Indian J. Applied & Pure Bio. Vol. 37(3), 795-800 (2022). **ISSN: 0970-2091**
A web of Science Journal

New distributional record of *Evelineus mcintoshii* (Langerhans, 1880) (Nemertea: Pilidiophora: Heteronemertea) from Gujarat, India

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Abstract

Ribbon worms are primarily free-living benthic invertebrates, one of the least researched groups along the Indian coast. Here, we present the new distributional record of *Evelineus mcintoshii* from Gujarat, India. The single specimen of the rarely observed nemertean was collected from Mangrol coast in south Saurashtra. The Nemertean was discovered in the lower littoral zone on an algal bed. Observations during regular field visits indicated that this species is lurking inside a combination of local marine seaweeds.

Nemertea is a phylum of marine ribbon worms that grab their prey with a muscular proboscis. Nemertea or marine ribbon worms are unsegmented, soft bodied carnivore animals feeding on small crustaceans, polychaetes and molluscs[11]. Because of the presence of rhynchocoel, a fluid-filled hollow in the head region with a unique organ, the proboscis, which highlights the key feature of this phylum, these organisms are sometimes referred to as Rhynchocoela[12]. These worms live in different habitats such as sea bottom substrates, including silt, sand, algae, seagrasses, and dead corals, and are found in the supralittoral to abyssal zones[1]. There are 1275 species of Nemerteans worldwide, divided into two groups and 250 genera[8].

In India, the research on the phylum Nemertea is few and rare[11]. There are only a few literatures recording this group of animals, and almost all the works are based on an accidental collection of the specimen during any other research[12]. There was an account of a nemertean worm in the Gulf of Kachchh that was identified only up to the phylum level[4,12]. Other nemertean species reported from India include *Baseodiscus hemprichii*

from Andaman Nicobar Islands[10], *Baseodiscus quinquelineatus* from Andaman Islands[13], *Balionemertes australiensis*[10], and *Lineus mcintoshii*[11]. Originally *Evelineus mcintoshii* was established as *Cerebratulus mcintoshii* from Madeira[5]. Some closely resembling forms of this species are also reported from different parts of the world such as *Evelineus tigrillus*[2], *Evelineus mcintoshii*[3]; Japan as *Lineus mcintoshii*[7,8]; and Vietnam as *Evelineus* cf. *mcintoshii*[1]. Shynu *et al.*[11] reported *Lineus mcintoshii* for the first time from the Kerala coast, which was the first record from India. Here we report the new distributional and first documented record of *Evelineus mcintoshii* from Gujarat. A complete synonym list along with its morphological features is provided here, which will help for the future identification of the species.

The colourful nemertean was incidentally observed along Mangrol coast (21°06' 21.92" N, 70°06' 21.92" E) of Saurashtra, Gujarat during routine field visits (fig. 1). A single specimen was observed crawling on the red seaweed *Champia parvula*. The specimen was examined in its native habitat to note the characters. The voucher specimen was preserved in 70% alcohol and deposited in the Marine and Freshwater Biology Division Laboratory, Department of Zoology, The Maharaja Sayajirao University of Baroda, Vadodara. The morphological characters of the specimen such as length, width and colouration patterns were noted on the field and identification was carried out. The identification was done based on morphological characters, taxonomic keys and published literature.

Fig. 1. Map showing the study site where *Evelineus mcintoshii* was observed and collected (Scale bar = 100 km)

a) Systematics :

Phylum: Nemertea
Class: Pilidiophora (Thollesson & Norenburg, 2003)
Order: Heteronemertea (Bürger, 1892)
Family: Lineidae (McIntosh, 1874)
Genus: Evelineus (Correa, 1954)
Species: *Evelineus mcintoshii* (Langerhans, 1880)

b) Synonyms (adopted from WoRMS as on 02-05-2022) :

Cerebratulus mcintoshii (Langerhans, 1880)
Evelineus tigrillus (Correa, 1954)
Lineus mcintoshii (Langerhans, 1880)
Lineus mintoshii

c) Material examined :

A single specimen was observed from the lower intertidal zone, crawling on the red seaweed *Champia parvula* along Mangrol coast (fig. 1), Gujarat, India.

d) Description :

In living form, the worm was 8.5 to 9 cms in length and 1 mm in width. The head and neck were not demarcated. The body was compressed on the ventral side. The cephalic tip, as well as the borders of the dorsal and ventral surfaces of the body were nearly colourless (fig. 2). The tip of the anterior portion was bluntly rounded. On the posterior portion of the cephalic tip, a flattened, triangular orangish red patch was observed. A single reddish orange mid dorsal strip was observed from the center of the patch which was extending up to the tip of the tail (fig. 2). Dorsally, the body was pale white with regular patterned black patches (fig. 2). The distal ends of the patches were found abutting on each side of the longitudinal reddish orange strip, while the proximal ends were connected by a longitudinal dark black line that was found abutting on each side of the longitudinal reddish orange strip. The patches appeared to be triangular in shape, proximally wide and distally narrow (fig. 2). In front of the orangish red patch on the tip of the head, two small black spots were observed. These dots were occasionally transformed into longitudinal short black lines that extended rather posteriorly. The cephalic grooves were long and reached the second transverse patch. Eyes were not observed.

e) Habitat :

The specimen was observed in the lower intertidal zone, which comprises of small rocky pools and puddles covered with different types of seaweeds. The specimen was found associated with red seaweed (fig. 3).

f) Distribution :

Evelineus mcintoshii is been reported by various researchers from different parts of the world. In India, it is reported from Kerala[11] and Karnataka[9].

