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The Small, Yellow Flowered Cuban *Encyclia* Hook. Species of Achille Richard.

Ruben P. Sauleda[1] and Pablo Esperon[2]

[1] 22585 SW 187 Ave., Miami, Fl 33170.
[2] 6442 SW 107 Ct., Miami, Fl 33173.

Abstract

The three Cuban species of *Encyclia* Hook. described by Achille Richard which were considered synonyms of *Encyclia fucata* (Lindl.) Britt. & Millsp. are discussed.

Three of the Cuban species of *Encyclia* Hook. described by Achille Richard, *Epidendrum sagraeanum, Epidendrum affine* and *Epidendrum hircinum* have been a source of confusion due to several factors. First, the absence of field studies, making decisions without the knowledge of basic population dynamics and evolutionary theory in order to properly interpret the field data and finally the habit of copying the work of previous investigators without attempting to corroborate the information.

In the genus *Encyclia* in Cuba it is impossible to make informed decisions uniquely based on dried herbarium specimens unless the diagnostic charters are first determined and understood by studying live material from the type locality. Field studies are absolutely necessary to determine the genetic boundaries of these species.

The author (Reichenbach,1861) that originally reduced the three species of Richard to synonymy did not have the field observations with which to make that decision. Most of the authors that followed copied previous publications without further research (Grisebach, 1866; Urban, 1909; Schlechter, 1915; Leon, 1946; Withner, 1996; Nir, 2000; Llamacho & Larramendi, 2005; Vale, et al, 2014; Mújica & González, 2015). All of the species from Cuba described by Lindley and Richard are clearly distinct and what each author described is well represented by herbarium specimens. All of the species except for one that Lindley described from Cuba were described using live material. In most cases the type locality is still extant and plants corresponding to the type can be found and studied.

A basic understanding of the species concept and population biology is imperative before beginning to study these species. It must be understood that in many cases when intermediates are found between the distinct species they are usually a result of hybridization and introgression. Hybridization and introgression are almost the rule between species of *Encyclia* in Cuba and the Bahama Islands (Sauleda & Esperon, 2016). In the encyclias in Cuba and to a

certain extent in the Bahama Islands there are prime examples of adaptive radiation through hybridization and introgression. This also must be understood prior to trying to simplify a flora by lumping all of the species of Richard into synonymy. Making a flora or checklist requires a level of investigation than most authors have not done in Cuba. In addition when preparing a flora or checklist all of the names in the literature attributed to the area of the flora must be investigated not simply ignored or placed in synonymy by copying previous authors. The type of each species must be examined and compared to live material. These basic taxonomic procedures have been lacking in many of the floras and check lists that included the genus *Encyclia* in Cuba.

The geological history and resulting habitat diversity of Cuba has to be taken into account when considering the speciation that has occurred. Geographical isolation of habitats is one of the main factors contributing to the speciation that has occurred in the genus *Encyclia* in Cuba. Cuba has more species of encyclias per km^2 than almost any other area with encyclias. The Isle of Pines especially has an inordinate number of endemic species per km^2.

Although the source material used by Richard combined with his knowledge of the related species, E. *fucata* and *E. oxypetalum* and the plates and descriptions published for the new species are far better detailed than the material used for the publication of the generally accepted *Epidendrum trianguliferum* Rchb., *Epidendrum bipapularis* Rchb., or *Epidendrum grisebachianum* Cogn. all of which were published based on dry material collected by Wright and assembled and sold to the European herbaria by Asa Gray, no serious attempt was made to verify the Richard species.

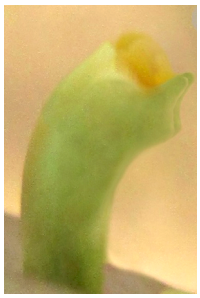
Three species names of Richard have been proven to be valid when the populations were studied in the field and compared to the type specimens and protolog. Extensive personal and professional fieldwork have resulted in the rediscovery and revalidation of the Richard species that had been treated as synonyms previously. Continued fieldwork in Cuba will eventually result in a complete and comprehensive treatment of the genus *Encyclia* in Cuba.

A number of characters, which include column structure, fragrance and pollinator preference of Richard's species of *Encyclia* clearly distinguish them from each other and from *E. fucata*. These features are the most important of their reproductive biology and determine their reproductive isolation. The attraction to a pollinator is selectively determined by these features and restricts the entry into the flower by the pollinator. Due to the lack of field studies of live material these features have been mostly overlooked or ignored.

Although hybridization and introgression tends to sometimes cloud the differences between species, populations of these distinct species exactly as described by Richard still exist in Cuba and their presence can be verified by field studies.

Key to the Richard Species of *Encyclia* previously considered synonyms of *Encyclia fucata* (Lindl.) Britt. & Millsp.

