Pinger trials to reduce bycatch in Bulgarian Black Sea turbot fishery

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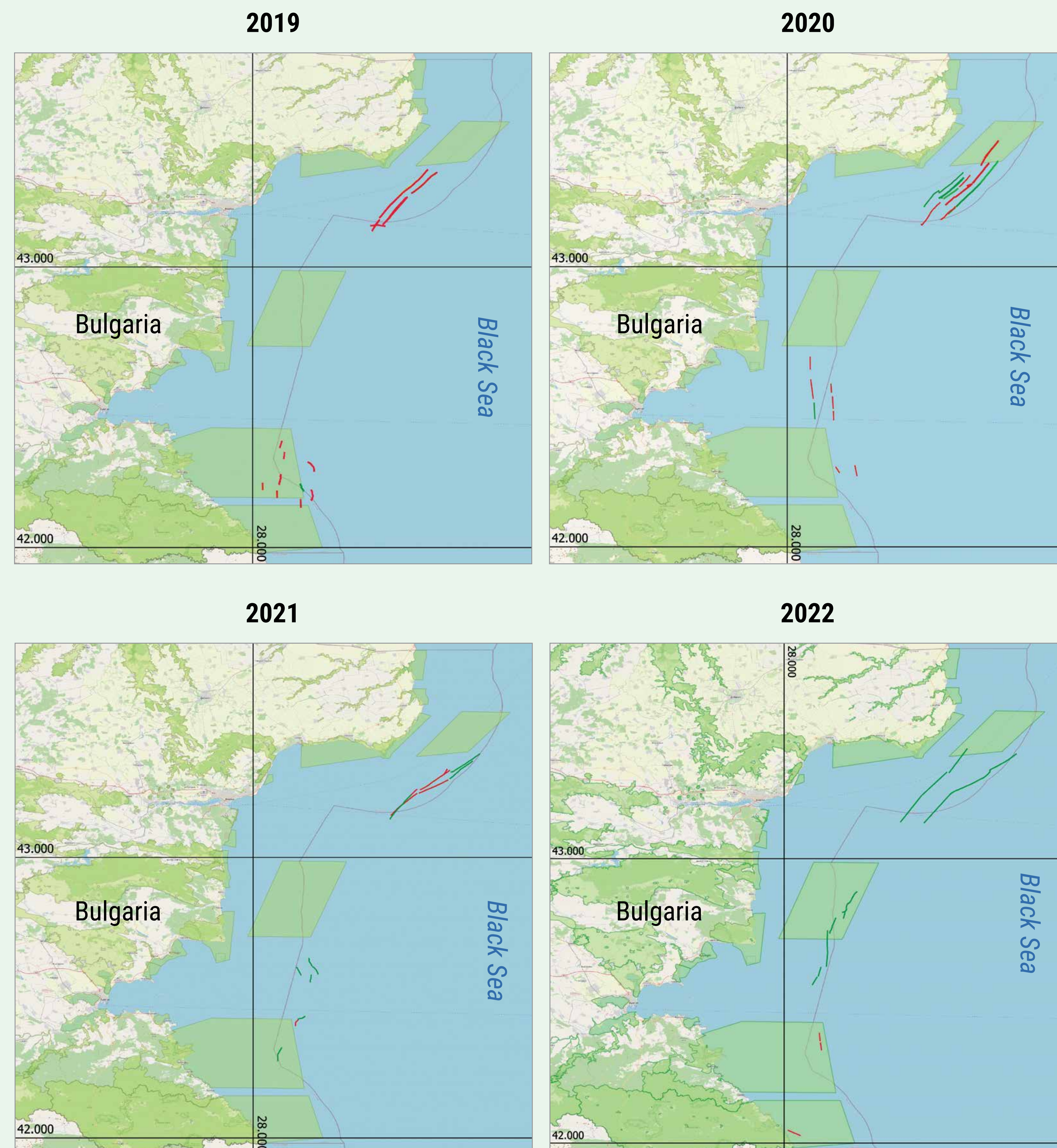
INTRODUCTION

Incidental bycatch in fishing gear, mainly in bottom gillnets targeting turbot, is a major mortality factor for the Black Sea harbour porpoise (*Phocoena phocoena relicta*), an endemic subspecies listed as Endangered in the IUCN Red List. Acoustic deterrent devices or pingers are globally widely used to mitigate bycatch.

MATERIAL AND METHODS

In 2019-2022, trials with three different models of pingers (Future Oceans 10 kHz; Future Oceans 70 kHz; and PAL 10 kHz) were conducted in Bulgaria during standard turbot fishing operations. 85 hauls were covered by the study. Data was collected by independent onboard observers (66% of all hauls) and through self-reporting by fishermen (34%).

RESULTS AND DISCUSSION

Over the four years of the study a total of 476.93 km of turbot gillnets have been surveyed. In 62% of all hauls, we recorded bycatch. A total of 250 cetaceans were bycaught: 235 harbour porpoises, 12 bottlenose dolphins and 3 common dolphins. Soaking time varied between seasons: 14-31 days in spring and 7-26 days in summer. Bycatch rate varied significantly between the years (Kruskall-Wallis, H=9.411, p<0.05). Statistical analysis (nonparametric Mann-Whitney U test) showed that there is not significant difference in bycatch rates between spring and summer seasons (U=755, p>0.05). No significant difference in bycatch rates between active and control nets (2 hauls per trial) were observed in trials involving Future Oceans 10 kHz (18 trials) and 70 kHz (6 trials) pingers (t-test, p>0.05). A significant reduction in cetaceans' bycatch of 86% was however recorded during the 6 trials conducted with 10kHz-PALs (t-test, p<0.05) in 2020 and 2021.

FO 10 kHz	Control net	Active
Year	Bycatch (ind./km²*days)	Bycatch (ind./km²*days)
2019	7,12	0,00
	2,16	2,38
	0,00	2,29
	0,00	8,16
	35,84	55,56
	103,90	86,58
	16,03	0,00
		16,03
2020	2,42	2,64
	0,00	0,00
	14,88	0,00
2021	26,46	0,00
	20,25	0,00
	0,00	0,00
2022	100,00	150,00
	150,00	
	0,00	0,00
	42,10	0,00
Total	521,15	323,64
Bycatch reduction		37,90%

PAL 10 kHz	Control net	Active
Year	Bycatch (ind./km²*days)	Bycatch (ind./km²*days)
2020	5,67	0
2020	32,18	14,88
2020	27,55	9,92
2020	6,87	3,13
2021	9,45	0
2021	6,54	
2022	26,46	
2021	17,80	0
2021	45,79	
2021	20,25	
Total	198,56	27,93
Bycatch reduction		85,93%

FO 70 kHz	Control net	Active
Year	Bycatch (ind./km²*days)	Bycatch (ind./km²*days)
2019	0,00	0,00
	0,00	6,67
	78,13	74,40
	56,69	0,00
2020	0,00	0,00
2022	0,00	42,10
Total	134,81	123,17
Bycatch reduction		8,64%

LEGEND

— Active net — Control net ■ SCI/SACs of NATURA 2000

CONCLUSIONS

We recommended PAL as a successful bycatch mitigation device to Bulgarian authorities (Ministry of Environment and water; Executive Agency for Fisheries and Aquaculture) and to the General Fisheries Commission of the Mediterranean (GFCM). GFCM initiated further confirmation trials in Black Sea waters of Bulgaria, Romania and Turkey.

ACKNOWLEDGEMENTS