

**NOTES ON SOUTH AMERICAN CAREX (CYPERACEAE): C.
CAMPTOGLOCHIN AND C. MICROGLOCHIN**

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ABSTRACT: Wheeler, G. A. & Guaglianone, E. R. 2003. Notes on South American *Carex* (Cyperaceae): *C. camptoglochin* and *C. microglochin*. *Darwiniana* 41(1-4): 193-206.

Carex microglochin (Cyperaceae), a member of *Carex* sect. *Leucoglochin*, is a bipolar species that, for the most part, occurs in the northern part of the Northern Hemisphere and in the Andean region of South America. A majority of past and present workers have treated the northern plants as subsp. *microglochin*, whereas the southern plants have been referred to subsp. *fuegina*. However, it is demonstrated in this paper that two closely-related yet taxonomically-distinct species, *C. camptoglochin* and *C. microglochin*, occur in South America, these differing both morphologically and ecologically. Regarding the South American distribution of these two species, it is documented below that: (1) *C. microglochin* occurs sporadically throughout nearly the full extent of the Andes; (2) *C. microglochin* and *C. camptoglochin* grow sympatrically in both the boreal and austral parts of South America; and (3) *C. camptoglochin* occurs as a disjunct on the Falkland Islands (Islas Malvinas).

Key words: Taxonomy, Cyperaceae, *Carex*, sect. *Leucoglochin*, *Carex camptoglochin*, *Carex microglochin*.

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Carex microglochin (Cyperaceae, *Carex*, sect. *Leucoglochin*) es una especie bipolar. La mayoría de los autores, han considerado las plantas del hemisferio Norte como subsp. *microglochin*, mientras que las plantas del hemisferio Sur se refirieron a la subsp. *fuegina*. En esta nota se demuestra que este último taxón corresponde a dos especies estrechamente relacionadas aunque taxonómicamente distintas, *C. camptoglochin* y *C. microglochin*, ambas en Sud América, las que difieren tanto en su morfología como en su hábitat. En relación con la distribución sudamericana de estas dos especies, se documenta que: (1) *C. microglochin* habita ocasionalmente casi a todo lo largo de los Andes; (2) *C. microglochin* y *C. camptoglochin* son simpátricas en Sud América, tanto austral como septentrional, y (3) *C. camptoglochin* habita como disyunta en las Islas Malvinas (Falkland Islands).

Palabras clave: Taxonomía, Cyperaceae, *Carex*, sect. *Leucoglochin*, *Carex camptoglochin*, *Carex microglochin*.

INTRODUCTION

It is well known, and of phytogeographical interest, that some plants occur in both North and South America though with varying degrees of disjunction (Raven, 1963). Contrary views exist for some amphitropical taxa, however, such as the taxonomic status and bipolar distribution of *Carex*

microglochin Wahlenb., particularly its relationship to *C. camptoglochin* V. I. Krecz., whose type comes from austral South America. A review of apposite literature indicates that a majority of past and present authors (e.g., Kükenthal, 1909; Barros, 1947, 1969; Moore, 1968, 1974, 1983; Moore &

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Chater, 1971) maintain that *C. microglochis* subsp. *microglochis* occurs only in the Northern Hemisphere, whereas all South American material is assignable to subsp. *fuegina* Kük. But contrarily, the present study supports the claim of other workers (Roivainen, 1954; Kukkonen, 1970) who suggest that two closely-related yet taxonomically-distinct species, *C. camptoglochis* and *C. microglochis*, occur in South America. Indeed, it is shown below that these two species, which differ both morphologically and ecologically, grow sympatrically in both the far northern and southern parts of South America. Moreover, we document that *C. microglochis* occurs sporadically throughout nearly the full length of the Andes and, further, that *C. camptoglochis* grows as a disjunct on the Falkland Islands (Islas Malvinas).

Both *C. camptoglochis* and *C. microglochis*, as well as the austral South American endemic *C. kingii* (Boott) Reznicek, belong in *Carex* sect. *Leucoglochis* Dumort. A key to the three South American members of this section is given near the end of this report. For essentially the remainder of this paper, however, *C. kingii* is not discussed further and the term “*microglochis*-like” is restricted to *C. camptoglochis* and *C. microglochis*, the only two of the three that possess strongly deflexed perigynia at maturity and a rachilla that lacks a hook-like appendage at the apex.

BRIEF HISTORICAL OUTLINE

Carex microglochis, whose type comes from northern Lapland in Scandinavia, is well known from North America and parts of Europe and Asia, though on the North American continent it is reported only as far south as south-central Colorado (Mackenzie, 1931–1935; Hermann, 1970). It is unknown from Central America (Chater, 1994) but has been reported from Colombia (Mora & Rangel, 1983; Luteyn, 1999), Ecuador (Jørgensen & Ulloa, 1994; Luteyn, 1999), and Peru (Luteyn, 1999) in northern South America. The type of *C. camptoglochis*, on the other hand, comes from Bahía Orange on Isla Hoste in southern Tierra del Fuego. This plant was originally called *C. oligantha* Boott (1867), but Kreczetowicz (1937) created a new name for it, as the former name was a later homonym.

In general, two different distribution scenarios have been presented in the literature regarding the *microglochis*-like plants that occur in the Northern

and Southern Hemispheres. Moore & Chater (1971) treated all such plants from the Northern Hemisphere as *C. microglochis* (their subsp. *microglochis*), whereas all such plants from South America were referred to *C. camptoglochis* (their *C. microglochis* subsp. *fuegina*). Contrarily, Roivainen (1954) suggested that both *C. microglochis* and *C. camptoglochis* (his *C. oligantha*) occur in Tierra del Fuego, with the former growing in the drier, eastern parts of Fuegia and the latter in the wetter, western and southwestern parts. A subsequent study by Kukkonen (1970) supports Roivainen’s claim that *C. camptoglochis* and *C. microglochis* are distinct species, as does also the mention of both names by Reznicek (1990). Nevertheless, a great majority of South American authors (e.g., Barros, 1947, 1969; Marticorena & Quezada, 1985; Guaglianone, 1996) have followed Kükenthal (1909) and Moore & Chater (1971), the latter who claim that a large overlap in characters precludes recognition of both taxa in Tierra del Fuego. It is also worth noting here that most authors, while discussing the taxonomic status of the *microglochis*-like plants that occur in Tierra del Fuego, offer no opinion as to the status of similar populations that grow elsewhere on the South American continent.

MORPHOLOGY

Moore & Chater (1971: 328) studied nine characters of the *microglochis*-like plants that occur in South America and concluded that none of those characters could be used to positively differentiate the two taxa in question. The characters they studied were: stem length, stem diameter, length of longest leaf, number of male flowers, number of female flowers, length of largest perigynium, width of largest perigynium, emergent length of largest rachillae, and stipe length. But as is evident in Table 1 and in the key given near the end of this report, there are several other characters, not utilized by these workers, that provide clear-cut differences between the two taxa. Salient morphological differences are discussed immediately below.

The pistillate scales of the two taxa differ considerably in both size and shape. Those of *C. camptoglochis* (Fig. 1) are lanceolate and longer than the perigynium, with the apex acute to acuminate and the broad midrib frequently projecting

Table 1.- A selected morphological comparison of *Carex camptoglochin* and *C. microglochin* in South America.

