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gariiepinus* (Burchell, 1822) (Clariidae) from the Asi River  
(Southern Turkey)**

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# *Orientocreadium batrachoides* Tubangui, 1931 (Orientocreadiidae): The only Trematode Parasite of *Clarias gariepinus* (Burchell, 1822) (Clariidae) from the Asi River (Southern Turkey)

Asi Nehri'nden Yakalanan *Clarias gariepinus* (Burchell, 1822) (Clariidae)'un Tek Trematod Paraziti: *Orientocreadium batrachoides* Tubangui, 1931 (Orientocreadiidae)

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## ABSTRACT

**Objective:** Some information is available about the parasite fauna and incidence for *Clarias gariepinus* in Turkey, but digenean parasites have received little attention. The purpose of the study is to contribute to the parasite fauna of Turkey.

**Methods:** From 2007 to 2008, a total 63 *Clarias gariepinus* that were caught in the Asi River were purchased from the fish market in Hatay and brought on ice to the Parasitology Research Laboratory at Atatürk University. The fish were dissected. The obtained parasites were fixed with AFA, dyed with Mayer's Carmalum, and mounted with Canada Balsam.

**Results:** Forty-eight fish were infected with the *Orientocreadium batrachoides*. The prevalence of the parasite was 76.2% overall, and 100% in the largest size class of *C. gariepinus*. There was no significant correlation between fish size and number of parasites.

**Conclusion:** Our sample of *C. gariepinus* from the Asi River exhibited high rates of incidence of *O. batrachoides* which is the first record from Turkey. It was detected that the specimens of *O. batrachoides* in Turkey are larger than previously reported samples. This is the first clearly documented report of *O. batrachoides* in teleost fish of Turkey. (*Türkiye Parazitol Derg* 2013; 37: 203-7)

**Key Words:** Turkey, Asi River, *Clarias gariepinus*, *Orientocreadium batrachoides*

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## ÖZET

**Amaç:** Ülkemizde *Clarias gariepinus*'un parazit faunası üzerine çalışmalar yapılmış olmasına karşın digenea parazitleri ile ilgili pek fazla yayın bulunmamaktadır. Bu çalışmanın amacı Ülkemizin parazit faunasına bu yönde katkıda bulunmaktır.

**Yöntemler:** 2007-2008 yılları arasında Asi Nehrinden yakalanan *Clarias gariepinus*'lar Hatay'daki balıkhanelerden satın alınarak buz içerisinde Atatürk Üniversitesi Parazitoloji Araştırma Laboratuvarı'na getirilmiştir. Balıkların diseksiyonu yapılmış, elde edilen parazitler AFA ile fikse edilmiş, Mayer's Carmalum ile boyanmış ve Kanada balzamu ile kalıcı preparatları yapılmıştır.

**Bulgular:** Kırk sekiz balık *Orientocreadium batrachoides* ile enfekte olmuştur. Parazitlerin bütün balıklardaki prevalansı %76,2, en büyük boy grubunda %100'dür. Balık boyu ve parazit sayısı arasında önemli bir korelasyon bulunmadığı belirlenmiştir.

**Sonuç:** Türkiye'den ilk kez kaydedilen *O. batrachoides* Asi nehrinden yakalanan *C. gariepinus*'ta yüksek oranda rastlanmaktadır. Ülkemizden tespit edilen *O. batrachoides*'lerin boyutları daha önce tespit edilenlerden daha büyük olduğu belirlenmiştir. Bu çalışma *Orientocreadium batrachoides*'in Türkiye teleostlarındaki ilk kayıdır. (*Türkiye Parazitol Derg* 2013; 37: 203-7)

**Anahtar Sözcükler:** Türkiye, Asi Nehri, *Clarias gariepinus*, *Orientocreadium batrachoides*

**Geliş Tarihi:** 24.05.2013

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This study was presented at the 20<sup>th</sup> National Biology Congress, 21-25 June 2010, Denizli, Turkey.

