

A SYNOPSIS OF *PACHYPHYLLUM* (ORCHIDACEAE)

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ABSTRACT

The 41 accepted species of the neotropical orchid genus *Pachyphyllum* Kunth are enumerated. Types are cited for all names including 10 new lectotypifications. The genus is divided into 3 sections, one based on the genus *Orchidotypus* Kraenzl. and one wholly new, **P. sect. Capitulum** E.A. Christ. Three names are considered synonyms within *Pachyphyllum* and eight names are excluded from the genus.

KEY WORDS: *Pachyphyllum*, Orchidaceae, Neotropics

RESUMEN

Se enumeran las 41 especies aceptadas del género de orquídeas neotropical *Pachyphyllum* Kunth. Se citan los tipos de todos los nombres incluyendo 10 nuevas lectotipificaciones. El género se divide en 3 secciones, una basada en el género *Orchidotypus* Kraenzl. y otra totalmente nueva, **P. sect. Capitulum** E.A. Christ. Tres nombres se consideran sinónimos en *Pachyphyllum* y ocho nombres se excluyen del género.

Despite the characteristic growth habit and relative abundance of available herbarium material, the genus *Pachyphyllum* remains woefully understudied. Concentrated biodiversity studies in the Department of Cusco in southern Peru (www.andesamazon.org) have recorded many species in the genus, some new to Peru and some, no doubt, new to science. Critical study and dissemination of this information has just begun (Repasky & Christenson, in press).

Recent collections of *Pachyphyllum ecallosum* from the Department of Cusco, Peru, have emphasized the distinct nature of its inflorescence. Unlike the few flowered inflorescences of the type collection from the Department of Huancavelica, more recent collections consistently bear 4–6 flowers arranged in a well defined capitulum. A new section is proposed for *P. ecallosum* and its sister species, *P. tortuosum*. In addition, the genus *Orchidotypus* is given formal status as a section of *Pachyphyllum*.

KEY TO THE SECTIONS

1. Flowers arranged in a dense capitulum _____ **P. sect. Capitulum**
1. Flowers arranged in a raceme.
 2. Sepals and petals fused together at the base forming a tube for half their length _____ **P. sect. Orchidotypus**
 2. Sepals and petals free _____ **P. sect. Pachyphyllum**

Pachyphyllum section **Pachyphyllum**. TYPE SPECIES: *Pachyphyllum distichum* Kunth.

Pachyphyllum breviconnatum Schltr., Repert. Spec. Nov. Regni Veg. Beih. 9:115. 1921; Repert. Spec. Nov. Regni Veg. Beih. 57: t. 130, nr. 510. 1929. TYPE: PERU. DEPT. CUSCO: Prov. Paucartambo, below Tres Cruces Inn, 3600–3700 m, *Weberbauer* 6976 (HOLOTYPE: B, destroyed; LECTOTYPE, designated here: US; ISOLECTOTYPES: F, MOL).

Comment.—The US specimen is designated lectotype as there are better flowers available than on either of the two sheets at F or the two sheets at MOL.

Pachyphyllum bucarasicae Kraenzl., Pflanzenr. 4, 50:25. 1923. TYPE: COLOMBIA. DEPT. SANTANDER: Bucasasica, 3300 m, *Kalbreyer* 918 (HOLOTYPE: ?W).

Pachyphyllum capitatum Kraenzl., Bot. Jahrb. Syst. 37:386. 1906. TYPE: PERU. DEPT. AMAZONAS: E of Chachapoyas, between Tambo Ventillas and Piscohuana, 2600–2700 m, *Weberbauer* 4421 (HOLOTYPE: B, destroyed; LECTOTYPE, designated by Bennett & Christenson in Icon. Orchid. Peruv. pl. 739, 2001: MOL).

Pachyphyllum cardenasii Smith & Harris, Contr. Gray Herb. 114:12. 1936. TYPE: BOLIVIA. DEPT. COCHABAMBA: PROV. Ayopapa, Sailapata, 3000 m, *Cardenas* 3289 (LECTOTYPE, designated here: AMES; ISOLECTOTYPE: G).