Character	<i>C. camptoglochin</i>	<i>C. microglochin</i>
Growth habit	decumbent old stems	creeping sympodial rhizomes
Rhizome/decumbent stem width (mm)	0.9 - 1.4	0.4 - 0.7
Number of male flowers per spike	2 - 3	5 - 6
Anther length (mm)	1.6 - 2.4	0.8 - 1.6
Number of female flowers per spike	2 - 5 (most often 3 or 4)	3 - 12
Lowest pistillate scale length (mm)	6 - 12 (-15)	2 - 4
Pistillate scale shape	lanceolate	ovate
Pistillate scale apex	acute to acuminate or awned	obtuse to subacute
Pistillate scale color	reddish brown	pale brown to brown
Perigynium length (mm)	4.6 - 8.2	2.8 - 4.8
Perigynium stipe type and length (mm)	long-stipitate, 0.7 - 2	short-stipitate, < 0.7
Perigynium stipe shape when deflexed at maturity	inverted U-shaped	flattened-thickish
Perigynium beak color	reddish brown	stramineous or brownish
Number of vascular bundles in rachilla	2	1
Achene length (mm)	2.5 - 3.4	2 - 2.5

beyond the apex as a smooth awn; in contrast, *C. microglochin* (Fig. 2) has ovate scales that are shorter than the perigynium, with the apex obtuse to subacute and the comparatively narrow midrib seldom reaching the tip. Moreover, the lowermost pistillate scale of the former species sometimes extends to, or even exceeds, the tip of the exerted rachilla, which is never the case in the latter. In regard to the staminate scales, it is worthy of note that *C. camptoglochin* has 2 or 3 per spike, while *C. microglochin* has 5 or 6. Also, both the staminate and pistillate scales of *C. camptoglochin* are reddish brown, whereas those of *C. microglochin* are pale brown to brown.

Some characteristics of the perigynia also differentiate the two species. For instance, the base of the perigynium in *C. camptoglochin* is long-stipitate, whereas *C. microglochin* has a short stipe. In the former, when plants are mature and perigynia usually deflexed, the stipe is strongly inverted U-shaped (Fig. 1); contrarily, in the latter species, though the perigynia are also usually deflexed at maturity, the stipe is flattened-thickish with the perigynia appearing sessile on the rachis (Fig. 2). Moreover, the perigynium beak of *C. camptoglochin* is reddish brown near the apex, whereas in *C. microglochin* the apex of the beak is stramineous or brownish. It is also worth noting

that, in general, the perigynia of *C. camptoglochin* are longer than those of *C. microglochin*, though this character by itself, as pointed out by Moore & Chater (1971), cannot be used to positively separate the two species as some overlap in length does occur.

As indicated in Table 1 and in the key further below, *Carex camptoglochin* has, generally speaking, fewer perigynia per spike than *C. microglochin*. Also, both the achenes and anthers of *C. camptoglochin* are slightly longer than the same features in *C. microglochin*. All three of these characters are useful in identification, with the last being most useful at anthesis and the first two when perigynia are mature.

As first pointed out by Kukkonen (1970: 144), "even the mode of growth is different in these two species" (see Figs. 1, 2). It is usually reported correctly (e.g., Kükenthal, 1909; Mackenzie, 1931–1935) that *C. microglochin* is rhizomatous, with the plants producing creeping sympodial rhizomes. On the other hand, *C. camptoglochin* is unusual, though not unique in *Carex*, in having the next year's shoots, both vegetative and flowering, arise from dormant buds in the axils of dried leaves of prolonged, decumbent old stems, with the terminal and upper nodes producing mostly newly-developed flowering shoots and the lower nodes

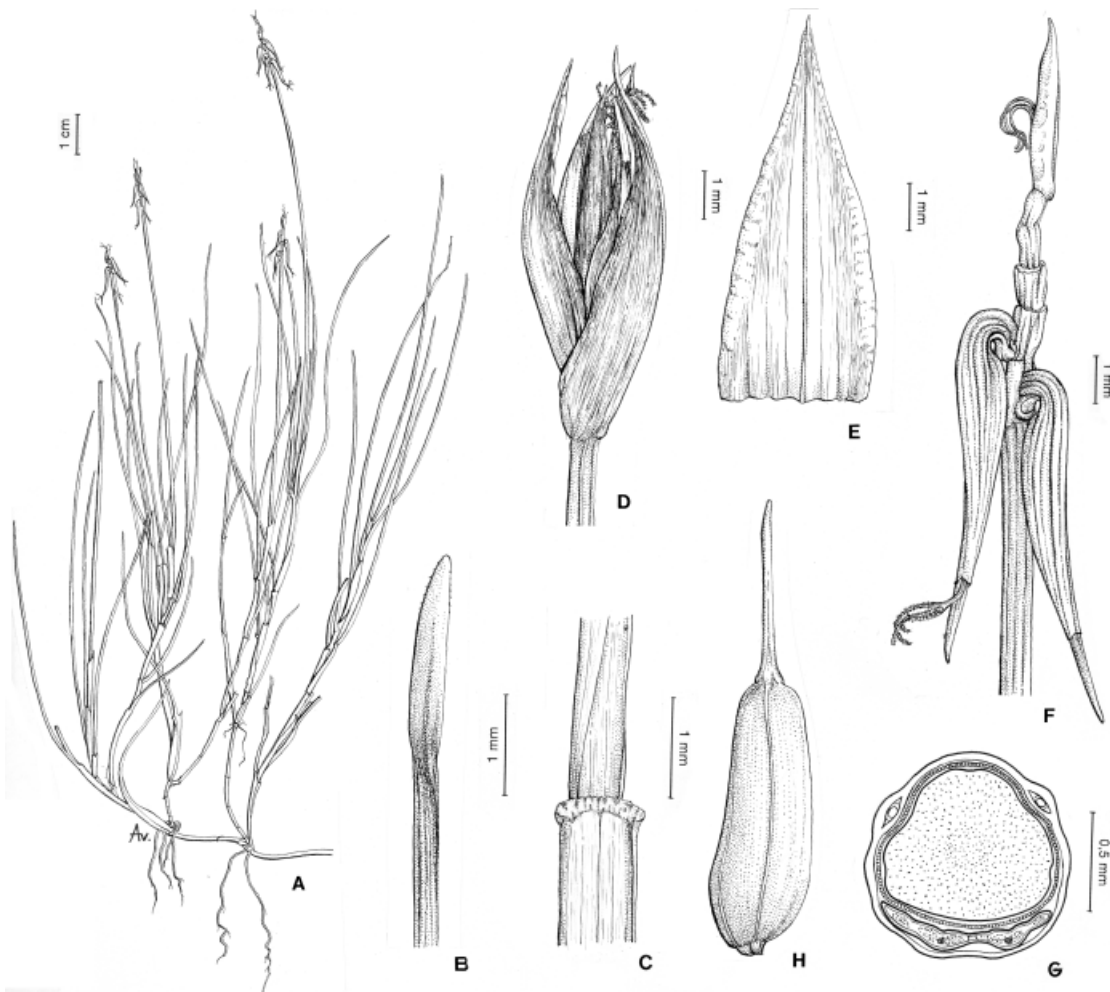


Fig. 1.- *Carex camptoglochin*. A: plant. B: flattened apex of leaf. C: leaf with sheath and ligule. D: spike. E: scale. F: mature spike with perigynia deflexed, showing the long stipes strongly inverted U-shaped. G: transection of perigynium with rachilla and trigonous achene. H: achene, with part of the style. A, B: from *T.B.P.A. 1732*; C, F, G, H: from *Goodall 2417*; D, E: from *Biganzoli 744*.

