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Olgu Sunumu / Case Report

First record of *Kathlania leptura* (Rudolphi, 1819) and *Tonaudia tonaudia* (Lane, 1914) (Nematoda) in a loggerhead sea turtle (*Caretta caretta*) from the Eastern Mediterranean, Türkiye

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ABSTRACT:

The Aegean and Mediterranean coasts of Türkiye are home to the most important feeding, breeding and nesting areas in the Mediterranean for the migratory loggerhead sea turtles (*Caretta caretta*). These sea turtles, which are carnivorous and have a complex life cycle, attract attention with their population density in the Mediterranean and are being investigated parasitologically. The material of this case report submitted consists of nematode specimens obtained from the gastrointestinal tract of a stranded adult female loggerhead sea turtle during necropsy. Two species of kathlanid nematodes (*Kathlania leptura* and *Tonaudia tonaudia*) are reported from the small intestine of a loggerhead sea turtle *Caretta caretta*, found stranded on Demre Beach (Antalya), Türkiye, in August 2024. Both species represent new locality records for Türkiye and in general for the Eastern Mediterranean. In addition, necropsy revealed that the potential cause of death was malnutrition due to two fish hooks penetrating the esophagus and intestinal plication caused by fishing line traction. In conclusion, this study is the first detailed parasitological report on sea turtles in Türkiye and will set an example for future research.

Türkiye Doğu Akdeniz'den iri başlı deniz kaplumbağası (Caretta caretta)'ndan Kathlania leptura (Rudolphi, 1819) ve Tonaudia tonaudia (Lane, 1914) (Nematoda)'nın ilk kaydı

ÖZET:

Türkiye'nin Ege ve Akdeniz kıyıları, göçmen iri başlı deniz kaplumbağaları (*Caretta caretta*) için Akdeniz'deki en önemli beslenme, üreme ve yuvalama alanlarına ev sahipliği yapmaktadır. Karnivor ve karmaşık bir yaşam döngüsüne sahip olan bu deniz kaplumbağaları, Akdeniz'deki popülasyon yoğunluklarıyla dikkat çekmekte olup parazitolojik olarak araştırılmaktadır. Sunulan bu olgu sunumunun materyali, karaya vurmuş yetişkin bir dişi iri başlı deniz kaplumbağasının gastrointestinal sisteminden nekropsi sırasında elde edilen nematod örneklerinden oluşmaktadır. Ağustos 2024'te Türkiye'nin Demre Plajı'nda (Antalya) karaya vuran iri başlı deniz kaplumbağasının (*Caretta caretta*) ince bağırsağından iki tür kathlanid nematod (*Kathlania leptura* ve *Tonaudia tonaudia*) rapor edilmiştir. Her iki tür de Türkiye ve genel olarak Doğu Akdeniz için yeni kayıt niteliği taşımaktadır. Ayrıca nekropsi sonucunda potansiyel ölüm nedeninin yemek borusuna iki adet balık kancasının batması sonucu oluşan yetersiz beslenme ve olta misinanın çekilmesi sonucu oluşan bağırsak düğümlenmesi olduğu belirlendi. Sonuç olarak bu çalışma Türkiye'de deniz kaplumbağaları hakkında yapılmış ilk detaylı parazitolojik çalışma olup, gelecekte yapılacak araştırmalara örnek teşkil edecektir.

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1. Introduction

The loggerhead sea turtle *Caretta caretta* (Linnaeus, 1758) is the most abundant sea turtle species in the Mediterranean Sea (1). It is a carnivorous and highly migratory species with a complex life cycle. In early development, they feed on plankton and small arthropods, while at the adult stage, they feed prevalently on crabs, molluscs, and fish (2). Because of their long-life span, ability to live in large and diverse areas such as pelagic, neritic and benthic areas, and wide range of dietary preferences, they are exposed to many helminth parasites (3).

In the eastern Mediterranean, the Aegean waters of Türkiye host important foraging, breeding and nesting areas for loggerhead sea turtles (4,5). Despite this, there is only one report of loggerhead sea turtle parasites from Türkiye, where the parasites were identified as Trematoda, Nematoda and Annelida (*Ozobranchus* sp.) (6). Herein, we report a case of coinfection with *Kathlania leptura* and *Tonaudia tonaudia* in a loggerhead sea turtle found stranded on Demre Beach (Antalya), Türkiye.

