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CASE REPORT

A Fish Trematode *Vitellibaculum* Identified in the Gastrointestinal Tract of the Little Gull (*Larus minutus*): The First Report of Trematode from Iran

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ABSTRACT

Vitellibaculum, which belong to the subfamily *Megasoleninae* within the family *Haploporidae,* are typically parasites of marine fish. This trematode has been reported from different regions of the world. The Little Gull (*Larus minutus*), a migratory bird common in the coastal regions of Iran, was the subject of this study. A dead bird found by the Environmental Protection Agency in Babolsar was referred to the laboratory of the Department of Parasitology of the Science and Research branch of the Islamic Azad University. After necropsy and sampling of the intestinal contents, a single trematode was identified. After staining and slide preparation, it was identified as *Vitellibaculum* and registered in the National Parasitology Museum of Tehran University.
Keywords: Iran, Little Gull, Trematode, *Vitellibaculum.*

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Küçük Martının (*Larus minutus*) Sindirim Sisteminde Tanımlanan Bir Balık Trematodu *Vitellibaculum*: İran'dan Trematodun İlk Raporu

ÖZ

Vitellibaculum, *Haploporidae* familyasının *Megasoleninae* alt familyasına ait bir deniz balığı paraziti olarak bilinmektedir ve dünyanın çeşitli bölgelerinden rapor edilmiştir. Bu çalışmada, İran'ın sahil bölgelerinde yaygın olarak bulunan göçmen bir kuş türü olan Küçük Martı (*Larus minutus*) incelenmiştir. Çalışma kapsamında, Babolsar'da Çevre Koruma Ajansı tarafından bulunan ölü bir kuş, İslam Azad Üniversitesi Bilim ve Araştırma Birimi Parazitoloji Laboratuvarı'na gönderilmiştir. Nekropsi ve bağırsak içeriği örneklemesi sonrasında bir trematod tespit edilmiştir. Boyama ve lam hazırlama işlemlerinin ardından, bu trematodun *Vitellibaculum* olduğu belirlenmiş ve Tahran Üniversitesi Ulusal Parazitoloji Müzesi'nde kayda geçirilmiştir
Anahtar Kelime: İran, Küçük Martı, Trematod, *Vitellibaculum*

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INTRODUCTION

The genus *Vitellibaculum* (Syn. *Allomegasolena* Siddiqi & Cable, 1960), first described by Montgomery in 1957, comprises trematodes that occur as helminth parasites in various marine fish species. These parasites are assigned to the family *Haploporidae*, in particular the subfamily *Megasoleninae* (Montgomery, 1957; Madhavi and Bray, 2018).

The subfamily *Megasoleninae* is characterized by the presence of extensive vitelline follicles and an external seminal vesicle. These follicles are widespread throughout the hindbody and converge either behind the testes or near the posterior end of the body, while the external seminal vesicle is elongated and relatively narrow. Some genera within this subfamily possess a single testis, while others have two testes arranged in tandem, occasionally oblique. Typically, the caeca extends to the posterior end of the body. The *Megasoleninae* includes five genera: *Megasolena, Hapladena*, *Vitellibaculum*, *Myodera*, and *Metamegasolena*. This subfamily is distributed worldwide and is commonly found in marine fishes (Pulis and Overstreet, 2013; Andres et al., 2018).

The *Vitellibaculum* has a long, narrow body. Its oral sucker is at the end, and the ventral sucker is large, without a stalk. It has two testes arranged in tandem and a hermaphroditic sac. Its external seminal vesicle is elongated, and its ovary is located before the testes. The life cycle of this species remains unclear, but some studies suggest the involvement of invertebrates as intermediate hosts (Jones et al., 2005).

The little gull *(Larus minutus*) is a migratory bird species found in Iran. These birds prefer to spend the winter in the coastal regions and have been reported on both the southern and northern coasts of the country. Their dispersion is particularly large along the Caspian Sea, encompassing the entire coastal areas of Gilan and Mazandaran provinces. Little gulls feed mainly on small marine organisms and tiny fish that inhabit the shallow waters of the sea (Scott and Adhami, 2006; Mansoori, 2009).

