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CLARIFICATIONS AND NEW COMBINATIONS IN THE *PHRAGMIPEDIUM CAUDATUM* COMPLEX FROM CENTRAL AMERICA

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ABSTRACT. Members of the *Phragmipedium caudatum* complex (*Phragmipedium* section *Phragmipedium*) are clarified. The name *Cypripedium humboldtii* Warsz. ex Rchb.f. is lectotypified based on a syntype from Chiriquí, Panama and formally combined as *Phragmipedium humboldtii* (Warsz. ex Rchb.f.) J.T. Atwood & Dressler. The combination *Phragmipedium humboldtii* subsp. *exstaminodium* (Castaño, Hágsater & Aguirre) J.T. Atwood and Dressler is also made.

One would think that enough has been said about the attractive and widely published *Phragmipedium caudatum* complex or *Phragmipedium* Sect. *Phragmipedium.* Historically nearly the entire section was accepted as *Phragmipedium caudatum* with the exception of *P. lindenii* (Lindl.) Dressler and N.Wms., an obligately autogamous entity ranging from Ecuador to Venezuela with pouched lip replaced by a normal third petal. In addition it has a third stamen with distinct filament. With the appearance of new collections into cultivation within the last 30 years it has become clear that there are at least three kinds of plants with normal lips corresponding to different geographical areas.

Entity one, now accepted as *Phragmipedium caudatum,* is an enormous plant with leaves sometimes attaining 70 cm in length which exceed the inflorescence. The flower is usually brownish with darker reticulation, and the orifice is pubescent but little flared. It hails from Peru and Bolivia, but doubtfully from further north. The plant purchased in Europe and illustrated in Dunsterville and Garay as *P. caudatum* (Venezuelan Orchids Illustrated, v. 2, p. 265, 1961) has thin leaves, pendent ovaries and swellings on each side of the orifice consistent with the garden hybrid, *P.* Grande registered in 1881 casting doubt on the occurrence of *P. caudatum* in Venezuela.

Entity two from Ecuador (probably also Colombia and perhaps Venezuela) is a much smaller plant with a white lip peppered with lavender and much flared at the orifice. This corresponds with *P. wallisii* (Rchb.f.) Garay. *Phragmipedium lindenii* is probably a selfing form of this.

Entity three hails from Central America. Its leaves are the shortest and broadest in the complex; shorter than the inflorescence. The flowers are yellowish green with the lip darkly stained around the orifice, a feature we have not seen in South American plants. McCook (1990) accepts this as the same as South American *P. caudatum* on the basis of isozyme analyses as well as of morphological similarity, but consistent differences in the flowers as well as the leaves suggest to us that recognition as separate species is useful. Attempts have been made to apply the name, *P. warszewiczianum* (Rchb.f.) Garay[3] to the Central American entity (Garay 1979, Atwood 1984), but McCook (1990) pointed out that the type of this name is based on a South American rather than a Central American plant. Therefore, *Phragmipedium warszewiczianum* (Rchb.f.) Garay cannot be the same as the Central American species, and the non-flared lip suggests that this name must be a synonym of *P. caudatum* Lindl. rather than of *P. wallisii.*

Interestingly enough, there is a description preceding the original description of *Cypripedium warszewiczianum* Rchb.f. that has been ignored by all: *Cypripedium humboldti* Warsz. ex Rchb.f. A translation of the German and Latin reveals why no one has wanted to deal with this name.

"*Cypripedium Humboldti* Wszwcz. [ex Rchb.f.] I have a specimen and a drawing by the author. I compare the same with specimens of *C. caudatum* of Ruiz, [and] with the illustration in Hook. Ic. VII. 628 [actually this should read '658']. Paxton Fl. G. 9. Also I believe in more species as does Mr. Von W[arszewicz]. The plant of our traveler is but exactly the same, which is submitted in Hook, Ic.; the same, which Ruiz collected. After a bad flower of the latter, Professor Lindley erected his *C. caudatum*: I

[3] The specific epithet is usually spelled "*warscewiczianum.*" However, the spelling in the original description as "*warszewiczianum*" corresponds with the name of the collector, Joseph Ritter von Rawicz Warszewicz.

know the same plant in good specimens, also exactly as the author himself kept the name for the plant.—From this the plant in Fl. Gard. T. 9 is distinguished principally by the transversely two lobed staminode. The illustration is very distinct, and Mr. Professor L. says explicitly: staminode transversely bilobed, setose at the apex. The illustration in Hook. Ic., on the other hand, evidently shows the same organ three lobed, as I always find it. Although I most rarely distinguish plants after foreign illustrations and descriptions, nevertheless it stands as self evident that I trust an illustration and description by Mr. Professor Lindley. I place the diagnoses of two [species] thus."

