

Notes from the OIC

PHALAEOPSIS VIOLACEA, IN A BROADER SENSE

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Recently, a fine plant awarded as *Phalaenopsis bellina* (Rchb.f.) Christenson, was submitted to the Orchid Identification Center (OIC) at the Marie Selby Botanical Gardens, Sarasota, Florida, for verification of the identity. As it often turns out, many of our most beloved and “well-known” orchids also represent some of the most confusing and toughest taxonomical nuts to crack. *Phalaenopsis bellina* is a good example of this. The process of studying the natural history of this beautiful orchid led me into an all too familiar complex and confusing taxonomic jungle. For anybody lost in “the jungle,” a good way to get out of it can be to follow a straight line in any direction and hope for the best, and that the line is short enough to survive. To get out of a taxonomic jungle, I compare with similar cases that I am more familiar with, select a proper direction that seems logical and consistent, and stay on that track until things begin to make sense.

Phalaenopsis bellina was described in *Brittonia* 47(1): 57 (1995), by Christenson, as a new combination of a “variety” of *Phalaenopsis violacea* Witte, giving it rank as a distinct species. The name “bellina” originates from a *Phalaenopsis* that was sent to Reichenbach by Williams in 1878, subsequently identified as *Phalaenopsis violacea* var. *bellina*, and published in the *Gardener’s Chronicle*, n.s. 22: 262 (1884). A drawing was prepared by Reichenbach, which can be seen at the herbarium of the Museum of Natural History in Vienna, and in various publications (Sweet, 1968; Christenson, 2001). The natural origin of this plant is unknown (Sweet, 1980). If we check the distribution of *Phalaenopsis violacea* in Williams’ “The Orchid Grower’s Manual”: 674–675 (1894), however, we read “Malay Archipelago.” Additionally, Rolfe (1891) reported that in 1881 Mr. Curtis sent a consignment of plants from Palembang (southern Sumatra) to Veitch that were “very variable in the colour of its flowers, which range from almost uniform violet shade down to cream-white, with the segments somewhat barred and spotted in some varieties. In the light-coloured varieties, however, the front lobe of the lip usually retains

its violet colour, and in some cases also the contiguous halves of the lateral sepals, forming a very elegant contrast.”

So the question is: what separates *Phalaenopsis bellina* from *Phalaenopsis violacea*? According to the author of the former species, the difference is based on morphological and chemotaxonomic data; but it is also mentioned that the two species generally represent separate geographic distributions, where *Phalaenopsis bellina* is horticulturally known as the “Bornean type” and *Phalaenopsis violacea* represents what is known as the “Malayan type,” although the type plant of the latter species was collected in Sumatra. These “type” definitions seem to have been coined by Janet and Lee Kuhn (1965), the creators of J & L Orchids, who imported large numbers of *Phalaenopsis violacea* over the years. To complicate things, both “types” (at least the “Bornean” type) reportedly occurs throughout the entire area of distribution, making this geographic “typification” unreliable for taxonomic purposes. On the other hand, the fact that both “types” grow sympatrically, or at least in the same country (even though they may be isolated by other factors such as altitude or habitat preference) supports the possibility that they may indeed be distinct species. What speaks against this, however, are the selected distinguishing features for *Phalaenopsis bellina* on which the species diagnosis is based.

The first feature mentioned by Christenson is a difference in color. The flowers of *Phalaenopsis violacea* are “usually rose-pink but may be white . . . or bluish.” The color of *Phalaenopsis bellina* is described as “white, greenish white, or yellow . . . tepals with an intense deep-purple blotch on the inner halves of the lateral sepals. In some color forms of *P. bellina* there are either purple spots or purple flushes on the proximal portions of the petals and lateral sepals. The perianth of *P. bellina*, however, is never uniformly pigmented as in *P. violacea*.” When analyzing these descriptions, my impression is that we are dealing with a certain degree of natural variation in color range for both taxa that merge into each other. Looking at the cho-

