
Taxonomic Changes in *Carex* (Section *Scirpinae*, Cyperaceae)

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ABSTRACT. *Carex scirpoidea* Michaux var. *convoluta* Kükenthal and *C. scirpoidea* Michaux var. *pseudoscirpoidea* (Rydberg) Cronquist are herein recognized and elevated to subspecies, and *Carex scabriuscula* Mackenzie and *Carex gigas* (Holm) Mackenzie are treated as synonyms.

During the course of preparing a treatment of *Carex* sect. *Scirpinae* (Cyperaceae) for a forthcoming volume of the *Flora of North America*, it has become necessary to publish a change of rank for two combinations and make a note of synonymy. *Carex scirpoidea* Michaux var. *convoluta* Kükenthal and *C. scirpoidea* Michaux var. *pseudoscirpoidea* (Rydberg) Cronquist are herein recognized and elevated to subspecies, and *Carex scabriuscula* Mackenzie and *Carex gigas* (Holm) Mackenzie are treated as synonyms.

Carex sect. *Scirpinae* is a group of North American sedges (except for one population of *Carex scirpoidea* subsp. *scirpoidea* that grows in Norway) that possesses a dioecious breeding system, unispicate inflorescence, and pubescent perigynia. The section includes *Carex scirpoidea* and its four subspecies (subsp. *scirpoidea*, subsp. *stenochlaena* (Holm) Löve & Löve and the two proposed herein), *Carex curatorum* Stacey from Utah and Arizona, and *Carex scabriuscula* from Oregon and California.

Based on the results of a biosystematic study (Dunlop, 1990), *Carex scirpoidea* is recognized as a geographically wide-ranging species with four subspecies. Subspecies in *C. scirpoidea* are geographically based ecotypes that share a common chromosome number, possess similar achene micromorphology and leaf anatomy, interbreed in greenhouse experiments, and have the majority of morphological characters falling within the normal range for *C. scirpoidea* but differ morphologically in only a few characters. Here, I propose that *C. scirpoidea* var. *convoluta* and *C. scirpoidea* var. *pseudoscirpoidea* be elevated to the rank of subspecies as they satisfy the criteria mentioned above.

Carex scirpoidea* subsp. *convoluta (Kükenthal) D. A. Dunlop, stat. nov. Basionym: *Carex scirpoidea* var. *convoluta* Kükenthal, in Engler, Pflanzenreich 38(IV: 20): 81. 1909. TYPE: U.S.A. Michigan: Thunder Bay Island, 18 July 1895, Wheeler s.n. (holotype, B destroyed; isotypes, BH, CAN, GH, MICH, MIN, MSC, NY, POM, US, VT).

Plants caespitose, lacking short creeping rhizomes. Flowering shoots lacking the persistent sheaths and bases of the previous years' leaves, erect. Vegetative leaves to 23 cm × 1.8 mm. Subtending scales ovate, 2.4 × 1.2 mm. Perigynia ovate, 1.5–2.6 × 1–1.2 mm, tightly enveloping the fruits for the entire length and width. Fruits 1–1.5 mm × 0.6–0.9 mm.

Plants flowering from May to July and fruit from late June to September. *Carex scirpoidea* subsp. *convoluta* occurs in alvar communities (glacial scoured limestone pavements with shallow soil) along the Bruce Peninsula and island shores of Lake Huron. This subspecies is restricted to Ontario and Michigan; subspecies *scirpoidea* also occurs inland infrequently in the Great Lakes region.

Subspecies *convoluta* is geographically the most restricted subspecies of *Carex scirpoidea* and is distinguished by narrowly V-shaped leaves, especially of the flowering shoot, a strongly caespitose habit, and conspicuously more flowering shoots per plant than other subspecies.

These narrow-leaved plants were first described as a variety of *Carex scirpoidea* by Kükenthal based on specimens collected by Wheeler in 1895 from Thunder Bay Island, Michigan. Isotypes are available of Wheeler's 1895, Thunder Bay Island, Michigan, collections since Kükenthal's *Carex* herbarium, presumably including the holotype of *C. scirpoidea* var. *convoluta*, was sent to Berlin (B) and was destroyed during World War II (Stafleu & Cowan, 1979).

