



First record of cyst in *Epinephelus diacanthus* (Spinycheek grouper) from Mumbai waters, Central Eastern Arabian Sea

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Abstract

The fish samples of *Epinephelus diacanthus* (n= 262) are collected from fish landing centre such as Newferrywharf in Maharashtra, Veraval in Gujarat and Cochin in Kerala along the Indian West coast from October to December 2019. The fish infected with cyst displayed no clinical anomalies and seemed to be totally normal from outside but when it was filleted cyst was present inside it on lateral muscles near spinal vertebrate. Some fish from Mumbai are found with cysts in their bodies, while those from Veraval and Cochin are free of such cysts. Although these cysts are not particularly harmful to the fish, they can diminish their market appeal due to the dark stains they leave in the flesh. As groupers are highly valued as a food source, the presence of cysts would negatively impact their marketability.

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Introduction

Epinephelus diacanthus (Valenciennes, 1828) is a grouper dispersed in the continental shelf of the northern Indian Ocean from the Gulf of Aden to Sri Lanka and Tamil Nadu (Froese and Pauly, 2021) comprising Lakshadweep and Andaman Islands (Rekha *et al.*, 2011). The groupers are the topmost hunters assumed to play significant roles in ecosystem function. This species has been captured in huge quantities in trawls, hooks and lines along the Indian coast. Its depth range is 2-180 meters, but most commonly between 10-90 metres (Heemstra and Randall, 1993). Spinycheek groupers are a carnivore, which feeds mainly on crabs, fishes, and shrimps, sometimes on its juveniles also. Serranids were sequential hermaphrodites function as a male in one life phase and changed to a female in another phase (Warner, 1988). Smith (1965), reported they have a protogynous mode of reproduction. Considering the significant economic impact of parasites on fisheries resources, it is crucial to undertake a comprehensive, long-term research initiative to investigate the effects of isopod parasites on host fish. Crustacean parasites that affect fish are mainly categorized into three primary types: Branchiura, Isopoda (advanced crustacea), and Copepoda (minor crustacea), with most of these parasites being found in both marine and freshwater environments (Aneesh *et al.*, 2013; Wanjari *et al.*, 2022). The second group, which are the biggest category of crustacea and utmost of them are parasitic on equally marine and freshwater fishes, is sectioned into two orders: Cyclopoida and Caligoida. These copepods are categorized based on their form and arrangement of the buccal area. Copepods was parasitic on fishes at

least from the time of the lower Cretaceous, around 110 to 120 million years ago. Almost 30, families of copepods comprise parasites which use fishes as hosts and majority of them are found wholly on fishes (Woo, 1995; Noga, 2010; Godbold *et al.*, 2013). *Sarcotaces* type is an endoparasitic more centimeters lengthy initiated encysted below the skin and in the muscle flesh of marine fish intensely inserted in the dorsal muscle near to the spinal column. The copepod inserts its head into the muscle and is ultimately enclosed by the host skin excluding posterior body part that sustains link with external seawater. When the copepod expires, the flesh forms a sealed cyst about the parasite. It is presumed that *Sarcotaces* nourishes on the host's blood. It is often spotted enclosed by a cyst determining 4-8 cm, which is packed with ink-coloured blood (Amalcher, 1970; Boxshall and Halsey 2004; Choi *et al.*, 2014).

Sarcotaces, male and female, alive in cysts in the flesh of the fish host recognized arrangements from the Rasp head rockfish, *Sebastes ruberrimus*, in British Columbia, as *Sarcotaces arcticus* (Kuitunen-Ekbaum, 1949). Every infested fish confined one to three cysts comprising live parasites, familiar by outside protrusions, or most usually, by black liquid discharge from cysts. *Sarcotaces arcticus* was defined and examined by Collet and Hjort from samples collected from *Molva abyssorum* captured in Norway (Collett, 1874; Hjort, 1895). Two additional species, *S. verrucosus* and *S. pacificus*; have been studied by Olsson and Komai (Olsson, 1872; Komai, 1924) *Sarcotaces verrucosus* has been spotted in *Iridio radiatus* captured at Martinique and *S. arcticus* has been described from *Molva abyssorum* in Scotland and *Molva byrkelange* (Walbaum, 1972) in Germany (Dollfus, 1928; Aitken, 1942; Amalcher, 1958).

