Common Name: MAT-FORMING QUILLWORT

Scientific Name: *Isoetes tegetiformans* Rury

Other Commonly Used Names: 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** forming dense mats in granite outcrop pools. **Stem** brown, horizontal at or just below the soil surface, often pushing up small hummocks of soil; horizontal stems bear stout, coiled **roots** near the leaf bases and slender, straight **roots** near the end of the stem. **Leaves** usually less than 1½ inches (3 cm) tall, rarely up to 2 ¾ inches (7 cm) tall, very narrow and pointed, in clusters of 4 - 8 leaves along the top of the horizontal stem; leaves hollow

with cross partitions. Spores produced in a chamber (**sporangium**) in the flared leaf base, the chamber completely covered by a translucent membrane (**velum**). Dozens of tiny, brown **female spores** may be seen with 30x magnification; minute, dust-sized **male spores**, which occur on separate leaves, are also present 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. Piedmont quillwort (*Isoetes piedmontana*) occurs in muddy seeps and ephemeral pools in erosion pits on granite outcrops. Its leaves are 2¾ - 6 inches (7 - 15 cm) long and have brown to black bases; the sporangia contain larger, distinctly dimpled megaspores that are only partially covered by the velum.

Related Rare Species: Black-spored quillwort (*Isoetes melanospora*) occurs in similar habitats in Georgia and South Carolina but is larger, with larger megaspores, and leaves arranged spirally about the corm (see full species account elsewhere on this website). Populations of an undescribed *I. piedmontana*-like taxon occur in shallow pools on several granite outcrops in eastern Alabama and in Coffee County, Georgia; these are larger plants with larger megaspores that have conspicuously dimpled megaspore ornamentation and partial velum coverage of the sporangia. Black-footed quillwort (*Isoetes melanopoda*) leaves are 2¾ - 18 inches (7 - 45 cm) long and have shiny, black leaf bases. It occurs in pools on Piedmont granite outcrops, in seepy areas on Altamaha Grit, and in wet, clay soils of Coosa Valley flatwoods. 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 pools formed by natural erosion on granite outcrops.

Life History: Quillworts are seedless, non-flowering plants that reproduce by spores. Mat-forming quillwort also reproduces by forming new plants along a horizontal stem that lies at or just below the soil surface. Spores are produced in chambers at the base of the leaves from May to October, about 2 - 3 weeks following a rain. 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 dust-like microspores, which develop sperm-producing structures. Egg and sperm unite and form new plants.

Survey Recommendations: Plants are usually visible October–May, except during droughts, and typically reach their fullest height in April–May.

Range: Found only in the Piedmont of Georgia.

Threats: Quarrying of granite outcrops, trash dumping, off-road vehicle use, horseback riding, cattle trampling, and commercial and residential 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 10 populations have been discovered but only 7 have survived; 2 of these are on conservation land.

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.

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Author of Species Account: Linda G. Chafin and Daniel F. Brunton

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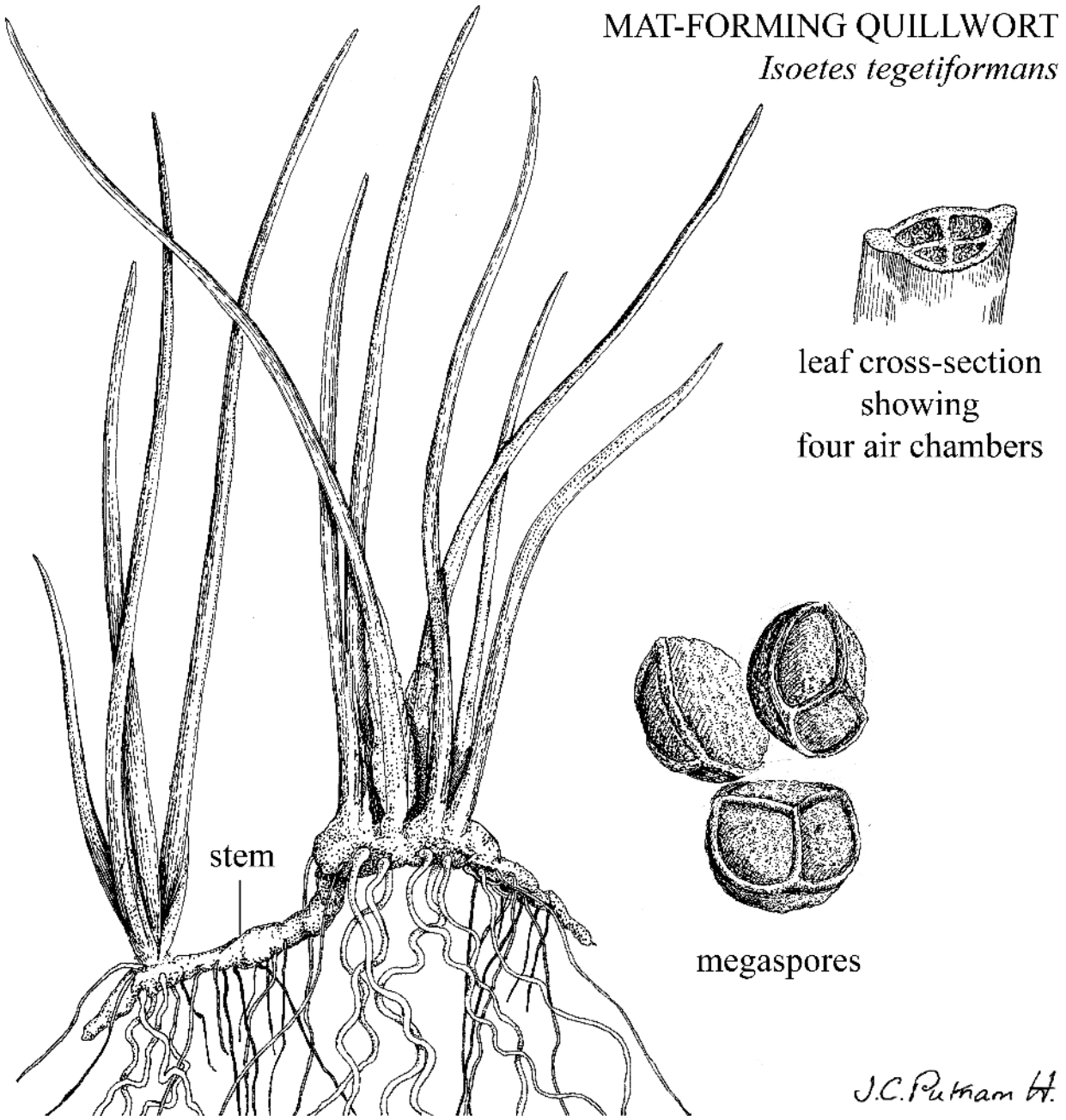


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