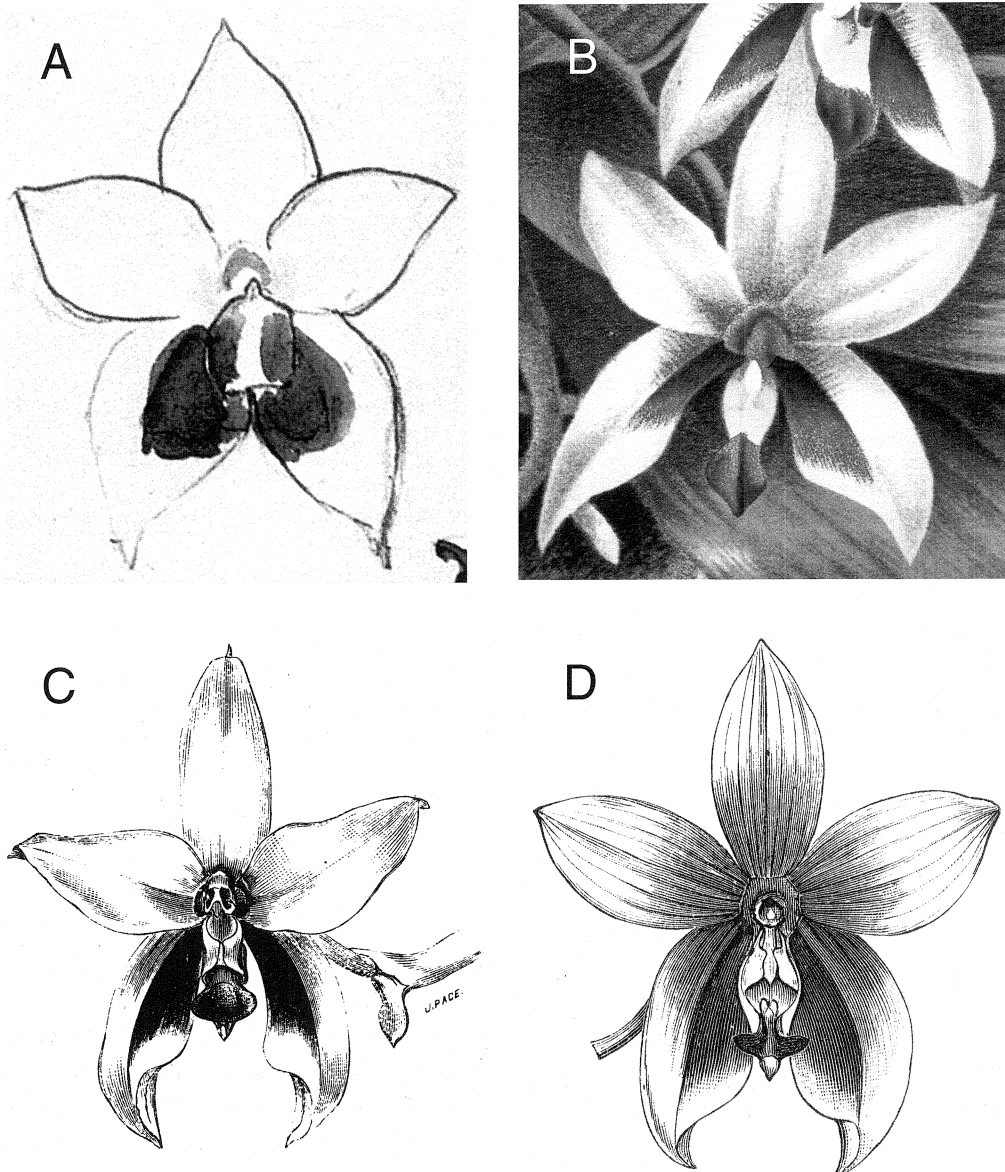


FIGURE 1. Comparison of *Phalaenopsis violacea* illustrations. **A.** Reichenbach's watercolor of *Phalaenopsis violacea* var. *bellina*. **B.** Rolfe's painting of *Phalaenopsis violacea*. **C.** Veitch's drawing of *Phalaenopsis violacea*. **D.** Williams' drawing of *Phalaenopsis violacea*.

sen photographs and illustrations in Christenson's (2001) monographic treatment of the genus strengthens this impression, with at least *Phalaenopsis violacea* f. *coerulea* displaying the coloration pattern typical for *Phalaenopsis bellina*. In general, vague and inconsistent color differences alone are not particularly reliable for taxonomical purposes, and this case seems to be no exception.

