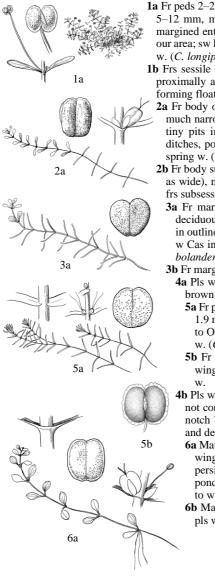
Key revised to synonymize *C. heterophylla* var. *bolanderi* and var. *heterophylla* within *C. heterophylla* based on communication with *Flora of North America* treatment author Richard Lansdown; Lead 2a: changed "Fr body elliptic..." to "Fr body oblong..." to better reflect shape in illustration; 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

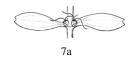
Pls  $\mathcal{Q}$ , rarely  $\mathcal{A}$ ,  $\mathcal{Q}$ ; fls tiny, 1–3 per lf axil, bracts 2 or absent; perianth absent; stamens 1 (rarely more); pistil 2carpellary and deeply 4-lobed; ovary superior; stigmas 2, thread-like; fr schizocarps separating when mature into four 1-seeded mericarps; aquatic 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).

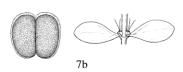
**Mature frs required for accurate identification.** *Callitriche terrestris* Raf. was recently (2016) coll in Vancouver, BC, also reported for WA; it will key to lead 6b and has frs 0.5–0.8 mm on peduncles 0.4–0.6 mm, reflexed fl and fr styles, and yellow anthers.



1a 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)
1 C. marginata Torr.

- **1b** Frs sessile or with peds to 1 mm, peds gen < 1/4 length of fr; st lvs either linear proximally and spatulate distally, linear only, or spatulate only; spatulate lvs often forming floating rosette
  - 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*)
     2 C. palustris L.
  - **2b** Fr body sub-rotund or obovate, as wide as or wider than long (occ to  $1.1 \times as$  long as wide), margins winged either entire length, in distal half only, or wings absent; frs subsessile or occ on ped to 1 mm
    - 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.*)
      3 C. heterophylla Pursh
    - 3b Fr margins winged entire length; fls bracteate or not4a Pls with linear lvs only, the dark green lvs contrasting strongly with the pale
      - brown sts; If tips shallowly to deeply notched, notch U-shaped; fls ebracteate **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*) 4 **C. hermaphroditica** L.
      - 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. 5 C. fassettii Schotsman
      - **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,  $\pm$  clear, ca = the carpels and deciduous or persistent in fr
        - 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.
           6 C. stagnalis Scop.
        - **6b** Mature fr body dark brown to black, strongly contrasting with pale wings; pls with linear and spatulate lvs





- 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
- 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