Comment.—No holotype was designated in the protologue.

Pachyphyllum costaricense (Ames & C. Schweinf.) L.O. Wms., Lilloa 3:481. 1938. *Centropetalum costaricense* Ames & C. Schweinf., Sched. Orch. 10:110. 1930. TYPE: COSTA RICA. PROV. SAN JOSÉ: near Finca La Cima, above Los Lotes, N of El Copey, 2100–2400 m, 21–22 Dec 1935, *Standley* 42600 (HOLOTYPE: AMES; ISOTYPE: US).

Pachyphyllum crystallinum Lindl., Orch. Linden. 18. 1846. TYPE: VENEZUELA: Merida, 10,000 ft, *J. Linden* 686 (HOLOTYPE: K).

Pachyphyllum cuencae Rchb.f., Linnaea 41:31. 1877. TYPE: ECUADOR: Surucucho near Cuenca, 2900 m, Jul 1864, *Jameson* s.n. (HOLOTYPE: W; ISOTYPE: AMES).

Pachyphyllum cyrtophyllum Schltr., Repert. Spec. Nov. Regni Veg. 15:217. 1918, in textu; Repert. Spec. Nov. Regni Veg. Beih. 10:80. 1922. BASIONYM: *Pachyphyllum falcifolium* Schltr., Repert. Spec. Nov. Regni Veg. 10:460. 1912, non Rchb.f. TYPE: BOLIVIA: in moss, near Ingenio, R.S. Williams 1631 (HOLOTYPE: B, destroyed; LECTOTYPE, designated here: NY; ISOLECTOTYPE: BM).

Comment.—The NY specimen is here designated lectotype. *Pachyphyllum confusum* Kraenzl. is a new name based on Schlechter's *P. falcifolium*, but was published after Schlechter himself had published his own new name.

Pachyphyllum confusum Kraenzl., Pflanzenr. 4, 50:22. 1923.

Pachyphyllum dalstroemii Dods., Orquideología 20(3):278. 1997. TYPE: ECUADOR: Loja, San Pedro road from Loja to Vilcabamba, 2500 m, Apr 1984, *Dalström & Hoijer* 802 (HOLOTYPE: SEL).

Pachyphyllum denticulatum (Ruiz & Pav.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 9:180. 1921. *Fernandezia denticulata* Ruiz & Pav., Syst. Veg. Fl. Peruv. & Chil. 1:240. 1798. TYPE: PERU. DEPT. HUANUCO: Pillao, *Pavon* s.n. (HOLOTYPE: MA).

Pachyphyllum distichum Kunth, Nov. Gen. & Sp. 1:339. 1816. TYPE: ECUADOR: Loxa, Gonzanam, 6420 ft (1070 hexap.), *Humboldt & Bonpland* s.n. (HOLOTYPE: P).

Pachyphyllum falcifolium Rchbf., Linnaea 41:32. 1877. TYPE: ECUADOR: Loja, Sep, *Jameson* s.n. (HOLOTYPE: W; ISOTYPE: AMES).

Pachyphyllum favosifolium Kraenzl., Pflanzenr. 4, 50:23. 1923. TYPE: COLOMBIA. DEPT. ANTIOQUIA: Sonson, 3300 m, *Kalbreyer* 1935 (HOLOTYPE: ?W).

Pachyphyllum hagsateri Dods., Orquideología 20:104. 1996. TYPE: ECUADOR. Sucumbios, El Mirador between Playón and San Gabriel, 3300 m, 8 Jul 1990, *Dodson et al.* 18501 (HOLOTYPE: RPSC; ISOTYPES: MO, QCNE).

Pachyphyllum hartwegii Rchb.f., Bonplandia 2:219. 1854. *Pachyphyllum distichum* Lindl. ex Rchb.f., Bonplandia 3:219. 1855, non Kunth. TYPE: ECUADOR: Pichincha, *Hartweg* s.n. (HOLOTYPE: W).

