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Rediscovery of a Cuban Encyclia Hooker.

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ABSTRACT: *Epidendrum grahami* Hook. is established as a distinct Cuban *Encyclia* Hook. and transferred into the genus *Encyclia*. *Epidendrum grahami* is compared to the species with which it has been considered a synonym (*Epidendrum phoeniceum* Lindl. and *Epidendrum phoeniceum var vanillosmum* Lem.) and is concluded that it is a valid distinct *Encyclia*. Additionally, *Encyclia navarroi* Vale & Rojas is here reduced to a synonym of *E. grahami*.

A detailed study of the published names of epidendrums and several populations of encyclias considered synonyms of *Encyclia phoenicea* (Lindl.) Neum. has resulted in the identification and establishment of several distinct species. Once a proper typification of *E. phoenicea* was made (Sauleda & Esperon, 2012), the true nature and proper name of these distinct species was determined and systematically published in this series of nomenclatural notes (www.newworldorchidaceae.com). The species identified and published include *Encyclia havanensis* Bello, Esperon & Sauleda (Bello, Esperon & Sauleda, 2013) previously identified in herbaria (P) as *Epidendrum phoeniceum* var. *fragrans*; *E. pyriformis* (Lindl,) Schltr. (Esperon & Sauleda, 2014) previously reduced to a synonym of *E. phoenicea* (Acevedo Rodriguez, 2012; Ackerman, 2014); *Encyclia hamiltonii* Sauleda & Esperon (Sauleda & Esperon, 2013) and *Encyclia oblongata* (A. Rich.) Acuña (Esperon & Sauleda, 2014) both previously misidentified as *E. pyriformis* and subsequently reduced to synonyms of *E. phoenicea* (Ackerman, 2014).

Reducing names of validly published species to synonymy is an error that can be easily made by only consulting herbarium specimens, without the benefit of studying live material, physically observing the populations or understanding the factors that have led to speciation in the encyclias in Cuba. One of these names that has been considered a synonym of *E. phoenicea* is *Epidendrum grahami* Hook. *Epidendrum grahami* was described by Hooker in 1841 and has been considered a synonym by several authors starting with Lindley (1841), who almost immediately after the publication of *E. grahami* published a comment implying that *E. grahami* could be a synonym of *Epidendrum altissimum* (Batem. ex Lindl.) Schltr. Later Lindley (1853) reduced *E. grahami* to a synonym of *E. phoeniceum var. vamillosmum* Lem.

Lindley's comments on *E. grahami* deserve detailed considerations. The knowledge of *Epidendrum* section *Encyclium* was at that time in its early stages. Authors such as Lindley, Hooker and Richard were beginning to focus on and describe the species of *Epidendrum (Encyclia)* from the Cuba-Bahamas region as more species were collected (Bateman, Sagra, Linden, Wright) or introduced into cultivation (Loddiges). However, many of the early descriptions of encyclias

from the Caribbean area were made by comparisons to continental species, *E. altissimum* to *Epidendrum oncidioides* Lindl. (Lindley, 1838), *E. phoeniceum* to *E. macrochilum* Hook. (Lindley, 1841), *E. fucatum* Lindl. (Lindley, 1838) and *E. gracile* Lindl. (Lindley, 1835) to *Epidendrum odoratissimum* Lindl.

In Lindley's first published reference to E. grahami, he implicitly elaborates on the concept of E. grahami that the origin of E. grahami was from the Caribbean region even though according to Hooker (1841) the specimen had been received at the Edinburgh Botanical Garden from Mexico. Lindley in Edwards's Botanical Register (1841, Miscellaneous Notices, page 67, no. 145) following his publication of E. phoeniceum lists E. grahami (1841, Miscellaneous Notices, page 57, no. 120) and states "I do not see how it differs from *Epidendrum altissimum*, except in being a small imperfectly formed specimen". Lindley recognizes that *E. grahami* is not a synonym of the *E*. phoeniceum that he just published. Certainly the color of the flowers of some of the morphs of E. grahami could be considered close to some of the dominant morphs of *Epidendrum altissimum*. The source material for the description and illustration of *E grahami* was a live plant, but the source material of E. altissimum was dried material. However, Lindley could have known about the color of the flowers from the references to the species from the collector he cites in the description of E. altissimum (Lindley, 1838). The morphological differences are too drastic to be ignored and they are accounted for in Lindley's last comment ("a small imperfectly formed specimen"). Besides the difference in the size of the plant and inflorescence, the pseudobulbs in E. grahami are ovate and in E. altissima they are greatly elongated. Epidendrum grahami was never officially reduced to a synonym of E. altissimum.

