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Three new exotic fish records from the SE Aegean Greek waters

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SUMMARY: Three exotic fish, *Iniistius pavo* (Labridae) and *Lagocephalus sceleratus* (Tetraodontidae), Lessepsian immigrants, and *Seriola fasciata* (Carangidae) of Atlantic origin, were recorded in the marine area of Rhodes Island (SE Aegean Sea, Greece). The first species is a new record for the Mediterranean Sea, the second is new for Greek waters, while the occurrence of the third is registered for the first time in the eastern Mediterranean Sea.

Keywords: Lessepsian migration, exotic fish, *Iniistius pavo, Lagocephalus sceleratus*, *Seriola fasciata*, Mediterranean Sea.

RESUMEN: Tres nuevas especies de peces exóticos registrados en el área marina de la isla de Rodas (Mar Egeo sud oriental, Grecia). – Tres peces exóticos, *Iniistius pavo* (Labridae), *Lagocephalus sceleratus* (Tetraodontidae), inmigrantes lessepsianos, y *Seriola fasciata* (Carangidae), especie del Atlántico, se registraron en el área marina de la isla de Rodas (mar Egeo sudoriental, Grecia). La primera especie es nueva para el Mediterráneo, la segunda es nueva para aguas griegas, y la tercera es registrada por la primera vez en el Mediterráneo oriental.

Palabras clave: migración lessepsiana, peces exóticos, *Iniistius pavo, Lagocephalus sceleratus, Seriola fasciata,* mar de Mediterráneo.

The majority of exotic marine species listed in Hellenic waters have been recorded in the south-east Aegean Sea, particularly in the continental shelves of Rhodes and the Dodecanese Islands. About 90% of this biota consists of Lessepsian migrant species and the frequency of their records is increasing in the area (Pancucci-Papadopoulou *et al*., 2005; Corsini *et al*., 2005).

In this paper two more Indo-Pacific fish species, *Iniistius pavo* Valenciennes, 1840, new in the Mediterranean and *Lagocephalus sceleratus* (Gmelin, 1789), new for Greek waters, are presented. Additionally, the first occurrence in the eastern Mediterranean of the carangid of Atlantic origin *Seriola fasciata* (Bloch, 1793) is reported.

The juvenile *I. pavo* specimen was identified according to Randall (1986), Randall and Earle (2002) and Victor *et al*. (2001). Randall (*pers. comm.,* 2005) revised an initial misidentification of the specimen as *Xyrichtys niger* (Steindachner, 1900) (Randall, 1981), claiming that the black specimen "is a colour phase of *X. pavo*" (Fig. 1). It was captured on August 2004 in the Plimmiris area, SE coast of Rhodes, at a depth of 2.5 m, on a sandy bottom with rocks around, sea temperature 28°C.

The specimen of *L. sceleratus* was identified according to Smith and Heemstra (1986a) and Akyol *et al*. (2005). It was caught by a fishing-rod on 21 September 2005 at Ladiko, SE coast of Rhodes, at a depth of 15-20 m, on a sandy bottom.

The rather juvenile *S. fasciata* specimen was identified according to Smith-Vaniz (1986) and Golani *et al.* (2002). It was caught in November 2004 by a trawl-net at a depth of 50 to 80 m off Ialissos-Trianda Bay, NW coast of Rhodes, with a sea temperature at the surface of 21°C, and sandy to muddy bottom.

The samples are deposited at the Hydrobiological Station of Rhodes Collection.

DESCRIPTION OF SPECIMENS

The morphometric measurements and meristic counts of fish specimens were performed according to Smith and Heemstra (1986b) and Bauchot (1987).

Abbreviations. Total length: TL, Fork length: FL, Standard length: SL, Maximum body depth: H, Minimum body depth: h, Caudal peduncle length: lpc, Head length: HL, Eye diameter: Oh, Preorbital distance: prO, Postorbital distance: poO, Interorbital distance: iO, Base of dorsal fin: bD, Base of 1st dorsal fin: bD_1, Base of 2nd dorsal fin: bD_2, Base of anal fin: bA, Pectoral fin length: PL, Ventral fin length: VL, Ventral-Anal distance: V-A, Predorsal distance: pD, Preventral distance: pV, Preanal distance: pA. Ratios are given as % in SL or in HL. Meristic counts comprehended spines (designated by Roman numerals) and soft rays (Arabic numerals) of dorsal (D or D_1, D_2), anal (A), pectoral (P), ventral (V) and caudal (C) fins.