vegetative shoots. Moreover, the roots of *C. camptoglochin* are produced along the decumbent old stems, generally at the lower nodes, whereas those of *C. microglochin* are produced at the base of flowering and vegetative shoots, with essentially none produced along the rhizome itself. Also, the slender, elongated creeping rhizomes of *C. microglochin* are appreciably narrower than the chord-like, decumbent stems of *C. camptoglochin*. Regarding growth habit, *C. camptoglochin* resembles that of some carices from the Northern Hemisphere, such as *C. chordorrhiza* L. f. and *C. limosa* L. (e.g., Mackenzie, 1931–1935; Damman, 1964; Reznicek & Catling, 1986).

Lastly, but notably, Kukkonen (1970) reported anatomical differences between these two species. After studying a number of characters, both quantitative (e.g., presence or absence of prickles or papillae, size of stomata, position of vascular bundles) and qualitative (e.g., position of stomata, number of air-cavities, differentiation of chlorenchyma), he maintained that both *C. camptoglochin* and *C. microglochin* occur in Tierra del Fuego. Also, microscopy (by E.R.G.) reveals that the rachilla of *C. camptoglochin* has two vascular bundles, whereas *C. microglochin* is reported (Reznicek, 1990) to have only a single bundle.



Fig. 2.- *Carex microglochin*. A: plant. B, C: spikes in different stages of anthesis. D: mature spike with perigynia deflexed, lacking long stipes. E: transection of perigynium with rachilla and subtrigonus achene. F: achene and style. A, E, F: from Moore 1343. B: from Notø 31. C: from Kiesling 7996. D: from Cabrera 31756.

GEOGRAPHIC DISTRIBUTION AND ECOLOGICAL REQUIREMENTS

Some of the South American *microglochin*-like populations that occur north of 30°S lat. are clearly assignable to *C. microglochin* (Fig. 4), as they are essentially identical to populations of this species occurring in the Northern Hemisphere. Within this same extensive area *C. camptoglochin* (Fig. 3) is known, thus far, only from Colombia and Ecuador. Few *microglochin*-like plants have been seen between 30°S lat. to 45°S lat., but in the southern half of Patagonia *C. microglochin* is known from both sides of the Andes, whereas *C. camptoglochin* is confined west of the Andean

summit. Farther south, in Tierra del Fuego, *C. microglochin* occurs in the north and northeastern portions of Fuegia, while *C. camptoglochin* grows in the west and southwestern portions. The two species grow sympatrically in southern Fuegia, where the elevation is higher, but *C. microglochin* is unknown from Antártica Chilena Province, Chile, an area that, generally speaking, lies southwest of the Andean summit; contrarily, *C. camptoglochin* is well known from this Chilean province (e.g., Isla Hoste, Isla Navarino, Isla Wollaston) as well as from Isla de los Estados, an Argentine island which lies just off the southeastern tip (Península Mitre) of South America.

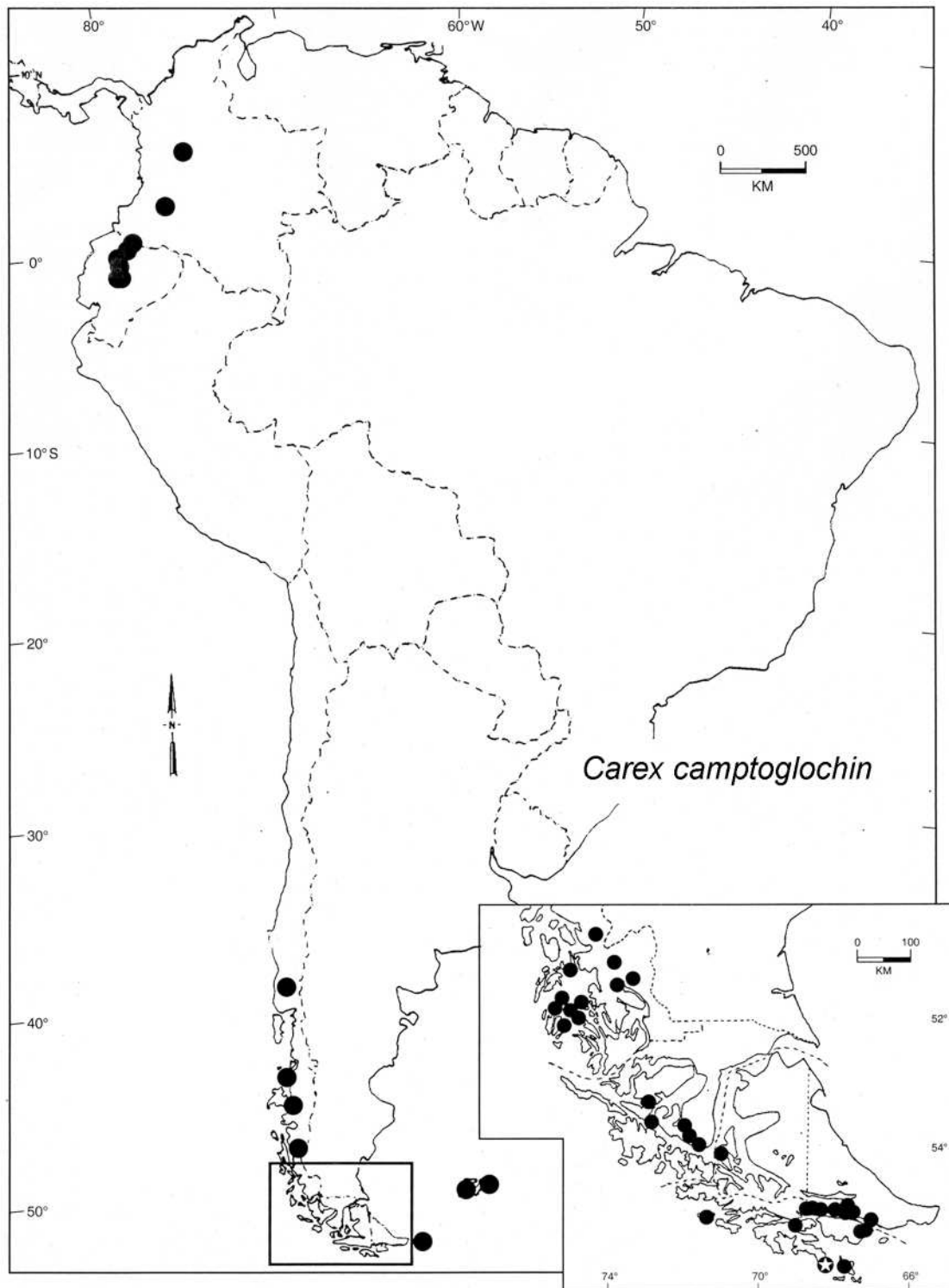


Fig. 3.- Map of South America showing the distribution of *Carex camptoglochin*; starred circle represents the holotype locality.

