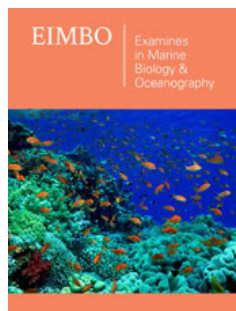


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# New Records of the Rare Slender Snipe Eel *Nemichthys scolopaceus* (Anguilliformes: Nemichthyidae) in the Mediterranean Sea

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## Abstract

Two new records of the rare slender spine eel *Nemichthys scolopaceus* (Anguilliformes, Nemichthyidae) in the Mediterranean Sea are presented in this contribution. The specimens were collected in August 2023 during a scientific bottom trawl survey in the deep central Karpathian Sea (southern Aegean Sea, Greece). These significant findings highlight the importance of exploring the Mediterranean bathyal habitats to stand out their biodiversity and to increase our knowledge on the distribution patterns of rare species.

**Keywords:** Deep waters; Spine eels; Nemichthyidae; Eastern Mediterranean; Aegean Sea; Greece

**Abbreviations:** TL: Total Length; MBD: Maximum Body Depth; HL: Head Length; Sn-L: Snout Length, Sn-D: Snout to first dorsal fin Distance; Sn-PEC: Snout to Pectoral Fin Distance; Sn-A: Snout to Anal Fin Distance; ID: Interorbital Distance; ED: Eye Diameter; SL: Standard Length; %HL: % Head Length; %TL: % Total Length; TW: Total Weight

## Introduction

Nemichthyidae is one of the most interesting fish families comprising three genera and nine valid species, being found in deep waters [1]. Although the taxon is small, it is zoogeographically distributed in seas and oceans extended from the equator to latitudes close to the polar circles. The first genus of the family, *Nemichthys* Richardson, 1848, was described almost 175 years ago, followed by *Labichthys* Gill & Ryder, 1883 and the most recent *Avocettina* Jordan & Davis, 1891. The most diverse genus is *Avocettina*, represented by *A. acuticeps* (Regan 1916), *A. bowersii* (Garman, 1899), *A. infans* (Günther, 1878) and *A. paucipora* Nielsen & Smith, 1978. The taxonomy of the *Nemichthys* genus recognizes three species [*N. scolopaceus* Richardson, 1848, *N. curvirostris* (Strömman, 1896) and *N. larseni* Nielsen & Smith, 1878] whereas of the *Labichthys* reports two species [*L. carinatus* Gill & Ryder, 1883 and *L. yanoi* (Mead & Rubinoff, 1966)].

The slender snipe eel *Nemichthys scolopaceus* Richardson, 1848 is a cosmopolitan species distributed in tropical and temperate seas. It is found in both sides of the Atlantic and the Pacific oceans [2]. Within the western-central Mediterranean Sea *N. scolopaceus* has been reported off Algerian and northern Sicilian coasts [3], in the Strait of Messina [4], in Sardinian waters [5-7], in southern Adriatic Sea [8] and in Ionian Sea [9]. The first occurrence of *N. scolopaceus* in the eastern Mediterranean Sea has been reported off Marmaris coast [10]. Additional records come from other localities in southeastern Aegean Sea [11,12] and in Levantine Sea [13-17].

