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BLUNTNOSE SIXGILL SHARK, *HEXANCHUS GRISEUS* (CHONDRICHTHYES: HEXANCHIDAE), CAUGHT BY COMMERCIAL FISHING VESSELS IN THE SEAS OF TURKEY BETWEEN 1967 AND 2013

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ABSTRACT

One hundred and fifty specimens of Hexanchus griseus *(Bonnaterre, 1788) were caught by commercial fishing vessels in the seas of Turkey, between 16 July 1967 and 4 February 2013. Regarding the number of captured specimens per marine areas, the highest number of captures was recorded in the Sea of Marmara (90 specimens; 60 %), followed by the Aegean (41 specimens; 27.3 %), Mediterranean (15 specimens; 10 %) and Black (3 specimens; 2 %) seas. A single stranded individual was also recorded in the Çanakkale Strait. Regarding the number of recorded specimens it is obvious that the Sixgill Shark Data Bank of Turkey holds a significant number of* H. griseus *specimens caught in the eastern Mediterranean Sea, both reported in historical and contemporary studies. The sex ratio of the examined specimens of* H. griseus *is 1:2.61 in favour of females. Analysis of the fishing gear used for 72 of 150 examined sixgill sharks indicates that the most common fishing gear used to catch* H. griseus *is purse-seine, followed by several types of bottom fishing gear. Total length of the recorded specimens ranged between 50 and > 650 cm TL for both sexes; however, catches were dominated by two size groups, 250-350 cm and 350-450 cm TL, respectively.*

Key words: sixgill shark, *Hexanchus griseus*, Turkey, occurrence, eastern Mediterranean

SQUALO CAPOPIATTO, *HEXANCHUS GRISEUS* (CHONDRICHTHYES: HEXANCHIDAE), CATTURATO DA PESCHERECCI COMMERCIALI NEI MARI DELLA TURCHIA NEL PERIODO 1967-2013

SINTESI

Centocinquanta esemplari di Hexanchus griseus *(Bonnaterre, 1788) sono stati catturati da pescherecci commerciali nei mari della Turchia fra il 16 luglio 1967 ed il 4 febbraio 2013. Il numero più alto di catture è stato registrato nel mar di Marmara (90 esemplari; 60 %), seguito dall'Egeo (41 esemplari; 27,3 %), dal Mediterraneo (15 esemplari; 10 %) e dal mar Nero (3 esemplari; 2 %). Un individuo arenato è stato inoltre rinvenuto nello stretto dei Dardanelli. Visto l'alto numero di esemplari catturati, risulta ovvio che la banca dati turca dello squalo capopiatto detiene un numero significante di individui di* H. griseus *catturati nel Mediterraneo orientale, il che emerge sia da studi storici che contemporanei. Il rapporto tra i sessi negli esemplari di* H. griseus *esaminati è di 1:2,61 a favore delle femmine. L'analisi degli attrezzi da pesca usati per 72 esemplari ha evidenziato che la maggior parte di essi è stata catturata con la senna a sacco, seguita da diversi tipi di attrezzi da pesca di fondo. La lunghezza totale degli esemplari catturati variava da 50 a più di 650 cm per entrambi i sessi. Tuttavia, due gruppi di dimensioni sono risultati dominanti, ossia fra i 250 e i 350 cm, e fra i 350 e i 450 cm di lunghezza totale.*

Parole chiave: squalo capopiatto, *Hexanchus griseus*, Turchia, presenza, Mediterraneo orientale

INTRODUCTION

The presence of the bluntnose sixgill shark, *Hexanchus griseus* (Bonnaterre, 1788), one of the largest apex predators in the Mediterranean Sea and adjacent waters, has been well documented in specific studies on the species (*e.g.*, Vaillant, 1901; Sagarra, 1932; Desbrosses, 1938; Barrull & Mate, 2000; Capapé *et al*., 2003, 2004; Celona *et al*., 2005; Vella & Vella, 2010), and in general icthyological studies (*e.g.*, Tortonese, 1956; Bini, 1967; Ben-Tuvia, 1971; Capapé, 1977; Boseman, 1984; Compagno, 1984; Lipej *et al*., 2004; Serena, 2005). Records of *H. griseus* in the seas of Turkey has been pioneered by Ninni (1923) and followed by several authors (Deveciyan, 1926; Akşıray, 1987; Meriç, 1995; Kabasakal, 2011). During the last decade, our knowledge on distribution and biology of the bluntnose sixgill shark caught in Turkish waters has remarkably increased. Although, the first writings on the presence of *H. griseus* in Turkish waters dates back to the early 1920's (Ninni, 1923; Deveciyan, 1926), the bluntnose sixgill shark has always been neglected in ichthyological research until late 1990's. Due to this scientific ignorance, a profound lack of knowledge on bluntnose sixgill sharks from Turkish waters, has dominated almost the entire 20th century.

Although no targeted fishery is carried out on *H. griseus* in Turkish waters, historical and contemporary reports by newspapers suggest the bluntnose sixgill shark has always been a subject of public display in fishmongers (Kabasakal, 2010a). Unfortunately, this public attention has been mostly in the form of promoting a fear of sharks, and caused the formation and growing of an artificial fishing pressure on *H. griseus* in the course of time. The sole favourable aspect of capturing and subsequent displaying the specimens of *H. griseus* was that, they have been the focus of several pioneering studies on the biology of this magnificient shark from Turkish waters.

In order to create a database on sharks in Turkish waters, the Ichthyological Research Society (IRS) has been carrying out regular surveys on sharks, including *H. griseus*, since 2000. In previous studies on *H. griseus* carried out by IRS, Kabasakal (1998, 2004, 2005, 2006, 2009, 2010a, b) reported data on reproductive biology and stomach contents of *H. griseus* specimens caught by commercial fishing vessels. Following these pioneering studies, the ongoing research led to the capture of further specimens, mostly landed by commercial fishing fleets along the Anatolian coast. The primary subject of the present study is to update the status of the bluntnose sixgill shark from Turkish waters, in the light of published and new data. Furthermore, the Sixgill Shark Data Bank (SSDB) of Turkey, which is based on the survey of scientific and popular literature, as well as field surveys, is presented as a full list for the first time. This data bank is expected to become a valuable data source on *H. griseus* from the eastern Mediterranean region, as well.