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## INTRODUCTION

*Clarias gariepinus*, the African catfish is widespread in the southern and central freshwaters of Turkey, including the Asi River (where it has commercial importance), the Ceyhan, Seyhan, Göksu, Aksu and Sakarya rivers. *Clarias gariepinus* is a benthopelagic, dioecious, omnivorous fish, and is widely tolerant of extreme environmental conditions (1). It is one of the most important fish species for aquaculture in Turkey. However, parasitic infections are known to cause massive mortality in the fry and fingerling stages, especially in high-density aquaculture systems (2).

Previous studies have illuminated many aspects of the biology of *C. gariepinus* that are useful for aquaculture (i.e., karyotype, (3); nuclear abnormalities, (4); hormone effects on growth, (5); natural growth rates, (1); reproductive biology, (6); and stomach contents, (7)). However, only two previous papers have reported on the parasite fauna of this species in Turkey (8, 9). Although both of these papers are important and useful, neither focuses on digenean parasites. Given the devastating effect of parasites, especially on younger age classes in aquaculture facilities, it is important to document and understand important parasites of this species in the wild. Our objective in this study is to document and describe a common digenean parasite of the African catfish of Turkey that has not previously been reported.

## METHODS

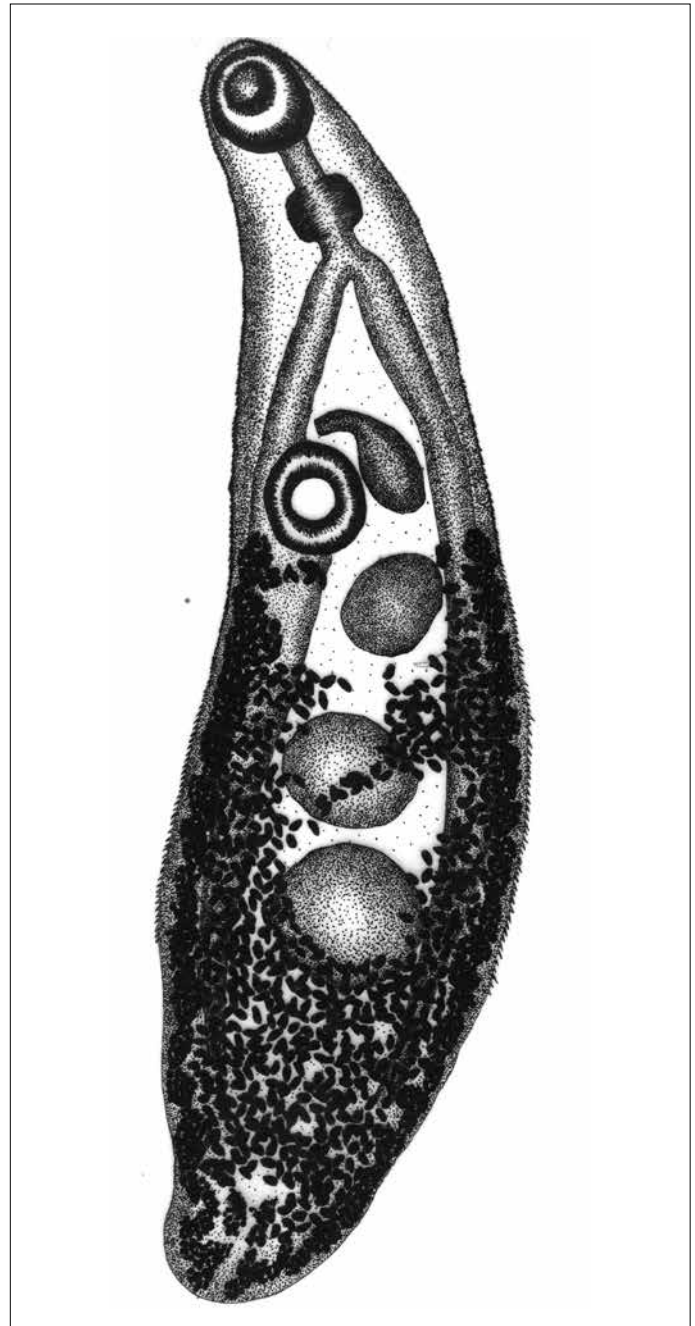
From 2007 to 2008, a total 63 *Clarias gariepinus* that were caught in the Asi River were purchased from the fish market in Hatay (Turkey) and brought on ice to the Parasitology Research Laboratory at Atatürk University. We recorded the total length (TL) of the fish in cm, and then opened the abdominal cavity to search for digenean parasites. First, we macroscopically inspected the visceral organs and intestines, and then systematically inspected all material microscopically with an Olympus BH-2 stereomicroscope. The obtained parasites were fixed with AFA, dyed with Mayer's Carmalum, and mounted according to standard methods (10). The identification of the parasite was established based on Tubanguui (11) and Sirikantayakul (12).

