



Occurrence of *Stemonitis axifera* (Bull.) T. Macbr. (Myxomycota: Stemonitales) in Pondicherry, a union territory of India

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Abstract

Stemonitis axifera, observed on a piece of dead wood from Pondicherry, a union territory of India is described here based on morphological and microscopical characteristics. This observation is relevant due to the infrequency of records of Stemonitales in southern India, especially in a territory like Pondicherry, a union territory of India with no appreciable forest cover and low biodiversity.

Key words – Acellular slime mould – Biodiversity – Myxomycetes

Introduction

Myxomycetes or slime molds are fungus-like heterothallic organisms existing as macroscopic multinucleate diploid ‘plasmodial stage’ and the microscopic uninucleate haploid ‘amoebflagellate stage’ (Clark & Haskins 2016). These are mainly terrestrial organisms, found throughout the world in different ecosystems (Ing 1994, Liu et al. 2015) comprising of about 985 described species (Lado et al. 2003). The occurrence, distribution, and diversity of myxomycetes in different habitats in different countries including India were reported earlier (Stephenson et al. 1993, Hatano 2007, Rojas et al. 2014, Liu et al. 2015). The most exhaustive report on the myxomycetes in India is available at “Checklist of Myxomycetes from India” (Ranade et al. 2012). From India, the most reports of myxomycetes are confined to the western, northern and eastern states of India and very less or negligible from southern states, especially union territories. The different schemes of their classification were reported by Alexopoulos et al. 1996, Everhart & Keller 2008, Stephenson 2011 & 2014, Ruggiero et al. 2015, Liu et al. 2015). *Stemonitis* Gled. (Chocolate tube slime; Tree hair; Pipe cleaner slime) is a myxomycete (Family: Stemonitidaceae) appearing brownish in color, cylindrical top portions (sporangia) and are supported by narrow, black stalks (Emberger 2008). The genus was first described by German botanist Johann Gottlieb Gleditsch in 1753 (Gottlieb 1753). The 2014 estimate suggests that there are 18 species in the genus (Doğan & Eroğlu 2014). This report describes *Stemonitis axifera* (Bull.) T. Macbr. observed in Pondicherry, the capital city of Indian union territory of Pondicherry.

The history of works

The history of works on myxomycetes in India is given by Venkataramani & Kalyanasundaram (1986). They also described the distribution of Stemonitales in relation to aspects such as altitude, temperature, and rainfall. Several (Ghosh & Dutta 1963, Vasava et al. 2015) authors have studied the distribution/abundance of Stemonitales in India and concluded that the distribution of Stemonitales is not uniform throughout the country with southern India showing low numbers. Stemonitales are generally found on woody substrates in northwestern India, however, some species may be observed on a litter (Stephenson et al. 1993). The myxomycete of the present study was collected on dead wood. Stephenson et al. (1993) further states that the occurrence of the myxomycete *Stemonitis axifera* is occasional or rare in northwestern and southern India. Also, Agnihothru & Chinnappa (1969) previously reported few myxomycetes from Southern India.

Materials & Methods

Sample collection

The specimen was collected from a dead wood located within the Pondicherry University campus (12°01'17.46" N 79°51'12.61" E), Pondicherry (or Puducherry, the local name) – the capital city of Indian union territory of Pondicherry (Fig. 1).

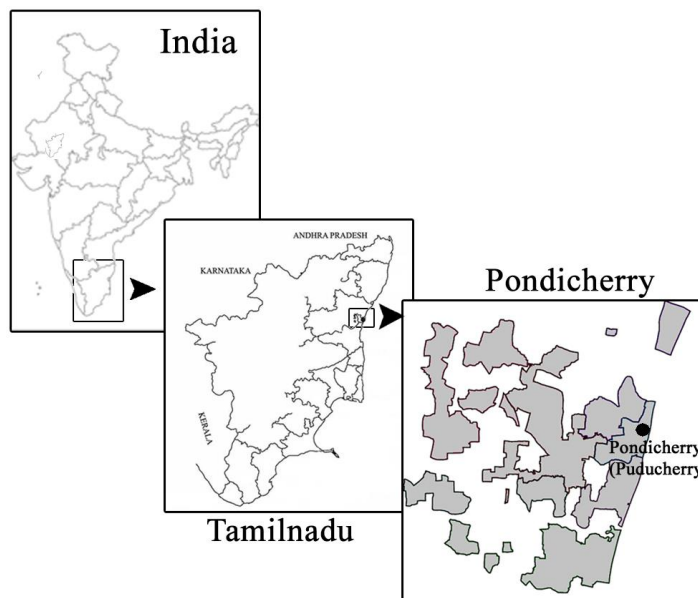


Fig. 1 – Map showing the location of specimen observation and collection at Pondicherry