2. Case Story

In August 21, 2024, a fresh carcass of an adult female loggerhead sea turtle ranging from approximately 85 cm curved carapace length (CCL) was found stranded on the Demre Beach (Antalya). The carcass was brought to the Mediterranean Fisheries Research, Production and Education Institute Training Facility Beach where a complete necropsy was performed to determine the cause of death using methods described in the relevant literature (7). The gastrointestinal tract was also examined for helminth parasites. When macroscopically observed, parasites were collected, counted, washed in tap water and preserved in ethanol 70% for morphological identification. For the light microscopy study, a representative number of nematodes were cleared with Amman's lactophenol, mounted using Hoyer's solution and dried at room temperature for 1–2 weeks. Then, they were studied using a compound microscope equipped with a digital camera (CX23 Binocular Microscope, Olympus Corporation, Tokyo, Japan). Nematodes were identified using identification keys provided in (8) and (9).

At necropsy, there were no signs of trauma on the external body surfaces of the carcass. During the examination of gastrointestinal viscera, two fish hooks penetrating the oesophagus and intestinal plication caused by fishing line traction were found. The small intestine was filled with a large amount of nematode parasites (n: 76). Nematodes were well agreed with the diagnostic morphological features of the family Kathlaniidae Lane, 1914 as described in the (9). Two species of Kathlaniidae were identified including 48 specimens of *Kathlania leptura* (Rudolphi, 1819) (Figure: A, B, and E) and 28 specimens of *Tonaudia tonaudia* (Lane, 1914) (Figure: C, D, and F) were identified. The main morphological characters used to discriminate among species were the lips of the cephalic extremity, and characters of spicule and gubernaculum. In particular, males with spicules of about 500 µm were identified as *K. leptura* and males with longer spicules (sometimes ending just posterior to the esophageal bulb) were identified as *T. tonaudia*. (see reference 10).

3. Discussion and Conclusion

In terms of number of species, the majority of helminths infecting loggerhead sea turtles comprise trematodes and nematodes (3,11,12). Currently, there are only five nematode species infecting the Mediterranean loggerhead sea turtles. These are *Cucullanus carettae* (Cucullanidae), *Sulcascaris sulcata*, *Anisakis pegreffii* (Anisakidae), *Kathlania leptura*, and *Tonaudia tonaudia* (Kathlaniidae). Except *A. pegreffii* that represents an accidental finding (see reference 13), all other nematode species use the loggerhead sea turtle as definitive host.

