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A New Species of *Vanilla* Miller is Described for Cuba.

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#### Abstract

A new species of *Vanilla* Miller is described for Cuba.

Climate is usually the primary limiting factor for biota, however the edaphic factor can be a limiting factor to plant distribution and a factor leading to rapid evolution. The edaphic factor is the substratum on which a plant grows and from which it derives mineral nutrients and its water supply. When these edaphic factors are discontinuous speciation can occur rapidly (Kruckeberg, 1986). Kruckeberg (1986) describes the steps through which evolution proceeds from tolerant genotype to ecotype to an edaphic endemic. Edaphic factors can be granite outcroppings, marble outcroppings or serpentine substrates. When these edaphic factors are arrayed discontinuously, opportunities for colonization by different species can lead to events resulting in ecotypes and eventually speciation (Kruckeberg, 1986). The differentiation from ecotype to an endemic is due to complete reduction in gene flow between the ancestral population and ecotype, allowing an independent gene pool to develop (Macnair and Gardner, 1998). In some cases closely related taxa can be distinguished by their edaphic tolerances (Macnair and Gardner, 1998). Populations of certain taxa may have the genetic preadaptedness to successfully adapt to edaphically extreme conditions. A preadapted tolerant genotype can adapt to extreme edaphic conditions rapidly within a few generations (Shaw, 1990). Edaphic conditions can be a strong element of natural selection.

Endemism and relic species have been reported to occur on marble outcrops (Bedini et al., 2007) similar to those found in Isle of Pines (Isla de la Juventud), Cuba. The ridges on either side of Nueva Gerona on the Isle of Pines, Cuba, are composed of crystalline marble, which is known as the Gerona marble. These ridges on either side of Nueva Gerona are Sierra las Casas to the West of Nueva Gerona and Sierra Caballos to the East of the City. Sierra de la Cañada, another ridge a few miles to the Southwest is also composed of the same material.

Plant populations on these marble outcroppings have demonstrated a high degree of endemism. The genus *Vanilla* in Cuba is represented by five leafless species: *Vanilla bakeri*, *Vanilla barbellata*, *Vanilla claviculata*, *Vanilla dilloniana* and *Vanilla poitaei*. *Vanilla bakeri* is listed by Ackerman (2014) as a valid species for Cuba and differentiates it from *B. barbellata*. Soto Arenas and Cribb (2010) list *V. bakeri* as a synonym of *V. barbellata* but then state “The original description of the flower (*V. bakeri*) suggests that it may have been based in an immature bud of *V. barbellata*,

but details of the lip ornamentation do not coincide with the morphology of that species”. This difference in the ornamentation of the labellum is what Ackerman (2014) refers to in distinguishing *V. bakeri* from *V. barbellata*. A species of leafless *Vanilla* was discovered at Sierra Las Casas, Isla de la Juventud, Cuba, on a marble outcrop, which does not correspond to any of the known leafless species of *Vanilla*. This is an example of speciation due to edaphically extreme conditions.

This new species is here described.

*Vanilla marmoreisense*, Soto Calvo, Esperon and Sauleda, sp. nov.

Type: Cuba, Isle of Pines (Isla de la Juventud), at Sierra Las Casas. Collector Manuel Alejandro Soto Calvo, s. n. (HAJB).

This species is named for the marble outcroppings on which it solely occurs.

### Description

Plant lithophytic vines on marble outcroppings, up to 8 meters long. Roots 1-2 per node, glabrous, to 2 mm thick. Stem scandent, green to dark reddish-brown, smooth, with a shallow longitudinal groove, occasionally branched, to 1 cm in diameter, internodes to 10 cm long. Leaves early deciduous, ovate, arcuate, acute, to 1 cm long, 8 mm wide. Inflorescence auxiliary on lateral branches, to 15 flowers; floral bracts ovate, to 1 cm long, 8 mm wide. Flowers ephemeral, resupinate, produced sequentially, ovary pedicellate to 3 cm long; sepals and petals free, spreading, brown to light greenish-cream; sepals oblong, 4 cm long, to 1 cm wide; petals oblong to oblanceolate, subacute, 4 cm long, 1.5 cm wide; labellum reddish-brown, lateral lobes with a white margin, claw adnate to lower half of the column; labellum trilobed, triangular, lateral lobes orbicular-oblong flaring out exposing the column, mid lobe fleshy and apically slightly reflexed, having a tuft of short hairs which extend in a line towards the apex, terminally ending in a few fleshy tuberculate hairs; column arching, semiterete, to 3.5 cm long. Capsule indehiscent pendent, cylindrical, curved, to 7 cm long, 1 cm in diameter.

