

## Trematodes of the Genera *Helicometra* Odhner, 1902 (Opecoelidae) and *Apharyngogyliuchen* Yamaguti, 1942 (Gyliuchenidae) from the Red Sea Fishes

M. M. RAMADAN

(Received for publication; February 5, 1986)

**Key words:** *Helicometra* and *Apharyngogyliuchen*, trematodes from Red Sea fishes

### Introduction

The Red Sea, an important offshoot from the Indian Ocean, has a very and varied fish fauna (Al-Kholy, 1965). Relatively several trematodes have been reported from marine fishes of Red Sea (Nagaty, 1973). Few papers were published later, including Parukin (1970), Saoud, et al. (1977) and Ramadan (1983, 1984 and 1985). The following report is based on collections made by the author during March to August, 1984. The present study was taken to make the digenetic trematode fauna of this region better known.

### Materials and Methods

Fishes were collected at the Marine Biological Station of Al-Ghardaga, 340 km to the South of Suez on the Red Sea. The fishes were brought mostly alive and identified using three standard references by Smith (1953), Fowler (1956) and Al-Kholy (1972). The fishes were dissected and examined for helminth parasites in the usual way. The trematodes were fixed in AFA fixative under slight pressure of cover glass for 24 hours. After fixation, the parasites were removed, kept in AFA fixative for sometimes, washed in 70% ethanol to remove excess

of the fixative and finally preserved in 70% ethanol containing 5% glycerine. They were stained using Harris' alum haematoxylin, Mallory triple stains (Weesner, 1968) and Gower's carmine (Johri and Smyth, 1956), dehydrated in graded series of alcohols, cleared in clove oil and mounted in Canada balsam. The drawings were made with the aid of a Camera lucida. All measurements in the text are in millimetres, unless stated otherwise.

### Results and Discussion

1. Trematodes of the genus *Helicometra* Odhner, 1902  
*Helicometra epinepheli* Yamaguti, 1934 (Fig. 1)

Hosts: *Balistes aculeatus* and *Anampses caeruleopunctatus*.

Location: Intestine.

Localities: Red Sea.

Specimens: Deposited in the Helminthological Collection, Zoology Department, Faculty of Science, Ain Shams University, Nos. 348 from *Balistes aculeatus* and 349 from *Anampses caeruleopunctatus*.

During the present investigation nine specimens belonging to the genus *Helicometra* and subgenus *Helicometra* were collected from *Balistes aculeatus* (Balistidae) locally called "Hegman" and *Anampses caeruleopunctatus* (Labridae) locally called "Mallas". These

---

Department of Biology, Faculty of Education, Ain Shams University, Heliopolis, Cairo, Egypt.