In this report, the trematode was accidentally discovered in the gastrointestinal canal of a little gull.

The Iranian seas, namely the Caspian Sea, the Persian Gulf, and the Oman Sea are home to a wide variety of fish species, and the fishing industry is an important sector in these regions. Consequently, various studies are being carried out in this sector concerning both the environment and the health of the fish. Samples are regularly taken from the fish caught and analyzed for food safety. Literature documents that these fish are infected with helminths and acanthocephalans (Ebrahim Zadeh Mosav et al, 2014; Tavakol et al., 2015). However, *Vitellibaculum* has not yet been reported in these fishes. This study is the first to report this trematode from the Middle East region, particularly from the Iranian basin.

MATERIAL and METHOD

In July 2018, the dead little gull was handed over by the Environmental Protection Agency of Mazandaran Province (Babolsar District) to the Faculty of Veterinary Medicine of the Islamic Azad University, Science and Research Branch, Tehran, for pathological examination.

Babolsar, located in the northern part of Iran, is one of the coastal cities of Mazandaran province. It is situated between the Caspian Sea and the Alborz Mountains, at 36°42'02"N, 52°39'00"E coordinates.

The autopsy of the deceased bird was performed, and samples were taken from different tissues to determine the possible cause of death. The gastrointestinal tract was separated for parasitological diagnosis. The entire canal was examined for the presence of parasites such as nematodes, cestodes, and trematodes. The intestinal contents were washed and passed through sieves with a diameter of 100 micrometers. A white trematode was observed in the residues in the sieves. After the initial microscopic examination confirmed that it was a trematode, aceto-alum-carmine staining was performed (Chandrawathani et al., 2019) and the trematode was fixed on a slide with antelan. The specimen was then forwarded to the National Parasitology Museum of Tehran University for further identification.

RESULTS

Microscopic examination of the trematodes revealed that the organism has a greatly elongated, narrow body. Body length and width are about 2.5 mm × 0.2 mm. It has a terminal oral sucker and a ventral sucker of equal size. The prepharynx is longer than the large pharynx, and the esophagus is also longer than the pharynx. In the hindbody's posterior half of the abdomen, there are two adjacent testes, one behind the other. The cylindrical, elongated external seminal vesicle is much longer than the hermaphrodite sac. The eggs are non-operculate, moderately numerous, and not filamentous. The vitellarium has numerous large follicles in lateral and sometimes medial fields that extend the entire length of the hindbody without fusing posteriorly (Jones et al., 2005). The specimen was diagnosed as *Vitellibaculum* (syn: *Allomegasolena*) and registered in the National Parasitology Museum of Tehran University.

Figure. 1: Overview of Vitellibaculum at 10X magnification, showcasing its elongated body, equal-sized terminal oral and ventral suckers, and notable reproductive structures.