Pachyphyllum herzogii Schltr., Meded. Rijks-Herb. Leiden 29:80. 1916. TYPE: BOLIVIA: Comarapa, 2600 m, Apr 1911, *Herzog* 1946 (HOLOTYPE: L; ISOTYPE: Z).

Pachyphyllum lycopodioides Schltr., Repert. Spec. Nov. Regni Veg. Beih. 9:116. 1921; Repert. Spec. Nov. Regni Veg. Beih. 57: t. 130, nr. 511. 1929. TYPE: PERU: Huanuco, SW of Monzón, 3400–3500 m, *Weberbauer* 3327 (HOLOTYPE: B, destroyed; LECTOTYPE, designated here: MOL).

Pachyphyllum micrangis Schltr., Repert. Spec. Nov. Regni Veg. Beih. 7:203. 1920; Repert. Spec. Nov. Regni Veg. Beih. 57: t. 73, nr. 281. 1929. TYPE: COLOMBIA: Cauca, ca. 3000 m, *M. Madero* s.n. (HOLOTYPE: B, destroyed, drawings AMES; LECTOTYPE, designated here: t. 73, nr. 281, loc. cit.).

Comment.—The published type drawing is designated as the lectotype, noting the augmentation of the unpublished drawings at AMES. No duplicates of Madero's collections are known to be extant.

Pachyphyllum micranthum Schltr., Repert. Spec. Nov. Regni Veg. Beih. 7:204. 1920; Repert. Spec. Nov. Regni Veg. Beih. 57: t. 63, nr. 282. 1929. TYPE: COLOMBIA: Cauca, *M. Madero* s.n. (HOLOTYPE: B, destroyed, drawings AMES; LECTOTYPE, designated here: t. 73, nr. 282, loc. cit.).

Comment.—The published type drawing is designated as the lectotype, noting the augmentation of the unpublished drawings at AMES. No duplicates of Madero's collections are known to be extant.

Pachyphyllum minus Schltr., Repert. Spec. Nov. Regni Veg. 10:460. 1912; Repert. Spec. Nov. Regni Veg. Beih. 58: t. 60, nr. 239. 1930. TYPE: BOLIVIA: Unduavi, ca. 3200 m, Nov. 1910, O. Buchtien s.n. (HOLOTYPE: B, destroyed; LECTOTYPE, designated here: t. 60, nr. 239, loc. cit.).

Pachyphyllum nubivagum L.O. Wms., Lilloa 3:483. 1938. TYPE: COLOMBIA. DEPT. SANTANDER: western slope of Páramo de las Puertas, above La Baja, 3300–3400 m, 25–31 Jan 1927, Killip & Smith 18161 (HOLOTYPE: AMES).

Pachyphyllum parvifolium Lindl. in Hook., Ic. Pl. 2: t. 117. 1837. TYPE: PERU. DEPT. AMAZONAS: Chachapoyas. 1836, Mathews s.n. (HOLOTYPE: K).

Pachyphyllum pastii Rchb.f., Bonplandia 3:239. 1855. TYPE: ECUADOR: Quito, Jameson 439 (HOLOTYPE: W; ISOTYPE: K).

Pachyphyllum pectinatum Rchb.f., Xenia Orchid. 3:22. 1881. TYPE: BOLIVIA. PROV. LARECAJA: Sorata, 3100–3200 m, May 1860, Mandon 1152 p.p. (HOLOTYPE: W; ISOTYPES: MICH, NY).

Pachyphyllum peperomioides Kraenzl., Pflanzenr. 4, 50:27. 1923. TYPE: COLOMBIA. PROV. NARIÑO: Pasto, 3300 m, Jun 1878, F.C. Lehmann s.n. (HOLOTYPE: W).

