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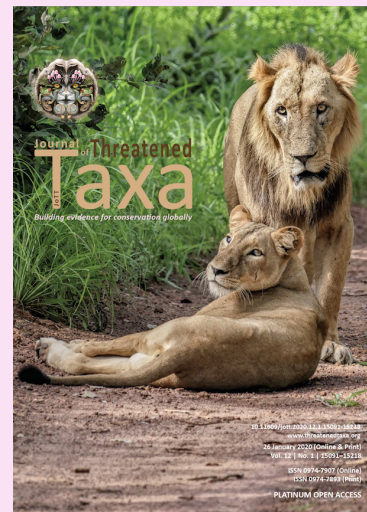
## NOTE

***TETRASPORIDIUM JAVANICUM* MÖBIUS (CHLOROPHYTA), A RARE SPECIES RECORDED FROM ARPA RIVER IN BILASPUR, CHHATTISGARH, INDIA**

Rakesh Kumar Dwivedi

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## *Tetrasporidium javanicum* Möbius (Chlorophyta), a rare species recorded from Arpa River in Bilaspur, Chhattisgarh, India

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Chhattisgarh State is located in the central eastern part of India, a part of the central highland. The state is well known for its unexplored and rich biodiversity and its mineral resources like iron, coal and limestone. The weather is hot and humid due to its proximity to the Tropic of Cancer (21.295°N and 81.828°E). Mahanadi is the largest river of the state and it is fed by the numerous tributaries including the river Arpa. The river originates from the Maikal range near the Kodari-Khongsara Village of Bilaspur District. It flows southwards to meet with Seonath River which in turn meets with the Mahanadi. Once perennial, now the river is mainly rain fed due to the formation of various check dams (Bhat & Geelani 2013). The riverbed is sandy at most of the places having an average height of about 1.5m and is rocky at some places. Arpa is considered as the lifeline for Bilaspur City as it flows through the middle of the city and is the major source of water. The present study deals with the algal flora of Arpa River near Koni, Bilaspur.

Epilithic algal samples were collected in different seasons by random sampling method between 2012 and 2018. They were collected from the submerged pebbles as epilithic algal thalli attached to the pebbles in the riverbed with the help of scalpel. The collected samples were kept in plastic bottles with river water

and 4% formaldehyde. Samples were observed under the microscope and photographs were taken with the help of a Leica DM 2000 microscope at Department of Botany, Guru Ghasidas Vishwavidyalaya, Koni, Bilaspur. Identification of the taxon was done by referring to standard research papers (Iyengar 1932; Sarma & Suryanarayana 1969; Pandey et al. 1980).

Samples collected in December 2012 (accession number Bsp/Arpa/14; collection date 23.xii.2012) and December 2013 (accession number Bsp/Arpa/02 collection date 22.xii.2013) were identified as *Tetrasporidium javanicum* Möbius (Chlorophyta, Chlorophyceae, Palmellopsidaceae).

The thalli under lower magnification (4x) appear net-like with many round perforations having smooth margins. Each thallus is multicellular, colonial, ranged between 10–30 cm in length, numerous cells are embedded into a common gelatinous matrix which are attached to the substratum with the help of an attachment disc. The cells are spherical to ellipsoidal, 5–12 µm in diameter. Each cell is uninucleate, with a single cup shaped chloroplast and a single, prominent pyrenoid.

*Tetrasporidium javanicum* Möbius was first reported from Java (Moebius 1893), and subsequently from other