Reichenbach starts a new paragraph quoting Lindley's description of *Cypripedium caudatum* then provides a short German and Latin diagnosis for his *C. humboldti* citing two specimens, one from Peru and the other from Panama, followed by a description of *C. warszewiczianum.* "*Cypr. caudatum* Lindl. Orch. 5. 31.; upper sepal [phyllo supremo] broad, oblong, acute; synsepal [inferiori subaequali] broader; petals [phyllis internis] from a broader base, linear, extremely long; lip [calceo] oblong, ventricose, with abbreviate margin, orifice velvety pilose, staminode three lobate.—Hook. Ic. l. c. *C. Humboldti* v. Wszwcz. 'Flowers dark yellow, red nerved, lip purple spotted.' In woods of the Peruvian Andes. Ruiz! (Herb. Berol.!) On oaks of mountains, Chiriqui. Von Warszewicz!"

Contributing to the confusion Reichenbach appears to have confused the identity of *Cypripedium caudatum,* but the important point here is that he cites two different specimens (syntypes) as his *C. humboldti*: (1) a Peruvian specimen collected by Ruiz and the other (2) a specimen from Chiriquí collected by Warszewicz. This latter specimen also seems to be the same that Reichenbach alludes to in the opening sentence. A specimen in the Reichenbach Herbarium labeled *C. humboldti* appears to be a duplicate corresponding with the Peruvian specimen of Ruiz presumably destroyed at Berlin. The other is the Central American specimen of Warszewicz along with a drawing of it on a second sheet. There is little doubt that the drawing and the specimen apply to the same plant as both contain the number "41." The specimen shows the short broad leaves exceeded by the inflorescence, features characteristic of Central American plants, and the drawing shows the dark stain on the rim of the lip that is less pronounced in South American material. Unfortunately Reichenbach failed to mention specimen number 41 in his text, but the specimen and drawing otherwise correspond with the original materials mentioned in his description of *Cypripedium humboldti.*

The name most probably commemorates Alexander von Humboldt, though Reichenbach fails to provide the etymology. It is fitting that we finally affix a name to this grand plant from Central America, but to do so requires a lectotypification based on *Warszewicz 41* and recombination with the genus *Phragmipedium.* Following is a formal taxonomic treatment of *Phragmipedium humboldtii.*

Phragmipedium humboldtii (Warsz. ex Rchb.f.) J.T. Atwood and Dressler, comb. nov. Basionym: *Cypripedium humboldti* Warsz. ex Rchb.f., Bot. Zeitung 10:691. 1852. Lectotype selected here: Panama, Chiriquí, *Warszewicz 41* (W 15682). Not *Phragmipedium warszewiczianum* (Rchb.f.) Garay.

Epiphytic or on steep slopes, roots 1.5–3 mm in diameter, tan, velvety; stems simple. Leaves several, distichous, conduplicate, 19–32 × 2.8–4.4 cm ligulate, obtuse or retuse. Racemes terminal with 1–4 simultaneous flowers, peduncles 15–30 cm long; floral bracts 4–6.2 × 3.2–3.4 cm ovate or obovate, obtuse; flowers yellowish green with brownish reticulation; the lip heavily stained with dark red, especially near the orifice, the orifice with yellowish hairs; pedicel and ovary velvety, 10–15 cm long; dorsal sepal 10–15 × 2–2.8 cm, lanceolate, synsepal 8–12 × 3.4–5.5 cm, ovate, obtuse; petals long-ciliate at the base, 30–40 cm × ca. 18 mm, linear, twisted; lip 5.5–6.2 × 3–3.7 cm, deeply saccate, hispid within, glabrous without; staminode broad, somewhat 3-lobate or appearing 2-lobate if the apex is strongly curved; capsule narrowly fusiform, ca. 10 × 0.8 cm.

An autogamous entity, *Phragmipedium exstaminodium* Castaño, Hágsater and Aguirre, was described From Mexico on the basis of the lack of staminode (Castaño, Hágsater & Aguirre 1984). However, some specimens from Guatemala also either lack the staminode or have irregular asymmetrical staminodes showing that the two entities are not really distinct on the basis of this feature. Furthermore, *Phragmipedium exstaminodium* has the same short leaves and dark flower color as the allogamous entities from Central America. We believe that this is best viewed as an autogamous geographic variant of *P. humboldtii* despite the recent publication of Cox *et al.* (1997) with cladogram showing *P. exstaminodium* well separated from *P. warszewiczianum* (probably *P. humboldtii*). We further note in their work that *P. caricinum,* a very different species with much smaller chromosome number, is nested within the *P. caudatum* group despite its resemblance to *P. pearcei.* We sug-