MATERIAL AND METHODS

This study is part of an extensive research project (KANIT Project - Türk Sularında Yaşayan Köpekbalıklarının

Fig. 1: Map showing the approximate locality of captures of *Hexanchus griseus* ***specimens in the present study. Numbers on the map are same as the numbers given in the "map plot" column in Table 1.***
Sl. 1: Zemljevid, ki prikazuje približno lokacijo ulova primerkov *Hexanchus griseus*, ***obravnavanih v članku. Številke na zemljevidu se ujemajo s številkami v stolpcu »map plot« v Tabeli 1.***

Tesbiti), which was initiated in 2000 by IRS, in order to clarify the current status of shark species in the seas of Turkey. Examined specimens of *H. griseus*, which are included in the SSDB of Turkey, were obtained from the following sources: (a) specimens landed at fishing ports; (b) specimens displayed at fishmongers; (c) specimens preserved in university collections or personnal collections; (d) records of specimens in ichthyological literature; and (e) records of specimens in popular media, such as newspapers, angling magazines, etc. Total length (TL) of the examined sixgill sharks were measured with a measuring tape to the nearest 0.5 cm. TL is the distance between the tip of the snout and the tip of the dorsal lobe of the caudal fin, where the caudal fin is placed in it's natural position. Examined sixgill sharks were sexed, state of maturity of gonads recorded, and tissue samples, teeth or complete sets of upper and lower jaws were dissected. Weight data of almost all specimens was extracted from the fishing logs. Data of fishing gear, depth and location were verified following fishing log checks. Regarding the historical or contemporary records of sixgill sharks, based on news published in popular media, every record was verified following the interviews with fishermen, who caught the corresponding sixgill shark. Individual photographs, and tissue, teeth and jaw samples of the examined sixgill sharks, as well as electronic and printed copies of newspaper records held in the archives of IRS. Approximate localities of capture of *H. griseus* specimens along the Turkish coast are shown on the map in Figure 1.

RESULTS AND DISCUSSION

The fishing data and remarks on 150 specimens of *H. griseus* are presented in Table 1. Regarding the number of captured specimens per marine area, the highest number of captures was recorded in the Sea of Marmara (90 specimens; 60 %), followed by the Aegean (41 specimens; 27.3 %), Mediterranean (15 specimens; 10 %) and Black (3 specimens; 2 %) seas. A single stranded individual was also recorded in the Çanakkale Strait (see the Strait of Dardanelles section of Table 1).

To date several researchers have reported on the capture of *H. griseus* off the Turkish coast and along the eastern Mediterranean, as well (*e.g.,* Ninni, 1923; Deveciyan, 1926; Konsuloff & Drensky, 1943; Ben-Tuvia, 1971) Following these historical records of *H. griseus* from the eastern Mediterranean Sea, the occurrence of the bluntnose sixgill shark in the area has also been reported in several contemporary studies (Goren & Galil, 2002; Jones *et al*., 2003; Sion *et al*., 2004; Golani *et al*., 2006; Kabasakal, 2011). Regarding the number of recorded specimens it is obvious that SSDB of Turkey holds a significant number of *H. griseus* specimens caught in the eastern Mediterranean Sea, both in reported historical and contemporary studies.

Based on a literary review and field observations conducted off the Maghrebin shore (Algerian and Tunisian coasts), Capapé *et al*. (2004) recorded 167 sixgill sharks from the Mediterranean. During a study of *H. griseus* in the eastern North Sicilian waters (central Mediterranean Sea), Celona *et al*. (2005) examined 37 specimens captured by commercial fisheries. Barrull & Mate (2000) recorded 62 specimens of *H. griseus* captured by commercial fishermen in the Catalan Sea (western Mediterranean Sea), off the Spanish coast. In a more recent study by Vella & Vella (2010), authors report on 435 specimens of *H. griseus* landed by fishermen at the Malta fish market, between 2004 and 2008.

The sex ratio of the examined specimens of *H. griseus* is 1:2.61 in favour of females, which corroborates other findings where similar ratios were observed on varying sample sizes in the Mediterranean Sea (Barrull & Mate, 2000 (1:1.53); Capapé *et al*., 2003 (1:1.45); Celona *et al*., 2005 (1:1.69); Kabasakal, 2004 (1:2.25), 2006 (1:2.54), 2009 (1:2.56)). This numerical dominance of females may indicate some form of sex segregation, although several adults would be required before such a conclusion could be drawn.

Analysis of the fishing gear used for 72 of 150 examined sixgill sharks shows that the most common fishing gear used to catch *H. griseus* is purse-seine, followed by several types of bottom fishing gear, *e.g.* gill- and trammel-nets, bottom-trawls (Fig. 2). A similar heterogenity in fishing gear used to catch *H. griseus* was reported by Celona *et al*. (2005) in the eastern north Sicilian waters, where the examined specimens caught by bottom and pelagic long-liners, trammel and gill-netters. On the contrary, Vella & Vella (2010) underlined that the most common fishing gear used to catch *H. griseus* in Maltese waters is bottom long-lines, which produced 97.6 % of total catches. Besides commercial fishermen, the recent escalation in recreational angling for *H. griseus* is

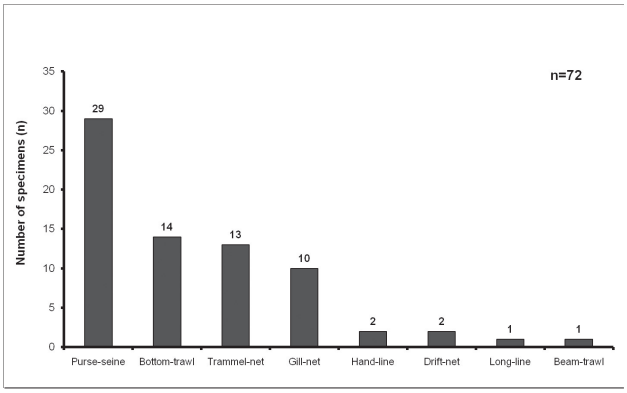

Fig. 2: Type of fishing gears used to catch** H. griseus **specimens in the present study. Graph is based on the data of 72 specimens.
Sl. 2: Vrsta ribolovne opreme, s katero so bili ulovljeni primerki** H. griseus**, obravnavani v članku. Graf je nastal na podlagi podatkov o 72 primerkih.