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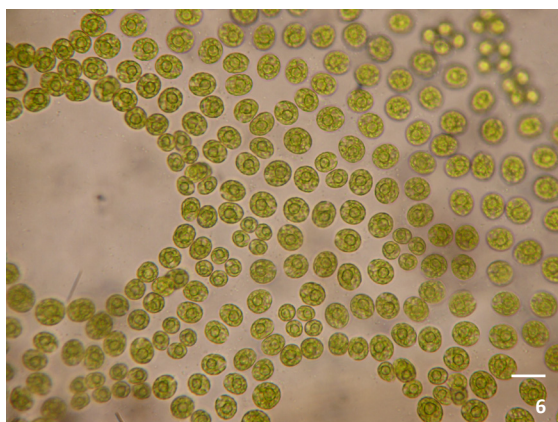
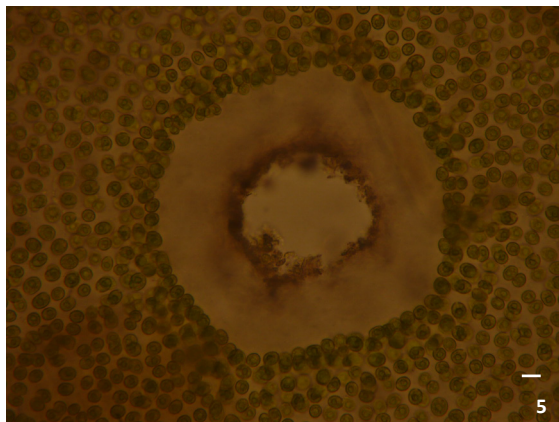
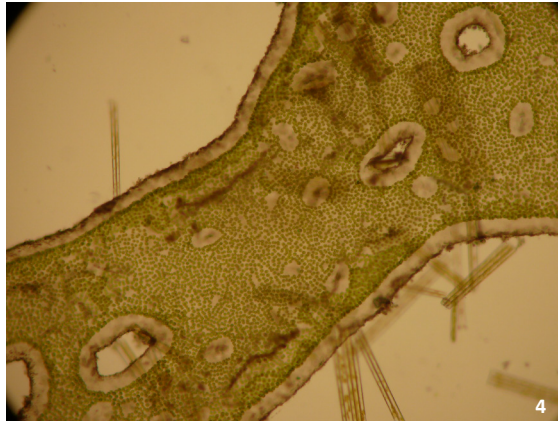
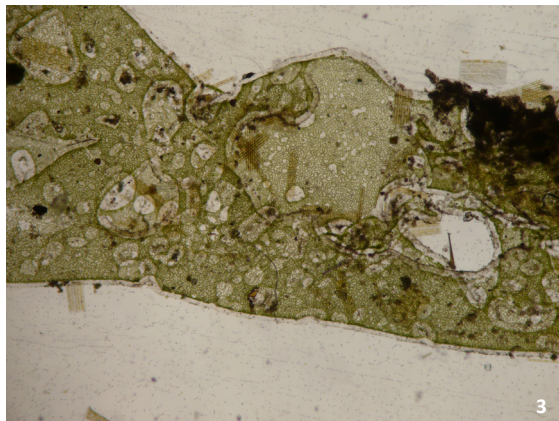
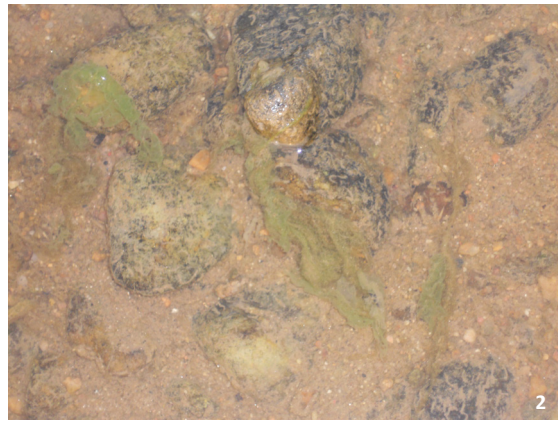


Image 1–8. *Tetrasporidium javanicum* and destruction of the habitat.

1,2—*T. javanicum* attached to the pebbles submerged in Arpa River | 3—*T. javanicum* in 4x magnification of objective lens (not to scale) | 4—*T. javanicum* in 10x magnification of objective lens (not to scale) | 5,6—thallus of *T. javanicum* in 40x and 100x magnifications of objective lens (scale bar is equal to 10µm) | 7,8—sand mining at the collection site. © Rakesh Kumar Dwivedi.



parts of the world such as Czech Republic (Fott et al. 1965), China (Jao 1947; Hu & Wei 2006), Bangladesh (Islam 1970), France (Coute & Tracanna 1981), Portugal (Calado & Rino 1992), Australia (Entwisle & Skinner 2002), the Hawaiian Islands (Sherwood 2004), and Spain (Tomas et al. 2012; Alcaraz et al. 2013). In India, *T. javanicum* was documented for the first time from the pools of Madras (Chennai) and the river Nagari in southern India (Iyengar 1932). Later it was reported from different parts of the country like Ravi River at Chamba in Himachal Pradesh (Singh 1941), Pallar River in Kerala (Randhawa 1962), Vallabha Vidyanagar in Gujarat (Sarma & Suryanarayana 1969), and Allahabad in Uttar Pradesh (Pandey et al. 1980).

The taxon has its distribution in both tropical and temperate regions growing in shallow, slow flowing oligo-mesotrophic to eutrophic river water attached to siliceous substratum, (Calado & Rino 1992; Entwisle & Skinner 2002; Sherwood 2004; Tomas et al. 2012; Alcaraz et al. 2013) which is also confirmed by the present report. Some reports of occurrence of *T. javanicum*, however, are also available from pools as epiphyte, epipelic in river and shallow water channels (Iyengar 1932; Pandey et al. 1980), fishponds as epiphyte on *Potamogeton crispus*, *Elodea canad.* and *Batrachium aquatile* (Fott et al. 1965). The present report of *T. javanicum* confirms its presence in Arpa River in the years 2012 and 2013 but when checked again in December 2014 and 2017 at the study site, the species, however, could not be located. The main reason for the disappearance of the rare alga might be sand mining at the riverbed using tractors and bulldozers. This may have destroyed the substratum and water quality required by this species.

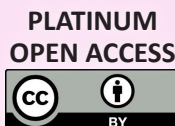
The status of rare and endangered algae is poorly known across the world and India as well. Very few countries like Australia, Britain, Japan, and Germany have tabulated the list of endangered algae and offered legal protection to them (Brodie et al. 2008). Among all groups of algae, the freshwater benthic and periphytons are most vulnerable to extinction. This is because water bodies are used for sewage discharge, coolants for various industries and mixing of the hot water effluent, and sand mining. Sand mining is supposed to be the reason for

missing *T. javanicum* in Arpa River at Bilaspur since 2014. For the protection of this rare and endangered alga, conservation of the habitat, mainly the stone substrates, is needed. Authorities providing concessions for sand mining should take this into consideration.

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