# A particular case of a tagged loggerhead sea turtle that naturally expelled a deep hook

J.C. Baez[1], S. Karaa[2,3], M.N. Bradai[3], J.J. Bellido[4], S. García-Barcelona[1] & J.A. Camiñas[1,5]

[1] Instituto Español de Oceanografía. Centro Oceanográfico de Málaga. 29640 Fuengirola. Málaga. C.e.: jcarlos.baez@ma.ieo.es
[2] Faculté des Sciences de Sfax. Route de Soukra, km 4. B.P. 802 Sfax. 3018, Tunisia.
[3] Institut National des Sciences et Technologies de la Mer (centre de Sfax). B.P. 1035 Sfax. 3018, Tunisia.
[4] Aula del Mar de Málaga. Avda. M. Heredia, 35. 29001 Málaga.
[5] Current addresses: Fisheries and Aquaculture Department. Food and Agriculture Organization of the United Nations (FAO). Subdelegación del Gobierno en Málaga. Paseo de Sancha, 64. 29071 Málaga.

**Fecha de aceptación:** 7 de marzo de 2011.
**Key words:** by-catch, fishery, longline, sea turtle, western Mediterranean Sea.

**Resumen:** El objetivo del presente trabajo es dar a conocer lo que parece el primer caso documentado de expulsión de un anzuelo de palangre en una tortuga boba en libertad. El ejemplar era un subadulto con una longitud curva mínima del caparazón de 58 cm. Tras ser capturado en el sureste de Menorca (Islas Baleares) el 11 de junio de 2006, se liberó con un anzuelo. Este no se halló durante la necropsia realizada en Túnez, tras su varamiento como cadáver 691 días después de su liberación. Aunque en estudios previos se han descrito casos similares de ejemplares recuperados en cautividad, se desconoce la frecuencia de hechos similares, así como las características de dichos ejemplares (tamaño, sexo, estado físico).

The surroundings of the Balearic Islands are important feeding areas for thousands of juvenile and subadult loggerhead sea turtles (Camiñas & de la Serna, 1995) coming from nesting areas in the western North Atlantic Ocean (Eckert *et al.*, 2008), Cape Verde Islands (Monzon-Arguello *et al.*, 2010) and eastern Mediterranean Sea (Carreras *et al.*, 2006). Revelles *et al.* (2008) suggests the existence of a permeable barrier between the north and the southwestern Mediterranean basin for loggerhead sea turtles. According to Laurent & Lescure (1994), the southern areas of the coast of Tunisia are a good wintering area for loggerhead turtles. Many authors reported numerous individuals of more than 70 cm SCL (straight carapace length), probably adults, captured in winter in this region, while in summer the bottom shrimp trawlers capture only a few loggerhead turtles (Jribi *et al.*, 2007).

Surface drifting longline is used worldwide by fisheries targeting large pelagic fish, mainly albacore *Thunnus alalunga* (Bonnaterre, 1788), bluefin tuna *Thunnus thynnus* (Linnaeus, 1758), and swordfish *Xiphias gladius* (Linnaeus, 1758). This fishing gear is considered an important threat for marine turtle populations of the western Mediterranean Sea (Camiñas, 1988; Camiñas *et al.*, 2006). Loggerhead turtles caught in surface longline can be killed when the line is brought on board. The main cause of direct mortality due to longlines is drowning (Work & Balazs, 2002). However, the rates of direct mortality are low, estimated between 0.004 and 0.057 dead turtles per 1000 hooks (Camiñas *et al.*, 2006).

There are studies that showed that animals rarely survive after swallowing the hook and usually part of the thread of a surface longline (Bentivegna *et al.*, 1993; Bjorndal *et al.*, 1994) due to the

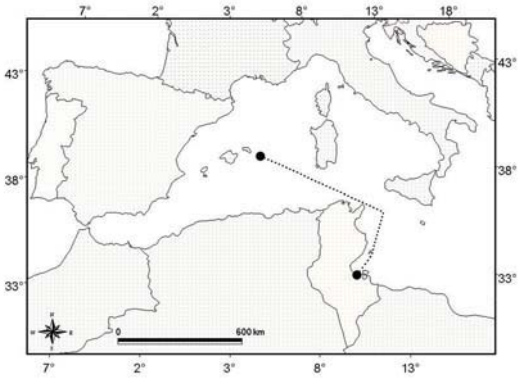


**Figure 1.** The area of loggerhead turtle release and stranded zone, in the western Mediterranean Sea. We show the release area, the stranded point, and the minimum distance travelled at sea (approximately 1200 km).
**Figura 1.** El área de la liberación de la tortuga boba y zona de varamiento, en el Mar Mediterráneo occidental. Se muestra el área de liberación, el punto de varamiento, y la distancia mínima recorrida en el mar (aproximadamente 1200 km).

