

**ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM**

Plant Abstract

Element Code: PPOPH01070

Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Botrychium lanceolatum* (S.G. Gmel.) Angstr.
COMMON NAME: Lanceleaf Grapefern, Triangle Grape-fern, Lance-leaved moonwort, Triangle moonwort
SYNONYMS: *Botrychium rutaceum* var. *lanceolatum* (S.G. Gmel.) T. Moore, *Osmunda lanceolata* (S.G. Gmel.), *Botrychium manshuricum*, *B. ramosum*
FAMILY: Ophioglossaceae

AUTHOR, PLACE OF PUBLICATION: Angstrom, J., Botaniska Notiser 1854: 68. 1854

TYPE LOCALITY: Scandinavia

TYPE SPECIMEN:

TAXONOMIC UNIQUENESS: There are 5 genera in Ophioglossaceae. The species *lanceolatum* is one of 35 in the genus *Botrychium*. Ten species occur in Arizona. The variety *lanceolatum* is one of two varieties and is found across Western North America. The other variety *angustisegmentum* is found across Eastern North America (Farrar, 2008) (USDA, NRCS, 2011).

DESCRIPTION: In the genus *Botrychium* the plants have solitary fronds that can be glabrous or pubescent and erect or reflexed. They consist of a simple, pinnatifid or pinnately compound sterile blade and a panniclelike fertile stalk. The species *Botrychium lanceolatum* are stout and fleshy, dark green ferns that stand 5-25 cm (2-10 inches) tall and consists of a slender, smooth, pale green stalk that is about 3 inches long. The rootstock is erect; the roots grow smooth, fleshy and numerous in deep, tangled masses. The bud is glabrous and smooth and during formation (vernation) both the sterile and fertile parts are reflexed. The sterile segment is closely sessile, and the once or twice pinnately or ternately divided blades are inserted at the top of a long common stalk. The blade is 3-10 cm (1.2-4 inches) long and much shorter than the leaf stalk; the large forms are broadly triangular (deltoid) and the smaller forms are three lobed. The frond is 7.6-20.3 cm (3-8 inches) long, it is semi-erect, smooth, fleshy and darkish green; glabrous and triangular and pinnate-pinnatifid; there are 4-5 primary divisions of the blade and the segments are sharp-pointed or blunt. The fertile segment is 1-5 cm long, bi-tripinnate and overlaps the sterile blade. The sporophyll appear in clusters and are slightly widespread; the spore cases are a greenish yellow. The variety *lanceolatum* has a common green stalk and a trophophore segment that is

somewhat shiny and medium green to yellow-green. It is a somewhat stout plant with a 1.2cm diameter including sheath and leaf base and is often 1-6 times the width of the stalk (dried). Segments are 2-3 cm wide and ultimate lobes are broadly ovate-oblong. Pinnae and lobes are somewhat blunt. Sporangia is exposed, not immersed (Cobb, 1963) (eFloras, 2008) (Harrington, 1954).

AIDS TO IDENTIFICATION: There are at most 5 pairs of pinnae; distance between 1st and 2nd pinnae is equal to or slightly more than between 2nd and 3rd pinnae; linear to broadly lanceolate and entire to divided tip; margins include distinct lobes or segments and are sharp-pointed or blunt. Sporophores are divided into several equally long branches in comparison to all other botrychiums which have a single stalk or a single dominant with 2 smaller stalks (eFloras, 2008). The variety *lanceolatum* is stouter and has thicker and broader trophophore segments which are also green to pale yellow green (Farrar, 2008). The very broadly triangular shape sets *Botrychium lanceolatum* apart from other *Botrychium* found in the Four Corners states (SWColoradoWildflowers 2016).

ILLUSTRATIONS:

Herbarium mounts at

<http://swbiodiversity.org/seinet/taxa/index.php?taxon=Botrychium%20lanceolatum>

Line drawing of plant and parts (USDA at

http://plants.usda.gov/java/largeImage?imageID=bola_001_avd.tif)

Line drawing of plant (USDA at

http://plants.usda.gov/java/largeImage?imageID=bola_003_avd.tif)

Color photo of plant (USDA at

http://plants.usda.gov/java/largeImage?imageID=bola_002_avp.tif)

Line drawing (Laura Louis Foster, in Boughton Cobb's A Field Guide to Ferns and their related families, 1963: Page 185 Fig. 2.d.)

TOTAL RANGE: Found solely in the Northern Hemisphere it ranges from Eurasia to North America and goes as far South as Arizona, New Mexico and West Virginia. The variety *lanceolatum* is found in Western North America from Southern and Western Alaska and the Yukon through British Columbia to Southwestern Saskatchewan and Alberta and Southward to Northern New Mexico and Arizona. It can also be found in Northeastern Canada and Southern Greenland (Clausen, 1938) (Farrar, 2008).

RANGE WITHIN ARIZONA: Apache County: Mt. Baldy, White Mountains. Fort Apache Indian Reservation. Coconino County, San Francisco Peaks, Inner Basin, 0.3 km SW of Fremont Pass (Reeves, 1977).

