

Rapid Communication

First record of dogtooth grouper *Epinephelus caninus* (Valenciennes, 1834), Perciformes, Serranidae, in the Black Sea

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Received: 4 June 2013 / Accepted: 22 July 2013 / Published online: 25 July 2013

Handling editor: Vadim Panov

Abstract

A single specimen of dogtooth grouper *Epinephelus caninus* Valenciennes, 1834 (Perciformes, Serranidae) was captured along the southwest Crimean Peninsula, in the Black Sea. It was captured by using a trap-net at a depth 40 m, on 26 April 2013. This is the first record of *Epinephelus* genus in the Black Sea.

Key words: *Epinephelus caninus*; dogtooth grouper; Black Sea; Crimean Peninsula

Introduction

The family of Serranidae is quite diverse and includes 3 subfamilies, 64 genera and 475 species (Nelson 2006). It is widely distributed in the tropical and subtropical waters of 3 oceans. The genus *Epinephelus* is itself very diverse and includes 98 species, of which 9 inhabit the Eastern Atlantic Ocean and the Mediterranean Sea (Heemstra and Randall 1993). To date Serranidae were strictly represented by three species of the *Serranus* genus in the Black Sea. The most common being the painted comber *Serranus scriba* (Linnaeus, 1758), which is found on all marine shores of the Black Sea (Vasil'eva 2007; Boltachev and Karpova 2012). *Serranus cabrilla* (Linnaeus, 1758) known commonly as the comber, is found infrequently near Turkish, Bulgarian and Romanian shores. The third species, the brown comber *Serranus hepatus* (Linnaeus, 1758), which is native of the Mediterranean Sea and Eastern Atlantic ocean from Portugal to Senegal, was observed only once, after the capture of a single individual in March 2012 in the region of the Şile coast,

approx. 38 km east of Bosphorus (Dalgıç et al. 2013).

In this study the first record of the dogtooth grouper *Epinephelus caninus* (Valenciennes, 1834) in the Black Sea is reported. *E. caninus* is a subtropical species distributed widely in the Eastern Atlantic Ocean from Portugal to Angola and in the Mediterranean Sea (Heemstra and Randall 1993). To date there is no published evidence of the occurrence of this species in the Black Sea.

Methods

A single specimen was caught using a trap net on 26 April 2013, in the southwest Crimean coastal waters, near Cape Ay-ya (2.7 km east of the Balaclava Bay, Grid reference: 44°28,8' N, 33°37,4' E), at a depth of 40 m. The live specimen was brought to Sevastopol public aquarium, where it was identified using the basic manual of Heemstra and Randall (1993) and supported by additional identification keys to marine fishes by Fischer et al. (1981) and Whitehead et al. (1986). The specimen has been kept alive and is currently used for demonstration purposes (Figure 1).

Figure 1. Dogtooth grouper *Epinephelus caninus* (Valenciennes, 1834) caught near the southwest coastal zone of Crimea in the Black Sea. Photograph by E. Karpova.

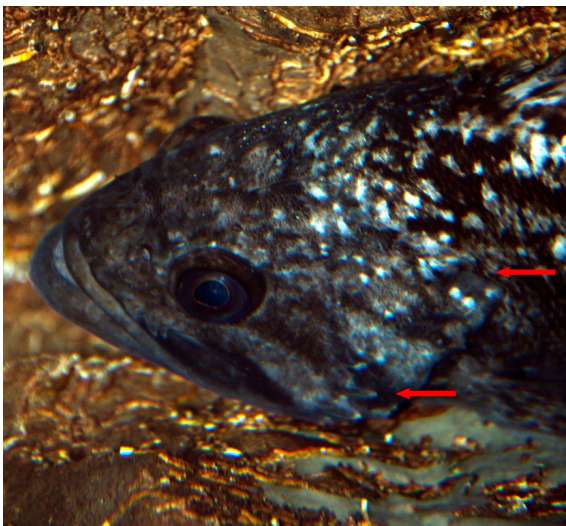


Figure 2. Spines and dark bands on the head of the dogtooth grouper *Epinephelus caninus* (Valenciennes, 1834). Photograph by E. Karpova.

