Current Research Journal of Biological Sciences 4(4): 488-491, 2012
ISSN: 2041-0778
© Maxwell Scientific Organization, 2012
Submitted: March 23, 2012 Accepted: April 20, 2012 Published: July 10, 2012

A New Species of Gill Monogenea (Dactylogyrus Diesing, 1850) from *Hampala macrolepidota* van Hasselt and Kuhl 1823 (Cyprinidae) in Sungai Kiang and Tanjung Mentong, Tasik Kenyir Lake: Malaysia

[1]B.M. Modu, [1]M.F. Saiful, [1]Zaleha Kassim, [2]Marina Hassan and [1]F.M. Shaharom-Harrison
[1]Institute of Tropical Aquaculture (AKUATROP), Universiti Malaysia Terengganu (UMT), 21030 Kuala Terengganu. Malaysia
[2]Faculty of Agrotechnology and Food Sciences, Universiti Malaysia Terengganu., 2103, Kuala Terengganu, Malaysia

Abstract: During surveys of gill monogenean parasites in tropical freshwater lake (Kenyir Lake) in Malaysia, one new species of the genus Dactylogyrus Diesing, 1850 was found and described. The study aims at investigating monogenean parasites parasitizing *Hampala macrolepidota* Van Hasselt and Kuhl 1823 (Cyprinids) in Sungai Kiang and Tanjung Mentong from the Kenyir Lake, Malaysia. In record there were three known species of the genus Dactylogyrus found in this fish host in Malaysia viz: *D. hampali*, *D. macrolepidoti and D. quadribrachiatus* and one also known in Thailand: *D. anchorobustus*summing to four known *Dactylogyrus* sp. parasitizing *Hampala macrolepidota* from this region. Taxonomic and morphometric data for this new species was presented. *Dactylogyrus terengganusis* n. sp. differs from the previously described species at the species level principally by its hamuli, dorsal connective bar, copulatory organ accessory piece and worm size.

Keywords: *Dactylogyrus terengganusis* n. sp., kenyir lake, Malaysia

INTRODUCTION

To date, three species of *Dactylogyrus species*: viz, *D. hampali, D. macrolepidoti and D. quadribrachiatus* have been described from *Hampala macrolepidota* in Malaysia (Lim, 1987) and one species *D. anchorobustus* from Thailand (Kaewviyudth and Chinabut, 1999) summing to four known *Dactylogyrus species* parasitizing *Hampala macrolepidota* from South-East Asia. This study presents a description of an additional new *Dactylogyrus species* from the same host fish in Malaysia.

MATERIALS AND METHODS

Two hundred and sixty seven specimens of *Hampala macrolepidota* Van Hasselt and Kuhl 1823 (25-32 cm in total body length and 250-500 g in weight) were examined for gill monogenean between January, 2010 and July, 2011. Host fishes were caught from two main tributaries of Kenyir Lake, Sungai Kiang (5º1′87.183″N 102º44′96.42″E) and Tanjung Mentong (4º1′48.31.40″N 102º45′46.010″E). All fish host were caught with gill net (2.5" mesh) and fish collected were conveyed by small aquarium supplied with aeration on board to examination camp. Fishes were then killed and monogeneans found on the gills were removed by sucking out with fine modified glass pipette (Berland, 2005). Worms were placed on a clean glass slide containing a drop of water and then a drop of Sodium Dodecyl Sulphate (5% SDS) was added to the glass slide to clear and digest the worms' cuticle for clear observation of their hard parts. Worms in SDS solution were allowed to stay for 8-10 min before thoroughly washed with distilled water. Ammonium-Picrate-Glycerine (APG) was added to stain and fixed the worms, cover-slip was then placed on top and four corners of the cover-slips were glued with nail vanish (Řehulková and Gelnar, 2006). Parasites were identified based on their haptor (hamuli, connective bars and hooklets) and reproductive organs (copulatory organ and vaginal armament) according to Gusev (1985). Drawings were done with the aid of phase contrast microscope and drawing tube. All measurements are in micrometers, mean followed by the range in parentheses. All pictures were observed by digital image analyser (NIS-Elements 8 Nikon Eclipse 80i); terminology and measurement procedures used follow that of Jarkovský *et al.* (2004).

The holotype and paratype specimens are deposited at National History Museum London UK.