Of phytogeographic interest, the *microglochin*-like plants that occur on the Falkland Islands (Islas Malvinas) are assignable to *C. camptoglochin*, these known from “peat bogs” on both large islands. Notably, there are also several other plants, such as *Agrostis magellanica* Lam., *Astelia pumila* (Forster f.) Gaudich., and *Cortaderia pilosa* (D’Urv.) Hackel that display a similar distribution pattern, i.e., the species grow primarily in *Sphagnum* bogs in southern Fuegia and farther westward, are uncommon or absent from north and northeastern Fuegia, but also are disjunct in peat bogs on the Falkland Islands (Islas Malvinas) (Moore, 1983).

In regard to the climatic requirements of these two species in austral South America, there also appear to be noteworthy differences. The frequent occurrence of the bog-loving *C. camptoglochin* in western Fuegia and far western Patagonia is not unexpected because of wetter conditions on the western side of the Andes due to orographic precipitation, a result of moisture picked up over the Pacific Ocean. The heavy rainfall in the western portions of Patagonia and Fuegia, concomitant with cool temperatures, is conducive to the accumulation of peat deposits, which supports bog vegetation. Contrarily, *C. microglochin* occurs in the relatively drier northern and eastern portions of Fuegia, which in large part is due to the rain-shadow effect of the Andes. As pointed out by Moore (1983: 4), “...there is a dramatic rainfall gradient from south and west Fuegia to the conspicuously more arid rain shadow of north and east Isla Grande [in northeastern Tierra del Fuego]”. In these portions of Fuegia, *C. microglochin* grows primarily in moist to wet minerotrophic sites. Farther south in Fuegia, however, where rainfall is more abundant, *C. camptoglochin* and *C. microglochin* occur sympatrically.

One can presumably speculate that the *Sphagnum*-dominated bogs, preferred by *C. camptoglochin*, have lower pH values (i.e., they are more acidic) than the minerotrophic wet meadows, moist grasslands, and swamps that are often recorded as habitats for *C. microglochin*. Thus, although *C. camptoglochin* and *C. microglochin* are known to grow sympatrically in northern South America as well as in southern Fuegia, it seems reasonable to suggest that these two species require different edaphic conditions for growth.

Unfortunately, very little information exists in the literature concerning microenvironmental differences between these two species, but personal correspondence and data on herbarium sheet labels have been most valuable and instructive. Habitat information for *C. camptoglochin* and *C. microglochin* are presented and discussed under each species further below.

CONCLUSIONS

If the view put forth by Moore & Chater (1971: 330) is correct that “... all Northern Hemisphere material be included in ssp. *microglochin*, while South American plants comprise ssp. *fuegina*”, then presumably all *microglochin*-like plants from South America should possess features essentially identical to those of the type of *C. camptoglochin* (their *C. microglochin* ssp. *fuegina*). But the morphological evidence presented above strongly contradicts this view, indicating instead that two distinct species, *C. camptoglochin* and *C. microglochin*, occur in South America. Moreover, it is documented here that both species occur in northern South America, with the specimens of *C. camptoglochin* from Colombia and Ecuador (see specimen citations further below) representing the first authenticated report of this species north of Patagonia.

Although we consider *C. camptoglochin* and *C. microglochin* to be distinct species, it would be remiss if, at this point, we failed to mention some probable reasons why these two taxa have been confused in the past. Firstly, because the pistillate scales of both species are pronouncedly caducous, most (if not all) of the scales are absent when fruits are fully mature (i.e., when the perigynia are deflexed) which is, unfortunately, when most collections of these plants are made. Secondly, the strongly-deflexed perigynia are very easily detached from the inflorescence, consequently, the plants typically have few perigynia remaining on the rachis when collected. Lastly, habit differences between these two species are difficult to assess on many herbarium sheets because only above-ground (or above-stratum) fruiting culms have been collected. In regard to the last point, and certainly worth emphasizing, we and other workers (e.g., Damman, 1964; Jermy et al., 1982; Reznicek & Catling, 1986) strongly urge that when collecting

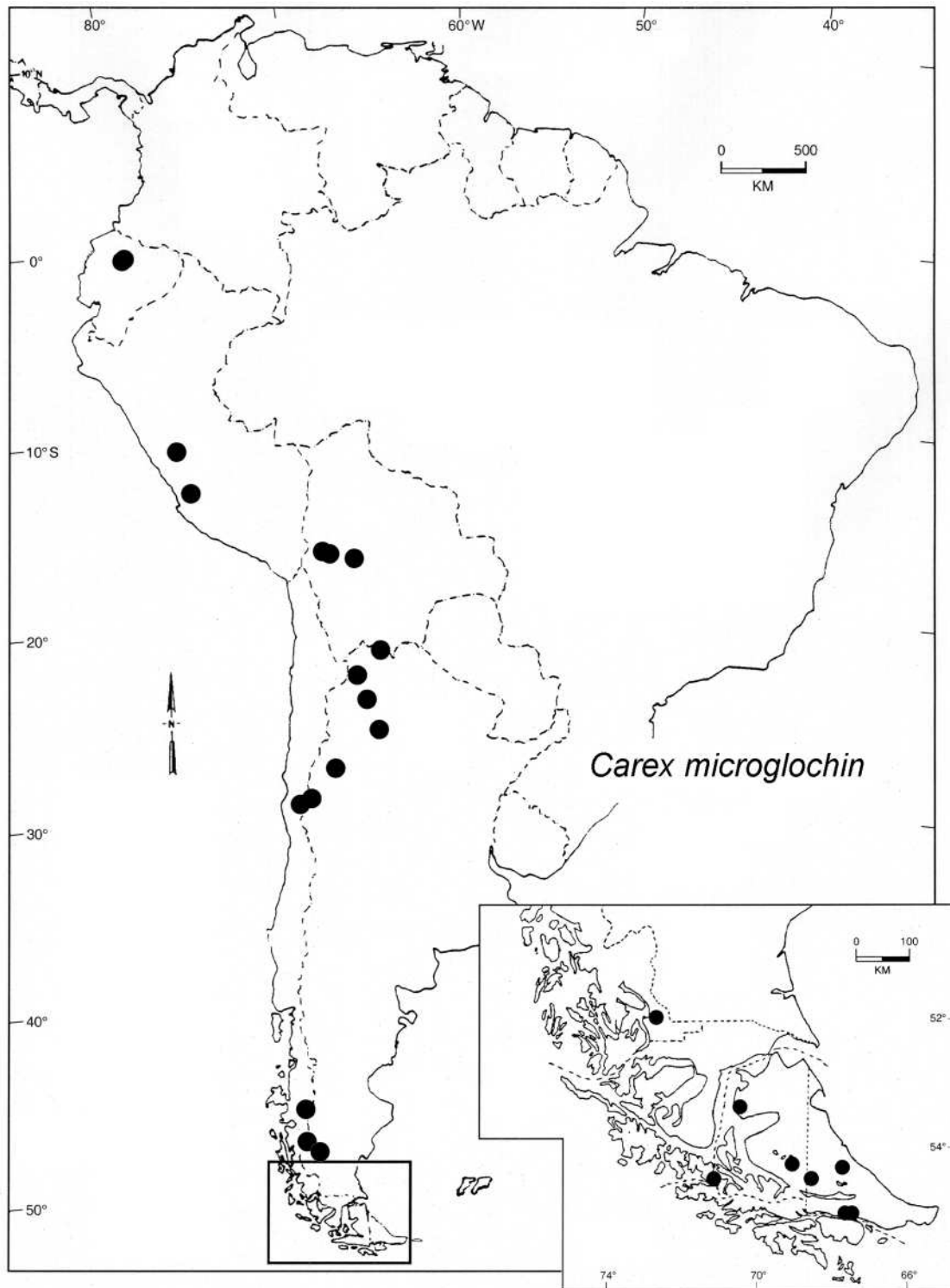


Fig. 4.- Map showing the distribution of *Carex microglochis* in South America. For the generalized range of this species in the Northern Hemisphere see Moore & Chater (1971: 321, Fig. 1 F).

