



***Gelatinomyces conus* sp. nov. (Ascomycota, Leotiomycetes): a new bambusicolous fungal species from North-East India**

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ABSTRACT: This study represents a newly discovered and described macro-fungal species under family Leotiomycetes (Ascomycota) named as *Gelatinomyces conus* sp. nov. The fungal species was collected from decayed bamboo material (leaves, culms and branches) during the survey in Upper Assam, India. It looks like a pine-cone with gelatinous ascostroma. The asci are thin-walled and arise in scattered discoid apothecia which are aggregated and clustered to form round gelatinous structure on decayed bamboo material. The study also brings the first record of fungal species from north east region of India. A taxonomic description, illustrations and isolation and culture of *Gelatinomyces conus* sp. nov. are provided in this study.

KEY WORDS: Apothecium, Bambusicolous fungus, Gelatinous ascostroma, India, New fungal species.

INTRODUCTION

Bamboo is like a life line in north-east India. In India, north-east states harbours bamboo in the form of homestead stands, bamboo groves (public/ private domain) and natural bamboo brakes. But the knowledge on macro and micro fungi growing on bamboos is meagre. Hino (1938) first used the term "*fungorum bambusicolorum*" (bambusicolous fungi), but did not give a definition. "Bambusicolous" means "living on bamboo". Bambusicolous fungi grow on bamboo substrates, which include leaves, culms, branches, rhizomes and roots. More than 1100 species of fungi have been described or recorded predominately from the tropics and include ca. 150 basidiomycetes and 330 mitosporic taxa (100 coelomycetes and 230 hyphomycetes) (Hyde *et al.*, 2002). However, there are only a few reports from India especially from north-east India in particular (Saharia & Sarma, 2012). In this study, a new macro-fungus growing on decayed bamboo material in Upper Assam of north-east India is described with taxonomy and illustrations.

MATERIALS AND METHODS

Collection of fungal samples and observations

Collection of the fungal specimens was done during one of the surveys from April, 2015 to September 2015 from Upper Assam, India (Fig. 1). The specimens were photographed with SONY DSC-H9 camera in their habitat during the survey period. Different identifying characters *viz.* Shape, colour, odour, texture, substratum, size of the whole fruit body was noted down in the field. The macro-morphological features were studied under the stereo-trinocular microscope. Micro-morphological features were studied from the collected samples

mounted in the DPX fixative (a mixture of distyrene (a polystyrene), a plasticizer (tricresyl phosphate), and xylene), on the slides. Spore dimensions were obtained under BIOXL (Labovision trinocular microscope) and the basidiospores were microphotographed (Gogoi & Parkash 2015). Colour codes and terms used and followed after Kornerup & Wanscher (1978). The minimum, the maximum and mean value for length and width were measured among the twenty basidiospores and their quotients (length – width ratio) were determined (Das & Zhao, 2013). The specimens were allotted accession number and deposited and conserved in Mycology laboratory of Rain Forest Research Institute, Jorhat.

Isolation and culture studies

Only tissue transplanting from parts of ascomata (ascostromata) technique was employed for isolation of mycelium on PDA (Potato Dextrose Agar) plates. The colonies appeared after 5-7 days and further purified by sub-culturing and culture tube slant/s were prepared for conservation and accessions.

TAXONOMIC TREATMENT

Gelatinomyces conus V.Parkash, *sp. nov.*,
MycoBank- MB 815447

Fig. 2 A-L

Diagnosis: Like a Cone, 3-4 cm (l & d), *Ascostromata* gelatinous, surface with many discoid ascomata, aggregated but clustered separately, greenish tinge (27F3) – Nickel Green, a mat of red pigmentation in the interior. *Asci* clavate, unitunicate, multispored. *Ascospores* very tiny, ovoid. Asexual morph *Phialospora* or *Exophiala*-like, conidia produced on very short conidiogenous cells or hyphal cells. Colonies were white, but with a distinctive red pigment underside,