In 1853 Lindley again referred to *E. grahami* as a synonym of a Cuban species. In Folia Orchidacea (1853) he lists E. grahami as a synonym of E. phoeniceum var vanillosmum Lem. (Flore des Serres et des Jardins de l'Europe 4: pl. 306. 1848.). Here again Lindley is recognizing that *E. grahami* is not a synonym of *E. phoeniceum*. The plate accompanying the protolog of *E*. phoeniceum var. vanillosmum is clearly different from E. grahami and E. phoeniceum. Lemaire emphasizes a particular character of the labellum: the ovate tuberosities below the column that protrude beyond the apex of the anther, which are well depicted in the plate. Lemaire also describes and depicts lateral lobes longer than the column in a vigorous and cespitose plant. These features can be found on morphs related to *E. pyriformis* from areas where introgression with other species such as *E. plicata* and *E. phoenicea* occurs. These morphs are well represented by herbarium specimens from as early as the 1820s. The protruding tuberosities that Lemaire describes appear to refer to a particular feature of *E. pyriforme* and related taxa. The same projected extension of the calli as Lindley calls them in the description of *E. pyriforme*. This particular character is shown in Fig. 1 of Lindley's plate (Botanical Register, vol. 33 t. 50) of *E. pyriforme*. Meanwhile the plate of E. grahami contains details that show how distinct the callus of this species is compared to E. pyriforme (Curtis's Bot. Mag. 67: t. 3885. 1841.). Figure 2 shows a detail of the lip where it can be observed that the lamellae descend in a gradual slope, not protruding nor ending abruptly. The plate also shows that the side lobes of E. grahami are not as large as the side lobes of E. phoeniceum var. vanillosmum. The only similarity between them appears to be the color of the labellum.



Epidendrum phoeniceum var *vanillosmum* Lem., Flore des Serres et des Jardins de l'Europe 4: pl. 306. 1848.

Rolfe (1901) published comments suggesting *E. grahami* and *E. phoeniceum* var. *vanillosmum* are distinct. Rolfe stated: "In 1848 a West Indian plant which flowered in the establishment of M. L. Van Houtte, at Ghent, was figured and described by Lemaire as *E. phoeniceum* var. *vanillosmum*", "Lindley, in his Folia Orchidacea, adopted Lemaire's variety, but reduced *E. grahami*, to a synonym of it." *Epidendrum grahami* "however, seems to represent a distinct species, and has rather long sepals and petals, suffused with dusky brown at the apex, a white lip veined with rose, and various technical differences." If Rolfe would have had the benefit of studying live material of *E. grahami*, he could have published a proper identification.

Schlechter in 1915 (Die Orchideen, 211) lists *E. phoenicea* Schltr. and in parenthesis *Epidendrum phoeniceum* Lindl., *Epidendrum Grahami* Hook. Tropicos interprets Schlechter's listing as *E. phoenicea* (Hook.) Schltr. an illegitimate homonym of *E. phoenicea* based on *E. grahami*. IPNI interprets Schlechter's listing as *E. phoenicea* Schltr. As with the other species that Schlechter transfers to the genus *Encyclia* in Die Orchideen, Schlechter is transferring *E. phoeniceum* Lindl. to the genus *Encyclia* and lists *E. grahami* as a synonym. Schlechter's determination that *E. grahami* is a synonym of *E. phoenicea* is the criterion followed by current authors (Ackerman, 2014).

E. phoenicea Schltr. (Epidendrum phoeniceum Ldl., Epidendrum Grahami Hook.).

Habitus wie bei *E. alata* Schltr. Schaft mäßig locker 8-20 blütig, zuweilen verzweigt. Blüten ziemlich groß, 6-7 cm im Durchmesser. Sepalen und Petalen zirka 3,5 cm lang, grüngelb, nach den Spitten bräunlich, schmalzungenförmig. Lippe dreilappig, weißlich, mit roter Aderung. Seitenlappen klein. Mittellappen fast kreisrund, groß. Blütezeit: September bis Oktober. Heimat: Mexiko.