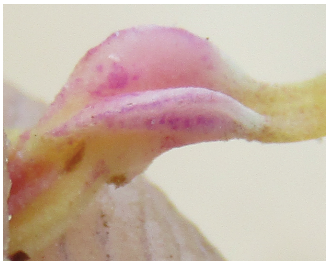
1. Plants flower in spring to summer…….2
1. Plants flower in October to January, column with auricles projecting beyond the tip of the anther ……..……..*Encyclia sagraeana*



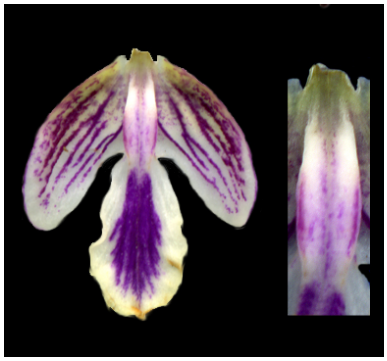
2. Plants monofoliate, column without auricles…….……..…*Encyclia fucata*

2. Plants bifoliate, column with auricles…....……..……..3

3. Keels under the column are raised and appear ‘fingernail-like’, flowers smell like a male goat……..*Encyclia hircinia*




3. Keels under column are long thin and erect…….
…….*Encyclia richardiana*



Encyclia richardiana **Rodriguez Seijo, Esperon & Sauleda**
Replaced name for *Epidendrum affine* A. Rich., nom. illegit.

In the summer of 2008, Efrain Rodriguez Seijo, studied a population of *Encyclia* Hooker at Clotilde, Najasa, Camaguey, Cuba, that resembled *E. fucata*. There were important differences in the vegetative and floral characters from *E. fucata*. The plants of the Najasa population had two leaves compared to a single leaf in *E. fucata* and the shape of the sepals, petals and labellum also were different leading to the conclusion that this population was a distinct species from *E. fucata*. A detailed analysis involving extensive field studies and comparison of live material to the holotype resulted in the recognition of the identity of one of the species Richard described, *Epidendrum affine* A. Rich.

In Sagra (Hist. Fisc. Cuba 11: 237. 1850) where *Epidendrum affine* A. Rich. was published there is an error. Under *E. affine* is the description for *E. fucatum* and under *E. fucatum* is what should be the protolog with the Latin description for *E. affine*. This is obvious since the description on the plate at Paris is the same description found under *E. fucatum*. In addition, the wrong plate is listed for *E. affine.* The plate referred to is of *Epidendrum ochranthum* Rich. The plate of *E. affine*, which is a black and white rendering of the color plate at Paris, is labeled *E. fucatum*. Therefore, *E. affine* was not validly published.

A new species name, was presented, for sensu *E. affine* A. Rich. (excluding description and plate) for the Najasa population based on the herbarium specimen in Paris labeled as the holotype of *E. affine* (Rodriguez Seijo et al., 2017).

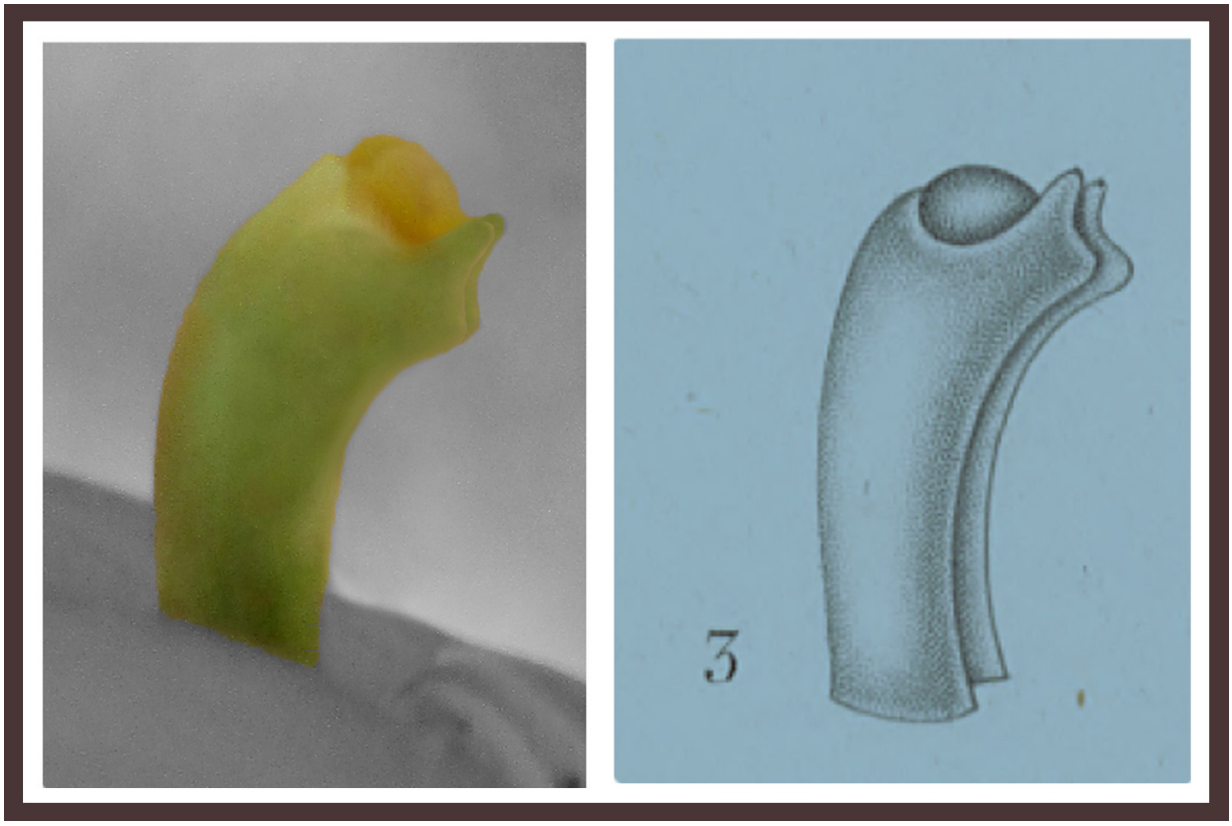
Encyclia richardiana Rodriguez Seijo, Esperon & Sauleda
Replaced name: *Epidendrum affine* A. Rich., Historia Física Política y Natural de la Isla de Cuba, Botánica 11: 237. 1850. nom. illegit.
HOLOTYPE: Herbier Museum Paris P00430664, *Epidendrum affine*, Cuba.

