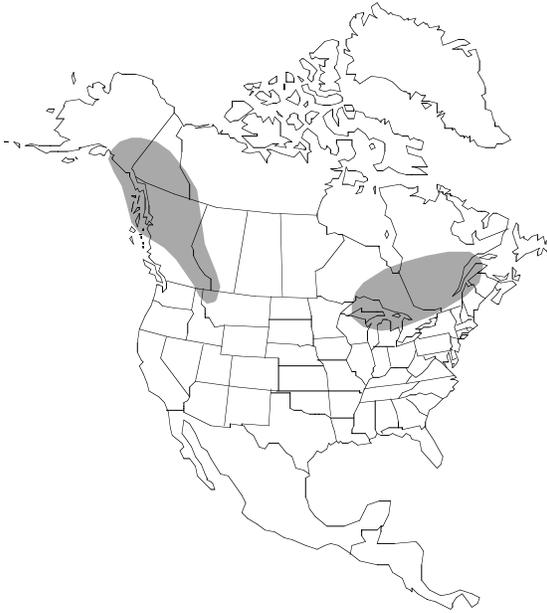


## ***Botrychium spathulatum***

**Family:** Ophioglossaceae  
**Genus:** *Botrychium*  
**Subgenus:** *Botrychium* (syn. *Eubotrychium*)  
**Species:** *Botrychium spathulatum* W. H. Wagner  
**Common Name:** Spatulate Moonwort  
**Ploidy:** Tetraploid



**Published description:** Similar to *B. minganense*. Blade color yellowish-green, outline narrowly deltoid, the lowest pinnae the largest. Pinna pairs (2) 4—5 (7), spatulate to flabellate, widest at apex, the basal pinnae the largest and commonly folded over the rachis, the pinnae mostly separate to remote, somewhat ascending and oblique, the corners rounded to angular. Pinna stalks narrowly adnate 1/4 to 1/3 of the pinna width. Outer pinna margins commonly cleft with wide sinuses. Sporophore length/trophophore length 1.2—1.8. Sporangia mostly mature by late June (northern Michigan). Sporangium diameter (1-) 1.2—1.4 (-1.7) mm. Chromosomes  $n = 90$ . (Wagner and Wagner 1990)

## Identification

*B. spathulatum* can be differentiated from *B. minganense* as well as *B. gallicomontanum* and *B. pallidum* by its sessile trophophore with the basal pinnae the largest and pinnae margins that are rounded and entire, or if dissected, irregularly so with segment margins rounded and entire. It most closely resembles *B. ascendens* which also may have a sessile trophophore with basal pinnae the largest, but in *B. ascendens* the outer pinna margin is coarsely toothed, and if divided into segments, pinnae of *B. ascendens* are symmetrically cleft into two or four spreading lobes with toothed outer margins. Additional characters differentiating these two species are listed below.

Character	<i>B. spathulatum</i>	<i>B. ascendens</i>
Trophophore stalk	sessile	sessile to short-stalked
Pinna outline	spatulate to fan-shaped	fan-shaped
Junction of the lower side margin with the outer margin	rounded	sharply angled
Lobing of pinnae, if present	irregularly cleft into non-spreading lobes	regularly cleft into 2 to 4 spreading lobes
Outer pinna margins	entire to dentate to shallowly lobed	regularly dentate
Pinna dentations, if present	rounded	pointed
Sporophore branches	loose, angling away from rachis	dense, lying closely along the rachis
Basal sporophore branches	often branched and twisted (so that sporangia project outward or downward)	seldom branched or twisted (sporangia project upward)
Spore size	45.52 $\mu\text{m}$ (42—49)	42.06 $\mu\text{m}$ (37—46)

## Distribution

*Botrychium spathulatum* was reported to occur around the margins of the upper Great Lakes and lower James Bay, in the St. Lawrence Valley, and in the western mountains from northwest Montana to Alaska. Because of the similarity of the species to western forms of *B. ascendens* and *B. minganense* the western occurrences have been questioned. However recent collections from Alaska, the Yukon and Southeastern British Columbia have proved to be genetically identical to *B. spathulatum* from the Great Lakes, confirming the widespread occurrence of this taxon in northwestern North America.

## Habitat

The habitat where *B. spathulatum* is most common and robust is on stabilized but sparsely vegetated sand dunes and grassy meadows along the shores of the upper Great Lakes and lower James Bay. It has also been found along railroad tracks on the north shore of Lake Superior. In the west it occurs in stabilized maritime dunes near sea level on Kruzof Island in southeastern Alaska, in grassy flats at mid elevations in British Columbia and Alberta, and in sparsely vegetated slopes in the subalpine zone in the Yukon. It frequently grows in the company of a diversity of moonwort species.

Additional photographs of *Botrychium spathulatum*:



From Michigan



From Michigan



From British Columbia



From Kruzof Island, Alaska