JKAU: Mar. Sci., **Vol. 17,** pp: 79-87 (2006 A.D. / 1427 A.H.)

First Record in Yemen of Two Larval Trypanorhynch Cestodes in Commercial Fish (*Lethrinus lentjan*) from the Red Sea

Ali B. Al-Zubaidy

Department of Marine Biology and Fisheries,
Faculty of Marine Science and Environment,
Hodeidah University, Yemen

Abstract. Helminth parasites of the marine fish (*Lethrinus lentjan*) is investigated. Out of 79 fishes dissected, 21 (26.6%) were found infected with larval trypanorhynch cestodes, 15 (19%) *Nybelinia bisulcata* larvae and 6 (7.6%) with larvae of unidentified species of the genus *Pseudogrillotia.* Since there is no previous report on these trypanorhynch cestodes from any fish host in Yemen, the present recording may well be considered the first in this country.

Introduction

All living organisms, including fish, can be infected with various parasites, because the parasites are a natural occurrence, not contamination. It is well known that marine fishes may play roles of intermediate or definitive host of a number of helminthic parasites (Shih *et al*., 2004)

Marine teleost fishes are important intermediate host for trypanorhynchs (Schmidt, 1986). Several larval trypanorhyches species have been reported and described from various marine fish hosts in various oceans. Dollfus (1969) described post larval stage of *Pseudogrillotia pleistacantha* in the musculature of the *Pogonias cromis* at the first time in Texas. From teleost and elasmobranch fishes Carvajal *et al.* (1976) recovered seven species of trypanorhynches from the pacific ocean of the Hawaiian Islands. Escalante and Carvajal (1984) investigated *Pseudogrillotia peruviana* from the mesentry of *Scomberomonas maculates* in the North coast of Peru. Campbell and Beveridge (1987) reported the adult worms tryphanorhynch *Floriceps minacanthus* for the first time from

the spiral valve of the sharks taken from coastal waters of Australia. In Brazil Saoclemente *et al.* (1991) and Saoclemente and Gomes (1992) recorded the adult worms trypanorhynch *Nybelinia bisulcata.* Richmond and Caira (1991) described the adult of *Floriceps minacanthus* from *carcharhinus melanopteus* in island of Kiribati. Campbell and Beveridge (1993) described adult *Grillotia amblyrhynches* and *Pseudogrillotia spani* collected from the spiral valves of Carcharhirid sharks in Australian waters at the first time, also reported trypanorhynch Cestodes (Family: Pseudogrillotiidae) from sharks and skates in the Mediterranean.

In Egypt, Abdou (2000, 2001 and 2005) investigated larval stage of trypanorhynch cestodes in the tissue of liver, gonads and muscles, from some Red Sea fish (*Tylosurus choran*, *Euthnnus afinis*, *Cephalopholis micri*, *Lethrinus mahsena* and *Carangoides bayad*).

In Saudi Arabia, Banaja *et al.* (1979) described larval stage of trypanorhynch cestode in *Plectropomus maculates* from the Red Sea, which was classified as *Floriceps saccatus* (Trypanorhynch: Dasyrhynchidae) by Banaja and Roshdy (1979). Some larval forms of apterobothriid trypanorhynch cestode in *Scomber japonicus* from the Red Sea were recorded and described for the first time (Banaja and Roshdy, 1981). Abu-Zinada (1998) recorded and briefly described two larval cestode species, *Grillotia* sp. from the intestine of *Plectropomus maculatus* and *Otobethrium* sp. from the mesentry of *Lethrinus mahsena* from the Red Sea. Toula (1999) described, for the first time, a plerocercus of Pseudogrillotid trypanorhynch cestode in four species of carangid fish (*Carangoides bayad; C. fulvoguttatus; Caranx sexfasciatus* and *C . melampygus*).

In Yemen, until now, there was no data reported on the helminth parasites of Red Sea fishes. Therefore, the present recording could be considered the first in this country.

