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Notes on the genus *Polycarpon* (Caryophyllaceae) in South America, with the description of a new subspecies from Peru

Notas sobre el género *Polycarpon* (Caryophyllaceae) en América del Sur, con la descripción de una nueva subespecie del Perú

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Abstract:

Background and Aims: *Polycarpon* is a genus traditionally comprising about 16 species distributed in tropical and temperate regions. Molecular studies demonstrated its polyphyly, highlighting three supported clades: the *P. coquimbense-suffruticosum* aggregate (from South America), *P. prostratum* (tropical), and the *P. tetraphyllum* aggregate (mainly in the Mediterranean region). The first two clades have been excluded from *Polycarpon*: *P. coquimbense*, *P. suffruticosum*, and *P. anomalum* recently transferred to *Augustea*, and *P. prostratum* recognized under *Polycarpaea*. The remaining members represent a polyploid complex treated as a single species, *P. tetraphyllum*. Taxonomic questions remain open, especially concerning the number of taxa occurring in some geographical areas. Among them is South America, for which we here present a synopsis.

Methods: This work is based on field surveys, examination of specimens, and analysis of literature. The International Code of Nomenclature for Algae, Fungi and Plants was consulted.

Key results: Three subspecies of *Polycarpon tetraphyllum* are recognized in South America: subsp. *apurensis* (from Argentina, Colombia, Paraguay, and Venezuela), subsp. *tetraphyllum* (alien in most of the countries), and subsp. *peruvianum* (endemic to Peru). The latter subspecies is newly described here and it differs from subsp. *diphyllum* and subsp. *tetraphyllum* by stipule shape, leaf arrangement and colour, arrangement of flowers in inflorescences, petal length, and stamen number. It also presents a distinct habitat: dry, rocky soils, in contrast to the sandy soils or disturbed areas where other subspecies grow. The name *P. urbanianum*, previously considered as a Peruvian endemic, is here demonstrated to be not a species of *Polycarpon*. A diagnostic key of the South American subspecies of *P. tetraphyllum* is proposed.

Conclusions: The results obtained remark the variability of *Polycarpon tetraphyllum* s.l. and highlight that the flora of South America, especially concerning the small Caryophyllaceae needs to be further investigated.

Key words: Andes, morphology, *Polycarpon tetraphyllum*, subspecies, synonymy.

Resumen:

Antecedentes y Objetivos: *Polycarpon* es un género que tradicionalmente comprende unas 16 especies distribuidas en regiones tropicales y templadas. Sin embargo, estudios moleculares han demostrado que es polifilético, identificándose tres clados bien sustentados: el agregado *P. coquimbense-suffruticosum* (Sudamérica), *P. prostratum* (tropical) y el agregado *P. tetraphyllum* (principalmente en el área mediterránea). Los dos primeros clados han sido excluidos del género *Polycarpon*: *P. coquimbense*, *P. suffruticosum* y *P. anomalum* fueron recientemente transferidos a *Augustea*, y *P. prostratum* se reconoce ahora bajo el género *Polycarpaea*. El resto de los miembros constituye un complejo poliploide que se trata como una sola especie: *P. tetraphyllum*. Sin embargo, persisten dudas taxonómicas, especialmente sobre el número real de taxones en algunas regiones, como Sudamérica, donde centramos nuestra revisión.

Métodos: El estudio se basó en exploraciones de campo, revisión de ejemplares de herbario y análisis crítico de literatura especializada. Se consultó el Código Internacional de Nomenclatura para Algas, Hongos y Plantas.

Resultados clave: Se reconocen tres subespecies de *Polycarpon tetraphyllum* en Sudamérica: subsp. *apurensis* (Argentina, Colombia, Paraguay y Venezuela), subsp. *tetraphyllum* (introducida en varios países) y subsp. *peruvianum* (endémica del Perú), esta última descrita aquí por primera vez. Se distingue por la forma de las estípulas, disposición y color de las hojas, inflorescencias, longitud de los pétalos y número de estambres. Además, presenta un hábitat distinto: suelos secos y rocosos, en contraste con los suelos arenosos o áreas perturbadas donde crecen otras subespecies. Se demuestra también que *P. urbanianum*, considerado antes endémico del Perú, no pertenece al género *Polycarpon*. Se incluye una clave diagnóstica para las subespecies sudamericanas.

