

Expansion of new host range of isopod *Tachaea spongillicola* infestation to fish species could pose a risk to aquaculture food industry in southeast Asian countries

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Fish and fisheries products are recognised as the healthiest animal source of protein on the planet and their role is being considered in national, regional and global food security with a view towards eliminating hunger and malnutrition. Current global fish production is 179 million ton (MT) of worth US\$ 401 billion¹. Cage aquaculture is being hailed as a means to increase aquaculture production for nutritional and livelihood security in southeast Asian countries^{2,3}. Cage aquaculture has grown in popularity over the last decade, and it is now used as an alternative to land-based fish farming in southeast Asian countries including India. India has 3.5 million hectares of reservoir resources with tremendous potential for increasing fish output through cage culture technology expansion. Cambodia is a pioneer in cage culture and at present this technology has been spreading and excelling since its inception in other southeast Asian countries also.

Disease outbreaks are a bottleneck in all types of diversified aquaculture. It has been estimated that bacteria (55%), followed by viruses (23%), parasites (19%) and fungi (3%) are the most common causes of diseases in aquaculture⁴. As a case study, the authors have recorded for the first time an isopod parasite *Tachaea spongillicola* infestation in three

freshwater fish species viz. *Labeo rohita*, *Cirrhinus mrigala* and *Notopterus notopterus* in reservoir ecosystems (Dhanei reservoir, Odisha).

The specimens were deposited in National Repository of Zoological Survey (ZSI) Kolkata, India, with registration number, C 8037/2. The severity of the pathology and prevalence of the parasite in these three species have been recently published in Aquaculture (<https://doi.org/10.1016/j.aquaculture.2021.737436>)⁵.

The major concern of this correspondence is to highlight two important issues, namely:

- Expansion of parasitism to new hosts.
- Infestation in diversified fish species as a threat to fish farmers undertaking cage aquaculture in inland open waters.

T. spongillicola was recorded for the first time as a commensal of freshwater sponges, *Spongilla carteri* in the Indian Museum Tank in Kolkata in 1907⁶. Since this first



Tachaea spongillicola (inset) infestation on Indian major carp.

record the parasite has been reported as infesting three freshwater prawn species, *Macrobrachium lamerrei*, *M. malcomsonii*, and *M. nobilii*^{7,8}. The expansion of parasitism from freshwater sponges and freshwater prawns to freshwater fish as we have reported is of concern to researchers with regards to the factors responsible for its host expansion.

We hypothesise that water flows could be one of the factors that may influence the degree of parasitism by *T. spongillicola*. Water flows have been found to be affected by global climate change. As aquaculture is linked to water availability and quality, it is likely that the aquaculture industry will be impacted by climate change⁹. Furthermore, expansion of parasitism to new host is also a matter of concern, particularly if linked to climate change. Although we have recorded a fish as a new host, a deeper investigation is required to establish the role of climate change in expansion of parasitism.

Diversification of species, system diversification with high stocking, and external inputs in terms of balance feed are requirements in cage aquaculture. Indian major and minor carps, Chinese carps, catfishes, mahseers, freshwater prawns, and monosex Tilapia have all been cage tested¹⁰. With this background, the record of *T. spongillicola* infestation in a fish species could definitely be a concern for the fish health manager. Good fish health management practices are crucial to lower the risk of disease outbreaks and facilitate fish production in reservoirs to meet state and national targets.

Conclusions and way forward

Records of *T. spongillicola* prevalence show a progressive expansion of host range starting from invertebrates (sponges and crustaceans) to vertebrates. As we discussed in our publication, water flow could be one of the factors that provides a clue for its infestation. Thus, the present correspondence is a research brief that provides an insight on *T. spongillicola* infestation, which could be a strategic advantage for neighbouring southeast Asian countries for sustainable aquaculture production.

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