

Sponge Restoration Aquaculture: Reproductive Viability Following Propagation for Nearshore Spongiidae Species in the Florida Keys

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Since 2010, a coalition of state natural resource managers and scientists have engaged in sponge restoration to mitigate a series of sponge die-offs in the nearshore hardbottom habitats of the Florida Keys. Sponge restoration aquaculture is a viable tool to accelerate the natural progression of sponge recolonization following ecological disturbances (e.g., algal blooms, heatwaves, hurricanes). For sponge restoration aquaculture to be successful, it is important that these aquacultured propagules become reproductive to sustain future populations. We surveyed the reproductive capacity of restored sponges to evaluate recruitment dynamics in Florida Fish and Wildlife Conservation Commission sponge nurseries. Using histology and light microscopy, we evaluated 4 Spongiidae species (*Hippospongia* cf. *lachne*, *Spongia barbara*, *Spongia graminea*, and *Spongia* (S.) *tampa*) for gametogenesis 3-6 years following *in situ* asexual aquaculture propagation near Key West, Florida. Eighty-eight percent of the sampled Spongiidae propagules (n=95) were in gametogenesis. Sex ratios were highly skewed in favor of spermatogenesis. From April through June 2023, 94% of the *H. lachne* propagules (n=16) were reproducing compared to 55% of the adult donor sponges (n=60) sampled the previous year. Restored sponge propagules had higher rates of gametogenesis and were more fecund. This study will answer key questions about sponge reproductive biology in support of the current state of Florida restoration and management efforts.