

# Association of seabirds with commercial fisheries at Murcia Region

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## INTRODUCTION

Association of seabirds with commercial fisheries is well documented for different regions through the world. Most studies are focused on the association of seabirds with demersal trawlers and the use of fishery wastes, which is especially generated by this type of fishery (Tasker *et al.* 2000, and references therein). In the Western Mediterranean, attendance to trawlers by seabirds has been studied by Arcos (2001) at Barcelona and Ebro Delta areas and by Martínez-Abraín (*et al.* 2002) in Northern Alicante province. Studies about the association of seabirds with purse seine fisheries are scarce and, at Spain, reduced to the one done by Arcos (2002) at Ebro Delta.

The third largest colony of the world of Audouin's Gull *Larus audouinii* (an endemic and threatened Mediterranean species) is at Murcia Region. Other species of seabird that breeds at the Region are the European Storm-petrel *Hydrobates pelagicus*, the Cory's Shearwater *Calonectris diomedea* and the Yellow-legged Gull *Larus michahellis*.

In spite of the seabird richness of the Murcia Region and their conservation status, there's no studies of the association with commercial fisheries in this area of the Western Mediterranean. The aim of our study is to assess the association of seabirds with demersal trawlers and purse seiners at the Murcia Region, especially focused to the Audouin's Gull.

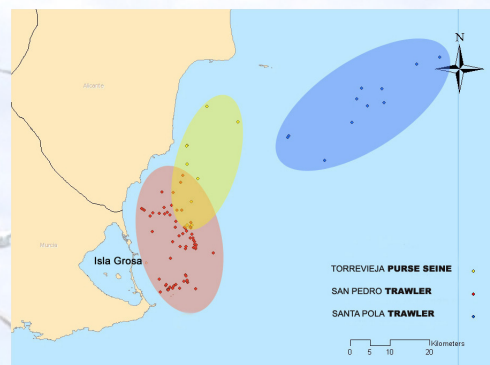


Figure 1. Study area.

	Winter n = 11			San Pedro Breeding n = 24			Postbreeding n = 11			Santa Pola Breeding n = 8		
	%P	Mean	Max.	%P	Mean	Max.	%P	Mean	Max.	%P	Mean	Max.
Balearic Shearwater <i>Puffinus mauretanicus</i>	81.8	13.00	60	37.5	0.58	4	81.82	1.09	2	62.5	2.50	8
Cory's Shearwater <i>Calonectris diomedea</i>	-	-	-	16.7	0.13	1	72.73	10.82	44	62.5	2.50	12
European Storm-petrel <i>Hydrobates pelagicus</i>	-	-	-	-	-	-	-	-	-	87.5	12.63	60
Northern Gannet <i>Sula bassana</i>	72.7	2.55	10	29.2	1.04	17	27.27	0.36	2	12.5	0.13	1
Shag <i>Phalacrocorax aristotelis</i>	-	-	-	-	-	-	-	-	-	37.5	0.38	1
Great Skua <i>Stercorarius skua</i>	9.09	0.09	1	20.8	0.21	1	-	-	-	-	-	-
Mediterranean Gull <i>Larus medanocephalus</i>	18.2	0.27	2	12.5	0.13	1	9.09	0.91	10	-	-	-
Black-headed Gull <i>Larus ridibundus</i>	72.7	12.64	80	25	1.04	10	54.55	7.64	50	-	-	-
Slender-billed Gull <i>Larus genei</i>	-	-	-	20.8	0.38	3	-	-	-	25	0.50	3
Audouin's Gull <i>Larus audouinii</i>	90.9	5.55	25	100	26.38	83	100	2.44	5	37.5	0.75	3
Yellow-legged Gull <i>Larus michahellis</i>	100	171.45	400	100	220.71	550	100	316.36	500	87.5	31.88	130
Lesser Black-backed Gull <i>Larus fuscus</i>	45.5	2.00	17	41.7	1.58	20	63.64	0.82	2	-	-	-
Sandwich Tern <i>Sterna sandwichensis</i>	27.3	0.27	1	33.3	0.50	2	63.64	2.45	6	-	-	-
Common Tern <i>Sterna hirundo</i>	-	-	-	33.3	2.33	25	72.73	3.55	15	37.5	1.38	6
Black Tern <i>Chlidonias niger</i>	-	-	-	4.17	0.63	15	27.27	0.27	1	37.5	4.50	25
Razorbill <i>Alca torda</i>	27.3	0.27	1	12.5	0.21	3	-	-	-	-	-	-

Table 1. Percentage of presence (%P), mean and maximum number of the different species of seabirds attending trawlers according to the study area and the season (winter period = November- February; breeding period = March-July and post breeding period = August-October).

