

Botrychium crenulatum

CRENULATE MOONWORT

Family: Ophioglossaceae

Agency Status:

US Fish & Wildlife Service: None (former C2 candidate for listing under the Endangered Species Act).

US Forest Service: Region 4 Sensitive

Heritage Rank:

Global: G3

State: S1

Range Context: Widespread/Edge; peripheral

Wyoming Contribution Rank: Low

Description: Crenulate moonwort is a perennial fern relative, mostly 10 cm or less tall with a single leaf divided into two dissimilar segments. The vegetative (sterile) segment is yellowish-green, averages 2 cm long (0.5-6.5) and 1.2 cm wide and is pinnately divided into 3-5 pairs of non-overlapping, wedge-shaped pinnae with entire to round-toothed margins. The spore-bearing (fertile) fronds are once to twice-pinnate and ca 1.5-3 times longer than the sterile fronds, and both segments arise from a common stem ca 1/2 the length of the entire leaf (Wagner and Wagner 1981, 1993, Farrar and Popovich 2012).

Local field characters: Mature specimens with well-developed, fully expanded leaves are needed for identification.

Similar Species: *Botrychium lunaria* has numerous leaflets that overlap. *Botrychium ascendens* has wedge-shaped, upward-directed leaflets with more sharply-toothed margins.

Phenology: July-August.

Distribution: Occurs from British Columbia and Alberta south to California and Arizona, as well as Ontario and Minnesota. In Wyoming known from the Big Horn,



Above: *Botrychium crenulatum* by Ben Legler (12486 RM)



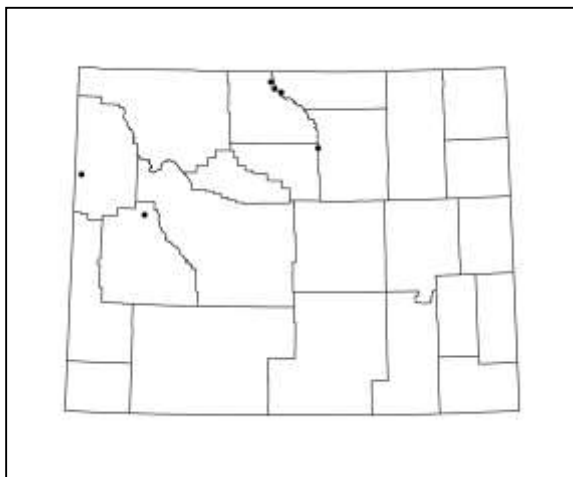
Left:
Botrychium crenulatum by Ben Legler

Habitat: Occupies some of the wettest habitat of species in the genus (Farrar 2011), including moist, open montane habitats, including damp meadows, boggy areas and marshes (Wagner 1981, Beatty et al. 2003). Wyoming populations are in wet meadows and wet *Picea engelmannii* forests.

Occurrences in Wyoming: Known from 6 extant occurrences in Wyoming, first discovered in 2008 (Heidel and Kesonie 2008). Previous reports were based on inference (Wagner and Wagner 1993) or on material later redetermined as *B. ascendens*.



Above: Rangewide distribution of *Botrychium crenulatum* from USDA, NRCS. The PLANTS Database (<http://plants.usda.gov>). National Plant Data Team, Greensboro, NC 27401-4901 USA.



Above: Wyoming distribution of *Botrychium crenulatum*

Abundance: All but one occurrence had fewer than 10 plants (35 maximum observed).

Trends: Unknown.

Protection Status: The only known occurrences are on public land managed for multiple use.

Threats: Unknown.

Managed Areas: Occurs on lands managed by the Bighorn, Bridger-Teton and Targhee National Forests.



Botrychium crenulatum habitat by Ben Legler

References:

Beatty, B. L., W. F. Jennings, and R. C. Rawlinson. 2003. *Botrychium ascendens* (trianglelobe moonwort), *B. crenulatum* (scalloped moonwort), and *B. lineare* (narrowleaf grapefern): A Technical Conservation Assessment. USDA Forest Service, Rocky Mountain Region.

<http://www.fs.fed.us/r2/projects/scp/assessments/Botrychiumlineare.pdf>.

Evert, E. F. 2010. Vascular Plants of the Greater Yellowstone Area: Annotated Catalog and Atlas. Park Ridge, IL.

Farrar, D. R. 2011, December last update. *Botrychium lunaria* var. *crenulatum* species description, map, and photo page. In Farrar, D.R. 2011, December last update. Moonwort (*Botrychium*) systematics. Department of Ecology, Evolution and Organismal Biology, Iowa State University, Ames. Online. Available:

<http://www.public.iastate.edu/~herbarium/botrychium.html>

Farrar, D. R. and S. J. Popovich. 2012. Ophioglossaceae. Pages 24-35 Colorado Flora: Eastern Slope, fourth edition. W.A. Weber and R.C. Wittmann. University Press of Colorado, Boulder, CO.

Heidel, B. and D. Kesonie. 2008. Teton Canyon botanical survey, Caribou-Targhee National Forest. Unpublished report prepared for Targhee National Forest by the Wyoming Natural Diversity Database, Laramie, WY.

Wagner Jr., W. H. and F. S. Wagner. 1981. New species of moonworts, *Botrychium* subg. *Botrychium* (Ophioglossaceae), from North America. American Fern Journal 71:20-30.

Wagner Jr., W. H. and F. S. Wagner. 1993. Ophioglossaceae. Pages 85-106 in Flora of North America Editorial Committee, editor. Flora of North America North of Mexico. Vol. 2. Pteridophytes and Gymnosperms. Oxford University Press, New York, NY.

Original author: Walter Fertig 2001-07-10

Update authors: Joy Handley and Bonnie Heidel 2008-11-13 and 2015-03-03

Extracted from database: 18-MAY-15