

NON-MAMMAL MARINE MACROFAUNA: A USABLE CLUE DURING CETOLOGIC FIELDWORK?



Adrien C. GANNIER

Groupe de Recherche sur les Cétacés

BP 715, 06633 Antibes cedex, France - www.cetaces.org





INTRODUCTION

Cetacean-aimed field research involves sea surveys, which are mainly designed to focus on those mammals. During fieldwork, observers often see non-mammal aquatic animals, but these sightings are frequently perceived as anecdotical and not used within main carried studies.

In this work we tried to estimate whether non-mammal marine macrofauna

MATERIALS

We used data gathered from sailboat surveys carried with a consistent methodology during two consecutive years (2016 and 2017) in the Northwestern Mediterranean Sea. In addition to cetacean-related information, encounters with birds aggregations, turtles, fishes and invertebrates aggregations were recorded.

Prior to analysis, this dataset was divided into 159 sessions of continuous transect

METHODS

A first overview:

Each of the extracted sessions contained a certain amount of non-mammal marine macrofauna sightings and a number of cetacean observations. Once weighed by the length of the session, these figures represented two rates of sightings per nautical mile.

We investigated whether they were correlated.

Taking proximity into account:

We then explored more accurately this correlation by estimating, within each prospection session, the spatial cooccurrence of the two sighting categories.

For each observation, we checked whether a sighting of the symmetrical category occurred less than one nautical mile away ([+/+] event) or not ([+/-] and [-/+] events). Double-negative events were extrapolated from remaining (*i.e.* without fauna encounters) transect lengths, in order to enable independence testing.

Some differences between cetaceans?

One could expect this correlation to be more significant when concerning (relatively) low-depth foraging cetaceans (example of the fin whale), and almost absent for deepdiving ones (*e.g.* sperm whales).

To test this hypothesis, we carried out processings using previous method but reducing cetacean sightings dataset to single species. We applied this process for striped dolphins (*Sc* ; 149 eligible sightings), sperm whales (*Pm* ; n=27), and fin whales (*Bp* ; n=34).

	<u>Contingency table</u> (expected values are bracketed)		Non-mammal fauna	
			+	-
	Cetaceans	+	43 (29)	176 (190)
		-	173 (187)	1251 (1237)

The positive spatial correlation appeared to be loose for *Sc* (Chi-squared test, $p \approx 0.063$), quite uncertain for *Pm* (Fisher's test, $p \approx 0.38$) and strongly significant with *Bp* (Fisher's test, $p \approx 0.0083$), thus validating our hypothesis.





A Spearman test revealed a positive correlation (p≈0.0001) between the two variables.

This method allowed us to draw a contingency table that confirmed (Chi-squared test, p≈0.002) a positive correlation between non-mammal marine macrofauna and cetacean sightings.

Two striped dolphins (Stenella coeruleoalba) surface among thousands of Velella velella

RESULTS

DISCUSSION AND CONCLUSIONS

Non-mammal marine macrofauna detection is probably biased by several factors. Mainly, apart from birds that can be detected rather easily, other taxa are affected by availability and perception biases, in an extent that greatly varies between species (these biases are obviously different if we consider a turtle and a sardine). Our fauna events should therefore be considered as fauna richness indicators rather than as true punctual sightings.

Some observers could also detect more non-mammal fauna when bored by the absence of cetaceans; this bias might be present but its effect would be anticorrelative, and thus can't explain our results.

Since the vast majority of the non-mammal fauna used in our analysis aren't usually consumed by cetaceans in the NW Mediterranean (Astruc 2005), our results should be viewed more as biological habitat parameters than as simple predator-prey co-occurrences.

Although experimental and possibly flawed (whether on the concept or on the arbitrary choice of some parameters (in particular, the one-nautical-mile co-occurrence

REFERENCE AND **A**CKNOWLEDGEMENTS

Astruc G., 2005. Exploitation des chaînes trophiques marines de Méditerranée par les populations de cétacés. Mémoire. Montpellier : École Pratique des Hautes Études.

Thanks to the GREC's observers for their participation to data gathering. Since this experimental study indicated that they seem to be *effective strategic partners*, special thanks to the various non-mammal marine macrofaunal species for their help during cetologic fieldwork.



distance)), our principle of spatio-temporal correlation could potentially be used for other problematics.

Our conclusions should be considered with caution but are overall very plausible, particularly regarding the differences between cetacean species.





mammal species. From left to right: Xiphias gladius, Calonectris diomedea, Velella velella, Chroicocephalus ridibundus and Larus michahellis, Trachurus trachurus, Caretta caretta and Naucrates ductor, Mola mola, Pelagia noctiluca, Mobula mobular Photos: A. C. Gannier