Botrychium pinnatum

Family: Ophioglossaceae
Genus: *Botrychium*
Subgenus: *Botrychium* (syn. *Eubotrychium*)
Species: *Botrychium pinnatum* H. St. John
Synonym: *Botrychium boreale* J. Milde subsp. *obtusilobum* (Ruprect) R. T. Clausen
Common name: Northwestern moonwort
Ploidy: Tetraploid

Published description: Plant slender or stout, 3-12 cm high; [common stalk] 3-7 cm tall; the sterile segment sessile or on large plants short stalked, not glaucous, once pinnate or on large plants twice pinnate, the blade oblong or somewhat narrowed to the tip, the simply pinnate blades having 7-11 pinnae which are sessile, broadly winged and confluent with the rachis, entire or frequently with large rounded pinnate lobings, the pinnae ovate or elliptical 3-5 mm long, prominently veined with twice forked veins; sterile segment of large plants ovate-deltoid, twice pinnate, 4 cm long, 3 cm wide, the pinnae pinnately cut and closely resembling the whole blade of a smaller plant; stalk of the fertile segment exceeding the sterile segment; fertile segment once to thrice pinnate, erect, narrow and with ascending branches; spores rounded tetrahedral 36-45 micrometers in diameter, rugose. (from H. St. John, 1929) Chromosomes n = 90. (F. S. Wagner, 1993)

Identification

Botrychium pinnatum and *B. lanceolatum* are the only pinnate-pinnatifid to twice pinnate moonwort species of the western contiguous United States that are lustrous, not glaucous. *B. pinnatum* can easily be differentiated from *B. lanceolatum* by its pinnately (rather than ternately) divided trophophore. Also unlike most allotetraploid species having *B. lanceolatum* as one parent, the sporophore of *B. pinnatum* is regularly pinnate whereas the sporophore of similar species (except *B. echo*) has a tendency to divide ternately into three large branches as it does in *B. lanceolatum*. Plants vary greatly in size with upper pinnae tending to be undivided in small plants, but all may be recognized by the above characters.

Prior to St. John's description of *B. pinnatum* this species was considered a subspecies (*obtusilobum*) of the European *B. boreale* and many herbarium collections and field records still bear this label. *B. boreale* differs from *B. pinnatum* in having shorter and broader (more triangular) pinnae with acute tips as is reflected in the subspecies name *obtusilobum*. A third species, *B. alaskense,* has morphology more or less intermediate between *B. pinnatum* and *B. boreale* (Grant and Wagner, 2002). *B. alaskense* can be distinguished from *B. pinnatum* by its sharply angular pinnae and ternately divided sporophore. *B. alaskense* is currently known only in Alaska. *B. boreale* does not occur in North America except in Greenland.

Distribution

Botrychium pinnatum occurs widely throughout western North America from high elevations in northern California, northern Nevada, northern Arizona, Utah and Colorado to near sea level in Alaska and northwestern Canada. Although rare in the southern part of its range, it increases in occurrence and abundance from Oregon and Montana northward. Though it occurs with many other moonwort species, it is seldom the most common moonwort at a given site.

Habitat

Botrychium pinnatum occurs in a range of habitats including closed canopy forests, but it is most commonly found in moist grassy sites in open forests and meadows. It often occurs near streams and other sites where soil moisture is constant.

Additional photographs of *Botrychium pinnatum*: