

NEW HOST RECORD AND REDESCRIPTION OF *PROCTOECES MACULATUS* (LOOSS, 1901) KHAN AND BILQEES, 1990

Ghulam Shabbir Shaikh¹, Fatima Mujib Bilqees² and Aly Khan³

¹Department of Zoology, University of Sindh, Jamshoro-76080

²Department of Zoology, Jinnah University for Women, Karachi-74600, Pakistan

³Crop Diseases Research Institute, PARC, University of Karachi, Karachi-75270, Pakistan

ABSTRACT

Proctoeces maculatus (Looss, 1901) is redescribed from small intestine of fish *Catla catla* (Ham.) from Keenjhar Lake, Sindh, Pakistan. This is the second record from a freshwater fish of Pakistan.

Keywords: *Proctoeces maculatus* Looss, 1901, freshwater fish, *Catla catla* (Ham.), Pakistan

INTRODUCTION

A survey of helminth parasites was conducted during 2007 and 2008. Two specimens were recovered from a freshwater fish *Catla catla* (Ham.) from Keenjhar Lake, Sindh, Pakistan. These were studied in detail and are being redescribed from a new host.

MATERIALS AND METHODS

Forty five *Catla catla* (Ham.) were purchased from Keenjhar Lake, Sindh, Pakistan. Two specimens were recovered from a single fish. The trematodes were slightly pressed under cover glass, fixed in formal-alcohol-acetic acid, stained with Mayer's carmalum and mounted in Canada balsam. The measurements are given in millimeters. Drawings were made with the aid of camera Lucida. The specimens are deposited with the senior author.

Proctoeces maculatus (Looss, 1901)

(Fig. 1)

Host: *Catla catla* (Ham.)
Locality: Keenjhar Lake, Sindh
Location: Small intestine
No. of host examined: 45 fishes
No. of specimens recovered: 2 from a single host

DESCRIPTION

Body is apparently divided into anterior enlarged region, greatest width at the level of the acetabulum, and a posterior elongated hindbody. Body size 2.83-2.89 by 1.24-1.27.

Oral sucker is well developed 0.29-0.30 by 0.31-0.34. Pharynx large, well developed, measuring 0.18-0.20 by 0.21-0.24. Esophagus is short. Ceca terminating near posterior extremity. Acetabulum large, muscular, elongated, measuring, 0.56-0.58 by 0.79-0.81. Testes are oval, in the posterior half of the body, postovarian, intercaecal, the anterior 0.21 by 0.22-0.24, while the posterior 0.21-0.23 by 0.21 by 0.24. Ovary oval, pretesticular, almost touching the anterior testis measuring 0.19-0.21 by 0.19-0.20. The distance between ovary and acetabulum is 0.67 – 0.69. Cirrus sac is elongated containing tubular seminal vesicle, pars prostatica is well developed and surrounded by prostate cells. Shell glands is poorly developed. Seminal receptacle and Laurer's canal were not observed.

Vitellaria is follicular, extending mostly in lateral ovotesticular field. Uterus reaches to posterior region. Eggs are numerous, oval, large, measuring 0.060-0.064 by 0.030-0.034.

Remarks: *Proctoeces maculatus* (Looss, 1901) was originally described in *Labrus marula* from Mediterranean Sea and is also known from Pakistan (Bilqees, and Khan, 1991), this is the only record from this part of the world from a freshwater fish. During present investigation two specimens of the genus were recovered from a freshwater fish *Catla catla* (Ham.). Bray, 1983 synonymised the genus *Xenoperca* Nicoll, 1915; *Complexobursa* Oshmarin and

Mamaev, 1963; *Proctoeces* Odhner, 1911; *Distomum maculatum* Looss, 1901; *Distomum subtenue* Linton, 1907; *Cercaria tenuans* Cole, 1935; *Cercaria milfordensis* Uzmann, 1953 and *Cercaria brachiodontis* Hopkins, 1954 as *Proctoeces maculatus* (Looss, 1901) Odhner, 1911 due to the absence of external seminal vesicle and considered the presence of external seminal vesicle in the genus *Xenopera* as an error reported by Nicoll (1915).

