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First record of the zebra goby, *Zebrus zebrus* (Gobiidae), in the Black Sea

by

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RÉSUMÉ. - Premier signalement du gobie *Zebrus zebrus* (Gobiidae) en mer Noire.

Un spécimen de l'espèce *Zebrus zebrus* (Risso, 1826) a été collecté en mer Noire. Cette capture est la première signalisation de cette espèce pour cette aire géographique et augmente de façon importante sa répartition, considérée comme uniquement méditerranéenne. L'utilisation d'anesthésique en plongée sous-marine se révèle être une technique très utile.

Key words. - Gobiidae - *Zebrus zebrus* - Black Sea - Morphology - Ecology - New records.

Zebrus zebrus (Risso, 1826) is a small cryptobenthic goby with a fairly continuous distribution along the Mediterranean coasts (Kovačić *et al*., 2005). The closest findings of this species to the Black Sea are records from the Aegean Sea, where *Z. zebrus* was stated to be a vulnerable species primarily due to habitat destruction, and a medium priority for conservation action was suggested (Fricke *et al*., 2007). In October 2007, SCUBA research was performed for the first time along the south coast of the Black Sea using the anaesthetic Quinaldine in search for small cryptic benthic fishes. A single specimen of *Z. zebrus* was collected at locality Cape Yason, Ordu. The present finding is the first record for the Black Sea and extends the distribution area of this species, previously considered exclusively Mediterranean (Fig. 1).

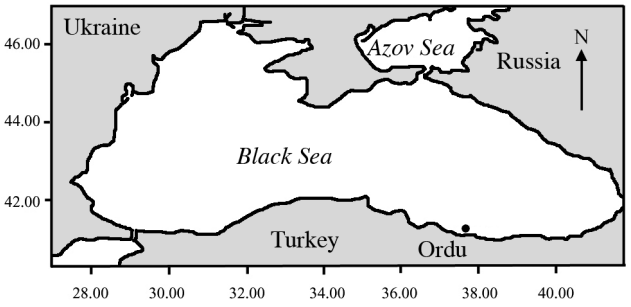

Figure 1. - Map of the Black Sea showing record of *Zebrus zebrus*. *[Carte de la mer Noire avec la localisation de la capture de* Z. zebrus*]*.

MATERIAL AND METHODS

One juvenile (Fig. 2) of unidentified sex, 14.5 + 3.7 mm, FFR 1023, Cape Yason, 25 km west from Ordu, Türkiye, South Black Sea coast, 41°08' 05,78"N, 37°41' 02,47"E, 17 Oct. 2007. The specimen was collected by S. Engín and M. Kovačić. It is deposited in Zoological collection, Faculty of Fisheries, Rize University (FFR). Meristic methods as in Kovačić *et al*. (2005). Meristic abbreviations: A, anal fin; C, caudal fin; D1, D2, first and second dorsal fin; P, pectoral fin; V, pelvic disc; LL, scales in lateral series; TR, scales in transverse series. Terminology of lateral-line system follows Miller (1986).

RESULTS

Diagnosis

The following minimum combination of characters positively identify the specimen as *Z. zebrus* among species of Gobiidae family in the Clofnam area: (1) suborbital papillae without longitudinal row *a*; (2) all three head canals present; (3) anterior nostril short, tubular, with tentacle from inner part of rim; (4) predorsal area naked; (5) 7 suborbital transversal rows; (6) LL = 29-30; (7) 2 transversal suborbital rows below longitudinal row *b*.

Description

Anterior nostril short, tubular, with tentacle from inner part of rim. Branchiostegal membrane attached to entire side of isthmus. Fins: D1 VI; D2 I/10; A I/9; C 14 branched rays, 17 segmented rays; P 16 and 17 (both sides); V I/5+I/5. The beginning of A deformed, the first soft ray short and unbranched. P uppermost rays moderately free from membrane. V complete, with anterior transverse membrane. Body with ctenoid scales, LL 29 and 31, TR 10 and 11 (both sides). Head, predorsal area and breast naked. Scales also only partially visible along D1 origin. Colouration immediately after fixation and colouration after longer preservation similar: body greyish brown, only six vertical dark bars recognizable along lateral sides. Head pigmented, except two whitish transverse bars, the first one spreading from each eye to the lips and the second present on cheek. Predorsal area, and operculum pigmented. Breast also pigmented. D1 with two longitudinal bands. D2 with three to four longitudinal bands. C transparent, with vertical dark strip along origin. P with vertical dark strip along origin of rays, the rest of fin colourless; P girdle with upper mark close to rays origin and lower mark closer to operculum. A densely pigmented, with transparent band along fin edge. V colourless. Head with anterior and posterior oculoscapular, and preopercular canals, with pores σ, λ, κ, ω, α, β, ρ, ρ^1, ρ^2, and γ, δ, ε respectively. Rows and number of sensory papillae as follows (counted on the right side, that was in better shape): no *interorbital* rows; *preorbital*: *r* (3), s^1 (2), s^2 (2), s^3 (2), c^1 (2), c^2 (2), c_1 (4), c_2 (2); *suborbital*: no row *a*, four transverse suborbital rows before, two below longitudinal row *b*, *1* (6), *2* (5), *3* (4), *4* (4), *5s* (2), *5i* (3), *6s* (3), *6i* (4), *7* (3), *b* (6) reaching but not distinctly passing row *5*, *d* continuous (14)*; preoperculo-mandibular*: *e* (14+14), *i* (7+8), *f* (3)*; oculoscapular*: x^1 (7), x^2 (2), *tr* (2), *z*

