19th century, the horticultural community used the informal name of *Cattleya dowiana aurea marmorata* for a number of plants exhibited in England and in France, probably originating in Colombia (Anonymous 1896). At that time, the prevailing opinion was that these specimens represented a natural hybrid between the *aurea* variety of *Cattleya dowiana* and *Cattleya warscewiczii* (the same parents of *C. × hardyana*), with a marked expression of the traits inherited from *C. dowiana*. In 1897, Alfred Cogniaux gave formal recognition to the horticultural name given to the marbled-petaled *C. dowiana*, and Antonie Petrus Gerhardy Goossens illustrated it for the first time in Cogniaux and Goossens’ *Dictionnaire Iconographique des Orchidées*, published in Ghent (Belgium) from 1897 to 1903



[15] The Central American *rosita* form of *C. dowiana* has sepals boldly tinged with purple, whereas the petals may be sometimes only slightly marbled with rose-purple, as in this example flowered at Lankester Botanical Garden. Courtesy of the Editorial de la Universidad de Costa Rica.

(Cogniaux and Goossens 1897).

***Cattleya dowiana* subsp. *aurea* f. *marmorata* (Hort. ex Cogn.) Pupulin, stat. nov.**

Bas. *Cattleya dowiana* var. *aurea-marmorata* Hort. ex Cogn. in C.A.Cogniaux and A.P.G. Goossens, Dict. Icon. Orchid., *Cattleya*: t. 2c. 1897. *Cattleya dowiana* var. *aurea-marmorata* Hort., Gard. Chron., ser. 3, 20: 425. 1896, *nomen nudum*.

TYPE: Origin unknown. "Elle vient de se montrer récemment Chez M. Fournier, à Saint-Barnabé, près de Marseille." Lectotype, selected here, the illustration of *Cattleya dowiana* var. *aurea marmorata* in Cogniaux and Goossens, Dict. Icon. Orchid., *Cattleya*: t. 2c. 1897.

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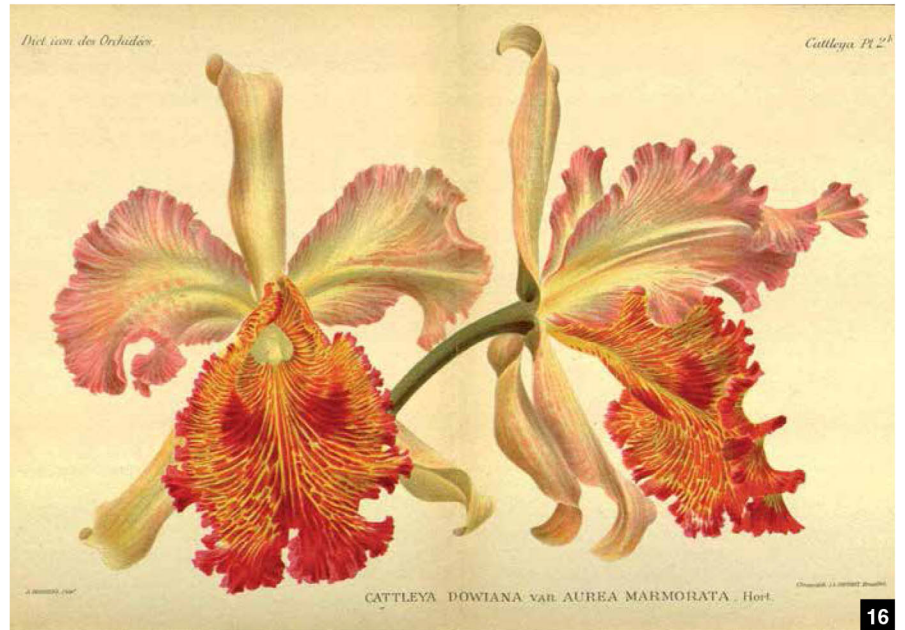
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[16] The illustration of two flowers from a plant exhibited by M. Fournier in 1896, selected as the lectotype of *Cattleya dowiana* subsp. *aurea* f. *marmorata*.