Carex (as well as other cyperaceous plants) all flowering and vegetative parts of the plant should be collected, not just fruiting culms.

Notably, every *microglochin*-like plant examined from South America could readily be assigned to either *C. camptoglochin* or *C. microglochin*, as propounded in the discussion of morphology above and pointed out in Table 1, where the differentiating characters between the two species are summarized. Because it is abundantly clear from this study that these two taxa differ both morphologically and ecologically, it is strongly recommended here that henceforth *C. camptoglochin* and *C. microglochin* be considered as distinct species in the *Carex* flora of South America.

CAREX CAMPTOGLOCHIN AND C.

MICROGLOCHIN

Carex camptoglochin V. I. Krecz., Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S. S. S. R., 7: 34. 1937. *Carex oligantha* Boott, Ill. *Carex* 4: 174. 1867, non Steudel (1855) et nec Phil. (1891). *C. microglochin* Wahlenb. subsp. *fuegina* Kük., Bot. Jahrb. Syst. 27: 546. 1899. *Uncinia microglochin* (Wahlenb.) Spreng. var. *fuegina* (Kük.) Macloskie, Reports Univ. Exped. Patagonia, 1896–1899, 8(5): 271. 1904. *Carex microglochin* Wahlenb. var. *oligantha* (Boott) Kük., in A. Engler (ed.), Pflanzenr., 4(20), 38: 109. 1909. Type: “Fuegia, Orange Harbor,” [CHILE: Región XII (Magallanes y de la Antártica Chilena), Prov. Antártica Chilena: Isla Hoste, Península Hardy, Bahía Orange, 55° 31' S Lat., 68° 03' W Long.,] 1838–1842, *Wilkes Explor. Exped. s.n.* (holotype: K; isotypes: GH, US). Figs. 1, 3.

Plant perennial, vegetative and flowering shoots arising from dormant buds in axils of dried leaves of prolonged, branched, decumbent old stems, 0.9–1.4 mm thick; roots produced at lower nodes of old, prostrate stems; fertile culms 3–34 cm tall, very obscurely trigonous, smooth, with glabrous, reddish brown basal sheaths. Leaves 2–8; blades 1–13 cm long, 0.4–0.8 mm wide, slightly channelled except near the apex where flattened to more or less terete, glabrous, the margins smooth (except slightly scaberulent near the apex), tips blunt; inner band of sheaths glabrous, pale reddish brown or reddish-brown-dotted; ligules 0.2–0.4 mm long, 0.5–0.8 mm wide, white-hyaline, the free portion reddish

brown. Inflorescence a single, terminal androgynous spike 7–14 mm long, 6–9(–13) mm wide; bracts absent. Staminate part 2–3-flowered; scales 3–5.5 mm long, 0.8–1.6 mm wide, ovate-lanceolate, apex acute or mucronate, pale reddish brown, with hyaline margins and greenish center, 1(–3)-veined. Pistillate part 2–5-flowered (most often 3 or 4); scales caducous, equaling to much exceeding the perigynia, 5–12(–15) mm long, 1.6–2.6 mm wide, lanceolate, apex acute to acuminate or awned, reddish brown, with narrow hyaline margins and greenish center, 1–3-veined, with the midrib frequently excurrent as a smooth awn. Perigynia 4.6–8.2 mm long, 0.7–1.1 mm wide, ascending at first but soon becoming wide spreading or more often deflexed, subulate or linear-lanceolate, suborbicular in cross-section, glabrous, membranaceous, greenish or pale reddish brown to reddish brown, weakly to moderately many-striate, the margins smooth, long-stipitate, with the 0.7–2 mm stipe strongly inverted U-shaped at maturity, very gradually tapering to the apex; beak not well differentiated from the body, ca. 1.5–2.5 mm long, margins smooth, reddish brown near the apex, the orifice obliquely truncate. Achenes trigonous with narrowly oblong sides, 2.5–3.4 mm long, 0.5–0.9 mm wide. Rachilla 5–9 mm long, narrowly long-subulate, somewhat curved, exserted up to 3.5 mm beyond orifice of perigynium. Stigmas 3; style usually slightly exserted, continuous with achene. Anthers 1.6–2.4 mm long.

In the Fuego-Patagonian region, *Carex camptoglochin* grows primarily in persistently wet, base-poor “bogs” (most of them probably more appropriately called poor fens), where *Sphagnum* hummocks, often dominated by *S. magellanicum* Brid., are well developed. In these *Sphagnum*-dominated bogs, the wiry, branched stems of *C. camptoglochin* often grow nearly vertically, extending upward to the top of moss-laden hummocks, with the roots seldom coming in contact with mineral soil. Other typical species in these bogs include, among many others, *Carex magellanica* Lam., *Carpha alpina* R. Br., *Cortaderia pilosa*, *Donatia fascicularis* J. R. Forst. & G. Forst., *Juncus scheuchzerioides* Gaudich., *Marsippospermum grandiflorum* (L.f.) Hook. f., *Rostkovia magellanica* (Lam.) Hook. f., *Tetroncium magellanicum* Willd. and the bryophytes *Calliergon sarmentosum* (Wahlenb.) Kindb. and

Drepanocladus fluitans (Hedw.) Warnst. *Carex camptoglochin* is also known to grow in mossy mats along rivers and in wet meadows, the latter often at or above tree line. On the Falkland Islands (Islas Malvinas), where this species is rare, it occurs from near sea level to about 150 m s.m., growing in "peat bogs" and often in association with *Rostkovia magellanica* and *Juncus scheuchzerioides* (Moore, 1968).

In northern South America *C. camptoglochin* occurs in páramo, where it grows from about 3500 to 4200 m s.m. In both Colombia and Ecuador, this species is most often recorded from persistently wet places, such as boggy depressions, swamps, sloping bogs, swales, and lakeshores, most of which are dominated by hydric mosses and cushion plants; however, it has also been recorded from boggy depressions dominated by *Espeletia*. Unlike the similar-appearing *C. microglochin*, which is well known from grassy páramo, *C. camptoglochin* seldom (if ever) grows in areas dominated by bunch grasses, such as *Calamagrostis*.

Notably, several high Andean wetlands in southern Peru, Bolivia, and northwestern Argentina and adjacent Chile have recently been intensively studied (Ruthsatz, pers. comm.), but *C. camptoglochin* was not recorded from any of these sites. While under collecting is a possibility, more likely the absence or paucity of extensive tracts dominated by hummock-forming mosses, as is characteristic of bofedales (this wetland type is discussed in more detail under *C. microglochin* below), may play no small role. Lastly, it is worth noting that *C. camptoglochin* is unknown, thus far, from north of Colombia.