Iniistius pavo. D: II+VII+12, A: III+12, P: 12, V: I+5, C: 15 (broken). SL 43.8 mm, weight 5.2 g. H 34.2 SL, h 13.7 SL, lpc 10.3 SL, HL 30.8 SL, Oh 23.0 HL, prO 26.7 HL, poO 53.3 HL, iO 14.1 HL, bD 62.1 SL, bA 45.2 SL, PL 17.6 SL, VL 14.2 SL, V-A 17.1 SL, pD 18.9 SL, pV 27.4 SL, pA 45.7 SL. The first two dorsal spines are separated from the rest of the dorsal fin and longer (1st: 7.2 mm, 2nd: 6.7 mm, 3rd: 3.3 mm) (Victor *et al.*, 2001, Randall and Earle, 2002). The origin of the first dorsal spine is distinctly behind the eye. The lateral line is interrupted: (20)+(6). The body is deep and compressed. The dorsal profile of the snout is not steep, sloping at an angle of about 55°. The eye is nearer the mouth than the dorsal profile of the head, the front of the head not ending in a fleshly keel. Two large canines are present in both the upper and lower jaws. The body colour in life is dark black, the posterior part of the caudal fin is transparent whitish, the margins of dorsal fin lightly reddish and the eyes reddish (Randall and Earle, 2002). The specimen was damaged due to the transport (Fig. 1).

The *I. pavo* is a wide-ranging Indo-Pacific (including the Red Sea) and eastern Pacific species (Victor *et al.*, 2001; Randall and Earle, 2002; Froese and Pauli, 2005).

Lagocephalus sceleratus. D: 12, A: 11, P: 17, C: 20. TL 376 mm, FL 354 mm, SL 335 mm, weight 648.5 g. H 19.1 SL, h 3.0 SL, lpc 26.6 SL, HL 31.6 SL, Oh 22.6 HL, prO 48.9 HL, poO 27.4 HL, iO 38.0

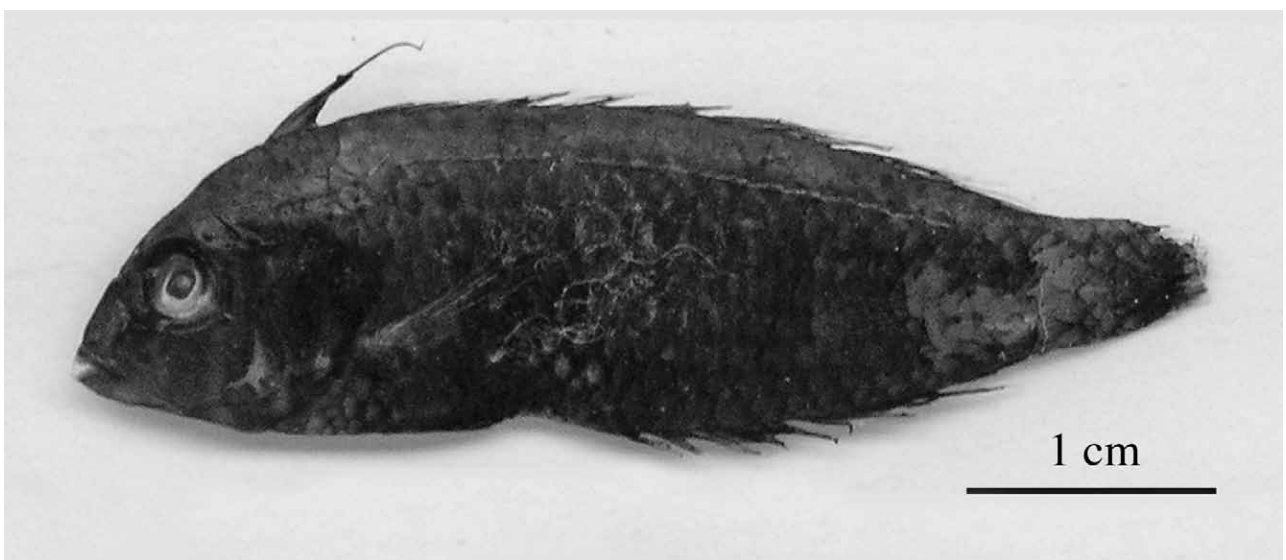

FIG. 1. – *Iniistius pavo* specimen preserved in formaldehyde.

FIG. 2. – *Lagocephalus sceleratus* specimen, after defrosting.

HL, bD 5.5 SL, bA 5.2 SL, PL 12.2 SL, pD 66.0 SL, pA 65.7 SL. The body is elongated. The dorsal and anal fins are posterior in position and opposite, the caudal fin is lunate. Small spinules are present on the dorsal area, extending from behind the upper lip to the dorsal fin, while ventrally the spinules do not reach the anus. No scales are present on the rest of the body surface. Colour of defrosted specimen: dorsally it is greyish to greenish with circular or ellipsoid black spots. A silver band originates from behind the upper lip and extends to the caudal fin base. In front of and below the eye a silver blotch almost reaches 1/3 of the horizontal eye diameter. The belly is whitish. The pectoral base and inside of gills are black (Fig. 2).

