

## Florida Integrated Science Center

# Publication Brief for Resource Managers

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**Contact**

Bill Smith-Vaniz  
Howard Jelks

**Phone**

352-264-2571  
352-264-3492

**Email and web page**

wsmith-vaniz@usgs.gov  
hjelks@usgs.gov  
<http://fisc.er.usgs.gov>

Florida Integrated Science Center 7920 NW 71 Street, Gainesville, Florida 32653-3071

## Relevance of cryptic fishes in biodiversity assessments: A case study at Buck Island Reef National Monument, St. Croix

Coral reefs are some of the most biologically diverse and complex ecosystems on Earth. While conspicuous reef animals have myriad shapes and colors, it is the cryptic fauna mostly hidden within the reef mosaic that comprise most of the diversity and numerical abundance. The ecological roles of cryptic animals in maintaining coral reefs and contributing to marine food webs have been generally ignored. To understand the energy flow and population dynamics of coral reefs, both conspicuous and cryptic elements must be studied. If coral reefs are impacted by hurricanes or pollution, comprehensive knowledge of pre-disturbance faunal composition is necessary to gauge recovery and guide management actions.

While conspicuous species can be adequately inventoried with traditional visual survey methods, cryptic species are missed or underestimated using these non-consumptive methods. Biodiversity assessments and management actions should be based on what is actually present rather than just what can be seen. Due to their relatively small sizes and tendency to remain hidden from view, cryptic fishes are challenging to inventory. When used responsibly, rotenone powder, a plant-derived toxin, was shown to be an environmentally safe and ideal means of accurately sampling cryptic fishes.

The recently published research by Smith-Vaniz, Jelks, and Rocha in the *Bulletin of Marine Science* described an inventory of cryptic fishes during August–September 2001 at Buck Island Reef National Monument, St. Croix, U.S. Virgin Islands. Fifty-eight sites were sampled at shoreline, nearshore reef, patch reefs in

### Management Implications:

- Rotenone samples complement underwater visual surveys for a more complete and accurate assessment of fish biodiversity.
- When done responsibly, rotenone collections pose no lasting threat to the environment and the relatively small defaunated habitat begins to recover immediately.
- Due to their close association with coral reef structure and low fishery pressure, cryptic fishes may be better indicators of environmental conditions than conspicuous fishes.

lagoon, backreef, forereef, and reefs on offshore bank habitats. These collections included 55 fish families and 228 species, 60 previously unreported from St. Croix. Fish assemblages varied across habitats with the shoreline assemblage the most distinct. Only 8% of the species were present in all habitats.

Results from rotenone collections were compared to underwater visual surveys done in the same area from July–August 2001 by National Oceanic and Atmospheric Administration (NOAA) divers. Comparison of the two methods revealed that 56% of fish species actually present were detected only through rotenone sampling, while 13% were only detected visually.

*Smith-Vaniz, W.F., H.L. Jelks, and L. A. Rocha. 2006. Relevance of cryptic fishes in biodiversity assessments: A case study at Buck Island Reef National Monument, St. Croix. Bulletin of Marine Science, 79(1):17-48.*