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Diving behavior of sperm whales in relation to behavior of a major prey species, the jumbo squid, in the Gulf of California, Mexico

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Sperm whales occur worldwide and feed largely on meso- and bathypelagic squid, but little is known about the behavioral ecology of this predator and its prey. In the Gulf of California, sperm whales are thought to feed on the abundant jumbo (Humboldt) squid, an ecologically and commercially important species. In this study, we attached satellite-linked dive recorders to 5 sperm whales and pop-up archival transmitting tags to 3 jumbo squid in the same area and time period in order to record their diving behavior and movements. Most (91%) deep dives by whales ranged from 100 to 500 m (average 418 ± 216.0 m) and lasted 15 to 35 min (average 27 ± 9.1 min). During daytime hours, jumbo squid spent about 75% of the time in the 200 to 400 m depth range, and sperm whales showed a similar dive-depth preference. The vertical distribution pattern of squid changed during the night, with squid spending about half the time at depths of <200 m and the remainder at 200 to 400 m. Although the whales shifted their nighttime diving to somewhat shallower depths, about 75% of dives remained in the 200 to 400 m depth range. Analysis of squid nighttime diving behavior, based on archival time-series data, showed that excursions into warm surface waters were often terminated by deep dives to typical daytime depths, after which the squid appeared to be relatively quiescent. Diving behavior by whales is thus consistent with the idea that they feed on jumbo squid at depth during the day, and we suggest that deep nighttime foraging may target squid that are recovering from stress after recent surface activity and are therefore more susceptible to predation.

Palabras clave: Prey, Movements, Dosidicus gigas, Biomasa, Physeter macrocephalus, Diving behavior, Satellite telemeters, Predator