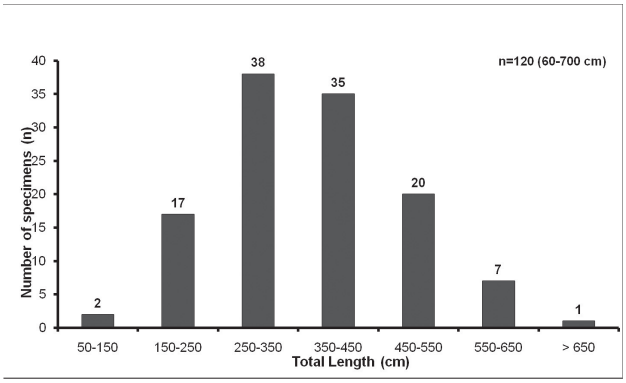

Fig. 3: Size groups of** H. griseus **specimens examined in the present study. Graph is based on the data of 120 specimens of which the total lengths were accurately measured.
Sl. 3: Velikostne skupine primerkov** H. griseus**, obravnavanih v članku. Graf je nastal na podlagi podatkov o 120 primerkih, pri katerih smo natančno izmerili dolžino.

a growing threat, which contributes to an increase in the fishing pressure on sixgill sharks (Williams *et al*., 2009). In the present study, an adolescent sixgill shark was also caught by recreational anglers at 1000 m depth (Tab. 1, sp No 41, in the Sea of Marmara section of the table).

Total length of the recorded specimens range between 50 and > 650 cm TL for both sexes; however, catches were dominated by two size groups, 250-350 cm and 350-450 cm TL, respectively (Fig. 3). Vella & Vella (2010) reported that in Maltese waters, female *H. griseus* ranged between 74 and 400 cm, and males between 106 and 356 cm TL. According to Celona *et al*. (2005), a specimen caught in December 2000 in the Messina Strait had an estimated total length of 500-600 cm, suggested to be the largest ever recorded for *H. griseus*. During the present study a specimen caught on 3 December 2006 in the Bay of Gökova (southeastern Aegean Sea) its' total length measured on deck was reported by the fisherman to be ca. 700 cm, which is well above the size records for this species (Tab. 1, sp No 16, in Aegean Sea section of the table).

Fig. 4: Sixgill shark in the fish market (sp No. 42 in Sea of Marmara section of Table 1)
Sl. 4: Šesteroškrgar na ribji tržnici (primerek št. 42 v odseku Marmarsko morje v Tabeli 1)

CONCLUSIONS

Our modern understanding of *H. griseus* in Turkish seas, particularly its' occurrence in fisheries, started with the decline of many commercially important species due to overfishing. This "ecological revolution" fundamentally changed our mindset of *H. griseus* from invaluable to a possibily valuable species. Still being an untargeted species for Turkish marine fisheries, at present many fishermen suppose that even the bluntnose sixgill shark may provide some benefits as display objects to attract customers attention (Fig. 4). This capture-display--discard scenario has happened for almost all of the examined sixgill sharks in the present study.

In a recent study analysing the newspaper and internet portrayals of *H. griseus* caught in Turkish seas, Kabasakal (2010a) stated that in 45.6 % of the analysed articles the tenor of coverage was clearly negative, promoting the "fear of shark". Furthermore, the author also underlined that a utilitarian or self-seeking perspective prevailed, appearing in 62.9 % of the articles examined. A clear hypocrisy in mankind swinging between fear and benefit is shading the survival of this fragile species in Turkish seas.

The last 20 years has witnessed the formation of SSDB of Turkey. Each article dealing with several episodes of this magnificient sharks' life story is a significant contribution for this long-lasting archival effort. Although there are still many gaps in the great picture extant, it is the first time that detailed data is available on the distribution, occurrence and capture of *H. griseus* in Turkish marine regions. However, new studies provide answers with new questions, as well. Since so little is known about their Pontic, Marmaric and Levanten populations, could they be in even greater danger. A clear lack of information on the movements of the specimens along Turkish coasts underlines the necessity of tagging surveys of *H. griseus* in the mentioned region to understand the spatial and bathymetric movement patterns of the species.

Tab. 1: List of** H. griseus **specimens caught by commercial fishing vessels in the seas of Turkey between 1967 and 2013. The recent update in Sixgill Shark Data Bank of Turkey was carried out on 27 Februaray 2013. The numbers under the "map plot" column are same as the station numbers shown on the map in Figure 1. Total regional catch numbers of respective marine areas are given in brackets.
Tab. 1: Seznam primerkov** H. griseus**, ki so jih ribiške ladje ujele med leti 1967 in 2013 v turških vodah. Podatki v turški banki podatkov o šesteroškrgarjih so bili nazadnje posodobljeni 27. februarja 2013. Številke v stolpcu »map plot« se ujemajo s številkami lokacij na zemljevidu, prikazanem na Sliki 1. Skupno število ulovljenih primerkov za posamično morsko območje je navedeno v oklepaju.