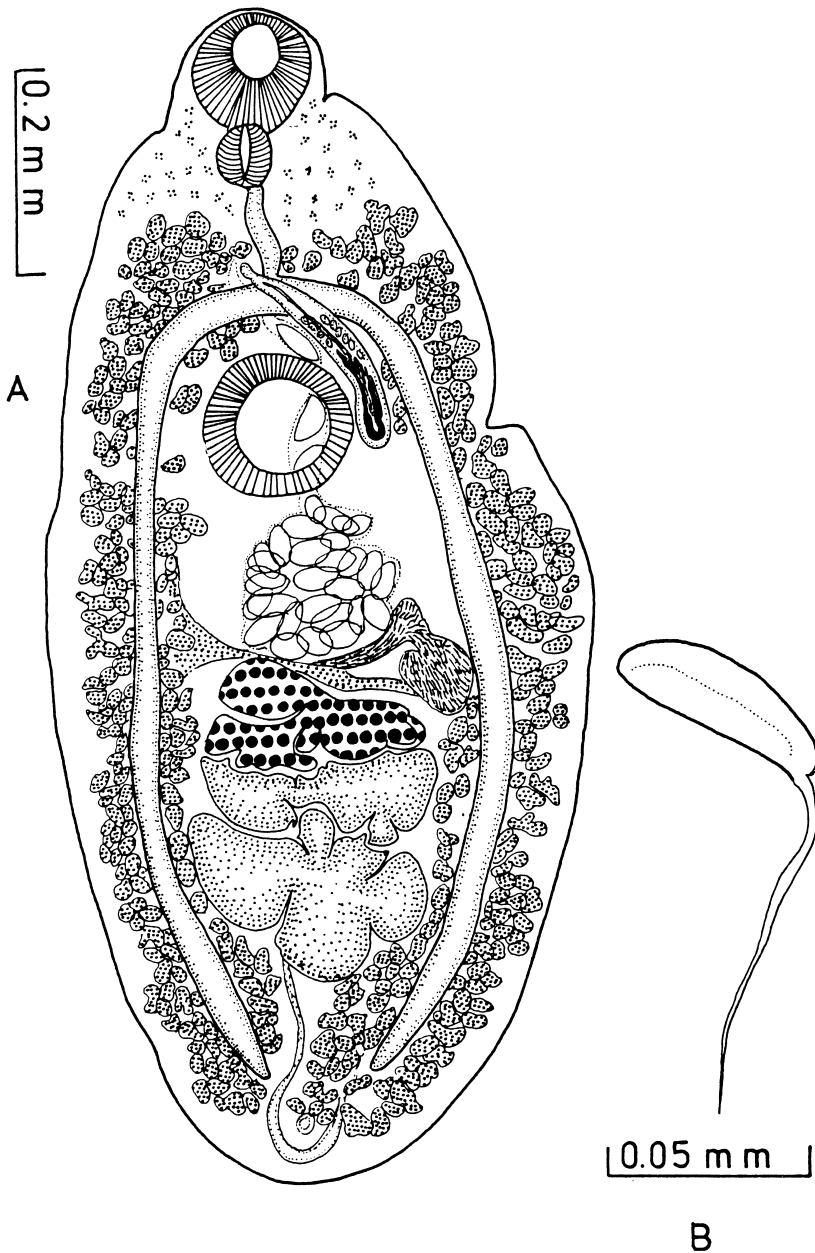


Fig. 1 *Helicometra epinepheli* Yamaguti, 1934.

A - Ventral view

B - Egg

specimens has been identified as *H. epinepheli* Yamaguti, 1934 and is described herein as new hosts, locality record and certain morphological variations.

Body flat with slight folded margins, 0.79–

1.84 long, 0.44–0.67 wide. Tegument smooth. Preoral lip and cervical glands present. Body length/body width ratio 1.80–2.75:1. Oral sucker subterminal, 0.12–0.14 in diameter. Prepharynx very short or absent. Pharynx

0.08–0.09 × 0.06–0.13. Oesophagus 0.03–0.10 long. Acetabulum 0.18–0.35 in diameter, 0.23–0.48 from the anterior extremity of the body. Oral sucker to acetabulum ratio 1:1.49–1.64. Testes median, closely tandem, at about middle of postacetabular region, irregularly lobed, anterior testis 0.09–0.26 × 0.19–0.34, posterior testis 0.05–0.12 × 0.07–0.17. Cirrus pouch extending posteriorly to half length of acetabulum, 0.15–0.26 × 0.06–0.07. Genital pore median in front of caecal bifurcation, 35–41 μm in diameter. Ovary deeply lobed, anterior to anterior testis, 0.07–0.16 × 0.18–0.32. Receptaculum seminis anterolateral to ovary, 0.05–0.08 × 0.04–0.07. Vitellaria lateral, beginning at level of genital pore or a little in front, extending more or less inwards across caeca. Eggs oval, 44–48 × 23–28 μm, with long polar filament. Excretory vesicle tubular, bifurcating at level of ovary.

The present material is similar in the main characteristics to Yamaguti's description but showed certain minor differences in the extension of the cirrus pouch, position of ovary and receptaculum seminis and relatively small eggs. This is the first record in the Red Sea and it is recorded from a new hosts.

