THE THREADFIN BREAM NEMIPTERUS RANDALLI RUSSELL, 1986 (PERCIFORMES: NEMIPTERIDAE) IN THE EASTERN MEDITERRANEAN SEA.

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Abstract

A total of 30 specimens (73-95 mm SL) of *Nemipterus randalli* Russell, 1986 were collected along the Lebanon coasts (Eastern Mediterranean Sea). The small size and immature status of the specimens collected indicate recent successful recruitment of *N. randalli* in the Levantine basin of the Mediterranean.

Keywords: Lessepsian migration; *Nemipterus randalli*; eastern Mediterranean; artisanal fishery

Communication

The settlement of Indo-Pacific and Red Sea species in the Mediterranean, known as Lessepsian migration, is an ongoing process that began in 1869 with the opening of the Suez Canal (Por, 1978; Golani, 1998; Galil, 2000). After the discovery of the first Lessepsian migrant (*Atherinomorus lacunosus*) in 1902, more than 60 new records of fish species for the Mediterranean have been described. For some of these species there is clear evidence of a recent rapid extension of their geographical range (Bilecenoglu *et al.*, 2002; Azzurro & Andaloro, 2004).

The threadfin breams (Nemipteridae) are small to medium-sized marine perciform fishes widespread in the tropical and subtropical Indo-West Pacific region, but absent in the eastern Pacific and Atlantic oceans (Russell, 1990). They represent a significant component of coastal demersal fish communities and are important to fisheries throughout the Indo-West Pacific (Pauly & Martosubroto, 1980; Russell, 1990; Harris & Poiner, 1990; Sharum, 2002; The *et al*., 2005).

The first record of a nemipterid fish species in the Mediterranean Sea was an unconfirmed report of *Nemipterus japonicus* (Bloch, 1791) as a Red Sea immigrant by Eggleston in Fisher and Whitehead (1974). In 2006, a single individual of *N. japonicus* captured by a trawler at a depth of 55 m in the Eastern Mediterranean has been described. However, closer examination of their figured specimen and description shows it to be a misidentification of *N. randalli* Russel, 1986, and it seems likely that this and other previous records of *Nemipterus* from the Mediterranean can be referred to *N. randalli*

In this paper, we confirm the presence of *N. randalli* from the Mediterranean Sea. *N. randalli* is widespread in the Western Indian Ocean region including the east and west coasts of India, Pakistan, the Persian (Arabian) Gulf, Red Sea (including the Gulf of Aqaba – Baranes & Golani, 1993), the Gulf of Aden, East African coast, the Seychelles and Madagascar, where it occurs on sand or mud bottoms in depths of 22 - 225 m (Russell,

1986). Its confirmed occurrence in the Levantine Mediterranean basin represents a significant range extension.

Figure 1: Specimen of *N. randalli* (80 mm SL) from south Lebanon coast.

A total of 30 individuals of *N. randalli* (Figure 1) were collected between the 28th February and 10th March 2007 from the commercial landing of the artisanal fishery of Tyre, Lebanon. They were caught by vessels using gillnets with stretched mesh size of 14-16 mm on sandy-muddy bottoms between 50 and 70 m depth.

The specimens ranged between 73 and 95 mm SL and were all immature. The sex ratio (SR = Females/Females + Males) was close to 0.5 (SR=0.53).

Meristic data of eastern Mediterranean specimens are as follows: dorsal fin rays, X+9; anal fin rays, III+7; pectoral fin rays, 15; pelvic fin rays, I+5; lateral-line scales, 45/46.

Morphometric measurements are given in Table 1.

