



Common Name: RUSH QUILLWORT

Scientific Name: *Isoetes junciformis* D.F. Brunton & D.M. Britton

Other Commonly Used Names: none

Previously Used Scientific Names: none

Family: Isoetaceae (quillwort)

Rarity Ranks: G1?/S1?

State Legal Status: Special Concern

Federal Legal Status: none

Federal Wetland Status: none

Description: Perennial **herb**, forming robust tufts of leaves. **Rootstock (corm)** rounded, with two lobes. **Leaves** 10 - 15¾ inches (25 - 40 cm) long, stiffly erect to somewhat curved, pale grayish lime-green except at base, where pale pinkish-purple. **Spores** are produced in the **sporangium**, a brown-streaked chamber about ¼ inch (7.5 mm) long in the leaf base, with a transparent membrane (**velum**) covering almost 40% of the chamber opening. Dozens of tiny **female spores (megaspores)**, approximately 0.5 mm across and covered with a dense pattern of broad, low, broken ridges, may be seen with 25-30x magnification. Much smaller **male spores (microspores)** are produced on separate leaves but are 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. Blackfoot quillwort (*Isoetes melanopoda*) occurs in habitats similar to rush quillwort's, and has similar leaves, but its velum usually covers less than 15% of the chamber opening; its megaspores are smaller and are more plainly patterned. Southern quillwort (*I. flaccida*) occurs in habitats similar to rush quillwort's and also occurs in the southwest portion of Georgia's Coastal Plain; it has long, flaccid, dark green leaves (4 - 24 inches, 10 - 60 cm) that are sprawling, not erect; its velum completely covers the spore chamber, which is colorless, not streaked with brown and its megaspores are smaller. Engelmann's quillwort (*I. engelmannii*) also has long leaves (10 - 24 inches, 25 - 60 cm) and its velum covers 30-60% of the chamber opening; it is the most common quillwort in Georgia but is found mostly in the Piedmont. Appalachian quillwort (*I. appalachiana*) has megaspores with more distinctively thin-walled, reticulate ornamentation patterns. Boom's quillwort (*I. boomii*) and Georgia quillwort (*I. georgiana*) both have larger, more coarsely ornamented megaspores and more extensive velum coverage.

Related Rare Species: Nine quillwort species are listed or considered of Special Concern in Georgia. Included on this website are: Boom's quillwort (*Isoetes boomii*), Georgia quillwort (*I. georgiana*), winter quillwort (*I. hyemalis*), rush quillwort (*I. junciformis*), black-spored quillwort (*I. melanospora*), and mat-forming quillwort (*I. tegetiformans*).

Habitat: Seasonally flooded open swales adjacent to floodplain swamps, submerged with flowing water during spring rains but often completely drying as summer approaches.

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 of rush quillwort wither and disappear during dry periods; however, the corm remains alive and will begin to produce leaves when there is again adequate water. Quillwort leaves have hollow chambers (sporangia) at the base where two types of spores are produced: tiny, dust-sized microspores develop sperm-producing structures, and larger (though still minute) megaspores produce eggs. Sperm swim to the eggs in available water and unite to form new plants. Quillworts compete poorly with other aquatic plants and are typically found in relatively sterile sand or silt or in frequently water-worn sites that support few or no other vascular plants.

Survey Recommendations: Surveys are best conducted immediately following spring flood season when plants are most conspicuous and before the leaves have withered and disappeared; mature megaspores are best developed in late spring but can be found (from previous years' growth) in the soil at the base of younger plants.

Range: Confirmed from one county in the inner Coastal Plain of Georgia and suspected in one other county in southwestern Georgia.

Threats: Ditching and draining wetlands, impounding streams, clearcutting in swamps and floodplains.

Georgia Conservation Status: One population with about 100 plants is known; it occurs on private land.

Conservation and Management Recommendations: Protect floodplains and swamps from damming, clearing, draining, filling, pollution run-off, and sedimentation from upland disturbances.

Selected References:

Brunton, D.F. and D. M. Britton. 1999. Rush quillwort (*Isoetes junciformis*, sp. nov.), a new pteridophyte from southern Georgia. *American Fern Journal* 89(3): 187-197.

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<http://www.herbarium.unc.edu/flora.htm>

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Date Compiled or Updated:

L. Chafin and D. Brunton, Dec. 2008: original account

K. Owers, Feb. 2010: added pictures