Conclusiones: Este estudio resalta la variabilidad morfológica dentro de *Polycarpon tetraphyllum* s.l. y la necesidad urgente de profundizar el conocimiento sobre la flora sudamericana, especialmente en Caryophyllaceae de pequeño tamaño.

Palabras clave: Andes, morfología, *Polycarpon tetraphyllum*, subespecies, sinonimia.

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Introduction

The genus *Polycarpon* L. (Caryophyllaceae), as traditionally circumscribed, includes about 16 species which are distributed in tropical and temperate regions of the world (Iamónico and Domina, 2015). The studies by Kool et al. (2007) demonstrated the polyphyly of this genus using DNA sequence data from the chloroplast *rps16* intron and nuclear *RPB2* regions, highlighting three different clades with high support values, i.e. 1) the *P. coquimbense suffruticosum* aggregate (from South America), 2) *P. prostratum* (Forssk.) Asch. & Schweinf. (tropical, widespread), and (3) the *P. tetraphyllum* aggregate (main diversity in the Mediterranean region). The first two clades must be excluded from *Polycarpon* since their members lack the synapomorphy for this genus, i.e. the capsule dehiscence by valves that elastically roll inwards. On the one hand, *P. coquimbense* Ge-reau & Martic. and *P. suffruticosum* Griseb., together with *P. anomalum* Hassl., were transferred by Iamónico (2015a) to the new genus *Augustea* Iamónico, endemic from South America (Argentina, Bolivia, Chile, and Paraguay). On the other hand, *P. prostratum* should be recognized under *Polycarpaea* Lam. The remaining members (*Polycarpon sensu stricto*) represent a polyploid complex that can be treated as a single species, *P. tetraphyllum* (L.) L. (see e.g., Kool et al., 2007; Hernández-Ledesma et al., 2015). Accordingly, Iamónico (2013, 2015b, c, d, 2017a), Iamónico and Domina (2015), and Iamónico and Zanotti (2022) proposed to recognize the various taxa at subspecies rank.

The flora of South America would comprise two *Polycarpon* species, i.e. *P. tetraphyllum* L. (with two subspecies: *P. tetraphyllum* subsp. *apurense* (Kunth) Iamónico & Zanotti and *P. tetraphyllum* subsp. *tetraphyllum*) and *P. urbanianum* Muschl. (see Iamónico and Zanotti, 2022; POWO, 2025).

As part of the ongoing studies on *Polycarpon* (e.g., Iamónico, 2015a, b, c, d, 2017a, b; Iamónico and Domina, 2015; Iamónico and Zanotti, 2022), which are part of the Caryophyllales Network project (coordinator: N. Korotkova, Freie Universität Berlin, Germany), we here present a note on the taxa occurring in South America. Specifically, a *Polycarpon* population found in the Apurímac region (southern-central Peru) displays morphological features which do not fit those of any other known taxon; accordingly, we here propose to describe a new taxon.

Material and Methods

The present research is based on field surveys, analysis of the relevant literature (including protologues), and search and examination of specimens (including types) preserved in the herbaria B, BM, COL, HOXA, HSP, HUT, MOL, P, PAL, RO, SI, U, USM, W, and WAG (herbarium acronyms according to Thiers (2025, continuously updated)).

The morphological characters were measured using both a millimeter ruler and Olympus SZX10 and NSZ-405 1X-4.5X stereomicroscopes (Olympus SZX10 Hachioji, Tokyo, Japan; NSZ-405 1X-4.5X, China). Other characters were evaluated under a Hitachi FESEM (Field Emission Scanning Electron Microscope, HI-0841-0001, Hitachi High-Tech Corporation, headquartered in Tokyo, Japan).

The Articles of the International Code of Nomenclature for Algae, Fungi, and Plants (hereafter reported as ICN; Turland et al., 2018).

The Conservation status for the new *Polycarpon tetraphyllum* subsp. *peruvianus* was proposed according to the criteria by IUCN (2016). Specifically, AOO and EOO were calculated using 2 × 2 km grid cells in the freeware QGIS program (QGIS Development Team, 2025).