## SAMPLING

We conducted 19 cruises on board of trawlers (54 hauls), 15 from San Pedro del Pinatar (46) and 4 from Santa Pola (8) between September 2005 and August 2006. San Pedro del Pinatar boat operates near to the coast and Santa Pola boat operates offshore (Figure 1). We also conducted 20 cruises on board of purse seiners from Torrevieja (4 of them without catches).

	Breeding						Non breeding					
	Night n=12			Daylight n=11			Night n=5			Daylight n=5		
	%P	Mean	Max.	%P	Mean	Max.	%P	Mean	Max.	%P	Mean	Max.
Balearic Shearwater <i>Puffinus mauretanicus</i>	25	0.75	5	90.91	4.09	14	20	29.80	149	60	61.80	-
Levantine Shearwater <i>Puffinus yelkouan</i>	-	-	-	-	-	-	-	-	-	-	-	20
Cory's Shearwater <i>Calonectris diomedea</i>	-	-	-	45.45	1.18	5	20	0.20	1	-	-	-
Northern Gannet <i>Sula bassana</i>	-	-	-	18.18	0.27	2	-	-	-	20	0.20	-
Great Skua <i>Stercorarius skua</i>	-	-	-	9.09	0.18	2	-	-	-	-	-	-
Mediterranean Gull <i>Larus medanocephalus</i>	-	-	-	9.09	0.18	2	-	-	-	-	-	-
Black-headed Gull <i>Larus ridibundus</i>	8.33	0.25	3	27.27	0.36	2	60	7.20	35	80	50.00	-
Slender-billed Gull <i>Larus genei</i>	8.33	0.33	4	54.55	1.45	7	-	-	-	-	-	-
Audouin's Gull <i>Larus audouinii</i>	100	108.50	230	100	66.36	150	100	34.20	104	60	6.80	-
Yellow-legged Gull <i>Larus michahellis</i>	83.33	14.42	55	100	126.91	290	100	2.40	7	100	195.00	-
Lesser Black-backed Gull <i>Larus fuscus</i>	16.67	4.83	56	27.27	4.75	40	40	3.80	17	80	76.40	-
Sandwich Tern <i>Sterna sandwichensis</i>	8.33	0.08	1	27.27	0.27	1	20	0.20	1	20	0.80	-
Common Tern <i>Sterna hirundo</i>	8.33	0.33	4	54.55	2.18	10	20	0.20	1	20	9.00	-
Razorbill <i>Alca torda</i>	-	-	-	-	-	-	-	-	-	20	0.20	-

Table 2. Percentage of presence (%P), mean and maximum number of the different species of seabirds attending purse seiners according to the activity of the vessel (hauling during night or discarding during daylight) and the season (breeding period = March-July and non breeding period = August-February).

## RESULTS AND DISCUSSION.

Yellow-legged Gull and Audouin's Gull were the most common species behind trawlers (Table 1). Most of the species selected the coastal area and does not exploit the offshore area (and Audouin's Gull showed significance differences,  $U = 30.50$ ,  $P < 0.001$ ). Only the European Storm-petrel preferred the offshore fishing. The number of Yellow-legged Gull was extremely high during all the seasons but Audouin's Gull attended trawlers in larger numbers during the breeding season (Kruskal-Wallis test,  $\chi = 8.5$ ,  $P = 0.014$ ).

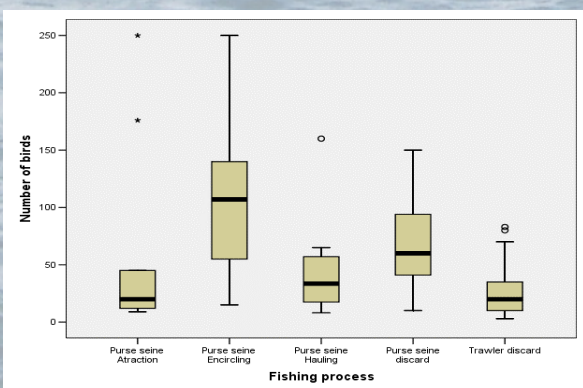


Figure 2. Number of Audouin's Gull (mean) in accordance with the purse seine and trawler activity. Attraction of the fish by lamps, encircling and hauling at purse seiners occurs during the night whereas the discarding activity at purse seiners or trawlers occurs during the daylight.

## Acknowledgements

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