Chorological and nomenclatural notes on Peruvian Carex (Cyperaceae)
Notas corológicas y nomenclaturales sobre Carex (Cyperaceae) del Perú

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ABSTRACT
Here we present relevant records of nine species of the genus Carex (Cyperaceae) new for Peru: C. amicta, C. brehmeri, C. camptoglochin, C. enneastachya, C. livida, C. maritima, C. ownbeyi, C. ruthsatzae, and C. vallis-pulchrae. We perform the lectotypification of the names Carex camptoglochin, C. amicta and C. confertospicata.

Keywords. Carex, Chorology, Cyperaceae, Peru, systematics, taxonomy

RESUMEN
En este estudio se reconocen nueve registros nuevos de especies del género Carex (Cyperaceae) para la flora del Perú: C. amicta, C. brehmeri, C. camptoglochin, C. enneastachya, C. livida, C. maritima, C. ownbeyi, C. ruthsatzae y C. vallis-pulchrae. También hemos realizado la lectotipificación de los nombres Carex camptoglochin, C. amicta y C. confertospicata.

Palabras clave. Carex, Corología, Cyperaceae, Perú, sistemática, taxonomía
**INTRODUCTION**

*Carex* is one of the largest genera of angiosperms with ca. 2000 species (e.g., Global *Carex* Group 2015, 2016, Martín-Bravo et al. 2019). It has mainly a circumboreal distribution with about 200 species reaching the South American continent. Recent works on taxonomy, chorology, and nomenclature of the Neotropical species of the genus *Carex* have resulted in significant changes on the species delimitation or distribution of quite a few taxa (Jiménez-Mejías and Escudero 2016, Jiménez-Mejías and Roalson 2016, Jiménez-Mejías et al. 2016a, 2018, Pindexter et al. 2017, Jiménez-Mejías and Reznicek 2018, Jiménez-Mejías et al. in press).

This publication is the result of an extensive study of specimens in the main Peruvian herbarium collections. Here we present relevant chorological and nomenclatural data for nine species new for Peru, as well as taxonomic notes on some species.

**MATERIALS AND METHODS**

Material of the following Peruvian herbaria was studied: CPUN, HSP, HUT, MOL, and USM (acronyms according to Index Herbariorum; Thiers c2019). High resolution images of type material available on the Internet were studied from the collections of BM, K, LPB, and SGO. In addition, a few type specimens were studied directly during visits to the collections of MICH, NY, and US. Specimens were determined using the specialized taxonomic literature cited under each taxon. The species are presented in alphabetical order following the names accepted in the World Checklist of Cyperaceae (Govaerts et al. c2019). The terminology of the inflorescence prophylls (utricles and cladoprophylls) follows the suggestions in Jiménez-Mejías et al. (2016b).

**RESULTS AND DISCUSSION**

*Carex amicta* Boott, Ill. Gen. Carex 4: 131. 1867. 

**Lectotype** (here designated): Paramo de Cuchero [Páramo de Cachirí], N. Granada 1845, W. Purdie s.n. (Herbarium Hookerianum) (K barcode 000584609 digital image!; **isolectotype**: K barcode 000584608 digital image!). 

**Material studied.** PERU. **Cajamarca:** Celendín, Laguna Azul, 3706 m, 6 Apr 1994, G. Vilcapoma & J.J. Alegria 7380 (MOL-15907). 

**Notes:** *Carex amicta* is an Andean endemic species previously known from Venezuela to Ecuador. Here we cite it for the first time for the department of Cajamarca in Peru, which becomes the southernmost limit of the species range. The dwarf *Carex amicta*, a species that dwell in páramos, is an atypical member of the formerly recognized subgenus *Vigneastra* (now known to be nested within subgenus *Carex*; Global *Carex* Group (2016) and references therein), mainly constituted by large species from tropical humid forests with open panicle-like inflorescences and fertile cladoprophylls.

We conclude that the type locality of this species, Páramo de Cuchero, belongs to some place in Colombia following Ewan (1948) whom describes the travel itinerary of Purdie between 1845 and 1846 indicating that he visited the northern part of the country with no reference to Venezuela or Ecuador or any other place south to Bogotá. This locality is listed as Colombia, Santander by the Missouri Botanical Garden database (Magill et al. c2019) without any further information and does not appear in the official colombian gazetteer (IGAC 1996).

*Carex brehmeri* Boeckeler, Allg. Bot. Z. Syst. 2: 190. 1896. 