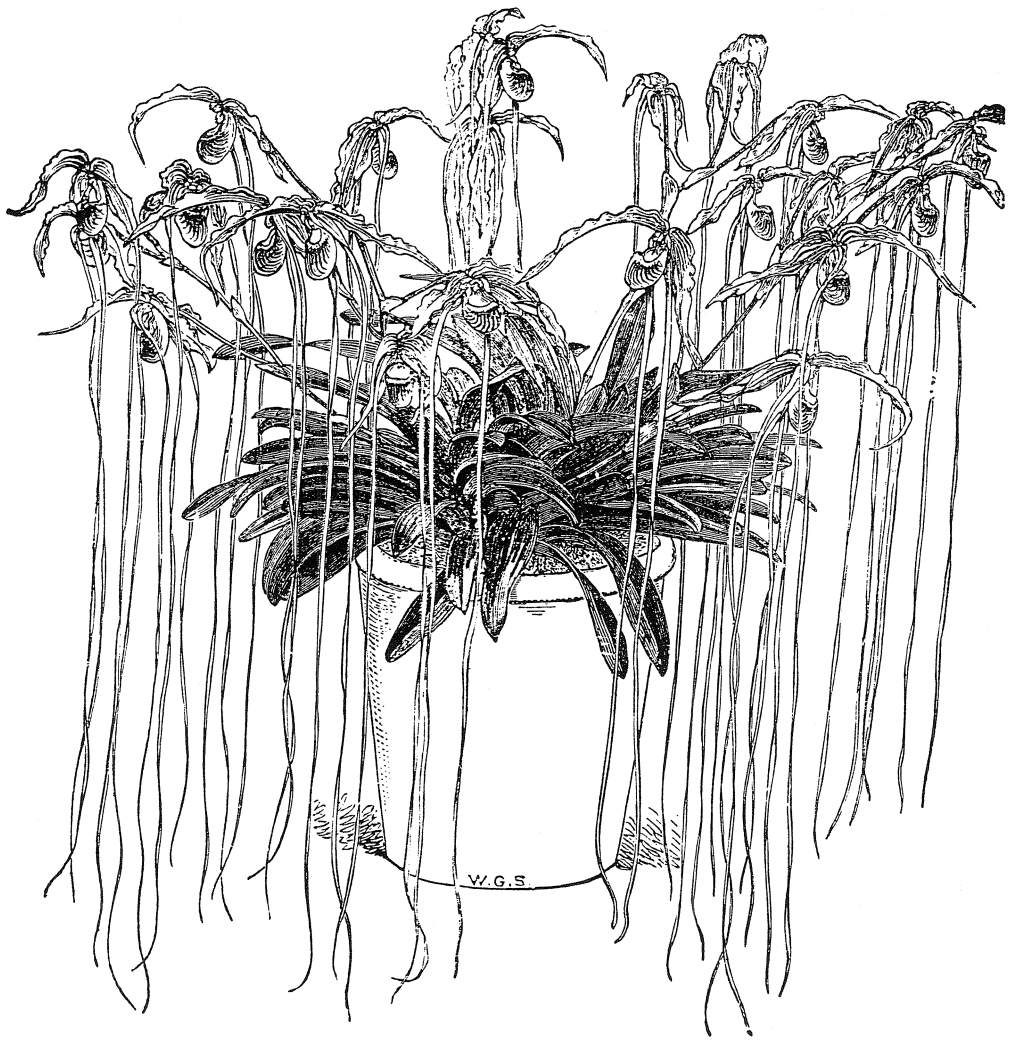

FIGURE 1. Engraving of *Phragmipedium humboldtii* published in Gardener's Chronicle ((new series) 3:211. 1875) as *P. caudatum.* The plant exhibits the short broad leaves of the Central American plant which are much shorter than the inflorescence.

gest that these taxa may need to be resampled owing to general confusion of identification and/or possible mislabeling of vials. A formal recombination of *P. exstaminodium* as an autogamous subspecies of *P. humboldtii* follows.

Phragmipedium humboldtii subsp. exstaminodium (Castaño, Hágsater & Aguirre) J.T. Atwood and Dressler, comb. et stat. nov. Basionym: *Phragmipedium exstaminodium* Castaño, Hágsater and Aguirre, Orquídea (Méx.) 9: 193. TYPE: MEXICO, Chiapas, Tziscao, 1,700 m, *Leleu s.n.* (Holotype: AMO).

The drawing of the type of *Phragmipedium exstaminodium* agrees well with *P. humboldtii* but lacks a staminode, a feature whose importance in lady-slipper classification has sometimes been exaggerated. The anthers of *P. exstaminodium* are supported on longer filaments bringing them into contact with the stigmas.

The Southern range of this subspecies is unclear. All flowers of specimens examined from Chiriqui, Panama ($N = 9$ at SEL), the type "locality" of *P. humboldtii* subsp. *humboldtii,* have normal staminodes.

The *Phragmipedium caudatum* complex includes four recognized species: *P. wallisii* from Ecuador and Colombia, *P. lindenii* from Ecuador, *P. humboldtii* from Central America, and *P.*

caudatum from Peru and Bolivia. Following is a key to species in the *Phragmipedium caudatum* complex.

1. Lip forming a third elongate petal, not saccate . . . . . *P. lindenii*
   2. Lip saccate 3
      3. Lip white with purplish flecks, orifice flared . . . . . *P. wallisii*
      3. Lip brown or yellow, orifice not flared . . 4
         4. Leaves longer than the inflorescence (Peru and Bolivia) . . . . . *P. caudatum*
         4. Leaves shorter than the inflorescence (Chiapas to Panama) 5
            5. Staminode present . . . . . *P. humboldtii* subsp. *humboldtii*
            5. Staminode absent . . . . . *P. humboldtii* subsp. *exstaminodium*

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