Odhner (1902) established the genus *Helicometra* for the distomes having filamented eggs, acetabulum in anterior half of body, testes two, tandem or oblique, ovary pre-testicular, genital pore median and near to intestinal bifurcation and vitellaria extending in lateral fields of the body. He designated *H. pulchella* (Rud, 1819) as type species of the genus. Manter (1933) created the genus *Stenopera* for a species *S. equilata* on the basis of unipolar filamented eggs, testes tandem, postequatorial, slightly lobed, genital pore median or submedian and prebifurcal and vitellaria confined to lateral fields of hindbody.

However, Siddiqi and Cable (1960) considered these differences only specific and synonymized *Stenopera* Manter, 1933 with *Helicometra*. Fischthal and Kuntz (1965) concur this synonymy and transferred *S.*

*pteroisi* Gupta, 1956 and *S. rectisaccus* Fischthal and Kuntz, 1964 to *Helicometra*.

Skrjabin (1964) proposed a key for 15 species of the genus *Helicometra*. He depend on the vitellaria extension, oral sucker to acetabulum ratio, egg measurements, genital pore position and testes shape for their differentiation.

Pritchard (1966) transferred *Helicometra boseli* Nagaty, 1956, and *H. nasae* Nagaty and Aal, 1962 from Red Sea to the genus *Stenopera* Manter, 1933 on the basis of short forebody and cirrus sac extending posterior to acetabulum. Although *H. boseli* and *H. nasae* have the same characters, Yamaguti (1971) considered only the validity of *H. nasae* in members of genus *Helicometra* and retained *Stenopera* as a valid genus.

Sekerak and Arai (1974) again synonymized *Stenopera* with *Helicometra* and considered the synonym of *H. boseli* Nagaty, 1956 with *Stenopera equilata* Manter, 1933 and *Stenopera rectisaccus* Fischthal and Kuntz, 1964 with *H. nasae* Nagaty and Aal, 1962. However, the present author accept Yamaguti's view to consider *Stenopera* as a valid genus and it is suggest to retain *H. boseli* and *H. nasae* in genus *Helicometra*.

*Helicometra hypodytis* Yamaguti, 1934 in *Hypodytis rubipinnis* from Japan. Also reported in *Serranus sp.* from Red Sea (Nagaty, 1956). Although Manter (1954) seems inclined to believe that this species as well as *H. epinepheli* is identical with *H. fasciata*. However, Yamaguti (1971) showed that the Laurer's canal forms a very peculiar convolution in *H. hypodytis*, but nothing like that in *H. epinepheli*.

Bray (1979) differentiated the most related genus *Neohelicometra* Siddiqi and Cable, 1960 (characterized also by having eggs with unipolar filament) from *Helicometra* by the funnel-shaped oral sucker and possession of 2 ani.

The genus *Helicometra* was classified under the family Allocreadidae (Looss, 1902) Stossich, 1903. However, Yamaguti (1971) arranged the trematode families on the basis of life history

information of the digenetic trematodes. Accordingly, the genus *Helicometra* has been placed under the family Opecoelidae Ozaki, 1925. Moreover, he divided the genus into two subgenera viz: subgenus *Helicometra* Odhner, 1902 and subgenus *Metahelicometra* Yamaguti, 1971 on the basis of vitellaria extension and the presence of preacetabular pit.