**Lectotype** (designated by Jiménez-Mejías et al. 2016a): BOLIVIA. Larecaja, vicinis Sorata, Cochipata, 3200 m, Dec 1884, G. Mandon 1427 (NY barcode 00011459!; **isolectotypes**: MICH barcode 1109115!, NY barcode 00011460!).

**Material studied.** PERU. **Cajamarca:** Cajamarca, Quebrada Pampa Larga, al Norte de las Minas Yanacocha, 4950 m, 5 Mar 1994, I. Sánchez & M. Cabanillas 6829 (CPUN-12486).

**Notes:** Specimens cited here, belonging to section *Phacocystis*, are dwarf sedges with stems much shorter than the leaves. *Carex sect. Phacocystis* was previously unrecorded from Peru and has a quite confusing taxonomy in South America that has often led to wrong taxonomic determinations and misapplication of names, e.g. see the cases of *C. azuayae* Steyerm. and *C. enneastachya* C.B. Clarke...
in Wheeler (1998), and C. deciduala Boott and C. brehmeri in Dragon and Barrington (2009). While more biogeographic data is available, we consider that the application of the name C. brehmeri to these dwarf plants is the best possible solution (see also the record of C. brehmeri in Jiménez-Mejías et al. 2016a).

There is a discrepancy between the altitude indicated in the protologue (“3100”) by Boeckeler (1896) and that provided on the type collection labels (“3200”). Beyond that, the specimens selected as types are certainly original materials of C. brehmeri.

**Carex enneastachya** C.B.Clarke, Bull. Misc. Inform. Kew, Addit. Ser. 8: 70. 1908.

*Holotype*: COLOMBIA [“Columbia”], Jameson 2 (K barcode 000584607 digital image!).

*Material studied*. PERU. Áncash: Recuay, Laguna de Querococha, 4050 m, 23 May 1970, A. López & A. Sagastegui 7516 (HUT). Cajamarca: Hualgayoc, entre Cajamarca y Hualgayoc, 3750 m, 16 Nov 1974, I. Sánchez Vega & J. Sánchez Vega 1339 (CPUN-670).

*Notes*: *Carex enneastachya* is another species of the section *Phacocystis* new for the Peruvian flora. Its presence in Peru has geographical sense since this species had already been recorded in Ecuador and Bolivia (Govaerts et al. c2019). In contrast with the materials that we cited above under *C. brehmeri*, these specimens are tall plants with elongated stems and several cylindrical spikes, and therefore easily identified as *C. enneastachya*.

Carex villosa Wahlenb., Sp. Pl. 4: 285. 1805.

*Material studied*. PERU. Cajamarca: Celendín, Minas Conga, sector El Águila, 3700-3800 m, 04 Oct 2005, A. Granda 2511 (MOL); Celendín, Minas Conga, Cocal, 3880-3900 m, 04 Oct 2005, A. Granda 2504 (MOL); Celendín, Minas Conga, Huaylamanchoy, 3650-3700 m, 1 Oct 2005, A. Granda 2474 (MOL); Celendín, Laguna Azul, 3600-3700 m, 5 Oct 2005, J.J. Alegría 2051 (MOL); Celendín, Laguna Azul, 3600-3700 m, 6 Oct 2005, J.J. Alegría 2065 (MOL).

*Notes*: A South American endemic species previously believed to be closely related to the superficially resembling *Carex microglochin* Wahlenb. Recent phylogenetic studies (Escudero et al. 2010, Gehrke et al. 2010, Global Carex Group 2016) have demonstrated that *C. camptoglochin* is allied to the species belonging to the sections *Aciculares* and *Junciformes*, two groups that are mainly distributed in South America and with a few disjunct species in New Zealand (Global Carex Group 2016).

**Carex enneastachya** C.B.Clarke, Bull. Misc. Inform. Kew, Addit. Ser. 8: 70. 1908.

*Holotype*: COLOMBIA [“Columbia”], Jameson 2 (K barcode 000584607 digital image!).

*Material studied*. PERU. Áncash: Recuay, Laguna de Querococha, 4050 m, 23 May 1970, A. López & A. Sagastegui 7516 (HUT). Cajamarca: Hualgayoc, entre Cajamarca y Hualgayoc, 3750 m, 16 Nov 1974, I. Sánchez Vega & J. Sánchez Vega 1339 (CPUN-670).

