

ON THE OCCURRENCE OF THE[MONOGENEAN *GYRODACTYLUS*
TAIMENI ERGENS, 1971 FOR THE FIRST TIME IN IRAQ ON GILLS
OF THE COMMON CARP *CYPRINUS CARPIO*

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ABSTRACT

The monogenean *Gyrodactylus taimeni* Ergens, 1971 was recorded in this study for the first time in Iraq from gills of the common carp *Cyprinus carpio* Linnaeus, 1758. The description and measurements of this parasite as well as illustration were given. In addition, a list of species of *Gyrodactylus* so far recorded from *C. carpio* in Iraq is also included together with a list of all other hosts recorded for each gyrodactylid species.

INTRODUCTION

Monogenean flatworms of the genus *Gyrodactylus* occur on a wide array of fishes, possess a high degree of host-specificity (Buchmann, 2012). Species of this genus are parasites of freshwater and marine teleosts (Bykhovskaya-Pavlovskaya *et al.*, 1962). All the species of *Gyrodactylus* are viviparous with embryo already containing a further developing embryo. These parasites have a specific birthing process of two daughters. The first daughter is created asexually from a ball of cells within the parent and then released through the birth pore. The second daughter and all subsequent daughters develop from an oocyst and enter the uterus after the previous daughter is born (Szczembara, 2011). Species of *Gyrodactylus* are seen especially in teleost fishes, infect and live ectoparasitically on the skin, fins and gills (Koyun and Altunel, 2011). The worm attaches to the fin or skin surface of the host by inserting 16 marginal hooklets and one pair of median hooks into the epidermis. This action is clearly associated with injuries to the epithelial cells. Also feeding activities of the worm impose epithelium damage (Buchmann, 2012). The parasites cause excessive mucous secretion and potential hemorrhagic lesions (Johnsen and Jensen, 1991). Salmon skin samples showed a reduced mucous cells concentration and epidermis was thinner than in uninfected fishes (Sterud *et al.*, 1998). The disease resulting from *Gyrodactylus* infection is called gyrodactylosis which has been reported to be responsible for death of a wide variety of fishes (Szczembara, 2011). *Gyrodactylus salaris* Malmberg, 1957 was recognized as a virulent pathogen on Atlantic salmon parr (*Salmo salar*) populations in Norway since 1975, the economic loss caused by this parasite amount to 480 million Euros (Bakke *et al.*, 2002; Rokicka *et al.*, 2007).

In Iraq, 21 *Gyrodactylus* species have been described from freshwater fishes from different water bodies, 17 species of which were recorded from the common carp *C. carpio*. The first study in Iraq concerning *Gyrodactylus* was that on *G. elegans* (Ali and Shaaban, 1984), after which several studies were carried out, among which some reported new records of *Gyrodactylus* species in Iraq (Ali *et al.*, 1988b; Salih *et al.*, 1988; Abdul-Ameer, 1989; Mhaisen *et al.*, 1990; Al-Zubaidy, 1998; Abdullah, 2002; Jori, 2006; Al-Zubaidy, 2007; Mama, 2012; Abdul-Ameer and Al-Saadi 2013, Abdullah, 2013).

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The present investigation deals with the record of the monogenean *G. taimeni* which parasitizes *C. carpio* as no previous record on this parasite in Iraq was documented (Mhaisen, 2013).

MATERIALS AND METHODS

A total of 63 specimens of the common carp *C. carpio* were collected from different fish markets in Baghdad city during the period from November 2011 till March 2012. The fishes were brought alive to the laboratory and freshly examined for ectoparasites. Skin and gill smears were microscopically examined. Care was taken to isolate and flatten the parasite specimens which then were stained by aqueous neutral red and fixed in glycerine. Drawing was done by using a camera lucida.

Parasite identification was performed according to two taxonomical accounts (Bykhovskaya-Pavlovskaya *et al.*, 1962; Gussev, 1985). The information on the previous account records of parasites was checked by using the index-catalogue of parasites and disease agents of fishes of Iraq (Mhaisen, 2013).

RESULTS AND DISCUSSION

Out of the 63 common carp, three fishes were infected with the monogenean *Gyrodactylus taimeni*. The parasites were found on the gills of examined fishes. The measurements were based on four specimens of parasites. The following is a brief description and measurements of this parasite (in mm) as shown in Fig. (1).