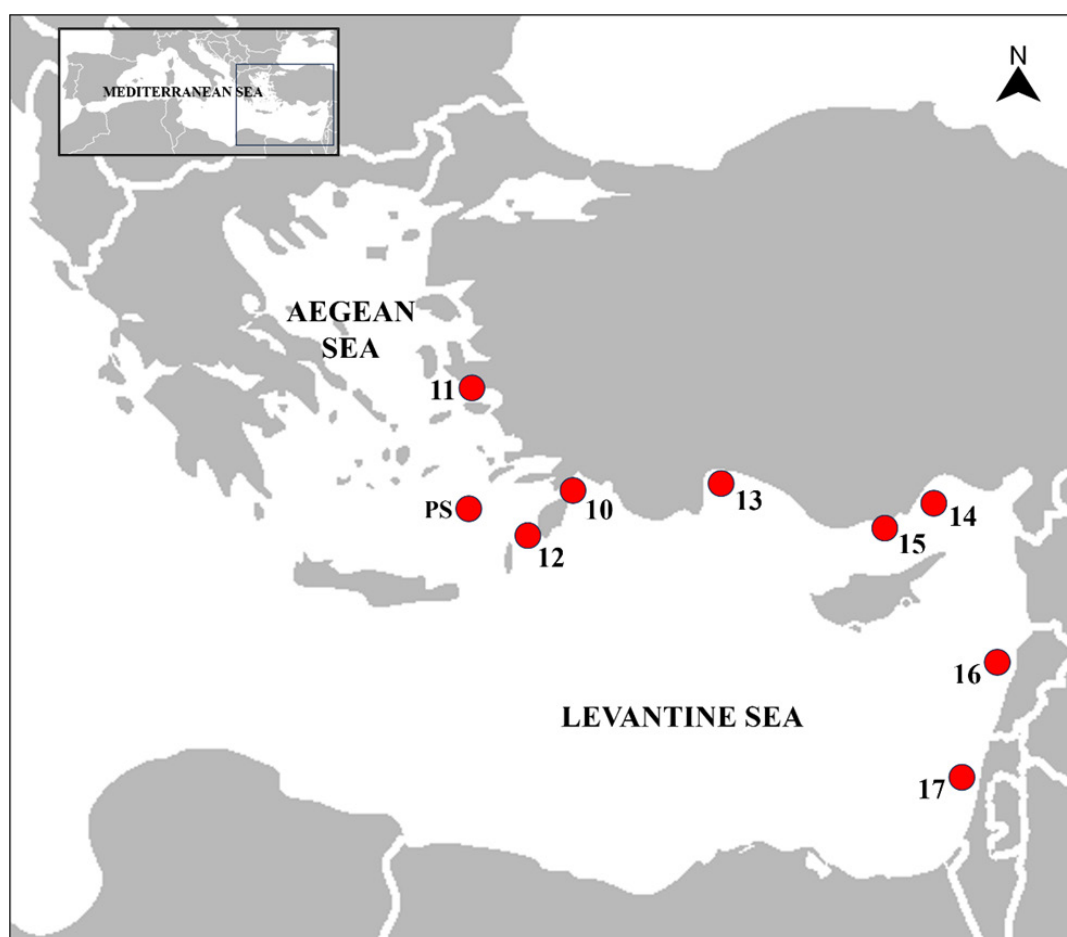
*Nemichthys scolopaceus* is an oceanic species, which may be encountered pelagically from surface to depths down to 4337m [18], usually between 100-1000m [19]. The maximum known size for this species is 1300mm [20]. Juvenile and adult individuals are characterized by

long bodies and are called snipe eels because of their non-occlusible beak body structure [21]. The genus *Nemichthys* is considered to be the most extreme example of axial extension among fishes and the species vertebral numbers are the highest of the vertebrates, up to 740 vertebral bones or more [21,22]. Eels belonging to the *Nemichthyidae* family differ significantly from other mesopelagic eel families because of their head and jaw shape and very thin body structures [23]. Herein we report two additional records of the rare *N. scolopaceus* from the Karpathian Sea, pointing out the emerged necessity of studying the biodiversity of the deep-sea habitats, taking into account that these environments are among the least explored on earth and simultaneously are significantly impacted by humankind.

