



Epitypification of *Carex bolanderi* (Cyperaceae)

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With the description of *Carex infirmivervia* Naczi (in Naczi *et al.* 2002: 528) and the summation of *Carex* sect. *Deweyanae* (Tuckerman ex Mackenzie 1913: 352) Mackenzie (1931: 114) by Naczi (in Naczi 2002: 321–325), a recent summary of Pacific Northwest sedges (Wilson *et al.* 2008: 106–107), and the new Jepson Manual (Zika *et al.* 2012: 1322), the circumscription of *C. bolanderi* Olney (1868: 393) is now firmly established. As such, *C. bolanderi* occurs from southern British Columbia to southern California east to Montana, Utah and New Mexico, and then south in the Sierra Madre Occidental through Chihuahua to northern Durango, Mexico. Previous usage of *C. bolanderi* was somewhat confused both as to its circumscription and to its distribution because of the inclusion of some specimens of *C. infirmivervia* as in the cases of Munz (1959: 1443, 1974: 887) and Mastrogioseppe (1993: 1122), or when it was included in *C. deweyana* Schweinitz (1824: 65; e.g., Cronquist 1969: 261, 1977: 158, Taylor 1983: 102).

Olney (1868: 393) cited four collections when he proposed *Carex bolanderi*. Errors are present in the citation of the first two of these syntypes (*Brewer 1665*, *Hillebrand 2313*, *Bolander 6201*, and *Bolander 6209*). *Brewer 1665* does not exist among the *C. bolanderi* specimens in Olney's herbarium (BRU) or in the other herbaria we examined. Rather, the correct number is *Brewer 1655* (BRU!, DS [2]!, GH!, MO!, NY!, UC!, US). Similarly, the correct number for the second syntype is *2315* (BRU!, GH!, UC!, US). The latter correction was noted by Mackenzie (1921a: 37). However, the collector's name on the label of *2315* at BRU is "Brewer" whereas "Hillebrand" is credited with the collections at GH and UC. Based on information in extant field books, the collector of the latter is Wilhelm B. Hillebrand rather than William H. Brewer.

By selecting one of the four Olney syntypes, Mackenzie (1921a: 37) declared a step-1 lectotype when he wrote "Bolander 6209 from the Yosemite is taken as the type." Designation of *Bolander 6209* as the type subsequently was repeated by Mackenzie (1921b: 218, 1931: 117). At least three duplicates of *Bolander 6209* exist (at BRU!, GH!, UC!). Our examination of this gathering has shown that important morphological details mentioned in the original description are not borne out in *Bolander 6209*. Olney described the perigynia as nerved and with spongy bases ("perigyniis ovalibus vel ellipticis acuminato-rostratis bifidis plano-convexis margine acutis serratis nervatis basi spongiosis squama ovata hispida aristata albo-hyalina nervo viridi longioribus"), and the achenes as orbicular or ovate ("achenio orbiculato vel ovato"). On *Bolander 6209*, the perigynia, being immature, lack nerves and spongy bases. In addition, the achenes are not developed. In contrast, *Bolander 6201* possesses perigynia with 3–6 complete nerves on their abaxial surfaces and has perigynia with spongy bases. Also, the achenes on *Bolander 6201* are orbicular-ovate. Examining the entirety of Olney's detailed description, it is clear that Olney compiled his comments from most if not all of his syntypes and Mackenzie failed to examine the syntypes carefully before making a step-1 lectotypification. Furthermore, considering Olney's English diagnosis that differentiated *C. bolanderi* from *C. deweyana*, his emphasis of "the oval or elliptical and nerved perigynia" as being critical to the identification of his new species further removes *Bolander 6209* as a reasonable choice for a type as these features are not present. Mackenzie (1921a: 37) assigned *Bolander 6201* to *C. leptopoda* Mackenzie (1917: 124, 1060), but this was a misidentification. Our examination of *Bolander 6201* has shown the perigynium beaks are 41–48% of the perigynium lengths, and this feature unambiguously distinguishes that collection from *C. leptopoda*, which has perigynium beaks 28–38% of the perigynium lengths.

Bolander 6209 lacks the characters considered to be critical by Olney to distinguish his new species and is so young that even now the collection cannot be assigned to any one of the species assigned to sect. *Deweyanae*. Thus, *Bolander 6209* “is demonstrably ambiguous and cannot be critically identified for purposes of the precise application of the name to a taxon” (Art. 9.8; McNeill *et al.* 2012). However, because a syntype cannot be considered to be in conflict with the protologue (Art. 9.19; McNeill *et al.* 2012), Mackenzie’s step-1 lectotype collection, *Bolander 6209*, cannot be rejected under 9.19(b) of that article. Therefore, we (1) designate the BRU specimen as a necessary step-2 lectotypification (Art. 9.17), and (2) designate *Bolander 6201* as an epitype to allow the continued use of *C. bolanderi* as currently circumscribed (Fig. 1).

***Carex bolanderi* Olney (1868: 393)**

Lectotypus (step-1, Mackenzie 1921a: 37):—UNITED STATES OF AMERICA. California: [Mariposa Co., Big Trees], Yosemite [National Park], 1866, *H.N. Bolander 6209* (lectotypus [step-2, *hic designatus*]: BRU!, isolectotypi: GH!, UC!, US).

Epitypus (*hic designatus*):—UNITED STATES OF AMERICA. California: [Mariposa Co.], Yosemite Valley, 1866, *H.N. Bolander 6201* (BRU!, isoepitypi: CAS!, DS!, G [2], GH!, MICH!, MO [2]!, NY [2]!, UC [2]!, US [2], VT!, YU [2]).

Should it be demonstrated via future studies that *Bolander 6209* differs taxonomically from our proposed epitype, *Bolander 6201*, the epitype would nevertheless maintain its standing unless and until it is displaced by a conservation proposal (Art. 9.20; McNeill *et al.* 2012).

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