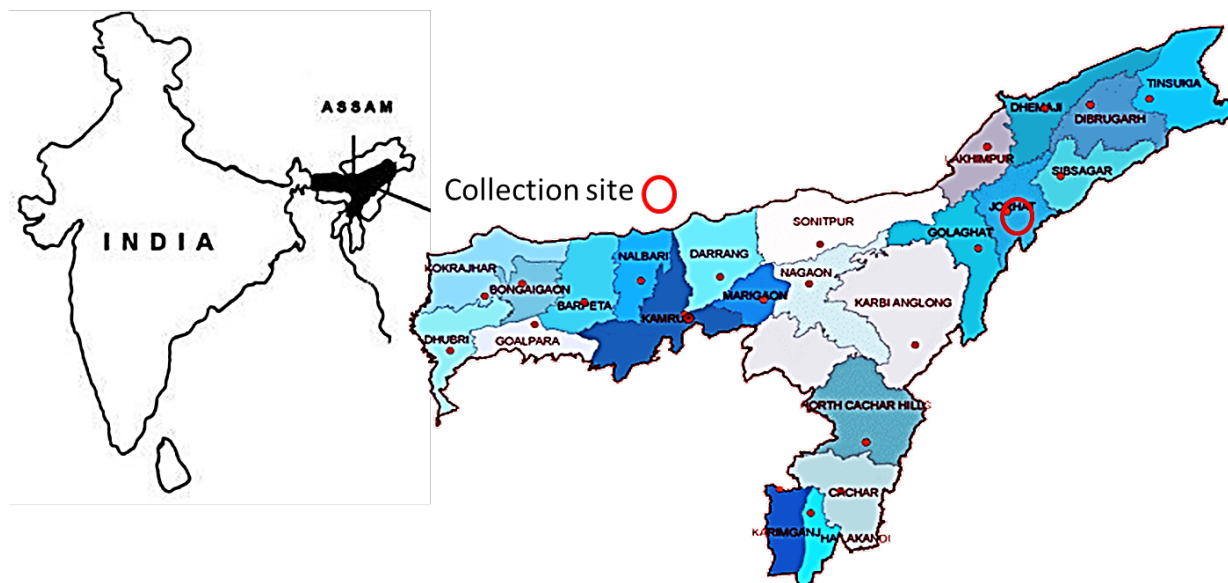


Fig.1. Map of collection site.

the reddish pigment diffusing into agar medium with irregular crystal deposition.

Etymology: The name of fungal species is after the shape and structure like a pine cone.

Type: INDIA: Assam, Jorhat district, Deovan, Lahodegarh- Kakojan area, (26°47'42.47"N; 94°19'22.18"E) growing on decayed bamboo material, 21 October, 2013, 17 May, 2016, RFRI/BF/55 (Holotype), 78, 79 (Paratypes), BF/Gel/55, 78 (ex Holotype).

Description: *Ascostromata*, 3–4 cm (h x b), grey to greenish tinge (27F3), soft and highly gelatinous, inner tissue repeatedly folded, up to golf-ball size when fresh, dark to black, hard and sclerotium-like when dry; discoid flattened irregular swollen ascomata aggregated (~ 80–160), but separate, embedded in the surface of a single gelatinous stromatic isthmus like gelatinous mass. *Ascomatal* apothecia, usually 120–250 µm tall and 350–700 µm diam. in surface view, greyish with green tinge, translucent, cushion-club shaped when young, brownish-black to black, discoid, flattened, with depressed surface when mature and sessile originated on a red gelatine material inside. *Hymenium* is gelatinous, exciple is smooth. *Asci* tapered at the base and clavate, without an operculum. *Ascospores*, hyaline, globose, ovoid, smooth-walled.

Colonies: very slow growing white flocculent colonies, *Conidiophores* hyaline, *Conidiophores* reduced to very short conidiogenous cells or conidiogenous pegs arising from hyphal cells. *Conidia* are single-celled and hyaline. *Conidia* produced on conidiogenous cells or hyphal cells, vary in shape and size, 3-4.5 × 2.5–3.0 µm, L/W= 3:3.6, aggregated in masses around the hyphae with two internal inclusions. Few swollen and septate hyphae are also present. A reddish pigment is produced in the medium during the

asexual morph in artificial culture which is also seen associated with ascostromatic structure accumulated inside the ascostroma. The pigment spreads into the medium after the establishment of the colony within a week. The unidentified crystals also appear on the fungal colony.

DISCUSSION

There are numerous bambusicolous fungi which have been reported in large numbers in the tropical regions than other areas due to the higher number of bamboo species. More than 630 species of fungi are known from bamboo, most of which are ascomycetes (Eriksson & Yue, 1998). 587 pyrenomycetes fungi on bamboo and approximately 200 species occur in south-east Asia (Hyde *et al.*, 2002). Ju *et al.* (1997) have described *Daldinia bambusicola* which was having a black, smooth surface, and relatively smaller ascostromata. Some fungi like *Munkia martyris*, *Neomunkia sydowii* and *Ustilaginoidea virens* are other hypocrealean fungi in the tribe *Ustilaginoideae* producing large asexual stromata on bamboo twigs but their relationships have not yet been resolved (Bischoff *et al.*, 2005). In addition, *Shiraia bambusicola* (*Dothideomycetes*, *Pleosporomycetidae*) produces spectacular pinkish orange ascostromata (Liu *et al.*, 2012). All taxa mentioned above have perithecioid or flask-shaped ascomata, 8-spored asci, ascospores, may or may not have interascal filaments, and occur on living leaves or branches but this fungal species has gelatinous, repeatedly folded, pine cone like, discoid flattened and irregular aggregated swollen ascomata occur on decayed bamboo leaves and twigs.

