

**FIRST REPORT OF PARASITIC ISOPOD *Norileca indica* Milne-Edwards, 1840 FROM NORTHERN PART OF EAST COAST OF INDIA.**

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**Abstract**

During a local survey on Shankarpur, West Bengal, East coast of India authors came across some specimens of *Norileca indica* Milne-Edwards, 1840 with its host fish *Rastrelliger kanagurta* (Cuvier, 1816). The present report communicates here on the occurrence of *Norileca indica* Milne-Edwards, 1840 first time from the Northern part of east coast of India.

**Key words:** Isopod, Ecto-Parasite, *Norileca*, First report.

**Introduction**

India with a long coastline of over 8000 km and a network of 14 major, 44 medium and 162 minor rivers along with their tributaries has a very diverse range of ecosystems such as estuaries, backwaters, lagoons, mangroves, coral reefs, lakes etc. which are rich in fish and shellfishes (Zingde, 2007). These are often parasitized by a variety of fauna including the crustaceans. Among the crustacean parasites, isopods are noteworthy. These are associated with many species of commercially important fishes and shellfishes and causes significant losses to fisheries by way of killing, stunting or damaging the fishes thereby limiting

aquaculture production and its economic viability. Most of the isopod parasites are external but they may also be found internally occurring in gill chamber, haemocoel, body and buccal cavities. Isopods are associated with fishes from Himalayan mountain streams to abyssal depths of the sea. They are mostly marine, shallow-water and coastal, however, a few cymothoids, aegids and corallanids also occur in the inland freshwaters. Some marine/brackishwater cymothoids even invade coastal freshwaters. Ectoparasitic isopods often pose problems by infecting fishes and crustaceans in the wild and aquaculture.

Knowledge of isopod parasites from fish and shellfishes of India is still scarce. Schiödte and Meinert (1881-83) recorded *Nerocila recurvispina* (Cymothoidae) from Calcutta. Incidentally, this was the first isopod parasite recorded from mainland India. Different parasite species have been recorded from marine fishes from India. This is, however, only a small fraction of marine fish parasites. A thorough knowledge of parasitic fauna is an essential pre-requisite to prevent and overcome future fish disease and parasitic outbreaks. Keeping this in mind, the present work was undertaken with a view to filling up this gap. The parasitic isopods have been found to consist of six families under four suborders, namely, Epicaridea, Flabellifera, Gnathidea and Anthuridea. A total of 104 species of isopod parasites of both fishes and shellfishes belonging to these six families are collated and have been listed based on literature and collection present in the National Zoological Collection of the Zoological Survey of India, Kolkata. Of the six families, the family Bopyridae contains the highest number of 47 species infesting mainly prawns, shrimps, lobsters and crabs, followed by the family Cymothidae representing 32 species. The occurrence and distribution of all these isopod parasites from various ecosystems and hosts are depicted and discussed.

The fish and shellfishes are parasitized by a number of cymothoid isopods which has been investigated and reported by a number of researchers (Barnard, 1936; Tiwari, 1953; Bal and Joshi, 1959; Pillai, 1964; Ramakrishna and Venkataramaniah 1978; Misra and Nandi, 1986; Rajkumar et al., 2005a, b, 2006; Trilles,

et al., 2011). Bopyrid isopods have been worked out by a number of workers (Chopra, 1923, 1930; George, 1947; Thomas, 1977; Lalitha Devi, 1982; Ghatak and Misra, 1983; Nandi and Raut, 1985; Shyamasundari, et al., 1993; Jayasree et al., 2001; Thirumilu, 2011).

Species belonging to Family Cymothoidae are obligate parasites of fishes. They attach externally on the gills or in the mouth, a few flesh burrowing species also exists. Found in the buccal cavity of fishes. They cause weight loss of their host and produce lesions in the branchial chamber, buccal cavity and body surface. A callus like thickening often develops on the gill arch and gill filament due to persistent irritation by the appendages of the parasites, thereby causing reduction of gill surface.

There are several works were available on the isopods parasites in marine fishes from Indian coast and those studies indicates most of the fishes are infected by mainly Cymothoids isopods. Trilles et al., 2011 comprehensively give a checklist of Indian Cymothoidae and covered 74 papers from 1783 to 2011, all those works deals with Indian cymothoidae. After that also some importance works were done (Aneesh, et al., 2013; Bharadhirajan et al., 2014; Neeraja et al., 2014; Raja et al., 2014; Rameshkumar et al., 2014a, 2014b, 2014c; Rameshkumar et al., 2013a, 2013b; Sivasubramanian and Ravichandran, 2013; Trillees et al., 2012 and 2013). A Cymothoid parasitic isopod *Norileca indica* Milne-Edwards, 1840 was reported from Off Mumbai coast (Neeraja et al., 2014), Parangipettai (Rameshkumar et al., 2013a and b) and Cochin (Rameshkumar et al., 2014 c.). During a course of studies on Fishes and their

parasites along the East coast of India the authors came across some specimens of *Norileca indica* with its host fishes, the present report communicate here on the occurrence of *Norileca indica* Milne-Edwards, 1840 first time from the Northern part of east coast of India.

