Biodiversity Journal, 2022, 13 (1): 141–144 https://doi.org/10.31396/Biodiv.Jour.2022.13.1.141.144

Nesting activity of Loggerhead sea turtle *Caretta caretta* (Linnaeus, 1758) (Reptilia Cheloniidae) from 2018 to 2021 on Lampedusa Island (Pelagie Islands, Sicily Channel)

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ABSTRACT The author reports main data on egg laying of Loggerhead sea turtle *Caretta caretta* (Linnaeus, 1758) (Reptilia Cheloniidae) in Lampedusa Island in the nesting seasons 2018-2021, with the discovery of a new nesting site, and an update on nesting females tagging program.

KEY WORDS *Caretta caretta*; sea turtle; nesting; Italy; Lampedusa.

Received 11.01.2022; accepted 26.02.2022; published online 22.03.2022

INTRODUCTION

Caretta caretta (Linnaeus, 1758) (Reptilia Cheloniidae) is the most widespread species of sea turtle in the Mediterranean Sea. The main nesting sites are situated in the eastern basin and in particular along the coasts of Greece, Turkey, Libya and Cyprus (Casale et al., 2018). A smaller number of nests is laid annually also along the Italian coasts (Casale et al., 2018), although in recent years there has been a significant increase in the number of clutches. Lampedusa Island, and in particular Conigli beach, is one of the historical Italian nesting sites where *Caretta caretta* reproduction is studied by Legambiente Sicilia, the managing body of the Nature Reserve "Isola di Lampedusa" (Pelagie Islands, Sicily Channel), which for over 25 years has carried out nests monitoring and protection programs and data collection on nesting females and newborns (Prazzi et al., 2010; Prazzi et al., 2013; Prazzi & Giacoma, 2018).

Conigli beach, falling within the Nature Reserve, has been affected by numerous tasks aimed at stopping the main threat factors that were compromising the site's suitability to host sea turtles' nests (Bombace et al., 2001; Prazzi et al., 2010).

Interventions concerning environmental recovery and soil bioengineering have made it possible to stop the erosion and washout processes triggered by incorrect anthropic interventions carried out in the past, inducing the accumulation of debris on the beach and the consequent modification of the chemical-physical characteristics of the sand (Motta & Motta, 2007; Prazzi et al., 2010; La Mantia et al., 2012).

The adoption of a regulation overlooking a sustainable use of the beach allowed to mitigate the pressure associated with mass tourism, in compliance with the ecological needs of *Caretta caretta*, while the drafting and approval of the Action Plan for the Conservation of *Caretta caretta* in the Pelagie Islands (Balletto, 2003) and the application of standardized protocols for the collection of scientific data have made it possible to apply management measures for the protection of nests and hatchlings and to increase the knowledge on the

species (Prazzi et al., 2010). Furthermore, nesting events in some other beaches of the Island falling outside the Nature Reserve have been ascertained by Legambiente Sicilia in these last years (Prazzi & Giacoma, 2018).

MATERIAL AND METHODS

Monitoring program was carried out daily from June to the end of August by patrolling in early morning both ascertained and potential *Caretta caretta*'s nesting beaches. All data on tracks, nests and newborns were recorded according to the Protocols for the protection of nests and assistance to hatching (Giacoma & Mari, 2003) and the Ministerial Guidelines (AA.VV., 2013), including date of nesting, minimum and maximum depth of the nest chambre, number of eggs laid, incubation duration, date of first and last hatchling emergence, number of hatchlings, hatching success. Some biometric measurements and weight were recorded on hatchlings with a digital calipers and scale. Samples of unhatched eggs, shells and dead hatchlings inside the nest were collected to microbiological analysis. Furthermore since 2004 a tagging program on nesting females has been carried out by Legambiente Sicilia (Prazzi et al., 2010).

RESULTS

In this note, main data about nesting activity of *Caretta caretta* on Lampedusa Island from 2018 to 2021 are reported (Table 1), with a further ascertain of a new oviposition site and an update on nesting females tagging program (Table 2).

From 2018 to 2021 nine nests were laid on Lampedusa Island in four different beaches (three on Guitgia beach, two on Cala Croce beach, two on Cala Pisana beach and two on Conigli beach). Guitgia beach represents a new oviposition site, ascertained for the first time in 2018 by the staff of the Nature Reserve. With an area of about 4,500 square meters, it is the most touristic beach on the Island: very close to the port and surrounded by numerous hotels, the beach is always very crowded with tourists. Furthermore, the presence of different touristic facilities located directly on the beach, which carry out activities even at night with the use of lights and music, represents a further source of disturbance and threat to *Caretta caretta*.

The incubation period of the nest 2/2020 laid on Guitgia beach was the longest ever recorded for Lampedusa site (82 days), while the shortest (47 days) was recorded in Cala Pisana for the nest 2/2021.