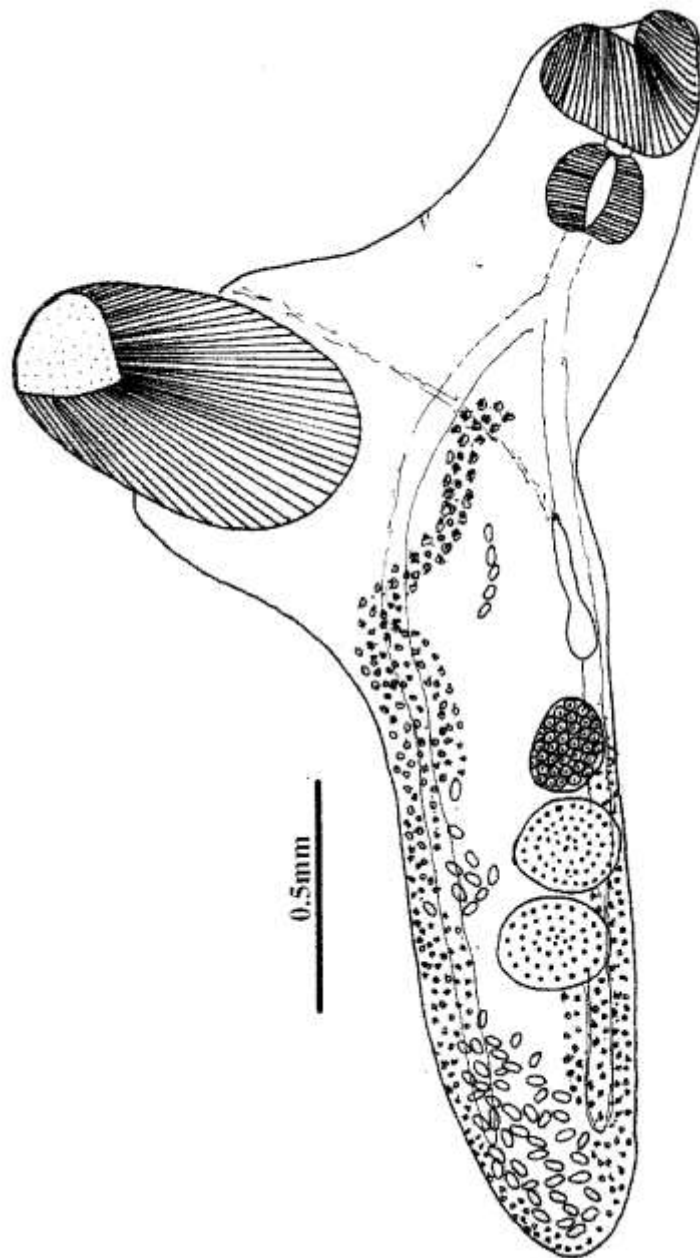


Fig. 1. *Proctoeces maculatus* Looss, 1901. Entire.

Bray and Gibson (1980) found *X. insolita* indistinguishable from *P. maculatus*. *P. lintoni* was distinguished by Siddiqi and Cable (1960) from *P. subtenue* by its bipartite seminal vesicle. Bray (1983) considered it to be only a doubtful distinguishing feature and is probably just a functional stage.

P. ichiharai was the name given by Shimura and Egusa (1979) to the specimens from *Batillus cornulus* of Ichihara (1964, 1965), which were originally called *Proctoeces*. Ichihara's specimens were considered to be *P. maculatus* by Bray and Gibson (1980). Similarly, all the other genus synonymised were considered to be *P.*

