

Botrychium lineare

SLENDER MOONWORT

Family: Ophioglossaceae

Agency Status:

US Fish & Wildlife Service: None (petitioned; listing denied).

US Forest Service: Region 2 Sensitive

WY Bureau of Land Management: Sensitive

Heritage Rank:

Global: G2G3

State: S1

Range Context: Regional Endemic/Disjunct

Wyoming Contribution Rank: Medium

Description: Narrowleaf moonwort is a perennial fern relative 18-21 cm tall with a single, pale green leaf divided into two dissimilar segments. The vegetative (sterile) segment is 6-18 cm long and once-pinnately compound with 4-6 widely spaced pairs of linear leaflets (pinnae) with parallel sides and bluntly toothed to lobed tips (these often spreading, but not fan-like). The lowest leaflet is usually larger than those higher up the leaf segment. The spore-bearing (fertile) segment is longer than the vegetative segment and once-pinnately divided into leaflets bearing round, grape-like sporangia. Vegetative and spore-bearing segments are joined to a common basal stem at or above the midpoint of the entire leaf (Spackman et al. 1997, Wagner and Wagner 1993, Farrar and Popovich 2012).

Local field characters: Vegetative leaf segments (trophophores) with 4-6 widely spaced, linear leaflets having smooth sides and lobed tips are characteristic.

Similar Species: *Botrychium campestre* has more narrowly wedge-shaped leaflet tips with the margins only shallowly cleft and the lowest leaflet is usually not the largest. *B. ascendens* has fan-shaped leaflets with finely toothed margins (it is hypothesized to be a hybrid between *B. lineare* and *B. crenulatum*; Farrar 2007).



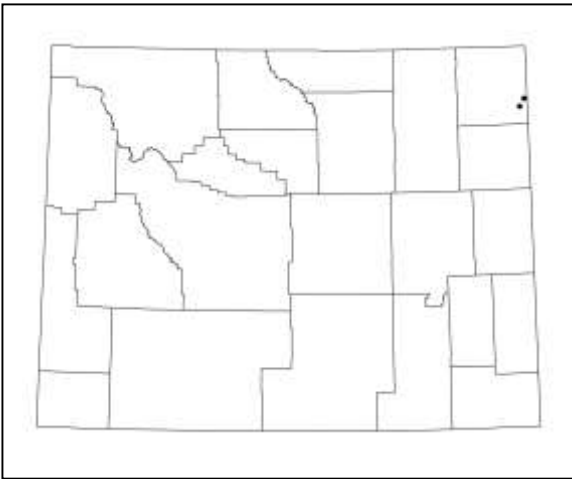
Above: *Botrychium lineare* by Ben Legler

Phenology: Late May-early July.

Distribution: Occurs from Alaska and Yukon Territory, south to California, and east to Montana, the Black Hills of South Dakota and Wyoming, and Utah; also intermittently in eastern North America. In Wyoming, known in the Black Hills (Crook County).



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



Above: Wyoming distribution of *Botrychium lineare*



Above: Habitat of *Botrychium lineare* by Cheryl Mayer

Habitat: Open meadows, rocky slopes, bare-soil roadsides and old road beds, and earthen dams (Farrar and Popovich 2012). Wyoming populations are in grassy open to partly shaded valley bottoms on loamy soils derived from limestone, in settings that were formerly disturbed, including road beds.

Occurrences in Wyoming: Known from two extant occurrences in Wyoming (last observed in 2010), and

one other occurrence that botanists have failed to relocate.

Abundance: The highest number observed at the extant site is 31 plants, though this might include related species.

Trends: One population may have been extirpated by earth-moving equipment installing a fire line.

Protection Status: The two extant occurrences are in Dugout Gulch Special Botanical Area.

Threats: Unknown.

Managed Areas: Occurs on lands managed by Black Hills National Forest.

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> .

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.

U.S. Fish and Wildlife Service. 2007. Endangered and threatened wildlife and plants: review of native species that are candidate for listing as endangered or threatened; annual description of progress on listing actions; Proposed Rule.

Wagner, W.H., Jr., and F.S. Wagner. 1994. Another widely disjunct, rare and local North American moonwort (Ophioglossaceae: *Botrychium* subg. *Botrychium*). American Fern J. 84(1): 5-10.

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