*Representative specimens of
Carex camptoglochin*

ARGENTINA. **Tierra del Fuego, Antártida e Islas Atlántico Sur.** Dpto. *Islas del Atlántico Sur*: Islas Malvinas (Falkland Islands), East Falkland Island (Isla Soledad): Port Stanley, Mount William, 28-II-1904, *Birger s.n.* (S); Stanley, 1-I-1902, *Skottsberg s.n.* (S: 2 sheets); Stanley, valley N of Two Sisters, 250-300 ft., 14-I-1968, *Engel s.n.* (H-1459345); West Falkland Island (Isla Gran Malвина): Hill Cove, base of French Peaks, ca. 500 ft., 14-II-1964, *Moore 873* (LP, RNG). Dpto. *Ushuaia*: Ushuaia, 275 m s.m., 25-II-1940, *Santesson 554* (S); Ushuaia, 245 m s.m., 11-III-1902, *Skottsberg s.n.* (S); Montes Martiales, 350 m s.m., 21-XII-1969, *Roivainen 1252* (H: 2 sheets, RNG); Montes Martiales, 9-I-1960, *Correa & R. L. Pérez Moreau 1848* (BAB); Río

Hambre, prope Rancho Hambre, 54° 45'S, 67° 54'W, 140 m s.m., 16-I-1970, *Roivainen 1950* (H: 2 sheets, RNG); Estancia Harberton, 54° 50'S, 67° 16.5'W, ca. 300 m s.m., 22-I-1968, *Moore 1602* (C, RNG); Bahía Moat, Estancia Moat, Moat Lake, 54° 57'S, 66° 46'W, 27-I-1968, *Moore 1705* (H, RNG); Estancia Moat, 10-II-1967, *Goodall 678* (NA, RNG); Lapataia, Laguna Negra, W of Río Lapataia, 2-III-1970, *Goodall 2417* (BAB, NA, RNG); Río Rancho Lata, near Mt. Moore, Bridges trail, 1600 ft., 7-II-1971, *Goodall 3340* (NA, RNG); Río Valdez, Bridges track, 1200 ft., 9-II-1971, *Goodall 3400* (NA, RNG); Preto's sawmill on Ruta 0, Río Remolino, Remolino track, 500-1800 ft., 12-II-1971, *Goodall 3418* (NA, RNG); NE of Río Tristen, 28-IV-1974, *Goodall 4812* (RNG); Tierra Mayor Valley, 23-III-1974, *Goodall 4796* (BAB, NA, RNG); Monte de las Carpas, valley NE of Monte Olivia, 6-III-1973, *Goodall & Prosser 4673b* (RNG); N of Almirante Brown, 50 m s.m., 25-I-1979, *Lægaard 13289* (AAU, NY); Isla de los Estados, Bahía Franklin, desde Caleta le Croix hacia Crossley, 16-XII-1999 (fl.), *Biganzoli 744* (SI); Isla de los Estados, Bahía Franklin, desde Caleta le Croix hacia Crossley, 16-XII-1999 (fr.), *Biganzoli 746* (SI); Isla de los Estados, Puerto Abrigado, 54° 46'S, 64° 09'W, 16-II-1934, *Castellanos s.n.* (BA 12810, 2 sheets); Isla de los Estados, XII-1932, *Castellanos 264* (SI).

CHILE. **Región X** (de Los Lagos) *Prov. Osorno*: Cordillera de la Carpa, ca. 950 m s.m., 1-3-II-1958, *Eyerdam 10585 B* (F, NY, UC, US). **Región XI** (Aisén del Gral. Carlos Ibáñez del Campo) *Prov. Aisén*: Parque Nac. Laguna San Rafael, Istmo de Ofqui, 46° 42'S, 74° 06'W, 3-4-II-1988, *Pisano 6317* (HIP, MIN); Isla Rivero, Puerto Concell, 45° 36'S, 74° 11'W, 29-XI-1968, *Barrett s.n.*, Hero No. 38-21 (NA, RNG). **Región XII** (Magallanes y de la Antártica Chilena) *Prov. Antártica Chilena*: Isla Navarino, Puerto Toro, 17-I-1971, *Pisano 3452* (RNG); Isla Navarino, Puerto Toro, 2-III-1976, *Dollenz 383* (GH, HIP, NA); Isla Navarino, Bahía Windhond, 5-6-III-1976, *Dollenz 417* (HIP); Islas Wollaston: Isla Bayly, Surgidero Romanche, 55° 37'S, 67° 33'W, 19-II-1980, *Pisano 5056* (HIP, RNG); Isla Hoste, Caleta Awaiakirrh, 23-I-1982, *Pisano 5469* (GH, HIP, RNG); Smoke Island, 54° 43'S, 71° 07'W, 18-V-1882, *Spegazzini s.n.* [227 of Kükenthal, 1909: 109] (CORD 14029, LP s.n.). *Prov. Magallanes*: Península de Brunswick, Cerro Mirador, camino al Club Andino, 8-II-1979, *Dollenz 608* (HIP, NA); Fiordo Silva Palma, Angostura Titus, 8-I-1973, *Pisano 3780* (HIP, MO, NA, RNG); Laguna El Parrillar, 53° 25'S, 71° 17'W, 7-II-1983, *Pisano 5730* (GH, HIP); Isla Santa Inés, Fiordo Nevado, Bahía Havergal, 53° 31'S, 72° 46.6'W, 26-II-1990, *Pisano & Henríquez 6698* (HIP, MIN); Isla Clarence, Estero Staples, 15-II-1929, *Roivainen s.n.* (H: 2 sheets); Isla Vidal Gormaz, Seno Nantuel, Bahía María Angélica, 51° 53'S, 74° 41'W, 3-II-1976, *Dollenz et al. s.n.*, T.B.P.A. 1306 (BAB). *Prov. Última Esperanza*:

Parque Nac. Torres del Paine, Cerro Quixote, W of Lago Grey, 51° 00'S, 73° 25'W, III-1976, *Steele 84* (RNG); Fiordo Peel, Río Murtillar, 50° 27'S, 73° 37'W, 20-XI-1985, *Pisano 5952* (HIP, MIN, RNG); Fiordo Falcon, barranca en costa E, 49° 37'S, 73° 50'W, 21-XII-1988, *Pisano 6509* (HIP, MIN); Isla Piazzzi, 51° 02'S, 74° 00'W, 16-I-1976, *Eskuche s.n.*, T.B.P.A.-FIT. 704 (BAB); Puerto Bella Vista, 51° 30'S, 73° 15'W, 9-XII-1979, *Roig et al. s.n.*, T.B.P.A.-FIT. 5280 (BAB, CONC); Isla Piazzzi, Caleta Ocasión, Abra Leackey's Retreat, 51° 44'S, 74° 01' W, 80 m s.m., 19-I-1976, *Dollenz et al. s.n.*, T.B.P.A. 1080 (BAB, RNG); Isla Rennel Norte, Canal Smyth, 51° 54'S, 74° 12'W, 250 m s.m., 28-I-1976, T.B.P.A. 1221 (HIP, RNG); Isla Virtudes, Canal Elías, Puerto Virtudes, 51° 33'S, 74° 54'W, 12-II-1976, *Dollenz et al. s.n.*, T.B.P.A. 1511 (BAB, HIP, RNG); Seno Última Esperanza, Puerto Toro, Río Serrano, 51° 25'S, 73° 05'W, 16-I-1977, *Moore & Pisano s.n.*, T.B.P.A. 1732 (BAB, HIP, RNG); Seno Última Esperanza, Puerto Toro, Río Serrano, N of Vent. Balmaceda, 51° 25'S, 73° 05'W, 18-I-1977, *Moore & Pisano s.n.*, T.B.P.A. 1788 (BAB, HIP); Seno Última Esperanza, Lote Sanchez, costa E Río Serrano, 51° 26'S, 73° 05'W, 26-I-1977, T.B.P.A. 2037 (BAB, HIP, RNG).