Table 1: Body proportions of specimens of *N. randalli* from Lebanon coasts and Indo pacific region

Diagnostic feature	*N. randalli* (Russel, 1986)		*N. randalli* (this study)		
	Mean	Range	Mean	σ	Range
standard length / body depth	3.20	2.9 – 3.4	3.55	0.20	3.2 – 4.1
standard length / head length	3.00	2.7 – 3.3	3.21	0.10	3.1 – 3.5
head length / body depth	1.00		1.11	0.06	1.0 – 1.2
head length / snout length	3.40	3.0 – 4.0	4.01	0.25	3.6 – 4.4
head length / eye diameter	3.40	2.7 – 3.7	2.94	0.17	2.6 – 3.3
head length / interorbital width	5.00	4.6 – 6.0	4.37	0.34	3.9 – 5.2
snout length / eye diameter	1.00	0.7 – 1.1	0.74	0.07	0.6 – 0.9
standard length / dorsal fin length	2.00	1.8 – 2.1	1.97	0.08	1.7 – 2.2
head length / pectoral fins length	1.20	1.0 – 1.4	1.10	0.05	1.0 – 1.2
head length / pelvic fins length	1.10	0.9 – 1.4	1.26	0.18	1.0 – 1.9
standard length / anal fin length	5.30	4.5 – 5.7	5.48	0.25	5.0 – 5.9

Diagnosis of the individuals collected followed those given by Russell (1986, 1990) for most of the characters, except for the eye diameter and pelvic and pectoral fins, that seem to be respectively larger and shorter for Lebanese specimens than for Western Indian

Ocean individuals (Table I), although this may reflect allometric growth and the smaller size of the Lebanese specimens. Mouth terminal with a single row of small recurved canines in both jaws (3-4 pairs on the premaxilla and 7-8 pairs on the dentary), bigger on the premaxilla than on the dentary. Premaxillary reaching to below anterior half of eye.

Dorsal fin continuous with membrane not incised. The length of spines increasing from the first to the fourth, the last seven spines more or less equal in length. Pectoral fins origin slightly anterior to pelvic fins and not reaching the origin of anal fin. Pelvic fins longer than pectorals, reaching just short of to just beyond the anus and with the first ray elongated. Caudal fin forked with a long trailing filament on the upper lobe.

Body pinkish, darker on the dorsal part, becoming pinkish-silver ventrally, with four pale yellow stripes below the lateral line. The uppermost stripe well separated from the other three and with a golden enlargement reaching the lateral line behind the operculum. This stripe extends from the postorbital part of the head as a straight line to the upper caudal fin base. The other three stripes very close to each other: running from the base of the pectoral fin, but not reaching the caudal fin-base. Another short, pale yellow stripe, extending on both side of the ventral midline from the posterior-most soft rays of anal fin to the lower caudal fin base. Head pink, cheeks and edge of opercle with golden reflections. Peritoneum salmon-pink.

Dorsal fin transparent, with a pale yellow medial stripe and the upper margin edged with red. Caudal fin yellow-orange, edged with pink and with a yellow stripe along the upper margin; margin of fork red. The caudal filament may vary in colour from yellow to orange-red. Pectorals pale yellow, darker at their bases. Pelvic fins and anal fin whitish.

A PCA analysis of meristic data (Figure 2a) did not showed any significant difference in proportions between sexes. Similarly, the results of a Monte Carlo test showed no significant differences between sexes (Figure 2b). All the analyses have been done using the ADE-4 R-package (Thioulouse *et al.*, 1997) freely available on the web (http//pbil.univ-lyon1.fr/ADE-4).

