

The first record of *Philophthalmus lucipetus* (Trematoda: Philophthalmidae) in the great egret (*Ardea alba*) from Turkey

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Abstract: The genus *Philophthalmus*, Looss 1899 (Echinostoma: Philophthalmidae) is a cosmopolitan group of parasites that infects the eyes of birds and mammals, including humans. A great egret (*Ardea alba*) was found dead in Kızılırmak Delta, Samsun, Turkey. The bird was transported to the Faculty of Veterinary Medicine, Ondokuz Mayıs University, Samsun Turkey, for a necropsy. In the parasitological examination, a trematode was detected in the eye, and then it was identified as *Philophthalmus lucipetus*. This is the first report of the zoonotic parasite *P. lucipetus* in Turkey.

Keywords: *Ardea alba*, eye fluke, *Philophthalmus lucipetus*, zoonosis

1. Introduction

Philophthalmid eye flukes belong to the genus *Philophthalmus* Looss, 1899. Parasites infect birds and mammals and settle in the eyes, except *P. coturnicola*, *P. skrjabini*, *P. pulchrus*, and *P. offlexorius*, which settle in the intestines. Parasites colonize the eye and cause intraocular irritation and pathological changes caused by opportunistic pathogens. Nutritional disorders can cause weakness, loss of appetite, visual disturbances, and in advanced cases, blindness [1,2].

Adult parasites hatch eggs with miracidium when they come into contact with water. The miracidium infects the freshwater snail (*Amphimelania holandri*, *Fagotia acicularis*, *Melanopsis praemorsa*) in the aqueous environment and develops to the cercariae stage in the intermediate host. The cercaria leaves the freshwater snail, adheres to the surrounding grasses, and transforms into metacercaria. The definitive host is infected by oral ingestion of metacercariae. The metacercaria opens in the oral cavity, and the young parasites migrate to orbital cavities via the tear ducts [3,4].

The great egret (*Ardea alba*) is a cosmopolitan species found in various wetlands on almost all continents except Antarctica. *Ardea alba* lives in different parts of Europe and winters in the Mediterranean and Turkey [5].

2. Materials and methods

A dead great egret was found in Kızılırmak Delta, Samsun,

Turkey, and it was then transported to the Faculty of Veterinary Medicine, Ondokuz Mayıs University, for a autopsy. The parasite was collected and preserved in 70% ethanol for morphological analysis. Then the parasites were identified using the morphological features [2–4,6] under the light microscope (Nikon Eclipse 80i). Then special morphological characters were measured and photographed using the MDX4-T Mshot camera integrated into the microscope and then drawn with Adobe Illustrator 2020.

3. Results

After parasitological examination, only one trematode was found on the eye, and identified as *Philophthalmus lucipetus* (Figure 1) [2–4,6]. It had the typical characteristics of *Philophthalmus* with elongated, medium-sized, and rounded ends. The body length was 6,89 mm and the maximum width at the center of the body in the region was 1.47 mm. The surface of the body was smooth and had no spination and/or ornamentation. The ventral sucker was located in the anterior third of the body, with the center averaging 15 mm from the anterior end, 726 × 705 µm. Oral sucker subterminal, with a width greater than length, 460 × 574 µm. The pharynx has no direct connection to the oral sucker and has a length greater than the width, 464 × 442 µm. Testes at the posterior end, tandem, very close together, variable shape, unlobed; front testes slightly larger, 516 × 508 µm; posterior testes 464 × 467 µm. Cirrus

