LENTIBULARIACEAE BLADDERWORT FAMILY

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Perennial and annual herbs, carnivorous, of moist or aquatic situations. ROOTS subsucculent, present only in *Pinguicula*. STEM a caudex, or stoloniferous, branching and rootlike. LEAVES simple, entire (*Pinguicula*, *Genlisea*, some *Utricularia*), or variously dissected, often into threadlike segments (*Utricularia*). CARNIVOROUS TRAPS leaf-borne bladders (*Utricularia*), sticky leaves (*Pinguicula*), modified leaf eel trap chambers (*Genlisea*). INFLORESCENCE a scapose raceme bearing one to many flowers; bracts present or not. FLOWERS perfect, zygomorphic; calyx lobes 2, 4, or 5; corolla spurred at base, lower lip flat or arched upward, both lips clearly or obscurely lobed; ovary superior; chamber 1; placenta generally free-central; stigma unequally 2-lobed, more or less sessile; stamens 2. FRUIT a capsule, round to ovoid, variably dehiscent; seeds generally many, small. –3 genera; 360+ species, worldwide, especially tropics.

Utricularia L. Bladderwort

Delicate perennial and annual herbs, epiphytic, terrestrial or aquatic, variable in size. ROOTS absent; small descending rootlike rhizoids sometimes associated with inflorescence bases. STEMS stoloniferous and rootlike, floating freely in water or descending into the substrate; caudex usually absent. LEAVES simple and entire, or variously dissected, often into threadlike segments; leaf segment margins and tips bearing minute bristles (setula) or not. BLADDERS (0.5-) 1–4 (-10) mm in diameter, borne on leaves; quadrifid glands (Fig. 1) inside bladders consist of 2 pairs of oppositely directed arms, the angles of divergence useful in verifying specific identity (view at 150×). INFLORESCENCE: bracts present. FLOWERS with 2 or 4 calyx lobes; corolla lower lip clearly or obscurely 3-lobed, the upper lip clearly or obscurely 2-lobed. Cytology variable and uncertain, X = 7–24. More than 235 species; worldwide distribution, especially tropics. Taylor, P. 1989. *Kew Bull. Add. Ser*. 14: 1–724.

Utricularia intermedia Hayne is unlikely in Arizona but should be looked for in high elevation fens; its preferred habitat is similar to that of *U. minor*. This species has a large floral spur, but can be differentiated from *U. macrorhiza* by strongly dimorphic stems, 20 ultimate leaf segments or fewer, and leaf segments strongly flattened.

Utricularia is a carnivorous genus, capturing and digesting prey by its bladders. The bladder walls normally bulge outwards, but the internal quadrifid glands pump water out of the traps, causing an overall negative internal pressure. Small aquatic organisms trigger the bladder valve to open, and in rushing water sucks the prey into the plant. Corrosive enzymes then digest the prey.

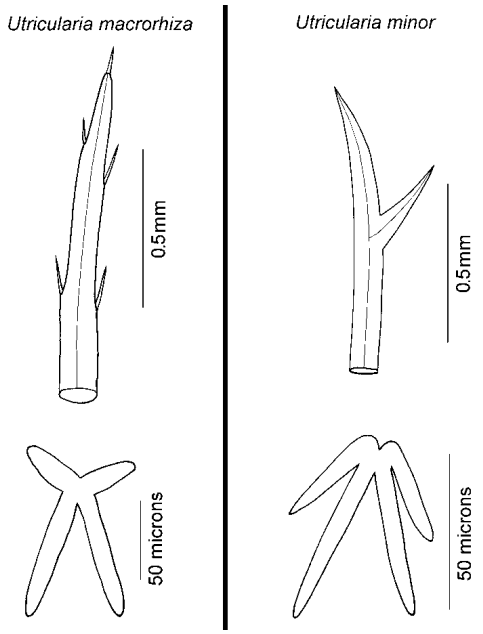
1. Flower 1-2 cm long; spur approximately as long as corolla lower lip, narrowly cylindrical, the apex acute, hooked upwards at tip; stems of 1 kind, not dimorphic; ultimate leaf segments usually more than 30, with marginal bristles 0.1-0.3 mm long . . . . . ***U. macrorhiza***

Vascular Plants of Arizona: Lentibulariaceae: Bladderwort Family. *CANOTIA* 8(2):54–58, 2012.