### Statistical Analysis

Parasitological quantitative descriptors were calculated according to Bush et al. (13) as follows: Prevalence (PREV), Mean Intensity (MI), Mean Abundance (MA). To test for a relationship between fish size and number of parasites found, we used a correlation analysis (IBM SPSS Statistics 20). Finally, we compared morphological measurements of parasites from our samples to those from the two previous studies on the same species to aid in identification in future samples (11, 12). Parasites and fish materials were preserved and stored in the Biology Department, Faculty of Science, at Atatürk University.

## RESULTS

Of the total of 63 fish examined, 48 were infected with the digenean *Orientocreadium batrachoides* (Figure 1). The prevalence of the parasite in the sample was 76.2% overall, and 100% in the largest size class of *C. gariepinus* (Table 1). There was no significant correlation between fish size and number of parasites ( $r^2=0.102$ ,  $p=0.43$ ) (Figure 2).



**Figure 1.** *Orientocreadium batrachoides* Tubanguui, 1931 from *Clarias gariepinus*

**Table 1.** Distribution of *O. batrachoides* in size groups of *C. gariepinus*

Size groups	EFN	IFN	TPN	MPS	PREV	MI	MA
21-30 cm	16	13	190	43	0.813	11.875	14.615
31-40 cm	41	29	399	49	0.707	9.732	13.759
41-50 cm	6	6	121	89	1.000	20.167	20.167
Total	63	48	710	89	0.762	11.270	14.792

(EFN: Examined Fish Number; IFN: Infected Fish Number; TPN: Total Parasite Number; MPS: Maximum Parasite Number; PREV: Prevalence; MI: Mean Intensity; MA: Mean Abundance)

