

Phragmipedium longifolium^a

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Abstract

Within the *Phragmipedium longifolium* complex, several taxa have been described at the species level: *P. longifolium*, *P. hartwegii* and *P. hincksonianum* as *Cypripedium* species; *P. dariense* and *P. roezlii* as *Selenipedium* species; and *P. chapadense*. Although still treated as autonomous entities by some, especially in horticulture, it has become evident that these taxa are to be considered variants of one single species. In this article, an overview of the complex is given, and the necessary nomenclatural changes are proposed.

Résumé

Le complexe *Phragmipedium longifolium* – A l'intérieur du complexe *Phragmipedium longifolium*, plusieurs taxons ont été décrits au rang d'espèces. *P. longifolium*, *P. hartwegii* et *P. hincksonianum* l'ont été en tant que *Cypripedium*, *P. dariense* et *P. roezlii* en tant que *Selenipedium*, et *P. chapadense*, directement dans le genre *Phragmipedium*. Bien que certains traitent ces taxons comme des entités autonomes, notamment dans le milieu horticole, il est devenu clair qu'ils doivent être considérés comme des variations d'une même et seule espèce. Dans cet article, une revue du complexe et les changements nécessaires dans sa nomenclature sont proposés.

Introduction

One of the most magnificent plants of the genus *Phragmipedium* is, without any doubt, *Phragmipedium longifolium*. The species was originally described

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in 1852 as *Cypripedium longifolium* by Heinrich Gustav Reichenbach¹, generally known as the younger Reichenbach (Reichenbach fil.), the year he presented his doctoral thesis. Reichenbach's publication in the *Botanische Zeitung*, a Berlin-based German language botany journal co-edited by the professors Hugo Mohl (1805-1872) and Diederich Franz Leonhard von Schlechtendal (1794-1866), was based on an incomplete and mutilated dried specimen sent by von Warszewicz. As a result, we are left with a "description" that is useless. From the Latin part of the text, it is simply impossible to extract anything that could not be applied to several *Phragmipedium* species, and the German parts are not much, if any, better:

„Blüthen etwa so gross, wie die des *Cypripedium calceolus*. „Hüllbätter gelb, Lippe braun.“ *Cypripedium klotzschianum* steht nahe, allein es hat die äusseren Hüllblätter sammtig; einen behaarten Fruchtknoten, breitere sterile anthere, behaarten Blüthenstengel. Letzteres findet bei *Cyp. caricinum* ebenfalls statt: dieses hat aber kahle Fruchtknoten und sehr schmale (1/4 “ breite) Blätter.“²

The species proves to be extremely variable, and it does not surprise that various forms would be described as separate entities: *Cypripedium hartwegii* (1852) [Fig. 1], *Selenipedium dariense* (1869), *Selenipedium roezlii* (1871) [Fig. 2], *Cypripedium hincksianum* (1878), all by Reichenbach fil., and *Phragmipedium chapadense* (2003). By 1890, the situation around "*Cypripedium longifolium*" (as it was then named) [Fig. 3], had become so confusing that Robert Allen Rolfe, an autodidact who had made his way up the ranks at Kew to become one of the leading orchid taxonomists of his time, was asked for advice on the subject.

1: Notwithstanding the fact that many authors cite this taxon as *Cypripedium longifolium* Reichenbach fil. & Warszewicz, the article "Neue Orchideen der Expedition des Herrn J. de Warszewicz" was without any doubt authored by Reichenbach fil. alone. In fact, Reichenbach lists himself as the sole author and simply states (column 690) that Warszewicz supplied some "completing notes". In respect to the description of *P. longifolium*, this amounts to the addition of the word "acutis" to the Latin description of the leaves, and in the German text, it amounts to "perianth yellow, labellum brown".

2: "Flowers approximately as large as those of *Cypripedium calceolus*, perianth yellow, labellum brown. Allied to *Phragmipedium Klotzschianum* but with a pubescent ovary, a wider sterile anther [staminode], a pubescent inflorescence. The latter is also the case in *Cypripedium caricinum*, but that species has a glabrous ovary and very narrow (1/4 inch wide) leaves."



