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Stigmatochroma microspora (Physciaceae), a new species from India

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ABSTRACT

Stigmatochroma microspora is described as new species which is close to *S. adaucta*. However, *S. microspora* has UV+ thallus, apothecial disc pruinose, UV-, 16-ascospores per ascus, smaller (4.5–7.0×1.5–2.3 µm) in size, atranorin, norstictic acid and lichexanthone in chemistry.

Key Words: *Buellia s. l.*, Eastern Ghats, Rayalaseema, taxonomy, Lichenized fungi.

INTRODUCTION

The lichen genus *Stigmatochroma* Marbach (Physciaceae) is a pantropical-subtropical genus circumscribed by Marbach (2000) from *Buellia* sensu lato for its unique characters of lecideine apothecia having white-grey pruinose disc emitting UV+ yellow or red fluorescence due to presence of xanthone. The genus is otherwise characterized by the crustose, often verruculose to verrucose thallus; clavate, *Bacidia*-type asci with 8–16 ascospores; small, oblong to narrowly ellipsoidal, *Buellia*-type ascospores with or without torus and smooth surface; paraphyses simple or furcate. The secondary metabolites are usually lichexanthone and norstictic acid. Marbarch (2000) in his monograph reported six corticolous *Stigmatochroma* species that included three each new species and new combinations. Subsequently, Marbach and Writh (2000) described one more species *S. sorediata* Marbach & Writh, from Polinesia. The species of *Stigmatochroma* are currently distributed in South Asia, Australia, South and Middle America and rarely in Europe. This is the first record of the genus from India.

The Eastern Ghats region of India is gaining importance for its lichenological studies in recent times. Nayaka *et al.* (2013a) illustrated the interesting lichen mycota of the region from where new species and records such as *Pyxine yercaudensis* Nayaka & Upreti (Nayaka *et al.* 2013b) and *Peltula farinosa* Büdel are reported. In our ongoing lichen exploration in Rayalaseema region of Andhra Pradesh we collected several interesting specimens and their identification in progress. Meanwhile few specimens close to *Buellia* described as a new species of *Stigmatochroma* for its unique characters as discussed below.

MATERIAL AND METHODS

The external morphology of the *Stigmatochroma* specimen was studied under a Magnüs MS 24/13 stereo-zoom microscope while anatomical characters of the thallus and apothecia were observed under a Leica DM500 compound microscope. Thin hand cut sections of the thallus and apothecia were initially mounted in water to record the colour and measurements of various structures. The apothecial sections were then observed after applying aqueous 10% KOH solution while Lugol's solution (I) was used for iodine reactions. The colour tests were performed by using routine reagents; aqueous solution of KOH (K), calcium hypochlorite (C), and paraphenylenediamine (P). The lichen substances were identified by thin-layer chromatography following literature (White & James 1985; Orange *et. al.* 2001). All the collected specimens were deposited in the CSIR-National Botanical Research Institute (LWG), Lucknow, India.

RESULTS AND DISCUSSION

The Species

Stigmatochroma microspora Mohabe, Nayaka and A.M. Reddy **sp. nov.** **(Fig. 1. A-E)**

MycoBank No.: **MB812638**

Thallus corticolous, areolate, UV+ yellow-orange; apothecial disc whitish-grey pruinose, UV-; ascospores 16 per ascus, 4.5–7.0×1.5–2.3 µm in size; atranorin, norstictic acid and lichexanthone in chemistry.

Type: INDIA, Andhra Pradesh, Kurnool district., Nalakaluva village, 9 km from Atmakur, starting way to Rudrakodur, on bark, 11.01.2013, Satish Mohabe & Suresh K. Raju 2912 (holotype: LWG).

Thallus crustose, corticolous, areolate to rimose, smooth to verruculose, yellowish-grey, UV+ yellow-orange; corticated; cortex hyaline to yellowish, 5–10 µm thick; algal layer continuous, 20–34 µm thick; medulla white, 19–35 µm thick, prothallus indistinct to brownish.

Apothecia restricted to centre, rounded, adnate to sessile, 0.1–0.8(–1.0) mm wide. Margin thin, lecideine. Disc brownish-black, flat to slightly convex, pruinose; pruina whitish-grey, dense. Exciple brown 17–30 µm thick. Epihymenium dark brown, 7–10 µm thick, granular. Hymenium hyaline to yellowish, without oil globules, 30–36 µm high, I+ blue. Hypothecium dark brown, K+ red (with norstictic acid crystals), 40–50 µm high; internal stipe dark brown, K+ red, 34–68 µm high. Ascus clavate, Bacidia-type, with well-developed tholus, I+ blue; 20–25×7–10 µm, with 16 ascospores. Ascospores brown, oblong to narrowly ellipsoidal, 1-septate, 4.5–7.0×1.5–2.3 µm; ascospore wall uniformly thickened, 0.3–0.5 µm thick, septa 0.4–0.6 µm thick. Paraphyses branched, apically swollen, pale brown; pycnoconidia not seen.

