

SHORT COMMUNICATION

New record of giant devil ray, *Mobula mobular* (Bonnaterre, 1788) from the Gulf of Antalya (Eastern Mediterranean Sea)

Nuri Başusta^{1*}, Elif Özgür Özbek^{2,3}

¹Fisheries Faculty, Firat University, 23119, Elazığ, TURKEY

²Antalya Metropolitan Municipality, Directorate of City History and Promotion, Marine Biology Museum, Antalya, TURKEY

³Turkish Marine Research Foundation (TUDAV), P.O. Box: 10, Beykoz, Istanbul, TURKEY

*Corresponding author: nbasusta@hotmail.com; nbasusta@firat.edu.tr

Abstract

On 10 March 2017, thirty individuals of giant devil ray, *Mobula mobular*, were caught accidentally by a commercial purse seiner at a depth of approximately 25 m off Beşadalar, the Gulf of Antalya. Of the thirty specimens, two are described in detail. *M. mobular* was recorded for the first time in the Gulf of Antalya (Eastern Mediterranean Sea).

Keywords: *Mobula mobular*, giant devil ray, elasmobranch, Gulf of Antalya, Eastern Mediterranean

Received: 21.03.2017, **Accepted:** 15.06.2017

Devil rays or mantas are very large, pelagic species and their body is lozenge-shaped with pointed tip (Golani *et al.* 2006). The family Mobulidae comprises eleven species belonging to two genera (Froese and Pauly 2017). The giant devil ray, *Mobula mobular*, is the only native species of the genus *Mobula* found in the Mediterranean Sea (Notarbartolo di Sciara 1987; Serena 2005).

A total of 64 species of elasmobranchs occur in the Mediterranean coasts of Turkey (Başusta *et al.*, 2016) with a recent addition of *Himantura leoparda* from the Turkish coasts by Yucel *et al.* (2017). Four non-native elasmobranch species (*Carcharhinus brevipinna* (Müller & Henle, 1839), *Himantura uarnak* (Forsskål, 1775), *Himantura leoparda* (Manjaji-Matsumoto & Last, 2008) and *Mobula japonica* (Müller & Henle, 1841)) have been reported from Turkey (Basusta *et al.* 1998; Sakallı *et al.* 2016; Yucel *et al.* 2017). These species are considered to be either vagrants or Lessepsian immigrants. However, they were assumed to

enter in the Mediterranean Sea from the Red Sea through the Suez Canal, or from the eastern tropical Atlantic into the Mediterranean Sea through the Strait of Gibraltar. Rafrafi-Nouira *et al.* (2015), Capapé *et al.* (2015) and Hemida *et al.* (2016) reported the occurrence of *M. japonica* from Algerian, Tunisian waters and Mediterranean Sea. It was seen in the Turkish coasts almost on the same date, last year (Sakalli *et al.* 2016).

M. mobular is very similar to *M. japonica*, which occurs circumtropically (Poortvliet *et al.* 2015). Although differences in tooth morphology suggest that they are separate species (Adnet *et al.* 2012), Last *et al.* (2016) consider *M. japonica* as conspecific species and according to the results of the genetic study, Poortvliet *et al.* (2015) reported that they are probably the same species; however, additional and population level sampling, combined with genetic analysis and morphological examination are necessary before any conclusions.

Giant devil ray is the largest species of the genus *Mobula* and has a very low reproductive capacity (i.e., giving birth to a single large pup at unknown intervals (Notarbartolo di Sciara and Serena 1988). Its geographic range is limited to the Mediterranean Sea and possibly adjoining North Atlantic waters. *M. mobular* population designated as Endangered (EN) by the International Union for Conservation of Nature (IUCN) (Notarbartolo di Sciara *et al.* 2015; Nieto *et al.* 2015; Dulvy *et al.* 2016). *M. mobular* was recorded from the Turkish coasts by Akyüz and Artüz (1957); from the Aegean Sea by Akyol *et al.* (2005); from Iskenderun Bay by Yaglioglu *et al.* (2013) and finally second time from the Iskenderun Bay (Northeastern Mediterranean Sea) by Sakalli (2017). In addition, there was no information from the Gulf of Antalya. This paper presents the first record of the giant devil ray caught from the Gulf of Antalya and its morphological measurements.

