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The first record of the copepod *Lernanthropus corniger* Yamaguti, 1954 parasitizing two carangid fishes in northwest of the Arab Gulf, Iraq

Khalidah S. Al-Niaeem[1]*,

Suzan A. Al-Azizz[2],

Fatimah H. Al-Ataby[2]

[1] *Department of Fisheries and Marine Resources, College of Agriculture, University of Basrah, Basrah, Ira*

[2] *Department of Microbiology, College of Veterinary Medicine, University of Basrah, Basrah, Iraq*

The lernanthropid copepod *Lernanthropus corniger* Yamaguti, 1954 was found attached to the gill filaments of two species of carangid fishes: *Megalaspis cordyla* and *Carangoides malabaricus* which were collected from northwest of the Arab Gulf. This represents the first record of *L. corniger* in the Iraqi territorial waters of the Arab Gulf. *M. cordyla* and *C. malabaricus* are new hosts for this parasite in the Arab Gulf.

Key words: *Lernanthropus corniger*, *Megalaspis cordyla*, *Carangoides malabaricus,* the Arab Gulf, Iraq

INTRODUCTION

Parasites represent an important source of economic losses for aquaculture in terms of reduced fish growth and increased mortality and also in terms of investments in the farming practices and chemicals necessary for prevention (Menzies et al., 2002).

According to the local adaptation hypothesis, parasites should have the evolutionary advantage over their hosts (Lively, Dybdahl, 2000), due to their shorter generation times, higher mutation rates and larger population sizes (Dybdahl, Storfer, 2003), which give them greater evolutionary potential (Gandon, Michalakis, 2002).

All *Lernanthropus* species parasitize on gills of marine teleosts, most of them inhabiting warmer waters. Some species of *Lernanthropus* are strictly host specific, but many are parasitizing on several species of fish belonging to one genus, or several genera of one family (Kabata, 1979). The parasitic copepods of the Arab Gulf fishes are poorly known. While nearly 300 species of copepods have been recorded from fishes of the Arab Gulf (Pillai, 1985), only few accounts on the copepods of fishes of the Gulf within the territorial waters of Iraq were published (Piasecki et al., 1993; Al-Daraji, 1995; Amado et al., 2001; Al-Daraji, 2002a, b, c; Bannai, 2002). So, this study was designed to investigate the parasitic copepods from two species of carangid fishes: *Megalaspis cordyla* and *Carangoides malabaricus* in the northwest part of the Arab Gulf within the Iraqi territorial marine waters.

MATERIALS AND METHODS

A total of 454 fish specimens (240 *C. malabaricus* and 214 *M. cordyla*) (Table) were examined for ectoparasites during the period from September 2010 to February 2011. They were captured by trawl net from the Iraqi marine waters, northwest of the Arab Gulf (latitudes 47° 30′ to 48° 15′; longitude 30° 50′ to 30° 00′). The fishes were transported to the laboratory, and copepod parasites were

* Corresponding author. E-mail: Kalidah_salim@yahoo.com

Table. **Infection rate of *Lernanthropus corniger* Yamaguti, 1954 on the gills of two species of the carangid fishes, sampled in northwest of the Arab Gulf in 2010 and 2011**

Fish species	No. of examined	Fish length (cm)		weight Fish (gm)		Parasite prevalence (%)	Mean parasite intensity
		Mean	±SD	mean	±SD		
C. malabaricus	240	21.5	4.5	350	250	5.4	0.4
M. cordyla	214	26	5.5	600	300	3.3	0.3

removed from the gill filaments in 70% ethanol.

Before dissection, the copepods were cleared in lactic acid using the wooden slide method (Humes, Gooding, 1964). Measurements were made using an ocular micrometer. Drawings were made using a camera lucida. Copepods were identified on the basis of their morphological features according to Yamaguti, (1963), Pillai, (1967) and Kabata (1979). Some specimens were sent to Prof. Dr. Geoffrey A. Boxshall, Department of Zoology, London for confirmation of the identification.

Statistical analysis

In order to determine the statistical significance among different variables SPSS program [(Statistical Program for Social Sciences (17.00)], ANOVA Table at the level of probability of 0.05 (LSD) was used to compare differences to describe the copepod during the study period.

RESULTS

Copepods belong to *Lernanthropus corniger* Yamaguti, 1954 of the family Lernanthropidae, Order Siphonostomatoida.

Number of copepod: 5 females and 2 males.

Number of measured copepod: 4 females and 2 males.

Number of infected fishes: 20.

Hosts: *Carangoides malabaricus* and *Megalaspis cordyla*.

