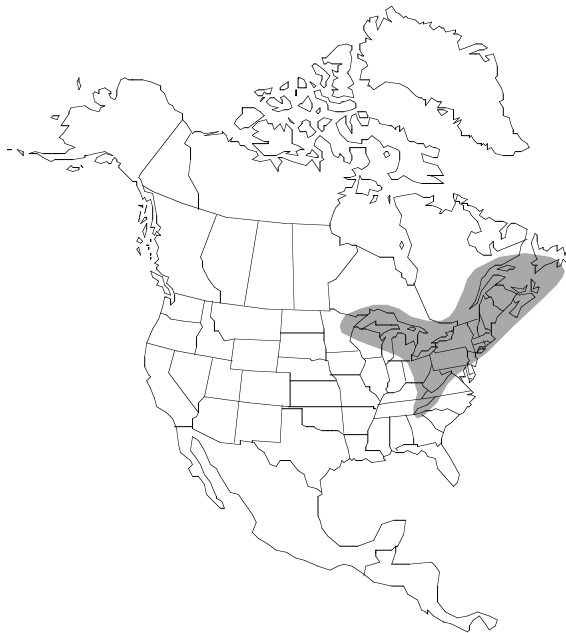


Botrychium lanceolatum

Family:	Ophioglossaceae
Genus:	<i>Botrychium</i>
Subgenus:	<i>Botrychium</i> (syn. <i>Eubotrychium</i>)
Species:	<i>Botrychium lanceolatum</i> (S. G. Gmelin) Angström
Subspecies:	<i>lanceolatum</i> , <i>angustisegmentum</i>
Common name:	Triangle Moonwort
Ploidy:	Diploid

Published description: Trophophore stalk 0-1 mm; blade dull to shiny green to dark green, deltate, 1-2 pinnate, to 6 x 7 cm. Pinnae to 5 pairs, ascending, approximate, distance between 1st and 2nd pinnae not or slightly more than between 2nd and 3rd pairs, linear to broadly lanceolate, entire to divided to tip, margins with distinct lobes or segments, apex acute to rounded, venation pinnate. Pinnae to 5 pairs, ascending, approximate, distance between 1st and 2nd pinnae not or slightly more than between 2nd and 3rd pairs, linear to broadly lanceolate, entire to divided to tip, margins with distinct lobes or segments, apex acute to rounded, venation pinnate. Sporophores 1-3 pinnate, 1-2.5 times length of trophophore, divided into several equally long branches (all other botrychiums have a single stalk or 1 dominant and 2 smaller). $2n = 90$.

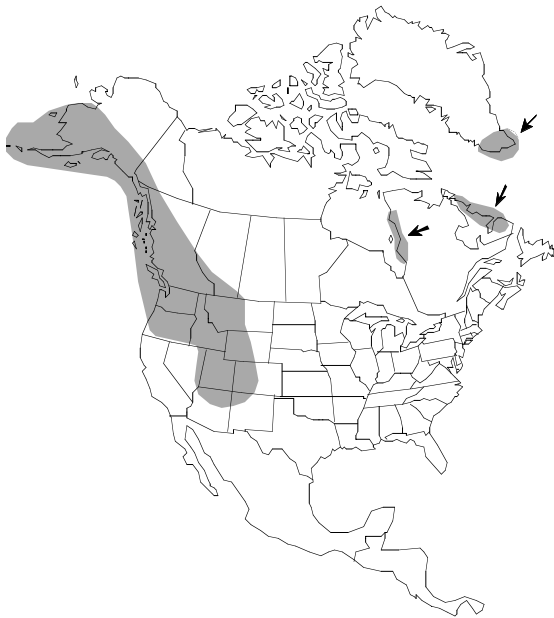
Subspecies *angustisegmentum*:



Published description: Differing from ssp. *lanceolatum* in being lax and membranous, with the divisions of the blade narrow, often more acute, 1-2.5 mm. wide, and with the spores slightly smaller, averaging 30u in diameter. (Claussen 1938)