The species inhabits the Indo-West Pacific and the Red Sea (Froese and Pauli, 2005) and it has been recorded recently for the first time in Turkish waters, SE Aegean Sea (Akyol *et al*., 2005).

Seriola fasciata. D_1: VIII, D_2: I+32, A: II+I+19, P: I+19, V: I+5, C: 22 (soft). TL 198 mm, FL 177 mm, SL 168 mm, weight 133.5 g. H 38.2 SL, h 5.9 SL, lpc 9.4 SL, HL 28.6 SL, Oh 22.5 HL, prO 32.1 HL, poO 47.9 HL, iO 40.8 HL, bD_1 10.7 SL, bD_2 45.2 SL, bA 27.1 SL, PL 14.7 SL, VL 21.5 SL, V-A 30.4 SL, pD 27.9 SL, pV 31.5 SL, pA 60.2 SL. The body is elongated, laterally compressed, with terminal mouth. The two dorsal fins are not connected to each other. The

FIG. 3. – *Seriola fasciata* specimen, after defrosting.

length of the 2nd dorsal fin lobe is 11% shorter than PL and 12% of FL (Smith-Vaniz, 1986). No scutes in lateral line, caudal peduncle grooves present. Colour of defrosted specimen: the body is yellowish, particularly on the dorsal part, above the lateral line, which is curved above the pectoral fin. There are seven dark vertical bars on the sides of the body, which extend from the middle dorsal line to the middle abdominal line. They are irregular and broken, the third to the seventh extending onto the inter-radial membranes of the second dorsal fin, the fifth to the seventh onto the anal fin (Smith-Vaniz, 1986; Golani *et al*., 2002). In addition, a bar is located on the head extending from the eye to the front, while another one is present on the caudal peduncle and a black spot appears on the caudal fin base (Fig. 3).

The species has a sub-tropical distribution, appearing in the western and eastern Atlantic (Golani *et al*., 2002; Froese and Pauli, 2005). In the Mediterranean, it was first recorded in the Balearic Islands (Massutí and Stefanescu, 1993), successively in the southern Tyrrhenian Sea, off Sicily and Lampedusa, in the Sicilian channel (Andaloro and Potoschi, 1997), in the Gulf of Lions (Quignard and Tomasini, 2000), and in the Gulf of Gabes (Bradai, 2000).

REMARKS

The present discovery of *I. pavo* in Dodecanese waters brings the total number of the Red Sea fish species which have colonized (or are colonizing) the eastern Mediterranean up to 63 (Golani *et al*., 2002; Golani *et al*., 2004; Corsini *et al*., 2005; Akyol *et al*., 2005, Sinis, 2005). Several of these Erythrean colonizing fishes are "relegated" to the Levant Basin, while some others have already expanded their distribution to the central Mediterranean (Catalano and Zava, 1993, Azzurro *et al*., 2004, Azzurro and Andaloro, 2004, Ben Soussi *et al*., 2004), and others have expanded as far as the Adriatic Sea (Dulčić and Pallaoro, 2003).

Currently there are six non-indigenous tetraodontids species in the Mediterranean (Golani *et al*., 2002; Corsini *et al*., 2005; Akyol *et al*., 2005) and the occurrence of *L. sceleratus* in Rhodes shows that its population is continuing to spread in the SE Aegean Sea.

There are 33 alien Atlantic fish species in the Mediterranean (Golani et al., 2002, 2004; Ben Soussi *et al*., 2005), some of which, such as *Sphoeroides pachygaster* (Müller and Troschel, 1848), *S. fasciata* and *S. carpenteri* Mather, 1971 have reached significant biomasses (Andaloro, 2001). It should be noted that *S. pachygaster*, from its first recording in Mallorca (Oliver, 1981), gradually expanded its distribution to the entire Mediterranean (Golani *et al*., 2002; Eryilmaz *et al*., 2003).

The successive recordings from west to east of *S. fasciata* obviously suggest a successful adaptation of the species to the warm waters of the south Mediterranean and its progressive establishment there (Andaloro *et al*., 2005).

The scientific community is increasingly interested in the phenomenon of the biological invasion, and the flux of invaders is continuous (Streftaris *et al*., 2005). The present case, which involves both Erythrean and Atlantic colonizing fishes in the SE Aegean Sea, may also suggest that the gradual warming of the area, occurring over the last period (Kevrikidis and Galil, 2003), also facilitates the immigration of Atlantic exotic species, which leads to a more complex vision of the recent colonization process in the entire Mediterranean and particularly in the area looked at in this paper.

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