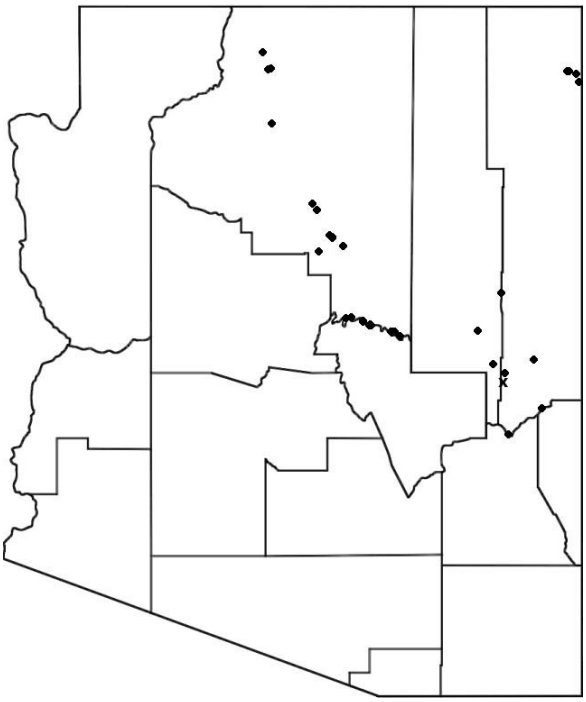
1' Flower 6-8 mm long; spur much shorter than corolla lower lip, broadly conical to saccate or even nearly absent; stems weakly to strongly dimorphic; ultimate leaf segments usually 7–22, without bristles. . . . . ***U. minor***

Utricularia macrorhiza Leconte (large roots). Common Bladderwort. – Floating aquatic herbs. STEM a well-defined, green, weakly branching stolon 30–150 cm long, bearing alternate leaves, not dimorphic; winter buds 1–2 cm, bristly. LEAVES 1.5–9 cm long, 1–2 parted at base, each part multiply pinnately dissected into 30–150 capillary segments (fewer in highly depauperate specimens), the ultimate segments bearing lateral and apical bristles 0.1–0.3 mm long. BLADDERS 1.5–5 mm long, those near the leaf base larger than those near leaf tip; quadrifid glands with long arm-pair parallel or diverging slightly, the short arm-pair diverging by 90–180º. INFLORESCENCE: 5–20-flowered; peduncle 10–60 cm, 1–3 mm diameter. FLOWER corolla 1–2 cm, clear yellow, variously marked with brown; cylindric spur hooked upward near tip. SEED 4–6-sided, winged; 2*n* = ca. 40. –Quiet, shallow or deep, rarely flowing, acidic or neutral waters. Apache, Coconino, Navajo cos; 1850–2750 m (6000–9000 ft), may be elsewhere n of the Mogollon Rim, especially when protected from cattle damage; Jul-Aug. N. Amer. except se; ne Mex.; east Asia. Formerly treated as *Utricularia vulgaris* L. (or an infraspecific taxon of that species), but now considered to be distinct. Plants can be dwarfed or modified by abnormal conditions (such as alkaline waters), and be misidentified as *U. minor*. The presence or absence of marginal bristles is highly reliable in identifications.