## Material and Methods

On 23 August 2023, two slender snipe eels *Nemichthys scolopaceus* were caught during an experimental bottom trawl survey (Fisheries & Sea Operational Program 2014 - 2020,

«Innovation in Fisheries» project) at 640m of depth in the central Karpathian Sea (southern Aegean Sea; coordinates: 36°14.579'N, 026°24.976'E) (Figure 1). Individuals were preserved in 98% ethanol and kept at -20 °C on board fishing vessel prior to examination. In the laboratory, morphometric measurements were taken on the left side of the specimens to the nearest 0.01mm using digital calipers. The list of morphometric measurements includes: TL: Total Length; MBD: Maximum Body Depth; HL: Head Length; Sn-L: Snout Length; Sn-D: Snout to first dorsal fin Distance; Sn-PEC: Snout to Pectoral Fin Distance; Sn-A: Snout to anal fin Distance; ID: Interorbital Distance; ED: Eye Diameter; SL: Standard Length. Morphometric measurements are expressed as percentages of Head Length (%HL) or Total Length (%TL). Total Weight (TW, g) was recorded as the total weight of each specimen. Both specimens were photographed and stored in the marine fauna collection of Dr Anastasiadou in the FRI's premises (Catalogue No: NemSCO1 and NemSCO2. For the species identification, all the relevant literature was used [20,24,25].



**Figure 1:** Map showing the sampling localities of *N. scolopaceus* published records in the Aegean-Levantine Sea. PS: present study; Numbers correspond to references.

## Results and Discussion

Herein we report for the second time the presence of *N. scolopaceus* in the Karpathian Sea, following one specimen of 1204mm (TL) captured between the islands of Saria and Rhodes on 13 September 2002, by longline, at 640m depth [12]. Morphometric

measurements of *N. scolopaceus* specimens are presented in Table 1. The specimen NemSCO1 reached 582.0mm (TL) and weighed 2.78 g (TW). The specimen NemSCO2 was not found in good state and only MBD, HL and SnL were recorded (Figure 2). Based on both specimens, the species is characterized by a long and strongly

compressed body with caudal fin ending as filament, mouth extremely long, pointed beak-like, and well-developed eyes. The posterior part of the head is deeper than the rest of the body. Both dorsal and anal fins are long and confluent with caudal fin. Dorsal fin origin is located in front of pectoral fins. Anus is located below pectoral fins. Anal fin begins just behind the anus. Pectoral fins are present. Teeth are small with recurved tips and closely set in diagonal rows. Morphometric measurements of *N. scolopaceus* have

also been recorded in one specimen from the central Mediterranean Sea [26], and from four specimens from the eastern Mediterranean Sea [10,11,14,15]. At this point it should be noted that the review of the relevant literature showed variations in the body measurements of the studied individuals of the species, which could be attributed to the frequent non-integrity of the specimens, especially in what concerns the caudal part (filament ending).

**Table 1:** Morphometric measurements expressed in mm and as percentages of total length (%TL) or head length (%HL) of *Nemichthys scolopaceus* specimens (NemSCO1 and NemSCO2) from the Karpathian Sea (southern Aegean Sea). Unavailable measurements are represented with an en-dash (-).

Measurements	mm		%TL (*, %HL)	
	NemSCO1	NemSCO2	NemSCO1	NemSCO2
Maximum Body Depth (MBD)	5.78	4.69	0.99	-
Head Length (HL)	45.27	19.37	7.78	-
Snout Length (SnL)	31.48	15	69.54*	77.44*
Snout-first dorsal fin Distance (Sn-D)	45.65	-	7.84	-
Snout-Pectoral Fin Distance (Sn-PEC)	43.44	-	7.46	-
Snout-Anal fin distance (Sn-A)	49.51	-	8.51	-
Interorbital Distance (ID)	2.36	0.25	5.21*	1.29*
Eye Diameter (ED)	4.88	1.81	10.78*	9.34*



**Figure 2:** *Nemichthys scolopaceus* preserved specimens (NemSCO1 and NemSCO2) caught by bottom trawler in the central Karpathian Sea (southeastern Aegean Sea, Greece) at 640m depth on 23 August 2023.