Pachyphyllum piesiki Szlachetko, Mytnik-Ejsmont & Rutkowski, Orchidee (Hamburg) 58:94. 2007. TYPE: ECUADOR: PROV. CHINCHIPE: near Yangana, Nov 2005, Szlachetko et al. s.n. (HOLOTYPE: UGDA-DLSz).

Pachyphyllum pseudodichaea Rchb.f., Xenia Orchid. 3:22. 1878. TYPE: BOLIVIA. PROV. LARECAJA: Sorata, 3100–3200 m, May 1860, Mandon 1152 p.p. (HOLOTYPE: W; ISOTYPE: NY).

Pachyphyllum serra Rchb.f., Bonplandia 3:219. 1855. TYPE: PERU. DEPT. AMAZONAS: Chachapoyas, Mathews s.n. (HOLOTYPE: W).

Pachyphyllum squarrosus Lindl., Ann. & Mag. Nat. Hist. 15:107. 1845. TYPE: COLOMBIA. PROV. POPAYÁN: 10,500 ft, leg. ? 1409 (HOLOTYPE: K; ISOTYPE: K).

Pachyphyllum stuebelii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 7:204. 1920; Repert. Spec. Nov. Regni Veg. Beih. 57: t. 73, nr. 283. 1929. TYPE: COLOMBIA: Tolima, Volcan de Tolima, above 4000 m, Nov 1868, A. Stübel 213 (HOLOTYPE: B, destroyed, drawing AMES; LECTOTYPE, designated here: t. 73, nr. 283, loc. cit.).

Comment.—No duplicates of Stübel's collections are known to be extant. The published type drawing is designated as the lectotype.

Pachyphyllum tajacayaense D.E. Benn. & E.A. Christ., Icon. Orchid. Peruv. pl. 739. 2001. TYPE: PERU. DEPT. HUANCAYELICA: Tayacaja, Dist. Huacocolpa, zone Inquilapata, 2900 m, M. León M. ex Bennett 7877 (HOLOTYPE: MOL).

Pachyphyllum* sect. *Orchidotypum (Kraenzl.) E.A. Christ., **stat. nov.** BASIONYM: *Orchidotypus* Kraenzl., Bot. Jahrb. Syst., 37:383. 1906. TYPE SPECIES: *Orchidotypus muscoides* Kraenzl.

The genus *Orchidotypus* has been considered a synonym of *Pachyphyllum* with the notable exceptions of Senghas (1995) and Szlachetko et al. (2007). The fusion of the sepals and petals into a tube, however, appears to be ample reason to maintain them as a section of *Pachyphyllum*. Species of this section are also consistently smaller statured than species of section *Pachyphyllum*.

Pachyphyllum aurorae D.E. Benn. & E.A. Christ., Icon. Orchid. Peruv. pl. 546. 1998. TYPE: PERU: Chanchamayo, 2700 m, 12 Apr 1996, O. del Castillo ex Bennett 7501 (LECTOTYPE, designated here: MOL; ISOLECTOTYPE: NY).

Comment.—Bennett and Christenson (1998) neglected to designate the holotype in the original publication. The name is lectotypified with the specimen at MOL (transferred from USM).

Pachyphyllum bryophytum Schltr., Repert. Spec. Nov. Regni Veg. Beih. 27:181. 1924. *Orchidotypus bryophytus* (Schltr.) Senghas, Die Orchideen, ed. 3, I/B(31):1923. 1995. TYPE: COLOMBIA. DEPT. CUNDINAMARCA: near Bogota, 2500 m, 1921, H. Hopf s.n. (HOLOTYPE: B, destroyed).

Comment.—No duplicates of Hopf's collections are known to be extant. Since I have nothing to go on except the original description, I think it is best to not lectotypify the name at this time. A more detailed study of the genus in Colombia is needed.

Pachyphyllum gracillimum C. Schweinf., Amer. Orchid Soc. Bull. 16:564. 1947. *Orchidotypus gracillimus* (C. Schweinf.) Senghas, Die Orchideen, ed. 3, 1/B(31):1923. 1995. TYPE: PERU. DEPT. CUSCO: Prov. Urubamba, Puyupata-Tuncapata, 3200 m, 6 Aug 1942, C. Vargas 2932 (HOLOTYPE: CUZ).