Site of infection: Gills.

Locality: Northwest of the Arab Gulf within the Iraqi territorial waters.

Material deposition: Voucher specimens were deposited in the Natural History Museum, London accessions BMNH 2012. 229–232.

Description

Female: Body (Fig. 1-A) large, total length 6.9 mm from anterior of the head to the end of caudal rami and divided into head, neck, trunk and urosome. Head nearly squarish, 2.30 × 1.5 mm with narrowed antennal area. Neck, short and wide, 0.7 × 0.5 mm.

Genital complex and abdomen wider than long, 2.3 × 3.0 mm. Egg sacs are short and straight. Carapace possesses 2 large apically acute antero-lateral horns projecting forward. First leg (Fig. 1-B) is endopod; outer protopodal seta is simple and thin, but inner protopodal seta is of spin form and arising from a large papilla; exopod is 1-segmented, large and tipped with 5 robust spines, inner 2 of which bear denticles on both sides, endopod larger than exopod. Second leg (Fig. 1-C) protopod is inconspicuous, without inner and outer setae; exopod is armed as in leg 1, but seta on endopod is bilaterally denticulated. Maxilliped (Fig. 1-D) is well developed, comprising proximal corpus ornamented with surface denticles and armed with papilliform element on medial surface; distal subchela is subdivided into proximal part representing endopod and is armed with a single tiny spine and distal claw. Posterior part of trunk (Fig. 1-E) is short, it is broader than long. Genital segment is longer than the one segmented-abdomen. Antenna (Fig. 1-F) possesses a tubercle carrying a spinule, distal segment short but stout, its swollen base with two claws and a spine.

Male: Body (Fig. 1-G) is demarcated by a narrow dorsal transverse semicircle groove. Anterior part of the trunk is sub-equal to the carapace in length. Genital segment is longer than the one-segmented abdomen. Cephalic and anterior thoracic appendages are like those of the female. Total length of the body 6.0 mm. The result of description the copepod (female and male) showed a not significant difference ($p > 0.05$).

DISCUSSION

The family Lernanthropidae as defined by Yamaguti (1963) contains eight genera including the