No	Map plot	TL (m)	W (kg)	Sex	Locality	Date	Depth (m)	Remarks	Reference
Black Sea (3 speciemens)									
1	2	?	600	?	Prebosphoric waters of the Black Sea	5 Feb 2001	?	Before eviscerated and sold, displayed in a shopping mall in Kartal, İstanbul.	Kabasakal (2004)
2	1	3	350	M	Amasra	19 Nov 2004	?	Captured by fisherman Rafet Martı 3 miles off-shore; type of fishing gear is unknown (probably gill-net); sold to a local restaurant.	Kabasakal (2005)
3	2	3.5	675	?	Şile	8 Oct 2006	?	Captured by fisherman Müddet Çimen and displayed to public in a fishmonger in Beşiktaş market, İstanbul.	Present study
Sea of Marmara (90 specimens)									
1	3	3.5	?	?	Prince Islands	16 July 1967	ca. 10	Captured by fisherman Ahmet Reis, by means of gill-netting, 20 m off the coast.	Present study
2	3	?	?	F	Prince islands	26 Nov 1974	ca.200	Captured by fisherman Turgut Reis, by means of gill-netting; before landing at the İstanbul Whole Sale Fishmarket, sixgill shark struggled nearly 12 hours.	Kabasakal (2004)
3	7	3.5	?	?	Marmara island	1987	ca.350	Captured by means of shark-net (a special type of gill-net with large mesh openings) in a vicinity between Şarköy and Marmara island.	Kabasakal (2004)
4	7	4	?	?	Marmara island	1988	ca.300	Captured by means of shark-net in a vicinity between Şarköy and Marmara island.	Kabasakal (2004)
5	3	3	?	M	Tuzla	Jan 1989	150	Captured by fisherman Kenan Balcı, by means of purse-seining.	Kabasakal (2004)
6	3	3	?	M	Tuzla	Nov 1989	ca.175	Captured by fisherman Kenan Balcı, by means of purse-seining. Remains of blue fish (*Pomatomus saltator*) found in the stomach content; claspers almost calcified.	Kabasakal (2004)
7	3	4.5	450	F	Tuzla	Dec 1989	ca.250	Captured by fisherman Kenan Balcı, by means of purse-seining. Remains of horse mackerel (*Trachurus* spp.) found in the stomach content.	Kabasakal (2004)
8	3	5	?	F	Yalova	May 1990	?	Captured by fisherman Kenan Balcı, by means of purse-seining. Remains of spurdog (*Squalus* spp.), hake (*Merluccius merluccius*) and dolphin found in the stomach content.	Kabasakal (2004)

No	Map plot	TL (m)	W (kg)	Sex	Locality	Date	Depth (m)	Remarks	Reference
9	3	2.5	?	F	Fenerbahçe	Dec 1990	50	Captured by means of purse-seining.	Kabasakal (2004)
10	3	3.5	500	F	Heybeliada	19 Dec 1990	?	--	Kabasakal (2004)
11	4	?	?	?	Mimarsinan	1991	350	Captured by means of trammel-netting in slope waters.	Meriç (1995)
12	3	3	?	F	Tuzla	Feb 1995	175	Captured by means of purse-seining; remains of bony fish remains (mostly horse mackerel) found in the stomach content.	Kabasakal (2004)
13	8	1.2	10	F	Hoşköy	Mar 1996	ca.100	Captured by means of trammel-netting; teeth from upper and lower jaws are preserved at IRS.	Kabasakal (2004)
14	5	4	350	?	Yalova	11 Sept 1996	150	Captured by means of trammel-netting off Esenköy coast.	Kabasakal (2004)
15	6	4.5	500	F	Tekirdağ	9 Dec 1996	ca.350	Two embryos found *in uteri*; remains of horse mackerel (*Trachurus* spp.) observed in the stomach content.	Kabasakal (2004)
16	6	2	?	?	Tekirdağ	11 Feb 1997	?	Captured by means of trammel-netting.	Kabasakal (2004)
17	6	4	350	F	Tekirdağ	18 Feb 1997	175	Remains of horse mackerel (*Trachurus* spp.) and hake (*M. merluccius*), and several food cans found in the stomach content.	Kabasakal (2004)
18	8	2.5	?	M	Hoşköy	20 Feb 1997	50	Captured by means of purse-seining.	Kabasakal (1998)
19	8	4.5	?	F	Hoşköy	27 Feb 1997	ca.120	Captured by means of purse-seining; 33 embryos, average total length 62.6 cm, found *in uteri*; remains of horse mackerel (*Trachurus* spp.), as well as plastic items found in the stomach content.	Kabasakal (2004)
20	4	?	700	F	Northern Marmara	19 July 1998	?	Captured by means of trammel-netting.	Kabasakal (2004)
21	3	5.5	?	M	Bay of İzmit	13 Dec 1998	ca.175	Captured by means of trammel-netting.	Kabasakal (2004)
22	4	?	?	F	Northern Marmara	20 Oct 1999	?	Remains of anchovies (*Engraulis encrasicolus*) found in the stomach content.	Kabasakal (2004)
23	4	5	600	?	Northern Marmara	14 July 2000	?	--	Kabasakal (2004)
24	4	5	300	F	Northern Marmara	18 July 2000	?	Remains of spurdog (*Squalus* spp.), hake (*M. merluccius*) and horse mackerel (*Trachurus* spp.) found in the stomach content.	Kabasakal (2004)
25	6	4.5	?	F	Tekirdağ	7 Feb 2001	?	Captured by means of purse-seining.	Kabasakal (2004)
26	3	2.5	?	M	Büyükada	23 Sept 2001	300	Captured by means of gill-netting; claspers not calcified.	Kabasakal (2004)
27	3	3.1	650	F	Tuzla	6 Jan 2002	ca.150	Captured by means of bottom-trawling.	Kabasakal (2004)