Carex scirpoidea* Michaux subsp. *pseudoscirpoidea (Rydberg) D. A. Dunlop, stat. nov. Basionym: *Carex pseudoscirpoidea* Rydberg, Mem. New York Bot. Gard. 1: 78. 1900. *Carex scirpoidea* var. *pseudoscirpoidea* (Rydberg) Cronquist, Univ. Wash. Publ. Biol. 17: (1): 325. 1969. TYPE: U.S.A. Montana: Spanish Basin, July 1896, Rydberg 3064 (lectotype, designated by Mackenzie (1935), NY).

Plants rhizomatous. Flowering shoots with persistent sheaths and bases of the previous years' leaves, erect. Vegetative leaves to 21 cm × 3 mm. Subtending scales ovate, 2.8 × 1.5 mm. Perigynia ovate, (1.5)2.0–2.8(3) × 1.5 mm, tightly enveloping the fruits for the entire length. Fruits 1.5–1.8 × 0.9–1.2 mm.

Plants generally flower from June to September, depending on elevation. Subspecies *pseudoscirpoidea* occurs at elevations from 3300 to 3900 m, on dry ridge sites, fellfields with gravelly and non-calcareous soils in contrast to the relatively lower elevation, wetter sites with calcareous soils of *Carex scirpoidea* subsp. *scirpoidea*. Subspecies *pseudoscirpoidea* is found in British Columbia, California (Sierra Nevada Range), Colorado (San Juan Mountains), Idaho (Sawtooth Range), Montana (Little Belts, Anaconda-Pintlar Range, and Beartooth Plateau), Oregon (Steen Mountains), Utah (Uinta and La Salle Mountains), and Washington (Okanagan Range).

Carex scirpoidea subsp. *pseudoscirpoidea* is a distinct ecological entity occurring in high-elevation sites in various mountain ranges in the West. This taxon is distinguished by culms that arise from second-year shoots that are clothed at the base by the withered and persistent leaf bases of the previous year. Generally, one culm arises from a single node and internodes of the rhizome are elongated, typically 1–2 cm. The leaves are clustered, diverging from the shoot axis at one point approximately 10–20 mm above the rhizome, in contrast to other taxa in which the leaves diverge from the stem at scattered intervals along the shoot axis. The plants generally have shorter and wider leaves than those of *C. scirpoidea* subsp. *scirpoidea*.

Carex scabriuscula Mackenzie, Bull. Torrey Bot. Club 35: 268. 1908. TYPE: U.S.A. Wet meadow in the Cascade Mountains, 30 June 1902, Cusick # 2849. (holotype, NY; isotypes, CU, DS, ORE, OSC, POM, UC, WS).

Carex gigas (Holm) Mackenzie, Bull. Torrey Bot. Club 35: 268. 1908. Syn. nov. *Carex scirpoidea* var. *gigas* Holm, Amer. J. Sci. IV 18: 20. 1904.

Historically, *Carex scabriuscula* and *Carex gigas* have been treated as two separate serpentine endemics in Oregon and California, respectively. Evidence from their morphology, chromosome number, leaf anatomy, and achene micromorphology (Dunlop, 1990) suggests that these serpentine taxa are synonymous. Since both taxa were simultaneously described at the rank of species (Mackenzie, 1908), I have chosen to use the name *C. scabriuscula* because the type specimen is known despite the vague locality data. When Mackenzie (1908) described this species he designated a type specimen collected by William Cusick, which was initially distributed as *Carex feta*. I did not choose the name *C. gigas* because when Holm (1904) described *C. gigas* as a variety of *C. scirpoidea*, he did not designate a type specimen. He merely indicated that the taxon occurred on Mt. Eddy, Siskiyou County, California. In 1908 when Mackenzie raised this taxon to the specific level, he did not lectotypify this species but only referred to Cyrus Pringle's specimen from 8000 feet, Siskiyou County, California, 18 August 1881. It is not known at this time which specimen of Pringle's was examined by Holm in 1904.

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