lethal injuries caused by the hooks. Nevertheless, there are evidences of loggerhead survival after being released with an inserted hook (Gerosa & Casale, 1999; Tomás *et al.*, 2001). Several studies reported that captive loggerheads have been able to spontaneously expel the hook through the cloaca with the nylon line attached (Mas & Garcia, 1990; Gerosa & Casale, 1999). However, the frequency of this fact and the characteristics of the specimens (size, sex, fitness) are unknown.

The Spanish Institute of Oceanography has put into practice an onboard observer program in commercial longline vessels that targets highly migratory species with the aim of obtaining direct information on catches and discards of target and by-catch species. The onboard scientific-observer marked 789 turtles in this program. Camiñas & Valeiras (2009) reported 15 recaptures, and recapture sites were: 11 turtles around the Balearic Sea, one turtle in the Alboran Sea, one turtle in Algiers (Algeria), one turtle in the Gulf of Cadiz (southern Iberian peninsula), and one in Cuba.

The aim of this short communication is to present a particular case of a subadult loggerhead turtle captured in the southeast of the Balearic Islands, near to Menorca Island (Mediterranean Sea) on 11 June 2006 and released with a hook in the deep oesophagus in the coordinate 39º 37' North, 04º 56' East. SCL of this specimen was 54 cm (58 cm curved minimum carapace length CCL, according to the transformation function by Báez *et al.*, 2010), and it was caught by a drifting surface longline targeting bluefin tuna (LLJAP) (Valeiras & Camiñas, 2003; Camiñas *et al.*, 2006; García-Barcelona *et al.*, 2010, showed in-depth description of fleet strata and technical characteristics of the fishery). The hooks used by this fleet show a C shaped form. The loggerhead turtle was tagged with a metallic tag, and released with the hook in the deep oesophagus. Loggerhead turtle was stranded dead in Zarat, Gulf of Gabes, Tunisia (33° 41' North, 10° 22' East), approximately 1200 km in minimum distance travelled at sea (Figure 1) on 14 May 2008 (691 days after release). The turtle was 62 cm CCL at the time of the recovery. The calculated growth rate was approximately 2 cm/year, which is within the average growth rate for juvenile loggerhead turtles in the Mediterranean Sea (Casale *et al.*, 2009). During the necropsy no fishing hook was detected, and the intestines had a normal shape.

Bjondal *et al.* (2003) and Casale *et al.* (2007) analyzed the survival probabilities of loggerhead sea turtles estimated from capture-mark-recapture data in the Greater Caribbean and Mediterranean Sea, respectively. According to both papers, there are low probabilities of dead loggerhead recoveries. Casale *et al.* (2007) obtained low estimates of annual survivorship, although this result should be considered with prudence, due to an unknown tag loss rate. In our case the turtle was injured, released and

killed for unknown causes. Thus, in two years the turtle had a very eventful life.

The present case exemplifies that a loggerhead turtle can survive after being released with a hook attached to the deep oesophagus, and that it can be able to spontaneously expel it in wild. Our results, according to previous studies, indicate the difficulties of estimating post-release mortality (Chaloupka *et al.*, 2004), and stress the importance of continuing tag-release programs.

**Acknowledgements:** Experts from different projects carried out at the Oceanographic Centre of Malaga (IEO, Spanish Institute of Oceanography) supported the Spanish onboard observer program in commercial longline fisheries. We are grateful to the skippers and fishermen for allowing to collect the data from the boats. We grateful to the scientific onboard observer J.F. Moreno de la Rosa and we would like to thank Dr. D. Macías and F. Ferri-Yañez for their helpful comments.

## References

Báez, J.C., Macías, D., Puerto, M.A., Camiñas, J.A. & Ortiz de Urbina, J.M. 2010. Análisis biométrico de la tortuga boba, *Caretta caretta* (Linnaeus 1758), en el Mediterráneo occidental. *Collective Volume Scientific Papers ICCAT (International Commission for the Conservation of Atlantic Tunas)*, 65: 2305-2309.

Bentivegna, F., Cirino, P. & Toscano, A. 1993. Care and treatment of loggerhead sea turtle from the Gulf of Naples, Italy. *Marine Turtles Newsletter*, 61: 6-7.

