The specimen was thus slightly smaller than the one reported by Prater (1941) from Bombay. It was bluish grey on the back and white below. Along the flanks there were three longitudinal ridges almost equidistant from each other. The spots were serially placed in vertical bands alternating with narrow bands of grey colour. On the head the spots were more pronounced and formed a kind of mosaic (Plate I). The specimen was a female with immature ovary. The liver weighed 57.62 kg. The stomach and intestine contained some greenish mucous substance which could not be identified specifically as it was in an advanced stage of digestion. It appeared that plant matter formed the major part of it as also has been noted by McCann (1954) for two specimens.

Survey and Research Division,
Directorate of Fisheries,
Gujarat State, Ahmedabad.

U. K. GOPALAN*

REFERENCES

CHACKO, P. I. AND M. J. MATHEW. 1954. *J. Bombay nat. Hist. Soc.*, **52** ; 623-24.

KAIKINI, A. S., V. RAMAMOHANA RAO AND M. H. DHULKHED. 1959. *J. Mar. biol. Assn. India*, **1** (1) : 92-93.

KULKARNI, C. V. 1948. *J. Bombay nat. Hist. Soc.*, **47** : 762-63.

MCCANN, C. 1954. *Ibid*, **52** : 326-33.

PRATER, S. H. 1941. *Ibid.*, **42** : 255-79.

NEW RECORDS OF THE GIANT TREMATODES OF THE GENUS *HIRUDINELLA* GARCIN FROM INDIAN WATERS

In the course of the examination of the stomach contents of certain Scombroid fishes *Katsuwonus pelamis* (Linnaeus), *Neothunnus macropterus* (Temminck & Schlegel), *Euthynnus affinis affinis* (Cantor) and *Acanthocybium solandri* (Cuvier & Valenciennes) from Minicoy and Tuticorin, I was able to collect several specimens of the so-called giant trematodes belonging to the genus *Hirudinella* (Digenea-Family Hemiuridae). These have not hitherto been definitely recorded from Indian waters, though Rao (1960) mentions about the parasites resembling *Distomum* sp. from the stomachs of *Acanthocybium solandri* from Vizhingam.

These are large, muscular and cylindrical or globular worms with the body strongly marked with transverse folds. The mouth and oral sucker are subterminal. The acetabulam situated close behind the oral sucker is larger than the latter. The oral sucker opens into the pharynx which is continued as oesophagus from which two lateral diverticula are directed forward. From the oesophagus two intestinal caecae pass backwards, filling the hind end of the body. The genital pore is a median and ventral opening near the oral sucker. The excretory pore is at the posterior tip of the worm. The testes lie behind the acetabulam. The seminal vesicle is

* Present address : Fisheries Laboratory, Veraval.

anterior to the sucker and leads into the cirrus sac containing the terminal part of the uterus and ejaculatory duct. The ovary is situated just behind the testes and the Mehlis' glands behind the ovary. The uterus as a coiled structure between the intestinal caecae is continued posteriorly to nearly ⅔ of the length of the worm.

Nigrelli & Stunkard (1947) after studying a large number of species of these parasites from various species of Scombroid fishes, refer them to any one of the two species of *Hirudinella* viz. (i) *H. ventricosa*, the large and thick-bellied form which becomes gravid at a length of approximately 17 mm. and may attain a length of about 70 mm. found in *Acanthocybium solandri* (2) *H. marina*, the smaller and slender form with powerful suckers and body wall, found in other scombroid hosts.

Hirudinella marina Garcin

Synonyms. A long list of synonyms of this species is reviewed by Nigrelli & Stunkard (1947).

Host and Locality. From the stomachs of *Katsuwonus pelamis* and *Neothunnus macropterus* from Minicoy island (8° 7′ N. 73° 19′ E.) and *Euhynnus affinis affinis* from Tuticorin (8° 30′ N. 78° 20′ E.).

Previously recorded hosts and localities. A long list of hosts, mostly Scombroid fishes including the hosts of this species, from Atlantic and Pacific oceans. *Distoma pallasii* in Porpoise, *D. dactylipherum* in ' Un Agronaute ' and *D. ampullaceum* in Coryphaena were reported from the Indian ocean before 1900 but none from the present hosts.