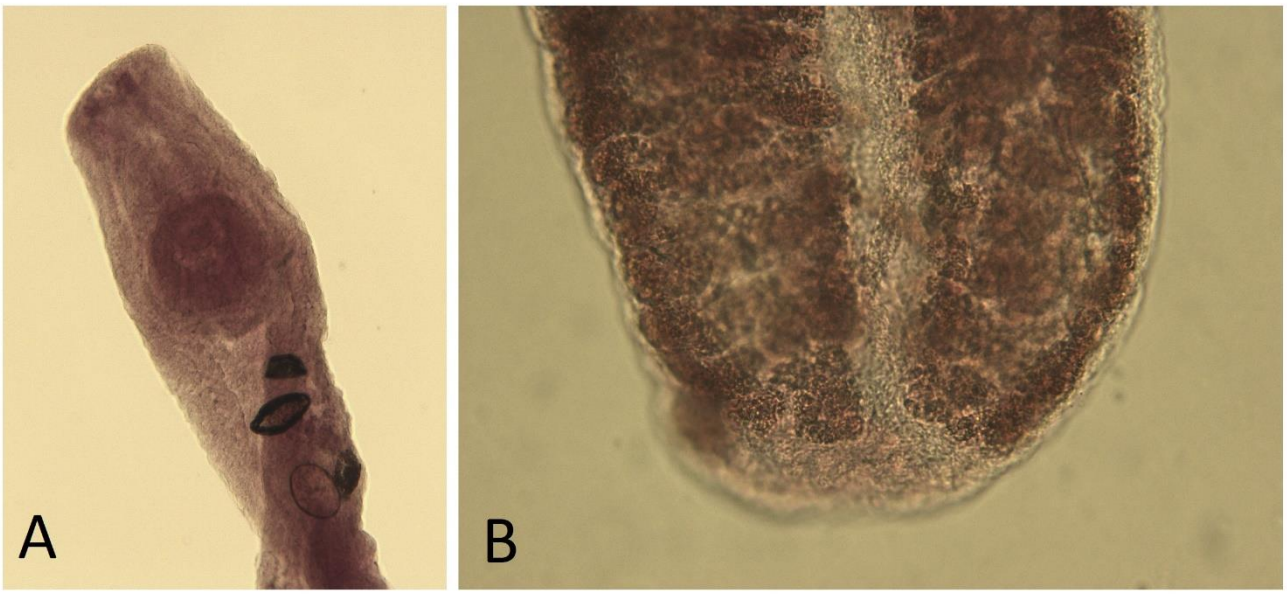

Figure. 2: A: Anterior end of *Vitellibaculum* at 10X magnification, highlighting the structure of the terminal oral sucker and ventral sucker; B: Posterior end of *Vitellibaculum* at 40X magnification, revealing the elongated external seminal vesicle.