Bjorndal, K.A., Bolten, A.B. & Lagueux, C.J. 1994. Ingestion of marine debris by juvenile sea turtles in Costa Florida habitats. *Marine Pollution Bulletin*, 28: 154-158.

Bjorndal, K.A., Bolten, A.B. & Martins, H.R. 2003. Estimates of survival probabilities for oceanic-stage loggerhead sea turtles (*Caretta caretta*) in the North Atlantic. *Fisheries Bulletin*, 101: 732–736.

Chaloupka, M., Parker, D. & Balazs, G. 2004. Modelling post-release mortality of loggerhead sea turtles exposed to the Hawii-based pelagic longline fishery. *Marine Ecology Progress Series*, 280: 285-293.

Casale, P. Mazaris, A.D., Freggi, D., Vallini, C. & Argano R. 2009. Growth rates and age at adult size of loggerhead sea turtles (*Caretta caretta*) in the Mediterranean Sea, estimated through capture-mark-recapture records. *Scientia Marina*, 73: 589-595.

Camiñas, J.A. 1988. Incidental captures of *Caretta caretta* with surface long-lines in the western mediterranean. *Rapport Commission Internationale pour la Exploration Scientifique de la Mer Méditerranée*, 31: 285.

Camiñas, J.A., Báez, J.C., Valeiras, J. & Real, R. 2006. Differential loggerhead by-catch and direct mortality in surface longline according to boat strata and gear type. *Scientia Marina*, 70: 661-665.

Camiñas, J.A. & de la Serna, J.M. 1995. The loggerhead distribution in the western Mediterranean Sea as deduced from captures by the Spanish longline fishery. 316-323. *In*: Llorente, G.A., Montori, A., Santos, X. & Carretero, M.A. (eds.), *Scientia Herpetologica*. Universitat de Barcelona, Barcelona.

Camiñas, J.A. & Valeiras, J. 2009. Tortuga boba. 216-227. *In*: Rodríguez-Cabello, C. (cod.), *Estudios de marcado y recaptura de especies marinas*. Ed. Instituto Español de Oceanografía. Madrid, Spain.

Carreras, C., Pont, S., Maffucci, F., Pascual, M., Barcelo, A., Bentivegna, F., Cardona, L., Alegre, F., San Felix, M., Fernandez, G. & Aguilar, A. 2006. Genetic structuring of immature loggerhead sea turtles (*Caretta caretta*) in the Mediterranean Sea reflects water circulation patterns. *Marine Biology*, 149: 1269-1279.

Casale, P., Mazaris, A.D., Freggi, D., Basso, R. & Argano, R. 2007. Survival probabilities of loggerhead sea turtles (*Caretta caretta*) estimated from capture-mark-recapture data in the Mediterranean Sea. *Scientia Marina*, 71: 365-372.

Eckert, S.A., Moore, J.E., Dunn, D.C., van Buiten, R.S., Eckert, K.L. & Halpin, P.N. 2008. Modeling loggerhead turtle movement in the Mediterranean: importance of body size and oceanography. *Ecology Application*, 18: 290-308.

García-Barcelona, S., Ortiz de Urbina, J.M., de la Serna, J.M., Alot, E. & Macías, D. 2010. Seabird by-catch in Spanish Mediterranean large pelagic logline fisheries, 1998-2008. *Aquatic Living Research*. DOI: 10.1051/alr/2010.

Gerosa, G. & Casale, P. 1999. *Interaction of marine turtles with fisheries in the Mediterranean*. RAC/SPA, Tunis, Tunisia.

Jribi, I., Bradai, M.N. & Bouain, A. 2007. Impact of trawl fishery on marine turtles in the Gulf of Gabès (Tunisia). *Herpetological Journal*, 17: 110-114.

Laurent, L. & Lescure, J. 1994. L'hivernage des tortues caouannes *Caretta caretta* dans le sud tunisien. *Revue d'Ecologie (Terre Vie)*, 49: 63-86.

Mas J. & García P. 1990. Tortues marines dans la zone levantine de la péninsule ibérique. *Rapport de la Commission Internationale pour l'Exploration Scientifique de la mer Méditerranée*, 32: 240.

Monzón-Arguello, C., Rico, C., Naro-Maciel, E., Varo-Cruz, N., López P., Marco, A. & López-Jurado, L.F. 2010. Population structure and conservation implications for the loggerhead sea turtle of the Cape Verde Islands. *Conservetion Genetetics*, 11: 1871-1884.

