

Circle hooks and catch rates of target and bycatch species in the longline fishery in the southwest Atlantic Ocean

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Circle hooks may affect catch composition in comparison with J style hooks in some pelagic longline fisheries. Between 2004 and 2008 the performance of 18/0 10° offset circle hooks was compared with 9/0 J-type hooks (control) in the Brazilian pelagic longline fishery targeting swordfish, tuna and sharks. During this experiment 26 trips, 229 sets and 145,828 hooks were set alternating circle and 'J' hooks and using mackerel as bait. A total of 60 different species, including turtles and seabirds, were caught. Statistical analyses (Mantel-Haenszel χ^2 tests) of species with at least 20 individuals caught were performed. Circle hooks resulted in a significant catch decrease for loggerhead *Caretta caretta* (55%) and leatherback *Dermochelys coriacea* (65%) sea turtles. Use of circle hooks resulted in increased capture rates of tunas (bigeye *Thunnus obesus* and albacore *Thunnus. alalunga*), and sharks (blue *Prionace glauca* and requiem sharks of the genus *Carcharinus*). There was no difference in the capture of yellowfin tuna (*Thunnus. albacares*), shortfin mako shark (*Isurus oxyrinchus*), hammerhead sharks (*Sphyrna lewini* and *S. zygaena*), and dolphinfish (*Coryphaena hippurus*). On the other hand, the capture rate of swordfish (*Xiphias gladius*) decreased significantly when using circle hooks. Additionally, use of circle hooks significantly decreased capture rates of bycatch species, such as pelagic stingrays (*Pteroplatytrygon violacea*) and white marlin (*Tetrapturus albidus*). Circle hooks performed similar to J hooks with respect to many species, and increased captures of marketable species such Atlantic pomfret (*Brama brama*), escolar (*Lepidocybium flavobrunneum*), and mackeral shark (*Lamna nasus*). Results demonstrate the effectiveness of circle hooks for the conservation of loggerhead and leatherback sea turtles, improving the capture rates of most target species, and significantly reducing the bycatch of the most common species, the pelagic stingray, thus economically improving this fishery.

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