Chemistry: Thallus K+ orange to red, P+ yellow-orange, C–, KC–, UV+ yellow-orange; Apothecia disc UV−; TLC: Atranorin (major), norstictic acid (major) and lichexanthone in thallus.

Ecology and Distribution: At present *Stigmatochroma microspora* was found growing on bark of tree trunk in tropical dry deciduous forests at an altitude of ~600 m.

Remark: *Stigmatochroma microspora* is characterised by yellowish-grey, areolate, smooth to verruculose, UV+ yellow-orange thallus, lecideine apothecia with densely whitish-gery pruina, UV- disc, 16 ascospores of smaller (4.5–7.0×1.5–2.3 µm) size and the presence of atranorin, norstictic acid and lichexanthone. It can be noted that pruinose apothecial disc with UV+ yellow or red colouration is mentioned as the genus character of *Stigmatochroma* by Marbach (2000) and (Elix 2011). Indian specimens have UV− pruinose disc but UV+ thallus. The new species is close to *S. adaucta* (Malme) Marbach, a tropical species distributed in Australia, Brazil, Malaysia, Papua New Guinea and Philippines. However, *S. adaucta* differs in having UV−, strongly verrucose thallus, black prothallus, pruinose and UV+ yellow apothecial disc and much larger ascospores of 10–15×5–7 µm. All the remaining six species of genus viz. *S. epiflavia* Marbach, *S. gerontoides* (Stirt.) Marbach, *S. metaleptoides* (Nyl.) Marbach, *S. epimarta* (Nyl.) Marbach, *S. kryptoviolascens* Marbach, and *S. sorediata* Mabarch & V. Writh differ variously and also have 8-spored per ascus (Table 1).

Etymology: The species epithet refers comparatively smaller size of the ascospores within the genus.

Specimens examined: India: Andhra Pradesh, Kurnool district, Rudrakodur, inside of the forest, N 15°47.361´ E 078° 38.257´ alt. 267 m, on bark, 11.01.2013, Satish Mohabe & K. Suresh Raju 2931 (LWG); 9 km from Atmakur, starting way to Rudrakodur, Nalakaluva village, N 15°48.746´ E 078° 36.761´ alt. 291 m, on bark of tree twigs, 11.01.2013, Satish Mohabe & K. Suresh Raju 2908 (LWG); 18 km from Atmakur, Bairluti village, N 15°53.804´ E 078° 34.655´ alt. 290 m, on bark, 12.01.2013, Satish Mohabe & K. Suresh Raju 2961 (LWG).

