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Diversity of Freshwater Ascomycetous Genus *Aniptodera* from Dang Forest of Gujrat

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ABSTRACT:

Freshwater ascomycetes complete part, or whole of their life cycle within freshwater environments. Dang is a district in the south eastern part of the state of Gujarat in western India. Dang has an area of 1,764 km². The present paper deals with three species of *Aniptodera* viz. *Aniptodera chesapeakensis* Shearer and Miller, *Aniptodera inflatiascigera* Tsui, Hyde and Hodgkiss and *Aniptodera lignicola* Hyde, Ho and Tsui and *Aniptodera megalospora* Hyde, Ho and Tsui collected during winter season in 2019. All the four species rare in occurrence and have been recorded for the first time from Dang forest.

Key Words: Freshwater ascomycetes, *Aniptodera*, Dang Forest.

Introduction:

Freshwater Ascomycetes are defined as Ascomycetes which have been recorded in freshwater habitats and which complete part, or the whole of their lifecycle within freshwater environments (Shearer, 1993; Thomas, 1996; Wong et al., 1998). According to this definition, in addition to species of Ascomycetes that function in water, transient ascomycetous fungi present in water and terrestrial ascomyctous fungi that release spores that are dispersed in water are all regarded as freshwater Ascomycetes (Luo *et al.*, 2004). Lignicolous freshwater Ascomycetes inhabit submerged woody material in lentic (lakes, bog, ponds, swamps, pools) and lotic (rivers, streams, creeks, brooks) habitats (Wong *et al.*, 1998; Luo *et al.*, 2004), playing an important role in recycling organic matter in the aquatic ecosystem. Thomas (1996), however, states that the aquatic nature of some substrates is questionable (e. g. emerging part of a plant), therefore fungi growing on these substrates cannot be classified as freshwater fungi.

The genus *Aniptodera* was established by Shearer and Miller with type species *Aniptodera chesapeakensis*, Saprobic on submerged wood in aquatic environment.

Materials and Methods:

Samples of submerged woods were collected from streams of Pampa Sarovar, Shabari Dham of Dang forest, kept in polythene bags and brought in laboratory. Those were examined under microscope to find out fungal fruiting structures. The fungal structures were mounted in lactophenol and stained with cotton blue and cover glass was sealed with D. P. X. The fungi were identified with the help of Shearer (1989), Shearer and Miller (1977), Jones (1995), Kohlmeyer and Kohlmeyer (1979), Tsui *et al.* (1997), Hyde *et al.* (1999). Indian distribution was confirmed with Kamat *et al.* (1971), Bhide *et al.* (1987), Mahabale (1987), Bilgrami *et al.* (1979, 1981, 1991), Sarbhoy *et al.* (1975, 1986, 1996), Jamaludden *et al.* (2004), Pande Alka (2009), Borse *et al.* (2016) and other relevant literature.

Taxonomic account:

1. ***Aniptodera chesapeakensis*** Shearer & Miller (Photo plate - I Fig. 1, 2, 3)

Mycologia, **69**: 894 (1977).

Ascomata: 130-300 µm high, 170-325 µm in diam, peritheciod, immersed, semi-immerssed or superficial, globose or subglobose, hyaline to brown, papillate, ostiolate, solitary or gregarious, membranaceous. *Ostiole*: central, or ascomata lying horizontal to the host surface, and then neck at one end and curving upwards, cylindrical to conical, hyaline to brown, periphysate. *Necks*: 81-326 µm long, 36-80 µm in diam, cylindrical, periphysate, brown at or below the tip. *Peridium*: 12-16 µm thick, composed of elongated, thin-walled cells with large lumina, forming a textura angularis, merging into the pseudoparenchyma of the venter. *Catenophyses*: wide, slightly constricted at the septa. *Asci*: 64-116 x 14-38 µm, 8-spored, clavate, or becoming ballon-shaped or swollen, short pedunculate, unitunicate, apically truncate, with apical thickening which has a central pore, and subapical cytoplasm retraction,

mostly persistent, slightly constricted at below the apex. *Ascospores*: 21-37 x 7-15 µm, 2-3-seriate, ellipsoidal or fusiform, 1-euseptate, not constricted at the septum, hyaline, smooth, thick-walled, guttulate, with or without polar appendages; appendages filamentous, unfurling in water, long or short.

Habitat: Saprobic on submerged wood in aquatic environment.

Description: Based on Shearer and Miller (1977) and Kohlm. and Kohlm. (1979).

2. ***Aniptodera inflatiascigera*** K. M. Tsui, K. D. Hyde & Hodgkiss (Photo plate - I Fig. 4, 5, 6)

Sydowia, **49**: 187 (1997).