Pachyphyllum hispidulum (Rchb.f.) Garay & Dunsterv., Venez. Orch. Ill. 3:236. 1965. *Aeranthus hispidulus* Rchb.f., Linnaea 41:31. 1876; *Campylocentrum hispidulum* (Rchb.f.) Rolfe, Orchid Review 11:246. 1903; *Orchidotypus hispidulus* (Rchb.f.) Senghas, Die Orchideen, ed. 3, 1/B(31):1923. 1995. TYPE: COLOMBIA: Santa Martha, Purdie s.n. (HOLOTYPE: W).

Pachyphyllum muscoides (Kraenzl.) Schltr., Repert. Spec. Nov. Regni Veg. 15:216. 1918; *Orchidotypus muscoides* Kraenzl., Bot. Jahrb. Syst. 37:383. 1906. TYPE: PERU. DEPT. CAJAMARCA: Prov. Chota, west of Huambos, 2700–3000 m, Weberbauer 4189 (B, destroyed).

Pachyphyllum microscopicum (Kraenzl.) Schltr., Repert. Sp. Nov. Regni Veg. Beih. 19:72. 1923; *Dichaea microscopica* Kraenzl., Pflanzenr. 4(50), 83:36. 1923. TYPE: ECUADOR: near Cuenca, ca. 3500 m, 16 Aug 1878, F. C. Lehmann s.n. (HOLOTYPE: W).

Orchidotypus vareschii Foldats, Acta Biol. Venez. 2(4):28. 1957. TYPE: VENEZUELA: Edo. Trujillo, Pmo. El Pulpito, 3200 m, Vareschi 4527-A (HOLOTYPE: VEN).

Pachyphyllum mexicanum Dressler & Hágsater, Orquidea(Mex.) 6(3):73. 1976. *Orchidotypus mexicanus* (Dressler & Hágsater) Senghas, Die Orchideen, ed. 3, 1/B(31):1923. 1995. TYPE: MEXICO. GUERRERO: Puerto El Asoleadero, entre Carrizal de Bravos y Cruz de Ocote, 2600 m, Hágsater 2839 (HOLOTYPE: MEXU; ISOTYPES: AMES, ENCB, K, MO, SEL).

Pachyphyllum schultesii L.O. Wms., Caldasia 1(3):15. 1941. *Orchidotypus schultesii* (L.O. Wms.) Senghas, Die Orchideen, ed. 3, 1/B(31):1923. 1995. TYPE: COLOMBIA: Páramo de Chipaque, SE of Bogota, 3200 m, 25 Sep 1941, R.E. Schultes 1020 (HOLOTYPE: AMES).

Pachyphyllum tenue Schltr., Repert. Spec. Nov. Regni Veg. Beih. 9:116. 1921; Repert. Spec. Nov. Regni Veg. Beih. 57: t. 131, nr. 512. 1929. *Orchidotypus tenuis* (Schltr.) Senghas, Die Orchideen, ed. 3, 1/B(31):1923. 1995. TYPE: PERU. DEPT. JUNIN: Chanchamayo Valley, Koehler s.n. (HOLOTYPE: B, destroyed; LECTOTYPE, designated here: t. 131, nr. 512, loc. cit.).

Pachyphyllum vaginatum Schltr., Repert. Spec. Nov. Regni Veg. Beih. 27:182. 1924. *Orchidotypus vaginatus* (Schltr.) Senghas, Die Orchideen, ed. 3, 1/B(31):1923. 1995. TYPE: COLOMBIA: Cundinamarca, near Bogota, 2500 m, 1921, H. Hopf s.n. (HOLOTYPE: B, destroyed).

Comment.—No duplicates of Hopf's collections are known to be extant. Since I have nothing to go on except the original description, I think it is best to not lectotypify the name at this time. A more detailed study of the genus in Colombia is needed.