Corresponding Author: B.M. Modu, Institute of Tropical Aquaculture (AKUATROP), Universiti Malaysia Terengganu (UMT), 21030 Kuala Terengganu, Malaysia, Tel.: +60132781019

RESULTS

***Dactylogyrus terengganusis*, n. sp (Fig. 1 and 2):**
Host: *Hampala macrolepidota* (Van Hasselt and Kuhl 1823).
Localities: Sungai Kiang ((5º1′87.183″N 102º44′96.42″E) and Tanjung Mentong (4º1′48.31.40ºN 102˚45′46.010″E) Tasik Kenyir Lake, Malaysia.
Site on host: Gills
No. of host examined: 267
No. of host infected: 123
No. of worms collected: 809
No. of measured specimens: 17

Prevalence (P) and Mean Intensity (MI): P = 46% and MI = 6-11 parasites per fish.
Type-material*:* Holotype: NHMUK no. 2012.14. 1; Paratypes: NHMUK 2012. 14. 2-10.

Etymology: This species is named *Dactylogyrus terengganusis* n. sp. after the state (Terengganu: Malaysia) from where the worm has been found.

Description: Body length 510 (510-1060); greatest body width 71 (70-158) measured at ovary level. Haptor measures 106 (87-111) long and 95 (76-109) wide. Single pair of anchor (dorsal), total length 34 (19-39) length of anchor base 28 (16-29), length of inner root 16 (16-28), outer root length 9 (8-10); length of point 12 (12-17). One dorsal bar with ventral groove at both ends, with simple patches their sizes measures 44 (31-44) in length and width 6 (4-7). Ventral bar was not observed. 7 pairs of marginal hooks with proper demarcated handles and their

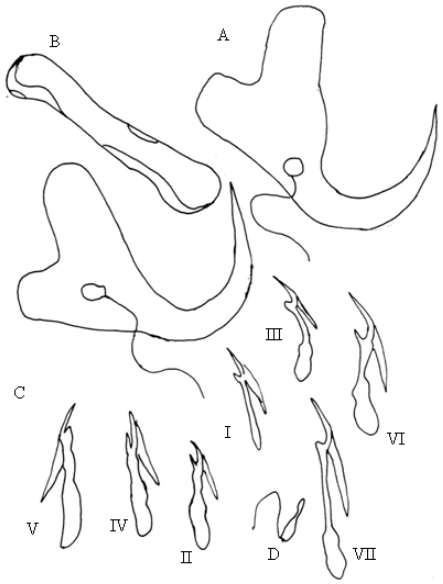

Fig. 1: Hard parts of haptor, *Dactylogyrus terengganusis* sp. n. (A: anchor; B: dorsal connective bar; C: hook of pairs I-VII. D: the needle. (Illustrations from both holotype and paratype specimens)

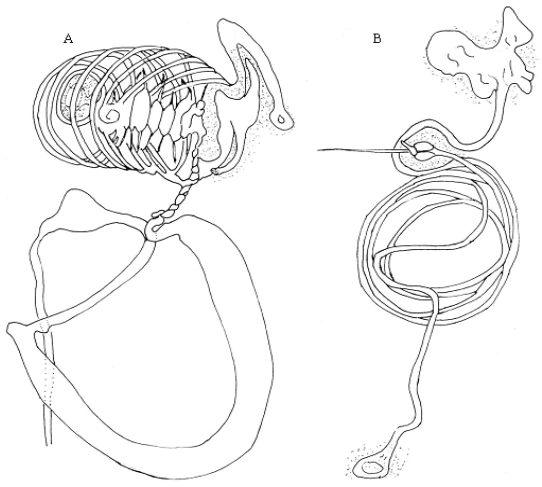

Fig. 2: Copulatory organ and vaginal armament of D*dactylogyrus terengganusis* sp. n. (A: copulatory organ and accessories pieces; B: vaginal armament (Illustrations from both holotype and paratype specimens)

sizes are variable pair I 15 (13-15), pair II 17 (16-18), pair III 19 (19-21), pair IV 24 (24-26), pair V 22 (22-25), pair VI 23 (19-26) and pair VII 31 (27-31). Copulatory organ-a sclerotized coiled tube of 8-10 counter-clockwise rings with diameter 19 (14-22); a stone-shape base with well sclerotized margin. Its accessory piece comprise thorny rod lying within the copulatory rings which is more or less articulated to the base of the copulatory organ and also have a horse-shoe shape features which is linked to the main copulatory organ by a twisted twined appendages. Vaginal tube simple long coiled and with accessory piece. Details microphotography of hard parts and whole worm are shown in Fig. 3A-D.

