Beamed-up lemon shark shows research promise (w/ Video)

May 6 2012, by Nancy Owano

(Phys.org) -- Not everyone is game enough to fit a laser beam on to a shark's head and live to tell the tale intact, but not everyone is a marine biologist, either. Last month, marine biologist Luke Tipple, armed with a career in the study of sharks, accepted the request from handheld laser manufacturers, Wicked Lasers, to attach a Wicked Lasers laser beam to a shark's fin, which he did with success. On a diving trip in the Bahamas, he fit a laser device onto a lemon shark's dorsal fin and tested the shark's movements.

Lemon sharks are a popular choice of scientists; Tipple says he chose a lemon shark for its swimming behavior, which is predictable and docile during the day. The lemon shark offered easy access in shallow water, another plus. The shark he chose was an adult male, about seven feet in length.

Tipple said that clipping the laser onto the dorsal fin and flipping on the laser was easy, although the shark didn't like it when Tipple first attached the clamp. He said a few seconds later "it returned to normal behavior."

The Wicked Lasers device that he used was a waterproof, modified, S3 Krypton product. The company said that the device used by Tipple was the lowest-powered version of its S3 Krypton green laser line. It was a 50-milliwatt laser.

Gel pads on the clamp created a tactile surface interaction with the dermal denticles of the shark's skin, Tipple said. The device was non-invasive in that it did not pierce the shark's skin. The zinc elements of the spring in the clamp were designed to corrode. After around 30 days, the spring would not work and the clamp would fall off. By the end of the experiment, though, Tipple removed the clamp from the test shark. He said the shark generally was unfazed and the clip was retrieved after about 15 minutes of monitoring and filming.

He said the clamp itself was not strong enough to cause pain, and the dorsal fin, mostly made up of cartilage, is not very sensitive. He also maintained that the laser used was not strong enough to cause ocular or thermal damage to other sea life.

Tipple would not agree with anyone calling this a silly stunt. Tipple said that he agreed to take on the challenge for better knowledge about sharks and testing gear that can ensure them humane treatment. He said the trial

was useful because he was able to further test a clamping apparatus for use in acquiring data.

“Traditionally in science we accept that drilling tags into sharks’ dorsal fins is the most effective attachment process for super expensive and informative electronic tags,” he said, but he was uneasy with any practice that may cause stress to the captured animal and damage to the dorsal fin. “I’m pleased that the experiment is getting so much attention and that we've demonstrated a secure and temporary attachment protocol. It definitely warrants further research and work... but probably minus the lasers from now on."

He also sought to verify that sharks avoid laser energy of specific spectrums and wavelengths. He discovered that with the Wicked Lasers model, he found the opposite to be true: “I actually found that the sharks were attracted to the laser! Viewed from an angle the laser is a bright point of green light and time and again the sharks seemed to swim over to me when they caught sight of it.”