On 10 March 2017, a total of thirty *M. mobular* specimens were captured accidentally by a commercial purse seiner at a depth of approximately 25 m off Beşadalar in the Gulf of Antalya (Eastern Mediterranean) and landed in the Izmir Harbor. According to the news issued by Anadolu Agency to several newspapers, the fishermen gave the fish to a dealer to sell. With this information, two specimens were asked for by the Marine Biology Museum of the Antalya Metropolitan Municipality for a scientific and exhibition purpose.

Two samples (male and female) were transferred by a refrigerated vehicle to the field area of the Marine Biology Museum, Antalya Metropolitan Municipality where they were identified, measured and photographed. The identification of species was made according to Notarbartolo di Sciara (1987; 2016); Serena (2005); and Capapé *et al.* (2015). The lengths (disc width, disc length, total length, etc.) were measured to the nearest 0.1 cm and the weight to the nearest kilogram (kg). The disc widths of the female and male giant devil ray measured as 270 and 272 cm and weighed approximately 103 and 105 kg, respectively

(Figures 1 and 2). Measurements, adopted for *Mobula* by Notarbartolo di Sciara (1987), used to describe proportional dimensions are given in Table 1. The individuals were checked for the stomach content and sex.

The stomachs were empty, except for the parts of seagrass leaves in the female and tiny body parts and a 4cm skeleton of a bony fish in the male stomach. The new record of the giant devil ray in the Gulf of Antalya is a very important data and increases its distribution along the Mediterranean coasts.



Figure 1. The male and female specimens of giant devil ray (*Mobula mobular*) from the Gulf of Antalya (eastern Mediterranean)



Figure 2. The giant devil ray (*M. mobular*) from the Gulf of Antalya (eastern Mediterranean)

Table 1. Morphometric measurements of the giant devil ray (*M. mobular*) from the Gulf of Antalya (eastern Mediterranean).

Measurement	Female cm	Male cm
Total Length	291.5	335
Disc length	145	147
Disc width	270	272
Tail	162.5	198
Cephalic fin length	33.5	36
Diameter of eye ball	3.8	4.5
Cranial width	43.5	44
Preoral length	10	10
Mouth width	31	30
Cephalic fin width	2.5	2.5
Width between first gill slit	30	31
Rostrum to 1st gill openings	29.2	29.5
Rostrum to 5th gill openings	58.8	59.5
Distance between cephalic fins	26	29
Distance between eyes	49.5	53
Interspiracular width	38.5	42
Pre-orbital length	19.8	21.2
Pre-spiracle length	30.5	31
Pre-nostril length	23.5	24
Pre-oral length	28	30
Dorsal fin (height)	15	19
Pectoral fin (convex length)	135.7	133
Pectoral fin (concave length)	133.5	131
Anterior pelvic fin	14.8	14.8
Posterior pelvic fin	6	6.5
Anus opening	9	10
Clasper	-	26
Eviscerated weight (kg)	103	105

Due to high morphological similarities of *M. mobular* and *M. japanica*, we also suspected the identification of the species. The misidentifications are generally based on wrong assumptions. For example, *M. japanica* has a white tip on the dorsal fin, while *M. mobular* does not. They both do, although some individuals (in both species) may not have it. They both have a ventral mouth, a spine at the base of tail, a thick dark band in nuchal region, peg-like teeth, and they both can reach a disc width >3m. The body measurements can also contribute to the ongoing fisheries science and taxonomic studies of the spinetail mobula in the Mediterranean.