### Diagnosis

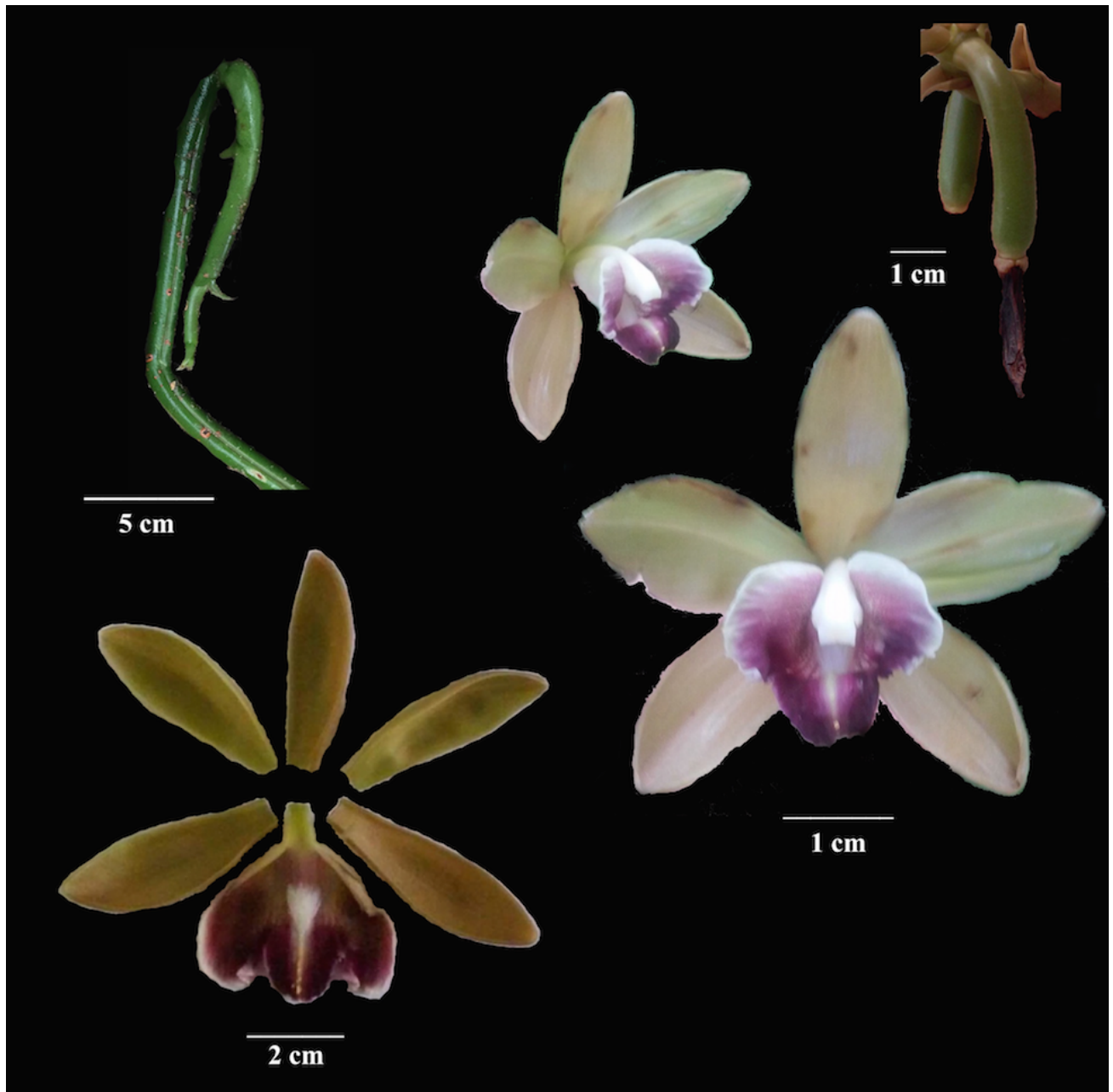
*Vanilla marmoreisense* is similar to *V. barbellata* and *V. bakeri*. It differs from *V. barbellata* in size, being about 1.5 cm smaller and having a tuft of short hairs on the mid lobe of the labellum which extend in a line towards the apex, terminally ending in a few fleshy tuberculate hairs, where *V. barbellata* has a tuft of rigid, retrose bristles from which extends to the apex a sparse line of fleshy tuberculate hairs (Ackerman, 2014). *Vanilla bakeri* has disc with tuft of retrorse, hinged scales 4 mm long beneath the stigma with a few thick tuberculate hairs scattered towards the apex of the mid lobe and terminating in a cluster of 10-14 such hairs about 1 mm long (Ackerman, 2014). *Vanilla marmoreisense* also differs from *V. bakeri* and *V. barbellata* in having the lateral lobes of the labellum flaring out exposing the column. In *V. bakeri* and *V. barbellata* the side lobes of the labellum form a tube enclosing the labellum.



*Vanilla marmoreisense*, Soto Calvo, Esperon and Sauleda in situ.



*Vanilla marmoreisense*, Soto Calvo, Esperon and Sauleda in situ.



*Vanilla marmoreisense*, Soto Calvo, Esperon and Sauleda.





*Vanilla marmoreisense*, Soto Calvo, Esperon and Sauleda in situ on marble outcropping.





*Vanilla marmoreisense*, Soto Calvo, Esperon and Sauleda in situ on marble outcropping.





Oblique view of Sierra Las Casas. Type locality for *Vanilla marmoreisense* Soto Calvo, Esperon and Sauleda.

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