DISCUSSION

This species is similar to *Dactylogyrus anchorobustus* (Kaewviyudth and Chinabut, 1999) from the same host in Thailand in the shape of its copulatory organ but however, differ in number of rings 8-10 (while *D. anchorobustus* had 5) and accessory piece have a horse-shoe appendages articulated to the centrally located thorny rod-like structure of the copulatory organ which support the organ in function. This structure is absent in the latter. The new species also differ in vaginal armament to the latter by simple coiled tube which opens into a sclerotized region. Its copulatory organ also closely resembles *Dactylogyrus helicoides* (Lim and Furtado, 1986) from *Puntius fosciatus* and *D. osteochili* (Lim and Furtado, 1984) from *Osteochilus hasselti* in Malaysia and *D. macrocolpius* (Řehulková and Gelnar, 2006) from *Balantiocheilos melanopterus* in Thailand. This species

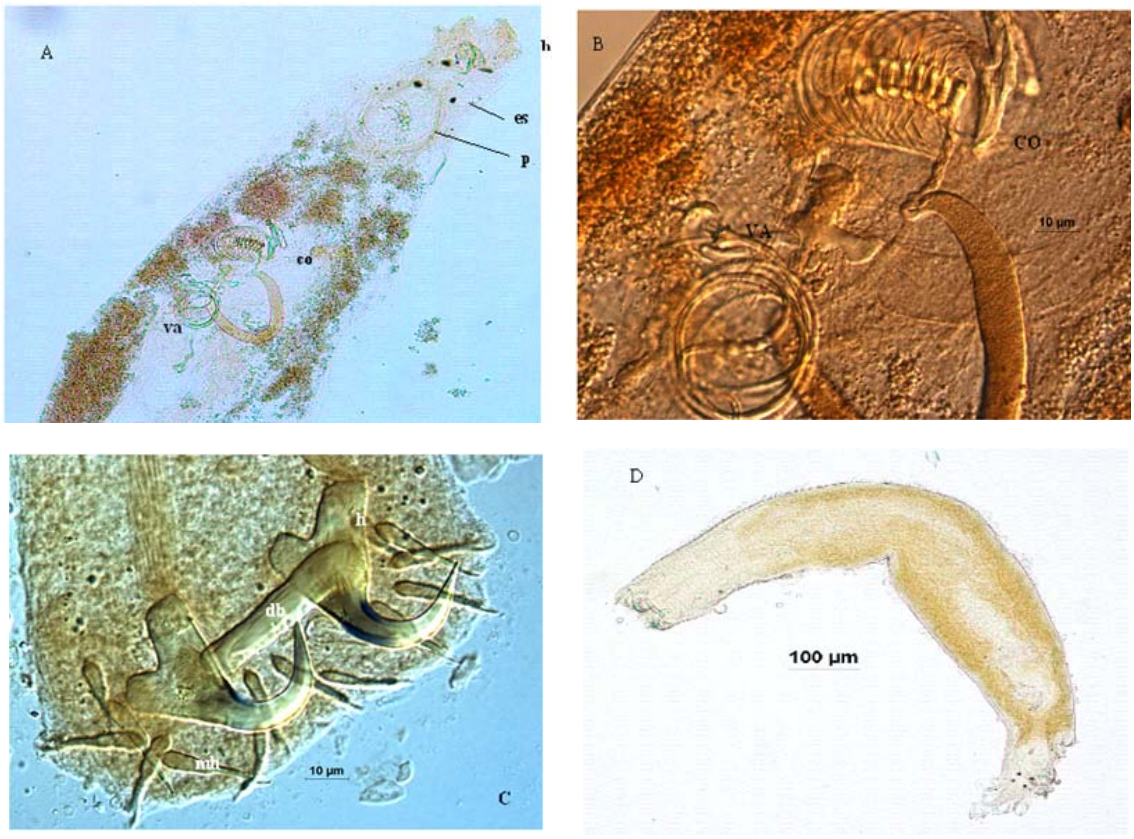

Fig. 3A-D: Photomicrographs of *Dactylogyrus terengganusis* n. sp. (A) Mid region of worm, paratype, showing head, 4 eye spot, pharynx and reproductive organs. (B) Details of reproductive organs-copulatory organ (co) and vaginal armament (va) with accessories pieces. (C) Haptorial region of worm, showing details of hooks; hamuli (h), dorsal connective bar (db) and marginal hooks (mh), paratype. (D) Entire worm Dactylogyrus terengganusis n. sp. (holotype)

