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

B.M. Modu, M.F. Saiful, Zaleha Kassim, Marina Hassan and F.M. Shaharom-Harrison

Institute of Tropical Aquaculture (AKUATROP), Universiti Malaysia Terengganu (UMT), 21030 Kuala Terengganu, Malaysia

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 terengganus 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 terengganus 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 (5º18’78.183”N 102º44’96.42”E) and Tanjung Mentong (4º18’48.31.40”N 102º45’46.010”E). All fish were 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.
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 (4º1'48.31.40"N 102º45'46.010"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 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 fociatus* and *D. osteochili* (Lim and Furtado, 1984) from *Osteochilus hasseltii* in Malaysia and *D. macrocolpius* (Rehulková 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 comparatively 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 (Rehulková and Gelnar, 2006). Finally, it seems gill monogeneans parasitizing fish family Cyprinidae in Southeast Asia have some similarities morphologically.

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