COLOMBIA. **Caldas.** Cordillera Central, Páramo del Quindío, 3700–4200 m s.m., 15-20-VIII-1922, *Pennell & Hazen 9961* (GH, NY). **Cauca.** Volcán Puracé, Laguna de San Rafael, aprox. 2 km al S de la Laguna, 3450 m s.m., 31-III-1972, *Cleef 2661* (NY).

ECUADOR. **Carchi.** Road Tulcán–Maldonado, 34–36 km from Tulcán, at base of Volcán Chiles, 00° 47'N, 77° 57'W, 3950 m s.m., 2-VIII-1976, *Øllgaard & Balslev 8346* (AAU, CTES, NY); Road Tulcán–Maldonado, approx. 43 km from Tulcán, SW slopes of Volcán Chiles, 00° 48'N, 77° 59'W, 3740 m s.m., 4-VIII-1976, *Øllgaard & Balslev 8539* (AAU); El Angel–San Gabriel km 8 along old road, páramo of Hac. El Consuelo, 00° 37'N, 77° 52'W, 3475–3625 m s.m., 15-II-1992, *Lægaard 101319* (AAU); Páramo del Angel, km 18 along road El Angel–Tulcán, páramo del Voladero, around large lakes near the pass, 00° 41'N, 77° 53'W, 3650–3750, 9-VIII-1990, *Øllgaard 98087* (AAU). **Chimborazo.** Road ca. 10 km NE of Alao, at Cuspipaccha, 01° 48'S, 78° 26'W, 3550–3600 m s.m., 6-V-1982, *Øllgaard et al. 38121* (AAU, QCA); About 15 km NE of Aloa on trail to Huamboya, at the bridge over Río Alao, 01° 52'S, 78° 28'W, 3500 m s.m., 4-I-1988, *Molau et al. 2329* (AAU). **Napo.** Llanganati, N-facing slope towards Río Golpe, just N of Chosa Aucacocha, 01° 08'S, 78° 18'W, 3600 m s.m., 16-V-1982, *Øllgaard et al. 38665* (AAU). **Pichincha.** Mountain ridge on right side of Río Bolteado, approach from the west to Cerro Saraurcu, 00° 03'S, 77° 58'W, 3800 m s.m., 31-VIII-1995, *Sklenar & Kosteckova 1553* (AAU). **Tungurahua.** Cordillera de Llanganates, near Lake Yanacocha, 3600 m s.m., 16-XI-1939, *Asplund 9736* (NY).

Carex microglochin Wahlenb., Kungl. Svenska Vet.–Akad. Handl. 24: 140. 1803. Figs. 2, 4.

Detailed descriptions of *Carex microglochin* already exist in the literature, such as that provided by Mackenzie (1935: 424), therefore one is not given here. Also see Mackenzie for synonymy and type information, and Luteyn (1999: 105).

The South American populations of *C. microglochin* grow primarily in moist to wet sites that are either deficient in mosses or at least in places where *Sphagnum* hummocks are poorly-developed. For instance, high Andean bofedales in Chile, Argentina, and Bolivia do not harbor many mosses; rather, these bofedales are predominantly formed by cushion-forming Juncaceae (Ruthsatz, per. comm.), with diminutive carices, such as *C. microglochin* and *C. ruthsatzae* G. A. Wheeler, growing in wet soil between cushion-forming vascular plants, such as *Oxychloë andina* Phil. and *Distichia muscoides* Nees & Meyen (Wheeler, 2002). Similarly, near Cochrane, in Capitán Prat Province (Región XI, Aisén), Chile, *C. microglochin* grows in mires around lakes, such as Laguna Elefantita and nearby Laguna Tamange, where *Sphagnum* bogs are absent. These mires are dominated by Poaceae and Cyperaceae, primarily *Cortaderia pilosa* and *Schoenus andinus* (Phil.) H. Pfeiffer, with diminutive carices, such as *C. microglochin* and *C. capitata* L., growing in the lower, herbaceous layer; several mosses also occur in the ground layer, but not *Sphagnum* (Vogel, per. comm.). In San Juan Province, Argentina, *C. microglochin* is known to grow among vegetation bordering fast-flowing streams, from about 3400–3900 m s.m. These moist to wet riparian margins, which often harbor scattered plants of *Acaena magellanica* (Lam.) Vahl. and *A. pinnatifida* Ruiz & Pavón, frequently have in the ground layer the cushion plants *Oxychloë simulans* Barros, *Azorella trifurcata* (Gaertn.) Pers., and *A. cryphanta* (Clos) Reiche, these often interspersed with other herbaceous plants growing in mineral soil, such as *C. microglochin*. Mosses are also usually present, but *Sphagnum* is absent or at least not dominant in the ground layer (Kiesling, per. comm.). Finally, in northern South America, such as in Ecuador, *C. microglochin* grows in páramo above 3500 m s.m., primarily in moist to wet sites dominated by grasses, such as *Calamagrostis*, as well as along the wet

margins of streams. In these habitats *Carex microglochin* grows in the herbaceous ground layer in mineral soil.

In southern Patagonia and Tierra del Fuego, *C. microglochin* is most frequently recorded on herbarium sheet labels as growing in mountain "meadows" (often called vegas or mallines), depressions in grasslands, along river banks and, less frequently, in swamps. These moist to wet sites, most of which are dominated by grasses and sedges, generally harbor several mosses, sometimes including *Sphagnum* species, but the mosses seldom dominate or form well-developed hummocks in these habitats. In this region, like farther northward in the Andes, *C. microglochin* seemingly grows in places where its roots and rhizomes come in contact with mineral soil. It is also noteworthy that in the Northern Hemisphere *C. microglochin* is often reported as growing in moist, calcareous soil (e.g., Mackenzie, 1931–1935; Damman, 1964), as well as in sites "where the total plant cover is usually less than 50 percent" (Jermy et al., 1982: 210). In the Northern Hemisphere, to my knowledge (G.A.W.), this species has not been reported from well-developed *Sphagnum* bogs.

