A MONOGENIC TREMATODE (DACTYLOGYRUS SP.) ASSOCIATED WITH HYBRID TILAPIA (OREOCHROMIS NILOTICUS X O. AUREUS) MORTALITY

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INTRODUCTION

Tilapias are among the most important commercial freshwater fish species in the tropics. It has become the main species cultured in Saudi Arabia (Siddiqui and Al-Harbi, 1995a). A sizeable population of exotic tilapia fish has been established in the water channels of Wadi Hanifah stream. Being a prolific breeder, tilapia is found in large numbers in the lakes, where flow of water is moderate (Siddiqui and Al-Harbi, 1995b). Parasitism is one of the most serious problems for cultured fish (Scholz, 1999). Several species of monogenea have been implicated in the mortality of cultured fish (Thoney and Hargis, 1991). Dactylogyrus Diesing, 1851 is the largest genus of parasitic helminths, with 971 species, approximately 95% of which are parasites of the gills of fish in the Cyprinidae (Gibson et al., 1996). These parasites are commonly found on cyprinid fish throughout Asia, Europe and North America (Beverley-Burton, 1984). During a routine monitoring programme of Wadi Hanifah stream, in Saudi Arabia, some of the hybrid tilapia (Oreochromis niloticus x O. aureus) was found dead in the stream water. The present paper describes the occurrence of monogenean trematode (Dactylogyrus sp.) on the gills of wild hybrid tilapia for the first time in Saudi Arabia.

MATERIALS AND METHODS

Study Area
Wadi Hanifah stream is located in the Arriyadh region of Saudi Arabia and flows from north of Badiah to South-east of Al-Hair city covering a distance of about 50 km (Fig. 1). The main source of stream water is sewage effluent, agriculture runoff and pumped shallow ground water from Arriyadh city. Along with establishment of a permanent flow of water a luxuriant flora has developed in the main channel and on the banks of the stream. Some wetlands with extensive growth of reed plants, Typha domingensis, have also developed along the course of the stream.

Physicochemical parameters
Water samples for physicochemical parameters were taken from several representative areas. Water temperature, dissolved oxygen (DO), pH, and total dissolved solids (TDS) were determined at the site of sample collection by a universal pocket meter multiline P4 (WTW, Weilheim, Germany). For other water quality parameters, samples were transported to the laboratory in an ice-box and were analyzed immediately using a HACH DR/4000 analysis unit (HACH Co., Loveland, Colorado).

Sampling and processing
A total of 40 live hybrid tilapia (Oreochromis niloticus x O. aureus) weighing 20-50 g were examined during the study. Out of these, 15 moribund fish were collected from the lake stations and 25 apparently healthy fish were collected from all the 15 stations of Wadi Hanifah stream. Besides, 20 specimens belonging to each of guppy (Poecilia reticulate) molly (P. latipinna), platy (Xiphophorus maculates) and Pteroplichthys sp. were caught.
with scoop and hand nets. Fish were transported live in plastic bag containing stream water to the Natural Resources and Environment Research Institute laboratory, King Abdulaziz City for Science and Technology. Upon arrival, the fish were killed by pithing the brain with a sharp probe and were subjected to a bacteriological and parasitological examination. For bacterial isolation, samples were taken from the kidney, spleen and liver and were inoculated onto plates of brain heart infusion agar (BHIA; Oxoid, Basingstoke, England) and tryptene soya agar (TSA: Oxoid) with incubation at 30°C for 48-72hr. Fish were initially examined for the presence of any parasites or lesions visible to the naked eye. Next, wet mounts of scrapings of body surfaces, fins, gills and intestines from freshly killed fish were examined for presence of any parasites under a stereomicroscope using incident light and a compound light microscope. Specimens were then preserved in 10% buffered formalin and 70% ethanol for storage prior to further identification.

RESULTS AND DISCUSSION

Water quality measurements of the Wadi Hanifah stream are given in Table 1. There was no significant difference in water quality parameters of samples from the two stations. The stream water is alkaline (pH: 7.3 - 7.5) and total alkalinity as CaCO₃ ranged from 136 to 140 mg/L. The water is well oxygenated (DO: 5.4 - 5.6) with low levels of ammonia, nitrite and BOD. Nitrite levels were comparable to that of a normal stream environment, but phosphate levels were high in areas of the stream receiving sewage effluent. Stream water is very hard (total hardness 780 mg/L) with large amounts of total dissolved solid, chloride, sodium, calcium, and magnesium (Table 1).

The present results of Water quality of the Wadi Hanifah stream is in agreement with a previous study (Siddiqui and Al-Harbi, 1995b; Al-Ogaily et al., 1999). On necropsy all of the fifteen moribund hybrid tilapia examined, were found to be heavily infected with a monogenean trematode (*Dactylogyrurus* sp.) (Fig. 2). No bacterial strains have been isolated from the healthy

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Station (14)</th>
<th>Station(15)</th>
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<tbody>
<tr>
<td>Water Temp. (ºC)</td>
<td>18.4</td>
<td>19.2</td>
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<tr>
<td>Dissolved Oxygen</td>
<td>5.4</td>
<td>5.6</td>
</tr>
<tr>
<td>pH</td>
<td>7.3</td>
<td>7.2</td>
</tr>
<tr>
<td>Alkalinity as Ca CO₃</td>
<td>140</td>
<td>136</td>
</tr>
<tr>
<td>Bicarbonates</td>
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<tr>
<td>Hardness</td>
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<tr>
<td>EC mmhos/cm</td>
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<tr>
<td>NO₃-N (ppm)</td>
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<tr>
<td>Magnesium</td>
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<tr>
<td>COD</td>
<td>48</td>
<td>32</td>
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</table>

Table 1: Water temperature and water quality parameters (mg/L) recorded at two sites of Wadi Hanifah stream

Figure 1: Map of Wadi Hanifah stream, showing the sampling area and station locations
and moribund hybrid tilapia, neither from other fish species. The mortality of tilapia was observed only at the end of the stream (station 14 and 15) where a number of shallow lakes (depth: 0.5-2.0 m) have been formed. The moribund fish were dark in color, weak, and had taken shelter in the marginal areas, and moved very slowly when disturbed. No exotic parasites were observed in guppy (Poecilia reticulate) molly (P. latipinna) platy (Xiphophorus maculates) and Pteroplichthys sp. The infected fish harbored only one parasite species (Dactylogyrus sp.) in both gills. Similar infection of gill by same monogenea trematode (Dactylogyrus sp.) have been reported from hybrid tilapia (Oreochromis niloticus x O. aureus) in Cameron (Nguenga, 1988). Monogenea are recognized as a serious threat to fish (Thoney and Hargis, 1991) because they have direct single – host life cycle and, given suitable conditions, can reproduce rapidly to reach epidemic proportions. Although metacercaria (Centrocestus formosanus) have been reported from tilapia (Oreochromis niloticus) from Wadi Hanifah stream (Kalantan et al., 1999), this is the first report of a monogenean trematode (Dactylogyrus sp.) on the gills of wild hybrid tilapia in Saudi Arabia. Generally, Dactylogyrus sp. is known to infest Cyprinidae (Beverley-Burton, 1984; Paperna, 1991; Gibson et al., 1996), it is significant that this parasite has been detected in hybrid tilapia (Oreochromis niloticus x O. aureus). The finding may stimulate further studies in health care of tilapia in culture.

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REFERENCES


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