Results

Three subspecies of *Polycarpon tetraphyllum* are recognized in South America, i.e. *P. tetraphyllum* subsp. *apurense* (from Argentina, Colombia, Paraguay, and Venezuela), *P. tetraphyllum* subsp. *tetraphyllum* (alien in most of the countries), and *P. tetraphyllum* subsp. *peruvianum* subsp. *nov.* (endemic to Peru). *Polycarpon urbanianum*, previously considered as a Peruvian endemic, is here demonstrated to be not a species of *Polycarpon* and has been proposed for a rejection by Iamónico and Montesinos-Tubée (2025).

***Polycarpon tetraphyllum* (L.) L., Syst. Nat., ed. 10, 2: 881. 1759.**

≡ *Mollugo tetraphylla* L., Sp. Pl. 1: 89. 1753.

TYPE: ITALY. Narbonia. *Herb. Clifford 28, Mollugo 2* (lectotype (designated by Burtt and Lewis 1952: 339): BM000557701!; image of the lectotype available at JSTOR, 2025a).

***Polycarpon tetraphyllum* L. subsp. *apurense* (Kunth)** Iamónico & C.A. Zanotti, *Bonblandia* 31(1): 93. 2022.

≡ *Polycarpon apurense* Kunth, *Nov. Gen. Sp.* 6: 40. 1823.

TYPE: VENEZUELA. Apure: In humidis rio Apure, III.1800, A. J. A. *Bonpland* 5534 (lectotype (designated by Iamónico and Zanotti, 2022: 93): P04925644!, image of the lectotype available at MNHN, 2025).

Polycarpon depressum sensu Rorhback (1872: 257) *pro minima parte*.

Polycarpon depressum sensu Pedersen (1987: 268) *pro minima parte*.

Polycarpon depressum sensu Gereau and Marticorena (1995: 152) *pro minima parte*.

Distribution and habitat: Argentina (Corrientes, Entre Ríos, Misiones), Colombia (Vichada), Paraguay (Department Central), Venezuela (Amazonas, Apure, Barinas, Bolívar, Delta Amacuro, Guayana), where it grows on riverbanks and humid places at elevation of 0-500 m (Fig. 1).

The subspecies' presence is doubtful in Peru where Macbride (1937: 627) reported the species as occurring "Probably". No specimens of *P. tetraphyllum* subsp. *apurense* collected in Peru were traced, but it is not impossible that the species could be present in this country.

Additional examined material: ARGENTINA. Corrientes, Empedrado, Estancia "Las Tres Marias", on almost bare sands, foot of the bank of the Rio Paraná, about 1-2 m, 22.VIII.1951, *Pedersen* 1152 (P04925767). COLOMBIA. Vichada, Entrada del raudal San Borja, Ventanas, 17.III.1971, *Pinto and Sastre* 1323 (COL000401650). PARAGUAY, Asunción, distrito Santa María de la Asunción. Ribera del Río Paraguay, Itá Enramada, IX.1971, *Schinini* 3964 (SI). VENEZUELA, Amazonas, Pto. Ayacucho airport, 5°40'N 67°40'W, 100 m, sandy beach and adjacent laja, 03.IV.1984, *Gentry and Stein* 46280 (U1886783). Apure, distrito Pedro Camejo, 9 km directly, in a straight line WNW of Paso de Cinaruco Chalana along the banks of the Rio Cinaruco, 6°35'N 67°35'W, 60 m, sand bar with mostly annual herbs, 02.V.1977, *Davidse and*

González 12492 (L3751387); distrito Pedro Camejo, 2.5 km up-stream from the mouth of the Rio Campanaro at its junction with the Rio Orinoco directly west of Isla La Urbana, 7°10'N 76°3'W, 30 m, sand bar in river, 05.V.1977, *Davidse and González* 12702 (WAG1396615). Barinas, a lo largo de los márgenes del Río Cáparo, entre campamento Cachicamo y Boca de Garza, este de El Cantón, 12.IV.1968, *Steyermark* 102274 (COL000401648). Guayana, Angustura, 1864, *de Grosuordy* 13 (P04325763); Caicara, 1864, *de Grosuordy* 13 (P04925762).