Sanoamuang *et al.* (2013) have already reported and

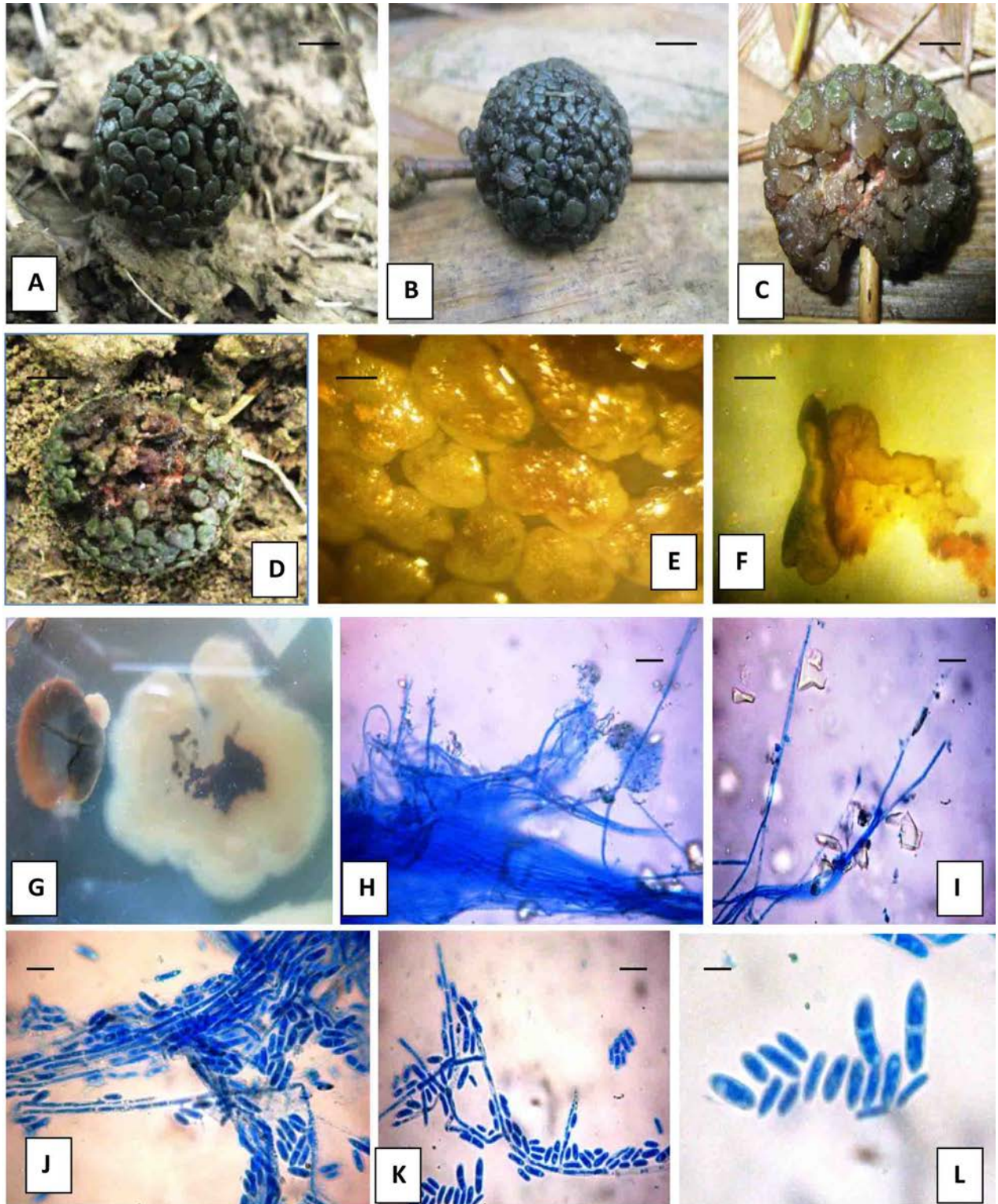


Fig. 2. Sexual morph of *Gelatinomyces conus* sp. nov. (A- Holotype RFRI/BF/55; B-C Paratypes- 78, 79 Ascstromata; D-Holotype RFRI/BF/55 showing red pigments accumulated inside ascostroma; E- Apothecial arrangement; F- gelatinous apothecium). Microscopic characteristics of the asexual morph of *Gelatinomyces conus* ex-holotype (G-H Fungal colonies on PDA medium producing reddish pigments; slender and skinny mycelia with hyphal branching and pairing; I- crystals like bodies generated in the medium; J-K- hyphal swollen and septate tips bearing conidia; L- conidia with internal inclusions). (A-D Bar = 1cm; E-F Bar = 300 μ m; H-L Bar = 10 μ m).



described a similar bambusicolous fungus, *Gelatinomyces siamensis* gen. et. sp. nov., *incertae sedis* within *Leotiomyces*, the Siamese jelly-ball. The fungus was collected from living bamboo culms and branches in Nam Nao National Park, Phetchabun, Thailand. But this fungus was on decayed bamboo leaves and branches. Moreover, the colour is also grey to greenish tinge in ascostromata whereas *G. Siamensis* was grey dark colour. The apothecia are compact in *G. siamensis* but separate in *G. conus*. Sanoamuang *et al.* (2013) have also discussed that the morphological characteristics and molecular phylogeny of the fungus, *G. siamensis* belong to phylum *Ascomycota*, class *Leotiomyces*.

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