THE TAXONOMIC AND ECOLOGICAL STATUS OF THE ENVIRONMENTALLY RESTRICTED SPONGILLID SPECIES OF NORTH AMERICA. I. SPONGILLA SPONGINOSA PENNEY 1957

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Abstract

The taxonomic validity, present distribution, and specific threats to the existence of the freshwater sponge, Spongilla spongina Penney were investigated. This species, reported only from the type locality, Week’s Pond, Sumter County, South Carolina, has apparently been extirpated due to highly acidic pH levels in the pond water. Examination of holotype materials indicate some question of the validity of S. spongina as a distinct species.

Examinations of the taxonomic literature reveal a number of freshwater sponges reported as occurring only from their respective type localities. Among these sponges with restricted distribution is Spongilla spongina Penney 1957, known only from the type locality, Week’s Pond, Manchester State Forest, Sumter County, South Carolina, U.S.A.

The present investigation was undertaken in order to determine the taxonomic validity, present distribution, and specific threats to the existence of the freshwater sponge species, Spongilla spongina Penney.

Methods

Environmental survey and collecting trips were made to the type locality and to neighboring habitats during August and December, 1975. Supplementary examinations of the area were performed in September and December, 1975, by personnel of the South Carolina Departments of Health and Environmental Control and Wildlife and Marine Resources, Nongame Endangered Species Section. Holotype materials of Spongilla spongina Penney (USNM 23521) were examined while on loan from the United States National Museum of Natural History.

Observations

Week’s Pond arises from the outflow of a ‘Carolina bay’, Big Bay Swamp. The outlet from the bay, Sammy Swamp Creek, is dammed to form Week’s Pond. The immediate border of the pond is a cypress-tupelo swamp. Taxodium distichium, cypress, forms over 50 per cent of the plant composition in the canopy layer of the pond border with Acer rubrum, red maple, and Nyssa biflora, tupelo gum, accounting for approximately 20 per cent each of canopy cover. The Understory layer is dominated by Myrica cerifera. Among shrubs and vines, M. cerifera, Lyonia lucida, fetter bush, and Tillandsia usneoides, Spanish moss, dominate. The herbaceous layer is dominated by Bamboo, colonial around the dam, Sphagnum, and Nuphar luteum, white pond lilly, both very abundant in the pond and at its border.

Grab samples studied for phytoplanton, periphyton, and microinvertebrates revealed that species diversification and population number were not extensive. Macroinvertebrates, collected by hand proved to be species that...
have little sensitivity to dissolved oxygen concentrations or to pH of their habitat.

Water samples were taken at two sites on the pond. At both sites the water was very acidic with pH's of 3.8 and 3.5. The pond outlet, Sammy Swamp Creek, showed a field pH of 3.9, while Curtis Pond on lower Sammy Swamp Creek showed a field pH of 4.9. Mineral levels were quite low with iron being the only one in significant concentration. Due to the acidic pH, the iron probably existed as the ferrous entity, a growth limiting ion for cyanophyta. Calcium was present in low concentration as were other divalent cations. This accounted for the very low hardness reading of 4 and 5 mg/l for each site. The pond showed typical winter patterns of low D.O., B.O.D., nitrate, and phosphate. Probable decay of vegetation with release of tannin may account for the acidity of the water.

Bacterial contamination was minimal. Fecal coliform analysis resulted in 10/100 ml and 2/100 ml for each site. These counts are at levels considered safe for drinking. Further, fecal Strep tests results showed 2/100 ml for both sites indicating that fecal contamination by man and animals is minimal, and/or that the pH is too low to support an extensive bacterial population.

Complete physiochemical data are listed in Table 1.

### Freshwater sponge distribution in Week's Pond and neighboring habitats

The freshwater sponge, *Spongilla spongiosa* is no longer present in the type locality, Week's Pond, or in any component of the drainage system. Sponge fauna (Table 2) in ponds and streams of the region are species commonly found in southeastern coastal plain habitats (Harrison, 1974).

*Spongilla lacustris*, the only freshwater sponge found in the Week's Pond-Sammy Swamp Creek drainage system, is a cosmopolitan species which tolerates a wide range of environmental conditions (Harrison, 1974). Although commonly found in acidic habitats in the southeastern United States (Poirrier, 1976), the Curtis Pond habitat (field pH 4.9) is the most acidic habitat in which *S. lacustris* has yet been collected.

### Taxonomy

Holotype materials of *Spongilla spongiosa* Penney (USNM 23521), examined while on loan from the U.S. National Museum of Natural History, do not coincide with the original description of the species by Penney (1957). The holotype examined is a specimen of another freshwater sponge common to the region, *Anheteromeyenia ryderi*. Taxonomically, this finding presents problems to say the least. Objectively, three explanations are possible:

1. the species was misidentified in the original description;
2. the dense spongine connective tissue fibers seen in *S. spongiosa* are ecomorphic variations in *A. ryderi*, an unlikely prospect due to obvious skeletal differences in the two species;
3. the holotype specimen sent to the U.S. National Museum was not a true holotype but rather another sponge from the same pond.

### Discussion

Week's Pond is a habitat undergoing the natural processes of succession into swampland. Damming of a