***Polycarpon tetraphyllum* L. subsp. *peruvianum* Montesinos & Iamónico, subsp. nov. Fig. 2.**

TYPE: PERU. Huánuco, Yarowilca, Choras, Restos Arqueológicos de Garu, on rocky slopes with tussock grasslands, 3800 m, 7.V.2017, *D. Montesinos* 5451 (holotype: HSP!, isotypes: B 10 0761273!, HUT!, RO!).

Polycarpon tetraphyllum subsp. *peruvianum* is similar to *P. tetraphyllum* subsp. *diphyllum* (Cav.) O. Bolòs & Font Quer and *P. tetraphyllum* subsp. *tetraphyllum*, from which it differs by the shape of the stipules (triangular-acuminate vs. ovate to lanceolate and acute in the other two subspecies), the arrangement and colour of the leaves (green and mostly in whorls of 4 vs. purplish or reddish, the lower nodes opposite in *P. tetraphyllum* subsp. *diphyllum*), dense inflorescence (vs. lax in *P. tetraphyllum* subsp. *tetraphyllum*), length of the petals (1.5-2.0 mm long vs. 0.5-1.0 mm long in the other two subspecies), and number of stamens (5 vs. 3-4 in the other two subspecies). Moreover, the habitat is different, i.e. rocky and dry soils, whereas *P. tetraphyllum* subsp. *diphyllum* occurs in sandy soil (especially along sea-coasts) and *P. tetraphyllum* subsp. *tetraphyllum* in typical disturbed-human-made areas.

Annual herb, (4-)5-13(-17) cm tall; stems ascending, glabrous or distally pubescent, branched; leaves mostly in whorls of 4, the distal ones sometimes opposite, shortly petiolate, green, blade ovate or obovate, 3-10 × 1-5 mm, not fleshy, sparsely ciliate, base cuneate, margin entire, apex obtuse, stipules 2, triangular, 0.9-2.5 mm long, as long as or longer than the peduncles of flowers, white-silvery scarious,