Results and discussion

The collected specimen was measured and identified as a dogtooth grouper *Epinephelus caninus* (Valenciennes, 1834) (Figure 1). Total length (TL) was 410 mm with a standard length (SL) of 360 mm. The dorsal fin had 11 spines and 13 soft rays. Membranes are deeply incised between spines. The anal fin had 3 spiny rays and 8 soft rays. The third spine of the dorsal fin was the largest one. Soft rays of the dorsal fin are quite high, which is characteristic for young specimens of groupers; the length of the tallest soft ray was equal to the length of the third spiny

ray. Pectoral fins were rounded, symmetrical and had 18 more rays than the ventral fins. Pectoral fin length was two times the head length. The head length was 2.5 times the standard body length. Ventral rays were quite short, ending far from the anus. The caudal fin was truncate with edges slightly rounded. In the lower preopercle, there were 4 notable, densely packed spines, while in the back part of operculum, there were three spines, which were separated (Figure 2). The back edge of the operculum was sharpened. Two small, ventrally orientated spines were present in front of the eye. Scales were of average size.

The fish was evenly dark in color when in a calm state. Three clusters of large white spots occurred along the upper half of the body, near the base of dorsal fin (behind the back of the head) (Figures 1 and 2). A further small cluster of white spots was situated near the end of the soft rays of the dorsal fin. There also were white spots of average size below the lateral line. They registered seldom white points lower the lateral line. There were white spots on the dorsal fin spines, developed directly above clusters on the upper part of the body that are mentioned above. There was a wide white band along the edge of the dorsal fin spines. Several small white spots also existed in the lower part of the soft rays of the dorsal fin. Other fins were evenly-colored and dark. There was a thin, weakly expressed white rim along the edge of the soft part of the dorsal and anal fins (more pronounced on the caudal fin).

Fish color weakened considerably under stress, and acquired a motley camouflage with the

domination of grey colors of different intensity. Under weak light the body color had dark tints from black, dark-brown to dark-grey, with separate white spots in the upper half of the body. There were three dark bands on the head, characteristic for young fish of standard length less than 450 mm for this species (Whitehead et al. 1986; Heemstra and Randall 1993). The upper band was the widest and began near the posterior edge of eye, went through the spines in the preopercle and ended near the lower rear edge of the operculum. The second band commenced from the middle of the lower edge of the eye and continued through to about the end of the lower part of the preopercle, before the spines. The third band was situated above the upper jaw. Both upper bands were orientated at about 45° ventrally.

Dogtooth grouper can reach a standard length (SL) of 1500 mm, but generally they grow up to 1000 mm, with a total length of 1570 – 1640 mms; maximum body mass is up to 78 kg (Fischer et al. 1981; Whitehead et al. 1986; Heemstra and Randall 1993). Life span can be up to 75 years (IUCN Red List 2012).

The dogtooth grouper is an eastern Atlantic species that is distributed from Portugal to Angola, including the Mediterranean and the Canary Islands (Spain). It has not been previously found in the Marmara, Black or Azov seas (Whitehead et al. 1986; Heemstra and Randall 1993).

Dogtooth grouper belong to typical nectobenthic fauna, occurring on sandy mud substrates in depths from 30 m to 300 – 400 m (Heemstra and Randall 1993). It is a predatory fish, feeding on smaller fishes and macro-invertebrates, mostly crustaceans (Whitehead et al. 1986; Heemstra and Randall 1993). This grouper is of commercial importance in the Eastern Atlantic, along the west coast of Africa and in the Mediterranean Sea, but catches are considered together with other *Epinephelus* commercial species.