In Table 1, a comparison between *Helicometra boseli* Nagaty, 1956 and *H. nasae* Nagaty and Aal, 1962, is given. It is evident that there are minor difference in position of genital pore

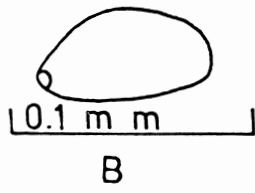
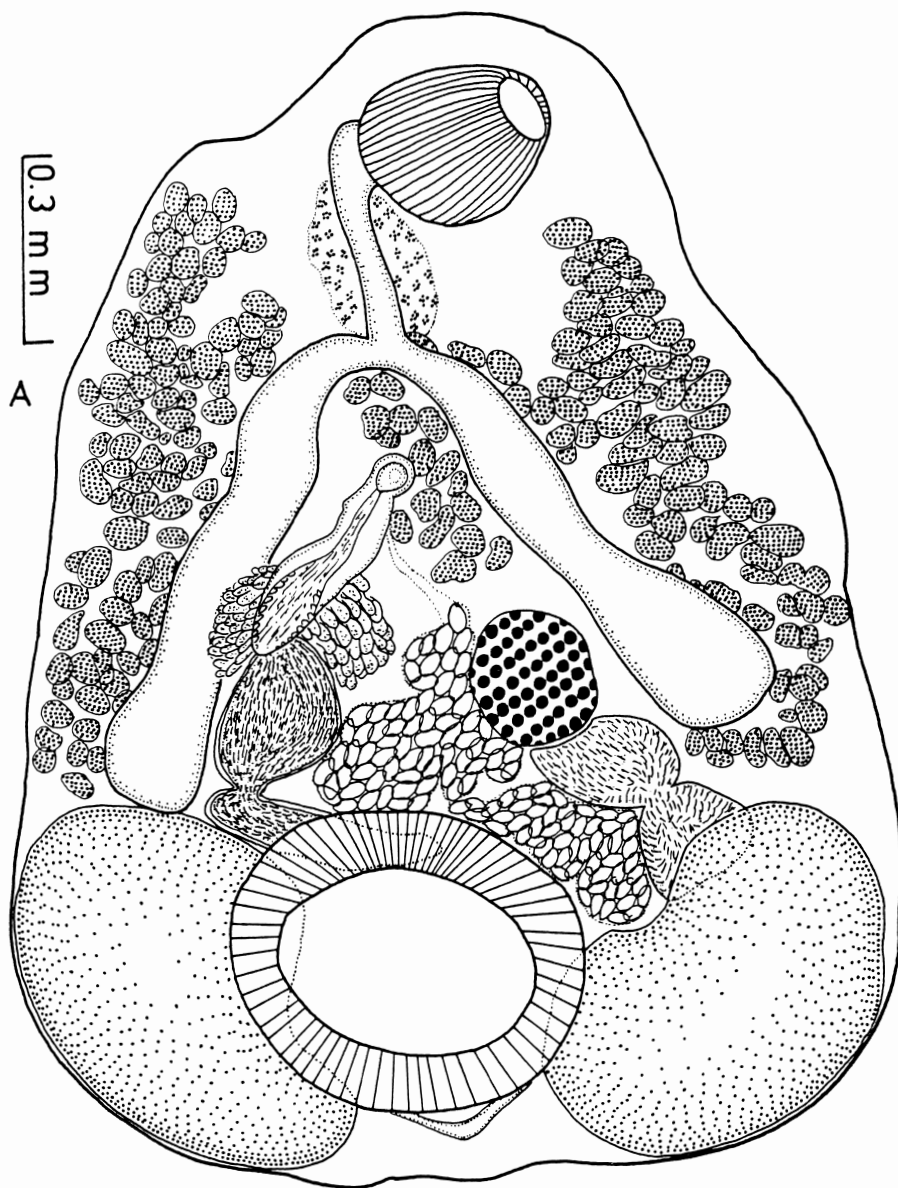
and extension of vitellaria. These characters were found to be quite common within the range of the same species. Thus its suggested that *H. nasae* should be considered as a synonym of *H. boseli*.

The following key is suggested to differentiated the species of the genus *Helicometra* in Red Sea fishes.