The external characteristics of specimens were photographed using a Nikon Coolpix S220 camera (Nikon Corporation, Japan). The microscopic images were captured using a Motic BA310 digital binocular microscope with Digital microscopy software suite (Images Plus 2.0) (Motic, Hong Kong).

Results

Taxonomy

Stemonitis axifera (Bull.) T. Macbr., North American Slime Moulds: 120 (1889) [MB#119956]

Description

The specimen was observed in small clusters on a dead wood located within the Pondicherry University campus. The fruiting body has distinctive reddish-brown sporangia, supported on slender stalks (Fig. 2).

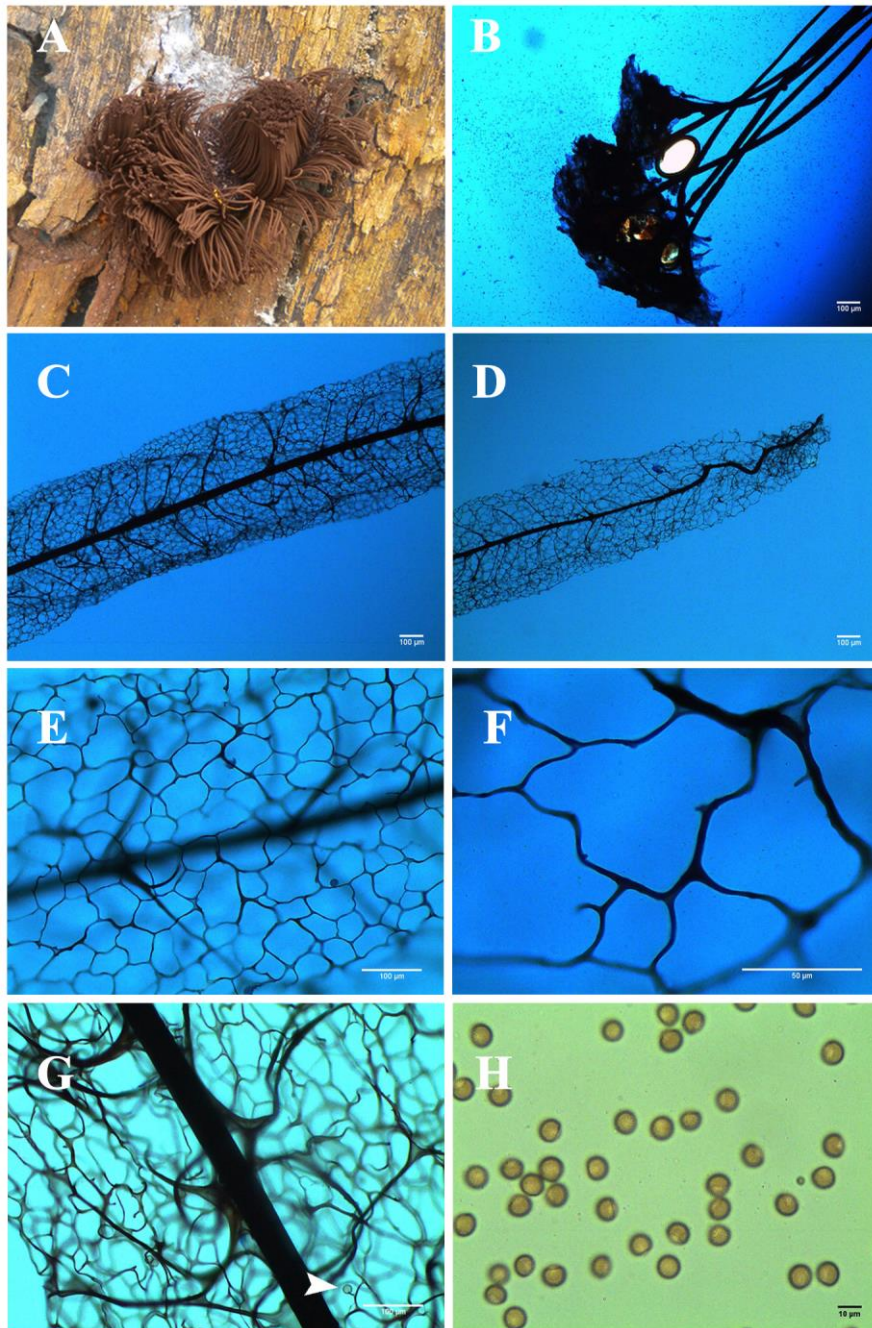


Fig. 2 – Fruiting bodies of *Stemonitis axifera* (Bull.) T. Macbr. On a dead wood A. bunch of stalks, B. Columella and Sporangium, C. Sporangium with acuminate apex, D. Capillitium – the mesh of internal network, E. Capillitium enlarged, F. Capillitium holding a spore (arrow head), G. Spores (H).

Fructification sporangiate, aggregated, stipitate, in medium size clusters, cylindrical, dark brown, acute or sub–acute apex. Sporocarps tufted, 10–15(~25) mm total height. Sporothecae (Sporangium) dark brown with a reddish tinge. Hypothallus silvery, shining, confluent. Stalk 1–4 mm long, shining black. Columella black, almost reaching the sporotheca apex, tapered and flexuous towards the tip. Capillitium dark brown/black and with a metallic glint, the primary branches arising obliquely to the columella expanded at the junctions within the net hardly branched thus only weakly supporting the surface net which usually collapses onto the columella soon after spore-dispersal, the mesh of internal network is angular, variable in size (ranges from 10–110 μm in width). Spore mass was dark reddish brown to pale brown in color. Spores lilac–brown, globose, warted and smooth in some parts with 7–9 μm in diameter.

Discussion

