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Sea turtle bycatch reduced by UV lights on fishing nets

Every year many marine animals including seabirds, sea turtles and sharks are unintentionally caught as bycatch in commercial fishing gear. Recent research has demonstrated that illuminating fishing nets with ultraviolet (UV) lights can reduce sea turtle bycatch without significantly affecting the number of fish caught or their market value.

Small-scale coastal gillnet fisheries are widespread and previous studies suggest that high numbers of sea turtles are trapped as bycatch in such fisheries, hampering efforts to conserve sea turtle populations. However, many local communities depend on small-scale fisheries and researchers are investigating ways to reduce the bycatch of marine animals, while at the same time preserving the amount and value of target fish caught.

One promising bycatch reduction technology relies on the differences in vision between sea turtles and many species of fish. Researchers have already found that nets equipped with green light-emitting diodes (LEDs) or chemical lightsticks can reduce catch rates of the green sea turtle (*Chelonia mydas*). Research has also shown that green loggerhead (*Caretta caretta*) and leatherback (*Dermochelys coriacea*) sea turtles are sensitive to UV light, and although some fish species have UV vision, several economically-important fish species do not.

To determine if this difference in UV sensitivity could be used to reduce sea turtle bycatch, the researchers carried out two sets of experiments: one to see if gillnets illuminated with UV LEDs affected the catch rate of sea turtles, and the other to see if they affected fish catch rates and the value of the fish catch.

In the first set of experiments, the researchers cast 11 pairs of gillnets off Punta Abreojos, Mexico, where large numbers of green sea turtles are found, after sunset. One of each of the pairs of nets was fitted with a UV LED every five metres and the other with an inactive LED every five metres.

The nets were regularly checked during the night and any turtles caught were released. In all, 332 green turtles were caught, of which 123 were trapped in the nets fitted with UV LEDs and 209 in the nets with inactive LEDs. This implies that the UV LEDs were able to reduce the catch rate of the turtles by almost 40%.

In the second set of experiments, 36 pairs of nets were deployed in the evening in a commercial gillnet fishery off Bahı´a de los Angeles, Mexico, where the fishermen were willing to participate in the study. As with the first set of experiments, each pair of nets was fitted either with active or inactive UV LEDs.

Next morning, the fish targeted for their commercial value were separated from the rest of the catch (fish bycatch and non-target fish). Altogether, 664 target fish were caught, 309 in nets fitted with UV LEDs and 355 in nets with inactive LEDs, suggesting the UV LEDs had little impact on the catch rates of target fish. Furthermore, there was no significant difference in the market value of the fish, with the value-per-unit-effort calculated as US$15.00 (€10.90) in the illuminated nets, compared with US$15.01 (€10.91) in the non-illuminated nets[1].

Further research in Peru, Indonesia and Mexico is determining exactly how effective net illumination by UV LEDS and other LED colours can be in reducing sea turtle bycatch in those coastal fisheries.

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Contact:
john.wang@noaa.gov

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1.The researchers calculated the value-per-unit-effort (VPUE) for each net as the market value (in US dollars) of the catch/([net length/400 m] × [net soak time/12 h]).