differs from *D. anchorobustus, D. helicoides* and *D. osteochili* in comparative morphology of the hamuli, dorsal connective bar and copulatory organ. The new species is comparably longer in terms of size to those previously described. *D. terengganusis* n. sp. measured to a maximum of 1060 µm body long (in most paratype), while *D. anchorobustus* had maximum of 438 µm in length (Kaewviyudth and Chinabut, 1999), D. *helicoides* had 625 µm long (Lim and Furtado, 1986), *D. osteochili* had maximum length of 840 µm (Lim and Furtado, 1984) long and *D. macrocolpius* had 385 µm in size, respectively. The penis ends in a club-like structure while those of others are all vertebrae rib-like in appearance. *Dactylogyrus terengganusis* n. sp. had robust and stronger hamuli and marginal hooks when compared to *D. anchorobustus* described from the same host in Thailand.

CONCLUSION

This new species of monogenea (*Dactylogyrus terengganusis* n. sp.) parasitizing *Hampala macrolepidota* was only seen at Sungai Kiang and Tanjung Mentong among the six main tributaries of Tasik Kenyir Lake visited during the period of study. However, low prevalence and low incidence of infestation was observed among the hosts investigated. Other species in the same host recorded were *D. macrolepidoti*, *D. hampali* and *D. quadribrachiatus* with higher incidence and prevalence. With this species in addition, the total number of *Dactylogyrus sp.* parasitizing cyprinids in Southeast Asian have became 63 from the previous records of 62 (Řehulková and Gelnar, 2006). Finally, it seems gill monogeneans parasitizing fish family Cyprinidae in Southeast Asia have some similarities morphologically.

ACKNOWLEDGMENT

Authors thanked Ministry of Science and Technology Malaysia (MOSTI: VOT NO: 52046) for the financial support rendered for this project. We also thanked UMT boatmen (Abdul-Manaf, Mohammed Adanan, Hajj Matae and others) for their assistance in catching fish specimens from the lake.

REFERENCES

Berland, B., 2005. Whole Mounts: Occasional Publication No.1, Institute of Oceanography Kustem, Publisher.

Gusev, A.V., 1985. Monogenea: In: Bauer, O.N., (Ed.), Key to parasites of the Freshwater Fish Fauna of the USSR, Nauka, Leningrad, Vol. 2

Jarkovský, J., S. Morand, A. Šimkova´ and M. Gelnar, 2004. Reproductive barriers between congeneric monogenean parasites (Dactylogyrus: Monogenea): attachment apparatus morphology or copulatory organ incompatibility? Parasitol. Res., 92: 95-105.

Kaewviyudth, S. and S. Chinabut, 1999. Five new species of dactylogyrus (monogenea) from cyprinid fishes in thailand. asian fisheries society, manila, philippines. Asian Fish. Sci., 12: 391-399.

Řehulková, E. and M. Gelnar, 2006. Three new species of Dactylogyrus Diesing, 1850 (Monogenea: Dactylogyridae) from the gills of the bala sharkminnow *Balantiocheilos melanopterus* (Cyprinidae) from Thailand. Syst. Parasitol., 64: 215-223.

Lim, L.H.S. and J.I. Furtado, 1984. Nine new Dactylogyrids from three species of *Osteochilus gunther* (Cyprinidae) in Peninsular Malaysia. Folia Parasitol., 31: 291-301.

Lim, L.H.S. and J.I. Furtado, 1986. Sixteen new species of dactylogyrus from the genus puntius hamilton (Cyprinidae). Folia Parasitol. (APRAHA), 33: 21-34.

Lim, L.H.S., 1987. Distribution and diversity of monogeneans freshwater fishes of peninsular Malaysia. Ph.D. Thesis, Universiti Malaya, Kuala Lumpur, Malaysia.