#### Material and method

Isopod along with fishes collected from Shankarpur fishing harbor, West Bengal. Ecto parasitic isopods were removed from buccal cavity of host species *Rastrelliger kanagurta* (Cuvier, 1817): Indian Mackerel. After collection fresh photo were taken. Fishes were preserved in 10% formaldehyde solutions and isopods were preserved in 95% ethanol. The prevalence (infected host fish number/number of examined host $\times$  100%) and intensity (total parasites number/ number of infected host) were calculated according to Margolis et al., (1982).

#### Results

##### Host species

*Rastrelliger kanagurta* (Cuvier, 1816)

##### Identifying characters

Medium size fishes with deep, fusiform body. Head longer than body depth. Maxilla partly concealed and extending hind margin of eye. Gill rakers very long and visible when mouth open. Teeth on jaws in single rows, minute and pointed. Two dorsal fin widely separated. Scale small, ctenoid.

Colour: Upper part of the body bluish green; flanks silvery with golden tint. Two rows of small dark spots on the side of the dorsal fin base. Dorsal fin yellowish with black spots.

##### Parasitic Isopod

*Norileca indica* Milne-Edwards, 1840.

##### Isopod characters

Body either twisted left or right side. Body 2.4-2.5 times as long as wide (Fig 1.) pereonite 4 widest. Cephalon slightly immersed in pereonite. Antennule (8 articles) extending to pereonite 1; Pleonite 5 about as wide as pleonite 1. Antenna (9 articles) slightly longer than antennules. Mandible with large palp; maxilliped palp article 2 longer than article 3, article 3 with four recurved spines. Pleopods 1-4 with lamellar rami; pleopods 1-5 increasing in size. Endopod slightly tapered.

##### Distribution

*Norileca indica* Milne-Edwards, 1840 is widely distributed in Indo-West Pacific region: most commonly in Sumatra, Indonesia, Philippines, New Guinea, north-western Australia, Madagascar, China and Thailand (Rameshkumar et al., 2014c). In Indian coastal water the distribution of *Norileca indica* Milne-Edwards, 1840 present in table 1 and



Fig 1. *Norileca indica* Milne-Edwards, 1840.



Fig 2. *Norileca indica* Milne-Edwards, 1840 inside the buccal cavity of *Rastrelliger kanagurta* (Cuvier, 1816).

Isopod	Host species	Location	References
<i>Norileca indica</i>	<i>Rastrelliger kanagurta</i>	Parangipettai and Cochin	Rameshkumar et al., 2013a & 2013b and 2014 c.
	<i>Selar crumenophthalmus</i>	Of Mumbai coast	Neeraja et al., 2014

Table 1. Location and host species of *Norileca indica* Milne-Edwards, 1840.

### Parasitological parameters

A total of 394 isopods were collected, among them 326 were attached with host species. A total of 2668 fish species were collected and observed for isopod parasitic infection; among those fishes 326 ex. under 34 species and 19 families were found to infect by those isopods. From those parasites 28

example of *Norileca indica* were found in the buccal cavity of *Rastrelliger kanagurta* (Fig 2). Prevalence and intensity of *Norileca indica* Milne-Edwards, 1840 are shown in below:

**Host Species:** *Rastrelliger kanagurta* (Cuvier, 1816),

**Family:** Scomberidae,

**Examined host species:** 124,

**Infected host species:** 28,

**Prevalence:** 22.58,

**Intensity:** 14.07.

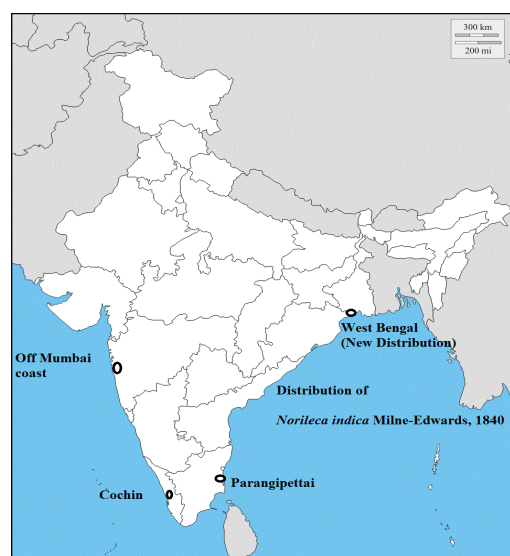


Fig 3. Distribution of *Norileca indica* Milne-Edwards, 1840 in India.