Epidendrum grahami Hook. was never considered a synonymy of *E. phoeniceum* by Lindley. Besides the obvious differences of color and vegetative habits demonstrated in the plates and descriptions of both species made from living material, there are distinct floral characters to which Lindley and Hooker paid special attention in the original descriptions. These features have demonstrated to be of taxonomic importance for the encyclias of this region.

The figures included in the type specimen and plates, representing details of the lips magnified and the description of the calli are of crucial importance in understanding the true nature of the Cuban species.



Crude sketches of the labellum of *E. fucatum* and *E. altissimum* showing their parallel lamellae drawn on the herbarium sheets of the types of both species as early as 1838.



As Lindley continued studying new material from Cuba and the Bahamas, the drawings of the lips of these species required more elaboration to reflect the complex shapes of the calli, as is shown on the plates of *E. phoeniceum*, *E. pyriforme* and *E. plicatum* drawn in the period from 1841 to 1847.

Lindley pays special attention to the importance of the labellum to differentiate these species. Comparing *E. phoeniceum* to continental species, Lindley in Sertum Orchidacearum (1841), writes that *E. phoeniceum* "... differs principally in the structure of the lip which in this species has two distinct elevated plates at its base, ending abruptly, without throwing out any runners into the main surface of the lip...". While in the description of *E. pyriforme*, explains "Fig. 1. Represents its lip spread open, to show the form of the calli, which scarcely adhere to the lip until they reach the re-entering angles at its sides." In addition to the brief descriptions, examination of live material verifies the differences shown in the drawings. The oblong border and abrupt end of the calli in *E. phoenicea* and *E. plicata* contrast to the angled border and projected ends in *E. pyriformis*, however it is the swollen and convergent end narrowing of the pollinator channel of *E. phoenicea* which distinguishes it from *E. plicata* and *E. pyriformis*.



In Hooker's illustration of the lip of *E. grahami* it can be seen that the callus does not the end abruptly nor swell or converge. A stable character observed on all the morphs studied.

Although these "technical differences" as Rolfe called the distinctive features of *E. grahami* that differentiate it from the species of the *E. phoenicea* group are evident on the type, description and plate, the validation of *E. grahami* could not be published without observing an abundant source of live material due to the floral polymorphism of the population. This

polymorphism makes it difficult to identify specimens of *E. grahamii* in herbaria or isolated individuals.

A live plant of one of the extreme morphs referable to *E. grahami* was observed and photographed in the collection of William Peters, in Miami, Florida. Peters purchased the plant from William Osment, a famous collector of Cuban orchids. Osment originally collected the plant in the early 1950's and deposited herbarium material also referable to *E. grahami* at AMES. However, what made it possible to understand the true nature of *E. grahami* was the discovery and extensive documentation of vicariant populations at two isolated locations during a period of several years by the first author.

Lindley in Folia Orchidacea (1853) lists *E. grahami* as a synonym of *E. phoeniceum var vanillosmum*. Lindley recognized that *E. grahami* was not the same as what he described as *E. phoeniceum*, but referred *E. grahami* to a synonym of *E. phoeniceum* var. *vanillosmum* principally based on the coloration of the labellum. However, the plate accompanying the protolog is clearly not *E. grahami*. It is established here that *E. grahami* is a distinct Cuban *Encyclia* and as Hooker stated, "we cannot find any described species with which it corresponds," therefore we here make the following combination:

Encyclia grahami (Hook.) Bosmenier, Esperon, Sauleda comb. nov.

Basyonym:

Epidendrum grahami Hook., Curtis's Bot. Mag. 68: t. 3885. 1841.

Type: "Mexico" (Holotype: K)

Hooker in the protolog states: "I am indebted to Dr. Graham, who sent me the specimen here figured in the autumn of 1840. I cannot find any described species with which it corresponds. It was received at the Edinburgh Botanic Garden from Mexico". Hooker does not actually state the origin of the specimen, the collector or the date of collection.

