Expanding Freshwater Sponge Surveys in South Carolina

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Introduction:

Freshwater sponges were originally reported in South Carolina in Adam's Pond near Columbia, SC (Bisbee, 1992), but no studies to date have conducted broader surveys of this important group. We started freshwater sponge surveys last summer and expanded these across South Carolina this year.

Goal: Continue freshwater sponges surveys across South Carolina to gain a better understanding of the diversity and distribution of this group.

Figure 1: Sponge collection in field. View of gemmules (bottom left)

Methods:

Fieldwork:

Sponges were removed from the substrate using a scraping tool and sectioned in the field. If gemmules were found, they were removed with tweezers and placed in 95% ethanol in a labeled vial. Sponge samples for histology and DNA barcoding were also processed and frozen.

Lab work:

A 1 cm x 1 cm piece of each sponge sample was cut with a clean razor and gloves and added to a well within a 24 well plate. Bleach was added to dissolve the sponge tissue. The remaining spicules were rinsed in water and ethanol and added to a slide for identification under a compound microscope. Gemmules, when present, were pressed and viewed under the compound scope. DNA extractions, PCR, and gel electrophoresis are currently being conducted for DNA barcoding.

Figure 2: Dissolving sponge tissue in bleach. Spicules under microscope.

Table 1: Sponge species found in SC during this project. * shows sponge species reported in SC before this project.

Genus	Species	Locations	Substrates
Trochospongilla	*horrida*	Herbert Jessen Boatramp, Landing Lane, Low Falls Landing, and Pea Landing	Barnacle, dock side, and moss
Trochospongilla	*leidii*	Gilligan's Boat Dock, Landing Lane, Low Falls Landing, Cathead Landing, Spiers Landing, Thornley Forest Landing	Dock side, wooden piling, and metal
Trochospongilla	*pennsylvanica*	Groton Plantation	Wood
Heteromeyenia	baileyi	Herbert Jessen Boatramp, Cyrpus Gardens Boat Landing, Adam's Pond, Pine Landing	Sedge
Heteromeyenia	*latitenta*	Pea Landing	Dock side (wood)
Radiospongilla	*cerebellata*	Richardson's Landing	Dock side (plastic)
Radiospongilla	*ryderi*	Wadboo Bridge Landing	Vegetation
Spongilla	lacustris*	Herbert Jessen Boatramp	Dock side (plastic), wooden piling
Spongilla	*wagneri*	Gilligan's Boat Dock	Dock side (plastic)
Spongilla	*argyrosperma*	Adam's Pond	Wood
Eunapius	*fragilis**	Cyprus Gardens Boat Landing	Dock side (plastic)
Corvospongilla	*becki*	MacDaddy's Boat Dock, Cyprus Gardens Boat Landing	Dock Side (plastic and wood)

