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Sphyrna gilberti sp. nov., a new hammerhead shark (Carcharhiniformes, Sphyrnidae) from the western Atlantic Ocean

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Abstract

Sphyrna gilberti **sp. nov.** is described based on 54 specimens collected in the coastal waters of South Carolina, U.S.A. Morphologically, *S. gilberti* **sp. nov.** is separable from *S. lewini* (Griffith & Smith 1834) only in the number of precaudal vertebrae. Due to rarity of specimens and the highly migratory behavior of most sphyrnids, the range of *S. gilberti* **sp. nov.** is unknown.

Key words: Carolina hammerhead, cartilaginous fishes, Chondrichthyes, cryptic species, Elasmobranchii

Introduction

Cryptic speciation is an increasingly common interpretation of genetic variation and gene tree reconstructions for broadly distributed but morphologically conservative taxa (Quattro *et al.* 2006). Among fishes, a striking example of genetic divergence in the face of morphological conservatism was the discovery that the bonefish, *Albula vulpes* (Linnaeus 1758), was actually a complex of eight sibling species (Colborn *et al.* 2001). Although less dramatic, five independent studies of genetic variation (Abercrombie *et al.* 2005; Quattro *et al.* 2006; Zemlak *et al.* 2009; Naylor *et al.* 2012; Pinhal *et al.* 2012) confirmed a deep evolutionary partition among samples morphologically assignable to the scalloped hammerhead, *Sphyrna lewini* (Griffith & Smith 1834), which is globally distributed in tropical, subtropical, and temperate marine waters. Specifically, a subset of samples from the western Atlantic Ocean was genetically divergent, e.g., 3-7% in mitochondrial control region haplotypes, and constituted an independent evolutionary lineage in gene trees. Speciation would account for these observations and could be confirmed with concordant variation in evolutionarily independent characters (Avise & Ball 1990; Grady & Quattro 1999). Gilbert's (1967) comprehensive revision of hammerhead sharks provided the first suggestion of divergence within *S. lewini* and offered a potential test of the genetic hypothesis of cryptic speciation. The total number of vertebrae reported for a broad geographic sample of nine specimens of *S. lewini* included a conspicuously low count for one individual collected near Charleston, South Carolina (Gilbert 1967). Quattro *et al.* (2006) evaluated a similarly small sample of whole specimens and found that vertebral counts and genetic variation were concordant and distinguished two groups within putative *S. lewini*. With the caveat that the morphological subdivision in *S. lewini* was predicated on very small sample sizes, both of specimens and morphological attributes, Quattro *et al.* (2006) attributed the concordant partitions to cryptic speciation.This study examines meristic and morphometric characters to test for concordant morphological and genetic variation and presents a description of the cryptic species proposed by Quattro *et al.* (2006).

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