Ascomata: 160-300 µm in diam, globose, subglobose or pyriform, partly immerssed or superficial, hyaline to greyish brown, membranaceous, ostiolate, periphysate, neck yellowish. *Necks*: 184-220 µm long, 60-70 µm in diam, cylindrical, periphysate, hyaline. *Peridium*: composed of an outer layer of *textura angularis* and inner layer of compressed cells. *Catenophyses*: present. *Asci*: 135-200 x 14-38 µm, 8-spored, clavate, becoming ballon-shaped or swollen, pedicellate, thin-walled, apically rounded, with apical thickening which has a central pore, and cytoplasm retraction below the ascus apex, somewhat persistent. *Ascospores*: 32-45 x 15-22 µm, hyaline, ellipsoidal, bicelled, not constricted at the septum, relatively thick-walled (2-3 µm thick), with or without polar appendages; delicate, released from the pores at the ascospore tips.

Habitat: Saprobic on submerged wood in aquatic environment.

Description: Shearer and Miller (1977) and Kohlm. and Kohlm. (1979).

3. ***Aniptodera lignicola*** Hyde, Ho & Tsui (Photo plate - II Fig. 7, 8, 9)

Mycoscience, **40:** 171 (1999).

Ascomata: 160-240 µm in diam., globose to subglobose, partly immersed or superficial, hyaline, becoming black at maturity, membraneous, ostiolate, papillate, periphysate. *Peridium*: of comptressed cells. *Catenophyses*: present. *Asci*: 50-64 x 14-18 µm, 8-spored, cylindrical to clavate, pedicillate, thin-walled, apically truncate and thickened, with a apical pore and cytoplasm retracted below the ascus apex, persitent. *Ascospores*: 16-21.5 (-26) x 6.5- 7.5 (-)8 µm, hyaline, ellipsoidal, bicelled, not constricted at the septum, relatively thin-walled (<µm 1 thick).

Habitat: Saprobic on submerged woody material in freshwater habitats.

Description: Based on Hyde *et al*. (1999).

4. ***Aniptodera megalospora*** Hyde, Ho and Tsui (Photo plate - II Fig. 10, 11, 12)

Mycoscience **40:**165 (1999)

Ascomata 100-350 µm in diameter, ellipsoidal or globose, partly immersed, dark brown, ostiolate, periphysate with long neck. Asci 120-150 x 40-50 µm, 8 spored clavate pedicellate thin walled, apically rounded and indistinctly thick-walled apical pore not found. Ascospore 45-75 x 10-12 µm, hyaline cylindric, fusiform, bicelled, not constricted at the septum, thick walled, polar appendages not seen.

Habitat: Saprobic on submerged woody material in freshwater habitats.

Description: Based on Hyde *et al*. (1999).

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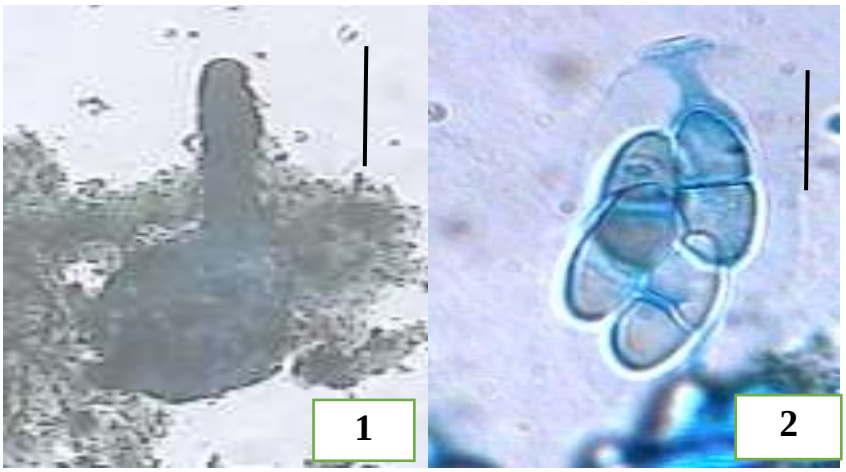
Photo plate - I