The slender snipe eel belongs to a group of offshore pelagic species that can be found worldwide because the relative homogeneity of the deep oceans gives them access to a much larger area of suitable habitat [27]. Although *N. scolopaceus* is rarely caught in the Mediterranean Sea, the species is probably more common than the data suggests mainly due to insufficient exploration of deep-sea marine habitats and due to the fact that it has an extremely elongate slim body that makes it difficult to capture. Overall, the species might be less rare than thought and its presence is probably underestimated.

## Conclusion

Herein, we report two specimens of the slender snipe eel *Nemichthys scolopaceus* from the southeastern Aegean Sea, Greece. It is important to underline that in a set of 12 bottom trawls carried out in an extended geographic area (Crete Sea, Libyan Sea, Karpathian Sea and Rhodes Sea) and in a depth range from 610 to 800m only these two individuals of the species were found. The new records of this rare species increase our knowledge about the deep-sea ichthyofauna, which remains limited in the largest

part of it. On the basis that deep-sea expeditions are extremely timely and costly, and consequently limited in number, any relevant information on such species remains valuable and interestingly completes the puzzle of their zoogeographical distribution both locally and globally.

## References

- Cruz-Mena ÓI, Angulo A (2016) New records of snipe eels (*Anguilliformes: Nemichthyidae*) from the Pacific coast of lower Central America. *Marine Biodiversity Records* 9: 1.
- Froese R, Pauly D (Eds.), (2024) Fishbase. World Wide Web electronic publication.
- Relini-Orsi L, Relini G (1973) New records of fishes from the Ligurian Sea and the composition of demersal, deep-water ichthyofauna (bony fishes). *Bulletin of the Museums and Biological Institutes of the University of Genoa* 41: 51-62.
- Berdar A, Cavallaro G, Giuffrè G, Potoschi A (1977) Contribution to the knowledge of fish stranded along the Sicilian coast of the Strait of Messina. *Memoirs of Marine Biology and Oceanography* 7: 77-87.
- Cau A (1979) First contribution to+ the knowledge of the deep-water ichthyofauna of southern Sardinia. *Reports of the Seminar of the Faculty of Science of the University of Cagliari* 49: 585-595.
- Follesa MC, Porcu C, Cabiddu S, Mulas A, Deiana AM, et al. (2011) Deep-water fish assemblages in the central-western Mediterranean (south Sardinian deep-waters). *Journal of Applied Ichthyology* 27(1): 129-135.
- Esposito G, Prearo M, Renzi M, Anselmi S, Cesarani A, et al. (2022) Occurrence of microplastics in the gastrointestinal tract of benthic by-catches from an eastern Mediterranean deep-sea environment. *Marine Pollution Bulletin* 174: 113-231.
- Varezić DB, Tutman P, Dragičević B, Matić-Skoko S, Dulčić J (2022) Slender snipe eel *Nemichthys scolopaceus* Richardson, 1848 (Pisces: Nemichthyidae), a new member of the Adriatic Sea ichthyofauna. *Acta Adriatica* 63(1): 75-82.
- Mytilineou C, Politou CY, Papaconstantinou C, Kavadas S, D' Onghia G, et al. (2005) Deep-water fish fauna in the eastern Ionian Sea. *Belgian Journal of Zoology* 135(1): 229-233.
- Bilecenoğlu M, Kaya M, Irmak E (2006) First records of the slender snipe eel, *Nemichthys scolopaceus* (Nemichthyidae), and the robust cusk-eel, *Benthocometes robustus* (Ophidiidae), from the Aegean Sea. *Acta Ichthyologica et Piscatoria* 36(1): 85-88.