- 1 – Vitellaria extending anteriorly to level of acetabulum . . . . . *H. boseli* Nagaty, 1956
- Vitellaria extending anteriorly to level of intestinal bifurcation . . . . . 2

Table 1 A comparison between *H. boseli* Nagaty, 1956 and *H. nasae* Nagaty and Aal, 1962

Characters	<i>H. boseli</i>	<i>H. nasae</i>
Body shape	Elongate, narrow anteriorly.	Elongate, flate.
Length	2.7–4.09.	3.15–6.30.
Width	0.39–0.99.	0.48–0.50.
Length/width	6.92:1.	6.56:1.
Tegument	–	Smooth.
Oral sucker	0.19–0.22.	0.18–0.24 × 0.20–0.30.
Ventral sucker	0.23–0.36.	0.21–0.35 × 0.23–0.35.
Oral sucker/acetabulum	1:1.20.	1:1.11.
Pharynx	Well developed.	0.08–0.11 × 0.09–0.14.
Oesophagus	Of median length.	0.11–0.23 long.
Intestinal caeca	Reaching to posterior end.	Reaching to posterior end.
Testes	In posterior half of body length, tandem or oblique, irregular lobed, measurements not given.	In posterior half of body length, usually tandem, irregular lobed, anterior testis 0.23–0.57 × 0.24–0.50, posterior testis 0.38–0.65 × 0.26–0.48.
Cirrus pouch	0.51–1.02, extending well posterior to acetabulum.	Elongate, extending back of acetabulum.
Genital pore	Median, anterior to acetabulum.	Median, at level of oesophagus or intestinal bifurcation.
Ovary	4 lobed, anterior to testes.	4 lobed, pretesticular, 0.08–0.30.
Receptaculum seminis	Anterior to ovary.	Pre-ovarian, 0.11–0.15 × 0.06–0.08.
Vitellaria	Extending from anterior edge of acetabulum to the body end.	Extending from posterior edge of acetabulum to the body end.
Eggs	50 × 35 μm, filament 4–5 times as egg-long.	50 × 30 μm, with long filament.
Hosts	<i>Holocentrus samara</i> .	<i>Nasa sp.</i> , <i>Epinephelus fasciatus</i> .
Locality	Red Sea.	Red Sea.



- 2 – Testes oblique and genital opening posterior to intestinal bifurcation . . . . .  
 . . . *H. marmoratae* Nagaty and Aal, 1962
- Testes tandem and genital opening anterior to intestinal bifurcation . . . . . 3
- 3 – Testes deeply lobed and vitellaria not reach anteriorly to level of pharynx . . . . .  
 . . . . . *H. epinepheli* Yamaguti, 1934
- Testes slightly emerginate and vitellaria

Fig. 2 *Apahryngogyliauchen callyodontis* Yamaguti, 1942.  
 A – Ventral view  
 B – Egg

reach anteriorly to level of pharynx . . . . .  
 . . . . . *H. hypodytis* Yamaguti, 1934

2. Trematodes of the genus *Apharyngogyli-  
 auchen*, Yamaguti, 1942

*Apharyngogyli-  
 auchen callyodontis* Yama-  
 guti, 1942 (Fig. 2)

Hosts: *Pseudoscarus harid* and *Anampses  
 caeruleopunctatus*.

Location: Intestine.

Locality: Red Sea.

Specimens: Deposited in the Helminthological  
 Collection, Zoology Department, Faculty  
 of Science, Ain Shams University, Nos. 350  
 from *Pseudoscarus harid* and 351 from  
*Anampses caeruleopunctatus*.

During the present investigation ten speci-  
 mens belonging to the genus *Apharyngogyli-  
 auchen* were collected from *Pseudoscarus harid*  
 (Scaridae) locally called "Harid" and *Anampses  
 caeruleopunctatus* (Labridae) locally called  
 "Mallas". These specimens has been identified  
 as *A. callyodontis* Yamaguti, 1942 and is re-  
 ported herein as a new host and certain mor-  
 phological variations.

