THAROOPAMA LIVISTONAE SP. NOV. – A NEW SYNEMATOUS HYPHOMYCETES FROM INDIA

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Abstract: A periodic survey for the collection of foliicolous fungi from the Western Ghats of Maharashtra, resulted into the description and illustration of a new interesting species of *Tharoopama* Subram. viz. *T. livistonae*. The new species has been reported from the leaf sheath of *Livistona chinensis* R.Br. which is described as follows.

INTRODUCTION

Subramanian (1956) described *Tharoopama* with *T. trina* as a type species. *Tharoopama* Subram. is a dematiaceous fungus characterized by erect, superficial, continuous, brownish synemata with a well-defined stalk and a fertile head composed of closely aggregated parallel septate, brownish hyphae; the head constituted by the conidiophores are pseudoverticillately arranged, geniculate and produces conidia acrogenously. A total of four species of *Tharoopama* Subram. has been reported from all over the world (Anon.) viz. *T. trina* Subram (1956), *T. arborescens* (Penz. and Sacc.) Subram. (1956), *T. mississippiensis* Lentz (1967), *T. naimnagarensis* Reddy *et al.* (1975). Subramanian 1956 made *Trichosporium arborescens* cogeneric with *Tharoopama* and described it as a new combination form namely as *Tharoopama arborescens* comb. nov. *T. triana* Subram. has been reported on dead culms of leaves of *Cyanodon dactylon* L. (Kapoor and Munjal, 1966) and on culms of *Saccharum spontaneum* (Sharma and Nema, 1990). During a routine survey of foliicolous fungi from Botanical Survey of India Garden, Pune the authors came across a distinctive new anamorphic fungi growing on leaf base of *Livistona chinensis* R.Br.The detail taxonomic features of the fungus are described here.

MATERIALS AND METHODS

The morphological description is based on an examination of material mounted in hydrous lacto phenol and cotton blue.

TAXONOMIC DESCRIPTION

***Tharoopama livistonae* sp. nov.** Dubey and Moonnambeth (Fig.1).

Synemata dispersi superficial, erecti, conspicua, album, visibilem nudus oculos, 440 - 2200 µm longus; aliquando duabus ad quattuor synemata oritur exeadem basi; sub handlens singulis synemata habere videtur simplex caule et a apicalibus fertilis caput. Caulis occupandisaltem ¾ ex longitudine synemata, flavo albus in iuvenibus conditione et flavo brunneae ad maturitatem, simplex, 320 – 890 µm longae, apice leviter intumuit ad basim habens crassitiem 71 – 140 µm et est 20-77 µm crassis supra in ulteriori parte, consistunt ex laxe disposita numerosa hyphis hyalinis sterile longa capillos; Hyphis dilute, valde laete brunnea, ramis nullis, parallela, septatis, Genitus est usque II µm lata, non insigniter ramosis in stipitati, sed ramosis pseudoverticillately in synematal caput; pilis hyalinis, aseptate, sub erectus, ramis nullis, laeves, et parietibus tenuibus acuto apice, initium capit a basi, inveni intermixta cum hyphis conidiophoris et excedit ultra longitudinem synemata et est Genitus est usque 2500 µm longus; fertilis apicalibus caput, mensurare usque ad 400 µm in diametero, albidus, grisei colons, ovalia vel nonnihil irregularibus adumbratim, consistens individuum, laxe disposita fertilis ramosis hyphis permansit de ligno ad formam conidiophoris; conidiophoris subhyalinis vel pallide brunneis, septatis, identidem ramosis (1-2 times), procurauit pseudoverticillately, ramis ultimis fertilis (cellulas conidiogenas), 38 - 89.5 x 1.39 - 2.0 µm; conidia producitur acropleurogenously et in coetibus ut scilicet producitur ab apice et al a teralibus latere

Table-1: Comparative account of *Tharoopama livistonae* sp. nov. with related species

