



Common Name: BLACK-SPORED QUILLWORT

Scientific Name: *Isoetes melanospora* Engelman

Other Commonly Used Names: black-spored Merlin's grass

Previously Used Scientific Names: none

Family: Isoetaceae (quillwort)

Rarity Ranks: G1/S1

State Legal Status: Endangered

Federal Legal Status: Endangered

Federal Wetland Status: OBL

Description: Perennial **herb** with a bulb-like base and forking roots. **Leaves** usually 1 - 3 inches (3 - 8 cm) tall, very narrow with a pointed tip and a wide base that overlaps with other leaf bases to form a round, bulb-like underground base; each leaf contains 4 hollow air chambers separated by partitions. **Spores** are produced in a cavity (**sporangium**) in the leaf base, the cavity completely covered by a translucent membrane (**velum**) and containing dozens of tiny black to light gray female **megaspores**, approximately 0.3 - 0.4 mm wide, with slightly dimpled surface ornamentation (seen with 30x magnification). Male **microspores**, which are produced on separate leaves, are also present but are dust-sized and indistinguishable without much higher magnification.

Similar Species: Quillworts are distinguished from flowering, wetland plants by their spongy leaves with conspicuous cross-walls and by the presence of sporangia in the flared base of the leaves. Piedmont quillwort (*Isoetes piedmontana*) occurs in muddy seeps on granite outcrops. Its leaves are 2¾ - 6 inches (7 - 15 cm) long with brown to blackish bases; its megaspores are larger than black-spored quillwort's and have a conspicuously dimpled ornamentation; Piedmont quillwort's sporangium is only partially covered by the velum. Black-spored quillwort occurs with Piedmont quillwort (*Isoetes piedmontana*) on several outcrops and has been known to hybridize with it.

Related Rare Species: Mat-forming quillwort (*Isoetes tegetiformans*) occurs in similar habitats but it is smaller, with unusual, alternating leaves distributed along a horizontal rootstalk, and has smaller megaspores (see full species account elsewhere on this website). Black-footed quillwort (*I. melanopoda*, Special Concern) has leaves 2¾ - 18 inches (7 - 45 cm) long, black leaf bases, and white female spores; it occurs in shallow pools on granite outcrops, in seepy areas on Altamaha Grit, and in wet, clay soils of Coosa Valley flatwoods. Populations of an undescribed *I. piedmontana*-like taxon occur in shallow pools on several rock outcrops in eastern Alabama and in Coffee County, Georgia; these plants are larger than black-spored quillwort and have larger megaspores with conspicuously dimpled megaspore ornamentation and partial velum coverage of the sporangia. Nine quillwort species are listed or considered of Special Concern in Georgia. Six of these are included on this website: Boom's quillwort (*I. boomii*), Georgia quillwort (*I. georgiana*), winter quillwort (*I. hyemalis*), rush-leaved quillwort (*I. junciformis*), black-spored quillwort (*I. melanospora*), and mat-forming quillwort (*I. tegetiformans*).

Habitat: Shallow, temporarily flooded, flat-bottomed pools formed by natural erosion on granite outcrops. The pools are seasonally inundated by winter and early spring rains and by seepage from surrounding habitats; they are usually completely dry during the summer and fall.

Life History: Quillworts are seedless, non-flowering plants that reproduce by spores. Quillworts have a short, fleshy, rootstock called a corm; leaves are produced on the upper surface of the corm, roots on the lower surface. The leaves disappear during dry periods; however, the corm is still alive and will begin to produce leaves when there is adequate water. Spores are produced in chambers at the base of the leaves in May and June and are released from the chamber when the leaf base deteriorates during summer's dry, hot weather. Spores usually remain near the parent plant but may be dispersed by flowing water or insects. Some leaves produce megaspores, which crack open to expose tiny egg-producing structures; other leaves produce microspores, which develop sperm-producing structures. Egg and sperm unite and form new plants.

Survey Recommendations: Plants are visible throughout the winter and spring and following rainy periods in the summer.

Range: Black-spored quillwort is endemic to the Piedmont of Georgia and South Carolina. The South Carolina population is atypical, however, and may involve hybridization with *Isoetes piedmontana*.

Threats: Quarrying of granite outcrops, trash dumping, off-road-vehicle use, horseback riding, cattle trampling, and development of woodlands surrounding granite outcrops. Within the pools, the exotic species weak buttercup (*Ranunculus pusillus*) and water-starwort (*Callitriche heterophylla*) are competing with black-spored quillwort and associated rare species; in areas surrounding the outcrops, Japanese honeysuckle (*Lonicera japonica*) and Chinese privet (*Ligustrum sinense*) are the biggest threats.

Georgia Conservation Status: Approximately 13 populations, 4 on conservation land, are known. At least 5 have been destroyed by quarrying.

Conservation and Management Recommendations: Protect granite outcrops from quarrying, trash dumping, and off-road-vehicle use. Direct foot traffic away from rare plant sites and rock pools. Create no-impact buffer zones and limit development around outcrops. Eradicate exotic pest plants.

Selected References:

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