Fig. 1: *Cypripedium hartwegii*
from Seemann (1852)



Fig. 2: *Cypripedium roezlii*
from Curtis's Botanical Magazine: t. 6217



Fig. 3: *Cypripedium longifolium*
from Curtis's Botanical Magazine: t. 5970

His clarifications were embedded in an article entitled “*Cypripediums longifolium and Lowii*” (Rolfe, 1890) that was published in the *Gardeners' Chronicle* (3. series, vol. 8[208]: 728-730). Rolfe wrote:

"Several times recently, at the suggestion of different correspondents, I have examined the question of the distinctness or otherwise of the closely allied *Selenipedium longifolium*, *S. Hartwegii*, *S. Roezlii*, *S. Hincksonianum*, and *S. dariense*, and, as their history is involved in much confusion, I now propose to place on record the results arrived at.

Cypripedium longifolium was originally described in 1852 by Professor Reichenbach, from an imperfect herbarium specimen collected by Warscewicz [*sic*] on the Cordillera of Chiriquí, at 5000 to 7000 feet elevation, in 1849. *C. Hartwegii* appeared but a few weeks later in the same year. Its origin was not at first very clearly stated, but the plant was really detected by Hartweg on the eastern slopes of the Andes of Ecuador, in wet marshy places near the hamlet of Nanegal, in the province of Quito, at about 4000 feet elevation, when collecting plants for the Horticultural Society of London, in 1842. Dried specimens alone were secured, but those are carefully preserved in Dr. Lindley's Herbarium, now at Kew. Strangely enough, Lindley thought they belonged to the previously described *C. caudatum*, and so labelled them; also when giving a figure for this plant in *Paxton's Flower Garden*, in 1850 (vol. 1. p. 40, woodcut), he borrowed all but the flowers from the former to help make up the figure. He has the bracts correct in the coloured figure (t. 9), but, to account for the discrepancy between the two figures, he calls them 'mere abortions.'³ Messrs Veitch (*Man. Orch. Pl.*, pt. 4, p. 61), follow Lindley in ascribing Hartweg's locality to *C. caudatum*, which is incorrect. In 1854, Reichenbach established the genus *Selenipedium*, on the tropical American species, formerly referred to *Cypripedium*, but differing in having a trilocular ovary with axile placentations. To it, of course, *Cypripedium longifolium* and *C. Hartwegii* were transferred. Sometime afterwards, the same author referred to *S. Hartwegii* some specimens which had been collected by Seeman [*sic*] in the Isthmus of

3: Indeed, the bracts on the colour plate of *Paxton's Flower Garden* (tab. 9) are much smaller than those depicted on the woodcut of the entire plant at the end of the text (page 40). In Lindley's text (page 37) we find the following: "The great sheathing bracts, which in South America are as large as those of *Heliconia*, were mere abortions; and we learn from drawings brought home by Mr. Warczewitz [*sic.*] that the flowers are very much larger and finer coloured in its native swamps."

Darien, in Panama; a figure being given in Seeman's [sic] *Botany of the Herald*, which showed a pair of remarkable anguli on the side-lobes near the base of the lip, to be mentioned presently.

Hitherto none of the plants had been in cultivation, but in 1867 Endres re-discovered *S. longifolium*, and introduced it to European gardens, where it first flowered during 1869. Just prior to this date, Reichenbach had separated his Panama *S. Hartwegii* from the true Ecuadorian plant, on account of the curious anguli on the side-lobes at the lip's base; calling it *S. dariense*. A fourth species now appeared, *S. Roezlii*, having been discovered by Roezl, in 1871, on the banks of the small river Dagua, on the eastern slopes of the Central Cordillera of New Granada. It was sent to M. Linden's horticultural establishment at Ghent, and flowered for the first time in Europe in the St. Petersburgh Botanic Garden, in 1873. In 1878 Reichenbach described *Cypripedium Hincksonianum*, from a plant which flowered in the collection of Captain Hincks of Breckenbrough, Thirsk, Yorkshire. From the account given, we learn that it was collected by Wallis, near "Cape" Darien. When, and by what means, *S. Hartwegii* was introduced to cultivation, I cannot say; though it has existed in several collections for some few years.