Material and methods

In this present study, the fish samples of *Epinephelus diacanthus* are collected along the Indian west coast from October to December 2019 (Table 1, Fig. 1 and Fig. 2). The fishes are kept in ice and transported to laboratory for examination. The samples was washed to remove dirt and mucus from outside. After that fish

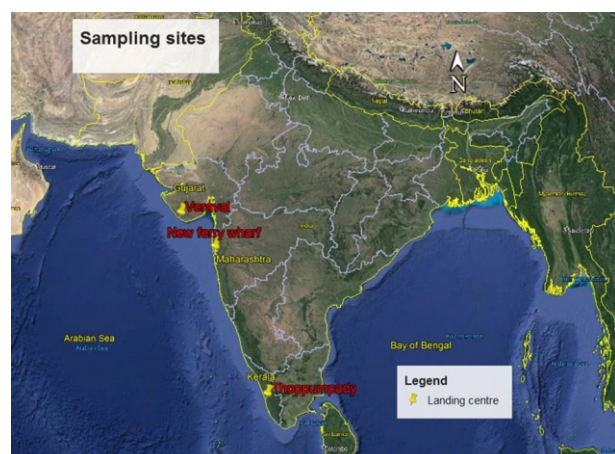


Fig. 1 Study area location map.

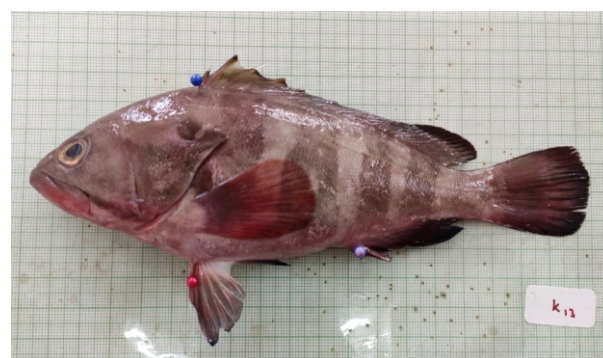


Fig. 2 Image of *Epinephelus diacanthus*

sample was examined outside and dissected to examine the internal organs and biology of fishes. That time while filleting cyst was encountered in the specimens.

Table 1 Number of fishes infected with cyst

S. No	Sampling location	Number of fishes examined	Number of fishes cyst is present
1	Newferrywharf	70	5
2	Veraval	110	0
3		82	0

Results and discussion

Some of the *Epinephelus diacanthus* specimen collected from Mumbai are having cyst inside of their body and the cyst is not present in the specimens collected from Veraval and Kerala region. The fish infected with cyst displayed no clinical anomalies and seemed to be totally normal from outside. When the fish was dissected cyst was present inside mostly near the lateral muscle near to vertebral column. The cysts are in pyriform in shape, pale colour in colour and when the cyst is broken inky colour fluid came out. The cyst outer cover is so thin. Osman *et al.* (2014) reported the cyst infestation of *Sarcotaces* sp in *Epinephelus cholorosigma* at Arabian Gulf of Saudi Arabia. In



Fig. 3 Depicting the occurrence of cyst in *Epinephelus diacanthus*

Epinephelus diacanthus they have reported the cyst at first time in Kerala waters (Sharma et al., 2021). The occurrence of cyst is very rare in this groupers. This is the first study reporting presence of the cyst in *Epinephelus diacanthus* from Mumbai waters (Fig. 3).

Conclusion

This study marks the first report of cyst infestation in *Epinephelus diacanthus* from Mumbai waters, with no such occurrences found in specimens from Veraval and Cochin. The cysts, though not harmful to the fish's overall health, present significant concerns for the marketability of this commercially valuable species due to the visible dark stains they cause in the flesh. Given the rarity of such infestations in groupers, further research is essential to understand the underlying causes and broader implications of these cysts, especially considering the economic importance of *Epinephelus diacanthus* in the fishing industry. Comprehensive monitoring and continued investigation into the effects of parasites, particularly isopod parasites like Sarcotaces, are critical for maintaining the health and market value of fish populations along the Indian coast.

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