

Key revised to synonymize *C. heterophylla* var. *bolanderi* and var. *heterophylla* within *C. heterophylla* based on communication with *Flora of North America* treatment author Richard Lansdown; Lead 2a: changed "Fr body elliptic..." to "Fr body oblong..." to better reflect shape in illustration; Lead 5b: range statement for *C. fassettii* changed to "Deschutes Co, OR to CA" based on recently collected specimens. Leads 7a and 7b edited to emphasize leaf apex differences, which are supported by a new illustration for *C. brutia* var. *hamulata*.

Callitriche L. Water-starwort

Pls ♀♂, rarely ♂, ♀; fls tiny, 1–3 per lf axil, bracts 2 or absent; perianth absent; stamens 1 (rarely more); pistil 2-carpellary and deeply 4-lobed; ovary superior; stigmas 2, thread-like; fr schizocarps separating when mature into four 1-seeded mericarps; aquatic herbs, submerged or emergent and rooted in mud; lvs exstip, either opp (rarely whorled), linear, and 1-nerved, or tufted at br ends and then commonly widened and 3-nerved. (Gr *callos*, beautiful, and *trichos*, hair, referring to slender sts).

Mature frs required for accurate identification. *Callitriche terrestris* Raf. was recently (2016) coll in Vancouver, BC, also reported for WA; it will key to lead 6b and has frs 0.5–0.8 mm on peduncles 0.4–0.6 mm, reflexed fl and fr styles, and yellow anthers.

1a *C. marginata* Torr. 1a Fr peds 2–25 mm, much > than frs, often becoming recurved and buried in mud; lvs 5–12 mm, mostly spatulate entire st length; fr 0.7–1 mm, wider than long, wing-margined entire length; lakes, floodplain pools, streams, vernal pools; uncommon in our area; sw BC, nc and e WA, Latah Co, ID, e CRG, and sw OR s to Baja Cal; winged w. (*C. longipedunculata* misapplied)

2a *C. palustris* L. 2a Fr body oblong, 1.2–1.5 × as long as wide, winged in distal half only, or wings much narrower below; frs 0.8–1.4 mm, subsessile or on ped to 0.2 mm, faces with tiny pits in rather reg longitudinal lines; both linear and spatulate lvs present; ditches, ponds, lakes, streams, and rivers; widespread throughout N Am; Eurasia; spring w. (*C. verna*)

3a *C. heterophylla* Pursh 3a Fr margins winged in distal half or wings absent; fl bracts gen present but deciduous in fr; frs (0.4–)0.7–1.1(–1.2), gen widest above middle and ± obovate in outline, sessile; both linear and spatulate lvs present; AK to CA, more common w Cas in our area, e across N Am, and in S Am; different-lvd w. (*C. anceps*, *C. bolanderi*, *C. h.* vars. *b.*, *h.*)

4a *C. hermaphroditica* L. 4a Pls with linear lvs only, the dark green lvs contrasting strongly with the pale brown sts; lf tips shallowly to deeply notched, notch U-shaped; fls ebracteate

5a *C. fassettii* Schotsman 5a Fr peds 0–0.2 mm; fr width ≥ length, brown, not contrasting with wings, 1.1–1.9 mm; lakes, ponds, slow rivers, ditches; circumboreal, s both sides of Cas, to OR, NV, AZ, and CO, e in Can and n US to New England; autumnal w., n w. (*C. autumnalis*)

6a *C. stagnalis* Scop. 6a Mature fr body pale gray-brown or gray-green, not strongly contrasting with wings; pls usually with spatulate lvs only; fls gen solitary in each lf axil; bracts persistent in fr; frs 1.2–1.8 mm, subsessile or on ped to 0.2 mm; lowl ditches, ponds, and occ riverbanks; common European intro; w Cas, BC to CA, occ e to w MT, also in e US; pond w.

3b Fr margins winged entire length; fls bracteate or not

4b Pls with both linear and spatulate lvs or spatulate lvs only, the green of the lvs not contrasting with green color of the sts; lf tips rounded to shallowly retuse, notch V- or U-shaped; fl bracts conspicuous, falcate, ± clear, ca = the carpels and deciduous or persistent in fr

5b *C. fassettii* Schotsman 5b Fr peds 0.4–0.6(–1) mm; fr width > length, black, with contrasting paler wings, 1.1–1.8 mm; vernal and per pools; Deschutes Co., OR to CA; Fassett's w.

6b Mature fr body dark brown to black, strongly contrasting with pale wings; pls with linear and spatulate lvs



7a



7b

7a Lf apex notched, often wrench-like in shape; styles strongly reflexed and appressed to sides of ovary in fl, remaining reflexed in fr; pollen and anthers colorless when fresh; fl bracts deciduous in fr; frs 1.1–1.6 mm, sessile to subsessile; spatulate lvs 2.3–3 mm wide; flowing streams or quiet waters; uncommon European intro; sc BC and coastal Lane Co, OR, reported also for WA; narrow-lf w.; ours var. **hamulata** (Kütz. ex W.D.J. Koch) Lansdown

7 **C. brutia** Petagna

7b Lf apex entire; styles ascending in fl, becoming reflexed in fr; pollen and anthers yellow when fresh; fl bracts persistent in fr; frs 1–1.2 mm, sessile or on ped to 0.5 mm; spatulate lvs 2.6–6 mm wide; vernal and per pools and ditches; uncommon in Benton and Grant cos, OR, more common in CA; effluent w.

8 **C. trochlearis** Fassett