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## OCCURRENCE OF *POMATOSCHISTUS MINUTUS* (PALLAS, 1770) (PISCES: GOBIIDAE) ALONG THE NORTH AEGEAN COAST OF TURKEY

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### ABSTRACT

*The sand goby (Pomatoschistus minutus) is a scarcely documented gobiid of Turkey, whose reliable occurrence records are confined to the Black Sea and Sea of Marmara. 69 specimens were recently collected off the northern Aegean Sea coasts, representing the first record of the species in the locality.*

**Key words:** *Pomatoschistus minutus*, Gobiidae, Aegean Sea, Turkey

## RITROVAMENTO DI *POMATOSCHISTUS MINUTUS* (PALLAS, 1770) (PISCES: GOBIIDAE) IN ACQUE DELLA COSTA SETTENTRIONALE EGEE DELLA TURCHIA

### SINTESI

*Il ghiozzetto minuto (Pomatoschistus minutus) è una specie di gobiidi raramente documentata per la Turchia, i cui ritrovamenti attendibili sono confinati al Mar Nero e al Mar di Marmara. Sessantanove esemplari sono stati recentemente raccolti nelle acque antistanti la costa settentrionale del mare Egeo e rappresentano il primo ritrovamento di tale specie in questa località.*

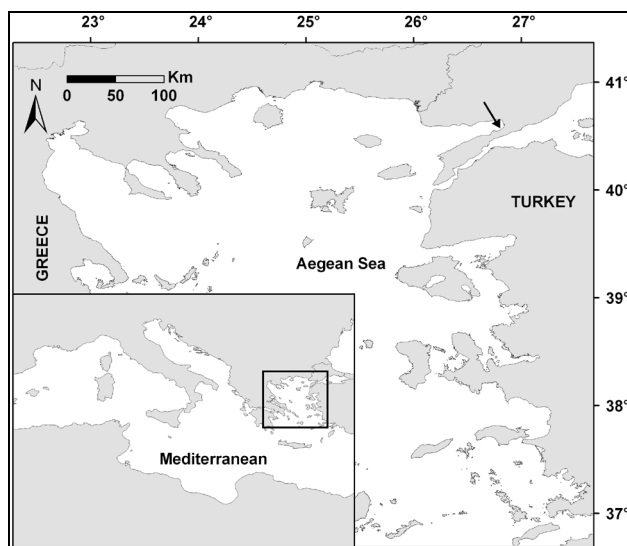
**Parole chiave:** *Pomatoschistus minutus*, Gobiidae, mare Egeo, Turchia

## INTRODUCTION

*Pomatoschistus* is the dominant gobiid genus of the Mediterranean and eastern Atlantic coasts of Europe, represented by 11 species inhabiting mostly marine and estuarine environments (Miller, 1986). Data on this group of fishes are remarkably scarce especially in the eastern Mediterranean basin, since they are generally overlooked due to their small sizes, cryptic and epibenthic habits. A total of four species were listed from Turkish coasts (Bilecenoglu *et al.*, 2002), and a new record (*Pomatoschistus quagga*) has recently been added to the local ichthyofauna (Fricke *et al.*, 2007). Apart from sporadic occurrence records, status and actual distribution of *Pomatoschistus spp.* in Turkey is yet to be resolved. Recent studies conducted along the northern Aegean Sea coasts have revealed the presence of a sand goby population, *Pomatoschistus minutus* (Pallas, 1770), whose occurrence in the area had previously been questionable.

## MATERIALS AND METHODS

Samples were collected with a beach seine from sandy shallow waters (<2 m), Saros Bay, Turkey (40°35'0.6" N, 26°50'15.0" E; Fig.1), during February 2007. Surface water temperature was 10.7°C, with salinity reaching 27.0 ppt on the sampling day. Fish were anesthetized with tricaine methanesulphonate (MS-222) before being fixed in 4% buffered formalin. Five fish were stained with potassium permanganate (KMnO<sub>4</sub>) for scale count, sensory papillae analyses and photography.