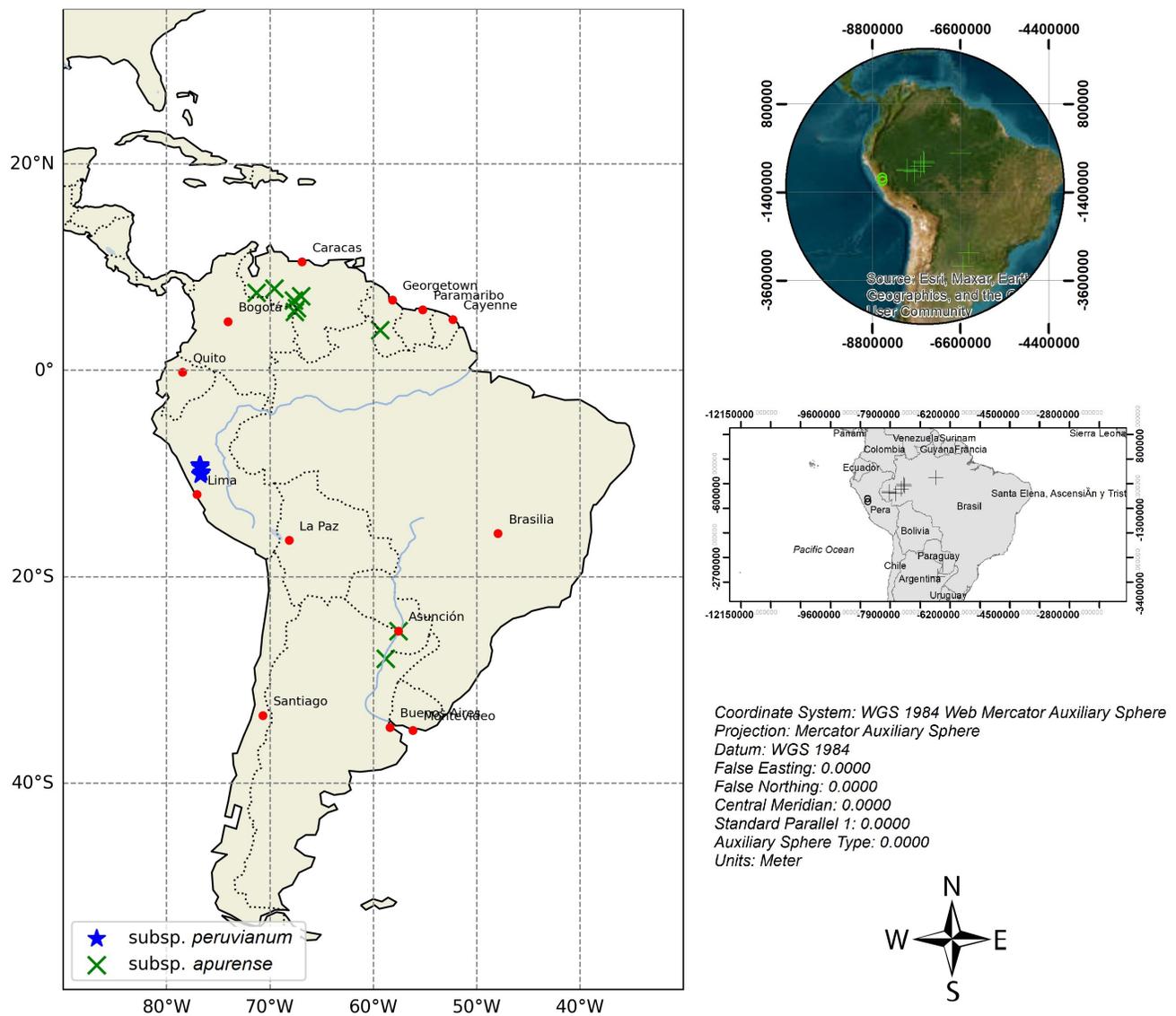


Figure 1: Distribution map of *Polycarpon tetraphyllum* subsp. *apurense* (Kunth) Iamónico & Zanotti and subsp. *peruvianum* Montesinos & Iamónico.

apex acuminate, pubescent; inflorescences of dichasial terminal cymes densely flowered; flowers bisexual; sepals 5, ovate or lanceolate, 1.7-2.5 mm long, glabrous, keeled, margin whitish, membranous, apex acute and mucronate; petals 5, bilobed, 1.5-2.0 mm long, as long as the sepals or slightly shorter, white, apex obtuse; stamens 5, free, shorter than the sepals; anthers white; gynoecium with 1 pistil, 1 style and 3-loculed ovary, stigmas 5; loculicidal capsule ovoid, 1.9-2.1 × 1.5-1.7 mm, dehiscent by 3 twisting valves; seeds

40-50 per fruit, oblong, ca. 0.5 mm in diameter, brown, dorsally verrucose with cells more or less hexagonal, margins brown.

Etymology: the specific epithet is derived from the name of the country Peru, honoring its geographic origin. This designation highlights the species natural distribution within the Peruvian territory and acknowledges the nation's rich biodiversity.



Figure 2: *Polycarpon tetraphyllum* subsp. *peruvianum* Montesinos & Iamónico from Huánuco (*D. Montesinos 5451*). Photo by D. Montesinos.

Distribution and habitat: endemic to Apurímac region (south Peru), where it grows in rocky and dry soils (Fig. 1).

Proposed vernacular name: Peruvian Manyseed (English), Yaku Qura, Paray Pacha Qura (quechua).

Preliminary conservation status: *Polycarpon tetraphyllum* subsp. *peruvianum* appears to be a common annual during the wet season in Peru, particularly in rocky and dry habitats. Field surveys and herbarium records indicate a stable and widespread presence across multiple localities in southern Peru. Based on available data, its Extent of Occurrence (EOO) is estimated to be approximately 12,000 km²,

whereas Area of Occupancy (AOO) is around 60 km². Based on criterion B1 (EOO is less than 20,000 km²), *P. tetraphyllum* subsp. *peruvianum* could be assessed as Vulnerable (VU).