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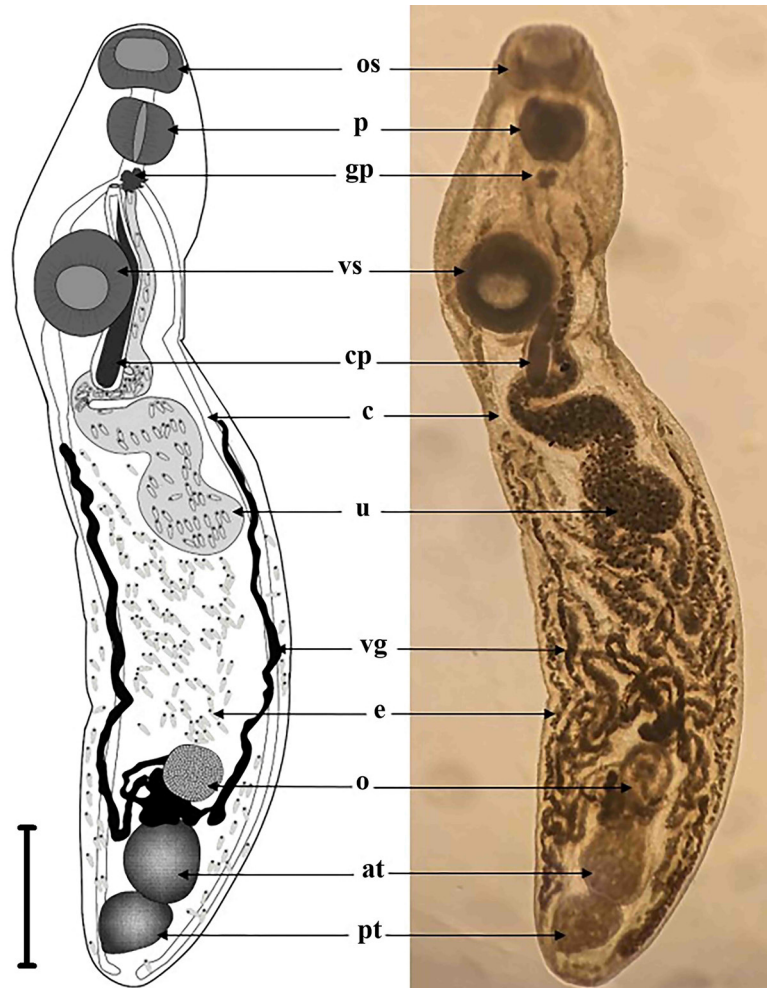


Figure 1. *Philophthalmus lucipetus*: at: anterior testis; c: cecum; cp: cirrus pouch; gp, genital pore; e: eggs; o: ovary; os: oral sucker; pt: posterior testis; u: uterus; vg: vitelline glands; vs: ventral sucker. Scale bar: 1 mm.

pouch 1.10 mm long. The ovary is more or less median in front of the anterior testes, circular to slightly oval $339 \times 366 \mu\text{m}$. The vitelline glands begin behind the ventral sucker, extend to the level of the anterior testes, and cross the secum at various sites. Uterine coils are wide, occupying almost the entire body's width from the testes to the ventral sucker. The eggs are located from the front of the vitellar gland to the posterior testes. The eggs contain eyespotted miracidium and a size of $102 \times 36 \mu\text{m}$ (Figure 2), (Table).

4. Discussion

Philophthalmid eye flukes are trematodes that are widespread worldwide. *Philophthalmus lucipetus* has been reported in many birds in Austria, Czechoslovakia, Egypt, Russia, Ukraine, Israel, and Yugoslavia [1]. Most recently, it

was reported in a *Philophthalmus* outbreak in gulls in Spain [3]. Our study provides the first report of philophthalmid eye flukes in Turkey in great egret as *P. lucipetus*.

There are many cases of humans infected by philophthalmid eye flukes. *Philophthalmus lucipetus* was detected in Germany in 1832 in a visually impaired woman, and also it was reported several times in Austria between 1833 and 1939 in five month old infants. Furthermore, *Philophthalmus* sp., a 64-year old female patient diagnosed with acute conjunctivitis, was reported in Japan in 2019 [1].

Kızılırmak Delta is home to many migratory birds due to its location in the eastern and western Palearctic region and the natural migration routes of wild birds passing through the country [7]. These migratory birds can carry many parasitic diseases, some of which the zoonotic, such as philophthalmiosis, so wildlife surveys should be increased.