Body pyriform, tapering anteriorly, rounded  
 or flattened posteriorly and measures 3.07–  
 3.71 long and 1.58–2.05 in maximum width,  
 tegument smooth. Body length to body width  
 varies from 1.81–1.94:1. Acetabulum fairly  
 round, subterminal at posterior end and mea-  
 sures 0.66–0.82 × 0.65–0.90. Oral sucker,  
 subterminal, ovoid and measures 0.32–0.38 ×  
 0.29–0.35. The oral sucker to ventral sucker  
 ratio varies from 1:2.08–2.17. Pharynx absent.  
 Oesophagus relatively long, measures 0.35–  
 0.55 in length and with a thick coat of accom-  
 panying cells. Intestinal caeca wide and short,  
 extending through approximately middle third  
 of body and just reaching or slightly overlap-  
 ping anterior border of testes and measures  
 1.18–1.78 × 0.24–0.41. Testes 2, ovoid  
 smooth, situated one on each side at posterior  
 end, dorsal to acetabulum. The right testis  
 measures 0.89–1.09 × 0.54–0.68 and the left  
 testis measures 0.78–1.13 × 0.56–0.83. Vesic-  
 ula seminalis entirely outside cirrus pouch,

divided into two unequal portions by a con-  
 striction, proximal portion subcylindrical and  
 measures 0.10–0.14 × 0.54–0.65 and the an-  
 terior portion elongate oval and measures  
 0.31–0.40 × 0.17–0.18. Pars prostatica ovoid  
 or elliptical, 0.24–0.35 × 0.10–0.11, partly  
 outside of cirrus pouch, and surrounded by a  
 large rounded prostate cells. Cirrus pouch  
 pyriform, 0.44–0.57 × 0.17–0.19 and contain-  
 ing anteriorly well developed cirrus of 0.20–  
 0.23 long. The genital pore fairly round, equa-  
 torial, median and lined with genital atrium  
 which measures 0.13–0.15 in diameter. Ovary  
 subglobular, situated anterior to acetabulum  
 and toward the left side at level of caecal ends,  
 and measures 0.35–0.42 × 0.33–0.35. Recep-  
 taculum seminis constricted into two equal  
 portions, lies posterior to ovary, between ovary  
 and left testis and measures 0.41–0.62 × 0.23–  
 0.25. Vitellaria of irregularly shaped follicles  
 of medium size, lateral, between levels of oral  
 sucker and testes and may or not confluent  
 medianly in anterior third of body. Uterus  
 short, with a few intercaecal convolutions an-  
 terior to acetabulum, metraterm dorsolateral  
 to cirrus pouch, opening into genital atrium  
 immediately dorsal to cirrus. Eggs fairly large,  
 oval in shape, with small operculum at one  
 end and measures 76–78 μm × 41–46 μm.  
 Excretory vesicle elongate, saccular, reaching  
 to middle of acetabulum and the excretory  
 pore dorsal to posterior part of acetabulum.

Yamaguti (1942) established the genus  
*Apharyngogyli-  
 auchen* with *A. callyodontis*  
 from *Callyodon* sp. from Japan as type species  
 of the genus (the only species till now). He  
 distinguished the genus from the most closely  
 related genera Viz: *Gyiliauchen* Nicoll, 1915  
 and *Paragyli-  
 auchen* Yamaguti, 1934, by the  
 absence of the pharynx and the intermediate  
 position of the reproductive organs to these  
 two genera.

Nagaty (1956) reported *A. callyodontis*  
 from *Pseudoscarus harid* in Al-Ghardaga, Red  
 Sea on account of additional notes made of  
 its morphology. Although the present material

differs from descriptions of Yamaguti (1942) and Nagaty (1956) in certain morphological differences summarized as follows:

- 1 – The present material included specimens with variations in the topography of the ovary in relation to testes and acetabulum, a character which may occur within the range of the same species (Saoud et al., 1977).
- 2 – The receptaculum seminis is constricted into two equal portions.
- 3 – The posterior position of testes in relation to the acetabulum.
- 4 – Minor variations in measurements of body organs. However, these differences are considered to be of minor importance.