Representative specimens of Carex microglochin

ARGENTINA. **Jujuy**. Dpto. *Susques*: subida de Chorrillos, 4100 m s.m., II-1980, *Cabrera et al.* 31756 (SI). **La Rioja**. Famatina, camino a Alto Blanco, 20-I-1928, *Castellanos s.n.*, BA 28/33 a (SI). **Salta**. Dpto. *Cachi*: Cerro Negro, 3710 m s.m., 5-I-1994, *Charpin & Lazare* 24055 (G, MIN); Dpto. *Santa Victoria*: Paso de Lizoite, 22° 16'S, 65° 11'W, 4355 m s.m., 7-III-1997, *Ruthsatz & Erschb* 9822 (MIN). **San Juan**. Dpto. *Iglesia*: Quebrada del Agua Negra, El Arenal, 30° 20'S, 69° 40'W, 3700–3900 m s.m., 24-II-1992, *Kiesling et al.* 7996 (SI); Quebrada Agua Negra, Arroyo Pircas, 3900 m s.m., 20-I-1995, *Ruthsatz* 8985 (MIN); Cordillera de Colangüil, Quebrada de la Vicuña, 3400 m s.m., 26-I-1995, *Kiesling et al.* 8707 (SI). **Santa Cruz**. Dpto. *Lago Argentino*: Lago San Martín, Bahía del Depósito, 8-III-1905, *Dusén* 6040 (BAF, S); Brazo Norte: valle de La Cristina, pie occidental cerro Cuchillo, 970 m s. m., abundante en el borde del mallín, 4-II-1953, *Vervoorst* 4406 (LIL). **Tierra del Fuego, Antártida e Islas del Atlántico Sur**. Dpto. *Río Grande*: Estancia La Criolla, 19-XII-1972, *Goodall* 4414 (A, BAB, MO, NA, RNG); Río de la Turba, Estancia La Marina, 54° 18'S, 68° 30'W, 23-II-1968, *Moore* 2027 (C, RNG). Dpto. *Ushuaia*: Estancia Harberton, Campo Lagunas Abajo, Harberton Swamp, 54° 51'S, 67° 20'W, 5-I-1968, *Moore* 1343 (BAB, H, MO, RNG); Estancia Harberton, Harberton Swamp and Fox Trap Hill, 5-I-

1968, *Goodall* 1127 (NA); Valle Lasifashaj, Las Cotorras, about 20 km ENE of Ushuaia, 200 m s.m., 6-II-1940, *Santesson* 421 (S). **Tucumán**. Dpto. *Tafi*: Peñas Azules, Casa de Piedra, San José, 3150 m s.m., XII-1931, *Schreiter* 6989 (LIL).

BOLIVIA. **Cochabamba**. Prov. *Quillacolla*: Bella Vista, Cotopata, Laguna Marquina, 4270 m s.m., 3-II-1999, *Ruthsatz & Budde* 10259 (MIN). **La Paz**. Prov. *Murillo*: La Paz, Río Palcoma (Río Hampaturi), 4370 m s.m., 15-II-1999, *Ruthsatz & Budde* 10345 (MIN); Valle de Chuquiaguillo, Paeocola Pampa, 4200 m s.m., 4-I-1921, *Asplund* 1945 (UPS).

CHILE. **Región IV** (Coquimbo) Prov. *Limarí*: Bocatoma Río Hurtado, Seidental, 2650 m s.m., 1-XII-1990, *Ruthsatz* 6508 (MIN). **Región XI** (Aisén del Gral. Carlos Ibáñez del Campo) Prov. *Capitán Prat*: NW of Lago Cochrane, Lago Elefantita, 47° 12'S, 72° 31'W, 1000 m s.m., 26-II-1999, *Vogel* 43 (MIN). **Región XII** (Magallanes y de la Antártica Chilena) Prov. *Tierra del Fuego*: Lago Blanco (E side), Cerro Cuchillo (E side), 54° 05'S, 68° 59'W, 12-III-1968, *Moore* 2222 (H); Porvenir, 2-I-1941, *Santesson* 1550 (S). Prov. *Última Esperanza*: Lago Balmaceda, 4-II-1938, *Kalela* 2031 (H).

ECUADOR. **Cotopaxi**. Zumbahua-Pujilí km 39, 00° 53'S, 78° 47'W, 3750–3800 m s.m., 4-IV-1992, *Lægaard* 102093 (AAU, QCA); Latacunga–Quevedo road, 28.5 km W of Latacunga, 00° 52'S, 78° 43'W, 3780 m s.m., 4-IV-1992, *Luteyn & Quezada* 14392 (AAU, QCA); Latacunga–Quevedo road, 18 km W of Pujilí, 3700 m s.m., 28-XI-1980, *Balslev* 1057 (NY).

PERU. **Huánuco**. Prov. *Lauricocha*: San Miguel de Cauri, Laguna Taulicocha (E side), 10° 20'S, 76° 44'W, 3910 m s. m., 9-VIII-2002, *Salvador* 434 (MIN); ídem, *Salvador* 438 (MIN); ídem, Añaspampa bog; 10° 21'S, 76° 45'W, 3915 m s.m., 10-VIII-2002, *Salvador et al.* 510. (MIN). **Lima**. Prov. *Cañete*: Cañete valley, above Hortigal near Madean, 12° 57'S, 75° 46'W, 3600 m s.m., 7-III-1987, *Brandbyge* 223 (AAU).

Some selected sites from the Northern Hemisphere.

CANADA: **Alberta**. Banff National Park, near Banff, 1-VII-1915, *Hunnewell* 3965 (MIN); **Manitoba**. vicinity of Churchill, 58° 46'S, 74° 10'W, 18-VII-1956, *Schofield & Crum* 6821 (MIN); **Newfoundland**. Straits of Belle Isle, Capstan Point, Flower Cove, 28-VII-1924, *Fernald et al.* 26403 (MIN).

NORWAY: Dovre, Kongsvold, 18-VII-1885, *Olsson s.n.* (SI-2923); Ringvatsö Island, North of Tromsö, 10-VI/10-VII-1896, *Noiø* 31 (SI).

SWITZERLAND: VII-1875, *Colemann s.n.* (SI).

UNITED STATES OF AMERICA: **Alaska**. Arctic North Slope, Anaktuvuk Pass, 68° 20'N, 151° 25'W, 2000 ft, 7-VIII-1951, *Spetzman* 3976 (MIN); **Colorado**. Denver, Three Cabins, 12000 ft., 8-XI-1919, *Clokey* 3342 (BAF, MIN).

Key to the three South American members of Carex sect. Leucoglochin

1. Apex of rachilla tipped with a hook-like appendage; perigynia ascending to somewhat wide spreading, but not deflexed, at maturity *C. kingii*
1. Apex of rachilla lacking a hook-like appendage; perigynia wide spreading or, more often, strongly deflexed at maturity 2
2. Pistillate scales as long as or longer than perigynia, apex acute to acuminate or smooth-awned, reddish brown; staminate scales 2-3 per spike; perigynium long-stipitate, when deflexed the stipe appearing inverted U-shaped, beak reddish brown near apex; perigynia 2-5 (most often 3 or 4) per spike; plants with stems becoming decumbent and sending up new stems from dormant buds in old leaf axils *C. camptoglochin*
2. Pistillate scales shorter than perigynia, apex obtuse to subacute, brownish; staminate scales 5-6 per spike; perigynium short-stipitate, when deflexed appearing sessile on the rachis, beak stramineous or brownish at apex; perigynia 3-12 per spike; plants rhizomatous *C. microglochin*

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