Materials and Methods

A total of 79 fishes were collected from Red Sea coast of Hodeidah city, Yemen, during 2005. Fishes were brought to the laboratory and examined immediately for helminth parasites. Cyst of cestode larvae were found in the body cavity, muscles and mesentries of fishes, cysts, when present, were opened and the larvae kept for 24h in distilled water. Fixed in 10% formalin. Cestodes were stained with Delafields hematoxylin, dehydrated in graded ethanol series and mounted in Canada balsam. Drawings were made by camera lucida. Measurements are given in millimeters unless otherwise stated. The classification used here that of Dollfus (1969), Campbell and Beveridge (1993 and 1994) and Palm (1999).

Results and Discussion

This study documents the occurrence of the cestode larvae collected from fish (*Lethrinus lentjan*) from the Red Sea coast of Yemen, Hodeidah city. Two species of Trypanorhyncha are reported as follows :

Phylum : *Platyhelminthes* Gegenbaur, 1859
Class : Cestoda
Order : Trypanorhyncha Diesing, 1863
Family : Tentaculariidae Poche, 1926
Genus : *Nybelinia* Poche, 1926

Nybelinia Bisulcata (Linton, 1889)

Host : *Lethrinus lentjan* (Lacepede,1802). Length range (25-49cm).

Environment: Reef-associated, non-migratory, Marine;
Depth range: 20-90 meters. Fisheries: highly commercial.
Distribution: widespread from the Red Sea, Arabian Gulf and East Africa.
Feeds on: crustaceans and mollusks.
Site of infection: body cavity, mesentry and muscles.
Prevalence and intensity: 19% (15 fishes infected / 79 Fishes examined); 2-5/ host.
Localities: Red Sea, coast of Yemen, Hodeidah city (collecting data: during 2005).
Description: Based on 37 larvae examined; 6 measured (Fig. 1).
Scolex: 1.94 mm (1.00-2.86mm) long.
Bulbs: 0.57mm (0.29-0.83mm) Long and 0.16mm (0.07-0.26mm) wide.
Bothridia: 1.01mm (0.75-1.26mm) long.
Appendix: 0.50mm (0.30-0.69mm) long.
Hooks: 15µm (13-18µm) long.

Trypanorhyncha are taxonomically complex and considered the most confused group of tapeworms (Campbell and Beveridge, 1994). The adult of this species has a wide geographical distribution and it is a species inquerenda (Pereira and Boeger, 2005).

Comparing the characteristics described of the specimens studied, such as scolex, bothridialis, hooks with those of the families of Trypanorhycha, it is classified as *Nybelinia bisulcata* larvae. This is the first record of the genus *Nybelinia* from the Red Sea fishes in Yemen Republic.

Phylum: Platyhelminthes Gegenbaur, 1859
Class: Cestoda
Order: Trypanorhyncha Diesing, 1863