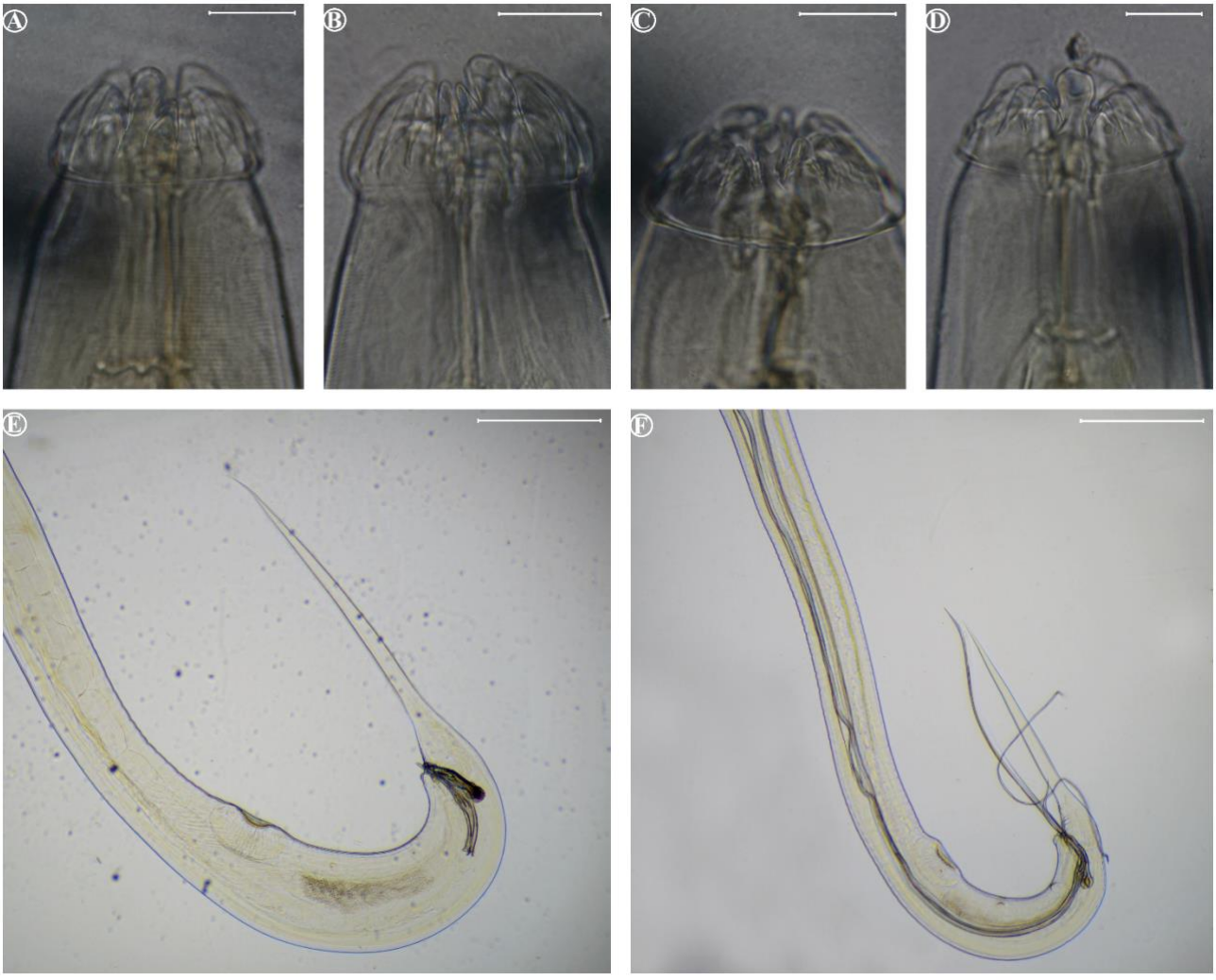

Figure 1: Anterior extremities of *Kathlania leptura* male **(A)** and female **(B),** *Tonaudia tonaudia* male **(C)** and female **(D),** in dorsolateral view; tails and spicules of *Kathlania leptura* **(E)** and *Tonaudia tonaudia* **(F)** in lateral view (scala bars: 250 µm).

Şekil 1: *Dorsolateralden Kathlania leptura* erkek ***(A)*** *ve dişi* ***(B)*** *anterior uç*, *Tonaudia tonaudia* erkek ***(C)*** *ve dişi* ***(D)*** *anterior uç*; *lateralden Kathlania leptura* ***(E)*** *ve Tonaudia tonaudia* ***(F)*** *kuyruk ve spikülümler* (ölçek çizgileri: 250 µm).

Both *Kathlania* and *Tonaudia* are monotypic genera which infect only sea turtles. *Kathlania leptura* is known from the loggerhead sea turtle, the green sea turtle (*Chelonia mydas*) and the olive ridley sea turtle (*Lepidochelys olivacea*), while the latter only from the loggerhead sea turtle. Regarding their geographical distribution, *Kathlania leptura* has been reported from the Nearctic Region (including Brasil, Costa Rica, and the United States of America) (10,14,15), the Western Mediterranean (including Spain, Italy, Egypt, and Tunisia) (11,12,16,17), the Oriental Region (Sri Lanka) (18), the Afrotropical Region (including Mauritania and Zanzibar) (19), and the Australian Region (20). In contrast, *T. tonaudia* has been reported from the Atlantic of the United States of America (10), the Western Mediterranean (Egypt and Tunisia) (8,16,17) and the Indian Ocean (Sri Lanka) (18).

Then, according to previous cited studies, the finding of both species represents new locality records for Türkiye and in general for the Eastern Mediterranean.

Conflict of Interests

The authors declared that there is no conflict of interest.

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Authors' Contributions

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Analysis and / or Interpretation: Gökhan EREN, Mario SANTORO
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Ethical Approval

The data, information and documents presented in this article have been obtained within the framework of academic and ethical standards. Ethical statements have been obtained from the authors, affirming that all information, documents, evaluations, and conclusions are presented in accordance with scientific ethical and moral principles.