***Encyclia hircina* (A. Rich.) Acuña**

During the summer of 2016 and 2017, Manuel Alejandro Soto Calvo, studied a population of *Encyclia* Hooker at Los Indios Ecological Reserve, Isla de la Juventud, Cuba that resembled *E. fucata*. The distinct differences between this species and *E. fucata* were originally disregarded due to the confusing wide spectrum of characters attributed to *E. fucata* in the literature. However, after carefully examining live material, many images and considering in the description the particular scent of the flower, it was clear that the population at Los Indios Ecological Reserve was what Richard had described as *Encyclia hircina*.
Julian Acuña was the only author who recognized *E. hircina* as a distinct species after Reichenbach (1861) reduced most of Richard's epidendrums to synonyms. Acuña (1936) understood the nature of the species after observing live material in the field and transferred *E. hircinum* to *Encyclia*.

***Encyclia sagraeana* (Richard) Soto Calvo, Esperon and Sauleda**

On October of 2017, Manuel Alejandro Soto Calvo, found several abundant and stable populations of a mostly monofoliate *Encyclia*, that resembled *E. fucata,* on isolated tree islands along the Lanier Swamp near the southeast coast of Isla de la Juventud, Cuba.
Lindley described *E. fucatum* as a monofoliate species; Richard also described *E. sagraeanum* as a monofoliate species. However, in addition to the distinct flowering seasons, the column and callus of each species are totally different. The column of *E. fucata* does not have any signs of auricles, while the column of the *E. sagraeanum* found in these populations always has the prominent auricles projecting beyond the top of the anther as illustrated by Richard. The callus of *E. fucata* is described by Lindley as two oblong fleshy processes while the detail of the callus of *E. sagraeanum* in Richard's illustration shows two parallel lacinias that appear to end abruptly leaving a wide pollinator canal between them.
No other population of Cuban encyclias has been reported up to now with the auricles projected beyond the tip of the anther. The only reference to a column with those characteristics is the detail of the column of *E. sagraeanum* included on the illustration and the holotype of the species (P00410657). It is clear that the populations discovered by Manuel Alejandro Soto Calvo correspond to *E. sagraeanum* as described by Richard in 1850.
Richard references the dominant color form of *E. sagraeana* in the Latin description is "luteolis" or yellowish; and in a comment in Spanish about the differences of the three species he was describing, he specifies that the lip is white with purple veins.



Encyclia sagraeana (Rich.) Soto Calvo, Esperon & Sauleda column compared to detail on Richard's illustration.

Comparison of the distinct species of Richard to *Encyclia fucata* (Lindl.) Britt. & Millsp. (D); 1. flower, 2. labellum, 3. callus and 4. Column. A. *Encyclia sagraeana* (Rich.) Soto Calvo, Esperon & Sauleda. B. *Encyclia hircina* (Rich.) Acuña. C. *Encyclia richardiana* Rodriguez Seijo, Esperon & Sauleda. D. *Encyclia fucata* (Lindl.) Britt. & Millsp.

Acknowledgements

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