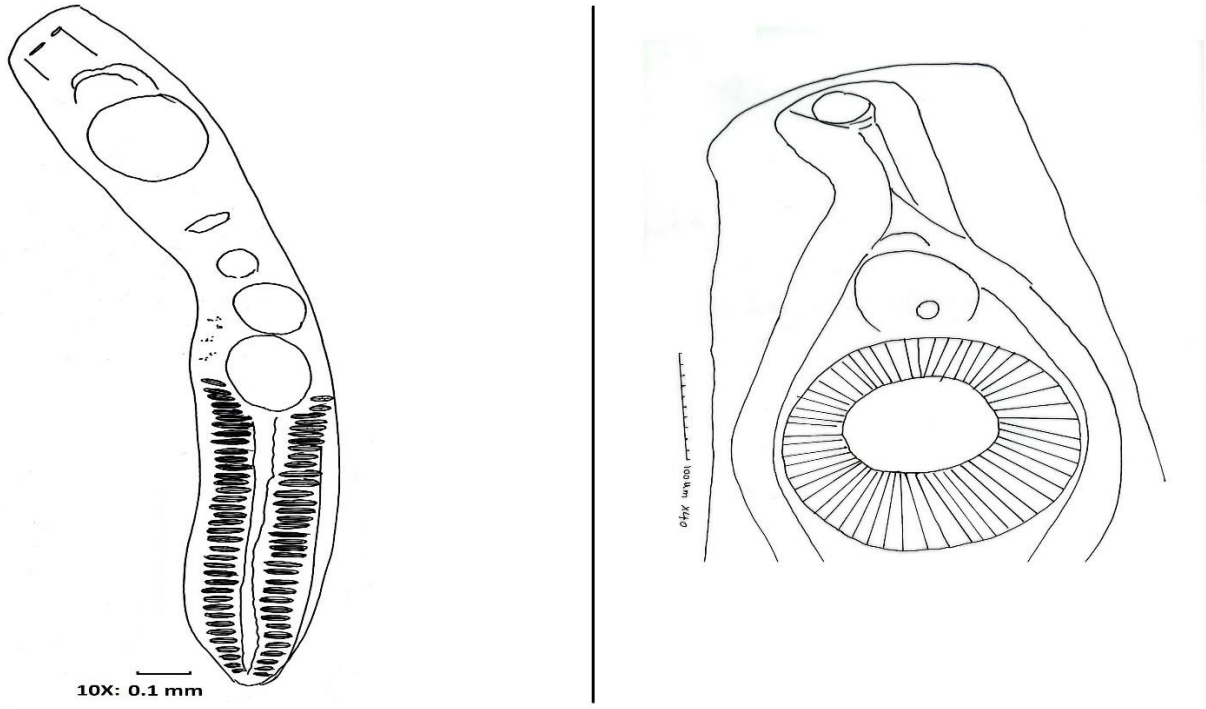

Figure.3: Ventral views of the oral and ventral suckers, along with non-operculate terminal eggs (Original)

DISCUSSION

Vitellibaculum is known to parasitize the intestines of marine fish. There is no documented evidence of lethal or pathological effects on fish yet. This trematode has been reported in various marine fish species. The life cycle of *Vitellibaculum* remains unclear, but there are two hypotheses: One states that it is a free-living cercariae stage, while the other proposes that invertebrates such as snails are used as intermediate hosts (Andres, 2014). This trematode has been reported from North and South America, particularly Brazil, Puerto Rico, and the USA, as well as from Libya in Africa (Montgomery, 1957; Overstreet, 1969; Fernandes and Kohn, 1984; Al-Bassel and Hussein, 2012; Roberts, 2021).

The taxonomic identification of *Vitellibaculum* remains complicated and controversial. Many trematodes in the family *Haploporidae* have only one testis, while members of the subfamily Megasoleninae, including genera such as *Megasolena, Hapladena, Vitellibaculum, Myodera,* and *Metamegasolena*, possess two testes. This characteristic suggests that *Vitellibaculum* and other *Megasoleninae* with two testes may not belong to the family *Haploporidae*. However, this hypothesis has yet to be confirmed by molecular identification methods (Andres, 2014). However, since the first identification of this trematode in 1957, there have been no reports of trematodes in fish from the seas of the Middle East. The little gull (*Larus minutus*) is found in many coastal areas of Iran. This bird is long and much smaller than the black-crowned cormorant. Its flight resembles that of a sea swallow. The behavior of this bird is similar to that of cormorants, and like the swallows, it hunts fish and insects on the water surface in flight. This bird is often found in coastal areas, estuaries, and on the edges of marshes. In Iran, it migrates in large numbers in winter to the low-lying areas along the coast of the Caspian Sea and is occasionally seen on the edges of marshes in Fars, Khuzestan, and on the coasts of the Persian Gulf. These birds migrate from south to north within Iran, and some of them spend the summer on the northern coast of the Caspian Sea and the winter on the southern coast. These birds are distributed along the entire southern coast of the Caspian Sea (Khaleghizadehi & Sehhatisabet, 2007; Khalilipour et al., 2007; Mansoori, 2009).

It seems that the little gull is not the usual host of *Vitellibaculum*, but it can feed on infected fish that carry the trematode. After consumption, the trematode could possibly survive in the gastrointestinal tract. However, no trematode eggs were detected in the fecal analysis of the cecum and large intestine, and only one trematode was found in the bird's intestine.

CONCLUSION

This study suggests that the trematode cannot maintain physiological activity in the bird's body. Nevertheless, the gastrointestinal secretions of the bird do not damage the trematode, indicating that the tegument structure of the *Vitellibaculum* is resistant to all physiological secretions and physical activities of the gastrointestinal tract of *Larus minutus*. This resistance means that although the metabolic functions of the trematode are inhibited, its structural integrity remains

intact, allowing it to survive passage through the bird's digestive system.

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Authors' Contributions: Both authors contributed equally to all aspects of the research.

Ethical approval: The current study does not require ethics approval.