Remarks. An infection rate of 48.4% for 103 *K. pelamis* and 34.3% for 35 *N. macropterus* were found at Minicoy, whereas at Tuticorin among the 21 specimens of *N. macropterus* examined during 1960-61 only 3 of them had this parasite. As many as 13 specimens were occasionally found in a single skipjack though the most common number was 3-4 per stomach. An infection rate of 32% for 166 *parathunnus sibi* and 26% for 439 was reported by King and Ikehara (1956). A total of 74 specimens ranging in length from 6 to 35 mm. were collected and preserved for further studies.

Hirudinella ventricosa Pallas

Synonyms. Synonyms of this species are listed by Nigrelli and Stunkard (*op. cit.*).

Host and locality. From the stomachs of *Acanthocybium solandri* from Minicoy island and Tuticorin.

Previously recorded hosts and localities. From *Acanthocybium* in the Atlantic and Pacific oceans. *Distoma ampullaceum* (Buttel-Reepen) is recorded in Indian ocean from *Coryphaena* sp. (Nigrelli and Stunkard, 1947).

Remarks. Rao (1960) in the course of examination of the stomach contents of 7 specimens of *A. solandri* from the west coast of India, states ' a large species of

digenetic trematodes found in the stomachs of all the fish examined ; and it appears to be similar to the species of *Distomum* recorded by Kishinouye (1923) from the stomachs of this fish from Japan.' As *H. ventricosa* is now known to infect exclusively *A. solandri* and as the *Distomum* referred to above, is considered as a synonym of *H. ventricosa* it is quite likely that the species recorded by him is also the same. Iversen & Yoshida (1957) found an infection rate of 98.2% of this parasite among 220 *A. solandri* from Pacific, recording as high as 17 worms occasionally in a single host. 10 specimens of *A. solandri* ranging in size from 948 to 1500 mm. were examined at Minicoy and Tuticorin during 1958-61 with 2 parasites per host occurring frequently in all the hosts. 16 specimens varying in length from 30-54 mm. in the preserved state are kept for further studies.

Though these parasites have been known for more than 200 years with *Fasciola hepatica* and *Haplometra cylindracea*, the knowledge of the group was very incomplete and there was no agreement on the number of species or their differential diagnosis, till Nigrelli & Stunkard (*op. cit.*) solved the difficulties to a certain extent. The several new species created by the previous workers mostly from single specimens were based on the differences in shape, in appearance of dermal plications and other results of muscular contraction are now considered as being based on variations due to the distortion in the process of killing and preserving them. As the study of the scombroid fishes of Indian waters is now given gfeater attention, the incidental collection of such parasites from various species of their hosts, the preservation of them in different ways and the assemblage of all facts regarding their ecology and morphology are likely to clear much of the confusion of the systematics of this group.

ACKNOWLEDGEMENT

My thanks are due to Dr. S. Jones, Director, Central Marine Fisheries Research Institute, for going through the manuscript and offering helpful criticism.

Central Marine Fisheries Research Unit,
Tuticorin.

G. RAJU

REFERENCES

IVERSEN, E. S. AND HOWEN, E. E. 1958. *Pacific Sci.*, **12**(2) : 131-134.

———, AND YOSHIDA, H. O. 1957. *Ibid*, **11**(4) : 370-379.

KING, J. E. AND IKEHARA, I. I. 1956. *U.S. Fish and Wildlife, Ser. Fishery Bull.*, **57**(108) : 61-65.

KISHINOUYE, K. 1923. *Tokyo Imp. Univ. Col. Agr. Journ.*, **8**(3) : 293-475.

NIGRELLI, R. F. 1938. *American Museum Novitates*, No. 996.

———, AND H. W. STUNKARD, 1947. *Zoologica*, **31**(13) : 185-196.

RAO, K. V. N. 1960. *J. Mar. Biol. Assn. India*, **2**(1) : 130-133.