

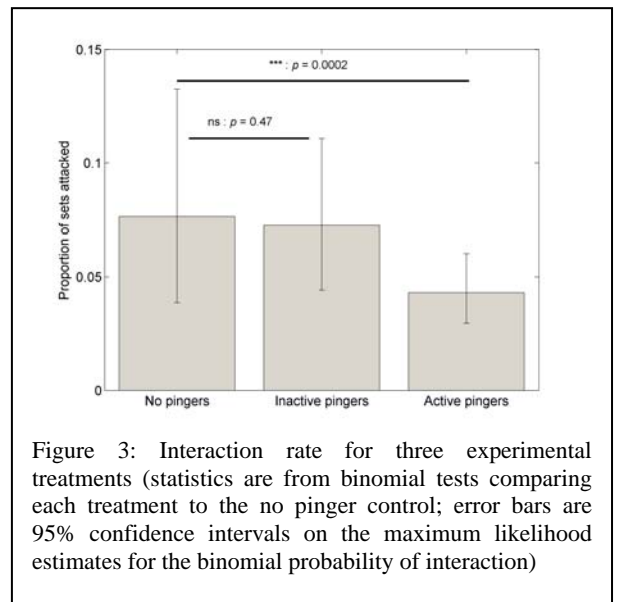
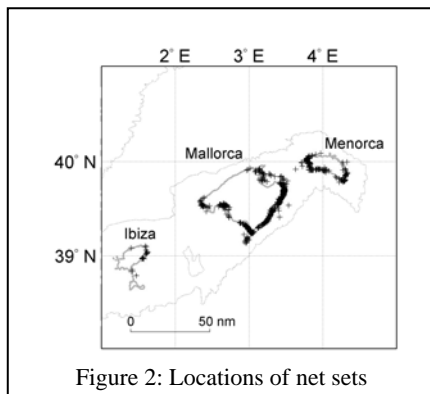
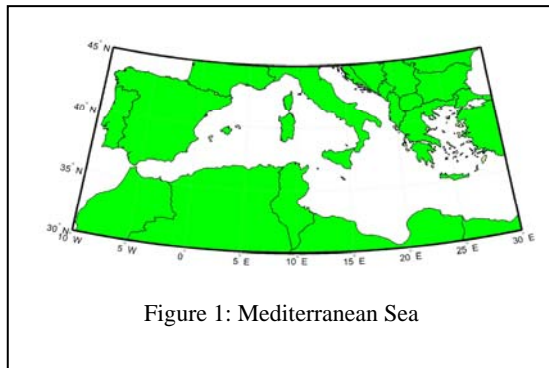
Are pingers effective at reducing interactions between bottlenose dolphins and artisanal fisheries around the Balearic Islands?

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Interactions between marine mammals and fisheries represent a serious and growing conservation issue. Around the Balearic Islands bottlenose dolphins regularly interact with coastal artisanal fisheries. We estimate that this interaction results in an economic cost of 6.5% of the total landed catch value (95% CI 1.6%-12.3%), and the interaction also results in dolphin mortality. Pingers are one possible mitigation measure. We tested the efficacy of three brands of commercially available pingers using both inactive (placebo condition) and active (treatment condition) pingers and nets with no pingers (control condition). Each vessel was equipped with 15 identical bottom-set gill nets for the study, 60m long, 1.25m high and with 50mm mesh. Nets were equipped with either one of three brands of pinger (Savewave™, Aquamark™ and Netmark™) or with no pingers. Pinger activation was carried out such that those reporting on the fishing were unaware of the condition. Catch data were recorded for each operation on board the vessel. Between June and December 2005, 59 participating vessels have reported on 1149 fishing operations. Of these operations, 743 were with active pingers, 262 with inactive pingers and 144 with no pingers. Depredation was evidenced either by direct observation of dolphins taking from nets or by the presence of characteristically damaged fish in the hauled net. The frequency of depredation on nets with no pingers was 0.08 (95% CI 0.04-0.13). Significant overall reduction in rates of dolphin/net interactions in active pinger condition was detected -but not equal among brands- but no significant changes in net damage rates and CPUE were observed.