The present description of this species represents the first record from a new host *Anampses caeruleopunctatus* from Red Sea.

### Summary

*Helicometra epinepheli* Yamaguti, 1934 is reported from Red Sea fish, *Balistes aculeatus* and *Anampses caeruleopunctatus* as new host and locality record. *Apharyngogyliauchen calyodontis* Yamaguti, 1942 is also reported from Red Sea fish, *Pseudoscarus harid* and *Anampses caeruleopunctatus* as new host record. The genera *Helicometra* Odhner, 1902 and *Apharyngogyliauchen* Yamaguti, 1942 are briefly reviewed. *H. nasae* Nagaty and Aal, 1962 considered to be a synonym of *H. boseli* Nagaty, 1956.

### Acknowledgements

The author would like to express his deep gratitude to Professor A. F. A. Latif, Vice-President of the Egyptian Academy for Scientific Research and Technology for his unlimited support in the provision of different facilities at the Institute of Oceanography, Al-Ghardaga and for his interest in the work. Thanks are also due to Professor A. R. Bayoumi, Director of the Institute of Oceanography for his kind help and advice on the identification of certain fish species.

### References

- 1) Al-Kholy, A. A. (1965): Fisheries on the Red Sea. Aquatic Resources Organization, Egypt (in Arabic).
- 2) Al-Kholy, A. A. (1972): Aquatic resources of the Arab countries, Science Monograph Series (in Arabic).
- 3) Bray, R. A. (1979): Digenea in marine fishes from the eastern Seaboard of Canada. J. Nat. Hist., 13, 399–431.
- 4) Fischthal, J. H. and Kuntz, R. E. (1965): Digenetic trematodes of fishes from North Borneo (Malaysia). Proc. Helm. Soc. Wash., 32, 63–71.
- 5) Fowler, H. W. (1956): Fishes of the Red Sea and Southern Arabia. Branchiostomida to Polynemida I.
- 6) Johri, L. N. and Smyth, J. D. (1956): A histochemical approach of the study of helminth morphology. Parasitology, 46, 107–116.
- 7) Manter, H. W. (1933): The genus *Helicometra* and related trematodes from Tortugas, Florida. Pap. Tortugas Lab., 28(11), 167–182.
- 8) Manter, H. W. (1954): Some digenetic trematodes from fishes of New Zealand. Trans. Roy. Soc. N.Z., 82, 475–568.
- 9) Nagaty, H. F. (1956): Trematodes of fishes from the Red Sea. Part 7. On two gyliauchenid and three Allocreads, including four new species. J. Parasit., 42, 523–527.
- 10) Nagaty, H. F. (1973): Trematodes of fishes from the Red Sea. Parts 1 to 20. A recapitulation. Bull. Zool. Soc. Egypt, 25, 1–13.
- 11) Nagaty, H. F. and Aal, T. M. (1962): Trematodes of fishes from the Red Sea. Part 17. On three allocreadiid sp. and one schistorchiid sp. J. Arab Veter. Med. Ass., 22, 307–314.
- 12) Odhner, T. (1902): Mitteilung zur kenntnis der Distomen. Centralbl. Bakt. 1, 31, 58–68.
- 13) Parukhin, A. M. (1970): Study of the trematode fauna of fish in the Red Sea and Gulf of Aden. Biologiya Marya, Kiev, 20, 187–213.
- 14) Pritchard, M. H. (1966): Studies on digenetic trematodes of Hawaiian fishes: Family Opecoelidae Ozaki, 1925. Zool. Jb. Syst. Bd., 93, 173–202.
- 15) Ramadan, M. M. (1983): A review of the trematode genus *Hamacreadium* Linton, 1910 (Opecoelidae), with descriptions of two new species from the Red Sea fishes. Jap. J. Parasit., 32, 531–539.
- 16) Ramadan, M. M. (1984): *Monostephanostomum Yamagutii* sp. nov. (Trematoda: Acanthocolpidae) – Intestinal parasite of a Lethrinid fish from the Red Sea. Z. Parasitenk., 70, 183–187.
- 17) Ramadan, M. M. (1985): The genus *Proctotrema* Odhner, 1911 (Monorchiiidae), with description of *Proctotrema odhneri* sp. n. from Red Sea fishes. J. Egypt Soc. Parasit., 15, 293–298.
- 18) Saoud, M. F. A., Abu Sinna, H. and Ramadan,