Thus it will be seen that Reichenbach recognised five distinct species. Messrs. Veitch recognise one only, making *Hartwegii* and *Hincksonianum* varieties, and *Roezlii* synonymous with the former. Another well-known cultivator writes that he considers *Hincksonianum* identical with *Roezlii*, but quite distinct from *longifolium*. While yet a third considers *Roezlii* to be synonymous with *longifolium*, and *Hincksonianum* with *Hartwegii*, but quite distinct from *longifolium*. My own belief, based on an examination of over a dozen sheets of herbarium specimens, and several living plants, is that the whole series can only be considered as representing one widely-diffused and somewhat variable species, with several more or less well-marked varieties. Here, however, is abundant play for individual opinion to come in, varieties being proverbially ticklish things to deal with. If we recognise geographical varieties, the case is not particularly difficult. First comes *S. longifolium* from Chiriquí; then var. *Hincksonianum* (including *S. dariense*) from the Isthmus of Darien, a little further south; then var. *Roezlii*, from New Granada; and finally, var. *Hartwegii* from Ecuador, some 500 miles distant from the home of the original *S. longifolium*.

I am inclined to think this represents approximately the differences observed in the plants, but it is impossible to say whether the discovery of intermediate stations may not break down these apparent differences. Geographical varieties can only be made when the individuals from different isolated localities present certain recognisable characters, as is the case of the varieties of *Cattleya labiata*, and others. It will be observed that *S. dariense* and *S. Hincksianum* are both from the Gulf of Darien district; but the former appears to have been founded in error. I have carefully dissected an authentic flower, and find the remarkable anguli near the base of the side-lobes of the lip are not present at all. If they existed in the flower drawn, it must have been abnormal; but I am inclined to think their presence in the drawing has arisen from an error of observation. Apart from this character, I do not see much to separate the two, *S. dariense* has leaves a little narrower than *S. Hincksianum*; but it is only known from dried specimens. The differences observable in the specimens are not great. *S. longifolium* has comparatively narrow leaves and rather pale flowers. Var. *Hincksianum* has broader leaves, larger bracts, and the margin and apex of the petals brighter in colour. Var. *Roezlii* is very vigorous in habit, the leaves are broad, but the bracts smaller than in the last-named; the petals very brightly coloured, and the lip proportionately rather small. Var. *Hartwegii* is about equally vigorous, with broad leaves, but the bracts are larger, and the flowers less brightly coloured. The variety *coloratum*, Rchb. f. appears not to differ from *Roezlii*. Var. *gracile*, Veitch I have not seen. Possibly a critical comparison of living specimens of all the forms might reveal other slight differences, and render some rearrangement necessary; but I do not see any character by which they can be separated, except as varieties." R. A. Rolfe.

Since the differences are such that one can explain them as simple biogeographic variations, we agree with Robert Allen Rolfe that only *Phragmipedium longifolium* deserves the status of species.

As "*hincksianum*" and "*dariense*" originate from the same area as the type, we regard them as mere synonyms. All other taxa discussed under *Phragmipedium longifolium sensu lato* are geographical or colour variants that can, at the outmost, claim to be regarded as taxonomic forms.

General description

Phragmipedium longifolium is a perennial herb that grows to about 1 metre tall. The rhizomes are woody and to about 1 cm thick. The roots are striate, to 0.4 cm in diameter. The leaves are linear, dark green, glabrous, with finely revolute margins and a minutely trilobate, apiculate, oblique apex. They are to 85 cm long by 0.6 to 4.5 cm wide. The inflorescence is a spicate raceme or a panicle with a single branch, 20 cm to 1 metre tall, and generating 3 to 12 (rarely more) flowers. The peduncle is brownish-purple, glabrous to somewhat pubescent with short hairs that are at times deciduous. The floral bracts are lanceolate to elongate-ovate, 2.5 to 11.2 cm long by 1.0 to 2.6 cm wide at the base, about equally as long as, or longer than the ovary, green tinged with purple, margins more or less hyaline, the acute apex finely trilobate. There are 2 to 4 sterile lower bracts that are 4 to 17.5 cm long by 1 to 1.8 cm wide. The flowers are green to yellow tinged with maroon and with green or maroon veins. The dorsal sepal is ovate-lanceolate, green to yellow with up to 21 purple veins that are straight to slightly reticulate, glabrous inside and outside, with margins entire to undulate and the apex obtuse to acute; 2 to 5.6 cm long by 0.7 to 2.2 cm wide. The synsepal is ovate with entire to undulate margins and an obtuse to acute apex, 2 to 5 cm long by 1.5 to 3.3 cm wide, as long as or shorter than the labellum, green with up to 30 purple veins, glabrous inside and outside. The petals are linear, 3.4 to 13.0 cm long by 0.4 to 1.4 cm wide, yellow-green suffused with purple, with a green central vein, purple inside the margins, the inner surface with some scattered pubescence; spreading at a 45 to 75 degree angle from the labellum. The petal margins are white, apically finely ciliate, and slightly undulate. The petals are twisting to one full turn, covered by short, red-brown hairs, the apex retuse to finely bilobed. The labellum is deeply saccate, pointed, 2.4 to 5.4 cm long by 1.5 to 3.2 cm wide, yellow or green tinged with brownish-purple. The orifice is square in front, the lateral labellum rim glabrous; the rounded spurs to 7 mm long. The claw face is glabrous and smooth, yellow-green, covered with small, irregular purple spots; on each margin there are 2 to 3 green tubercles; the interior of the claw has horizontally oblong purple spots and pilose hairs. The staminode is more or less rhombic to triangular, 6 to 10 mm wide by 3 to 6 mm long; green to yellow-green; the apex obtuse to acute, the basal margin pubescent. The indumentum is thick and shaggy to sparse, extending to the tips of the lateral lobes, and sometimes onto the