**Table 2.** Morphometric measures of *Orientocreadium batrachoides* Tubangui, 1931

	<i>Orientocreadium batrachoides</i> Tubangui, 1931				
	Present study Adult	Tubangui, 1931 Adult	8-10 days old	Sirikantayakul, 1985 11-12 days old-mature	15-18 days old-mature
L	2092-3148 (2620)	1740-2120	890-1010 (950)	1190-1370 (1280)	1140-1920 (1530)
W	345-914 (703)	410-540	165-300 (233)	300-410 (350)	289-426 (357)
OSL	162-259 (214)	170-190	103-118 (110)	137-163 (150)	103-179 (141)
OSW	202-242 (227)		106-129 (118)	129-156 (143)	122-198(160)
VSL	178-283 (221)	160-200	114-118 (116)	144-148 (146)	130-203 (166)
VSW	202-275 (233)	---	122-130 (125)	144-152 (148)	122-182 (152)
PL	113-194 (151)	80-130	49-72 (61)	80-110 (95)	65-100 (82)
PW	121-170 (144)	110-130	46-61 (53)	76-84 (80)	80-130 (105)
E	16-89 (54)	30-70	27-57 (42)	58-61 (49)	42-68 (55)
ATL	275-299 (286)	150-200	84-118 (101)	141-148 (144)	95-152 (123)
ATW	251-347 (312)	130-170	91-99 (95)	118-125 (123)	103-171 (137)
PTL	267-372 (319)	160-260	99-114 (106)	133-148 (141)	103-160 (131)
PTW	323-380 (352)	110-170	99-114 (106)	118-141 (129)	106-182 (144)
CSL	218-372 (311)	300-330	---	---	---
CSW	97-154 (127)	70-90	---	---	---
ISVL	---	240-260	19-26 (23)	30-34 (32)	122-182 (152)
ISVW	---	70-80	30-34 (32)	57-65 (61)	130-201 (165)
ESVL	---	---	30-45 (37)	76-84 (80)	65-91 (78)
ESVW	---	---	38-53 (45)	137-144 (141)	87-198 (142)
OL	170-226 (205)	160-190	49-72 (61)	72-148 (110)	76-118 (96)
OW	267-299 (283)	120-130	91-99 (95)	99-118 (108)	99-125 (112)
EL	26-50 (32)	25-32		27-38 (32)	32-34 (33)
EW	14-22 (18)	18-20		15-23 (19)	16-18 (17)

(L: Length; W: Width; OSL: Oral Sucker Length; OSW: Oral Sucker Width; VSL: Ventral Sucker Length; VSW: Ventral Sucker Width; PL: Pharynx Length; PW: Pharynx Width; O: Oesophagus (Prepharynx); ATL: Anterior Testis Length; ATW: Anterior Testis Width; PTL: Posterior Testis Length; PTW: Posterior Testis Width; CSL: Cirrus Sac Length; CSW: Cirrus Sac Width; ISVL: Internal Seminal Vesicle Length; ISVW: Internal Seminal Vesicle Width; ESL: External Seminal Vesicle Length; ESVW: External Seminal Vesicle Width; OL: Ovary Length; OW: Ovary Width; EL: Egg Length; EW: Egg Width)

**Orientocreadiidae Yamaguti, 1958**

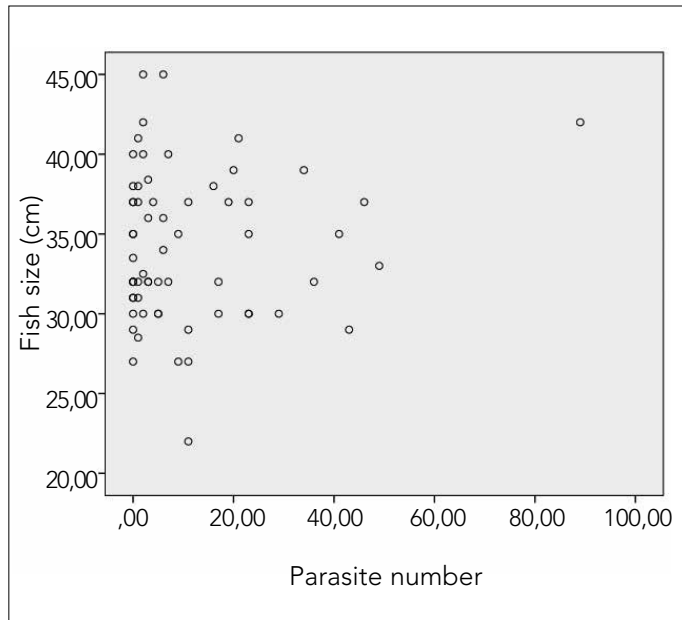
***Orientocreadium batrachoides* Tubangui, 1931**

The body is ellipsoid and the anterior region is spinous. The oral sucker is slightly oval and the ventral sucker is larger than the anterior one. The pharynx is located behind the very short prepharynx. The caecum is bifurcated shortly after the pharynx. Testicles are tandem, slightly oval, postovarian and median. The anterior testis is smaller than the posterior. The cirrus sac is large and located to one side of the acetabulum. The ovary is oval, median, and located at the equator of the body. The uterus extends to the posterior end of the body. The eggs are numerous, small, and operculated. The vitelline follicles extend from the uterine level to the posterior end of the body. In general, specimens of *O. batrachoides* from *C. gariepinus* in Turkey are larger than previously reported samples (Figure 1, Table 2).