Revelles, M., Camiñas, J.A., Cardona, L., Parga, M., Tomás, J., Aguilar, A., Alegre, F., Raga, A., Bertolero, A. & Oliver, G.

2008. Tagging reveals limited exchange of immature loggerhead sea turtles (*Caretta caretta*) between regions in the western Mediterranean. *Scientia Marina*, 72: 511-518.

Tomas, J., Dominici, A., Nannarelli, S., Forni, L., Badillo, F.J. & Raga, J.A. 2001. From hook to hook: the odyssey of a loggerhead sea turtle in the Mediterranean. *Marine Turtle Newsletter*, 92: 13-14.

Valeiras, J. & Camiñas, J.A. 2003. The incidental captures of seabirds by Spanish drifting longline fisheries in the Western Mediterranean Sea. *Scientia Marina*, 67: 65-68.

Work, T.M. & Balazs, G.H. 2002. Necropsy findings in sea turtles taken as by-catch in the North Pacific longline fishery. *Fisheries Bulletin*, 100: 876-880.

# Albinismo en un adulto de *Pelophylax perezi* en el sur de Cádiz (SO de la Península Ibérica)

Francisco Jiménez-Cazalla

Avda. Italia, 5. 11205, Algeciras. Cádiz. C.e.: virgatta@yahoo.es

**Fecha de aceptación:** 13 de diciembre de 2010.
**Key words:** *Pelophylax perezi*, albinism, province of Cádiz.

Se han descrito numerosas variaciones en el patrón de coloración de la piel de anfibios, siendo el albinismo uno de los casos más destacados (Dyrkacz, 1981). El albinismo está definido como la ausencia de pigmentación determinada genéticamente, o inducida ambientalmente, en animales que, generalmente, son pigmentados (Lawrence, 2000). El albinismo total o parcial ha sido descrito en la mayor parte de los linajes de vertebrados (Sanabria *et al.*, 2010) y, en condiciones no inducidas, se debe a una alteración congénita de la pigmentación dérmica (Brame, 1962) por la expresión de un alelo recesivo (Álvarez de Villar *et al.*, 2007; Sanabria *et al.*, 2010). El fenotipo resultante es de color blanco o amarillento y con los ojos rojos (Diego-Rasilla & Luengo, 2007). Dentro del grupo de los anfibios, son numerosos los trabajos en los que, desde hace décadas, se citan casos de albinismo total o parcial tanto en urodelos (e.g., Flindt, 1985; Mitchell & Church, 2002; Diego-Rasilla *et al.*, 2007) como en anuros (e.g., Eales, 1933; Federighi, 1938; Smallcombe, 1949; Gill *et al.*, 1970; Browder, 1972; Mitchell, 2005; Tazawa *et al.*, 2006; Motte & Cacciali, 2009; Eagleson *et al.*, 2010).

Son frecuentes las referencias sobre casos de albinismo en diferentes especies de anfibios encontrados en la Península Ibérica. Dentro de los urodelos se ha registrado el hallazgo de albinismo en larvas de *Chioglossa lusitanica* (Teixeira et al., 1999), en adultos y larvas de *Salamandra salamandra* (Arribas & Ribera, 1992; Benavides *et al.*, 2000), albinismo parcial en adultos de *Pleurodeles waltl* (Schreitmüller, 1934; Fontanet *et al.*, 1992), *Calotriton asper* (Thiesmeier, 1988), *Triturus marmoratus* (Budó, 1997; Matallanas & Lombarte, 1990; Diego-Rasilla *et al.*, 2007), *Triturus pygmaeus* (Romero & Real, 2007) y *Lissotriton boscai* (Pedrajas *et al.*, 2006; Galán, 2010) y albinismo completo en adultos de esta última especie (Thorn, 1968; Rivera *et al.*, 2001; Galán, 2010). Entre los anuros se han descrito casos de albinismo en larvas de *Alytes obstreticans* (Rivera *et al.*, 1991; Diego-Rasilla & Luengo, 2007), *Alytes cisternasii* (Barnestein & González de la Vega, comunicación personal), *Alytes dickhilleni* (Benavides *et al.*, 2000), *Pelobates cultripes* (Bosch, 1991; Gómez-Serrano, 1994) y *Pelodytes punctatus* (Arribas, 1986); juveniles albinos de *A. dickhilleni* (Benavides *et al.*, 2000) y *P. punctatus* (Arribas, 1986) así como juveniles albinos parciales de *P. cultripes* (Bosch, 1991) y *Rana iberica* (Alarcos *et al.*, 2006).