REFERENCES

Al-Bassel, D., & Hussein, A.-N. (2012). A survey on parasites infecting mullets from Egypt and Libya. Egyptian Academic Journal of Biological Sciences, B. Zoology, 4(1), 9–19. **https://doi.org/10.21608/eajbsz.2012.13534**

Andres, M. J. (2014): Clarification of the systematics of the Haploporoidea (Trematoda) with descriptions of new genera and species. The University of Southern Mississippi.

Andres, M. J., Pulis, E. E., Curran, S. S., & Overstreet, R. M. (2018). On the systematics of some marine haploporids (Trematoda) with the description of a new species of Megasolena Linton, 1910. Parasitology International, 67(6), 805–815. https://doi.org/10.1016/j.parint.2018.08.002

Chandrawathani, P., Premaalatha, B., Omar, J., & Mamat, Z. C. (2019): Manual on Parasitology. Department of Veterinary Service Malaysia.

Ebrahim Zadeh Mosavi, H., Soltani, M., Shohreh, P., Abdy, K., Ghadam, M., Banitalebi, A., Rahmati Holasoo, H. (2014). Study on the helminth parasites in some species of the Persian Gulf fishes. Iranian Veterinary Journal, 10(4), 5-12.

Fernandes, B. M., & Kohn, A. (1984): Report of *Lepocreadium bimarinum* Manter, 1940, *Vitellibaculum spinosa* (Siddiqi & Cable, 1960) and *Hirudinella ventricosa* (Pallas, 1774), parasites of marine fishes in Brazil. Memórias Do Instituto Oswaldo Cruz, 79(4), 507–508. https://doi.org/10.1590/s0074-02761984000400018

Jones, A., Bray, R. A., & Gibson, D. I. (2005): Keys to the Trematoda: Volume 2. CABI Publishing

Khaleghizadehi, A., & Sehhatisabet, M. E. (2007): Avifaunal surveys of the Latian Dam and Lashgarak Area, an important IBA for migrants in Iran. Sandgrouse, 29(1), 53.

Khalilipour, O., Behrouzi-Rad, B., & Khaleghizadeh, A. (2007): A six-month survey of wintering waterbirds in Alaghol and Kiashahr wetlands, Northern Iran, 2002/2003. Sandgrouse, 29, 167-176.

Madhavi, R., & Bray, R. A. (2018): Digenetic trematodes of Indian marine fishes. Springer.

Mansoori, J. (2009): The Avian Community of Five Iranian Wetlands, Miankaleh, Fereidoonkenar, Bujagh, Anzali and Lavandevil, in the South Caspian Lowlands. Podoces, 4(1), 44-59.

Montgomery, W. R. (1957). Studies on Digenetic Trematodes from Marine Fishes of La Jolla, California. Transactions of the American Microscopical Society, 76(1), 13. https://doi.org/10.2307/3223917

Overstreet, R. M. (1969): Digenetic trematodes of marine teleost fishes from Biscayne Bay, Florida. University of Miami.

Pulis, E. E., & Overstreet, R. M. (2013). Review of haploporid (Trematoda) genera with ornate muscularisation in the region of the oral sucker, including four new species and a new genus. Systematic Parasitology, 84(2), 167–191. https://doi.org/10.1007/s11230-012-9401-8

Roberts, B. A. (2021): A systematic review of parasites found within selected teleost fishes of the South Florida Hermatypic Coral Reef Tract. Capstone. Nova Southeastern University. Retrieved from NSUWorks. https://nsuworks.nova.edu/hcas_etd_all/57

Scott, D. A., & Adhami, A. (2006): An updated checklist of the birds of Iran. Podoces, 1(1/2), 1-16.

Tavakol, S., Amin, O. M., Luus-Powell, W. J., & Halajian, A. (2015). The acanthocephalan fauna of Iran, a check list. Zootaxa, 4033(2). https://doi.org/10.11646/zootaxa.4033.2.3