- M. M. (1977): On *Hamacreadium caranxi* n. sp. (Trematoda: Allocreadidae); an intestinal parasite of a perciform fish from the Red Sea. J. Egypt Soc. Parasit., 7, 181-186.
- 19) Sekerak, A. D. and Arai, H. P. (1974): A revision of *Helicometra* Odhner, 1902 and related genera (Trematoda: Opcoelidae), including a description of *Neohelicometra sebastis* n. sp. Canad. J. Zool., 52, 707-738.
- 20) Siddiqu, A. H. and Cable, R. M. (1960): Digenetic trematodes of marine fishes of Puerto Rico. N.Y. Acad. Sci., Sci. Surv. Puerto Rico and Virgin Islands, 17, 257-369.
- 21) Skrjabin, K. I. (1964): Keys to the trematodes of animals and man. University of Illinois Press, Urban, U.S.A., 351 pp.
- 22) Smith, J. L. B. (1953): The Sea fishes of Southern Africa. General News Agency, Ltd., South Africa.
- 23) Weesner, F. M. (1968): General zoological micro-techniques. Scientific Book Agency, Calcutta.
- 24) Yamaguti, S. (1934): Studies on the helminth fauna of Japan. Part 2 Trematodes of fishes, I. Jap. J. Zool., 5, 249-541.
- 25) Yamaguti, S. (1940): Studies on the helminth fauna of Japan. Part 31 Trematodes of fishes, VII. Jap. J. Zool., 9(1), 35-108.
- 26) Yamaguti, S. (1942): Studies on the helminth fauna of Japan. Part 39 Trematodes of fishes mainly from Naha. Trans. Biogeogr. Soc. Jap., 3, 329-398.
- 27) Yamaguti, S. (1953): Parasitic worms mainly from Celebes 3. Digenetic trematodes of fishes, II. Acta Med. Okayama, 8(3), 257-295.
- 28) Yamaguti, S. (1958): Studies on the helminth fauna of Japan. Part 52 Trematodes of fishes, XI. Public Seto Marine Biol. Lab., 6(3), 369-384.
- 29) Yamaguti, S. (1971): Synopsis of digenetic trematodes of vertebrates, Vol. I. Keigaku Publishing Co., Tokyo, 1074 pp.

紅海産魚類の吸虫 *Helicometra eqinepheli* Yamaguti, 1942 (Opcoelidae) と  
*Apharyngogyliauchen callyodontis* Yamaguti, 1942 (Gyliauchenidae)  
 について

M.M.RAMADAN

(Department of Biology, Ain Shams University, Cairo, Egypt)

紅海産魚類を調査して *Helicometra epinepheli* Yamaguti, 1934 を *Balistes aculeatus* 及び *Anampses caeruleopunctatus* の腸から得て記載した (新宿主, 新地域報告).

*Apharyngogyliauchen callyodontis* Yamaguti, 1942 を *Pseudoscarus harid* 及び *Anampses caeruleopunctatus* の腸から得て記載した (新宿主報告).

*Helicometra* Odhner, 1902 及び *Apharyngogyliauchen* Yamaguti, 1942 の 2 属の検討を行った.

*H. nasae* Nagaty et Aal, 1962 は *H. boseli* Nagaty, 1956 の Synonym とした.

紅海から知られている *H.* 属の種への検索を示した.