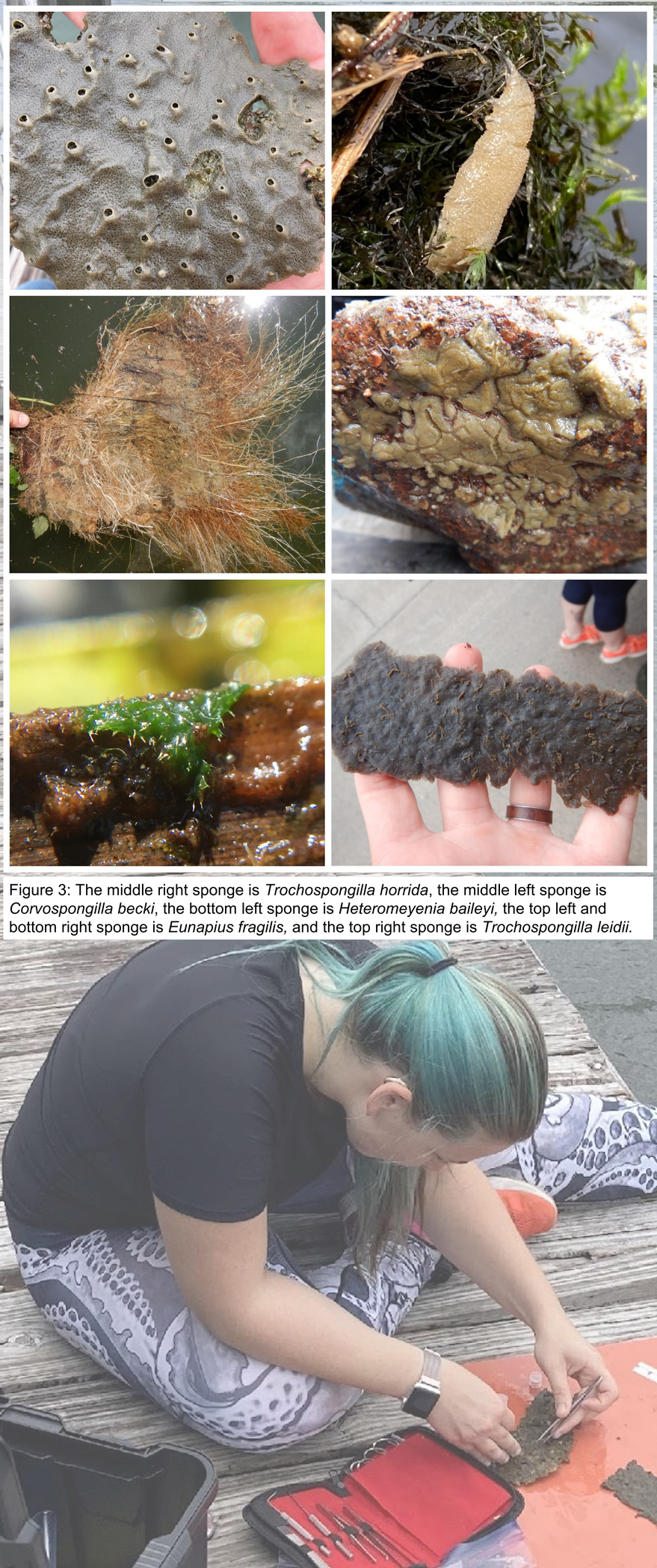

Figure 3: The middle right sponge is *Trochospongilla horrida*, the middle left sponge is *Corvospongilla becki*, the bottom left sponge is *Heteromeyenia baileyi,* the top left and bottom right sponge is *Eunapius fragilis,* and the top right sponge is *Trochospongilla leidii.*

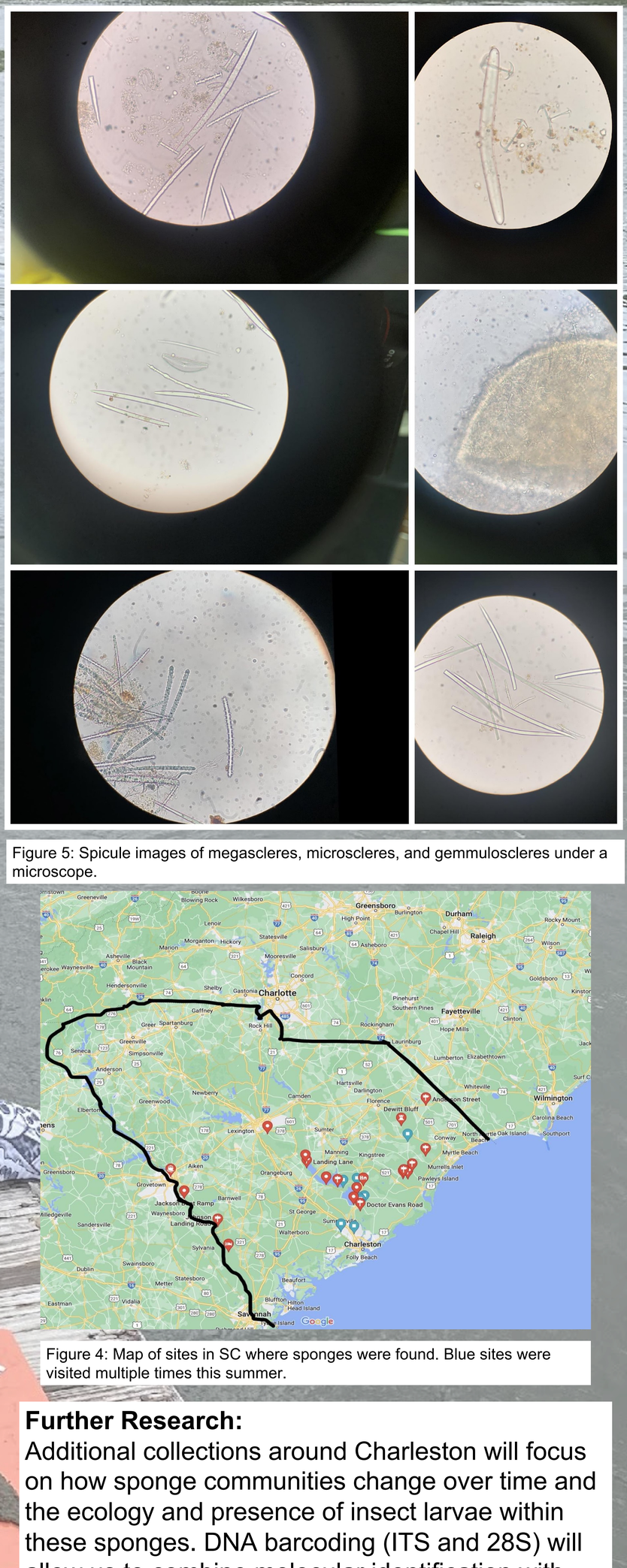

Figure 5: Spicule images of megascleres, microscleres, and gemmuloscleres under a microscope.

Figure 4: Map of sites in SC where sponges were found. Blue sites were visited multiple times this summer.

Results and Conclusion:

We added 10 sites to our surveys this summer and expanded out to the NC and GA border. We now have a total of 12 identified species and six genera of freshwater sponges collected. Sponges are rare at most sites, but species richness varies across sites with at most three species found at one location. This remains the largest collection of freshwater sponge species ever found in the state of SC. In addition, there are 1-4 possibly new species in our collection. There was also a noticeable die off of sponges and release of gemmules later in the summer of 2022. We hypothesize that this may be the result of high water temperatures.

Further Research:

Additional collections around Charleston will focus on how sponge communities change over time and the ecology and presence of insect larvae within these sponges. DNA barcoding (ITS and 28S) will allow us to combine molecular identification with our field and lab identifications and help determine which species are newly discovered for SC, North America, and possibly a completely new species.

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Citations:

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