No	Map plot	TL (m)	W (kg)	Sex	Locality	Date	Depth (m)	Remarks	Reference
28	8	3	200	M	Karabiga	2003	?	Captured by means of trammel-netting.	Kabasakal (2004)
29	8	6	ca.1000	F	Southern Marmara	23 July 2004	?	Remains of dolphin blubber and smooth-hound dogfish (*Mustelus* spp.) found in the stomach content.	Kabasakal (2006)
30	8	5	ca.1000	?	Southern Marmara	23 July 2004	?	Remains of dolphin blubber and bony fish (Scombridae) found in the stomach content.	Kabasakal (2006)
31	5	3.6	500	F	Gemlik	27 Sept 2004	?	Captured by means of purse-seining; remains of unidentified bony fish. cephalopods and dolphins found in the stomach content.	Kabasakal (2006)
32	5	3.5	400	F	Gemlik	25 Nov 2004	?	Captured by means of purse-seining; remains of hake (*M. merluccius*) found in the stomach content.	Kabasakal (2006)
33	5	4.5	400	?	Silivri	25 Nov 2004	?	Remains of unidentified dogfish and hake (*M. merluccius*) found in the stomach content.	Kabasakal (2006)
34	4	3.5	300	F	Büyükçek-mece	29 Nov 2004	?	Captured by means of purse-seining; remains of unidentified squid and bony fish found in the stomach content.	Kabasakal (2006)
35	7	4	450	F	Bandırma	29 Nov 2004	?	Captured by means of purse-seining.	Kabasakal (2006)
36	7	4	300	?	Southern Marmara	7 Dec 2004	?	Captured by means of bottom-trawling.	Kabasakal (2006)
37	7	3.5	400	?	Bandırma	26 Dec 2004	?	Captured by means of gill-netting; remains of hake (*M. merluccius*) and sardine (Clupeidae) found in the stomach content.	Kabasakal (2006)
38	4	3	?	?	Büyükçek-mece	12 Feb 2005	?	Captured by means of purse-seining; remains of hake (*M. merluccius*) and horse mackerel (*Trachurus* spp.) found in the stomach content.	Kabasakal (2006)
39	4	4.5	?	?	Yeşilköy	20 Feb 2005	?	Captured by means of purse-seining.	Kabasakal (2006)
40	5	5	1000	F	İmralı island	9 May 2005	?	Captured by the fisherman Serdar İşcan; purchased by a seafood company.	Present study
41	3	2	?	M	Çınarcık trench	June 2005	1000	Captured by sport anglers by means of deep-deployed shark tackle.	Present study
42	4	3	350	M	Gürpınar	18 Feb 2006	?	Captured by means of purse-seining around 04:00 hours before sun rise; claspers almost calcified; teeth from lower jaw are preserved at IRS.	Present study
43	3	2	200	?	Yalova	31 Aug 2006	?	Entangled in a net deployed to catch pouting (*Merlangius merlangus*).	Present study
44	6	2.5	200	F	Tekirdağ	6 Sept 2006	?	Captured by means of purse-seining after midnight; before pulling the boat sixgill shark struggled for nearly 6 hours.	Present study

No	Map plot	TL (m)	W (kg)	Sex	Locality	Date	Depth (m)	Remarks	Reference
45	4	5	650	?	Florya	22 Dec 2006	?	Displayed in Florya, İstanbul for a few days.	Present study
46	4	3.6	600	?	Yeşilköy	25 Dec 2006	?	Captured by fisherman Hür Civlez and displayed for a few days.	Present study
47	6	3.5	320	M	Tekirdağ	22 Jan 2007	240	Captured by gill-netter Hasan Ülker and sold.	Present study
48	4	3	150	F	Silivri	10 Feb 2007	?	Displayed in fishmonger in Kadıköy, İstanbul for a few days.	Present study
49	5	5	750	F	İmralı island	30 Mar 2007	?	Captured by the fisherman Mustafa Güler.	Present study
50	8	6	600	F	Biga	16 Apr 2007	?	Captured by means of purse-seining; displayed in Biga and delivered to İstanbul to auction.	Present study
51	4	4	500	?	Kumkapı	13 Sept 2007	?	Captured by means of purse-seining in the early morning.	Present study
52	4	6	1000	F	Büyükçek-mece	11 Dec 2007	?	Captured by purse-seiner Kenan Balcı.	Present study
53	4	5	1000	F	Gürpınar	12 Dec 2007	?	Captured by purse-seiner Kenan Balcı.	Present study
54	4	6	1000	F	Gürpınar	18 Dec 2007	?	Captured after midnight; displayed at a fishmonger in İstanbul.	Present study
55	3	3.5	300	F	Yalova-Çınarcık	8 Feb 2008	?	Captured by fishermen Orhan and Ayhan Keleş and displayed at a fishmonger in Feneryolu market, İstanbul; teeth from jaw are preserved at IRS.	Present study
56	4	1.8	50	F	Silivri	15 Mar 2008	25	Captured by means of purse-seining and displayed in a fishmonger at Büyükdere market, İstanbul.	Present study
57	4	2.5	200	M	Silivri	19 Mar 2008	30	Captured by means of purse-seining and displayed at Tarihi Canlı Balık Lokantası in Kadıköy, İstanbul; upper and lower jaws are preserved at IRS.	Present study
58	4	2.5	220	?	Silivri	22 Mar 2008	50	Captured by means of purse-seining.	Present study
59	5	4	280	?	İmralı island	17 Apr 2008	?	Captured by two fishinboats after 5 hours of struggle; displayed to public at the fishmonger called 'Geçiciler Balıkçılık' in Bandırma.	Present study
60	3	2.33	100	M	Prince is-lands	1 Nov 2008	?	Displayed in fishmonger called Okyanus Balıkçılık in Erenköy, İstanbul; claspers not calcified and shorter than pelvic fins; teeth from the lower jaw are preserved at IRS.	Present study
61	?	4	1500	F	Sea of Mar-mara	22 Jan 2009	?	Captured by fisherman Ekrem Varıcı; exact fishing locality is unknown; sixgill shark misidentified as *Galeorhinus galeus*; mass surely overestimated.	Present study