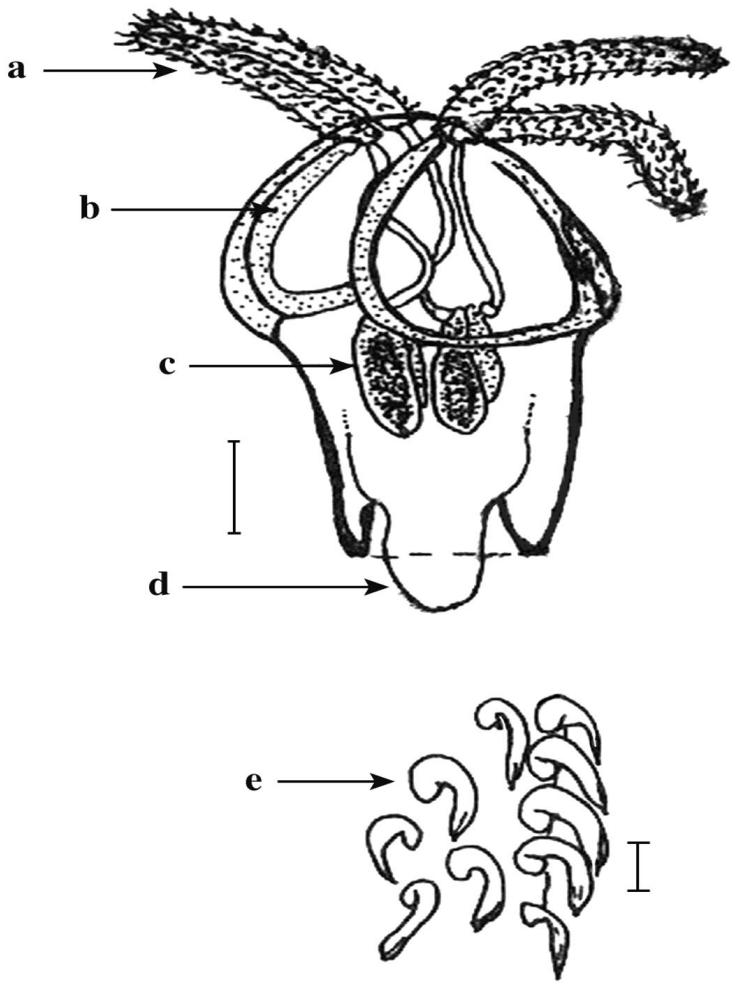

Fig. 1. Larva of *Nybelinia bisulcata* (Linton, 1889).
a- Proboscis, b- Bothridia, c- Bulb, d- Appendix, e- Hooks
scale bar = 0.5 mm

Family: Pseudogrillotiidae Dollfus, 1969
Genus: Pseudogrillotia Dollfus, 1969

***Pseudogrillotia* sp.**

Host: *Lethrinus lentjan* (Lacepede, 1802)
Site of infection: body cavity and mesentries
Prevalence & intensity: 7.6% (6 fishes infected / 79 fishes examined); 1-3/ host

Localities: Red Sea, coast of Yemen, Hodeidah city.
Description: Based on 12 larvae examined; 3 measured (Fig. 2).