Our observations on the behaviour of the captured dogtooth grouper in the Sevastopol aquarium, noted that much of its day was spent in cavities of false rocks on the vertical back wall of the aquarium, practically motionless (Figure 1). At night, with very low light, the fish moved out to the sandy substrate in the centre of the aquarium, took up a horizontal position and hunted for small pickerel fish *Spicara flexuosa* (Rafinesque, 1810).

The exact pathway of introduction of this species into the northernmost part of the Black Sea is not known. Introduction via ballast water

or as an aquarium release is unlikely. The presence of this fish is probably due to a gradual extension of its range, reaching the Black Sea from the Mediterranean, through the straits of Dardanelles and Bosphorus. Long-distance migrations are, however, not normal behaviour for this species (Whitehead et al. 1986; Heemstra and Randall 1993).

From 1999 to 2012, fourteen new species were recorded along the southwest Crimean coast. Six species are new for the Black Sea in principle and nine species are new for the Crimean peninsula coastal zone. Out of these species, 12 species have primarily Mediterranean origin; three others are exotic species: Indian – Pacific red barracuda *Sphyraena pinguis* (Günther, 1874) (identified according Doiuchi and Nakabo 2005), pennant coralfish *Heniochus acuminatus* (Linnaeus, 1758) and north-western Pacific chameleon goby *Tridentiger trigonocephalus* Gill, 1859 (Boltachev and Yurakhno 2002; Boltachev 2009; Boltachev et al. 2009; Boltachev and Karpova 2012) (see also checklist in Appendix 1).

The geographic position of the Crimean peninsula is an important factor in relation to the apparent invisibility of this area. The most southern point of the Crimean Peninsula, Cape Sarych, lies only 258 km from the Anatolian peninsula of Turkey where a surface longitudinal current, going northwards from Turkey to Crimea exists. This current declines near Foros, and follows along the southwest and west coast of Crimea (Zenkevich 1963). It is possible that Mediterranean species are carried with this current and move into the southwest and western coast of the Crimean peninsula. Such species as the yellow-headed goby *Gobius xanthocephalus* (Heymer and Zander, 1992) and Bath's goby *Pomatoschistus bathi* (Miller, 1982) were both found near the Tarkhankut peninsula, which several years ago were only registered near the more southern Sevastopol shores.

The potential of a substantial established population of dogtooth grouper in the Black Sea may have its challenges due to low salinity, averaging 18 with low winter temperatures, and dropping to 7 near the southwest Crimean coast. However, some other recent Eastern Atlantic or Mediterranean species, such as salema porgy *Sarpa salpa* (Linnaeus, 1758) and gilthead seabream *Sparus aurata* (Linnaeus, 1758), were first reported near Balaclava in 1999, and are now regularly recorded and most likely established along the coast of southwest Crimea (Appendix 1). This process of Mediterraneanization of the

Black Sea (Boltachev and Yurakhno 2002; Boltachev et al. 2009) shows some interesting parallelisms with the northward expansion of southern Mediterranean fishes (Azzurro et al. 2012).

Acknowledgements

We are grateful to Associate Editor of *BioInvasions Records*, Dr. Monica R. Sullivan, for her suggestions and assistance with editing English writing, and to anonymous reviewer for useful comments. Publication of this paper was supported by the European Commission 7th Framework Programme through the *enviroGRIDS* project (Grant Agreement No. 26740).