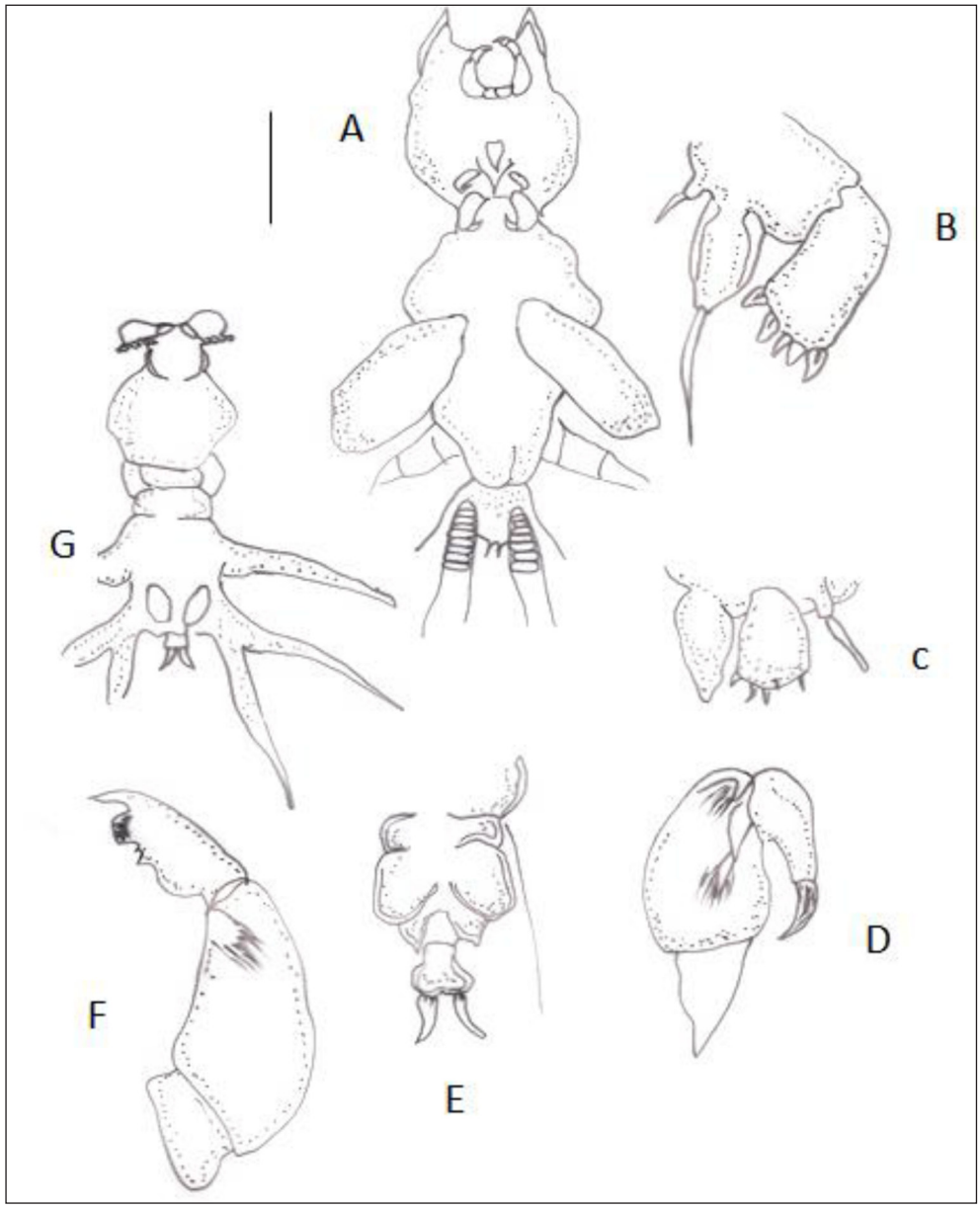

Fig. 1. *Lernanthropus corniger*, (A) Female: ventral view, (B) leg 1, (C) leg 2, (D) maxilliped, (E) posterior part of trunk, (F) antenna, (G) male. Scale-bars: A & G = 0.2, B-F = 0.05, G = 0.2 mm

type genus *Lernanthropus*. *Lernanthropus corniger* was firstly reported by Yamaguti (1954) from an unidentified *Megalaspis* collected from Macassar in the Celebes. Later, it was reported from *Caranx* (=*Alepes*) *djedaba* in South Africa (Kensley, Grindley, 1973), *M. cordyla* from Hainan Island in the South China Sea (Song, Chen, 1976) and from *M. cordyla* of Malaysia (Leong, 1986). Pillai (1985) suspected that *Lernanthropus kanagurta* Tripathi, 1962 described from India, might be conspecific with *L. corniger*, and hence the Indian mackerel *Rastrelliger kanagurta* is another host for the present species. *L. corniger* has wide distribution in the Indo-west Pacific region. Pillai (1985) provided a detailed description of *L. corniger.*

In the Arab Gulf, Al-Daraji (1995) recorded *Lernanthropus* sp. from the gills of *Scomberomorus guttatus* from Khor Al-Zubair lagoon and Bannai (2002) recorded *L. trifoliatus* (erroneously reported as *L. trithfoliatus*) from *Otolithes ruber* in Khor Abdulla, northwest of the Arab Gulf. According to Piasecki and Hayward (2002), *L. trifoliatus* is considered as a synonym of *L. polynemi* Richiardi, 1881.

The study extends knowledge on distribution of *Lernanthropus corniger* both by hosts and geographically.