Small worm, length 0.25-0.3 (0.27), width 0.07-0.09 (0.08). Overall length of median hooks 0.061-0.064 (0.062), basal median hook length 0.047-0.05 (0.048) and point 0.024-0.028 (0.026). Ventral connecting bar 0.004-0.006 (0.005) × 0.025-0.027 (0.026), length of membranoid extension 0.014-0.016 (0.015). Marginal hooks total length 0.049-0.054 (0.051), shaft 0.036-0.04 (0.038), sickle 0.012-0.014 (0.013). The measurements of the present *G. taimeni* are in agreement with these of the holotype of the parasite from Mongolia (Gussev, 1985).

According to the index-catalogue of parasites and disease agents of fishes of Iraq (Mhaisen, 2013), the present report of this monogenean represents its first record in Iraq, as no previous record was given for this parasite from fishes of Iraq.

By recording *G. taimeni* of the present study, a total of 18 *Gyrodactylus* species become known from *C. carpio* in Iraq. The following is a list of these species (arranged alphabetically) together with their hosts in Iraq. Due to the existence of 82 reports on the occurrence of *Gyrodactylus* species in Iraq (Mhaisen, 2013); only the first report for each host will be given here.

1. *Gyrodactylus baicalensis* Bogolepova, 1950:

This parasite was recorded for the first time in Iraq from *C. carpio* by Salih *et al.* (1988). The other seven hosts known in Iraq are: *Acanthobrama centisquama* (Balasem *et al.*, 2003), *Barbus sharpeyi* (Mhaisen *et al.*, 1997), *Carasobarbus luteus* (Ali *et al.*, 1988a), *Carassius auratus* (Asmar *et al.*, 2003), *Chondrostomum regium* (Mhaisen *et al.*, 1995), *Cyprinion macrostomum* (Ali *et al.*, 1988a) and *Liza abu* (Mhaisen *et al.*, 1995).

2. *Gyrodactylus barbi* Ergens, 1976:
This parasite was recorded for the first time in Iraq from *C. carpio* by Mama (2012). So far, no more hosts are reported from Iraq for this parasite (Mhaisen, 2013).
3. *Gyrodactylus cyprini* Diarova, 1964:
This parasite was recorded for the first time in Iraq from *C. carpio* by Mama (2012). So far, no more hosts are reported from Iraq for this parasite (Mhaisen, 2013).
4. *Gyrodactylus elegans* Nordmann, 1832:
This parasite was recorded for the first time in Iraq from both *C. carpio* and *Liza abu* by Ali and Shaaban (1984). The other 20 hosts known for this parasite in Iraq are: *Acanthobrama centisquama* (Ali *et al.*, 1987), *Acanthobrama marnid* (Mhaisen *et al.*, 1995), *Alburnus orontis* (Al-Sa'adi, 2007), *Aspius vorax* (Asmar *et al.*, 1999), *Barbus belayewi* (Al-Jawda *et al.*, 2000), *Barbus esocinus* (Asmar *et al.*, 1999), *Barbus grypus* (Ali *et al.*, 1986), *Barbus luteus* (Al-Awadi, 1997), *Barbus sharpeyi* (Khalifa, 1989), *Barbus xanthopterus* (Ali *et al.*, 1986), *Carassius auratus* (Asmar *et al.*, 2003), *Carassius carassius* (Mhaisen *et al.*, 2003), *Chondrostoma regium* (Mhaisen *et al.*, 1995), *Ctenopharyngodon idella* (Salih *et al.*, 1988), *Cyprinion macrostomum* (Al-Jadoaa, 2002), *Garra rufa* (Mhaisen *et al.*, 1995), *Heteropneustes fossilis* (Ali *et al.*, 1987), *Hypophthalmichthys molitrix* (Mohammad-Ali *et al.*, 1999), *Mastacembelus mastacembelus* (Mhaisen *et al.*, 1999) and *Silurus triostegus* (Al-Jawda *et al.*, 2003).
5. *Gyrodactylus gobioninum* Gussev, 1955:
This parasite was recorded for the first time in Iraq from *C. carpio* by Mama (2012). So far, no more hosts are reported from Iraq for this parasite (Mhaisen, 2013).
6. *Gyrodactylus kherulensis* Ergens, 1974:
This parasite was recorded for the first time in Iraq from *C. carpio* by Ali *et al.* (1988b). The other two hosts known in Iraq are: *C. idella* (Al-Zubaidy, 1998) and *S. triostegus* (Abdullah, 2013).
7. *Gyrodactylus lavareti* Malmberg, 1956:
This parasite was recorded for the first time in Iraq from *C. carpio* by Abdul-Ameer and Al-Saadi (2013). So far, no more hosts are reported from Iraq for this parasite (Mhaisen, 2013).
8. *Gyrodactylus longoacuminatus* Zitnan, 1964:
This parasite was recorded for the first time in Iraq from *C. carpio* by Mama (2012). So far, no more hosts are reported from Iraq for this parasite (Mhaisen, 2013).
9. *Gyrodactylus malmbergi* Ergens, 1961:
This parasite was recorded for the first time in Iraq from both *C. carpio* and *H. molitrix* by Al-Zubaidy (1998). So far, no more hosts are reported from Iraq for this parasite (Mhaisen, 2013).
10. *Gyrodactylus markevitschi* Kulakovskaya, 1952:
This parasite was recorded for the first time in Iraq from *Varicorhinus trutta* by Abdul-Ameer (1989). The other four hosts known for this parasite in Iraq are: *Aphanius dispar* (Kadhim, 2009), *Barbus grypus* (Al-Sa'adi, 2007), *Cyprinion kais* (Al-Sa'adi, 2007) and *C. carpio* (Al-Zubaidy, 1998).