*Notes*: *Carex enneastachya* is another species of the section *Phacocystis* new for the Peruvian flora. Its presence in Peru has geographical sense since this species had already been recorded in Ecuador and Bolivia (Govaerts et al. c2019). In contrast with the materials that we cited above under *C. brehmeri*, these specimens are tall plants with elongated stems and several cylindrical spikes, and therefore easily identified as *C. enneastachya*.

*Carex livida* (Wahlenb.) Willd., Sp. Pl. 4: 285. 1805.

*Carex limosa* var. *livida* Wahlenb., Kongl. Vetensk. Acad. Nya Handl. 24: 162. 1803.

*Lectotype* (first step lectotypification designated by Wheeler and Guaglianone 2003): CHILE. Orange Harbour, Fuegia, Capt. Wilkes Exploring Expedition s.n.; second-step lectotypification (here performed): K barcode 000998497 digital image!; *isolectotypes*: GH barcode 00101839 digital image!; K barcode 000999226 digital image!; LE barcode 00103383 digital image!; US barcode 00087249 digital image!).

*Material studied*. PERU. Huánuco: Lauricocha, San Miguel de Cauri, Oconal de Añasapampa, 3915 m, 8 Oct 2002, F. Salvador et al. 474 (USM). La Libertad: Pataz, Puerta del Monte, ruta de Huayllillas, 3200 m,
22 May 1961, A. López & A. Sagástegui 3453 (USM); Pataz, Parayoc, cercanías del puesto de vigilancia de Ventanas, 3770-3950 m, 6 Jun 2001, B. León et al. 5043 (USM). San Martin: Mariscal Cáceres, Huincungo, valle de Riuibarbos, 3600-3640 m, 7° 58′ 30″ S 77° 22′ 8″ W, 12 Jun 2001, B. León & K. Young 5178 (USM); Mariscal Cáceres, Pastizales de La Empedrada, 3750-3785 m, 27 Jul 2000, B. León & K. Young 4582 (USM); Mariscal Cáceres, Puerta del Monte, NW corner of Río Abiseo National Park, 3450 m, 10 Jul 1987, K. Young & B. León 4338 (USM); Mariscal Cáceres, campamento chochos y laguna de Chochos y alrededores en el P. N. del Río Abiseo, 3200-3600 m, 27 Jun 1996, A. Cano et al. 7345 (USM).

Notes: A mainly circumboreal species showing a striking trans-Caribbean disjunction, being present in the mountains of Panama and northern South America. This remarkable disjunction is shared with four other species of Carex, i.e., C. buxbaumii Wahlenb., C. leptalea Wahlenb., C. limosa L., and C. lurida Wahlenb. (Jiménez-Mejías et al. 2018). Here we present the southernmost records of the species, confirming its presence in Peru.

The Neotropical populations of C. livida were considered a different species called C. confertospicata (Govaerts and Simpson 2007). However, the careful comparison with Northern hemisphere materials of C. livida reveals that there are no differences between the Boreal and Neotropical populations (Reznicek pers. comm., Jiménez-Mejías pers. obs.). Accordingly, we agree in considering the name C. confertospicata as a heterotypic synonym of C. livida.

Carex maritima Gunnerus, Fl. Norveg. 2: 131. 1776. Lectotype (designated by Jorgensen 2012: 1090): Oeder, Fl. Dan. 3(8): t. 432. 1769. Epitype (designated by Bakken et al. 2011: 122): NORWAY. Finnmark, Másoy, Maaseo, 27 Jun 1767, J. E. Gunnerus s.n. (TRH V-44006 photo!).

Iconography: Barros (1969: 17, sub C. incurva Lightf.); Wheeler (2009: 330).

Material studied. PERU. Arequipa: Laguna Las Salinas, 16° 20.95′ S, 71° 8.67′ W, 4315 m, 3 Nov 1998, H. Beltrán et al. 3173 (USM-200014).

Notes: Carex maritima is a bipolar species present at high latitudes of both the Northern and Southern Hemispheres, whose remarkable disjunction seems to date back to the Pleistocene (Escudero et al. 2010, Villaverde et al. 2015). Our records from Peru constitute the new northernmost occurrences of the species in the Southern Hemisphere.

Carex ownbeyi G.A.Wheeler, Darwiniana 40: 200. 2002. Holotype: BOLIVIA, Cochabamba, Quillacollo Prov., “camino Sipe Sipe-Lipichi”, 3800 m, 9 Apr 1990, I. Hensen 731 (MIN; isotype: LPB barcode 0000242 digital image!).

Iconography: Wheeler (2002a: 202, fig. 2C-D).