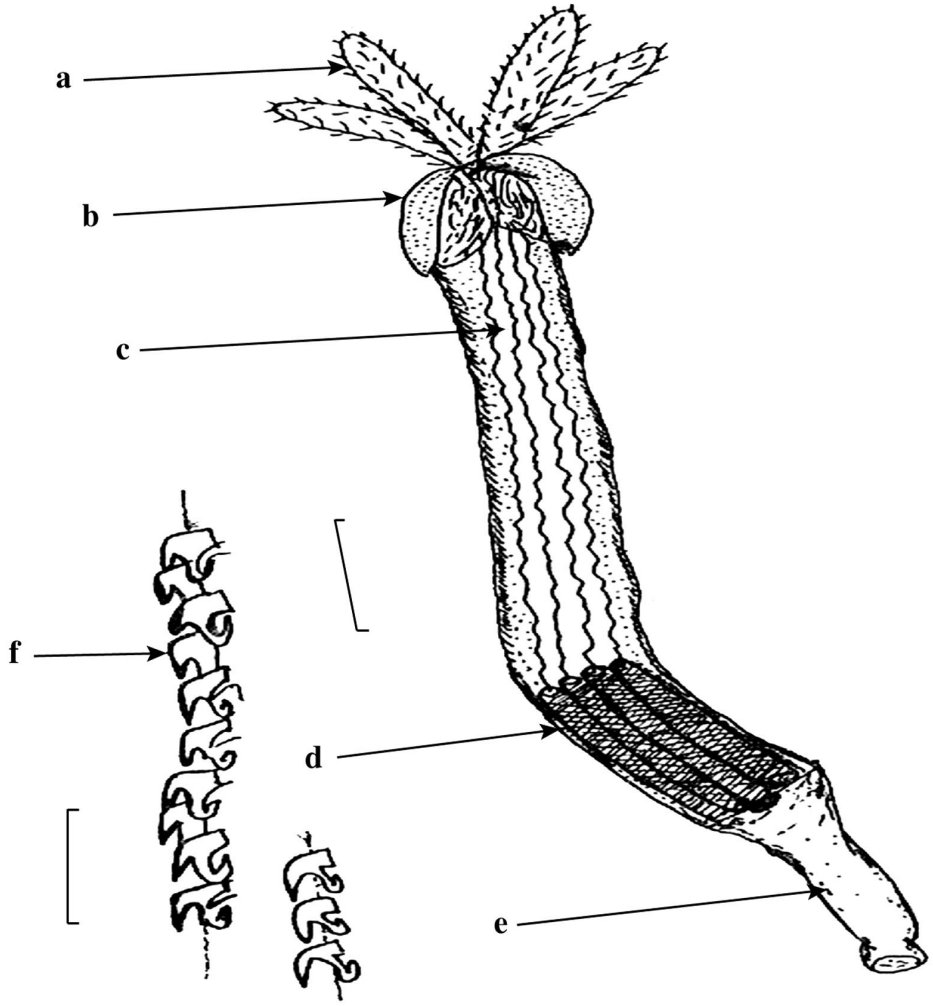

Fig. 2. *Pseudogrillotia* sp.
a- Proboscis, b- Bothridia, c- Proboscis sheath, d- Bulb,
e- Parts proliferans (Appendix), f- hooks
scale bar = 0.5 mm

Light microscopic examinations of the collected specimens reveal that larval scolex is divided into four regions: Pars bothridialis; pars vaginalis; Pars bulbosa and pars proliferens (appendix). Pars bothridialis is 610µm (530-700µm) long, which composed of two posteriorly notched bothridia, and two proboscides

infront of each bothriduim, located at the tip of scolex. Tentacle sheath is spirally coiled. Pars vaginalis is 6.5mm (4.5-7.5mm) long. Pars bulbosa is 2.5mm (2.0-3.2mm) long. Four bulbs are located in the pars bulbosa, each bulb is elongated and is 150µm (126-180µm)i n width. Pars proliferens is 2.2mm (1.1-3.2 mm) long.

Present observations on the parasite in the body cavity and mesentry of *Lethrinus lentjan* from the Red Sea, coast of Yemen, reveals previously unknown information on the trypanorhynchid plerocercus in the fish intermediate host. Comparing the general features of the present larvae with those of the families of Trypanorhyncha, its identity is of a pseudogrillotia species, a genus within family Pseudogrillotiidae Dollfus, 1969. The genus Pseudogrillotia contains four previously described species (*P. pleistacantha*, Dollfus, 1969; *P. basipunctata* Carvajal *et al.*, 1976; *P. peruviana* Escalante and Carvajal, 1984 and *P. spani* Campbell and Beveridge, 1993).

In 1999, Toula recorded larval cestodes from four species of carangid fish from Red Sea in Jeddah, which was identified as *Pseudogrillotia* sp. measurements of the material collected in the present study are about two times longer than those presented by Toula (1999).

In general, it is well known that most components of the worlds vertebrate and invertebrate fauna are parasitized and thus monitoring the helminth parasites of these hosts can contribute information to many aspects :

Parasites can provide a new dimension to our understanding of ecological interactions, patterns of distribution and the complex history of many geographic regions and biotas (Hoberg, 1997).

Parasites constitute biodiversity probes that can be directly applied to questions of contemporary diversity and the historical development of community structure (Brooks *et al.*, 1992).

Parasites can serve as indicators of both acute and chronic conditions, those resulting from either anthropogenic or natural events (Overstreet, 1997).

Fish parasites have been used for almost a century as biological indicators, markers or tags to provide information on various aspects of host biology (Williams, *et al*., 1992). Because fish may play roles as either intermediate or definitive hosts of helminth fluke, infections may cause fish diseases which can directly damage the host or can indirectly affect human health if raw or poorly cooked fish which contains cestod larvae is consumed (Shih *et al.*, 2004).

References

Abdou, El.N. (2000) Light and scanning electron microscopy of *Floriceps* sp. plerocercoid (Cestoda: Trypanorhyncha) from the Red Sea fish *Tylsums choram*, *Union Arab. Biol.*, **14** (A) Zool.: 37-47.