SPECIES BIOLOGY AND POPULATION TRENDS

GROWTH FORM: Small perennial fern

PHENOLOGY: The active growth period is when new fronds appear in the spring and lasts through the summer (USDA, NRCS, 2011).

BIOLOGY: The growth form is rhizomatous and the after harvest re-growth rate is slow. Its anaerobic tolerance is moderate; fire tolerance is high but has no drought tolerance. The minimum temperature is -33 °F and the minimum frost free days is 90. Precipitation minimum is 32 inches and maximum is 60 inches. The root depth minimum is 10 inches (USDA, NRCS, 2011).

HABITAT: Open, sunny mountain balds or meadows with such a climate as the San Francisco Peaks and Mount Baldy. Both areas lie in Arizona's plateau section and experience high annual precipitation and low temperature in comparison to the rest of Arizona. The specimens collected in the Reeves report were most rampant in barren, gravelly spots or growing through lichens or mosses.

ELEVATION: 2900 to 3550 m (9514-11646 ft) in Arizona (Reeves, 1977). 0 to 3700 m (0-12135 ft) Range-wide (Flora of North America 2016).

EXPOSURE: Open mountain balds or meadows.

SUBSTRATE: Adapted to fine and medium textured soils (USDA, NRCS, 2011). In all specimens collected in Reeves report, the soil was devoid of competing vegetation in the immediate vicinity of *Botrychium*.

PLANT COMMUNITY: Found in communities that occur in meadows at 9,000 feet above timberline. At San Francisco Peaks it occurs with other *Botrychium*, *B. boreale*, *B. dusenii*, *B. lunaria*. Surrounded by spruce-aspen forest; shrubs include *Juniperus communis* (Common Juniper), *Lonicera involucreta* (Twinberry Honeysuckle), and *Ribes* sp (Currant)., Herbaceous angiosperms include *Anemone globosa* (Pacific Anemone), *Arenaria fendleri* (Fendler's Sandwort), *Carex* sp (Sedge)., *Castilleja linariifolia* (Wyoming Indian Paintbrush), *Fragaria ovalis* (Virginia Strawberry), *Lathyrus arizonicus* (Nevada Pea), *Poa fendleriana* (Muttongrass), *Potentilla pulcherrima* (Beautiful Cinguefoil), *Pseudocymopterus montanus* (Alpine False Springparsley), *Solidago decumbens* (Dwarfe Goldenrod), *Solidago multiradiata* (Rocky Mountain Goldenrod), *Swertia radiata* (Elkweed), and *Zigadenus elegans* (Mountain Deathcamas). Agassiz Peak at San Francisco Peaks- dominant ground cover is *Geum turbinatum* (Ross' Avens). Associated herbaceous species are *Arenaria rubella* (Beautiful Sandwort), *Festuca ovina* (Alpine Fescue), *Mertensia franciscana* (Franciscan Bluebells), *Polemonium viscosum* (Sticky Polemonium), *Pseudocymopterus montanum* (Alpine False Springparsley), *Ribes montigenum* (Gooseberry Currant), *Saxifraga flagellaris* (Whiplash Saxifraga), *Saxifraga rhomboidea* (Diamond Saxifraga), *Sedum rhodanthum* (Redpod Stonecrop), *Sibbaldia procumbens* (Creeping Subbaldia), *Silene acaulis* (Moss Champion), and *Solidago multiradiata*

(Rocky Mountain Goldenrod). Mount Baldy associated species include *Achillea lanulosa* (Western Yarrow), *Arenaria fendleri* (Fendler's Sandwort), *Draba helleriana* (Heller's Draba), *Festuca ovina* (Alpine Fescue), *Heuchera parvifolia* (Littleleaf Alumroot), *Pedicularis parryi* (Parry's Lousewort), *Potentilla diversifolia* (Varileaf Cinquefoil), *Pseudocymopterus montanus* (Alpine False Springparsley), *Sedum rhodanthum* (Redpod Stonecrop), *Solidago parryi* (Parry's Goldenrod), and *Zigadenus virescens* (Green Deathcamas). (Reeves, 1977)

POPULATION HISTORY AND TRENDS: After harvest, re-growth rate is slow.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: None.

STATE STATUS: None.

OTHER STATUS: None.

MANAGEMENT FACTORS: Although *Botrychium lanceolatum* ssp. *lanceolatum* occurs across Western North America, within the range it is rare and local. (NatureServe, 2010)

PROTECTIVE MEASURES TAKEN: None.

SUGGESTED PROJECTS: Field surveys at known locations should be conducted to verify if species is extant.

LAND MANAGEMENT/OWNERSHIP: United States Forest Service, Coconino National Forest, Apache-Sitgreaves National Forest; BIA White Mountain Apache Indian Reservation.

SOURCES OF FURTHER INFORMATION

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ADDITIONAL INFORMATION:

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