Audouin's Gulls *Larus audouinii* Associate with Sub-surface Predators in the Mediterranean Sea

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Oro, D. (1995): Audouin's Gulls *Larus audouinii* associate with sub-surface predators in the Mediterranean Sea. J. Orn. 136: 465–467. — Two observations of Audouin's Gull flocks foraging on small fish forced to rise to the sea surface by tunas are presented. Observations were made just off-shore in the Ebro Delta, and Audouin's Gulls and terns concentrated in these flocks more than other seabirds breeding there, probably due to their higher ability for catching fish actively. The association of Audouin's Gulls with sub-surface predators may be a supplementary foraging behaviour for the species, especially during periods of short food supply.

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The association between seabirds and sub-surface predators such as tunas or cetaceans has been described as a feeding strategy that is usually incidental or opportunistic (see review in Evans 1982), and sometimes possibly obligatory (Pitman & Ballance 1992). Most published records of seabirds associated with marine predators are from areas of high density of sub-surface predators such as the eastern tropical Pacific (Au & Pitman 1988) or upwelling zones (such as the coasts of Mauritania, E. Grau pers. obs.). This association was previously described by Witt (1982) in the Mediterranean Sea for Audouin's Gull. Although he stated that catching success of Audouin's Gulls depended on the presence of feeding dolphins or tunas, little is still known on the exploitation of this resource by Mediterranean seabirds.
although tunas and cetaceans are not uncommon there (LiOrzou & Bīgôt 1990; Forcada et al. 1994).

In this note I report observations of Audouin’s Gull *Larus audouinii* and other seabirds benefitting from prey forced to the surface by sub-surface predators just off-shore at the Ebro Delta, Spain, in the northwestern Mediterranean Sea. This place (Punta de la Banya, 40° 37’ N 00° 35’ E) is the world’s largest breeding site for Audouin’s Gulls with ca. 7000 pairs (roughly 60 % of total world population; Oro & Martínez 1992). The area surrounding the delta is the most important fishing ground for cupleids in the Mediterranean due to the wide continental shelf and the nutrients brought by the Ebro river (Carreras et al. 1990). Many seabirds species breeding at the Punta de la Banya colony depend largely on trawler discards from these fisheries (Ruíz et al. in press, Oro et al. in press).

On 23 May 1994 using a 20 x 60 spotting scope I observed a dense flock of seabirds flying close to the surface approximately 500 m off-shore, where depth is about 5—6 m. The weather was calm. The observation started at 18:10 GMT and lasted 20 min, after which the flock dissolved quickly. The flock consisted of 590 Audouin’s Gulls (89 % from the total), 70 Common Terns *Sterna hirundo* (11 %), 3 Little Terns *S. albigularis* and 1 Yellow-legged Gull *Larus cachinnans*. The birds were flying very slowly in wide turning circles, with hovering flight dropping sharply to the surface when fish appeared, clearly visible from the shore because surface seemed to boil. On some occasions, I saw the backs of striped tunnies *Sarda sarda* (identified by dorsal finlets), which is the only Scombridae living in coastal waters often schooling near the surface (Whitehead et al. 1986) and often caught by trawler fisheries off-shore (A. Cruelles, pers. com.). High number of birds plunging did not allow a count of the number of plunges and their outcome, but terns plunged faster and more often than gulls did (from a count of 27 plunges, 16 were performed by terns), and their success rate seemed to be also higher.

On 28 May 1994 I observed again the same phenomenon, 600—700 m off-shore with similar weather conditions. The observation started at 14:30 GMT and lasted 15 min. This flock consisted of 328 Audouin’s Gulls (85 % from the total), 50 Common Terns (13 %), 30 Sandwich Terns *S. sandvicensis* (8 %), 1 Yellow-legged Gull, 3 Black-backed Gulls *L. fuscus* and 4 Yelkouan Shearwaters *Puffinus yelkouan*. This observation confirms that Yelkouan Shearwater feed mostly in inshore waters (Del Hoyo et al. 1992). In this occasion, predators were again probably tunas. Although I could not identify the sub-surface predator, there is virtually no way that large air-breathers like bottlenose dolphins *Tursiops truncatus* could have been overlooked, owing that observation lasted 15 min.

The Punta de la Banya site held in 1994 a colony of 11,904 pairs of gulls (10,143 pairs of Audouin’s Gulls, 1653 pairs of Yellow-legged Gulls and 108 pairs of Black-backed Gulls) and 1010 pairs of terns (ca. 950 pairs of Sandwich Terns, 59 pairs of Common Terns and 1 pair of Little Terns). Assuming that owing to both the large size of the flock and the flat profile of the colony the feeding flocks were equally visible from any part of the colony, terns significantly outnumbered gulls in these flocks ($\chi^2 = 61.48$, df = 1, $P < 0.001$), possibly related to their hovering capabilities during foraging. Considering only gull species, Audouin’s Gulls concentrated more than other gulls ($\chi^2 = 167.34$, df = 1, $P < 0.001$), probably also due to their higher ability for catching fish (Oro & Martínez 1994).

Little is known about foraging grounds and foraging strategies of Audouin’s Gulls, a rare endemic species of the Mediterranean Sea (Mace & Collar 1994). In three years of field work in the colony, including more than 600 h of observation from hides (Oro & Martínez 1994 and author unpub.), I did never observed such behaviour, neither during sea censuses from...