Abdou, El.N. (2001) A record of *Floriceps* sp. plerocercoid larvae (Trypanorhncha) from the Red Sea fish *Euthynnus afinis* with scanning electron microscopy, *J. Egypt. Ger. Soc. Zool.*, **35** (D): 29-38.

Abdou, El.N. (2005) Scanning electron microscopy of the plerocercoid *Floriceps minacanthus* (Cestoda: Trypanorhyncha) Parasitize the fish *Cephalopholis micri*, A new host record in the Red Sea, Egypt, *J. Egypt. Ger. Soc. Zool*., **47**(D), 133-145.

Abu-Zinada, N. (1998) Observations on two larval cestodes from Red Sea fishes at Jeddah Saudi Arabia, *Vet. Med. J. Gaza*, **46** (2): 193-197.

Banaja, A.A. and **Roshdy, M.A.** (1979) Scanning electron microscopy of the scolex of a trypanorhynch plerocercus in the fish, *Plectropomus maculates* (Bloch) (Cestoda: Trypanorhynch), *Bull. Fac. Sci., K.A.U., Jeddah*, **3:** 29-35.

Banaja, A.A. and **Roshdy, M.A.** (1981) Observations by light and scanning electron microscopy on larval stages and a pterobothriid trypanorhynch cestode in the mackerel fish, *Scomber japonicus* from Red Sea, *Bull. Fac. Sci., K.A.U., Jeddah*, **5:** 69.75.

Banaja, A.A., Roshdy, M.A., Ghandour, A.M. and **Farag, A.A.** (1979) Observations on larval stages of a trypanorhynch cestode in the fish, *Plectropomus maculates* (Bloch) from the Red Sea, *Bull. Fac. Sci., K.A.U*., **3:** 9-18.

Brooks, D.R., Mayden, B.L. and **Mclennan, D.A.** (1992) Phylogeny and biodiversity: Conserving our evolutionary legacy, *Trends Ecol. Evol*., **7:** 55-59.

Campbell, R.A. and **Beveridge, L.** (1987) *Floriceps minacanthus* sp. Nov.(Cestoda: Trypanorhyncha) from Australian fishes, *Soc. S. Aust*., **111** (4): 189-194.

Campbell, R.A. and **Beveridge, L.** (1993) New species of *Grillotia* and *Pseudogrillotia* (Cestoda: Trypanorhyncha) from Australian sharks, and definition of the family Grillotiidae Dollfus, 1969, *Transactions of the Royal Society of S. Aust*., **117** (1): 47-53.

Campbell, R.A. and **Beveridje, L.** (1994) Order the trypanorhyncha Diesing, 1863, In: L.F. Khalil, A. Jones and R.A. Bray, *Keys to the Cestode Parasites of Vertebrates*, Int. Inst. of Parasito1. 395a Hatfield Road, St. Albans Hertfordshire Al40xy, UK.51-149.

Carvajal, J.R., Campbell, R.A. and **Cornford, E.** (1976) Some trypanorhynch cestodes from Hawaiian fishes, with description of four new species, *J. Parasitol*., **62:** 70-77.

Dollfus, R.PH. (1969) Quelques especes do cestodes Tetarahynues de Ia cote at lantiqus des Etats Unis, don't, I'me n'etait pas connus al'etat adulte, *J. Fish Res Board. Can.*, **26:** 1037-1061.

Escalante, H. and **Carvajal, J.** (1984) Larval trypanorhynch cestodes from Peruvian teleost fishes with descriptions of two new species, *Studies on Neotropical Fauna and Environment*, **4:** (19) 185-194.

Hoberg, E.P. (1997) Phylogeny and historical reconstruction host-parasite systems as keystones in biogeography and ecology, In: M.L. Reaka-Kudla, D.E. Wilson and E.O. Wilson (Eds.) *Biodiversity*, *Vol. 11. Understanding and Protecting our Biological Resources*, Washington, DC: Joseph Henry Press, pp: 243-261.

Overstreet, R.M. (1997) Parasitological data as monitors of environmental health, *Parassitologia*, **39:** 169-175.