Taxonomic notes: *Polycarpon tetraphyllum* subsp. *peruvianum* is the seventh annual *Polycarpon* subspecies to add to the currently recognized ones, i.e. *P. tetraphyllum* subsp. *alsinifolium* (Biv.) Iamónico & Domina (Mediterranean; Iamónico, 2017b), *P. tetraphyllum* subsp. *depressum* (Nutt.) Iamónico (endemic to California; Iamónico, 2015b), *P. tetraphyllum* subsp. *diphyllum* (Mediterranean-Macaronesian; Iamónico, 2017b), *P. tetraphyllum* subsp. *dunense* (P. Fraga & Rosselló) Iamónico (endemic to the island Menor-

ca (Balears, Spain); Iamónico, 2015c), *P. tetraphyllum* subsp. *arabicum* (Boiss.) Iamónico (Eastern Mediterranean-Arabian area; Iamónico, 2017a), *P. tetraphyllum* subsp. *tetraphyllum* (Europe, North and North-eastern Tropical Africa, Middle east, India and Sri Lanka; Iamónico, 2017b; POWO, 2025).

Additional examined material: PERU. Áncash, Huánuco, Huamalies, Jircán, Road from Arancay to Jircán, 3220 m, 18.VII.2016, *D. Montesinos 4713* (B 10 0745303, HSP, HUT, RO). Huamalies, Jircán, Tarapampa, 2775 m, 16.V.2017, *D. Montesinos 5620* (B 10 0761258, HSP, HUT, MOL, RO). Huamalies, Tantamayo, Hospedaje Don Eladio de Tantamayo, 3526 m, 22.VII.2016, *D. Montesinos 4775* (B 10 0745210, HSP, HUT, RO). Huari, Huacchis, Chucman Punta, 3250 m, 10.V.2017, *D. Montesinos 5504* (B 10 0761267, HSP, HUSA, HUT, MO, MOL, RO, USM). Rapayán, Huashgo, 3120 m, 20.VII.2016, *D. Montesinos 4747* (B 10 0745300, HSP, HUT, RO). Lauricocha, Baños, Chiquia, 3540 m, 19.V.2017, *D. Montesinos 5660* (B 10 0761259, HUT, HSP, RO). Lauricocha, Jesús, Resto Arqueológico de Chiquia, 3540 m, 29.IV.2022, *D. Montesinos 9381* (B 10 1228110, HOXA). Lima, Canta, Lachaqui, Taraca en camino hacia Arahua, 3480 m, 29.VI.1998, *G. Vilcapoma 4850* (MOL, USM).

Polycarpon tetraphyllum L. subsp. *tetraphyllum*

Distribution and habitat: central and southern Europe, western Asia, India, Sri Lanka, Macaronesia to north and eastern Africa where it grows mainly in human-made habitat. It is alien in western Canada and USA, widespread in South America, southern Africa, Japan, southeastern Australia and northern New Zealand.

Additional examined material: ALGERIA. Algiers, Alger, *M. Brichi s.n.* (RO). AUSTRALIA. New South Wales, Cumberland, near Sidney, s.d., Alameda Co., near North Hall, 24.IX.1906, *W. A. Setchell coll. s.n.* (RO). AUSTRIA. Wien, Bezirk Böcklinstraße 23 und Josef-Gall-Gasse, 04.VII.2010, *R. Diran s.n.* (W); 16, Bezirk, raum Konstantingasse - Odoakergasse Wögingergasse, 16.IX.2011, *W. Adler s.n.* (W). GREECE. Central Greece, Athens, 10.VI.1893, *T. Heldreich s.n.* (RO). ITALY. Friuli-Venezia Giulia, ager Tergestinus, Ter-

geste in ruderatis, VIII.1917, *C. Marchesetti s.n.* (RO); Lazio, Tenuta di Castel Porziano, Tor Paterno, *B. Anzalone 12809* (RO); Piedmont, Torino, Parco del Valentino, *E. Ferrari 596* (RO); Sicily, Caltanissetta, ferrata a San Cataldo, V.1900, *I. Di Giovanni s.n.* (RO); Palermo alla Pizzuta, VI.1900, *I. Di Giovanni s.n.* (RO); Tuscany, Grosseto, agro di Roccastrada, loc. Pian di Muro verso Sticciano, 27.VIII.2010, *F. Selvi s.n.* (PAL89164). PORTUGAL. Centro, Coimbra, Cumiada, *A. Moller 331* (RO).