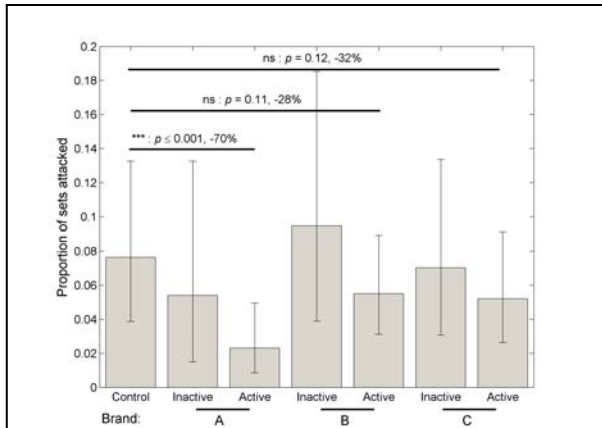


Figure 4: Interaction rates by treatment and pinger brand (statistics are from binomial tests comparing the active treatment to the no pinger control; error bars are 95% confidence intervals on the maximum likelihood estimates for the binomial probability of interaction)

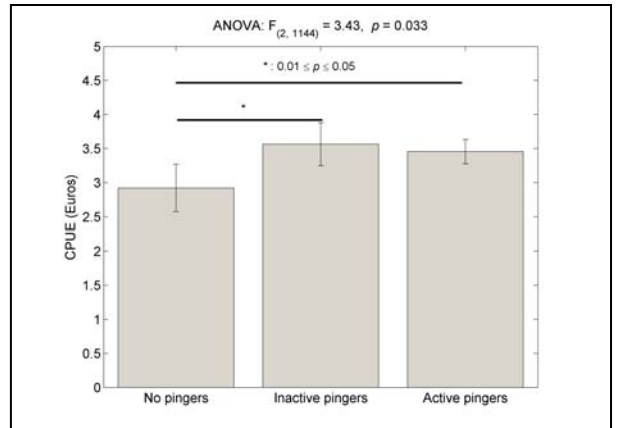


Figure 5: Economic CPUE in the three different conditions; values are Euros/50m net set (statistics are from one-way analysis of variance and post-hoc Tukey-Kramer multiple comparison tests; error bars represent 95% confidence intervals assuming normal errors)

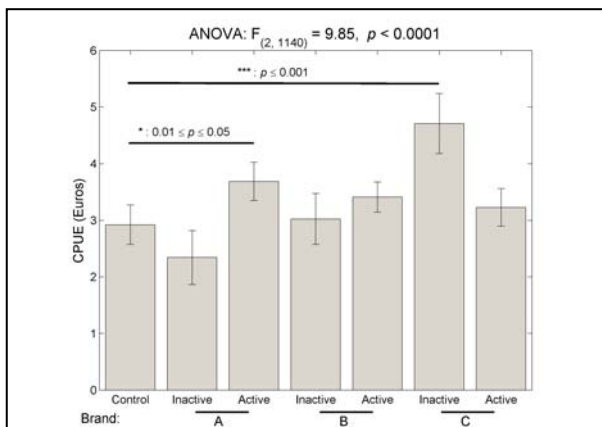


Figure 6: Economic CPUE by pinger brand; values are Euros/50m net set (statistics are from one-way analysis of variance and post-hoc Tukey-Kramer multiple comparison tests; error bars represent 95% confidence intervals assuming normal errors, only significant results shown)

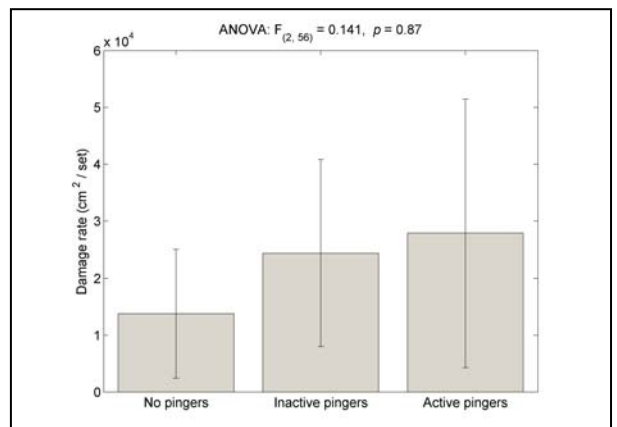


Figure 7: Net damage rates across three different treatments (statistics are one-way analysis of variance, errors bars represent 95% confidence intervals assuming normal errors)