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

JOSEPH M. QUATTRO1, WILLIAM B. DRIGGERS III2, JAMES M. GRADY3, GLENN F. ULRICH4 & MARK A. ROBERTS1

1Department of Biological Sciences, Marine Science Program, University of South Carolina, Columbia, SC 29208. E-mail JosephQ@mailbox.sc.edu
2National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, Mississippi Laboratories, P.O. Drawer 1207, Pascagoula, MS 39567.
3Department of Biological Sciences, University of New Orleans, New Orleans, LA 70148
4South Carolina Department of Natural Resources, Marine Resources Division, 217 Fort Johnson Road, Post Office Box 12559, Charleston, SC 29412

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, Sphyra 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).