Synonym:

Encyclia navarroi Vale & Rojas. Annales Botanici Fennici 49: 83-86. 2011.

Encyclia grahami has a restricted distribution in Western Cuba where it was recently rediscovered. The only collections previously attributed to *E. grahami* are the original collection (Holotype) used by Hooker to describe the species, the plant collected by Osment in the Peters collection and the specimen at AMES collected by Osment.

Due to its characteristics, several previous collections of *E. grahami* could have remained in herbaria as unidentified material. Herbarium material identified as *Encyclia* sp. at HAC (Havana) and HPPR (Pinar del Rio) (Mujica, 2003) could be referable to *E. grahami*.

Properly identifying isolated plants of *E. grahami* is difficult due to the highly variable nature of the populations. The morphs of *E. grahami* differ in the size of the flower and inflorescence, in the size of the plants and in the shape and color of the flowers, including the shape, size and color of the labellum. The high density of morphologically distinct individuals in these two isolated populations, could erroneously lead to the conclusion that in the population there are several different species. This diversity is characteristic of a hybrid swarm with several species and introgression involved. The two populations of *E. grahami* are gregarious populations, as is the case of other hybrid swarms like *Tolumnia lucayana* (Nash) Bream. They are characterized by high

rates of fecundity and occur in communities with high density of morphologically different individuals.

There are key characters physically observed in individuals of *E. grahami*. The shape of the side lobes of the labellum and the shape of the lamellae, which gradually slope descending to the disc of the labellum, are consistent characters in all of the individuals.

A recently described species, *Encyclia navarroi* Vale & Rojas (Vale and Rojas, 2011), corresponds to one of the morphs found in the population of *E. grahami*. According to Vale & Rojas (2011) *E. navarroi* is found in coastal areas of West Cuba growing "in evergreen microphyllous forest, swamp vegetation and the ecotone between them". This is also where the authors found the population of *E. grahami*. *Encyclia navarroi* is here reduced to a synonym of *E. grahami*.



Holotype (K) of Epidendrum grahami Hook. at Kew.



Illustration of *Epidendrum grahami* Hook., in Curtis's Bot. Mag., t. 3885. 1841, clearly illustrating the keels sloping down to the disc of the labellum.



Encyclia grahami (Hook.) Bosmenier, Esperon and Sauleda. Original plant collected by Osment now in the Peters collection and herbarium material from West Cuba, referable to *E. grahami*, deposited by William Osment at AMES in the 1950's (Orchid Herbarium of Oakes Ames 115114, Harvard University Herbaria 00256529).



Encyclia grahami (Hook.) Bosmenier, Esperon and Sauleda. Illustration of different morphs flowering in the same population (in situ) demonstrating the polymorphism.



Encyclia grahami (Hook.) Bosmenier, Esperon and Sauleda. Illustration of additional morphs flowering in the same population (in situ) demonstrating the polymorphism.



Morphs of *E. grahami* differ greatly in the size of the flower. However, the shape of the side lobes is consistent in all of the individuals observed.



Comparison of the calli of *E. grahami* and *E. plicata* a possible species involved in the population of *E. grahami*. On *E. grahami* the callus is "...two white prominent lamellae" (Hooker, 1841) that descend in a gradual slope, while on *E. plicata* the lamellae end abruptly.



Encyclia grahami (Hook.) Bosmenier, Esperon and Sauleda. Comparison of lamellae of different morphs (in situ).



Encyclia grahami (Hooker) Bosmenier, Esperon and Sauleda and *Encyclia phoenicea* (Lindl.) Neum. illustrating a possible species involved in the population of *E. grahami*.



Encyclia grahami (Hook.) Bosmenier, Esperon and Sauleda and *Encyclia bocourtii* Múj. Benítez & Pupulin illustrating another possible species involved in the population of *E. grahami*.



Encyclia grahami (Hook.) Bosmenier, Esperon and Sauleda and *Encyclia pyriformis* (Lindl.) Schltr. demonstrating yet another possible species involved in the population of *E. grahami*.



Encyclia grahami (Hook.) Bosmenier, Esperon and Sauleda in natural habitat.



Population of *E. grahami* is characterized by highly successful pollination.



Encyclia grahami (Hook.) Bosmenier, Esperon and Sauleda in natural habitat.

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