No	Map plot	TL (m)	W (kg)	Sex	Locality	Date	Depth (m)	Remarks	Reference
62	6	3.5	ca.500	F	Marmara Ereğlisi	6 Mar 2009	ca.100	Captured by means of purse-seining and displayed in fishmonger called Yıldız Balıkçılık. in Bostancı market, İstanbul; tissue sample and teeth from the lower jaw are preserved at IRS.	Present study
63	3	3.7	1000 (?)	?	Maltepe	13 Mar 2009	?	Captured by means of purse-seining.	Present study
64	4	5	800	F	Gürpınar	7 Sept 2009	ca.100	Captured by purse-seiner Kenan Balcı and displayed in a shopping center in Beylikdüzü, İstanbul.	Present study
65	3	3.5	600	?	Prince islands	2 Oct 2009	?	Captured by fisherman Şahin Altun who departed from Eskihisar (northern Bay of İzmit) and deployed nets in a vicinity off Prince islands; sixgill shark pulled the boat before sun rise in the early morning and displayed in Gebze (north-western Bay of İzmit).	Present study
66	5	3	?	F	İmralı island	11 Nov 2009	?	Type of fishing gear unknown; displayed at a shopping mall in İstanbul; tissue sample and teeth from the lower jaw are preserved at IRS.	Present study
67	5	ca.5	550	F	Zeytinbağı	18 Nov 2009	?	Captured by fisherman Hüseyin Bayraktar 500 m off the coast; shark entangled the gill-net before dawn and pulled on the fishing boat 'Bayraktar 3' before sun rise.	Present study
68	5	3.5	500	?	Bay of Gemlik	25 Nov 2009	?	Captured by the fishermen from the village called 'Kapaklı'; sixgill shark entangled in the nets deployed for horsemackerel (*Trachurus* spp.); displayed to public at Gemlik Fish Market.	Present study
69	4	3	150	?	Gürpınar	2 Dec 2009	?	Captured by a commercial purse-seiner and displayed in Gürpınar at the fishmonger called 'Balıkçı Kenan'.	Present study
70	4	5	750	F	Gürpınar	2 Dec 2009	?	Captured by a commercial purse-seiner and displayed in Gürpınar at the fishmonger called 'Balıkçı Kenan'.	Present study
71	6	2.5	300	F	Şarköy	3 Dec 2009	?	Captured by the shrimp beam-trawler; displayed at the fishing port of Şarköy.	Present study
72	5	3.5	370	?	Tirilye	8 Dec 2009	?	Captured off Tirilye coast and transported to İnegöl; displayed to public at the fishmonger owned by Varol Sönmez.	Present study

No	Map plot	TL (m)	W (kg)	Sex	Locality	Date	Depth (m)	Remarks	Reference
73	7	4	420	F	Bandırma	15 Dec 2009	?	Captured by the fisherman Ömer Kocamanlar and his crew; fishermen claimed that the sixgill shark was torn the nets; sixgill shark displayed to public in Bursa.	Present study
74	6	3	250	?	Şarköy	26 Dec 2009	35	Captured by means of coastal trammel-netters and delivered to İstanbul to auction.	Present study
75	İB	4.1	560	?	Prebospho-rus (Mar-mara)	12 Nov 2010	?	Captured by the fisherman Kenan Balcı and displayed to public.	Present study
76	İB	2.9	320	?	Prebospho-rus (Mar-mara)	12 Nov 2010	?	Captured by the fisherman Kenan Balcı and displayed to public.	Present study
77	İB	1.85	210	?	Prebospho-rus (Mar-mara)	12 Nov 2010	?	Captured by the fisherman Kenan Balcı and displayed to public.	Present study
78	6	3	250	?	Kumbağ	15 Nov 2010	?	Captured by fisherman Faruk Göymen and landed at Kumbağ fishing port.	Present study
79	3	2.1	125	?	Yalova	25 Feb 2011	?	Displayed to public in İstanbul.	Present study
80	4	2.2	125	?	Silivri	25 Feb 2011	?	Displayed to public in İstanbul.	Present study
81	6	3	250	F	Marmara Ereğlisi	31 Mar 2011	?	Captured by fisherman Süleyman Coşkunçay and sold to a fish restaurant at Çanakkale. 2.5 TL per kilogram.	Present study
82	4	3.5	?	M	Ahırkapı	17 Sept 2011	?	Discarded carcass was found on the bottom at a depth of 7 m by the author during the end of a dive.	Present study
83	3	4.2	900	F	Tuzla	17 Oct 2011	?	Captured by a commercial purse-seiner and displayed to public.	Present study
84	5	3.2	312	F	Karacabey	13 Nov 2011	?	Captured by a commercial purse-seiner and delivered to İstanbul city.	Present study
85	8	3.2	291	F	Şarköy	12 Jan 2012	?	Captured by a gill-netter and delivered to İstanbul city.	Present study
86	6	5	1000	F	Marmara Ereğlisi	3 Apr 2012	?	Captured by commercial fishermen and delivered to İstanbul city for the auction; type of the fishing gear unknown.	Present study
87	3	4.5	?	?	İstanbul city	15 Dec 2012	?	Captured by commercial fishermen and displayed to public in the fishmonger.	Present study
88	8	3	250	?	Şarköy	28 Dec 2012	?	Captured by a gill-netter 3 miles off the coastline; delivered to İstanbul city and displayed in the fishmonger.	Present study
89	3	?	500	F	İstanbul city	6 Jan 2013	?	Captured by a gill-netter 3 miles off the coastline; delivered to İstanbul city and displayed in the fishmonger.	Present study
90	4	2.5	300	?	Silivri	26 Feb 2013	?	Captured by seine-net and displayed to public.	Present study