Lawson *et al.* (2017) summarized the international, national, and territory/state protections currently in place for manta rays. Among them, CMS Appendix I & II (2014), European Union (2015), IATTC (2015), and CITES (2016) are the international protections that restricts fishing and/or trade of multiple species of

the genus (*Mobula* spp.). Additionally, according to the joint statement of five international NGOs (iSea, Tethys, TUDAV, SUBMON, IMMRAC 2017) on this incident; since 2006 *M. mobular* is listed in Annex II to the Barcelona Convention SPA/BD Protocol, Appendix I of the Convention on the Conservation of Migratory Species of Wild Animals, and since 2017 in Appendix II of the CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). Furthermore the parties to the Barcelona Convention agreed that this species cannot be retained on board, trans-shipped, landed, transferred, stored, sold, displayed or offered for sale, and must be released unharmed and alive, to the extent possible, pursuant to Recommendation GFCM/36/2012/3 (FAO 2012). They are also strictly protected by EU (72/2016/EU), Croatian (Law of the Wild Taxa 2006), Maltese (Sch. VI), Israeli (since 2005), Greek (PD 67/1981) and Turkish (Environmental Law No. 2 872) legislation.

Despite these legislative measures, incidental catch of the mobulids is the main problem for the conservation. Although the meat value is low, fishermen still prefer to market the fish when caught instead of releasing. In this case, the fisherman explained his intention to sell the fish to Greece for 3-4 Euros per kg. Although the gill plates of mobulids have high market value, there is no record of the Turkish fishermen to sell the fish with this purpose. The studies on the survival rate of post-released individuals are very scarce (Francis and Jones 2017 and the references therein) but they generally indicate that handling, boarding or removing fish from water decrease the survival rate; however, releasing them directly from the brailer of the purse seine (a large scoopnet) is considered as the best practice.

Lawson *et al.* (2017) also summarized the Specific, Measurable, Achievable, Relevant/Realistic, and Time-Bound (SMART) criteria as a guide for setting objectives and actions for the conservation of these species for three main goals which are 1) to generate the required knowledge and share with relevant stakeholders, 2) to manage the fisheries, trade, and demand to maintain or recover the populations, 3) to increase the awareness of the community for their engagement and support for the conservation.

Research on *M. mobular* is very scarce and more studies should be done to understand their biology, abundance, distribution, etc. Reproduction and nursery areas should be identified and fishing should be banned throughout the Mediterranean Sea.

Acknowledgements

We thank Prof. Dr. Bayram Öztürk for his encouragement to submit this paper, warmly thank Dr. Giuseppe Notarbartolo di Sciarra for the identification of species and his valuable comments, Mr. İlyas Çopur, Director of the Directorate of City History and Promotion of Antalya Metropolitan Municipality for his support to obtain the fish samples, Assist. Prof.

Dr. Arda M. Tonay for his contribution to the manuscript and Mr. Göktuğ Özgül for video and photos.

Hayalet vatozun, *Mobula mobular* (Bonnaterre, 1788) Antalya Körfezi'nden yeni kayıtları

Öz

Toplam 30 hayalet vatoz (*Mobula mobular*) 10 Mart 2017 tarihinde, Antalya Körfezi Beşadalar açıklarından yaklaşık 25 m derinlikten ticari gırgır avcılığı yapan balıkçı teknesi ile kazara yakalanmıştır. Bu 30 balıktan ikisi tanımlanmıştır. Bu çalışma ile *M. mobular* Antalya Körfezi'nden ilk kez kaydedilmiştir.

References

Adnet, S., Cappetta, H., Guinot, G., Notarbartolo di Sciara, G. (2012) Evolutionary history of the devilrays (Chondrichthyes: Myliobatiformes) from fossil and morphological inference. *Zoological Journal of the Linnean Society* 166(1): 132-159.

Akyol, O., Erdem, M., Ünal, V., Ceyhan, T. (2005) Investigations on drift-net fishery for swordfish (*Xiphias gladius* L.) in the Aegean Sea. *Turkish Journal of Veterinary and Animal Sciences* 29: 1225-1231.