**DISCUSSION**

*Orientocreadium batrachoides* is a broadly distributed, host-specific parasite first described from *Clarias batrachus* in the Philippines (11, 14). It has since been documented in *Clarias macrocephala* in the Philippines (12), in *Clarias lazera* in Egypt (15, 16), in *Channa gachua* in India (17), and in *Clarias fuscus* and *Parasilurus asotus* in China (14). In addition, Soylu and Emre (8) described a digenean parasite as *Orientocreadium* sp. from *Clarias lazera* in Turkey. Given the measurements and characteristics reported in this study, we suggest that this was *Orientocreadium batrachoides*.

Our sample of *C. gariepinus* from the Asi River exhibited high rates of incidence of *O. batrachoides* (76.2%). Given this high rate of infection, it is surprising that this parasite has not been described previously in the fish of Turkey. It may be that this represents a relatively new invasion by the parasite in the Asi



**Figure 2.** The scatterplot of the parasite numbers

River, possibly via the introduction of infected fishes from some other location. Alternatively, the parasite may be widespread, and the lack of prior documentation may simply reflect the lack of focused study. Intermediate hosts for *O. batrachoides* include *Lymnaea viridis* (Mollusca) as the first intermediate host, and secondary intermediate hosts are mosquito larvae, aquatic worms, tadpoles, dragonfly nymphs and young fish (12). These intermediate hosts are widespread in the rivers of Turkey, and are common in the diet of *C. gariepinus* (7). Thus, we suggest that the distribution of *O. batrachoides* is likely to include much of the range of *C. gariepinus* in the freshwaters of Turkey.

## CONCLUSION

*C. gariepinus* from the Asi River exhibited high rates of incidence of *O. batrachoides* which is the first record from Turkey. It was detected that the specimens of *O. batrachoides* in Turkey are larger than previously reported samples. This is the first clearly documented report of *O. batrachoides* in the teleost fish of Turkey.

## Conflict of Interest

No conflict of interest was declared by the authors.

**Peer-review:** Externally peer-reviewed.

**Informed Consent:** Written informed consent was obtained from patients who participated in this study.

## Author Contributions

Concept - Y.T.; Design - Y.T., M.C.O., M.B.; Supervision - M.C.O., M.B.; Funding - Y.T.; Materials - Y.T., R.Ö.; Data Collection and/or Processing - Y.T., R.Ö.; Analysis and/or Interpretation - Y.T., M.C.O., M.B., R.Ö.; Literature Review - Y.T.; Writer - Y.T., M.C.O., M.B.; Critical Review - M.C.O., M.B.; Other - R.Ö.

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## Çıkar Çatışması

Yazarlar herhangi bir çıkar çatışması bildirmemişlerdir.

**Hakem değerlendirmesi:** Dış bağımsız.

**Hasta Onamı:** Yazılı hasta onamı bu çalışmaya katılan hastalardan alınmıştır.

## Yazar Katkıları

Fikir - Y.T.; Tasarım - Y.T., M.C.O., M.B.; Denetleme - M.C.O., M.B.; Kaynaklar - Y.T.; Malzemeler - Y.T., R.Ö.; Veri toplanması ve/veya işlemesi - Y.T., R.Ö.; Analiz ve/veya yorum - Y.T., M.C.O., M.B., R.Ö.; Literatür taraması - Y.T.; Yazıyı yazan - Y.T., M.C.O., M.B.; Eleştirel İnceleme - M.C.O., M.B.; Diğer - R.Ö.

## Teşekkür

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