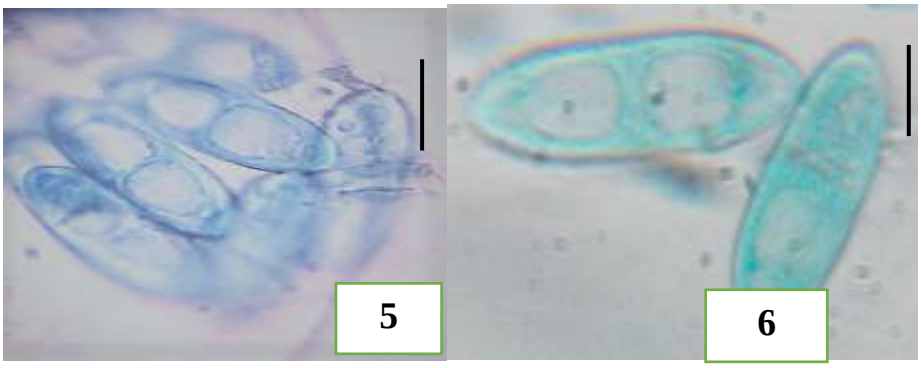


Aniptodera chesapeakensis ***Aniptodera chesapeakensis***

Ascocarp (Scale Bar = 40 µm) Ascus (Scale Bar = 40 µm)

Aniptodera chesapeakensis ***Aniptodera inflatiascigera***

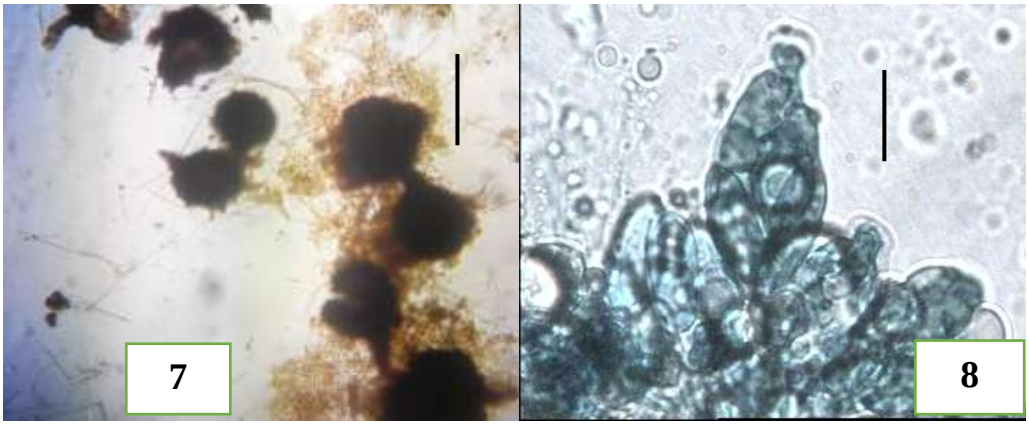
Ascospore (Scale Bar = 20 µm) Ascocarps (Scale Bar = 50 µm)



Aniptodera inflatiascigera ***Aniptodera inflatiascigera***

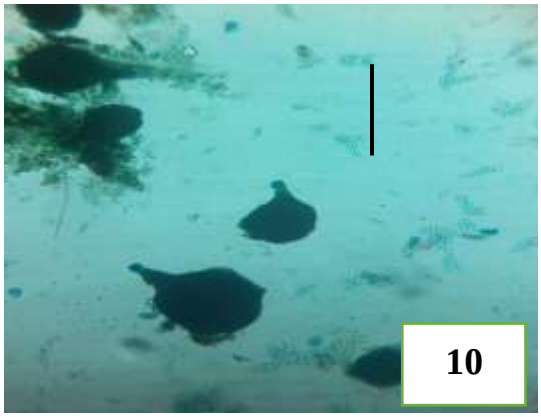
Ascus (Scale Bar = 50 µm) Ascospores (Scale Bar = 20 µm)

Photo plate - II



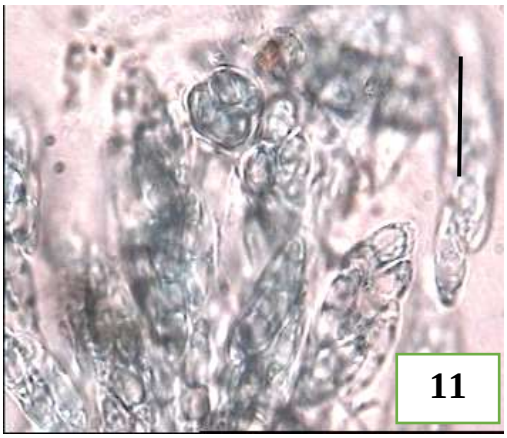
Aniptodera lignicola ***Aniptodera lignicola***

Ascocarps (Scale Bar = 50 µm) Asci (Scale Bar = 40 µm)



Aniptodera lignicola ***Aniptodera megalospora***

Ascospore (Scale Bar = 10 µm) Ascocarps (Scale Bar = 50 µm)



Aniptodera megalospora ***Aniptodera megalospora***

Asci (Scale Bar = 50 µm) Ascospore (Scale Bar = 10 µm)