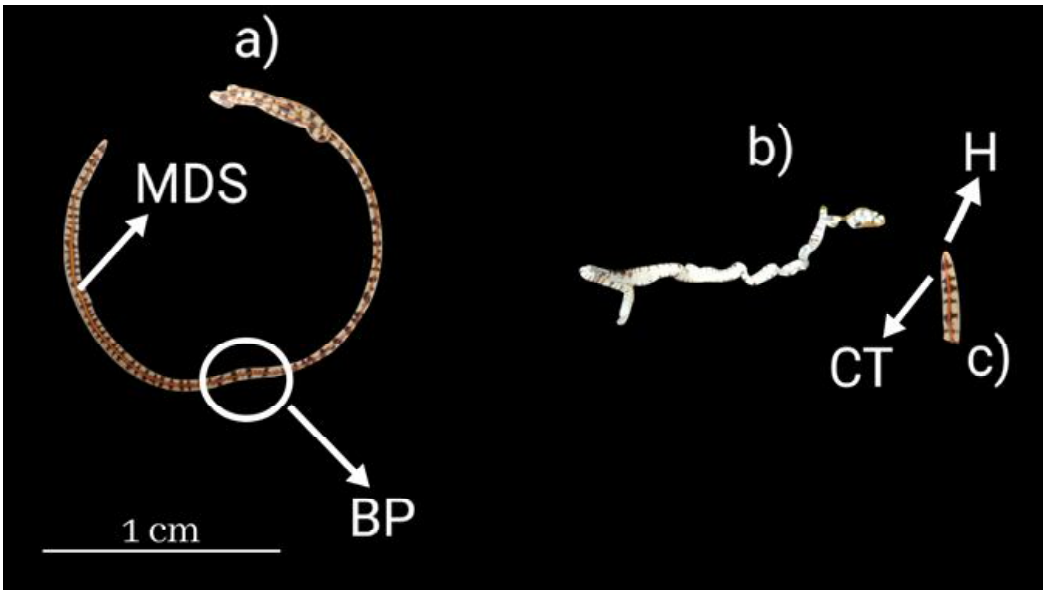

Fig. 2. *Evelineus mcintoshii* specimen a) Dorsal view, b) Ventral view, c) Anterior portion, H) Eyeless Head, CT) Cephalic tip, BP) Black patches, MDS) Mid dorsal strip (Scale bar = 1 cm)

Fig. 3. *Evelineus mcintoshii* in natural habitat.

The phylum Nemertea is one of the least studied group of animals in India. In comparison to the huge geographical region and the overall number of species reported globally (over 1200), the number of nemertean species described from India is extremely low[12]. A comprehensive report of 81 nemertean species along the coast of Vietnam was published, which mentioned the occurrence of *Evelineus mcintoshii* from the coast of Gujarat and Maharashtra (north eastern Arabian Sea) based on a blog, but no scientific publication was observed[9]. The present study reports distributional record of *Evelineus mcintoshii* from Gujarat, India. Previously this nemertean was observed in Kerala and Karnataka[9] which are the coasts of the eastern Arabian sea. The average distance between Karnataka and Gujarat is approximately 1300 kms. Therefore, according to the present study, the range extension of *Evelineus mcintoshii* is observed towards north eastern Arabian sea.

According to Mohan *et al*.,[9] the morphological characteristics of the specimen including the reddish orange curve patch on the posterior region of the cephalic tip is said to be specific to specimens from the Asian coast[1] whereas, a somewhat curved patch on the tip of the head was noted on the specimen reported from Brazil. On the basis of this difference, it is possible to conclude that both morphotypes are available along the coast of the eastern Arabian sea, and that these morphotypes are not necessarily region specific.

The specimen in the present study was observed in the lower intertidal zone of the rocky coast, which was covered by multiple types of seaweeds. The previous records describe the observation of this species from a similar type of habitat i.e, rocky intertidal belt and associated with seaweeds. This means the species prefers rocky substratum covered with seaweeds. The occurrence of the organism is rare,[9] as the studies of infaunal diversity along the Gujarat coast is carried out since many years and this is the first record of the particular species. From the previous reports[9,11] it can be concluded that *Evelineus mcintoshii* has continuous distribution from eastern Arabian sea, however, its occurrence is rare. The current study establishes the occurrence of *Evelineus mcintoshii* up to the north-eastern Arabian Sea, as well as provides information on the insight to the distributional records of this species along the region.

Authors would like to thank the Head, Department of Zoology, The Maharaja Sayajirao University of Baroda, Vadodara and the Head, Department of Life Sciences, Bhakta Kavi Narsinh Mehta University, Junagadh for the laboratory, storage and museum facilities. The authors are thankful to the anonymous reviewers for their critical review of the manuscript. Pooja Agravat would like to thank SHODH - ScHeme Of Developing High quality research fellowship provided by the Education Department, Gujarat State.

Conflict of Interest :

The authors declare no conflict of interest related to this research article.

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