Akyüz, E., Artüz, I. (1957) Some observations on the biology of tuna (*Thunnus thynnus*) caught in Turkish waters. *GFCM Proc Tech Papers* 4: 93-99.

Başusta, N., Başusta, A., Özbek, E.Ö. (2016) Cartilaginous fishes and fisheries in the Mediterranean coast of Turkey. In: *The Turkish Part of the Mediterranean Sea; Marine Biodiversity, Fisheries, Conservation and Governance* (eds., C. Turan, B. Salihoğlu, E. Özgür Özbek, B. Öztürk), Turkish Marine Research Foundation (TUDAV), Istanbul, pp. 248-274.

Başusta, N., Erdem, U., Kumlu, M. (1998) Two new fish records for the Turkish seas: round stingray *Taeniura grabata* and skate stingray *Himantura uarnak* (Dasyatidae). *Israel Journal of Zoology* 44(1): 65-66.

Capapé, C., Rafrafi-Nouira, S., El Kamel-Moutalibi, O., Boumaïza, M., Reynaud, C. (2015) First Mediterranean records of spinetail devil ray, *Mobula japonica* (Elasmobranchii: Rajiformes: Mobulidae). *Acta Ichthyologica et Piscatoria* 45(2): 211-215.

Dulvy, N.K., Allen, D.J., Ralph, G.M., Walls, R.H.L. (2016) *The Conservation Status of Sharks, Rays and Chimaeras in the Mediterranean Sea*. (Brochure) IUCN, Malaga, Spain.

Francis, M.P., Jones, E.G. (2017) Movement, depth distribution and survival of spinetail devilrays (*Mobula japonica*) tagged and released from purse-seine catches in New Zealand. *Aquatic Conservation: Marine and Freshwater Ecosystems* 27: 219-236.

Froese, R., Pauly, D. (2017). Fishbase. Retrieved from www.fishbase.org. (accessed on 15 March 2017)

Golani, D., Öztürk, B., Başusta, N. (2006) Fishes of the Eastern Mediterranean. Turkish Marine Research Foundation, Istanbul. 259 pp.

Hemida, F., Kassar, A., Capapé, C. (2016) Mediterranean occurrence of *Mobula japonica* (Chondrichthyes: Mobulidae) with first record from the Algerian coast. *Rapp. Comm. int. Mer Médit.* 41: 326.

iSea, IMMCRAC, SUBMON, Tethys, TUDAV (2017) Joint Statement on the 30 Giant devil ray landing in Izmir. Available from: http://www.tudav.org/images/2017/documents/Final_Joint_Statement_Mobula_mobular.pdf (accessed on 02 May 2017)

Last, P., White, W., de Carvalho, M., Séret, B., Stehmann, M., Naylor, G. (Eds.) (2016) Rays of the World. CSIRO Publishing, Melbourne, Australia. 800 pp.

Lawson, J.M., Fordham, S.V., O'Malley, M.P., Davidson, L.N.K., Walls, R.H.L., Heupel, M.R., Stevens, G., Fernando, D., Budziak, A., Simpfendorfer, C.A., Ender, I., Francis, M.P., Notarbartolo di Sciara, G., Dulvy, N.K. (2017) Sympathy for the devil: a conservation strategy for devil and manta rays. *PeerJ* 5:e3027.

Nieto, A., Ralph, G.M., Comeros-Raynal, M.T., Kemp, J., Garcia Criado, M., Allen, D.J., Dulvy, N.K., Walls, R.H.L., Russell, B., Pollard, D., Garcia, S., Craig, M., Collette, B.B., Pollom, R., Biscoito, M., Labbish Chao, N., Abella, A., Afonso, P., Alvarez, H., Carpenter, K.E., Clo, S., Cook, R., Costa, M.J., Delgado, J., Dureuil, M., Ellis, J.R., Farrell, E.D., Fernandes, P., Florin, A-B., Fordham, S., Fowler, S., Gil de Sola, L., Gil Herrera, J., Goodpaster, A., Harvey, M., Heessen, H., Herler, J., Jung, A., Karmovskaya, E., Keskin, C., Knudsen, S.W., Kobylansky, S., Kovačić, M., Lawson, J.M., Lorance, P., McCully Phillips, S., Munroe, T., Nedreaas, K., Nielsen, J., Papaconstantinou, C., Polidoro, B., Pollock, C.M., Rijnsdorp, A.D., Sayer, C., Scott, J., Serena, F., Smith-Vaniz, W.F., Soldo, A., Stump, E., Williams, J.T. (2015) European Red List of Marine Fishes. The European Union, Luxembourg. 88 pp.