Subspecies *lanceolatum*:



Published description: Plants stout and fleshy, glabrous, 6-42 cm. high; common stalk 4-15 cm. long; blade sessile or nearly so, inserted near the summit of the plant, 1-9 cm. wide, 1-6 cm. long, deltoid, with lanceolate segments 1-6 mm wide, of which the lowest pair is longest; fertile stalk 0.5-1 cm. long; fruiting spike paniculate, 1-5 cm. long; sporangia 0.8-1.5 mm. in diameter; spores 29-42 μ , averaging about 35 μ in diameter. Matures spores in midsummer, during July and August. (Claussen 1938)



Identification

All *B. lanceolatum* in western North America is subspecies *lanceolatum*. This subspecies is stouter, with thicker and broader trophophore segments than the eastern subspecies *angustisegmentum*. Both subspecies are easily recognized by their triangular trophophores with basal pinnae larger and more dissected than the one to three upper pinna pairs. The trophophore is sessile and shiny to dull green but never glaucous. The sporophore is also divided into three nearly equal segments and the sporangia, which mature later than most moonworts, are bright yellow at maturity. The sporophore stalk is shorter than the length of the trophophore. *Botrychium pinnatum*, *Botrychium alaskense* and *B. boreale* are the only other pinnate-pinnatifid moonworts with a lustrous surface comparable to that of *B. lanceolatum*. The trophophores of these species have a strong central axis with four or more pairs of pinnae.

Two distinct genotypes of *B. lanceolatum* subgenus *lanceolatum* can be recognized morphologically. One, designated herein as the red genotype, has red coloration extending throughout the common stalk and into the base of the trophophore. It has relatively narrow pinna segments and basal pinnae that curve upward. The other genotype, designated as the green genotype, usually has no red coloration, and if present, it does not extend into the trophophore. Pinna lobes of this genotype are broader and the basal pinna are straight.

Distribution

Botrychium lanceolatum subspecies *angustisegmentum* extends from the Great Lakes region east to Newfoundland and south to southern Ohio and, at high elevations, to eastern Tennessee.

Botrychium lanceolatum subspecies *lanceolatum* is broadly distributed in western North America from northern New Mexico and Arizona northward to southwestern Saskatchewan and Alberta, and through British Columbia and the Yukon to southern and western Alaska. It also occurs in northeastern Canada on the eastern shores of Hudson Bay in Quebec, on the northern coast of Labrador, in Newfoundland, and in southern Greenland. Possibly this subspecies extends southward to northern Maine (Gilman, personal communication). Plants presumed to be of this subspecies are also reported to occur in Scotland, Sweden, Siberia (Kamchatka) and Japan.

The red genotype of subspecies *lanceolatum* occurs from 9,000 ft. to treeline in Colorado, in Lake Clark, Denali, Katmai and Wrangell St. Elias National Parks in Alaska, Kluane National Park in Yukon Territory and in southern Greenland. It is not known whether this genotype is present at treeline habitats between Colorado and Alaska. The green genotype extends from lower elevations in Alaska to mid elevations in Oregon. More southern occurrences of *B. lanceolatum*, except in Colorado, have not been examined genetically, but all appear to be of the red genotype.

Habitat

Botrychium lanceolatum subspecies *angustisegmentum* is most commonly found in mesic deciduous woodlands under closed canopy. It also occurs in mesic coniferous forests.

Botrychium lanceolatum subspecies *lanceolatum* occurs in moist open woodlands, meadows and roadsides throughout most of its range. It is occasionally present in closed canopy coniferous forests. In Alaska where both red and green genotypes of subspecies *lanceolatum* occur, the green genotype tends to occur at lower elevations in more densely vegetated habitats; the red genotype tends to occur at higher elevations in sparsely vegetated habitats.

Additional photographs of *Botrychium lanceolatum* subspecies *lanceolatum*:



genotypes: green



green red



red