maculatus (Looss, 1901) Odhner, 1911. *P. maculatus* (Looss, 1901) has been reported from different localities of the world viz. W. Mediterranean (Prevot, 1965); Japan (Yamaguti, 1934, 1938; Ichihara, 1964, 1965, 1969; Shimura and Egusa, 1979; Shimura, 1980; Shimazu, 1972; Manter and Pritchard, 1962; Sakaguchi, 1972; Sakaguchi *et al.*, 1970; Fujita, 1925); Scotland (White, 1972); North Sea (Loos-Frank, 1969); Hampshire (Bray and Gibson, 1980); Chile (Bretos and Jiron, 1980); Atlantic Coast of Morocco (Dollfus, 1965, 1966); Devon (Bray and Gibson, 1980). Black Sea (Dolgikh, 1965; 1967; 1968; 1969; Zdun and Ignatyev, 1980; Machkevasky and Parukhin, 1981; Viasenko, 1931; Skrjabin and Koval, 1957; Pogoreltseva, 1952; Naidenova, 1967, 1974); Gulf of Marseille (Prevot, 1965); N.E., U.S.A. (Allen and Costello, 1972; Uzmann, 1953; Stunkard and Uzmann, 1970; Dennis *et al.*, 1974; Lang and Dennis, 1976; Tripp and Turner, 1976; Florida, Alabama, Mississippi (Manter, 1947; Winstead and Couch, 1981; Overstreet, 1969); Louisiana (Hopkins, 1954); Texas (Wardle, 1980); N.W. France (Dubois, 1907; Dupony and Martinez, 1973); N. Wales (Cole, 1935); E. England (Cole, 1935) S.W. England (Atkins, 1931; White, 1972); W. Portugal (Peneda, 1965; Dias and Serrano, 1972); N.W. Spain (Canzonier, 1972); Italy (Canzonier, 1972); S.E. England (Freeman, 1962, 1963; White, 1972; Bray and Gibson, 1980; Freeman and Llewellyn, 1958; N.W. Germany (Loos-Frank, 1969); S. Wales (James *et al.*, 1977); Hawaii (Yamaguti, 1970); Israel (Fischthal, 1977, 1982); Red Sea (Odhner, 1911); Texas (Wardle, 1980); Jamaica (Nahlas and Cable, 1964); Bimini (Sogandares-Bernal, 1959); Belize (Fischthal, 1977); Bermuda (Hanson, 1950; Linton, 1907); Puerto Rico (Siddiqi and Cable, 1960); Queensland (Nicoll, 1915) and Pakistan (Bilqees, 1980).

Bilqees (1980) reported *Complexobursa magna* from the intestine of marine fish *Lates calcarifer* (Bloch) which was later synonymized as *Proctoeces maculatus* (Looss, 1901) by Bray (1983).

The present specimens are close to *Proctoeces maculatus* (Looss, 1901) in all essential features and regarded the same with a new host record. The present species is being reported from the freshwater fish *Catla catla* while the earlier description was from *Labeo rohita* (Bilqees and Khan, 1991) from the same locality. This is the first record of *Proctoeces maculatus* (Looss, 1901) from *Catla catla* of Keenjhar Lake, Sindh, Pakistan.

REFERENCES

- Allen, D.M. and T.J. Costello (1972). The Calico scallop, *Argopecten gibbus*. NOAA Tech. Rep. NMFS SSRF, 655: 1-19.
- Atkins, D. (1931). On abnormal conditions of the gills in *Mytilus edulis* 11. Structural abnormalities with a note on the method of division of the mantle cavity in normal individuals. *J. Mar. Biol. Assoc., U.K.*, 17: 489-543.
- Bilqees, F.M. (1980). Three trematodes including two new species from fishes of Karachi coast. *Zool. Scripta*, 9: 89-91.
- Bilqees, F.M. and A. Khan (1991). Two digenetic trematodes from freshwater fish of Kalri Lake, Sindh, Pakistan. *Pakistan J. Zool.*, 23: 105-113.
- Bray, R.A. (1983). On the Fellodistomid genus *Proctoeces* Odhner, 1911 (Digenea), with brief comments on two other Fellodistomid genera. *J. Nat. Hist.*, 17: 73-90.
- Bray, R.A. (1985). *Macvicaria taksengi* new species (Digenea: Opecoelidae) in marine teleosts from Pinang, Malaysia. *System. Parasitol.*, 7: 75-80.
- Bray, R.A. and D.J. Gibson (1980). The Fellodistomidae (Digeneae) of fishes of the northeast Atlantic. *Bull. Brit. Mus. Nat. Hist. Zool. Ser.*, 37: 199-293.
- Bretos, M. and C. Jiron (1980). Trematodes in Chilean fissurellid mollusks. *The Veliger*, 22: 293
- Canzonier, W.J. (1972). *Cercaria tenuans*, larval trematode parasite of *Mytilus* and its significance in mussel culture. *Aquaculture*, 1: 267-278.
- Cole, H.A. (1935). On some larval trematode parasites of the mussel (*Mytilus edulis*) and the cockle (*Cardium edule*). *Parasitology* Cambridge, 27: 276-280.
- Dennis, E.A., M. Sharp and R. Douglass (1974). Carbohydrate reserves and phosphatase activity in the mollusc trematode relationship of *Mytilus edulis* L. and *Proctoeces maculatus* (Looss, 1901) Odhner, 1911. *J. Helminth.*, 48: 1014.
- Dias, A.A. and M.D. Serrana (1972). Alteracoes des branquias parasitismo nas mexihoes (*Mytilus edulis*) da Ria de Aveiro. *Boletim Informativo do Instituto de Bolodis Maritima*, 3: 82 pp.
- Dolgikh, A.V. (1965). *Larval trematodes-parasites of mollusks from the Crimean shore of the Black Sea* (Sevastopollvov: Autoreferat disertachi na soiskanie uchenoj stepeni Kandidata biologicheskikh nauk. Lovoskii Ordena Lenina goosudarvennikh Universites im I Franko). (in Russian)
- Dolgikh, A.V. (1967). On progenesis in trematodes of the genus *Proctoeces* Odhner, 1911. *Parazitologiya*, 1: 219-221. (in Russian)