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11. *Gyrodactylus medius* Kathariner, 1893:
This parasite was recorded for the first time in Iraq from *C. carpio* by Al- Zubaidy (1998). The other host known in Iraq is *Barbus luteus* (Al-Sa'adi, 2007).
12. *Gyrodactylus menschikowi* Gvosdev, 1950:
This parasite was recorded for the first time in Iraq from from both *C. carpio* and *L. abu* by Al- Zubaidy (2007). So far, no more hosts are reported from Iraq for this parasite (Mhaisen, 2013).
13. *Gyrodactylus molnari* Ergens, 1978:
This parasite was recorded for the first time in Iraq from *C. carpio* by Abdullah (2013). So far, no more hosts are reported from Iraq for this parasite (Mhaisen, 2013).
14. *Gyrodactylus paralatus* A.Gusev, 1955:
This parasite was recorded for the first time in Iraq from both *C. carpio* and *H. molitrix* by Al-Zubaidy (1998). No more hosts are reported from Iraq for this parasite (Mhaisen, 2013).
15. *Gyrodactylus salaris* Malmberg, 1957:
This parasite was recorded for the first time in Iraq from *C. carpio* by Al-Zubaidy (1998). So far, no more hosts are reported from Iraq for this parasite (Mhaisen, 2013).
16. *Gyrodactylus sprostonae* Ling, 1962:
This parasite was recorded for the first time in Iraq from *C. carpio* by Al-Zubaidy (1998). The other five hosts known in Iraq are *Alburnus orontis* (Al-Sa'adi, 2007), *Carassius auratus* (Abdullah, 2013), *Carassius carassius* (Al-Sa'adi, 2007), *Chalcalburnus sellal* (Al-Sa'adi, 2007) and *Cyprinion kais* (Al-Sa'adi, 2007).
17. *Gyrodactylus taimeni* Ergens, 1971:
This parasite was recorded for the first time in Iraq from *C. carpio* of the present study.
18. *Gyrodactylus vicinus* Bykhovskii, 1957:
This parasite was recorded for the first time in Iraq from *C. carpio* by Al-Zubaidy (1998). The other two hosts known in Iraq are *B. luteus* and *L. abu* which were both reported by Al-Nasiri (2000).

ACKNOWLEDGEMENTS

Thanks are due to Prof. Dr. Furhan T. Mhaisen for confirming the identification of *G. taimeni*, permission to use his index-catalogue of parasites and disease agents of fishes of Iraq and critical reading of the manuscript. Also, thanks are due to Mrs. Azhar A. Al-Moussawi of the Iraq Natural History Research Center and Museum, University of Baghdad for her help in using the camera lucida.