The second feature of distinction between

Phalaenopsis bellina and *Phalaenopsis violacea* is based on morphological differences in the shape and size of the sepals and petals, where one extreme is considered as one species, and the opposite extreme is considered the second species. No other morphological differences are apparent to separate these two taxa. When I analyze these features in various publications and descriptions (i.e., Dourado 1978, Fitch 1980, Williams 1894) it becomes clear that both size

and shape of the sepals and petals vary a lot, and merge into each other as well. This diffuse “distinction” is not satisfactory to consider the two entities as separate species either, but rather demonstrate the degree of natural variability of a widespread species: *Phalaenopsis violacea*. A comparable case is represented by *Odontoglossum crispum* Lindl., which is a highly variable orchid from the Colombian Andes. For whatever reasons, this polymorphic species displays an impressive degree of variation in terms of color patterns, shape and size of the sepals, petals and lip (Dalström 1996, 2003). Originally, many of these forms were described as distinct species, but gradually as the growers and the botanists learned more about the natural populations and their variations, it became clear that they all represented one single taxon. This conclusion does not contradict the existence of, and need for, certain geographical “type definitions.” An example of this is the “Pacho type” and the “Fusa type,” still used in horticulture to distinguish between individual plants with larger and rounder, versus smaller and more star-shaped flowers. The origin of these “type” definitions comes from the fact that it was possible to find *Odontoglossum crispum* plants with horticulturally desirable large and round flowers near the village of Pacho, north of Bogotá. Respectively, less desirable plants with starry flowers were more common around the village of Fusagasuga, south of Bogotá. This does not mean that you cannot find either one of these “types” in either location. It appears to be the same situation for *Phalaenopsis violacea*, with many plants representing one form originating in Sarawak (“Bornean” type) but found elsewhere as well; and the smaller, often more unicolored forms, commonly referred to as the “Malayan type,” generally originating in Malaysia and Indonesia (including Sumatra). One feature that is often connected with the “Bornean” type is the more or less “bow-legged” lateral sepals. Some authors (Freed 1978) mention that many (but apparently not all) plants imported from Borneo had this less attractive quality, while others (Kuhn 1965) say that all plants imported by them from Borneo had “bow-legged” lateral sepals. Veitch (1891) includes an illustration of a “bow-legged” *Phalaenopsis violacea* in his Manual of Orchidaceous Plants, but identifies Sumatra as his source of plants. Williams (1894) illustrates a “bow-legged” flower of *Phalaenopsis violacea*, with the Malay Archipelago as the geographic origin. Seidenfaden (1992) includes a drawing of a *Phalaenopsis violacea* with “bow-legged” lateral sepals in his Orchids of Peninsular Malaysia and Singapore. This effectively invalidates the geographic distinction of the

“bow-leggedness” as a useful taxonomic characteristic for this species. Viewing the selected photographs and illustrations in Christenson’s treatment (2001) of both *Phalaenopsis bellina* and *Phalaenopsis violacea* clearly reveals that this “bow-leggedness” varies a lot and merely represents natural variability within a species. Another example of the inconsistency in the “bow-legged” versus “star-shaped” characteristics can be seen if we study the selected photographs of *Phalaenopsis sumatrana* in Christenson’s treatment (2001). These photographs show a high degree of variability regarding the position and shape of the lateral sepals, including some seriously “bow-legged” ones. Furthermore, a form originally described as *Phalaenopsis violacea* var. *schroederiana* by Reichenbach is identified as *Phalaenopsis* × *singuliflora* and considered a hybrid between *Phalaenopsis bellina* and *Phalaenopsis sumatrana* Korth. & Rchb.f., by Christenson (2001). The illustration shows a flower with some basal stripes and spottings on the sepals and petals, and a purple unicoloration on the upper halves of the sepals and petals. The lateral sepals are distinctly “bow-legged.” How this supposed hybrid can get a uniform purple color on the upper halves of the sepals and petals from one species that have brown spots and stripes (*Phalaenopsis sumatrana*) and a species that “never” has this type of purple coloration (*Phalaenopsis bellina*) is puzzling.