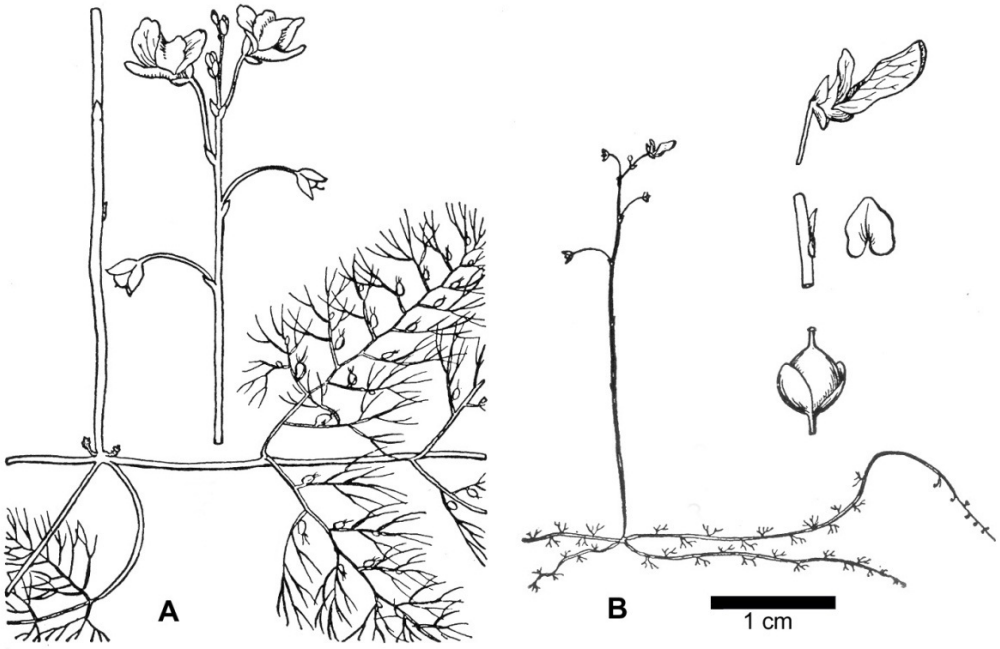
Utricularia minor L. (small). Small Bladderwort, Mud Bladderwort. –Affixed or floating aquatic herbs. STEM a tangled network, weakly to strongly dimorphic, the first form green with many leaves and some bladders, the second form pale white with few leaves and many bladders (collections frequently do not include the second kind of shoot, as they are fragile, descend into the muck, and break off during the collection process); winter buds less than 5 mm long, glabrous. LEAVES 3–20 mm long, 3-parted at base, variously dissected above to 7–22 thread-like to flattened ultimate segments, the ultimate segments bearing no bristles nor microscopic bristles. BLADDERS 0.5–2 mm long; those on descending shoots are frequently larger than on green shoots; quadrifid glands with the long arm-pair diverging slightly, the short arm-pair diverging by 270–300º. INFLORESCENCE: 2–6-flowered; peduncle 3–25 cm, less than 0.5 mm diameter. FLOWER corolla 6–8 mm, pale yellow, variously marked with brown; lower lip more than twice the length of the sac-like spur. SEED 4–6-sided, scarcely winged; 2*n* = ca. 40. –Quiet, shallow, acidic or neutral waters, mucky fens. Apache Co.; 2150 m (7100 ft), documented only from Woolsey Lake in AZ (ARIZ: *Rice 960701 & 960702*; other reports previous to 1996 were misidentified *U. macrorhiza*); not yet observed in flower (probably Jun-Jul). Across n U.S. to AK, Can; circumboreal.