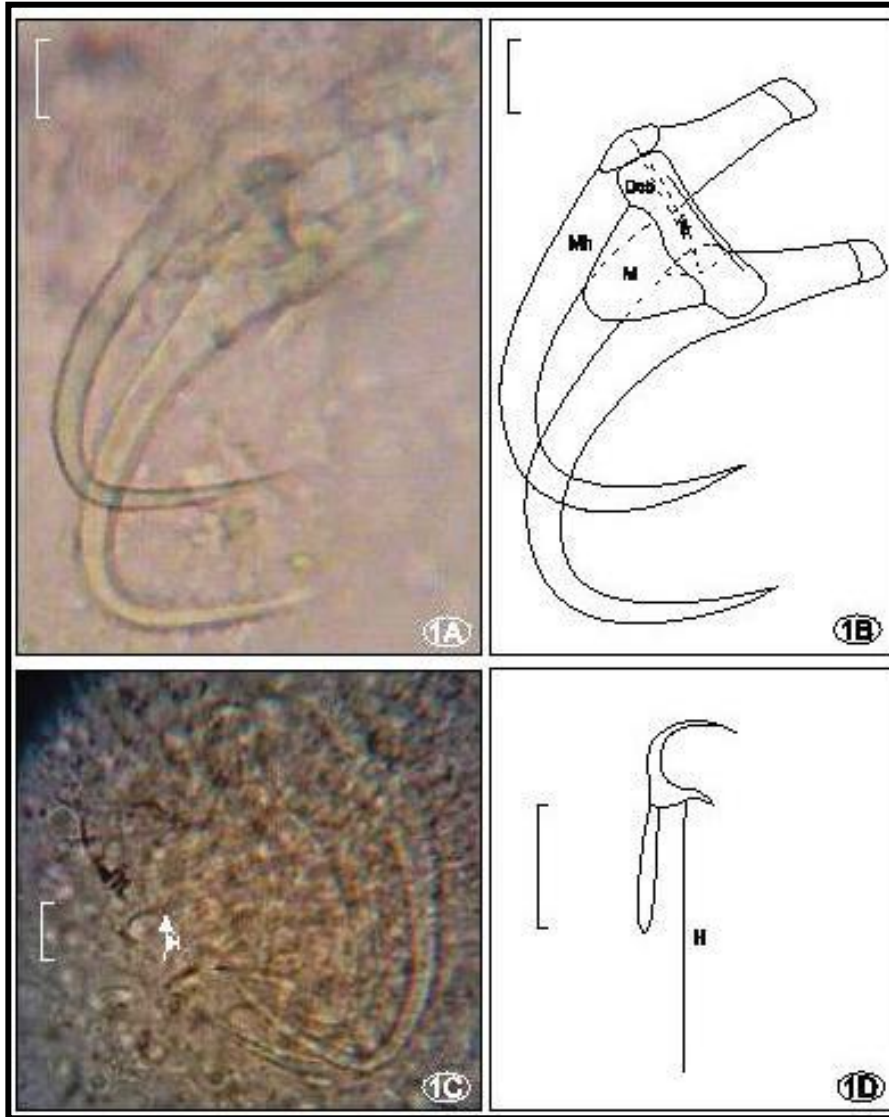


Fig. 1: *Gyrodactylus taimeni* Ergens, 1971

1A: Photomicrograph of the haptor (Scale bar= 0.01mm.).

1B: Camera lucida drawing of the haptor (Scale bar= 0.01mm.).

1C: Photomicrograph of the marginal hook (hooklet) (Scale bar= 0.01mm.).

1D: Camera lucida drawing of the marginal hook (hooklet) (Scale bar= 0.01mm.).

Dcb= dorsal connecting bar, H= hooklet, M= membranoid extension, Mh= median hook.

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Bull. Iraq nat. Hist. Mus.
(2013) 12 (3): 1-9

ظهور أحادي المنشأ *Gyrodactylus taimeni* Ergens, 1971 لأول مرة في
العراق من غلاصم أسماك الكارب الإعتيادي *Cyprinus carpio*

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الخلاصة

سجل أحادي المنشأ *Gyrodactylus taimeni* Ergens, 1971 لأول مرة في
العراق من غلاصم أسماك الكارب الإعتيادي *Cyprinus carpio*. تم إعطاء
مواصفات وقياسات هذا الطفيلي بالإضافة إلى الرسم التوضيحي له. فضلاً عن
ذلك، تم تضمين قائمة بأنواع الجنس *Gyrodactylus* المسجلة لحد الآن في
العراق من أسماك الكارب الإعتيادي مع أنواع المضيفات الأخرى لكل نوع
منها.