References

- Azzurro E, Moschella P, Maynou F (2011) Tracking signals of change in Mediterranean fish diversity based on Local Ecological Knowledge. *Plos ONE* 6(9): e24885, <http://dx.doi.org/10.1371/journal.pone.0024885>
- Boltachev AR (2009) Specifying Species Belonging of Barracuda of Group *Sphyræna obtusata* (Pisces: Sphyrænidae) Found in the Black Sea. *Journal of Ichthyology* 49(1): 128–131, <http://dx.doi.org/10.1134/S0032945209010172>
- Boltachev AR, Karpova EP (2012) Morskije Ribi Krimskogo Poluostrova [Marine Fishes of the Crimean Peninsula]. *Bizness-Inform, Simferopol, Ukraine*, 224 pp [in Russian]
- Boltachev AR, Karpova EP, Danilyuk ON (2009) Findings of New and Rare Fish Species in the Coastal Zone of the Crimea (The Black Sea). *Journal of Ichthyology* 49(4): 277–291, <http://dx.doi.org/10.1134/S0032945209040018>
- Boltachev AR, Yurakhno VM (2002) New Evidence of Ongoing Mediterraneanization of the Black Sea Ichthyofauna. *Journal of Ichthyology* 42(9): 713–719
- Dalgıç G, Gümüş A, Zengin M (2013) First record of brown comber *Serranus hepatus* (Linnaeus, 1758) for the Black Sea. *Turkish Journal of Zoology* 37: TUBITAK, <http://dx.doi.org/10.1007/s10228-004-0263-1>
- Doiuchi R, Nakabo T (2005) The *Sphyræna obtusata* group (Perciformes: Sphyrænidae) with a description of a new species from southern Japan. *Ichthyological Research* 52: 132–151, <http://dx.doi.org/10.1007/s10228-004-0263-1>
- FishBase (2012) <http://www.fishbase.org/summary/Epinephelus.caninus.html> (Accessed 14 May 2013)
- Fischer W, Bianci G, Scott WB (eds) (1981) FAO Species Identification Sheets for Fishery Purposes. Eastern Central Atlantic. Fishing area 34 and part of 47. Volume 4. Dept. Fish. Oceans, Ottawa, Canada
- Heemstra PC, Randall JE (1993) FAO species catalogue. Volume 16. Groupers of the world (Family Serranidae, Subfamily Epinephelinae). An annotated and illustrated catalogue of the grouper, rockcod, hind, coral grouper and lyretail species known to date. FAO Fisheries Synopsis. No. 125 Volume 16. FAO, Rome, 382 pp
- IUCN Red List of Threatened Species (2012) Version 2012.2. <http://www.iucnredlist.org/details/> (Accessed 14 May 2013)
- Nelson JS (2006) *Fishes of the world*. 4th edition. John Wiley and Sons, Inc, New York, US, 601 pp
- Vasil'eva ED (2007) Ribi Chernogo morya [Fish of the Black Sea. Key to Marine, Brackish-Water, Euryhaline, and Migratory Species with Colour Illustrations, Collected by S.V. Bogorodsky]. VNIRO, Moscow, Russian Federation, 238 pp [in Russian]
- Whitehead PJP, Bauchot ML, Hureau JC, Nielsen J, Tortonese E (eds) (1986) *Fishes of the North-Eastern Atlantic and Mediterranean (FNAM)*. Volume 2. UNESCO, Paris, France, 517–1007 pp
- Zenkevich LA (1963) *Biologiya morey SSSR [Biology of the Seas of the USSR]*. Academy Sciences of the USSR, Moscow, USSR, 739 pp [in Russian]

Supplementary material

The following supplementary material is available for this article:

Appendix 1. List of new fish species reported for coastal waters of south-western Crimea during 1998 – 2013.

Appendix 1. List of new fish species reported for coastal waters of south-western Crimea during 1998 – 2013.