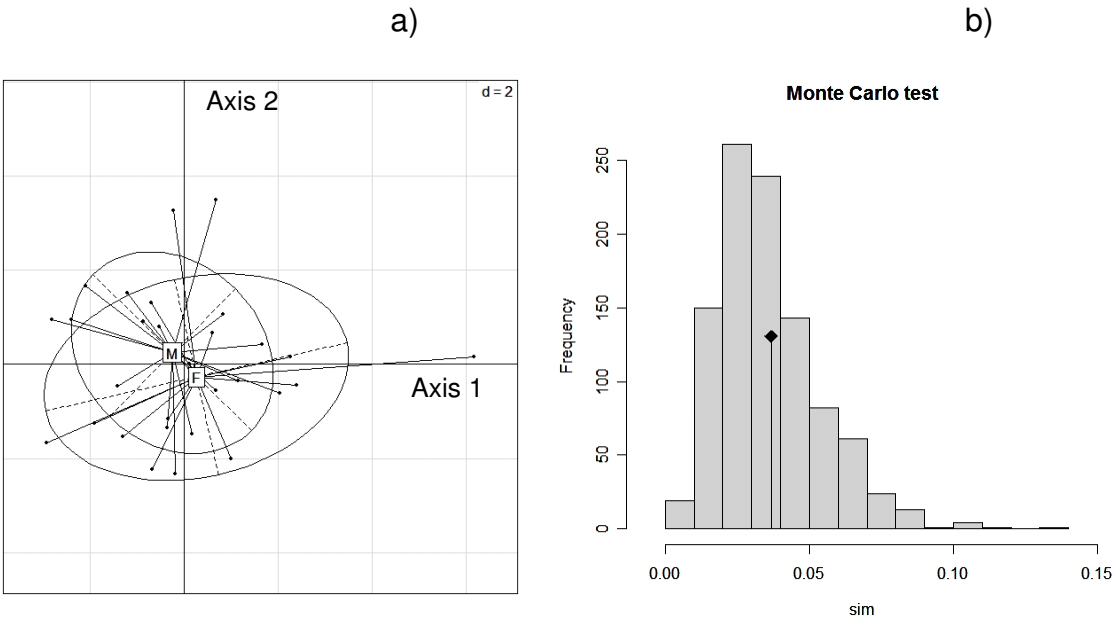

Figure 2: Morphometric differences between females (F) and males (M) of *N. randalli* from south Lebanon coasts. a) PCA analysis on body proportions; b) Results of a Monte Carlo test on the proportion of inertia between sexes.

N. randalli was previously unknown by local fishermen, and individuals collected from Tyre fisheries represent the first catch of this species in south Lebanon. The relatively large number of individuals captured in just a few days by artisanal vessels appears to indicate a recent rapid colonization of the Lebanese coasts by *N. randalli*. The specimen previously reported (as *N. japonicus*) in 2006 in the Eastern Mediterranean was 161 mm SL and close to the maximum size (185 mm SL) reported for this species (Russell, 1990).

The small size and immature status of the specimens collected from Tyre indicate recent successful recruitment of *N. randalli* in the Levantine Mediterranean basin and suggest that this species has now established a successful breeding population in the Eastern Mediterranean Sea. Elsewhere, nemipterid species are an important component of artisanal and commercial fisheries (Russell, 1990) and the recently established population of *N. randalli* in the Eastern Mediterranean may well in future form the basis of an important fishery in the area.

Invasive species may alter the evolutionary pathway of native species by competitive exclusion, niche displacement, predation, and other ecological and genetic mechanisms (Mooney & Cleland, 2001). The Levantine Mediterranean basin offers some clear examples of the impact of newly settled species on native fauna. For instance, the rapid reduction in abundance of the herbivorous sparid *Sarpa salpa*, a very abundant species in the rest of the Mediterranean, has been attributed to the settlement of the competitor *Siganus rivulatus*, a Lessepsian migrant, recorded in the Levantine basin since the early

1900s (Bariche *et al*., 2004). Evidence of niche displacement between indigenous and Red Sea competitors have been also reported, as in the case of the indigenous red mullet (*Mullus barbatus*) and hake (*Merluccius merluccius*) that have been displaced in deeper waters by their competitors, *Upeneus molluccensis*, and *Saurida undosquamis* (Por, 1978; Golani & Galil, 1991; Galil & Zenetos, 2002).

The establishment of a breeding population of *N. randalli* in the Levantine Mediterranean basin suggests that the immigration of Red Sea fish species from the Suez Channel is an ongoing process that is continuously changing the fish communities of the eastern Mediterranean. The role of this newly settled species within the coastal ecosystem, its impact on local populations need to be the object of future research. At the same time, it will be important to study the genotypic and phenotypic changes of this new settled population driven by natural selection through the interactions with indigenous populations and in response to the new abiotic environment.

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