Notarbartolo di Sciara, G. (1987) A revisionary study of the genus *Mobula* Rafinisque, 1810 (Chondrichthyes: Mobulidae) with the description of a new species. *Zoological Journal of the Linnean Society* 91: 1-91.

Notarbartolo di Sciara, G. (2016) Mobulidae. In: The Living Marine Resources of the Eastern Central Atlantic, Volume 2: Bivalves, Gastropods, Hagfishes, Sharks, Batoid Fishes and Chimaeras (eds., K.E. Carpenter, N. De Angelis), FAO Species Identification Guide for Fishery Purposes, FAO, Rome, pp. 1434-1440.

Notarbartolo di Sciara, G., Serena, F. (1988) Term embryo of *Mobula mobular* (Bonnaterre, 1788) from the northern Tyrrhenian Sea. *Atti Soc Ital Sci Nat Mus Civ Stor Nat Milano* 129: 396-400.

Notarbartolo di Sciara, G., Serena, F., Mancusi, C. (2015) *Mobula mobular*. The IUCN Red List of Threatened Species 2015: e.T39418A48942228. <http://dx.doi.org/10.2305/IUCN.UK.2015-.RLTS.T39418A48942228.en>.

Poortvliet, M., Olsen, J.L., Croll, D.A., Bernardi, G., Newton, K., Kollias, S., O'Sullivan, J., Fernando, D., Stevens, G., Magaña, F.G., Seret, B., Wintner, S., Hoarau, G. (2015) A dated molecular phylogeny of manta and devil rays (Mobulidae) based on mitogenome and nuclear sequences. *Molecular Phylogenetics and Evolution* 83: 72-85.

Rafrafi-Nouira, S., El Kamel-Moutalibi, O., Amor, M.M.B., Capapé, C. (2015) Additional records of spinetail devilray *Mobula japanica* (Chondrichthyes: Mobulidae) from the Tunisian coast (Central Mediterranean). In *Annales: Series Historia Naturalis* 25(2): 103-108.

Sakalli, A. (2017) Relationship between climate change driven sea surface temperature, Chl-a density and distribution of giant devil ray (*Mobula mobular* Bonnaterre, 1788) in Eastern Mediterranean: A first schooling by-catch record off Turkish coasts. *YUNUS Research Bulletin* 2017, 1: 5-16.

Sakalli, A., Yucel, N., Capapé, C. (2016) Confirmed occurrence in the Mediterranean Sea of *Mobula japanica* (Müller & Henle, 1841) with a first record off the Turkish coasts. *Journal of Applied Ichthyology* 32: 1232-1234.

Serena, F. (2005) Field Identification Guide to the Sharks and Rays of the Mediterranean and Black Sea. FAO, Rome. 97 pp.

Yaglioglu, D., Turan C., Gurlek, M. (2013) On the occurrence of the giant devil ray *Mobula mobular* (Bonnaterre, 1788) from the Mediterranean coast of Turkey a by-catch documentation. *Journal of Applied Ichthyology* 29: 935-936.

Yucel, N., Sakalli, A., Karahan, A. (2017) First record of the honeycomb stingray *Himantura leoparda* (Manjaji-Matsumoto & Last, 2008) (Myliobatoidei: Dasyatidae) in the Mediterranean Sea, confirmed by DNA barcoding. *Journal of Applied Ichthyology* 33: 530-532.