### Discussion

*Rastrelliger kanagurta* (Cuvier, 1816) is a common marine fish in both the coast of India, and *Norileca indica* Milne-Edwards, 1840 is till now collected from a single host species only. The present study support that this parasitic isopod is common in this coastal area. This host species were also infested frequently by another two isopod species namely, *Nerocila phaeopleura* and *Joryma brachysoma* (Trilles et al., 2011) but in our present study we only encountered the former species only as parasite of the said fishes.

## References

- Aneesh P.T., Sudha, K., Arshad, K., Anilkumar, G. and Trilles, J.P. (2013). Seasonal fluctuation of the prevalence of Cymothoids representing the genus *Nerocila* (Crustacea, Isopoda), parasitising commercially exploited marine fishes from the Malabar coast, India. *Acta Parasitologica*. 58(1): 80-90.
- Bal, D.V. and U.N. Joshi. (1959). Some new isopod parasites on fishes. *Journal Bombay Natural History Society*. 56: 363-569.
- Barnard K.H. 1936. Isopods collected by the R.I.M.S. "Investigator". *Records of the Indian Museum, Calcutta*. 38: 147-191.
- Bharadhirajan, P., Murugan, S., Sakthivel, A. and Selvakumar, P. (2014). Isopods parasites infection on commercial fishes of Parangipetti waters, southeast coast of India. *Asian. Pac. J. Trop. Dis*. 4. (Suppl 1): S268-S272.
- George, P.C. (1947). *Megacepon choprai*, gen. et sp. nov., a bopyrid isopod from the gill chamber of *Sesarma tetragonum* (Fabr.). *Records of the Indian Museum*. 44:385-390.
- Ghatak, S.S. and Misra, A. (1983). Notes on the occurrence and hermaphroditic nature of the parasitic isopod *Nerocila madrasensis* Ramakrishna and Venkata Ramaniah from the Hooghly-Matla Estuary, Sundarbans, India. *Bulletin of the Zoological Survey of India*. 5(1): 21-25.
- Jayasree L., Jankiram P. & Madhavi R. (2001). Epibionts and parasites of *Macrobrachium rosenbergii* and *Metapenaeus dobsoni* from Gosthani estuary. *J. Nat. His*. 35(2):157-167.
- Lalitha, D. S. (1982). Bopyrid parasites of prawns at Kakinada. *J. mar. biol. Ass. India*. 24 (1 & 2): 23-32.
- Margolis, L., Esch, G.W., Holmes, J.C., Kuris, A.M. and Schad, G.A. (1982). The use of ecological terms in Parasitology (report of an ad hoc Committee of the American Society of Parasitologists). *J. Parasitol.* 68:131-133.
- Misra, A. and N.C. Nandi (1986). A new host record of *Cymothoa indica* Schioedte and Meinert (Crustacea: Isopoda) from Sundarbans, West Bengal. *Indian J. Fish.* 33: 229-231
- Nandi, N.C. and Raut, S.K. (1985). A note on the occurrence of a bopyrid isopod parasite in the prawn *Palaemon* (*Exopalaemon*) *styliferus*. *Journal of the Indian Society of Coastal Agricultural Research*. 3: 67-68.
- Neeraja, T., Tripathi, G. and Shameem, U. (2014). Occurrence of the isopod, *Nerocila indiaca* (Isopoda: Cymothoidae) on big eye scad, *Selar crumenophthalmus* (Bloch) off Mumbai coast, India. *Indian J. Fish.* 61(1): 49-56.
- Pillai, N.K. (1954). A preliminary note on the Tanaidacea and Isopoda of Travancore. *Bulletin of the Central Research Institute, University of Travancore (Series C, Natural Sciences)*. 3: 1-21.
- Raja, K., Vijayakumar, R., Karthikeyan, V., Saravanakumar, A., Sindhuja, K. and Gopalakrishnan. (2014). A. Occurrence of isopod *Nerocila phaiopleura* infestation on Whitefin wolf-herring (*Chirocentrus nudus*) from Southeast coast of India. *J Parasit. Dis*. 38(2): 205-207.