- Dolgikh, A.V. (1968). Helminthofauna of mollusks of northern part of the Black Sea. *Biol. Mar. Kiev.*, 14: 114-126. (in Russian)
- Dolgikh, A.V. (1969). Some results of the study of the helminth fauna of mollusks in the Black Sea. *Problem Parazitologii Trudy vi nauchnoi Konferenstii Parazitology USSR*, 1: 96-97.
- Dollfus, R.P. (1965). Metacercaria: *Proctoeces progeneticus* (Trematoda: Digenea) Chez une *Gibbula* (Gastropoda Prosobranchiata) de la cote Atlantique de Maroc. Observations sur la famille Fello-distomatidae. *Annal. Parasitol. Hum. Comp.*, 39: 755-774.
- Dollfus, R.P. (1966). Metacercaria progenetique de *Proctoeces* Chez un gastropode prosobranchie de la cote Atlantique de Maroc. *Proc. Int. Cong. Parasit. (Rome 21st-26 September, 1964)*, C4: 536-537.
- Dubois, R. (1907). Sur les metamorphoses du distome parasite due *Mytilus perliers*. *C.R. Hebdom. Scan. Mem. Soc. Bio.*, 63: 334-336.
- Dupouy, J. and J.C. Martinez (1973). Action de *Proctoeces maculatus* (Looss, 1901) Trematoda: Fellodistomatidae) sur le development de gonads chez. *Mytilus galloprovincialis* Lmk. *C.R. Hebdom. Sean. Acad. Sci. Paris*. 277D: 1889-1892.
- Fischthal, J.H. (1977). Some digenetic trematodes of marine fishes from the Barrier Reef and Reef Lagoon of Belize. *Zool. Scripta*, 6: 81-88.
- Fischthal, J.H. (1982). Additional records of digenetic trematodes of marine fishes from Israel's Mediterranean coast. *Proc. Helminth. Soc. Wash.*, 49: 34-44.
- Freeman, R.F.H. (1962). Volumetric respirometer measurements of Oxygen consumption of digenetic trematode *Proctoeces subtenius*. *Comp. Biochem. Physiol.*, 7: 199-209.
- Freeman, R.F.H. (1963). Experimental infection of two species of wrasse with the digenean *Proctoeces subtenius*. *J. Mar. Biol. Assoc. U.K.*, 43: 113-123.
- Freeman, R.F.H. and Llewellyn, J. (1958). An adult digenetic trematode from a invertebrate host: *Proctoeces subtenius* (Linton) from the lamellibranch *Scrobicularia plana* (Da Costa). *J. Mar. Biol. Assoc. U.K.*, 37: 435-457.
- Fujita, T. (1925). Etudes sur les parasites de l'huitre comestible due Japan *Ostrea gigasa* Thunberg, Traduction accompagnee de notes de diagnoses et d'une bibliographie par Robert. *Phil. Dollfus. Annls. Parasit. Hum. Comp.*, 3: 37-59.
- Hanson, M.L. (1950). Some digenetic trematodes of marine fishes of Bermuda. *Proc. Helminth. Soc. Wash.*, 17: 74-89.
- Hopkins, S.H. (1954). *Cercaria brochidontis* sp. nov. from the hooked mussel in Louisiana. *J. Parasit.*, 40: 29-31.
- Ichihara, A. (1964). On an adult trematode (*Proctoeces*) obtained from the top- shell. *Turbo cornutus*. *Jap. J. Zool.*, 13: 294-295. (in Japanese)
- Ichihara, A. (1965). On a trematode (*Proctoeces* sp.) of the topshell, *Turbo (Batillus) cornutus* Solander. I. Geographical distribution in Japan and observation on the adult fluke. *Jap. J. Parasit.*, 14: 426-436.
- Ichihara, A. (1969). On the parasites of fishes and shellfishes in Sagami Bay (7). Parasitic helminthes of *Sebastiscus mormoratus*. *Japan J. Parasit.*, 8: 419-420.
- Lang, W.H. and E.A. Dennis (1976). Morphology and seasonal incidence of infection of *Proctoeces maculatus* (Looss, 1901) Odhner, 1911 (Trematoda) in *Mytilus edulis* L. *Ophelia*, 15: 65-75.
- Linton, E. (1907). Notes on parasites of Bermuda fishes. *Proc. U.S. Nat. Hist. Mus.*, 33: 85-126.
- Loos-Frank, B. (1969). Zwei adulte Trematoden aus Nordsee-Mollusken: *Proctoeces buccini* sp. nov. und *P. scrobiculariac* sp. nov., *Z. Parasitenkunde*, 32: 324-340.
- Looss, A. (1901). Ueber einige Distomen der Labriden des Triester Hafens. *Ziblt. Bakteriolog. Parasit. Infektionskrankh. Hyg., Jena.*, 29: 398-405.
- Machkevsky, V.K. and A.M. Parukhin (1981). On the role of nematodes from the *Proctoeces* Odhner, 1911 genus in certain littoral biocenoses of the Black Sea. *Vestnik Zool.*, 1: 56-61. (in Russian)
- Manter, H.W. (1940). Monorchidae from fishes of Tortugas, Florida. *Trans. Am. Micros. Soc.*, 61: 349-360.
- Manter, H.W. (1947). The digenetic trematodes of marine fishes of Tortugas, Florida. *Am. Midl. Natural.*, 38: 257-416.
- Nahlas, F.M. and R.M. Cable (1964). Digenetic and a spidogastrid trematodes from marine fishes of Curacao and Jamaica. *Tulane Stud. Zool. Bot.*, 11: 167-228.
- Naidenova, N.N. (1967). Study of helminth fauna of *Gobius niger* Linne in the Black Sea. *Problemy Parazitologii Trudy V Nauchnoi Konferenstii Parazitology U.S.S.R.*, PP. 486-588. (in Russian)
- Naidenova, N.N. (1974). *Parasite fauna of fishes of the family Gobiidae from the Black and Azov seas*. Pp. 182 (Kiev: naukova Dumka), (in Russian)
- Nicoll, W. (1915). The trematode parasites of North Queensland III parasites of fishes. *Parasit.* 8: 22-41.

