

Night surveys and smell, a mixed method to detect colonies of storm petrel *Hydrobates pelagicus*

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Abstract – Storm-petrels usually breed in sites difficult to access, making it hard to estimate the number of individuals in a colony or even the presence of a colony. After several years of study in the main colony and diurnal surveys to other caves of the island, we planned an extensive night survey for identifying previously unknown colonies. In the breeding season of 2011 we found 5 new colonies of storm petrels (*Hydrobates pelagicus*) at Marettimo island, increasing the estimation of the population on this island to approximately 3000 breeding pairs. We propose the use of mixed methods to locate new colonies, as they can be found by the characteristic smell of storm petrels, but under windy conditions it would be difficult. It is therefore very important to use night surveys to observe night activity by the individuals.

Key words: colonial seabirds, elusive species, cave nesting, odour.

Storm petrels (*Hydrobates pelagicus*) are widely distributed in Europe along the Atlantic coast and the Mediterranean. The largest colonies are those located in the Atlantic, such as the Faroe Islands with 150,000-400,000 pairs, the UK with 20,000-150,000 pairs and Iceland, with approximately 150,000 pairs. In the Mediterranean basin huge colonies consist only of 5,000-8,000 pairs on Malta and 2,500 pairs in Italy (Bricchetti & Fracasso 2003, BirdLife International 2004, 2011, Sultana *et al.* 2011).

According to the IUCN, the storm petrel is not considered to be under any threat. The species was previously categorised as near threatened, but after some studies carried out on the Atlantic population, the status was lowered to Least Concern (BirdLife International 2004, 2011). However, it has been proposed that there are two subspecies of *H. pelagicus*; in the Atlantic area, the smaller *H. p. pelagicus*, and in the Mediterranean the larger *H. pelagicus melitensis*. This differentiation was recently demonstrated by mitochondrial DNA from 5 populations across the Atlantic and the Mediterranean (Cagnon *et al.* 2004). Being krill almost absent in the Mediterranean, the diet and foraging behaviour of the Atlantic and Mediterranean populations are also different, with the latter feeding mainly on fish (Albores-Barajas *et al.* 2011); additionally, Mediterranean subspecies shows different phenology and

age of first breeding (Lo Valvo & Massa 2000). Focusing on the *melitensis* subspecies populations, a large decrease was observed through 1900', due to habitat degradation and introduction of predators, such as rats and cats (Massa 2006). For this reason a major attention should be paid to the Mediterranean subspecies.

The second largest known population of storm petrels in the Mediterranean, located in Marettimo Island (Italy) was first recorded by Krampitz (1956, 1957), who observed a few nests inside a pair of caves along the North-western coast. Krapp (1970) confirmed breeding in the caves recorded by Krampitz (1956, 1957) and also found some nests in the "grotta del Cammello", not cited by Krampitz. However, after subsequent visits by Massa and colleagues (Massa & Catalisano 1986, Lo Valvo & Massa 2000) smaller colonies apparently disappeared, probably due to the human disturbance or to a general decrease of the species. During later surveys, by 2007, some individuals were observed nesting at the "grotta del Cammello", with an estimate of 30 breeding pairs (Albores-Barajas *et al.* 2008). This small colony seemed to become extinct due to human disturbance as the cave is a touristic attraction of the island, but the recent discovery encouraged us to look for previously described as well as for unknown colonies apparently deserted in recent years. Furthermore the

finding of a new colony in Lampedusa Is. (Sicilian Channel, Italy) (Massa 2009), where the presence of the species was previously unknown, encouraged further research. We planned a night survey with the aim of visiting all the caves present on Marettimo's coastal cliffs. During the breeding season of 2011, we took advantage of perfect sea conditions (no wind, no waves, no rain), to visit all the caves in Marettimo Island during a moonless night. We visited a total of 10 coastal caves, and were surprised to find breeding storm petrels in five of them for a total of seven colonies on the island. We estimated at least 250 breeding pairs at "Bombarda" cave, 100 breeding pairs at "Presepe" cave, 50 pairs at "Pipa" cave and "Mammariddu" cave each and 25 pairs at "Tuono" cave. We also listened to chick calls inside the inaccessible holes of the caves. Of course, numbers could be underestimated, due to difficulties to count all the individuals together, as we considered only the individuals flying in the caves.

Our discovery significantly increases the population numbers of the Mediterranean storm petrel. Although the numbers discovered are not big enough as to be considered the largest colony in the Mediterranean, our findings indicate that the population is in stable conditions and perhaps its estimate was overlooked. Considering all the 7 colonies, the total population of the island can be estimated around 3,000 pairs.

In previous years we tried to locate other colonies within Marettimo Island and were not successful. From our experience, the best way to locate a colony was the use of smell. Storm petrels have a very characteristic odour and can be easily recognised. We considered a presence signal the typical smell of the species, usually perceivable at the entrance of the occupied caves. During the 2007 and 2011 surveys we observed individuals or nests directly, the results were not extrapolated from the typical smell of storm petrels. And we later realized that for smaller colonies (approximately 20 pairs) observed it was very difficult to perceive the smell. So if there is some wind, it would be impossible to precisely determine the presence of a small colony. In fact the smell could help in absence of wind and in the case of big colonies.

For instance, in Greece the storm petrel has been observed during at-sea surveys (*unpublished data*) but the breeding sites have not been identified, especially due to the lack of night surveys and the very large number of islands as possible breeding sites (Hellenic Seabird Database/Hellenic Ornithological Society).

In this paper we aim to highlight the need of accurate field techniques for identifying the breeding sites of the

storm petrels. Being in a speciation process, the storm petrel may at some point be split into two distinct species. Having that in mind, it is important to locate all the colonies and to acquire accurate numbers of the Mediterranean population in order to set a clear conservation status for the *melitensis* ssp.

We can conclude that many other colonies of storm petrels, where access to the colonies is not easy, can be underestimated due to low detectability of the species. It is therefore necessary to apply several methods, under different circumstances, to better determine population numbers.

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