column. The column is green with patches of red hair. The ovary including the pedicel is 3 to 7 cm long, glabrous to sparsely pubescent, green to purple-brown. The capsule is dark purple-brown, curving.

As the species is variable, it does not surprise that different chromosome counts have been reported: Brown (in Duncan 1959) reports $2n = 20$; Karasawa (1980) reports $2n = 23$ for *P. longifolium*, $2n = 20$ for *P. hartwegii*, $2n = 21$ for *P. longifolium* var. *gracile*, and $2n = 22$ for *P. roezlii*; and Robert-Jan Quené (Orchids Limited) reports (personal communication, March 2015) $2n = 24$ for *P. longifolium* ("a small Peruvian variety"), *P. longifolium* "var. *hartwegii*", and *P. longifolium* "var. *hincksonianum*". The designations of the plants sampled do not always correlate to the original descriptions.

Phragmipedium longifolium sensu lato is a widespread species. It occurs in Costa Rica, Panama [Fig. 4A], Colombia, Ecuador [Fig. 4B], and Brazil, from sea level to about 1,600 m in elevation. Some plants grow as terrestrials and *P. longifolium* is often found in road cuts [Fig. 5] and on and between boulders along rivers and within the reach of the spray of waterfalls, sometimes in areas that are temporarily submerged. In wet forests the plants are found growing on slopes, wet road sides, and cliffs over rivers. Some plants grow epiphytically on tree trunks. In Colombia some populations grow in close vicinity of the sea and in Ecuador, plants have been found in pastures used to graze cattle and horses.

In its natural habitat, *Phragmipedium longifolium* flowers from September through March. The blooms last up to a month or longer.

***Phragmipedium longifolium forma chapadense* (Campacci & Takase)
Braem, forma et comb. nov.**

Basionym : *Phragmipedium chapadense* Campacci & Takase

Journal of the Hokkaido Orchid Society, 28, Supplement 1: 1 (2000)

According to Campacci & Tanaka, plants of *P. longifolium* forma *chapadense* differ from the nominal forms by somewhat brighter-coloured flowers that have a different staminode and by a different habitat. *Phragmipedium longifolium* is rather variable in its flower colour, and we fail to observe any structural difference in respect to the staminode. Furthermore, a difference in habitat is no marker for a systematic differentiation. The taxon was already reduced to the varietal level by Gruss (2003), but if one wants to retain this variant as a separate, taxonomic entity, it can, at the outmost, be as a taxonomic form.

Phragmipedium longifolium forma *chapadense* [Fig. 6A] grows on open grassland and bush-land in the Brazilian State of Goiás near the town of Alto Paraíso in the Chapada dos Veadeiros.



A



B

Fig. 4: *Phragmipedium longifolium*

A. from Chiriquí, Panama
(ph. Peter Peeters)

B. from north-eastern Ecuador
(ph. Henry Oakeley)

***Phragmipedium longifolium* forma *gracile* (Kent) O.Gruss**

Caesiana, 16: 40 (2001)

Adolphus Henry Kent (1889) first described this form based on a plant he had observed in the collection of R. I. Measures at Cambridge Lodge, Camberwell. Kent wrote: "Leaves narrower, scapes more slender and paler in colour, and the bracts more compressed. Flowers somewhat smaller and coloured as in the variety *Hartwegii*."

This is obviously a geographical variant. The plants are 30-40 cm tall; leaves are to 40 cm long and linear; inflorescence is to about 30 cm tall and carries flowers that are 10 to 12 cm in diameter.