**Fig. 1: Sampling locality of *Pomatoschistus minutus* (indicated with arrow).**

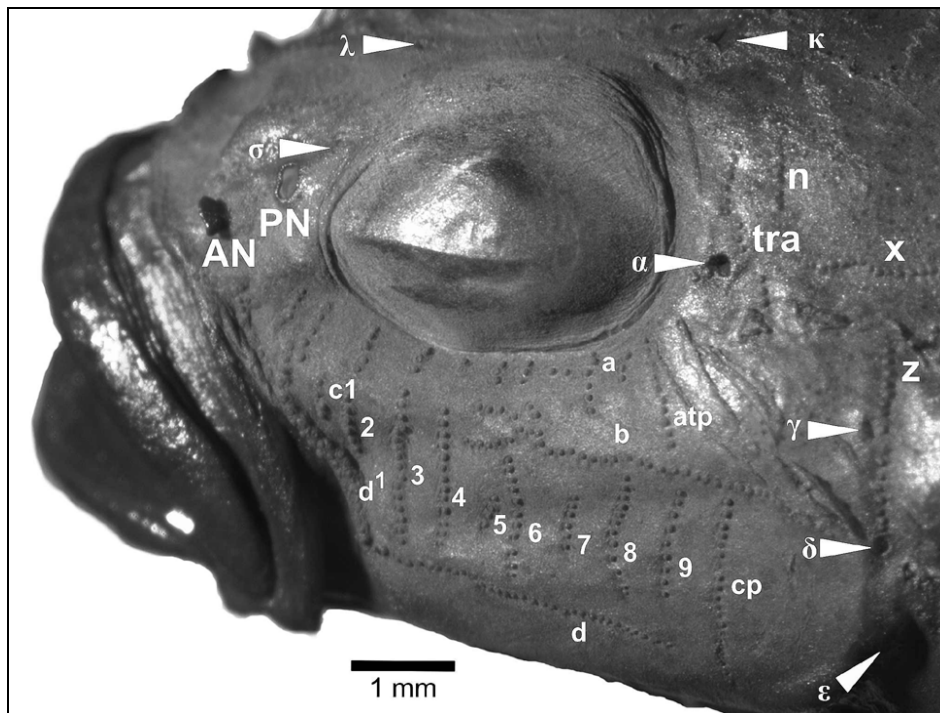
**Sl. 1: Vzorčiče peščenega glavačka *Pomatoschistus minutus* (označeno s puščico).**

Terminology of the lateral line system follows Miller (1986). Two fish were dissected for vertebral count. Some of the specimens were fixed in 70% ethanol and preserved in the Piri Reis Marine Museum of Canakkale Onsekiz Mart University, Canakkale (6 females, 10 males; catalogue number PRM-PIS/2007-0055) and in the Fisheries Faculty Museum, Ege University, Bornova, Izmir (7 males, 3 females, catalogue number ESFM-PIS/07-1).

## RESULTS AND DISCUSSION

Males ( $n = 51$ ) ranged between 47 and 57 mm SL (mean  $\pm$  SD = 49.5  $\pm$  2.97 mm), the females ( $n = 18$ ) between 46 and 56 mm SL (mean  $\pm$  SD = 51.6  $\pm$  2.26 mm). Meristic characters were: first dorsal finrays VI, second dorsal finrays I + 9–11, anal finrays I + 10–11, pectoral finrays 18–20, lateral line scales 56–62 (ctenoid). Breast and predorsal area with cycloid scales. Vertebral counts of two dissected fish were 32. The distribution of head sensory papillae of neuromasts (Fig. 2) were similar to the description of Miller (1986). Sub-orbital row *a* had several (9–12) short transverse rows. Row *b* extended forward to below half of the eye. Only transverse row *cp* descended below row *d* in most of the specimens. One individual, however, had row *c8* passing through row *d* on the left side (with 12 *c* rows) but not on the right side (with 9 *c* rows). As described by Webb (1980), row *i* and supralabial section of *d* (*d*<sup>1</sup> in figure 2) were double layered. Head canals included pores  $\sigma$ ,  $\lambda$ ,  $\kappa$ ,  $\alpha$ ,  $\rho$ ,  $\rho^1$ ,  $\rho^2$ ,  $\gamma$ ,  $\delta$ , and  $\epsilon$ . Both sexes generally had a sandy-grey colour. The males had four vertical dark bars, dark edged anal fins, dark pelvic fin, and spot on the rear of the first dorsal fin with a black-to-blue colour encircled with white. Females were pale with conspicuous dark chin blotch, some spots along the lateral line, and lacked spot on the first dorsal fin. Pelvic membrane had villous anterior edge in both sexes. Branchiostegal membrane attached to the anterior half side of isthmus.

Systematics of the *Pomatoschistus minutus* complex, including *P. minutus*, *P. lozanoi* and *P. norvegicus*, has not been settled as yet (Huyse *et al.*, 2004). Small body size and superficial resemblance to each other appears to be a conspicuous problem in precise species identification. Main characters that distinguish *P. minutus* from other species of the complex are as follows (Miller, 1986): sub-orbital row *b* extending forwards to below anterior half of eye (ending anteriorly under rear half of eye in *P. norvegicus*), suborbital transverse rows with only *cp* extending below row *d* (sub-orbital transverse rows with two extending downwards through or below level of row *d* in *P. lozanoi*).



