

Whale shark (*Rhincodon typus*) behavior: A multi-year analysis of individuals at Georgia Aquarium

Michael P. Black¹, Matthew Grober², Bruce Carlson³, Chris Schreiber³, Chris Coco³ and Alistair Dove⁴

¹Neuroscience Institute, Georgia State University, USA. seawater@gsu.edu

²Biology Department, Georgia State University, USA

³Georgia Aquarium, USA

⁴Georgia Aquarium Research Center, USA

Background. From the coastal seas near Taiwan to the 6.3 million gallon Ocean Voyager habitat at Georgia Aquarium in Atlanta, Georgia, whale sharks, *Rhincodon typus*, were brought in stages: two females arrived in June 2006 and two males in June 2007. The behavioral observations described in this study began in 2008 as the first reported observations in captivity to assist in husbandry and better understand whale shark behavior variation between individuals and across time.

Methods. Two types of observations were made of the four sharks currently in the Georgia Aquarium Ocean Voyager habitat: 1) 15-minute focal observations throughout the day of individual sharks from a high gantry vantage point using Stopwatch+ software to time stamp all recorded behavior and 2) observations of swim speed, depth, and swimming direction for all sharks passing by a section of wall over longer periods of time (15 min-hours). Z-tests were used for inter-observer reliability.

Results. For most traits, whale sharks demonstrated unique behavioral profiles that were consistent over many years, but, over the course of years, some of these behavioral traits changed for individual sharks. There were also daily changes in behavior that were consistent across days. For instance, whale sharks showed a clear anticipation of feeding time marked by increases in swimming speed prior to obvious cues of the feed (i.e. 1 hour prior). During observations recorded during the day, whale sharks spent the majority of their time swimming at or near the surface. Most spent relatively equal times swimming clockwise as they did counterclockwise. Swim speeds observed in the habitat were similar to the range of those estimated from work in the field.

Conclusion. Each shark in the habitat demonstrated a behavioral profile unique to that individual, and we have observed short-term and long-term consistent patterns as well as changes in some behavior. These observations increase our knowledge of whale shark behavior, assisting in the husbandry of these animals and giving a better understanding of individual differences, temporal changes, and interactions between sharks.

Key words: individual variation, circadian