Material studied. PERU. Ayacucho: Cangallo, Dist. Los Morocuchos, a 8.6 km al SO de Condorcocha, 3380 m, C. Tejada 287 (HSP). Junín: Yauli, La Oroya, Paccha, 4207 m, 7 May 2011, H. Beltrán 7160 (USM).

Notes: Until recently, C. ownbeyi was known only from its type locality / the locus classicus in Bolivia (Wheeler 2002a). The additional records from northern Argentina (Jiménez-Mejías et al. 2016a), Colombia (Jiménez-Mejías et al. 2018), and now Peru confirm that this species is much more widespread through the Andes than previously believed and much under-collected.

Carex ruthsatziae G.A.Wheeler, Darwiniana 40: 191. 2002. [“ruthsatziae”]

Holotype: BOLIVIA, Dpto. Oruro, Prov. Sajama, Payachatás, 4420 m, 27 Jan 1999, B. Ruthsatz & S. Budde 10216 (MIN not seen; isotype: LPB barcode 0000244 digital image!).

Iconography: Wheeler (2002b: 194, fig. 2A, Bf, C).

Material studied. PERU. Pasco: Pasco, along the road between Carhuamayo and Cerro de Pasco, 4100 m, W. Morawetz & B. Wallnöfer 44-16985 (USM).

Notes: Third species of section Abditispicae reported for Peru, after C. collumanthus (Steyerm.) G.A. Wheeler (Wheeler 2002b) and C. humahuacaensis G.A. Wheeler (Salvador et al. 2009). Carex section Abditispicae comprises dwarf sedges growing at high altitudes in the Andes or Southern Patagonia. Its complex taxonomy strongly differentiates the identification of the individuals. The occurrence of C. ruthsatziae in Peru is not surprising since it was known from a Bolivian locality pretty close to the Peruvian border.

Carex ruthsatziae closely resembles C. humahuacaensis, from which it can easily be distinguished by its glumes (dark reddish-brown, obtuse to acute glumes in C. ruth-
satziae vs. orange to stramineous with acuminate tips in *C. humahuacaensis* and its narrower leaves (up to 1.5 mm in *C. ruthsatziae* vs. 1.2–3.5 mm in *C. humahuacaensis*) (Wheeler 2002b).

Despite *C. ruthsatziae* was synonymized with *C. maritima* Gunn. by Jørgensen et al. (2014), molecular data (Martín-Bravo et al. 2019) has shown both species as distinct (Jiménez-Mejías et al. in press).

**Carex vallis-pulchrae** Phil., Anales Univ. Chile 93: 487. 1896.

*Lectotype* (designated by Wheeler 1989): CHILE, Valle Hermoso, 1872, *P. Ortega* s.n., (SGO barcode 0000000893, digital image!); *isLECTOTYPE*: SGO barcode 000000894 digital image!); *syntypes*: CHILE, Cordillera de Colchagua, 1888, *R.A. Philippi* s.n. (K barcode 000584710 digital image!; US barcode 02141441!).

Iconography: Barros (1969: 74).

**Material studied.** PERU. *Arequipa*: Chivay, Tunin a Ram Ram, 13 Jan 1999, *B. Ruthsatz* 10105 (Herbarium Trier University!; LPB!, UPOS!). *Huancavelica*: Huancavelica, Tucumachay, bofedal de Lachoco, 4300 m, 23 Oct 2018, *J. Curasma* s.n. (MOL). *Lima*: Huarochirí, San Lorenzo de Quinti, sector Huachipampa, 4633 m, 30 Mar 2018, *M. S. Maldonado Fonkén* s.n. (MOL).

**Notes:** *Carex vallis-pulchrae* is a species belonging to the taxonomically complex group known as section *Aciculares*. The species is disjunctly distributed in Southern Patagonia (including Tierra del Fuego), the High Andes of central Chile and Argentina, and the Central Andes of Bolivia and Peru (Wheeler 1989, Wheeler and Beck 2011). Wheeler (1989) established two varieties, i.e., var. *vallis-pulchrae* restricted to High Andean territories and var. *barrosiana* G.A.Wheeler for Patagonian populations, both distinguished by minor features of the utricles (more or less abruptly contracted into the beak vs. gradually attenuated). Remarkably, the Bolivian and Peruvian populations seem to be morphologically close to var. *barrosiana* (the utricle is tapered into the beak). Further studies are necessary to figure out if these Central Andean populations actually belong to var. *barrosiana* or if those constitute a new variety.

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