

UTRICULARIA (LENTIBULARIACEAE) OF IRAN

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The distribution of *Utricularia* in Iran is not well known and represents a gap in our understanding of the ranges of some species. In 2006, one of us (A.N.) was botanizing in the northern portions of Iran and made some collections which considerably expand our knowledge. These specimens, which have been stored at the University of California, Davis herbarium (DAV) and Tehran University Herbarium (TUH) are described in the following paper.

The north-central border of Iran is marked by the Caspian Sea, which is met on the Iranian side by the Alborz Mountains. Although only approximately 100 km wide (north to south), this mountain range reaches elevations greater than 4500 m and forms a long, east-west barrier that separates the moist (approximately 1000-2000 mm annual precipitation) Caspian Sea climate from the more arid (280-500 mm annual precipitation) Tehran-Semnan plateau to the south.

Prior to 2004, the only *Utricularia* species known from Iran was *Utricularia australis* R.Br., which is also found in the neighboring Turkey, Iraq, Yemen, Afghanistan, and Pakistan (Schlauer 2000, 2002; Taylor 1989; Casper 1969). *Utricularia vulgaris* L. was reported (Parsa 1949; Shokri *et al.* 2004) in Iran near the Caspian Sea, although this might be an erroneous detection of the very similar *U. australis* (see further discussion of similarities below). The detection of *U. vulgaris* would not, however, be too surprising since it has been reported from the bordering Turkey, Afghanistan, Pakistan, and the nearby Syria (Schlauer 2000, 2002; Taylor 1989; Casper 1969). As yet, the "*U. vulgaris*" collection has not been inspected by either author of this paper. The only other *Utricularia* species reported for this region in the Middle East are *Utricularia minor* L. (Turkey, Afghanistan, and the Republic of Azerbaijan), *U. ochroleuca* Hartm. (Afghanistan), and *U. aurea* Lour. (Pakistan).

Collection #1: *U. australis* R.Br.

The first collection site was at Lar National Park, Tehran Province (E51°58'22.0", N35°55'58.3", 2500 m a.s.l.). The plants grew in small wet and scattered depressions (up to 50 cm deep, pH=7.8) on the edge of Alarm River, in a community dominated by *Juncus inflexus* L. Other plants in the community include *Batrachium trichophyllum* (Chaix) Bosch, *Chara* sp., *Potamogeton pectinatus* L. and *Zannichellia palustris* L. (see Back Cover)

The specimen (#BR060801, DAV) consists of several stolon segments, equivalent to a total stolon length of approximately 110 cm of plant material. The leaves are approximately 2 cm long, and pinnately divided into numerous capillary ultimate segments. Bladders are scattered throughout. The ultimate leaf segments bear lateral and terminal setulae (bristles); the lateral setulae are set upon small teeth on the leaf margins. The stolons are not at all dimorphic (compare with descriptions of plant collections below). Two inflorescences are included in the specimen, with scapes approximately 5-6 cm tall, each bearing 2-3 scales and 3-4 flowers (some of which are mature). Capsule development was not exhibited, nor was it observed in the field.

Based upon the monomorphic stolons, lateral setulae set upon teeth, and presence of inflorescence scales, this plant was easily identified as *U. australis* R.Br. Microscopy of the quadrid glands provided supporting evidence as the arms in the gland long-arm pair were weakly diverging, while