Species excludendae

Polycarpon urbanianum Muschl., Bot. Jahrb. Syst. 45(4): 452-453. 1911, *nomen incertae sedis* (not a member of *Polycarpon*).

Discussion

POWO (2025) reported three species of *Polycarpon* in South America, i.e. *P. apurense* Kunth (northeastern Argentina, Colombia, Paraguay and Venezuela), *P. tetraphyllum* (alien in most of the countries; absent in French Guyana, Guyana, Paraguay and Suriname), and *P. urbanianum* (endemic to Peru). Recently, Iamónico and Zanotti (2022) clarified the identity of Kunth's *P. apurense* by typifying the name on a Bonpland's specimen deposited in P (barcode P04925644) and proposing to transfer the taxon at subspecies rank of *P. tetraphyllum*. According to these authors, the number of *Polycarpon* species occurring in South America would be two: *P. tetraphyllum* (with subsp. *tetraphyllum* and subsp. *apurense*) and *P. urbanianum*. Concerning the latter taxon, no detailed paper was published up to now and the name appears to be untypified. Therefore, we here investigated in detail Muschler's name to verify its correct application.

Muschler (1911: 452-453) validly described *Polycarpon urbanianum* by providing a detailed description; a syntype (ICN Art 9.6) was cited: "Peru: Cordillera blanca prope Huaraz, in formatione plantis caespitosis pulvinaribusque composita, 4300-4400 m (Weberbauer n. 2985, Specimina florigena fructiferaque 14. Maii 1903. - Herb. Berol.)". According to the HUH-Index of Botanists (2013), Weberbauer's herbarium and types are deposited in the herbaria B, MOL, and USM. Collections in B were



mostly destroyed during the Second World War, while no Weberbauer's specimen useful for the typification purpose was traced in MOL and USM. Lacking original material, a neotypification is required according to the ICN Art. 9.8.

However, the neotypification of Muschler's name is a difficult issue. Firstly, at elevations of 4300-4400 m no *Polycarpon* taxon occurs in Peru, based on our personal investigation on field. Second, after checking the original description by Muschler (1911: 452-453) we verified that the morphology of *P. urbanianum* cannot be ascribed to any known member of *Polycarpon*. This species is an annual species and six taxa in *Polycarpon* are annuals: i.e. *P. tetraphyllum* subsp. *depressum* (Nutt.) Iamónico, *P. tetraphyllum* subsp. *arabicum* (Boiss.) Iamónico, *P. tetraphyllum* subsp. *diphyllum* (Cav.) O. Bolòs & Font Quer, *P. tetraphyllum* subsp. *dunense* (P.Fraga & Rossellò) Iamónico, *P. tetraphyllum* subsp. *alsinifolium* (Biv.) Ball, and *P. tetraphyllum* subsp. *tetraphyllum* (the latter two subspecies can also be perennials). Based on the height of the plant described by Muschler (1911: 452), i.e. 2-4 cm, we can exclude both *P. tetraphyllum* subsp. *alsinifolium* (5-20 cm) and *P. tetraphyllum* subsp. *tetraphyllum* (8-35 cm). Concerning the remaining three subspecies, *P. tetraphyllum* subsp. *depressum* has sepals of 0.5-0.7 mm long and lax inflorescences (sepals 1-2 mm long and inflorescence is dense in *P. urbanianum*), *P. tetraphyllum* subsp. *diphyllum* has leaves 8-12 mm long, and ovate-lanceolate stipules of up to 2.5 mm long (leaves 6-8 mm long and triangular stipules 1 mm long in *P. urbanianum*), *P. tetraphyllum* subsp. *dunense* has ovate, obtuse sepals that are not keeled (lanceolate, acute, and keeled in *P. urbanianum*), *P. tetraphyllum* subsp. *arabicum* has spatulate leaves and brown seeds (leaves not spatulate and reddish seeds in *P. urbanianum*). Furthermore, *P. tetraphyllum* subsp. *depressum*, *P. tetraphyllum* subsp. *dunense*, and *P. tetraphyllum* subsp. *arabicum* are endemics to, respectively, California (western USA) and Baja California (Mexico), Balearic Islands (Spain, in the Mediterranean Sea), and the Arabian Peninsula plus Egypt.