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Figure 2. - *Zebrus zebrus,* juvenile of unidentified sex, collected on the south coast of the Black Sea, Turkey. Photograph realised immediately after fixation. *[*Z. zebrus*, spécimen juvénile non sexé. Photographie réalisée immédiatement après la fixation].*

(4), *q* (2), *y* (1), *as*[1] (4); *opercular*: *ot* (12), *os* (6), *oi* (4); *anterior dorsal*: *n* (6), *h* (8). *Oculoscapular* rows *as*[2], *as*[3], *la*[1], *la*[2] and *anterior dorsal* rows *g, o, m* were not visible or were partially visible probably due to skin damage.

Ecology

The specimen was collected on a rock at 5 m depth where it was hidden in a small crevice. The rocky substrate was consisted of bedrock covered with *Cystoseira* sp., with expanses of coarse sand and shell gravel and rare individual boulders and cobbles around.

DISCUSSION

The collected specimen from the Black Sea generally corresponds in body morphology, head and fins, squamation, coloration, and in lateral line system to populations of *Z. zebrus* from the Mediterranean. The noticed differences (P uppermost rays only moderately free from membrane, scales only partially visible along D1 origin) from species description (Miller, 1977; 1986) are probably results of juvenile stage of the examined specimen.

The use of SCUBA techniques has improved knowledge of geographical range and diversity of small gobies in the Mediterranean Sea during the last two decades (Kovačić *et al*., 2005; Engin and Dalgic, 2008). However, the advantage of SCUBA diving in a search for small benthic fishes was only recently recognised for the Black Sea (Vasil'eva and Bogorodskii, 2004; Engin *et al*., 2007). The present research, which included the first use of anaesthetic during SCUBA diving for ichthyological sampling in the Black Sea, showed the value of this additional technique. Including the present finding, 33 gobiid species have been recorded in the Black Sea (Vasil'eva, 2003; Vasil'eva and Bogorodsky, 2004; Boldyrev and Bogutskaya, 2007; Boltachev *et al*., 2007; Engin *et al*., 2007; Freyhof and Naseka, 2007; present finding). *Z. zebrus* was previously recorded for the north-western part of the Mediterranean, the Adriatic, the Ionian, the Aegean Seas, and the Levantine basin (Kovačić *et al*., 2005). Despite the late finding in the Black Sea, we believe that *Z. zebrus* is the native species for this area, based on the same arguments already discussed for *Gobius cruentatus* (Engin *et al*., 2007). Will future researches relying on the use of diving techniques and anaesthetic significantly increase the known diversity of native gobiid fauna of this basin? Target species for this technique are small cryptic gobiid species. Among more than ten small cryptic gobiid species in the Mediterranean (genera *Chromogobius, Corcyrogobius, Didogobius, Gammogobius, Lebetus, Millerigobius, Odondebuenia, Vanneaugobius, Zebrus*), only two, *Chromogobius quadrivittatus* (Vasil'eva, 2003) and *Z. zebrus* are now known in the Black Sea. *Z. zebrus* is generalist among Mediterranean small cryptobenthic gobies, present in many habitat types at shallow depth (approximately down to 10 m) (Kovačić *et al*., 2005). *C. quadrivittatus* inhabits very shallow infralittoral and mediolittoral pools among gravels and stones (Miller, 1986). However, it is tolerant to brackish water. The future use of diving techniques and anaesthetic in the Black Sea would answer if these two species were the only Mediterranean cryptobenthic gobies capable of entering the Black Sea considering the hydrographic characteristics and geological history of this region or if there are additional small cryptic Mediterranean gobiid species present in this area.

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