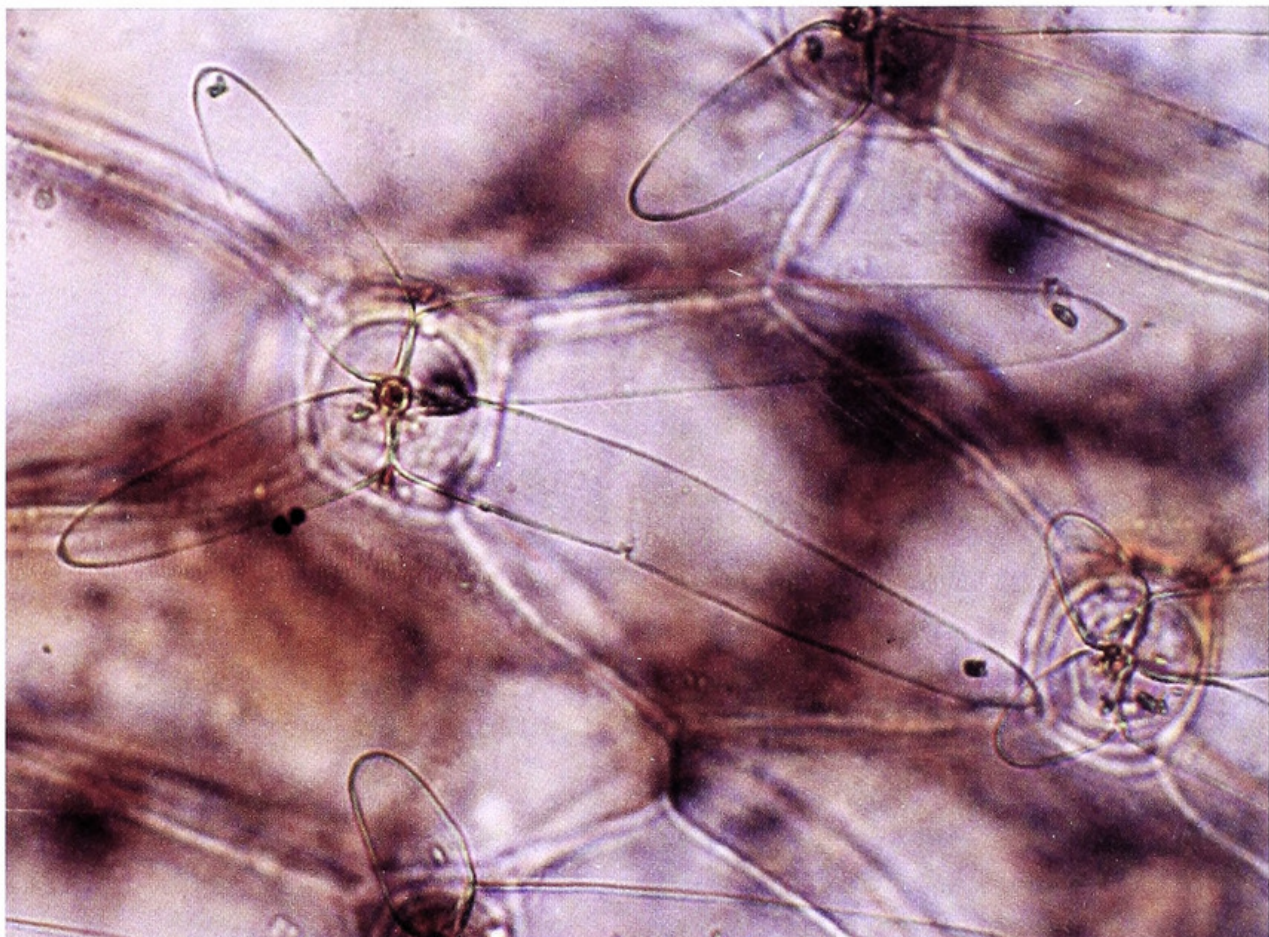


Figure 1: Quadrifid glands of *U. australis* in Lar National Park, 400x. Photograph by A. Naqinezhad.



Figure 2: The Mazandaran Province site for *U. minor*. Photograph by A. Naqinezhad.



Figure 3: *Utricularia minor* from the Mazandaran Province. Photograph by A. Naqinezhad.