The third feature is the chemo-taxonomic difference. Christenson and Whitten (1995) analyzed the floral fragrances between *Phalaenopsis bellina* and *Phalaenopsis violacea*, and concluded that they were different enough, together with the above listed color and morphological features, to distinguish between these two species. This result was never published, however; and when asked about this, Whitten (pers. comm.) explains that differences in fragrance composition provide evidence supporting that the two are distinct, but it provides no conclusive proof about species status. Variation in floral fragrances or in leaf essential oils is common within some species (chemotypes). Without analyses of population samples of *Phalaenopsis bellina* and *Phalaenopsis violacea*, we don’t know whether these differences in fragrances correlate with morphological differences, and we do not know whether the fragrances play an important role in pollinator specificity.

When the flower of some strongly scented orchids (*Coelogyne* sp., *Odontoglossum hallii*) are dissected, the various parts have distinctly different odors (pers. obs.), suggesting different chemical compounds. Consequently, depending on which part or combination of parts is used in

the analysis, the outcome may be different. In other cases, certain individual plants may reveal certain chemicals, while other individuals of the same species do not. Dr. Doel Soejarto of the University of Illinois gathered a sample from a tree in Sarawak that produced a nonalkaloid chemical compound effective in the laboratory against HIV-1. Unfortunately, scientists were unable to find more of the substance in other trees of the same species (Plotkin 1993).

CONCLUSIONS

When all here listed features are taken into consideration, I cannot but conclude that *Phalaenopsis bellina* just represents selected individual plants of a variable *Phalaenopsis violacea*. The terms "Bornean type" and "Malayan type" are misapplied, but I suspect they will probably remain in horticulture. What we really have are *forms* of a species that display certain slightly deviating characteristics, such as bow-legged lateral sepals, bluish color, or unusually broad petals. A "form" is the lowest taxonomic rank and is of no particular scientific importance, although it can have a considerable horticultural impact and value.

The World Checklist of Monocotyledons recognizes only *Phalaenopsis violacea* and treats all varieties and forms as synonyms. Thus the OIC treats *Phalaenopsis violacea* in a broad sense.

***Phalaenopsis violacea* H.Witte, Fl. Jard. 4: 129 (1861).**

Synonyms:

- Phalaenopsis bellina* (Rchb.f.) Christenson, Brittonia 47: 58 (1995).
- Phalaenopsis violacea* var. *bellina* Rchb.f., Gard. Chron., n.s., 22: 262 (1884).
- Phalaenopsis violacea* var. *alba* Teijsm. & Binn., Natuurk. Tijdschr. Ned.-Indië 24: 320 (1862).
- Phalaenopsis bellina* f. *alba* Christenson, Phalaenopsis: 113 (2001).
- Phalaenopsis violacea* f. *alba* (Teijsm. & Binn.) Christenson, Phalaenopsis: 164 (2001).
- Phalaenopsis bellina* f. *bowringiana* (Rchb.f.) Christenson, Brittonia 47: 59 (1995).
- Phalaenopsis violacea* var. *bowringiana* Rchb.f., Gard. Chron., n.s., 22: 262 (1884).

- Phalaenopsis violacea* f. *coerulea* Christenson, Phalaenopsis: 165 (2001).
- Phalaenopsis bellina* f. *murtoniana* (Rchb.f.) Christenson, Brittonia 47: 59 (1995).
- Phalaenopsis violacea* var. *murtoniana* Rchb.f., Gard. Chron., n.s., 10: 234 (1878).
- Phalaenopsis bellina* f. *punctata* (Rchb.f.) Christenson, Brittonia 47: 59 (1995).
- Phalaenopsis violacea* var. *punctata* Rchb.f., Gard. Chron., n.s., 22: 262 (1884).

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