- Odhner, T. (1911). Zum naturlichen System der Trematoden 11 (Ein Weiterer Fall von Sekundarem Anus). *Zool. Anzeig.*, 38: 97-117.
- Oshmarin, P.G. and Iu. L. Mamaev (1963). New trematodes from fishes of North Vietnam (Tonkin Bay). *Helminthologia* 4: 357-365.
- Overstreet, R.M. (1969). Digenetic trematodes of marine teleost fishes from Biscayne Bay, Florida. *Tulane Stud. Zool.*, 119-176.
- Peneda, M.C. (1965). Nouvelles observations sur L'infestation de *Mytilus edulis* et *Cardium edule* par des Trematodes a la Ria de Aveiro, ICES CM 1965. *Comite des Mollusques et Crustaces Comm.*, 76: 616-626.
- Pogoreltseva, T.P. (1952). Parasites of fish in the north-eastern part of the Black Sea. *Trud. Inst. Zool. Kiev.*, 8: 100-120 (in Russian)
- Prevot, G. (1965). Complement a la connaissance de *Proctoeces maculatus* (Looss, 1911) Odhner, 1911 [Syn. *P. erythraeus* Odhner, 1911 et *P. subtenuis* (Linton, 1907) Hanson, 1950] (Trematoda, Digenea, Fellodistomatidae. *Bull. Soc. Zool. France*, 90: 175-177.
- Sakaguchi, S. (1972). Studies on trematode genus *Proctoeces* parasitic in pearl oyster. *Pinctada fucata*-III on the adult trematode, *Proctoeces ostreae* Fujita in Dollfus, 1925 found in the black porgy, *Mylio macrocephalus*, from Tanabe Bay. *Bull. Nat. Pearl Res. Lab.*, 16: 2028-2037. (in Russian)
- Sakaguchi, S., T. Hosina and T. Minami (1970). Studies on trematode genus *Proctoeces* parasitic in pearl oyster, *Pinctada fucata*-I on the morphology, parasitic status and the distribution of pearl oyster infected with the parasite. *Bull. Nat. Pearl Res. Lab.*, 15: 1931-1938. (in Russian)
- Shimazu, T. (1972). A metacercaria of the genus *Proctoeces* (Fellodistomatidae: trematoda) from an abalone *Haliotis discus hannai*, of Rebun Island, Hokkaido. *Bull. Jap. Soc. Sci. Fish.*, 38: 813-816.
- Shimura, S. (1980). Ecological aspects of *Proctoeces ichiharai* (Trematoda: Digenea) parasitic in *Batillus cornutus* (Gastropoda). *Mar. Ecol. Progr. Ser.*, 3: 145-149.
- Shimura, S. and S. Egusa (1979). A new digenetic trematode, *Proctoeces ichiharai* new species (Fellodistomidae) from topshell, *Batillus cornutus* (Gastropoda) *Bull. Jap. Soc. Sci. Fish.*, 45: 1249-1253.
- Siddiqi, A.H. and R.M. Cable (1960). Digenetic trematodes of marine fishes of Puerto Rico. *Scient. Surv. Puerto Rico Virgin Islands*, 17: 257-268.