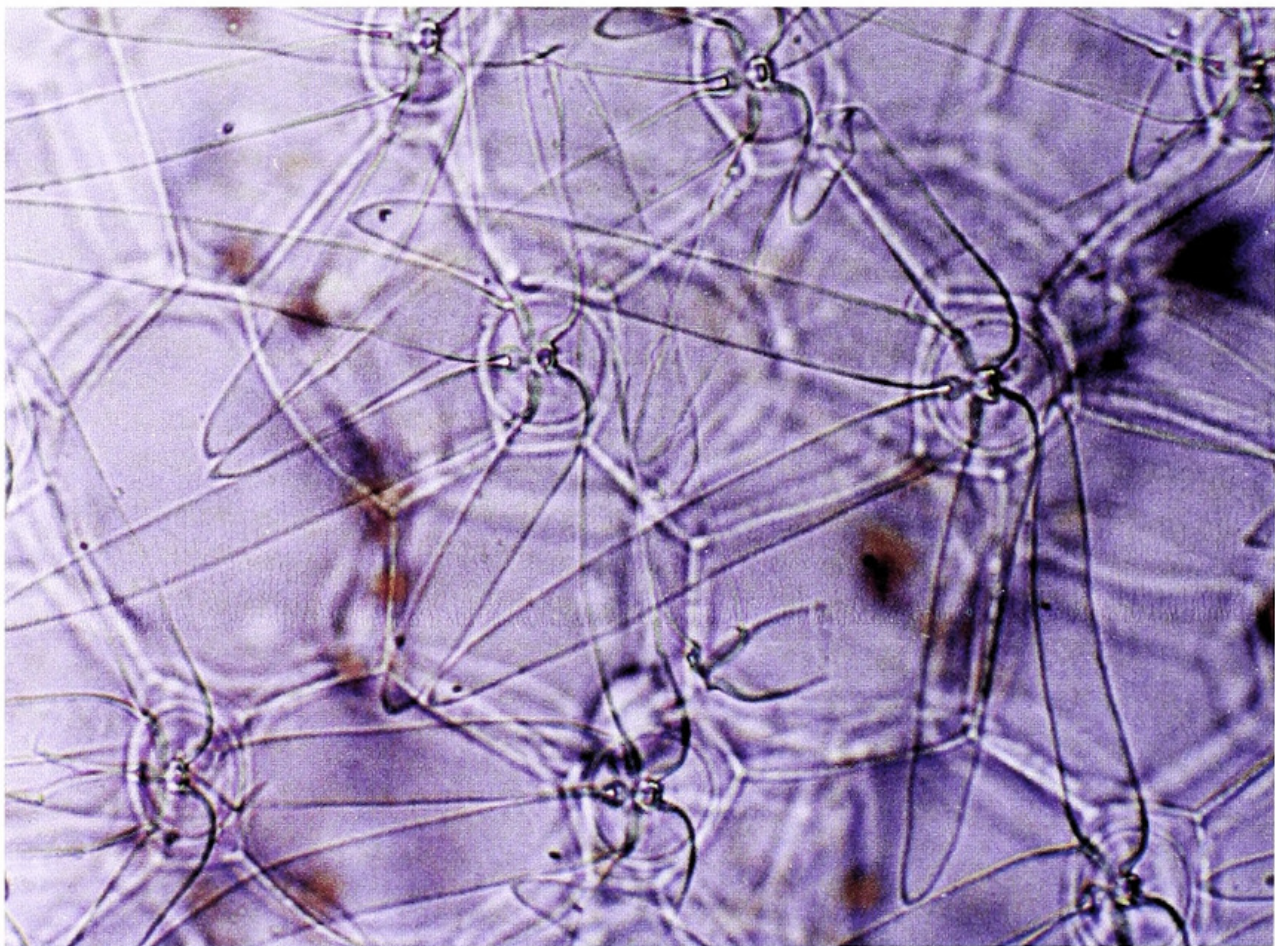


Figure 4: Quadrifid glands of *U. minor*, Mazandaran Province, 400x. Photograph by A. Naqinezhad.

the arms in the short-arm pair were highly divergent (see Figure 1). It is easy to confuse *U. australis* with *U. vulgaris*—the most reliable character for vegetative material is to note that the lateral setulae are set directly on the leaf margins for *U. vulgaris*, while they are mounted on small teeth for *U. australis*.

Utricularia australis has been previously reported in northern (Caspian lowland area) and western (Lorestan) parts of Iran (Casper 1969).

Collections #2 and #3: *U. minor* L.

The next collection site was between Tehran and Amol in Haraz road, Yoush-Baladeh deviation, between Razan and Baladeh, Mazandaran Province (E52°1'11.8", N36°12'7.8", 1735 m a.s.l.), approximately 30 km due north of the *U. australis* site. This site was a small pond (approximately 70 m² surface area, pH=7.7) up to 60 cm deep. This pond is associated with riparian habitat along the Baladeh River, one of main branch of Haraz River. The pond shrinks during the end of summer and is completely dry during autumn and winter. *Utricularia minor* was accompanied by *Chara* sp., *Potamogeton lucens* L., *Potamogeton pectinatus*, *Schoenoplectus lacustris* (L.) Palla and *Typha lugdunensis* P. Chabert (see Figure 2).

Although the collection (#BR060501, DAV) consists of approximately 200 cm of stolons in a tangle, the plant is overall smaller and more delicate than the species in the previous collection. Leaves are 0.4-0.8 cm long, variously palmate-dichotomously divided to 6-20 terminal leaflets (see Figure 3). Bladders are scattered throughout, but are more common on some shoots so that there is a weak dimorphism in the nature of the shoots. Under 20× magnification, the terminal leaflets are weakly to moderately flattened. Lateral setulae are absent, apical setulae are absent or occasionally present but minute. A few turions, having sprouted into growth, are present, and its broadly segmented leaves are similarly asetulose. No flowers are present.