Pachyphyllum sect. **Capitulum** E.A. Christ., **sect. nov.** TYPE SPECIES: *P. ecallosum* D.E. Benn. & E.A. Christ.

Flores in capitulum.

Pachyphyllum ecallosum D.E. Benn. & E.A. Christ., Icon. Orchid. Peruv. pl. 738. 2001. TYPE: PERU: Dept. Huanavelica, Tayacaja, Dist. Huachocolpa, Capcasoro, 3400 m, 15 Jun 1999, M. León M. 3067 (HOLOTYPE: MOL).

Pachyphyllum tortuosum Foldats, Soc. Venez. Cienc. Nat. 28:115. 1969. TYPE: VENEZUELA: Edo Tachira: Rio Quini-mari, Quebrada Las Copas, 2600–2630 m, G. C. K. Dunsterville & E. Dunsterville 90 (HOLOTYPE: VEN; ISOTYPE: K).

The recent collection of *P. tortuosum* from southern Peru (Dept. Cusco, Machu Picchu, Wiñay Wayna, Nauray 181, CUZ) strengthens the relationship of these two species.

EXCLUDED SPECIES

Pachyphyllum echinocarpon (Sw.) Spreng., Syst. Veg. 3:731. 1826. *Epidendrum echinocarpon* Sw., Prodr. 124. 1788. *Cymbidium echinocarpon* (Sw.) Sw., Nov. Acta Reg. Soc. Sci. Upsal. 6:71. 1799. *Dichaea echinocarpa* (Sw.) Lindl., Gen. & Sp. Orch. Pl. 208. 1833, nom. illeg. TYPE: JAMAICA: Swartz s.n. (HOLOTYPE: BM). = *Dichaea pendula* (Aubl.) Cogn.

Pachyphyllum haemathodes (Ruiz & Pav.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 9:180. 1921. *Fernandezia haemathodes* Ruiz & Pav., Syst. Veg. Fl. Peruv. & Chil. 1:240. 1798. TYPE: PERU. DEPT. HUANUCO: Muña, Pavon s.n. (HOLOTYPE: MA) = *Maxillaria haemathodes* (Ruiz & Pav.) Garay.

Pachyphyllum pamplonense Kraenzl., Pflanzenr. 4, 50:27. 1923. TYPE: COLOMBIA: Pamplona to Las Vetas, 3300 m, Funk & Schlim s.n. (HOLOTYPE: W) = *Maxillaria nubigena* (Rchb.f.) C. Schweinf.

Pachyphyllum procumbens Lodd. ex W. Baxt., Loud. Hort. Brit. Suppl. 3:607. 1850, nom. nud.

Pachyphyllum ?scandens Llave & Lex., Nov. Gen. 2:17. 1824. TYPE: MEXICO: Huandacareo, Sep (HOLOTYPE: preserved?) = *Barkeria scandens* (Llave & Lex.) Dressler & Halbinger

Comment.—No Lexarza specimens are known to be extant.

Pachyphyllum subbiflorum (Ruiz & Pav.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 9:181. 1921. TYPE: PERU. DEPT. HUANUCO: Muña, Pavon s.n. (HOLOTYPE: MA) = *Fernandezia subbiflora* Ruiz & Pav.

Pachyphyllum steyermarkii Foldats, Acta Bot. Venez. 3:369. 1968. TYPE: VENEZUELA. Edo. Tachira: Tamá, 2475–2550 m, Steyermark & Dunsterville 98345 (HOLOTYPE: VEN) = *Fernandezia sanguinea* (Lindl.) Garay & Dunsterv.

Pachyphyllum uniflorum Llave & Lex., Nov. Veg. Descr. 2:25. 1824. TYPE: MEXICO: Irapeo (HOLOTYPE: preserved?). = *Barkeria uniflora* (Llave & Lex.) Dressler & Halbinger.

Comment.—No Lexarza specimens are known to be extant.

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