

***Botrychium crenulatum*** W. H. Wagner**DAINTY MOONWORT****FAMILY:** *Ophioglossaceae*, the adder's-tongue family.**SYNONYMS:** *Botrychium lunaria* (misapplied)**STATUS:****Heritage Program SENSITIVE LIST, ranks: G3 S1?****USFWS/ESA:** species of concern. **STATE OF NEVADA:** none. **BLM:** Special Status Species in Nevada.**USFS:** Humboldt-Toiyabe NF and Inyo NF Sensitive Species. **NNNPS:** watch list.**POPULATION CENSUS (NEVADA):** **6 occurrences mapped** at 1.0 km (0.6 mi) separation, **OR 8 occurrences mapped** at 0.16 km (0.1 mi) separation; total estimated **individuals unknown**, total estimated **area 1.7+ ha (4.2+ ac)**.**TREND:** unknown.**IMPACTS AND MAJOR THREATS (NEVADA):** No summary available (see references).**INVENTORY EFFORT (NEVADA):** Not yet systematically surveyed in Nevada. Most recent entered survey 1998, average year of last survey 1982. **Years since last entered survey** (percent of mapped records at various survey ages): **0-5 yrs:** 37.5%; **6-10 yrs:** 37.5%; **51+ yrs or unknown:** 25%.**LAND MANAGEMENT (NEVADA)** in decreasing predominance: Humboldt-Toiyabe National Forest, designated wilderness.**RANGE:** Clark, Elko (?), Esmeralda (?), Lander (?), Lyon (?), Mineral (?), Nye (?), and White Pine (?) counties, Nevada; also in AZ, CA, ID, MT, OR, UT, WA, and WY. Likely occurs in isolated pockets in many of the higher and wetter mountains of Nevada. Maximum Nevada **range dimension 7.1 km (4.4 mi)** excluding most disjunct record.**ELEVATIONS RECORDED (NEVADA):** 8202-11150 feet (2500-3399 meters).**HABITAT:** Aquatic or wetland-dependent in Nevada.**PHENOLOGY:** fertile late-spring. Range of most frequent **survey months:** July-August.**LIFE-FORM AND HABIT:** small cormous fern-ally.**DESCRIPTION:** Wavy Moonwort is a small, perennial fern with a single aboveground frond. The frond is usually 10 cm or less tall, yellow-green, and divided into two segments which share a common stalk. The mostly sterile segment is once pinnatifid with usually three or four well separated pairs of thin textured, broadly fan-shaped pinnae which have distinct veins and crenulate margins. The fertile segment is longer than the sterile segment, is branched (often like a tiny Christmas tree), and bears grape-like sporangia. Spores germinate underground and develop into minute, subterranean, non-photosynthetic gametophytes which depend on an endophytic fungus for nourishment.**Distinguishing features:** Yellow-green color and well separated, thin textured, broadly fan-shaped pinnae with crenulate margins and prominent veins are diagnostic of *B. CRENULATUM*. It may be easily confused with *B. ASCENDENS*, *B. LUNARIA*, and *B. MINGANENSE*. Reliable field determination of moonworts depends on the careful use of technical keys and comparison with silhouette outlines of verified specimens. Identification can be complicated because there is often a high degree of morphological variability between individuals in a population and between populations of the same species; several species may grow together at the same site, and the few diagnostic characters may not be apparent in small plants.**PHOTOGRAPHS:** Nevada Natural Heritage Program images web page (1998-present).**ILLUSTRATIONS:** none known.**OTHER GENERAL REFERENCES** (listed separately): Flora of North America editorial Committee (1993), Hickman (1993), Sada and Nachlinger (1996).**SPECIFIC REFERENCES:**Paris, C. A., F. S. Wagner and W. H. Wagner, Jr. 1989. Cryptic species, species delimitation, and taxonomic practice in the homosporous ferns. *American Fern Journal* 79: 46-54.Wagner, W. and F. Wagner. 1986. Three new species of moonworts (*Botrychium* subgenus *Botrychium*) endemic in western North America. *American Fern Journal* 76(2): 33-47.Wagner, W. H., Jr., and F. S. Wagner. 1981. New species of moonworts, *Botrychium* subg. *Botrychium* (*Ophioglossaceae*), from North America. *American Fern Journal* 71: 20-30.Wagner, W. H., Jr. and F. S. Wagner. 1990. Notes on the fan-leaflet group of moonworts in North America with descriptions of two new members. *American Fern Journal* 80: 73-81.Wagner, W. H. and F. S. Wagner. 1993. *Ophioglossaceae*. Pages 85-106 in: Flora of North America editorial Committee. Flora of North America vol. 2. New York: Oxford University Press.Wagner, W. H., Jr., F. S. Wagner, C. Haufler and J. K. Emerson. 1984. A new nothospecies of moonwort (*Ophioglossaceae*, *Botrychium*). *Canadian Journal of Botany* 62: 629-634.