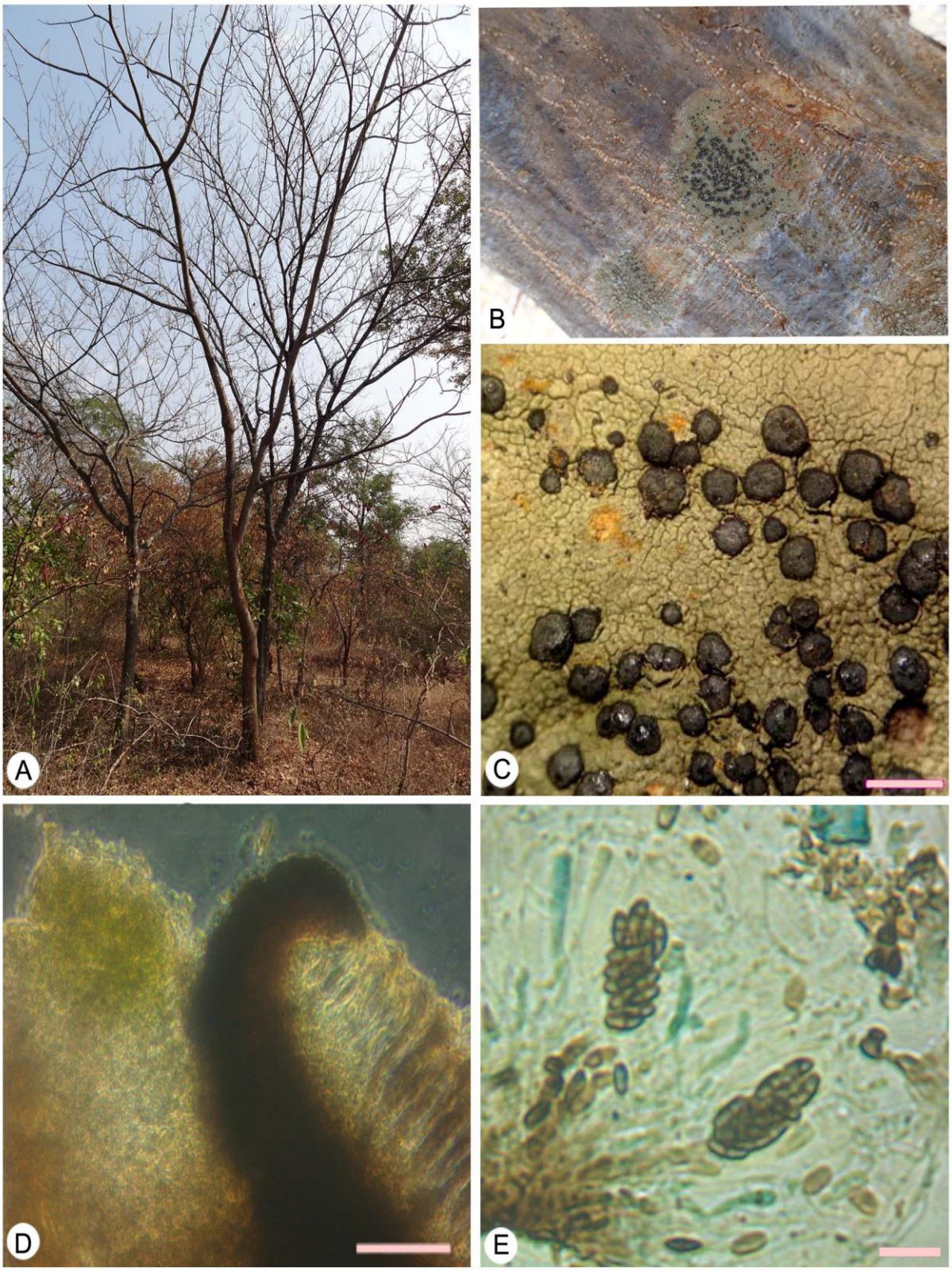

Fig. 1. A. Tropical dry deciduous forest (type locality), **B.** habitat of *Stigmatochroma microspora* **C.** habit (holotype), **D.** cross section of apothecium, **E.** ascospores; **Scale:** A-B = not to scale, C = 1 mm, D = 25 µm, E = 10 µm.

Table 1. Comparison of *Stigmatochroma* species with morphological and anatomical characters including UV reaction on thallus and pruina. New species in bold

	Soredia	Thallus, UV	Apothecia & size (mm)	Disc	Pruina, Colour	Pruina, UV	Spores per ascus	spores size (µm)	Chiemistry
S. adaucta	Absent	No colour	Sessile 0.7–0.9	Flat or convex	White	Yellow	8–12 (–16)	10–15 × 4.5–7.0	Atranorin, norstictic acid
S. epiflavia	Absent	No colour	Sessile 0.5–0.8	Slightly concave or flat	Yellow	Yellow	8	15–24 × 6.0–7.0	Atranorin, norstictic acid
S. epimarta	Absent	No colour	Sessile 0.6–0.9	Flat or convex	Orange or red brown	Red	8	15–22 × 7–10	Atranorin, norstictic acid, parietin
S. gerontides	Absent	± Orange	Sessile 0.4–0.7 (–1.0)	Flat or slightly convex, grey	Ochraceous or yellow	Yellow	8	12–16 × 5.0–6.5	Norstictic, thiophaninic
S. kryptoviolascens	Absent	No colour	Sessile 0.6–0.9	Flat or convex	Grey or Ochraceous grey	Yellow	8	16–22 × 7–8	Atranorin, norstictic acid
S. metaleptoides	Absent	Pink, Orange or Red	Sessile 0.4	Concave	White or yellow	Orange-red	8	16–21 × 6.5–9.0	Norstictic, thiophaninic
***S. microspora* Mohabe**	**Absent**	**Yellow-Orange**	**Adnate to sessile 0.1–0.8 (–1.0)**	**Flat to convex**	**Whitish or grey**	**No colour**	**16**	**4.5–7.0 × 1.5–2.3**	**Atranorin, norstictic acid, lichexanthone**
S. sorediata	Present	No colour	sessile 1.0–1.2	Flat	Grey	No colour	8	14–19 × 7.5–10.0	Atranorin, norstictic acid

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