**Fig. 2:** Head sensory papillae of *Pomatoschistus minutus* from the northern Aegean Sea, Turkey. Legend: AN – anterior nostrils; PN – posterior nostrils; ( $\sigma$ ,  $\lambda$ ,  $\kappa$ ,  $\alpha$ ) – anterior oculoscapular canal pores; ( $\gamma$ ,  $\delta$ ,  $\epsilon$ ) – preopercular canal pores; (b, d, x) – longitudinal rows; (cp, n, z) – transverse rows; (a) – suborbital rows.

**Sl. 2:** Čutilne bradavice na glavi peščenega glavačka *Pomatoschistus minutus* iz severnega Egejskega morja, Turčija. Legenda: AN – sprednji nosnici; PN – zadnji nosnici; ( $\sigma$ ,  $\lambda$ ,  $\kappa$ ,  $\alpha$ ) – sprednje očesno-ramenske kanalne pore; ( $\gamma$ ,  $\delta$ ,  $\epsilon$ ) – kanalne pore na predpoklopcu; (b, d, x) – vodoravni nizi; (cp, n, z) – navpični nizi; (a) – podočesni nizi.

The two subspecies previously described, *P. minutus minutus* in the Atlantic and *P. minutus elongatus* in the Mediterranean and Black Seas, seem to be invalid based on recent researches. Although female sand gobies had eggs developed in their ovaries and nuptial coloration was apparent on the male samples, we were unable to find any breast pigmentation in these mature samples in both sexes. Since this pigmentation is supposed to be present in *P. minutus elongatus*, our observation supports the findings of Stefanni *et al.* (2003) who suggested that the differentiation in the two subspecies, *P. minutus minutus* and *P. minutus elongatus*, is questionable based on their genetic analyses. However, the dark chin blotch was evident in female samples as is supposed to be a colour character for the subspecies *P. minutus elongatus*. Except for one specimen, who had only one  $\omega$  pore on the left side, we were not able to detect the pore  $\omega$  on the head canals for the other 68 specimens. Similarly, Stefanni (2000) did not detect any pore  $\omega$  on the head canal in the Mediterranean population of another *Pomatoschistus*, the closely related Norway goby, *P. norvegicus* (Collett, 1903). This pore is supposed to be present in both species according to Miller (1986).

Previous occurrence records of *P. minutus* from Turkey are based on a few scattered studies, majority of

which lack detailed species descriptions. Ninni (1923) was the first who recorded the species from Turkey, based on material collected from the Sea of Marmara. Sözer (1941) gave a concise description of sand goby from the same locality. The first Turkish Black Sea record was given by Erazi (1942), who also confirmed the presence of *P. minutus* in the Sea of Marmara. Considering that the species originated from the Mediterranean Sea, Erazi (1942) and Slastenenko (1956) indicated the possible occurrence of *P. minutus* in Aegean and Mediterranean Seas as well, although their assumption was not based on actual specimen collection and examination from these sites. The most reliable record of sand goby from the Aegean Sea was presented by Fage (1918), who found a single specimen (45 mm total length) from Saronikos Gulf of Greece (37° 51' N, 23° 14' E). It should be noted, however, that neither Tortonese (1975) nor Miller (1986) included the Aegean Sea within the known distribution range of *P. minutus*. In some recent ichthyoplankton studies (*i.e.* Hossucu & Ak, 2002), a dense postlarval distribution of sand goby was mentioned from Izmir Bay (central Aegean Sea coast of Turkey). Despite the several inventory studies carried out in Izmir Bay, no adult sand goby specimens could be found (see Bilecenoglu *et al.*, 2002), and this locality is

characterized by the well established population of *P. marmoratus*. Absence of the latter species in the ichthyoplankton list of Hossucu & Ak (2002) might be an indication of a misidentification. Since there is a lack of goby-oriented research in the Aegean Sea, further detailed studies may reveal a larger distribution range for *P. minutus*.

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POJAVLJANJE PEŠČENEGA GLAVAČKA *POMATOSCHISTUS MINUTUS*  
(PALLAS, 1770) (PISCES: GOBIIDAE) VZDOLŽ SEVEROVZHODNE OBALE  
TURŠKEGA DELA EGEJSKEGA MORJA

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## POVZETEK

*Peščeni glavaček (Pomatoschistus minutus) je redko dokumentirana vrsta iz družine glavačev v turških vodah, saj je bil zanesljivo zabeležen le v Črnem in Marmarskem morju. Pred kratkim pa je bilo v obrežnih vodah severnega Egejskega morja ujetih kar 69 primerkov peščenega glavačka, kar je prvi zapis o tej vrsti na tej lokaliteti.*

**Ključne besede:** *Pomatoschistus minutus*, Gobiidae, Egejsko morje, Turčija

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