No	Map plot	TL (m)	W (kg)	Sex	Locality	Date	Depth (m)	Remarks	Reference
Strait of Dardanelles (1 specimen)									
1	ÇB	4.5	?	F	Çanakkale	5 June 1999	?	Stranded specimen.	Kabasakal (2006)
Aegean Sea (41 specimens)									
1	12	4	1000	M	Karaburun	23 July 1993	?	--	Kabasakal (2004)
2	14	4	800	F	Kuşadası	10 July 1994	?	--	Kabasakal (2004)
3	10	3.5	310	?	Gökçeada	1997	400	Captured by means of bottom-trawling.	Kabasakal (2004)
4	10	3.6	?	M	Çanakkale	1998	?	Captured by means of bottom-trawling.	Kabasakal (2004)
5	9	4	?	M	Bay of Saroz	20 July 1998	250	Captured by means of bottom-trawling; claspers calcified.	Kabasakal (2004)
6	9	4	ca.1000	?	Northern Aegean Sea	20 July 1998	?	Captured by means of bottom-trawling.	Kabasakal (2006)
7	10	0.6	1.2	F	Gökçeada	27 Oct 1999	380	Captured by means of bottom-trawling; unhealed umblical scar observed between the pectoral fins.	Kabasakal (2004)
8	11	4	650	?	Altınoluk	6 Jan 2000	?	Captured by means of gill-netting.	Kabasakal (2004)
9	10	4	500	?	Gökçeada	6 July 2000	ca.400	Captured by means of purse-seining.	Kabasakal (2004)
10	16	5.2	1000	F	Southern Aegean Sea	16 Feb 2001	?	Captured by means of purse-seining; remains of sword fish (*Xiphias gladius*) and dolphin blubber found in the stomach content.	Kabasakal (2006)
11	16	5	570	F	Southern Aegean Sea	16 Mar 2001	?	Captured by means of sword fish long-line; remains of bony fish (Scombridae, mainly tuna) found in the stomach content.	Kabasakal (2006)
12	9	4	?	F	Bay of Saroz	24 Aug 2002	?	--	Kabasakal (2004)
13	11	?	565	?	Bay of Edremit	25 Dec 2002	?	Captured by means of gill-netting.	Kabasakal (2004)
14	13	3.5	280	?	Didim	14 Oct 2003	?	Captured by means of trammel-netting.	Kabasakal (2004)
15	10	4.5	500	M	Northern Aegean Sea	23 Sept 2004	?	Captured by means of trammel-netting; remains of hake (*M. merluccius*) found in the stomach content.	Kabasakal (2006)
16	14	4.1	600	?	Kuşadası	23 Nov 2005	?	Captured by the fisherman Sezgin Suluk and sold for 7 TL per kg.	Present study
17	14	4.5	300	?	Kuşadası	18 Oct 2006	?	Captured by means of bottom-trawling; delivered to Buca Fish Market, İzmir.	Present study
18	13	5	500	?	Alaçatı	24 July 2006	?	Captured by fisherman Ali Demir.	Present study
19	15	4.5	1000	?	Bodrum	23 Aug 2006	?	Captured by the crew of fishing boat "Alize" and delivered to İzmir for auction.	Present study
20	15	5	550	?	Bodrum	28 Nov 2006	?	Captured by fisherman Mustafa Bircan and delivered to İzmir or Antalya fishmarket for auction.	Present study
21	15	6	600	?	Bodrum	28 Nov 2006	?	Captured by fisherman Mustafa Bircan and delivered to İzmir or Antalya fishmarket for auction.	Present study

No	Map plot	TL (m)	W (kg)	Sex	Locality	Date	Depth (m)	Remarks	Reference
22	13	3.6	600	?	Didim	28 Nov 2006	?	Captured by fisherman Osman Mansur near Cape of Taşburnu; sixgill shark pulled on deck around 05:30 hours.	Present study
23	16	3.5	600	?	Bay of Gökova	2 Dec 2006	?	Captured by fisherman Mustafa Bircan.	Present study
24	16	6	600	?	Bay of Gökova	3 Dec 2006	?	Captured by fisherman Mustafa Bircan; remains of a traveller jack (*Lychia amia*) found in the stomach content; sixgill shark struggled for 4.5 hours before pulled on deck; it was the first sixgill shark captured before specimen no. 23.	Present study
25	16	7	700	?	Bay of Gökova	3 Dec 2006	?	Captured by fisherman Mustafa Bircan; remains of a traveller jack (*L. amia*) found in the stomach content; sixgill shark struggled for 4.5 hours before pulled on deck; it was the second sixgill shark captured after specimen no. 24.	Present study
26	13	4	920	F	Didim	18 Jan 2007	?	Captured by fisherman Aydın Mansur near Cape of Taşburnu, around 04:00 hours.	Present study
27	9	4	800	M	Bay of Saroz	27 Mar 2007	?	Captured by fisherman Necmettin Kaya; delivered to İstanbul and displayed to public at the fishmonger called Balıkçı Şafak.	Present study
28	11	6	600	?	Babakale	31 Mar 2007	?	--	Present study
29	16	3	300	?	Datça	16 Jan 2009	?	Captured by fisherman Yılmaz Kahraman and delivered to İzmir for auction; sixgill shark pulled on deck after midnight.	Present study
30	10	5	750	F	Çanakkale	20 Jan 2009	?	Delivered to İstanbul and displayed to public at the fishmonger called Uçan Balıkçı in Bahçelieveler, İstanbul.	Present study
31	9	4	?	F	Bay of Saroz	4 Mar 2009	?	Delivered to İstanbul and displayed to public at the fishmonger called Kardak Balıkçılık in Ümraniye, İstanbul; tissue sample and teeth from the lower jaw are preserved at IRS.	Present study
32	ÇB	3	?	?	Off the entrance of the Strait of Dardanelles	12 Mar 2009	?	Delivered to İstanbul and displayed in a shopping mall; tissue sample and teeth from the lower jaw are preserved at IRS.	Present study