- Filiz H, Akçınar CS, Ulutürk E, Bayhan B, Taşkavak E, et al. (2007) New records of *Bregmaceros atlanticus* (Bregmacerotidae), *Echiodon dentatus* (Carapidae), and *Nemichthys scolopaceus* (Nemichthyidae) from the Aegean Sea. *Acta Ichthyologica et Piscatoria* 37(2): 107-112.
- Corsini-Foka M (2009) Uncommon fishes from Rhodes and nearby marine region (SE Aegean Sea, Greece). *Journal of Biological Research-Thessaloniki* 12: 125-133.
- Gökoglu M, Guven O, Balci A, Colak H, Golani D (2009) First records of *Nemichthys scolopaceus* and *Nemipterus randalli* and second record of *Apterichthys caecus* from Antalya Bay, southern Turkey. *Marine Biodiversity Records* 3(29): 1-3.
- Bayhan YK, Erguden D, Altun A (2015) Records of *Stomias boa boa* (Risso, 1810) and *Nemichthys scolopaceus* Richardson, 1848 from Mersin Bay, Turkey. *Journal of Applied Ichthyology* 31(5): 922-923.
- Ayas D, Agilkaya GS (2018) New record of the slender snipe eel, *Nemichthys scolopaceus* Richardson, 1848, from the North-Eastern Mediterranean Sea (Büyükeceli Coast, Turkey). *Mediterranean Fisheries and Aquaculture Research* 1(2): 87-91.
- Aguilar R, Garcia S, Perry AL, Alvarez H, Blanco J, et al. (2018) 2016 Deep-sea Lebanon Expedition: Exploring submarine canyons. *Oceana Madrid*, pp. 1-94.
- Golani D (2021) An updated checklist of the Mediterranean fishes of Israel, with illustrations of recently recorded species and delineation of Lessepsian migrants. *Zootaxa* 4956(1): 1-108.
- Love MS, Mecklenburg CW, Mecklenburg TA, Thorsteinson LK (2005) Resource inventory of marine and estuarine fishes of the West Coast and Alaska: A checklist of North Pacific and Arctic Ocean species from Baja California to the Alaska-Yukon border. U.S. Department of the Interior, U.S. Geological Survey, Biological Resources Division, Seattle, USA, pp. 1-286.
- Mundy BC (2005) Checklist of the fishes of the Hawaiian Archipelago. *Bishop Museum Bulletin in Zoology* 6: 1-704.
- Nielsen JG (1984) Nemichthyidae. In: Whitehead PJP, Bauchot ML, Hureau JC, Nielsen J, Tortonese E (Eds.), *Fishes of the North-Eastern Atlantic and the Mediterranean*. Volume 2, UNESCO, Paris, pp. 551-554.
- Smith DG, Nielsen JG (1989) Family Nemichthyidae. In: Böhlke EB (Ed.), *Orders Anguilliformes and Saccopharyngiformes*. *Fishes of the western North Atlantic*. Yale: Sears Foundation of Marine Research, pp. 441-459.
- Ward AB, Mehta RS (2010) Axial elongation in fishes: Using morphological approaches to elucidate developmental mechanisms in studying body shape. *Integrative and Comparative Biology* 50(6): 1106-1119.
- Smith DG (1999) Nemichthyidae. Snipe eels. In: Carpenter KE, Niem VH, (Eds.), *FAO species identification guide for fishery purposes: The living marine resources of the western central Pacific, Italy*, 3(1): 1678-1679.
- Nielsen JG (1986) Ophidiidae. In: Whitehead PJP, Bauchot ML, Hureau JC, Nielsen J, Tortonese E (Eds.), *Fishes of the north-eastern Atlantic and the Mediterranean*. UNESCO, Paris, 3: 1158-1166.
- Nielsen JG, Cohen DM, Markle DF, Robins CR (1999) *FAO species catalogue. Ophidiiform fishes of the world (Order Ophidiiformes)*. An annotated and illustrated catalogue of pearl fishes, cusk-eels, brotulas and other ophidiiform fishes known to date. Volume 18, *FAO Fisheries Synopsis* No.125: 1ñ178.
- Genovese S (1954) On a new capture of *Nemichthys scolopaceus* rich in the strait of Messina. *Italian Journal of Zoology* 21: 81-92.
- Dale KE, Tinker MT, Mehta RS (2019) Larval morphology predicts geographical dispersal range of Eastern Pacific eels. *Biological Journal of the Linnean Society* 128(1): 107-121.