Based upon the weakly dimorphic stolons, flattened leaf segments, and absence of lateral setulae, the only likely possibilities are *U. minor* L. and possibly *U. bremii* Heer ex Kölliker. The broadly segmented leaves of the recently sprouted turions are, as Taylor (1989; p11) notes, unique to *U. minor* L. and *U. bremii*. The bladder quadrifid glands were observed under a microscope at 400×. The arms in the long-arm pair are separated by approximately 30°, while the arms in the short-arm pair are separated by approximately 315° degrees, so all four arms are pointing in approximately the same direction (see Figure 4). This is consistent only with the assignment of the specimen to *U. minor*. This is a new species for Iran, and is important because it represents a detection of *U. minor* at a site that bridges previous detections for the species in Turkey and Afghanistan. This record is a new report for the species in the Flora Iranica area. The first report of the species in this area was only from E Afghanistan (Casper 1969); it is also recorded for the Republic of Azerbaijan (Meusel *et al.* 1965).

This species with above-mentioned characters was collected in another wetland site, Sagoon Lake, in the mountains near Arjomand village, Firuzkuh, Tehran Province (E52°20'56.64", N35°50'57.43", 3097 m a.s.l.-Naqinezhad, 36933-TUH), and approximately 35 km east-southeast from the Alarm River *U. australis* site, and 49 km southeast of the Haraz Road *U. minor* site. This lake (approximately 1 ha surface area, pH=7.6, up to 2 m deep) is at a significantly higher elevation than the other collections we are reporting (see Figure 5). *Utricularia minor* was accompanied with *Carex* aff. *divisa* Huds., *Chara* sp., *Hippuris vulgaris* L. and *Potamogeton pusillus* L.

Collection #4: *U. minor* L.

The fourth collection was again of *U. minor*. However, leaf characters (described below) are sufficiently interesting to merit discussing this specimen separately from collections #2 and 3.

The collection site was on Lasem Road, between Sol-e Bon and Arjomand Village, Firuzkuh, Tehran Province (E52°33'54.8", N35°45'55.2", 2100 m a.s.l.), approximately 57 km east-southeast of the *U. australis* site, and 22 km southeast of the Sagoon Lake *U. minor* site. The plants grew in a perennially wet meadow (area approximately 2 ha, pH=7.3), dominated by *Phragmites australis* (Cav.) Stend. (see Figure 6). Other accompanying plants are *Carex divisa* Huds., *Carex orbicularis* Boott, *Chara* sp., *Eleocharis uniglumis* (Link) Schult., *Epipactis palustris* (L.) Crantz, *Juncus artic-*



Figure 5: The Sahoon lake site for *U. minor*. Photograph by A. Naqinezhad.



Figure 6: The Lasem Road site for *U. minor*. Photograph by A. Naqinezhad.