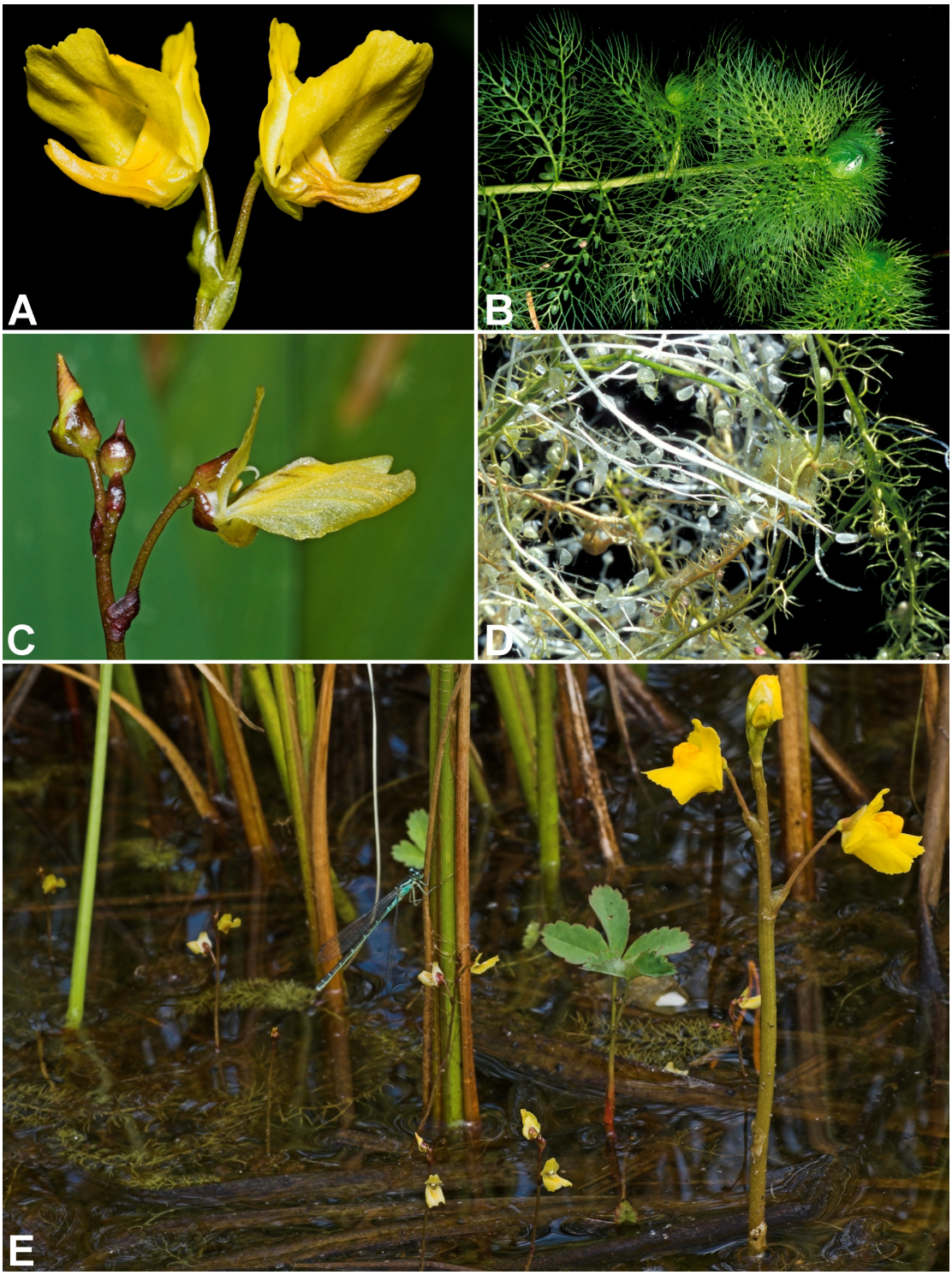
Lentibulariaceae Figure 1. Ultimate leaf segments (top) and four-armed quadrifid bladder glands (bottom) for *Utricularia macrorhiza* and *U. minor*. Note the presence of bristles on the *U. macrorhiza* leaf segment.



Lentibulariaceae Figure 2. Map of *Utricularia macrorhiza* (dots) and *U. minor* (X) in Arizona.



Lentibulariaceae Figure 3. *Utricularia macrorhiza* (A) and *U. minor* (B) reproduced from *An illustrated Flora of the Northern United States and Canada* by N. L. Britton and A. Brown (1913).



Lentibulariaceae Figure 4. A–B, *Utricularia macrorhiza*: (A) flowers; (B) leafy shoot with bladders borne throughout. (C–D) *Utricularia minor*: (C) flower; (D) green bladder-bearing leafy shoots and white bladder-only shoots. (E) Both species growing together for comparison. Images C, E, show plants growing in Idaho. All photos by Barry Rice.