The specimen of the present study was identified up to the species level as *S. axifera* based on the characters described for *S. axifera* from other parts of the world including India (Hatano 2007, Kharat & Nanir 2010, Vasava et al 2015, Ranade & Ranadive 2016). It is a common species found associated with decaying wood and can be distinguished by its bright rusty brown colored fruiting body/sporangia, occurring in small or medium-sized clusters (Phate and Mishra, 2014).

Earlier *S. axifera* was reported from Mahabaleshwar, (Maharashtra); Tindharia, Darjeeling, (West Bengal); Mussoorie, (Uttar Pradesh); Nazira, Tocklai, (Assam); Mandi, Simla, Narkanda, (Himachal Pradesh) (Ranade et al. 2012). Agnihothrudu (1954a, 1954b, 1955, 1956a, 1956b), Agnihothrudu & Chinnappa (1966a, 1966b), Indira (1968a, 1968b, 1975), Stephenson et al. (1993) have studied the myxomycetes of southern India. However, the record of *S. axifera* in the southern part of India is not obvious due to the unavailability of sufficient literature. On the other hand, Stephenson et al. (1993) reported the occurrence/distribution of myxomycetes from Madras (now called Chennai) collected during 1954–1989. They observed eight isolates of *Stemonitis* in the Chennai study area, except *S. axifera*. Both Chennai and Pondicherry union territory is located in the south–eastern coast (Coromandel Coast) of South India, sharing almost the same climatic conditions. The vegetation is classified under tropical dry evergreen forests (Champion & Seth 1968, Parthasarathy et al. 2008). Its biodiversity and conservation significances are discussed by Parthasarathy et al. (2008), Seshadri et al. (2012), Padmavathy & Anbarashan (2013). The biodiversity of union territory is in various stages of degradation due to unregulated and unsustainable exploitation of forests and diversion of forest lands for non–forest usages, excessive use of pesticides, fertilizers, discharge of untreated sewage and industrial effluents etc (Meher–Homji 1974, Rao & Meher–Homji 1993, Stephen 2016). In this context, finding *S. axifera* in this ecologically sensitive, with no significant forest cover (only 13 km²) is important.

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