Fungal Characteristics	*T. trina* Subram. (1956)	*T. mississippiensis* Lentz (1967)	*T. naimnagarensis* Reddy *et al.* (1975).	*T. livistonae* sp. nov.
Synemata	Scattered, superficial, brownish-black, 740 – 1470 µm long.	Gregarious, coalescent, arborescent.	Scattered, conspicuous, superficial, erect, 375 – 535 µm long.	Scattered superficial, erect,conspicuous, yellowish white, 440 – 2200 µm long. Two to four synemata arising from the same base.
Stalk	Brownish black composed of pale olivaceous hyphae, closely aggregated, 504-1050 µm long, 50-61µm thick at the base and 38.8-50.0 µm thick above.	Very short, dark brown, usually with short, free branches along the sides.	Simple, dark brown, cylindrical, 350-910 µm long, 84-140 µm thick at the base and 42-70 µm thick above.	Hyaline white to pale yellow, simple, 320 – 890 µm long, 71 – 140 µm thick at the base and is 20-77 µm thick above. Two to stalk arising from the same base.
Synematal head	460 – 1190 µm in diam.	Very small, broad and loosely branched.	550 µm in diam.	400 µm in diameter, oval or somewhat irregular in outline.
Synematal hairs	Rarely observed in stalk.	Absent.	Absent.	Hyaline, aseptate, sub erect,unbranched, smooth and thin walled, exceeds the length of synemata, upto 2500 µm long.
Conidiophores	Pale brown, pseudo verticillately branched, and hyaline towards the tip, having geniculations in older synemata.	Pale brown with ordinary branching.	Sub hyaline to pale brown, 1-3 branched, pseudo verticillately branched and geniculate.	Subhyaline to pale brown, septate, 1-2 times,arranged pseudoverticillately.
Conidia	Produced singly and acrogenously from the tip, globose with a basal apiculus,hyaline, smooth, one celled, 3-4 µm in diameter.	Produced on the denticles of sporogenous cells, acrogenous, ellipsoidal or asymmetric, truncate at base, pale, one celled, 4-5.5 x 2.25 - 2.75 µm.	Produced acrogenously and singly from the tips, Hyaline, ellipsoidal and beaked, one celled with a basal scar, 3.25–5.6 x 1.3-2.3 µm.	Produced acro-pleurogenously and are arranged in groups, hyaline, ellipsoidal, and slightly beaked, guttulate, one celled, smooth, 1.80 – 3 x 1.10 – 1.60 µm.

conidiophoris in coetus, geniculations non videntur in iuvenibus synemata sed raro visibile insenior ones; conidiis hyalinis, ellipsoideis, leviter rostratae unum cellularibus, laevibus, guttulate, 1.80-3 x1.10–1.60 µm.

Synemata scattered superficial, erect, conspicuous, white, visible by naked eyes, 440 – 2200 µm long; sometimes two to four synemata arises from the same base; under handlens each synemata seen to have a simple stalk and a apical fertile head. Stalk occupying at least ¾ of the length of synemata, yellowish white in young condition and yellowish brown at maturity, simple, 320 – 890 µm long, slightly swollen at the base having a thickness of 71 – 140 µm and is 20-77 µm thick above in the further part, consist of loosely arranged numerous hyphae and hyaline sterile long hairs; Hyphae pale, very light brown, unbranched, parallel, septate, upto 2 µm wide, not conspicuously branched in the stipe, but branched pseudoverticillately in the synematal head; hairs hyaline, aseptate, sub erect, unbranched, smooth and thin walled with pointed apex, starts from the base, found to be intermingled with hyphae and conidiophores and exceeds beyond the length of synemata and is upto 2500 µm long; the fertile apical head, measuring up to 400 µm in diameter,

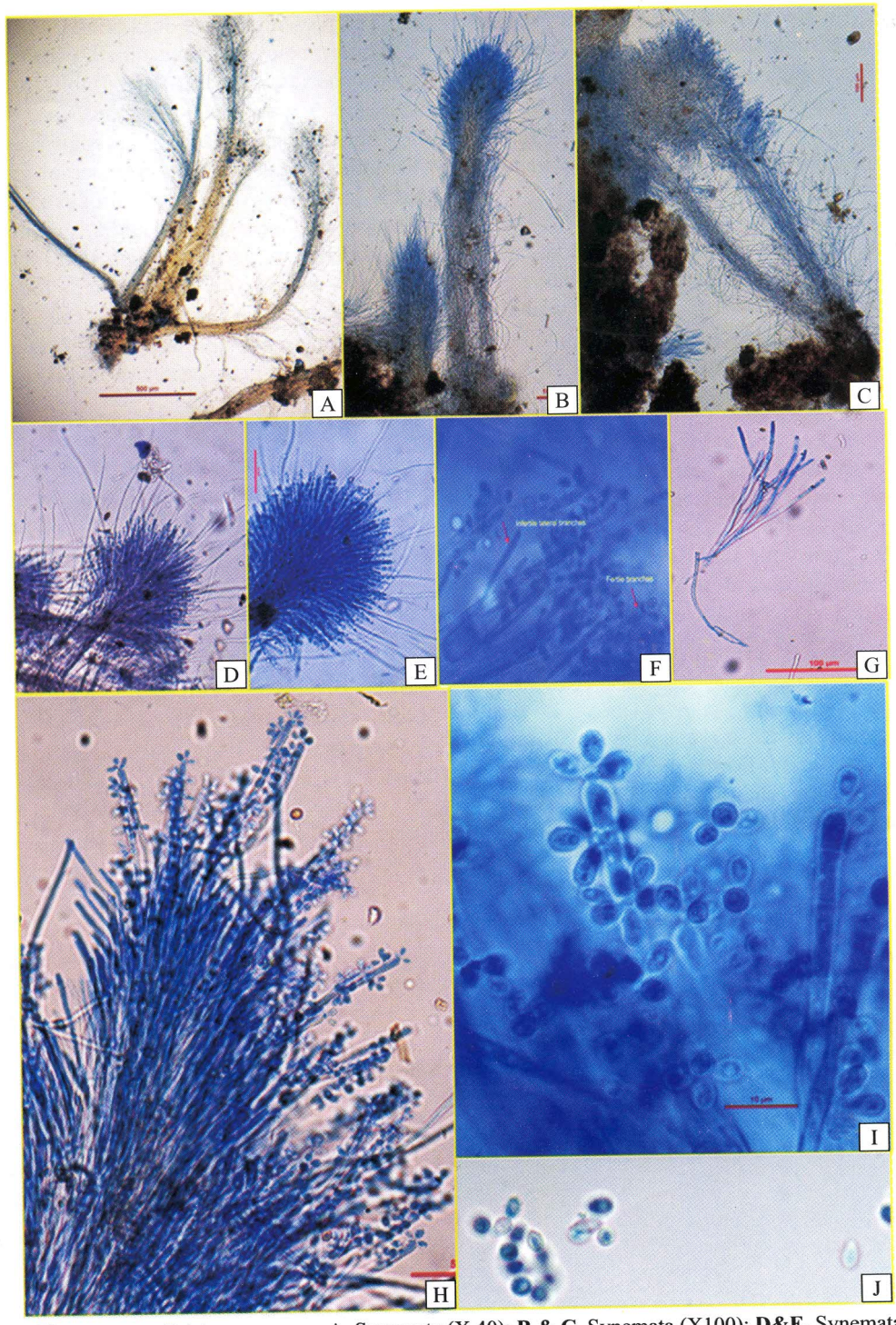

Fig. 1. ***Tharoopama livistonae*** sp. nov. **A.** Synemata (X 40); **B & C.** Synemata (X100); **D&E.** Synematal head with sterile hairs (X400); **F.** Fertile and infertile branches of conidiophores (X 400); **G.** Pseudoverticillate branching of conidiophores (X 400); **H.** Conidia and conidiophores (X 400); **I.** Conidia and conidiophores (X 1000); **J.** Conidia (X 1000).

whitish grey in colour, oval or somewhat irregular in outline, consisting of individual, loosely arranged fertile branched hyphae continued from the stalk to form conidiophores; conidiophores subhyaline to pale brown, septate, repeatedly branched (1-2 times), arranged pseudoverticillately, ultimate branches fertile (conidiogenous cells), 38 – 89.5 x 1.39 - 2.0 µm; conidia produced acropleurogenously and in groups i.e. produced from the apex and from lateral side of conidiophores in groups, geniculations are not seen in young synemata but rarely visible in older ones; conidia hyaline, ellipsoidal, slightly beaked, one celled, smooth, guttulate, 1.80 – 3 x 1.10 – 1.60 µm.

Holotype: On leaf sheath of *Livistona chinensis* R.Br. (Arecaceae), BSI garden, WRC, Pune, Maharashtra, India. Collected by R. Dubey in September, 2012. Deposited in Botanical survey of India, WRC, Pune with Accession No. BSI (WRC). 132410. Description and photographs have also been submitted to Mycobank with No. MB802965.

Etymology: Species epithet was given after the name of the host plant.

On comparison the present fungus was found to be quite different from other known species of *Tharoopama* in the general morphology.The diagnostic characters of the species is the presence of sterile, hyaline, unbranched hairs which starts from the base; extends far beyond the fruiting body; two to four synemata arising from the same base, the conidial development is acro-pleurogenous type and are produced in groups i.e. conidia are produced from the apex and from lateral side of conidiophores as well as the conidia are produced in groups; long synemata; branching of conidiophores, absence of scars in conidia and guttulate conidia etc. The present species does not matched in most of the morphological characteristics with the earlier known species of *Tharoopama* (Table-1). Although it resembles with *T. naimnagarensis* and *T. trina* in few minor character but differs significantly from it in other characters, viz. presence of long sterile hairs, long synemata, process of conidiogenesis, absence of scar on conidia, branching of conidiophores, guttulate conidia etc (Table -1). No species of *Tharoopama* has been reported with such unique features. Therefore, it was considered valid to reflect it as a new species namely *T. livistonae* sp. nov. Thus, it is a new species to the science.

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