Palm, H.W. (1999) *Nybelinia* Poche (1926) Heteronybelinia gen. nov. and *Mixonybelinia* gen. nov. (Cestoda: Trypanorhyncha) in the collection of the natural history Museum, London, *Bulletin of Natural History Museum of London (Zool.)*, **65:** 133.

Pereira, J. and **Boeger, W.A. (**2005) Larval tapeworms (platyhelminthes, cestoda) from sciaenid fishes of the southern coast of Brazil, *Zoosytema*, **27** (1): 6-24.

Richmond, C. and **Caira, N.J.** (1991) Morphological investigations into *Floriceps minacanthus* (Trypanorhynch: Lacistorhynchynchidae) with analysis of the systematic utility of the scol-ex microtriehes, *Syst. Parasitol*., **19:** 25-32.

Saoclemente, S.C. and **Gomes, D.C.** (1992) Description of the adult form of *Nybelinia* (syngenes) *rougetcampanae* Dollfus, 1960 and some new data on *N.* (*N.*) *bisulcata* (Linton, 1889) (Trypanorhyncha: Tentaculariidae), *Memorias do Instituto Oswaldo Cruz*, **87:** 251-255.

Saoclemente, S.C., Gomes, D.C. and **Freire, N.M.S.** (1991) Prevalenciae intensidade de in fec cao de worms da ordem Trypanorhyncha em elasmobranquios no litoral do Sul do Brasil, *Parasitologia al Dia*., **15: 9**-14.

Schmidt, G.D. (1986) *Handbook of Tapeworm Identification*, CRC Press, Inc., 2000 Corporate Blvd, N.W., Boca Raton, Florida, 33431.

Shih, H.H., Weiliu and **Zhao, Z.Q.** (2004) Digenean fauna in marine fishes from Taiwanese waters with the description of a new species, *Lecithochirium tetraorchis* sp. nov., *Zoological Studies*, **43** (4): 671-676.

Toula, F.H. (1999) A larval cestode (Trypanorhyncha: Grillotiidae) encysted in carangid fish from the Red Sea in Jeddah, Saudi Arabia, *Bull. Nat. Inst. of Oceanogr and Fish., A.R.E*., **25:** 411-419.

Williams, H.H., Mackenzie, K. and **McCarthy, A.M.** (1992) Parasites as biological indicators of the population biology, migrations, diet and phylogenetics of fish, *Rev. Fish Biol. Fish*.**, 2:** 144-176 .

أول تسجيل في اليمن لنوعين من يرقات الديدان الشريطية في أسماك *ليثرينيس لنتجن* من ساحل البحر الأحمر

علي بناوي الزبيدي

قسم الأحياء البحرية ، كلية علوم البحار والبيئة ، جامعة الحديدة – اليمن

المستخلص. تم في هذه الدراسة فحص ٧٩ نموذجًا من أهم الأسماك العظمية الاستهلاكية هي *ليثرينيس لنتجن* والتي تعرف محليًا باسم (الجحش) المأخوذة من ساحل البحر الأحمر في محافظة الحديدة – اليمن، وذلك بحثًا عن الديدان الطفيلية. أظهرت نتائج الفحص تسجيل الإصابة بيرقات نوعين من الديدان الشريطية (متكيسة في التجويف الجسمي والأحشائي والعضلات) العائدة لرتبة تريبانورينكا وهما :

١- يرقات الدودة الشريطية *نيبلينيا بسيولكاتا* بنسبة إصابة ١٩٪ .

٢- يرقات الجنس *سيدوكريلوتيا* بنسبة إصابة ٦ , ٧٪ .

وكانت نسبة الإصابة الكلية ٦ , ٢٦٪ . تم إعطاء وصف مظهري لتلك اليرقات . ونظرًا لعدم وجود أي دراسة في هذا المجال على الأسماك البحرية في الساحل اليمني للبحر الأحمر، لذا يعد تسجيل هذه الديدان الأول من نوعه في اليمن ولأول مرّة.