References

1. Speybroeck J, Beukema W, Bok B, Van Der Voort J. Field guide to the amphibians and reptiles of Britain and Europe. 1st ed. London, UK: Bloomsbury Publishing; 2016.
2. Baran İ, Avcı A, Kumlutaş Y, Olgun K, Ilgaz Ç. Türkiye amfibi ve sürüngenleri. 5. baskı. Ankara, Türkiye: Palme Yayınevi; 2021.
3. Greiner EC. Parasites of marine turtles. In: Wyneken J, Lohmann KJ, Musick JA, editors. The biology of sea turtles. Vol 3. 1st ed. Florida, USA: CRC Press; 2013. p. 427-46.
4. Baran İ, Kasparek M. Marine turtles in Turkey. Status survey 1988 and recommendations for conservation and management. WWF; Heidelberg, Germany; 1989.
5. Türkozan O, Kaska Y. Turkey. In: Casale P, Margaritoulis D, editors. Sea turtles in the Mediterranean: distribution, threats and conservation priorities. Gland, Switzerland: IUCN; 2010. p. 257-93.
6. Düşen S, Katılmış Y, Yaka HG, Sezgin Ç, Yağcı FE, Ulubeli SA, Kaska Y. Recording the epibionts of turtles under rehabilitation and internal and external parasites recorded from post-mortem examination of sea turtles in the Eastern Mediterranean. In: 35th Annual Symposium on Sea Turtle Biology and Conservation; Dalaman, Muğla, Türkiye; 2015. p. 309-13.
7. Work TM. Sea turtle necropsy manual for biologists in remote refuges. US Geological Survey, National Wildlife Health Center; Hawaii, USA; 2000.
8. Inglis WG. A revision of the nematode genera Kathlania and Tonaudia. Ann Mag Nat Hist. 1957;10(119):785-800.

9. Chabaud AG. Ascaridida: Cosmocercoidea, Seuratoidea and Heterakoidea. In: Anderson RC, Chabaud AG, Willmott S, editors. Keys to the nematode parasites of vertebrates: Archival volume. London, UK: CABI; 2009. p. 248-308.

10. Bursey CR, Richardson KE, Richardson DJ. First North American records of Kathlania leptura and Tonaudia tonaudia (Nematoda: Kathlanidae), parasites of marine turtles. Comp Parasitol. 2006;73(1):134-5.

11. Santoro M, Badillo FJ, Mattiucci S, Nascetti G, Bentivegna F, et al. Helminth communities of loggerhead turtles (Caretta caretta) from Central and Western Mediterranean Sea: The importance of host's ontogeny. Parasitol Int. 2010;59(3):367-75.

12. Gračan R, Mladineo I, Kučinić M, Lazar B, Lacković G. Gastrointestinal helminth community of loggerhead sea turtle Caretta caretta in the Adriatic Sea. Dis Aquat Organ. 2012;99(3):227-36.

13. Santoro M, Mattiucci S, Paoletti M, Liotta A, degli Uberti BD, et al. Molecular identification and pathology of Anisakis pegreffii (Nematoda: Anisakidae) infection in the Mediterranean loggerhead sea turtle (Caretta caretta). Vet Parasitol. 2010;174(1-2):65-71.

14. Werneck MR, Thomazini CM, Mori ES, Gonçalves VT, Gomes BM. Gastrointestinal helminth parasites of loggerhead turtle Caretta caretta Linnaeus 1758 (Testudines, Cheloniidae) in Brazil. Pan-Am J Aquat Sci. 2008;3(3):351-4.

15. Meira Filho MRC, Andrade MF, Domit C, Silva-Souza ÂT. A review of helminths of the green turtle (Chelonia mydas) in Brazil. Oecol Aust. 2017;21(1):17-26.

16. Brooks DR, Frazier J. New host and locality for Kathlania leptura (Rudolphi) (Nematoda: Oxyurata: Kathlanidae). Proc Helminthol Soc Wash. 1980;47(2):267-8.

17. Karaa S, Jribi I, Marouani S, Jrijer J, Bradai MN. Preliminary study on parasites in loggerhead turtles (Caretta caretta) from the southern Tunisian waters. Am J Biomed Res. 2019;5(5):373-6.

18. Lane C. Suckered round-worms from India and Ceylon. Indian J Med Res. 1914;2:655-69.

19. Gendre E. Nematodes. In: Joyeux C, Gendre E, Baer JE, editors. Recherches sur les helminthes de l'Afrique occidentale francaise. Paris, France: La Societe de Pathologie Exotique; 1928. p. 55-81.

20. Lester RJG, Blair D, Heald D. Nematodes from scallops and turtles from Shark Bay, Western Australia. Mar Freshw Res. 1980;31(5):713-7.