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REFERENCES

1. Al-Daraji S. A. M. 1995. Taxonomical and ecological studies on the metazoan parasites of some marine fishes of Khor Al-Zubair estuary, northwest of the Arabian Gulf, Ph. D. thesis, College of Agriculture, University of Basrah, Basrah: 182 p.
2. Al-Daraji S. A. M. 2002a. A new species of ergasilid copepods parasitic on the scorpion fish *Psudosynanceia melanostigma* Day, 1875 in Khor Al-Zubair lagoon, Iraq. *Marine Mesopotamia*. Vol. 17(1): 147–154.
3. Al-Daraji S. A. M. 2002b. Description of *Ergasilus pararostralis* new species (Copepoda: Poecilostomatoida) infesting *Liza subviridis* (Valenciennes, 1836) in Khor Al-Zubair lagoon, Iraq. *Marine Mesopotamia*. Vol. 17(1): 155–162.
4. Al-Daraji S. A. M. 2002c. *Ergasilus irakiensis* new species (Copepoda: Poecilostomatoida) from *Liza subviridis* (Valenciennes, 1836) in Iraq. *Marine Mesopotamia*. Vol. 17(2): 341–346.
5. Amado M. A. P. M., Rocha C. E. F., Piasecki W., Al-Daraji S. A. M., Mhaisen F. T. 2001. Copepods of the family Ergasilidae (Poecilos-tomatoida) parasitic on fishes from Khor Al-Zubair lagoon, Iraq. *Hydrobiologia.* Vol. 459: 213–221.
6. Bannai M. A.-A. 2002. Parasites of some marine fishes of Khor Abdulla, north-west Arabian Gulf. M. Sc. thesis, College of Education, University of Basrah, Basrah: 103 p. (in Arabic).
7. Dybdahl M. F., Storfer A. 2003. Parasite local adaptation: Red Queen versus Suicide King. *Trends Ecology and Evolution*. Vol. 18(10): 523–530.
8. Gandon S., Michalakis Y. 2002. Local adaptation, evolutionary potential and host- parasite coevolution: interactions between migration, mutation, population size and generation time. *Journal of Evolutionary Biology*. Vol. 15(3): 451–462.
9. Humes A. G., Gooding R. U. 1964. A method for studying the external anatomy of copepods. *Crustaceana*. Vol. 6: 238–240.
10. Kabata Z. 1979. Parasitic Copepoda of British fishes. Ray Soc., London, 468 pp.
11. Kensley B, Grindley J. R. 1973. South African parasitic Copepoda. *Annals of the South African Museum*. Vol. 62(3): 69–130.
12. Leong T. S. 1986. Four parasitic copepods (families Lernanthropodidae and Lernaeopodidae) of Malaysian fishes. *Tropical Biomedicine*. Vol. 3(2): 147–155.
13. Lively C. M., Dybdahl M. F. 2000. Parasite adaptation to locally common host genotypes. *Nature*. Vol. 405: 679–681.
14. Menzies F. D., Crockford T., Breck O., Midtlyng P. J. 2002. Estimation of direct costs associated with cataracts in farmed Atlantic salmon (*Salmo salar*). *Bull. Eur. Assoc. Fish Pathology*. Vol. 22(1): 22–27.
15. Piasecki W., Hayward C. J. 2002. Redescription of the fish parasite *Lernanthropus polynemi* Richiardi, 1881 (Copepoda: Siphonostomatoida) and relegation of two congeners to synonymy. *Systematic Parasitology*. Vol. 52(2): 137–144.
16. Piasecki W., Al-Daraji S. A. M., Mhaisen F. T. 1993. Preliminary survey on copepod parasites of four fish species from Khor Al-Zubair lagoon, Iraq. Aquacult. Assoc. Canada's 10th Ann. Meet. Conf., Charlottetown: 24–27 Aug. 1993. (Abstract).
17. Pillai N. K. 1967. Copepods parasitic on Indian marine fishes: A review. Proc. Symp. Crustacea, Symp. Ser. *Journal of the Marine Biological Association of India*. Vol. 2(5): 1556–1680.
18. Pillai N. K. 1985. Copepod parasites of marine fishes. In: The fauna of India. Zoological Survey of India, Calcutta, 900 pp.
19. Song D. X., Chen G. X. 1976. Some parasitic copepods from marine fishes of China. *Acta Zoologica Sinica*. Vol. 22(4): 406–424. (In Chinese with English summary).
20. Yamaguti S. 1954. Parasitic copepods from fishes of Celebes and Borneo. *Publ. Seto Marine Biological Laboratory*. Vol. 3(3): 375–398.
21. Yamaguti S. 1963. Parasitic Copepoda and Branchiura of fishes. Intersci. Publ. N.Y., 1104 pp.

Khalidah S. Al-Niaeem, Suzan A. Al-Azizz, Fatimah H. Al-Ataby

PIRMASIS ĮRAŠAS APIE STAURIDINIŲ ŠEIMOS ŽUVŲ PARAZITUS IRKLAKOJUS *LERNANTHROPUS CORNIGER* YAMAGUTI 1954 M. PERSIJOS ĮLANKOS ŠIAURĖS VAKARUOSE IRAKE

S a n t r a u k a

Lernanthropidae šeimos irklakojis *Lernanthropus corniger* Yamaguti 1954 m. buvo surastas prisitvirtinęs ant filamentų stauridinių šeimos žuvų *Megalaspis cordyla* ir *Carangoides malabaricus,* kurios buvo surinktos Persijos įlankos šiaurės vakaruose, žiaunų. Tai yra pirmas įrašas apie *L. corniger* Irakui priklausančioje Persijos įlankos dalyje. *M. cordyla* ir *C. malabaricus* yra nauji šio parazito šeimininkai Persijos įlankoje.

Raktažodžiai: *Lernanthropus corniger*, *Megalaspis cordyla*, *Carangoides malabaricus,* Persijos įlanka, Irakas