Fig. 5: *Phragmipedium longifolium* in situ

Chiriquí, Panama (ph. Peter Peeters)

***Phragmipedium longifolium forma hartwegii* (Reichenbach fil.) Braem,
forma et comb. nov.**

Basionym: *Cypripedium hartwegii* Reichenbach fil.

Botanische Zeitung, 10 (41): column 714 (1852)

The variant [Fig. 6B] was collected by Karl Theodor Hartweg in 1842 on the eastern slopes of the Andes of Ecuador “near the hamlet of Nanegal” in the province of Quito, in wet marshy places at about 4,000 ft. (1220 metres) elevation. Hartweg travelled on account of the London Horticultural Society, and only sent dried specimens which are now in the Lindley Herbarium at Kew. In his letters to the London Horticultural Society, Hartweg suggested the name “*Cypripedium macranthum*” which, of course, could not be followed as that name was already taken by the Asian *Cypripedium macranthos*, described by O. Swartz in 1800 but known since a description and illustration by Johann Georg Gmelin (1709-1755) in his *Flora Sibirica* which was published between 1747 and 1749.

According to A.H. Kent (1890): “Plant more robust with longer and broader leaves; scapes taller, green (not purple as in the type). Flowers somewhat large, the dorsal sepal usually with a pale rose-colour stain on the apical half, the petals bordered with rose-pink.”

Kent obviously considered this variant to be identical with *P. roezlii* and adds the treatment of *Cypripedium roezlii* by Hooker fil. (*Curtis's Botanical Magazine*, t. 6217) to his list of references.



A

B

Fig. 6: *Phragmipedium longifolium*

A. *f. chapadense*
(ph. M.Campacci)

B. *f. hartwegii*
(ph. Orchids Limited)

We can see no reason whatsoever to retain this taxon as a separate species. This plant should only be regarded as a geographical variant and can merely claim the status of a form.

***Phragmipedium longifolium forma roezlii* (Reichenbach fil.) Braem,
*forma et comb. nov.***

Basionym: *Selenipedium roezlii* Reichenbach fil.

Gartenflora, 20: 164 (1871)

This variety [Fig. 7A] was discovered by Benedikt Roezl "on a boulder" along the river Dague in the Cauca Valley while collecting for the Linden Company. From Roezl's account published by Reichenbach fil. (1871), we know that the leaves were up to 92 cm tall ("up to 3 feet"), that the inflorescences were 61 to 92 cm ("2-3 feet") long and carried 15 to 20 flowers that were yellow and green. The labellum was described by Roezl as yellowish, rose, and white, and the petals were 10 to 13 cm ("4-5 inches") long. The first plant to flower in Europe was a specimen sold by Linden to

the Botanical Garden of St. Petersburg. It flowered there in January of 1873 and Regel writes that it was one of the few specimens that had survived the long transport to Europe.

Linden obviously had his collectors go back, as Eduard André, the editor of *L'Illustration horticole*, wrote (vol. 20: 145, tab. 138 [1873]) that same year: "Mister Linden owns many plants of *Cypripedium Rœzlîi* of extreme vigor" [our translation from the French original]. And Joseph Dalton Hooker (1876) gave the information that the flowers were about 13.7 cm (five inches) from the tip of the dorsal sepal to the tip of the synsepal.

Phragmipedium longifolium forma album O.Gruss & Koopowitz, *nomen invalidum*

This albino [Fig. 7B] is listed in the *Orchid Digest* for 2008 (p. 133). The flowers are pure yellowish-green to green without any trace of anthocyanin pigmentation. In addition to the fact that the form was not published validly and effectively (as there is no type specimen deposited or basionym indicated), the argumentation to use the designation "album" by the authors is erroneous as the flower is green with very thin white margins on petals and sepals. "Album" is a Latin word that means "white", and should therefore not be used to describe a flower that is mainly green.⁴ If Gruss & Koopowitz wish to validate their taxon, they would be well advised to opt for a more appropriate designation.

Phragmipedium longifolium has been a confusing species since it was sent to Reichenbach by Warszewicz and described by Reichenbach on the basis of an incomplete, dried specimen. Adding the various geographical variants listed as species and/or varieties has made the concept even more complex. We agree with Rolfe and accept *P. longifolium* as a variable species, and consider several of the variants to be forms rather than varieties or separate species.

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A

B

Fig. 7: *Phragmipedium longifolium*

A. f. roezlii

B. f. album

(ph. Orchids Limited)

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