- Perumal, M. P., Trilles, J. P. (2005). *Cymothoa indica* (Crustacea, Isopoda, Cymothoidae) parasitizes the cultured larvae of the Asian Seabass *Lates calcarifer* under laboratory conditions. *Dis. Aquat. Org.* 66:87–90.
- Rajkumar, M., Vasagam K.P.K., Perumal P., Trilles J.P. (2005). First record of *Cymothoa indica* (Crustacea, Isopoda, Cymothoidae) infecting the cultured catfish *Mystus gulio* in India. *Dis. Aquat. Org.* 65:269–272.
- Rajkumar, M., Perumal, P. and Trilles, J. P. (2006) A note on the double parasitism (Copepod and Isopod) in Commersons Anchovy fish (India). *J. Environ. Biol.* 27: 613-614.
- Ramakrishna, O. and Venkataramanlah, P. (1978). A new cymothoid of the Genus *Nerocila* from Madras. *Bull. Zool. Surv. India*, 1 (2) : 177-180.
- Rameshkumar, G., Ravichandran, S. and Sivasubramanian. (2013a). Invasion of parasitic isopod in marine fishes. *Journal of Coastal Life Medicine.* 1(2): 88-94.
- Rameshkumar, G., Ravichandran, S., Sivasubramanian, K. and Trilles, J.P. (2013b). New occurrence of parasitic isopods from Indian fishes. *J. Parasit. Dis.* 37 (1): 42-46.
- Rameshkumar, G., Ravichandran S. and Ramesh, M. (2014 a). Distribution of Isopod parasites in Carangid fishes from Parangipettai, Southeast coast of India. *J. Parasit. Dis.* DOI 10.1007/s12639-014-0460-4.
- Rameshkumar, G., Ramesh, M., Ravichandran S., Trillers, J.P. and Shobana, C. (2014 b). *Nerocila sundaica* (Isopoda, Cymothoidae) parasitizing *Otolithes ruber* from Nagapattinam, Southeast coast of India. *Ind. soc. Parasitol.* DOI:10.1007/s12639-014-0439-1
- Rameshkumar, G., Ramesh, M., Ravichandran, S., Trillers, J.P. and Subbiah, S. (2014 c). New record of *Norileca indica* from the west coast of India. *J. Parasit. Dis.* DOI 10.1007/s12639-014-0416-8.
- Schioedte J.C., Meinert F. (1881). Symbolae ad Monographiam Cymothoarum Crustaceorum Isopodum Familiae. II. Anilocridae. *Naturhistorisk Tidsskrift, Ser. III, 13, 1–166, pls 1–10.*
- Schioedte J.C., Meinert F. (1883). Symbolae ad Monographiam Cymothoarum Crustaceorum Isopodum Familiae. III. Saophridae. IV. Ceratothoinae. *Naturhistorisk Tidsskrift, Ser. III, 13, 281–378, pls 11–16.*
- Shyamasundari, K, K, Hanumantha Rao, C. Jalajakumari, and A. Mary. (1993). A new bopyrid isopod *Athelges neotenuicaudis* (Crustacea: Isopoda: Epicaridea) parasitic on *Pagurus kulkarnii* from Visakhapatnam coast, India. *Boletin Chileno de Parasitologia.* 48(3-4): 60-63
- Sivasubramanian, K. and Ravichandra, S. (2013). Unusual attachment of *Nerocila exocoeti* in *Hemiramphus far* (Forsskal, 1775) from Parangipettai south east coast of India. *Journal of Parasitology and Dis.* DOI 10.1007/s12639-013-0407-1.
- Thirumilu, P. (2011). Bopyrid parasite *Epipenaeon ingens* (Nobili, 1906) (Bopyridae, Isopoda) infestation in penaeid shrimps of Cuddalore coast, Tamil Nadu. *Marine Fisheries Information Service T & E Ser.*, No. 209.

- Thomas, M.M.(1977). A new record of *Epipenaeon ingens* Nobili (Bopyridae, Isopoda) parasitic on *Penaeus semisulcatus* de Haan from Palk Bay and Gulf of Mannar. *Ibid.* 24 ( 1-2): 258-261.
- Tiwari, K. K. (1953). On a new species of the rare genus *Agarna* parasitic on *NematolosQ nasus* in the Bay of Bengal. *Ree. Indian M. Us.* 50: 295-300.
- Trilles, J.P., Ravichandran, S. and Rameshkumar, G. (2011). A cheek list of the Cymothoidae (Crustacea, Isopoda) recorded from Indian fishes. *Acta Parasit.* 56(4):446-459.
- Trilles, J.P., Ravichandran, S. and Rameshkumar, G. (2012). *Catoessa boscii* (Crustacea, Isopoda, Cymothoidae) parasitic on *Carangoides malabaricus* (Pisces, Carangidae) from India. Taxonomy and host-parasite relationships. *Acta Parasitological.* 57(2): 179-189.
- Trilles. J. P., Rameshkumar, G. and Ravichandran, S. (2013). *Nerocila* species (Crustacea, Isopod, Cymothoidae) from Indian marine fishes. *Parasitol. Res.* 112: 1273-1286.
- Zingde, M. D. (2007). Estuaries of India-Their Environmental status and management strategies. *Ins. Report* (National Institute of Oceanography). pp7-9.