- Skrjabin, K.I. and V.P. Koval (1957). Family Fellodistomatidae Nicoll, 1913. In *Trematodes of animals and man. Principles of Trematodology* 13. (ed. K.I. Skrjabin). Pp. 163-452. Moscow Akademii Nauk SSSR. (in Russian)
- Sogandares Bernal, F. (1959). Digenetic trematodes of marine fishes from the Gulf of Panama and Bimini, British West Indies. *Tulane Stud. Zool.*, 7: 69-117.
- Stunkard, H.W. and J.R. Uzzmann (1959). The lifecycle of digenetic trematodes. *Proctoeces maculatus* (Looss, 1901) Odhner, 1911 (Syn: *P. subtenuis* (Linton, 1907; Hanson, 1950), and description of *Cercaria adranocerca* sp. nov. *Biol. Bull. Marine Biol. Lab. Woods Hole*, 116: 184-193.
- Trip, M.R. and R.M. Turner (1976). Effect of the trematode *Proctoeces maculatus* on the mussel *Mytilus edulis* in L.A. Bulla & T.C. Cheng editors. *Comparative Parasitology*, Vol. 4 New York. Plenum Press, pp. 74-84.
- Uzzmann, J.R. (1953). *Cercaria milfordensis* nov. sp., a microcercous trematode larva from a marine bivalve, *Mytilus edulis* L., with its special effect on the host. *J. Parasit.*, 39: 445-451.
- Vlasenko, P. (1931). Zur Helminthofauna der Schwarzmeerfische. *Trudy Kradahskoyi Nauchnoyi Stontsiyi T.I. Vyazem Koho*, 4: 88-136. (in Russian)
- Wardle, W.J. (1980). On the lifecycle stages of *Proctoeces maculatus* (Digenea: Fellodistomidae) in mussels and fishes from Galveston Bay, Texas. *Bull. mar. Sci.*, 30: 373-743.
- White, I.C. (1972). On the ecology of an adult digenetic trematode *Proctoeces subtenuis* from a lamellibranch host *Scrobicularia plana*. *J. mar. Biol. Assoc. U.K.*, 52: 457-467.
- Winstead, J.D. and J.A. Couch (1981). *Proctoeces* sp. (Trematodea: Digenea) in the American oyster, *Crassostrea virginica*. *Trans. Am. micros. Soc.*, 100: 296-305.
- Yamaguti, S. (1934). *Studies on helminth fauna of Japan*. 2. Trematodes of fishes. *Jap. J. Zool.*, 5: 249-541.
- Yamaguti, S. (1938). *Studies on helminth fauna of Japan*, 24. Trematodes of fishes. V. *Japan J. Zool.* 8: 15-74.
- Yamaguti, S. (1953). Parasitic worms mainly from Celebes 3. Digenetic trematodes of fishes, 11. *Acta Med. Okayama*, 8: 257-295.
- Yamaguti, S. (1970). *Digenetic trematodes from Hawaiian fishes*. Keigaku Publ. Co. Tokyo.
- Zdun, V.I. and S.M. Ignatyev (1980). On ecological Parasitological characteristics of mollusks of the Crimean Sea. Black Sea. *Tezies Dokladov IX Konferenstsiya Ukrainskogo Parazitologicheskogo Kogo Obschehestya*, 2: 63-64. (in Russian)

(Accepted for publication January 2010)