No	Map plot	TL (m)	W (kg)	Sex	Locality	Date	Depth (m)	Remarks	Reference
33	9	ca.4	?	F	Bay of Saroz	20 Apr 2009	?	Captured by means of bottom-trawlig and discarded ashore while still alive; sixgill shark not survived due to lack of homeostasis; video footage recorded by Dr. Ata Bilgili, İstanbul is available at www.derintakip.blogspot.com Photographs of the specimen donated by Dr. Ata Bilgili are preserved in the IRS archieve.	Present study
34	9	3.5	?	M	Bay of Saroz	20 Apr 2009	?	Captured by means of bottom-trawlig and discarded ashore while still alive; sixgill shark not survived due to lack of homeostasis; photographs of the specimen donated by Dr. Ata Bilgili are preserved in the IRS archieve.	Present study
35	11	3.5	150	F	Behramkale	26 July 2009	?	Entangled in trammel nets; delivered to İstanbul and sold for 5 TL per kg.	Present study
36	14	4	700	F	Kuşadası	6 Oct 2009	?	Captured by fisherman Günal Dağ on board of fishing boat 'Sonay'; sixgill shark entangled the nets 6 miles off-shore.	Present study
37	14	3	1500 (?)	?	Kuşadası	9 Oct 2009	?	Entangled trammel-nets deployed off Güvercinada and delivered to İzmir for public display.	Present study
38	10	2.20	?	F	Çanakkale	15 Nov 2009	?	Delivered to İstanbul and displayed to public in a shopping mall in İstinye, İstanbul; tissue sample and teeth from the lower jaw are preserved at IRS.	Present study
39	9	2.5	200	?	Saros Körfezi	12 Feb 2011	?	Entangled in gill nets and displayed to public in the fishmonger.	Present study
40	17	3.85	400	F	Fethiye	15 Mar 2011	?	Captured by fishermen Ali Akboyun, Özay Güneş and Yusuf Dikici off Göcek coast.	Present study
41	10	5	1000	F	Gökçeada - Semadirek channel	4 Feb 2013	300	Captured by a bottom-trawler between Gökçeada and Semadirek islands; landed at Enez fishingport and displayed to public.	Present study
Mediterranean Sea (15 specimens)									
1	18	3	300	?	Alanya	1 Sept 2002	?	Captured off 2 miles from the coast by the long-liner Hasan Erik and sold for 5 TL per kg.	Present study
2	18	2.5	?	F	Antalya	16 Apr 2004	?	Captured by means of trammel-netting; remains of spurdog (*Squalus* spp.; 2 dorsal fins) and squid (*Loligo* spp.) found in the stomach content.	Kabasakal (2006)
3	18	2.5	200	M	Kemer	12 May 2004	ca.75	--	Kabasakal (2006)

No	Map plot	TL (m)	W (kg)	Sex	Locality	Date	Depth (m)	Remarks	Reference
4	19	5	600	F	Mersin	27 Oct 2004	?	Captured by means of bottom-trawling.	Kabasakal (2006)
5	21	3.5	400	F	North of Cyprus	6 Nov 2004	?	Captured by means of bottom-trawling.	Kabasakal (2006)
6	20	?	ca.1000	F	Anamur	31 Dec 2005	?	Captured by fisherman Salih Erdem.	Present study
7	21	2.6	220	M	Mersin	26 Nov 2006	?	Delivered to İstanbul and displayed to public in Kadıköy fish market; claspers not calcified and shorter than pelvic fins; sperm sacs not contained semen; teeth from the lower jaw are preserved at IRS.	Present study
8	21	3	ca. 400	?	Silifke	12 Apr 2008	?	Captured off Ovacık coast by a commercial bottom-trawler.	Present study
9	21	3	ca. 350	D	Bozyazı	5 May 2008	?	Captured by the hand-liner Sadettin Kahveci 4 miles off the coast	Present study
10	21	5	ca.1000	F	Silifke	5 Mar 2009	?	Captured by fisherman Savaş Çapkan near Cape of Taşucu 5 to 6 miles off-shore.	Present study
11	18	3	263	?	Bay of Antalya	28 Oct 2009	100 (?)	Captured by means of drift-netting by fisherman Hüseyin Kara.	Present study
12	18	2.5	120	?	Bay of Antalya	28 Oct 2009	100 (?)	Captured by means of drift-netting by fisherman Hüseyin Kara.	Present study
13	21	2	300	?	Taşucu	30 Nov 2009	?	Captured by means of a commercial bottom-trawler 6 miles off and displayed to public in Silifke.	Present study
14	22	4.5	700	D	Taşucu	10 Apr 2011	?	Captured by means of bottom set-net by fisherman Ayhan Uğuz. Displayed to public in Silifke and than delivered to Antalya.	Present study
15	18	2.5	220	?	Alanya	16 Aug 2011	ca. 50	Captured by means of bottom set-net by fisherman Hüseyin Çakal. Displayed to public, then discarded.	Present study

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ŠESTEROŠKRGARJI, *HEXANCHUS GRISEUS* (CHONDRICHTHYES: HEXANCHIDAE), KI SO JIH RIBIŠKE LADJE UJELE V TURŠKIH VODAH MED LETI 1967 IN 2013

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POVZETEK

Med 16. julijem 1967 in 4. februarjem 2013 so ribiške ladje v turških vodah ujele sto petdeset primerkov šesteroškrgarja, Hexanchus griseus *(Bonnaterre, 1788). Glede na število ulovljenih primerkov si posamezna morska območja sledijo po naslednjem vrstnem redu: Marmarsko morje (90 primerkov; 60 %), Egejsko morje (41 primerkov; 27,3 %), Sredozemsko morje (15 primerkov; 10 %) in Črno morje (3 primerki; 2 %). O nasedlem primerku so poročali tudi v ožini Dardanele. Število opaženih oz. ujetih primerkov priča, da turška banka podatkov o šesteroškrgarjih hrani številne primerke, ujete v vzhodnem Sredozemlju, ki so bili obravnavani bodisi v starejših bodisi v sodobnih strokovnih člankih. Pri preučevanih primerkih znaša razmerje po spolu 1 : 2,61 v korist ženskega spola. Analiza ribolovne opreme, uporabljene pri ulovu 72 od 150 preučevanih šesteroškrgarjev, nakazuje, da se za ulov* H. griseus *najpogosteje uporablja zaporno plavarico, takoj zatem pa različne vrste opreme za demerzalni ribolov. Pri obeh spolih je dolžina ulovljenih primerkov znašala med 50 in > 650 cm, pri čemer sta prevladovali dve velikostni skupini, in sicer 250-350 cm ter 350-450 cm.*

Ključne besede: šesteroškrgar, *Hexanchus griseus*, Turčija, pojavljanje, vzhodno Sredozemlje

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