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Taxonomy and Diversity of Genus Xylaria from Aurangabad District, (Maharashtra) India

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ABSTRACT

The present investigation deals with the taxonomy and diversity of genus Xylaria, specimens collected from various regions of Aurangabad District (Maharashtra) India. Xylaria genus is described in the family Xylariaceae, order Xylariales, class Sordariomycetes, phylum Ascomycota. During the survey, it was observed that most of the Xylaria species were grown on decaying wood logs. Collected specimens were examined on the basis of morphological and microscopic features, and noted down the dimension of stromata, perithecia, and ascospore. Based on observations five species of Xylaria were identified according to macro-morphological and microscopic character, Xylaria multiplex and Xylaria polymorpha were dominating macrofungi while Xylaria feejeensis, Xylaria hypoxylon, and Xylaria symploci were rarely observed. The four species newly reported for Aurangabad district are Xylaria feejeensis, Xylaria hypoxylon, Xylaria multiplex, and Xylaria symploci.

KEYWORDS: Aurangabad, Macro-morphological, Specimens, Stromata.

I. INTRODUCTION

Randomly survey and collection of stromata of *Xylaria* species were done from various regions of forest area, grassland, crop field, roadside, riverside, and sawmills of Aurangabad district, which comprises nine taluka Aurangabad, Gangapur, Kannad, Khultabad, Paithan, Phulambri, Sillod, Soygaon and Vaijapur. Aurangabad district is located between 19˚–20˚ North Latitude and 74˚–76˚ East Longitude, the total geographic area of Aurangabad district is 10107 sq. kms, out of forest area is 770.93 sq. kms i.e. 7.61%, which is rich in plant biodiversity.

The saprobic lignin degraders belong to the ascomycetous genus *Xylaria* Hill ex Schrankis cosmopolitan in distribution, occurs on dead wood, barks, wood logs, plant litter, saprobic or parasites on woody trees, are characterized carbon and cussion, sessile or stipitate, upright, simple or branched stromata, cylindrical to clavate or globoid or irregular fertile parts (Roger 1979, Trierveiler-Pereira et al. 2009). *Xylaria* was classified on the basis of morphometrical character by giving priority to the length and position of germination of ascospores (Whalley 1996). *Xylaria* species grow on various substrates, but the major substrate is decaying

wood, and wood logs, therefore they are wood decaying fungi mostly saprobic or rarely parasitic in nature (Rogers 2000). The new species of *Xylaria* from western ghat of India *Xylaria symploci* was reported by (Pande et al. 2005). Six new record *Xylaria* species for India out of ten species were collected from Musashi forest, western ghat of Maharashtra India (Kshirsagar 2009). Family Xylariaceae large and diverse family of phylum Ascomycota and randomly distributed throughout the world as pieces of evidence reported from the region or ecological diversity (Lee et al. 2018). Five species of *Xylaria* were reported from the Jalgaon district from various regions of the forest area (Firdousi 2021).

II. MATERIALS AND METHODS

In the present investigation, the thirty-three specimens of *Xylaria* were collected from various regions of Aurangabad district, 20 to 25 days after heavy rainfall during the year July (2016) to November (2019) after several intervals. The specimen of Stromata were collected in brown paper bags, noting the host name, locality, date of collection, color of the specimen, and type of attachment suggested by (Gilbertson and Ryvarden 1986), Dimension or range of measurement of stromata were done as started by (Ryvarden and Johanson 1980). The morphological and microscopic character was recorded, fresh material from the field and dried material in the laboratory. The freehand thin section cutting stromata is done with a sharp blade, stained, and studied in 5 % KOH, Lactophenol, Cotton Blue, and Melzer's reagent and microscopic observations were made under 40X and 100X Magnification (Olympus CX 41) in the laboratory.

III. RESULT AND DISCUSSION

***Xylaria feejeensis* (BERK.) Fr.**

Stromata annual, upright, up to 14.9 cm in length, corky, flattened, simple, the lower part of stromata grayish brown to black, stromatal context white. Perithecia rounded, some are flattened, few in stroma, present at periphery of stroma, 245–340×190–260 µm. Asci cylindrical, 91–85 × 3.2– 6.5 µm, 8-spored. Ascospores smooth, non-septate, ellipsoid-inequilateral, black, uniseriate, 9.8–16.5 × 3.5–6.5 µm.

Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Kannad, Barkatpur; 20°22′30″N 75°23′29″E; alt 640m; on the living tree at root of *Senna siamea* (Lam.) H.S.Irwin & Barneby; 08/09/2019; *Vijay Gore* (VUG/VPM–711).

***Xylaria hypoxylon* (L.) Grev.**

Stromata annual, erect, up to 3.9 cm in length, corky, flattened, simple or branched, the lower part of stromata grayish brown to black, stromatal context grayish white. Perithecia develop beneath the stromatal surface showing protruduing papillae of the perithecial necks. Perithecia with comspicuous ostioles. Asci cylindrical, 90–115 × 5–5.5 µm, 8-spored. Ascospores smooth, non-septate, ellipsoid-inequilateral, black, uniseriate, 10.5–14.5 × 5–6 µm.

Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Sillod, Ajanta forest; 20˚33′01″N 75˚42′09″E; alt 418m; on the wood logs of *Pistacia integerrima* J. L. Stewart ex Brandis; 02/10/2019; *Vijay Gore* (VUG/VPM–726).

***Xylaria multiplex* (Kunze) Fr.**

Stromata annual, upright, up to 7.1 cm in length, corky, flattened, simple, clavate, cylindrical, stromata grayish brown to black, stromatal context white. Perithecia black, sub-globous, embedded in fertile head, arrange in single layer, 285–375 × 170–240 µm. Asci cylindrical, 90–125 × 5–6.5 µm, 8-spored. Ascospores smooth, non-septate, ellipsoid-inequilateral, black, uniseriate, 8–11 × 5.5–6 µm.

Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Sillod, Loanwadi; 20˚17′19″N 75˚32′10″E; alt 653m; on the wood logs of *Mangifera indica* L.; 01/09/2016; *Vijay Gore* (VUG/VPM–308).

***Xylaria polymorpha* (Pers.) Grev.**

Stromata annual, 2.4–7.6 × 0.5 – 2.5 cm, extremely variable in shape and size, cylindric to cylindro-clavate, with rounded fertile apices, short or long stipe merging gradually into fertile parts or sessile with long rooting bases. Stromata grayish white to tan, at first bearing conidia over entire clavate, becoming dull blackish brown to black as conidial layer sloughs or flakes off. Stromatal context white to off white. Stromatal surface rugulose to strongly rugose, ostiolar papillae obscure to discoid to hemispheric. Perithecia 520–790 × 320–430 µm. Asci long-stipitate, 8-spored, 155–230 × 6 – 15 µm, spore bearing part 95–145 µm, with apical ring rectangular to urn-shaped, 4.5 – 6.5 × 3 – 4 µm. Ascospores smooth, brown to dark brown, ellipsoid-inequilateral to navicular, with rounded to acute ends 22–28×5.5–7 µm, with straight to slightly oblique germ slit.

Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Soygaon, Nimbayati Phata; 20˚32′54″N 75˚31′025″E; alt 336m; on the living tree of main trunk of *Butea monosperma* (Lam.) Taub; 09/11/19; *Vijay Gore* (VUG/VPM–784).

***Xylaria symploci* A. Pande, Waing., Punekar & Ranadive.**

Sromata annual, erect, 13–19 × 2.5– 3.5 cm, mostly straight, solitary, smooth, cylindrical, apex rounded, or rarely notched in upper part, surface pale yellow to yellowish green, with black dots of spread over entire surface, interior white, Stipe concolourous, slightly narrow, cylindrical, 2–5 × 2–3 cm, Stromatal surface becomes black wrinkled on drying. Perithecia numerous, innate, in one layer below the surface of stromata, ostiole punctuate or slightly papillate. Perithecia 710–780 × 320–450 µm. Asci numerous, cylindrical, stipitate, 8-spored, paraphysate, 95–130 × 10–12 µm. Ascospores light brown to brown, one celled, navicular or fusoid, slightly pinched at both tips, 12–16 × 4.5–6 µm, with germ-slits straight. Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Sillod, Palashi; 20˚16′59″N 75˚34′02″E; alt 618m; on the wood logs of *Acacia nilotica* (L.) Delile; 01/09/2016; *Vijay Gore* (VUG/VPM–298).

IV. CONCLUSION

Genus *Xylaria* belongs to family Xylariaceae, it was observed that *Xylaria polymorpha* species found that grow on living tree of two host *Butea monosperma* and *Senna siamea*. All specimens were collected during July

(2016) to November (2019) after the regular interval from different sites of Aurangabad district (M.S.) India. Thirty-three specimens of macrofungi were examined, and from that five different species, were studied (Photo Plate 1). From the above discussion, it is concluded that *Xylaria multiplex* and *Xylaria polymorpha* were dominating macrofungi while *Xylaria feejeensis, Xylaria hyooxylon*, and *Xylaria symploci* were rarely observed, four species are new reported for Aurangabad district, are *Xylaria feejeensis, Xylaria hyooxylon*, *Xylaria multiplex,* and *Xylaria symploci,* belongs to five hosts *Acacia nilotica, Butea monosperma*, *Mangifera indica*, *Pistacia integerrima* and *Senna siamea*.

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Photo Plate - 1

Xylaria feejeensis (BERK.) Fr. *Xylaria hypoxylon* (L.) Grev. *Xylaria multiplex* (Kunze) Fr.

Xylaria polymorpha (Pers.) Grev. *Xylaria symploci* A. Pande, Waing., Punekar & Ranadive.