New record of *Norileca indica* from the west coast of India

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Abstract Two hundred and twenty samples of *Rastrelliger kanagurta* from the Cochin Fisheries Harbour were collected during the month of August 2013. Forty-one specimens (32 females and 9 males) were parasitized by the cymothoid isopod *Norileca indica*. *N. indica* is recorded for the first time from the west coast of India.

Keywords *Norileca indica* · *Rastrelliger kanagurta* · Distribution · West coast of India

Introduction

Cymothoid isopods are ectoparasites of fish. They mostly occur in the near shore coastal marine environment. Using seven pairs of sharply hooked legs and specialized mouthparts, they typically attach on the skin, in the buccal or branchial cavities feeding on fish blood (Trilles 1994; Brusca et al. 2001). However, it has been reported that some species are commensal (Eiras 1994). The specimens at the male stage are always smaller than females (Thatcher 1993)

and the copulation occurs on the host (Brusca 1978). Species inhabiting the branchial chamber inflict damage to the gills which is directly proportional to the size of the parasite and the duration of its settlement on the host (Romestand and Trilles 1977). Parasitism by cymothoids has also been found inducing a decreasing fecundity of some adult fish (Adlard and Lester 1995; Fogelman et al. 2009).

Trilles (1994) provided a catalogue of the parasitic isopods of the family Cymothoidae, which highlighted the lack of informations in certain regions of the world, particularly South Africa, South America and Asia. The author suggested that this was not due to low diversity of isopods, but rather to the lack of researchers working in this field. From India, 47 nominal species corresponding to 36 valid species were listed from 74 host species belonging to 34 families (Trilles et al. 2011). However, several parasites remained not identified to the species level or the fish hosts of some species were still unknown. In the present contribution, the species *Norileca indica* (Fig. 1) parasitizing *Rastrelliger kanagurta* is reported for the first time from the west coast of India.

Materials and methods

The host species *R. kanagurta*, is a small pelagic fish commonly found in the coastal waters of the west coast of India. The samples (size ranging from 15.2 to 19.8 cm) were collected from the Cochin Fisheries Harbour (CFH), Kerala, west coast of India (Fig. 2), during the month of August 2013. CFH is a major fishing base where fishes are caught along the entire west coast of India by multiday deep-sea trawlers, long lines and hooks and line units throughout the year. The branchial cavities of fishes were examined for the presence of parasites (Fig. 3). Isopods were removed alive,

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Fig. 1 Dorsal view of males and females of *N. indica*

Fig. 2 Study area map of Cochin Fisheries Harbour

preserved in 70 % ethanol and brought to the laboratory for identification according to Milne Edwards (1840) and Bruce (1990). The prevalence (P) was calculated according to Margolis et al. (1982) and Bush et al. (1997). Host nomenclature and fish taxonomy are according to Fish Base (Froese and Pauly 2013). The total length of each parasite and parasitized fish was measured in cm. Voucher specimens of parasites were deposited at Department of Zoology, Bharathiar University, Coimbatore-641046 in the name of Rameshkumar collection.

Results and discussion

41 *N. indica* were collected from the host branchial cavity. This species has the head to the anterior, and the abdomen facing outwards, pressed against the gill operculum, positioned ventrally in the gill cavity (Bruce 1990). A similar position was figured by Tiwari (1952) for *Agarna malayi*. 28 specimens were found in the left branchial cavity and 13 in the right. Similar results were reported by Bello et al. (1997) in Italy, in a study about *Mothocya epimerica* populations from the Lesina Lagoon (57.1 % in the left branchial chamber and 42.9 % in the right) and Venice (70.5 % in the left chamber and 29.5 % in the right). The parasite's body was twisted to the left side when it occupied the left branchial cavity or to the right side when it occupied the right branchial cavity. Overall, 41 out of 220 fish specimens (prevalence = 18.6 %) were infested. Rameshkumar and Ravichandran (2014) reported a prevalence reaching only 7.5 % for *N. triangulata* parasitizing *Sardinella gibbosa* from Parangipettai coastal environment.

Norileca indica was first reported by Milne Edwards (1840). Later, this species was reported by several authors (Heller 1868; Schioedte and Meinert 1884; Nierstrasz 1915; Trilles 1976, 1979; Avdeev 1978; Rokicki 1982; Bruce 1990; Yu and Li 2003; Yamauchi et al. 2005; Nagasawa and Petchsupa 2009; Rameshkumar et al. 2013). It was previously reported from several host species, *Atule malam* and *R. kanagurta* (Avdeev 1978), *Selar crumenophthalmus* (Rokicki 1982), *S. crumenophthalmus* and *Herklotichthyes* sp. (Bruce 1990), *Herklotichthyes* sp. (Yu and Li 2003), *Coryphaena hippurus* (Yamauchi et al. 2005), *S. crumenophthalmus* (Nagasawa and Petchsupa 2009), *R. kanagurta* (Rameshkumar et al. 2013). Most of the parasitized fish observed in our study were infested by large ovigerous females (size ranging from 1.8 to 3.5 cm in length) or by non ovigerous females (1.3–1.7 cm). Few parasitized fish were also infested by a small male (size ranging from 1.1 to 1.6 cm in length, in the gill region). This observation is consistent with Lanzing and O'Connor (1975), who reported that it was uncommon to find more

Fig. 3 *Norileca indica* infecting the branchial cavity of *Rastrelliger kanagurta*

than two *Ceratothoa imbricata* (one male and one female) on the host fish.

Norileca indica occurs most commonly in Sumatra, Indonesia, Philippines and New Guinea (Trilles 1976). Previous records were from Sumatra (Milne Edwards 1840), Sambelong (Heller 1868; Schioedte and Meinert 1884), Kohkram, Sumatra and Mariveles, Luzon Islands (Schioedte and Meinert 1884), Sekroe New Guinea (Nierstrasz 1915), north-western Australia (Avdeev 1978), “Sissie near Misool Stand” (Trilles 1979), off Mozambique and northwestern coasts of Madagascar (Rokicki 1982), in the Arafura Sea, off the Northern Territory coast (Bruce 1990), in China (Yu and Li 2003), Philippines (Yamauchi et al. 2005). Recent records were from Thailand (Nagasawa and Petchsupa 2009) and Parangipettai, East coast of India (Rameshkumar et al. 2013). Present material is all from the Cochin Fisheries Harbour, off the west coast of India.

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