Species name	Date of first record	Location Name	Coordinates	Reference/ Collector	Origin, Status (Pathway)	Modern occurrence in the coastal zone of the Crimea
<i>Sardinella aurita</i> (Valenciennes, 1847), Round sardinella	10.10.1998	Balaclava bay	44°29,7' N 33°35,6' E	Boltachev et al. 2009	Mediterranean, Atlantic & Pacific oceans. Range extending	Very rare
<i>Sphyræna pinguis</i> Günther, 1874, red barracuda	20.08.1999	Balaclava bay	44°29,7' N 33°35,6' E	Boltachev 2009	Indian ocean, western Pacific; lessepsian migrants: eastern Mediterranean, Aegean Sea. Exotic (Canals)	Single record
<i>Sarpa salpa</i> (Linnaeus, 1758), bamboo fish, salemá	20.09.1999	Balaclava bay	44°29,7' N 33°35,6' E	Boltachev and Yurakhno 2002	Mediterranean, eastern Atlantic, southern Black Sea. Rare. Range extending	Established
<i>Sparus aurata</i> Linnaeus, 1758, gilthead seabream	04.08.1999	Balaclava bay	44°29,7' N 33°35,6' E	Boltachev and Yurakhno 2002	Mediterranean, eastern Atlantic, southern Black Sea. Rare. Range extending	Likely established
<i>Chelon labrosus</i> (Risso, 1827), thicklip grey mullet	31.10.1999	Balaclava bay	44°29,7' N 33°35,6' E	Boltachev and Yurakhno 2002	Mediterranean, eastern Atlantic, southern Black Sea Rare. Range extending	Migrants, registered in the warm season not every year
<i>Micromesistius poutassou</i> (Risso, 1827), 1999, blue whiting	19.01.1999	Cape Ay-ya	44°28,7' N 33°37,3' E	Boltachev and Yurakhno 2002	Mediterranean, northern Atlantic. Range extending?	Single record
<i>Gobius xanthocephalus</i> Heymer et Zander, 1992, yellow headed goby	12.06.2007	Kazach'ya bay	44°35,3' N 33°24,5' E	Boltachev et al. 2009	Mediterranean, eastern Atlantic, Black sea (Caucasus, single record). Range extending	Established
<i>Gobius cruentatus</i> Gmelin, 1789, red mouthed goby	06.05.2002.	Martynova bay	44°36,9' N 33°30,1' E	Boltachev et al. 2009	Mediterranean, eastern Atlantic, Black sea (Turkish, single record). Range extending	Established
<i>Parablennius incognitus</i> (Bath, 1968), incognito blenny	10.06.2007	Coastal zone of Sevastopol	44°35,3' N 33°24,4' E	Boltachev et al. 2009	Mediterranean, eastern Atlantic, Black sea (single record). Range extending	Established
<i>Syngnathus acus</i> Linnaeus, 1758, greater	21.11.2006	Sevastopol bay	44°36,4' N 33°36,2' E	Boltachev et al. 2009	Mediterranean, eastern Atlantic, Black sea (Turkish, single record). Range extending?	Single record
<i>Tridentiger trigonocephalus</i> Gill, 1859, chameleon goby	04.09.2006	Sevastopol bay	44°36,4' N 33°36,2' E	Boltachev et al. 2009	North-western Pacific. Exotic (aquarium release)	Established
<i>Heniochus acuminatus</i> (Linnaeus, 1758), pennant coralfish	27.10.2003	Balaclava bay	44°29,7' N 33°35,6' E	Boltachev et al. 2009	Indian ocean, western Pacific. Exotic (shipping)	Single record
<i>Pomatoschistus bathi</i> Miller, 1982, Bath's goby	15.17.2000	Kazach'ya bay	44°35,3' N 33°24,5' E	Boltachev et al. 2009	Mediterranean, Black sea (Caucasus, single record). Range extending	Established
<i>Millerigobius macrocephalus</i> (Kolombatovic, 1891), Miller's goby	25.04.2009	Sevastopol bay	44°37,0' N 33°31,4' E	Boltachev and Karpova 2012	Northern Mediterranean, Aegean sea. Range extending	Established
<i>Epinephelus caninus</i> Valenciennes, 1834, dogtooth grouper	26.04.2013	Cape Ay-ya	44°28,8' N, 33°37,4' E	Present study	Mediterranean, eastern Atlantic. Range extending?	Single record