As a consequence, Muschler's *Polycarpon urbanianum* does not belong to *Polycarpon*. It can be noted that MacBride (1937: 628), in his Flora of Peru, stated that *P. urbanianum* is "otherwise like *P. englerianum*, a species currently recognized as *Drymaria engleriana* (Mus-

chl.) Baehni & J.F. MacBr." (see e.g., POWO, 2025). Based on our knowledge of the group and extensive analysis of Muschler's (1911) work, his description of *Polycarpon urbanianum* cannot be ascribed to *D. engleriana*, since several key morphological traits described by Muschler are inconsistent with the current concept of *D. engleriana*. Specifically, *P. urbanianum* is described as an annual species with a low, dense caespitose growth form, whereas *D. engleriana* can be annual or biennial, typically forming a densely grassy habit. The root system of *P. urbanianum* consists of very thin, whitish-yellow roots measuring 5-6 cm long, while *D. engleriana* has shorter, yellow roots of 3-5 cm long. Stem morphology also differs, with *P. urbanianum* having thicker stems (0.5-1.0 mm diameter at the base) compared to 0.5 mm diameter observed in *D. engleriana*. The leaf structure presents further discrepancies: *P. urbanianum* has ovate-lanceolate leaves that are usually acute or very acute, with a long petiole and whitish squamiform pubescence, whereas *D. engleriana* has oblanceolate or obovate-oblanceolate leaves, which are obtuse or acute, with shorter petioles and curly hairs. Additionally, Muschler's description indicates differences in inflorescence structure, with *P. urbanianum* displaying compound dichasia with shortened secondary branches and curled pedicelled flowers, in contrast to *D. engleriana*, which lacks curls and has mostly sessile flowers. The calyx lobes of *P. urbanianum* are smaller (outer lobes 1 mm, inner lobes almost 2 mm long) compared to those of *D. engleriana* (outer lobes 2 mm long, inner lobes almost 3 mm), and petal presence is inconsistent, with *P. urbanianum* consistently having five petals, while *D. engleriana* sometimes lacks them. These discrepancies suggest possible misinterpretations in Muschler's description, particularly regarding inflorescence branching, calyx size, and petal presence. A proposal for rejection was prepared (Iamónico and Montesinos-Tubée, 2025; see also Bittrich, 1993).

In addition to the literature data, we came across to geographically isolated *Polycarpon* populations growing at high elevation in Central Peru. Plants are annual and show some peculiar characteristics in comparison with the other currently known annual taxa, especially with *P. tetraphyllum* subsp. *diphyllum* (Cav.) O. Bolòs & Font Quer and *P. tetraphyllum* subsp. *tetraphyllum*. We have here pro-



posed to treat this Peruvian population as a new subspecies of *P. tetraphyllum* (subsp. *peruvianum* subsp. nov.).

A diagnostic key of the South American taxa belonging to *Polycarpon* is proposed below.

Key to South American *Polycarpon* taxa

- 1a. Perennial herb; leaves linear to lanceolate, in whorls of 5; habitat: riverbanks and humid places
 *P. tetraphyllum*
 L. subsp. *apurensis* (Kunth) Iamónico & C.A. Zanotti
- 1b. Annual herb (subsp. *tetraphyllum* sometimes perennial); leaves usually ovate or obovate, in whorls of 4 2
- 2a. Stipules ovate, usually acute; inflorescence lax; petals 0.5-0.7 mm long; stamens 3-4; habitat: disturbed-human-made areas
 *P. tetraphyllum* L. subsp. *tetraphyllum*
- 2b. Stipules triangular, acuminate; inflorescence dense; petals 1.5-2.0 mm long; stamens 5; habitat: rocky and dry soils *P. tetraphyllum* L. subsp. *peruvianum* Montesinos & Iamónico

Author contributions

Conceptualization: DI, DM; methodology: DI, DM; investigation: DI, DM; resources: DI, DM; data curation: DI, DM; writing-original draft: DI; writing-reviewed drafts and editing: DI, DM.

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