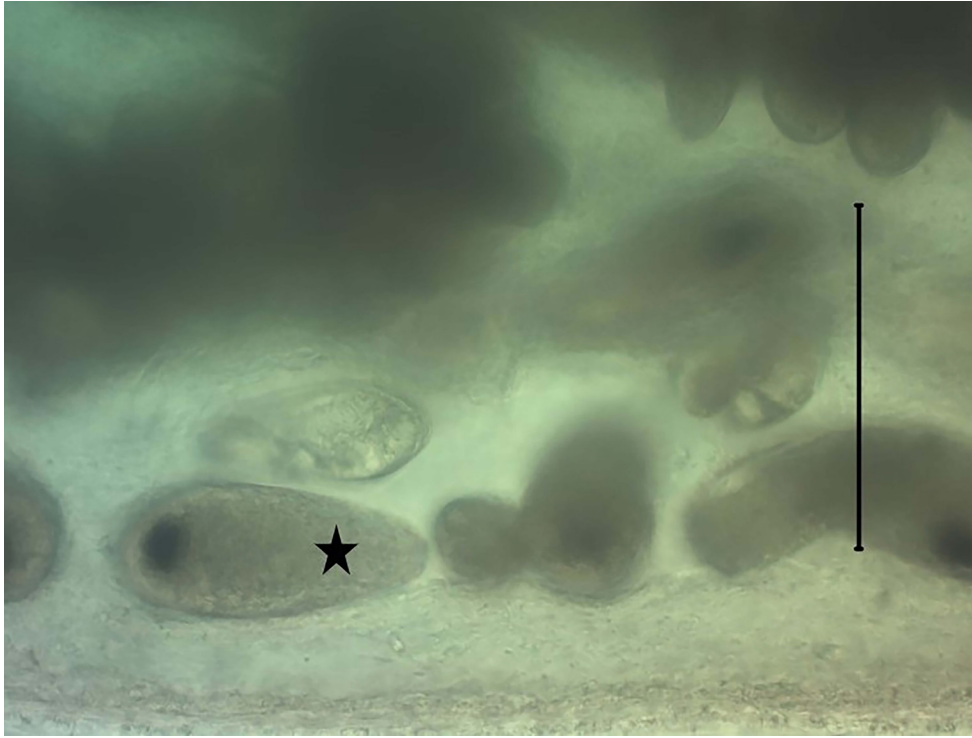


Figure 2. Egg containing miracidium with prominent eyespot, showing (★), scale bar: 100 µm.

Table. Comparison of the morphology of *Philophthalmus lucipetus*.

Measurements (µm)	Sonin (1985)	Kanev et al (1990)	Heneberg et al. (2018)	This study
Body size	4500–7870 × 1120–2260	3500–7400	3003–5710 × 626–2029	6980 × 1470
Oral sucker	200–449 × 333–558	190–490 × 200–430	276–460 × 267–515	460 × 574
Pharynx	295–436 × 317–422	121–380 × 120–340	202–396 × 175–304	464 × 442
Ventral sucker	633–1033 × 666–1166	430–780 × 410–888	497–892 × 497–920	726 × 705
Ovary	214 × 214	–	138–294 × 138–248	339 × 366
Anterior testis	695–749 × 708–817	180–650 × 200–780	276–820 × 230–580	516 × 508
Posterior testis	200–750 × 250–790	783–885 × 558–695	276–782 × 276–714	464 × 467
Egg	130–148 × 56–60	106–137 × 44–62	82–93 × 41–46	102 × 36

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References

1. Chalkowski K, Morgan A, Lepczyk CA, Zohdy S. Spread of an avian eye fluke, *Philophthalmus gralli*, through biological invasion of an intermediate host. *The Journal of Parasitology* 2021; 107 (2): 336-348. <https://doi.org/10.1645/20-72>
2. Nollen PM, Kanev I. The taxonomy and biology of philophthalmid eyeflukes. *Advances in Parasitology* 1995; 36: 205-269. [https://doi.org/10.1016/S0065-308X\(08\)60492-3](https://doi.org/10.1016/S0065-308X(08)60492-3)

3. Heneberg P, Casero M, Waap H, Sitko J, Azevedo F et al. An outbreak of philophthalmosis in *Larus michahellis* and *Larus fuscus* gulls in Iberian Peninsula. *Parasitology International* 2018; 67 (2): 253-261. <https://doi.org/10.1016/j.parint.2017.12.007>
4. Kanev I, Nollen P, Vassilev I, Radev V, Dimitrov V. Redescription of *Philophthalmus lucipetus* (Rudolphi, 1819) (Trematoda: Philophthalmidae) with a discussion of its identity and characteristics. *Annalen des Naturhistorischen Museums in Wien. Serie B für Botanik und Zoologie* 1990; 94/95 B: 11-34.
5. Włodarczyk R, Szafara D, Kaczmarek K, Janiszewski T, Minias P. Migratory behaviour and survival of Great Egrets after range expansion in Central Europe. *The Journal of Life & Environmental Sciences* 2020; 8: e9002. <https://doi.org/10.7717/peerj.9002>
6. Sonin MD. Key of Trematodes Fish-Eating Birds of Palearctic Region II. Moscow, Russian; Nauka: 1986.
7. Yavuz K. Önemli bir doğa alanı: Kızılırmak Deltası. In: Samsun sempozyomu. Samsun, Türkiye; 2011, pp: 1-4 (in Turkish).