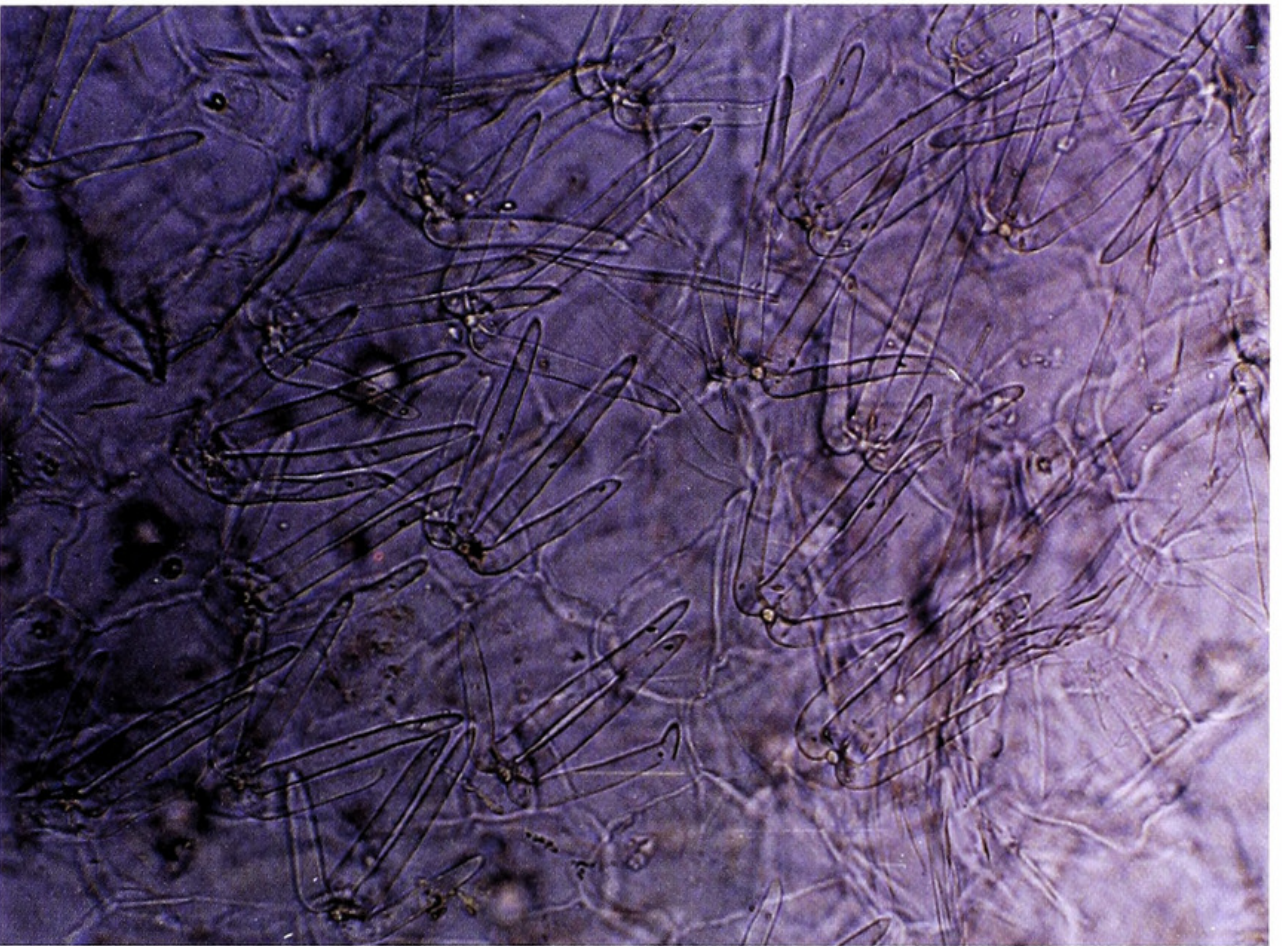


Figure 7: Quadrifid glands of *U. minor*, Lasem Road site, 200x. Photograph by A. Naqinezhad.



Figure 8: Two views of *U. minor* from the Lasem Road site. Photographs by A. Naqinezhad.

ulatus L., *Lythrum salicaria* L., *Mentha longifolia* (L.) Huds., *Schoenoplectus lacustris* and *Triglochin maritima* L.

The specimen (#BR060802, DAV) consists of a tangled mass of many delicate stolons, each 10-20 cm long. The leaves are 0.15-0.5 cm long, mostly palmately but also dichotomously divided to 8-16 terminal leaflets. Bladders are relatively infrequent, but are present on occasional bladder-rich shoots so there is a weak but clear shoot dimorphism in the specimen. Under 20× magnification, the terminal leaflets are moderately to strongly flattened, with acute tips. Apical setulae are present, as are the occasional lateral setulae. These setulae are uncommon, only 1 (or rarely 2) are present on 25-50% of all ultimate leaf segments, but they are well developed, i.e. the length of each setula is approximately 1/3-1/2 the width of the leaf segment it is mounted upon. The setulae are usually set on small teeth, approximately as long as the setula itself. Three inflorescences are present on the collection, are 10-18 cm long, and bear 5-9 flowers each. The flower is approximately 8 mm long, and yellow.

This specimen is somewhat confusing. The highly flattened leaves, presence of lateral setulae on marginal teeth, and acute leaf tips argued for an identification as *U. ochroleuca* Hartm. However, the number of setulae was somewhat low. Under high power, the quadrifid glands revealed a great surprise as they are entirely and exclusively consistent with *U. minor* (see Figure 7). It was difficult to determine the nature of the flower spur from the pressed specimens, but photographs of them show that the spur is relatively short and confirms the *U. minor* identification (see Figure 8).

In conclusion, this specimen is an interesting case of a variant population of *U. minor* with more flowers per inflorescence than is typical (Taylor (1989) reports 2-6 flowers/inflorescence), and a peculiar presence of apical setulae.

Conservation notes:

Although all of studied sites belong to Iranian protected areas (Lar National Park and Central Alborz protected area), some of these sites are under threat of human destruction, intensive grazing and degradation. The occurrence of such wetland sites in the steppe habitats of Central Alborz range demonstrates its high level of biodiversity importance. These sites are wet habitats with a patchy distribution over Alborz and therefore must be precisely considered as a refuge habitats of some rare aquatic species such as *Utricularia minor*. The different sites are located in different watersheds (separated by the 5671 m tall Mount Damavand), which offers them a certain amount of protection.

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