Thanks to the tagging program on nesting females started in 2004, seven females have been tagged, while one nesting female already presented tags during oviposition. One nesting female tagged in 2006 returned in the following years and in particular in 2009, 2012 and 2016. Another nesting female was tagged in 2016 on Cala Croce beach and two years later was observed nesting on Guitgia beach.

DISCUSSION AND CONCLUSIONS

Data on *Caretta caretta* reported in this paper join to those already recorded in these last 20 years as part of the monitoring program of Loggerheads nests in Lampedusa (Prazzi et al., 2010; Prazzi et al., 2013; Prazzi & Giacoma, 2018), which once again confirms to be a regular nesting site of *Caretta caretta*.

After the discovery in 2016 of Loggerhead sea turtle nests on the beaches of Cala Pisana and Cala Croce (Prazzi & Giacoma, 2018), in 2018 the staff of the Nature Reserve ascertained for the first time an oviposition on Guitgia beach. Consequently, monitoring actions became necessary and useful also for the other beaches of the Island, even outside the Nature Reserve, thus confirming the use of these three beaches by sea turtles in the following years (2020–2021). Unlike Conigli beach, which is part of the protected area where its use is regulated, in these other three beaches there are numerous disturbances and threats mainly linked to uncontrolled mass tourism. For this reason, a greater effort has been made in these sites to guarantee the conservation actions of sea turtles: from the protection of nesting females to the surveillance of nests, from the defence of newborns to the sensitization of tourists.

Thanks to the tagging program it was possible to gather more information on the number of females who frequent the Lampedusa site and their

Nest code	Nesting	Site	Nesting female tag code	N. eggs	Incubation period (days)	N. hatchlings	Hatching success (%)	Hatchlings mean ± SD (n)	
								Carapace lenght (mm)	Weight (g)
1/2018	07/07/2018	Guitgia	IT0549/ IT0550	109	71	71	65.1	40.1±1.0 (n=14)	12.5±0.6 (n=9)
1/2020	14/07/2020	Guitgia	LMP001/ LMP002	80	=	0	0	=	=
2/2020	28/07/2020	Guitgia	n.o.	73	82	43	58.9	41.6±1.9 (n=2)	14.9±1.5 (n=4)
1/2021	08/07/2021	Cala Croce	n.o.	110	68	100	90.9	39.8±0.9 (n=84)	13.8±0.9 (n=83)
2/2021	12/07/2021	Cala Pisana	n.o.	81	47	69	85.2	39.0±1.1 (n=62)	14.2±1.1 (n=63)
3/2021	15/07/2021	Cala Pisana	LMP003/ LMP004	110	57	1	0.9	40.2 (n=1)	15.9 (n=1)
4/2021	24/07/2021	Cala Croce	LMP006	122	54	114	93.4	37.9±2.1 (n=114)	12.7±0.9 (n=114)
5/2021	01/08/2021	Conigli	n.o.	91	63	1	1.1	42.8 (n=1)	15.8 (n=1)
6/2021	18/08/2021	Conigli	n.o.	63	=	0	0	=	=

Table 1. Main data on *Caretta caretta* nesting activity in Lampedusa Island from 2018 to 2021. (n.o.= not observed).

Tag code	Year of tagging	Year(s) of return	Site(s)
IT 0520	2004	=	Conigli
IT 0519 / IT 0521	2006	2009; 2012; 2016	Conigli
IT0526	2006	=	Conigli
IT 1069 / IT 1070*	unknown	2016	Conigli
IT 0549 / IT 0550	2016	2018	Cala Croce/Guitgia
LMP 001 / LMP 002	2020	=	Guitgia
LMP 003 / LMP 004	2021	=	Cala Pisana
LMP 006	2021	=	Cala Croce

Table 2. Main data on tagging of nesting females. (* = female not tagged by Legambiente Sicilia).

fidelity to the reproductive site. This number is however higher, as in some cases it was not possible to carry out the tagging activities. In fact, to tag all nesting females and collect as much data as possible on their biology and behaviour, it is necessary to patrol the beaches all night long. Although this would require a considerable effort in terms of human resources, it would be desirable in the future to extend night monitoring to all beaches affected by the presence of *Caretta caretta*, as well as to

adopt some conservation measures already successfully tested in the Conigli beach in the sites outside the Nature Reserve.

ACKNOWLEDGMENTS

The author wishes to thank the staff of the Nature Reserve "Isola di Lampedusa" who identified the nests and collected data on females and hatchlings of *Caretta caretta*. A special thanks to all volunteers who contributed to the protection of the nests. Finally, thanks to the staff of the Marine Protected Area of the Pelagie Islands and to the Coast Guard of Lampedusa for the support and collaboration provided during the protection activities of the nests laid on the beaches outside the Nature Reserve. All activities, including data and samples collection, were carried out in accordance with the authorizations of the Ministry of Ecological Transition held by Legambiente Sicilia.

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