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Research Article

Wood-Decaying Fungi from Gangapur Tehsil Aurangabad District (M.S.) India

Vijay Udhav Gore[1]*and Vasant Pandit Mali[2]

[1]Shiveshwar junior college Takli (A), Taluka Kannad, Dist. Aurangabad (M.S.) India, Pin. 431147.
[2]J. Watumull Sadhubella Girls College, Ulhasnagar Dist. Thane (M.S.) India, Pin.421001.
Email ID: Vijaygore777@gmail.com, vasant.mali@rediffmail.com

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Abstract

In every year an enormous amount of wood and wood products are destroyed by decay, rot, and decomposition. Decay refers to the process by which tissues of dead organisms break down into simpler forms of matter. Such a breakdown is essential for new growth and development because it is basic for recycling limited chemical components and freeing up limited physical space in the environment. Wood decaying fungi are the main organisms responsible for wood decay. A wide range of macro-fungi occurs on wood using various constituents for their metabolism. In the present investigation, sixty-two wood-decaying macro-fungi were collected from Gangapur Tehsil, Aurangabad district from that sixteen specimens was identified according to the macro-morphological and microscopic character which belongs to fifteen genera and sixteen species. Based on observations *Auricularia mesenterica, Auricularia nigricans, Coriolopsis brunneoleuca, Daldinia concentrica, Flavodon flavus, Pseudofavolus tenuis, Schizophyllum commune,* and *Truncospora tephropora* are dominating macrofungi while *Cyathus striatus, Funalia leonina, Ganoderma chalceum, Gymnopilus pampeanus, Navisporus floccosus, Phellinus allardii, Psathyrella* sp.1 and *Tremella mesenterica* were rarely observed macro-fungi.

INTRODUCTION:

Wood decaying fungi are the important decomposer of the ecosystem that can decompose wood and cause it to rot. They decompose the wood, plant litter, and coarse woody debris and play a primary important role in degrading organic material in the ecosystem. 75% of wood-decaying fungi play a significant role in wood decay belongs to Polyporaceae and are responsible for producing 90% decay to economically important timbers (Overholts, 1953). Fungi are the most diverse organisms, but due to inadequate or less research, only 5% of species are identified (Hawksworth, 1991).

The first Indian record of wood-decaying fungi could trace back to the work of (Klotzsch, 1832) in his paper on Indian Polyporaceae. Later special efforts were taken by (Sharma, 2000) to publish the book entitled "Genera of Indian Polypores", described an idea about the diversity of Polypores from India. 629 specimens from the Western Ghats of Maharashtra were collected and studied (Ranadive et al., 2011). Preliminary study of some wood-rotting fungi of Beed district, Maharashtra (Mali, 2019). 400 specimens of Aphyllophorales were studied belonging to 34 genera and 47 species were identified from Latur district, Maharashtra (Chouse & Mali, 2020). Recently 12 specimens were identified from the Vaijapur taluka Aurangabad district, belongs to 11 genera and 12 species (Gore & Mali, 2021).

MATERIALS AND METHODS:

The survey and collection of wood-decaying fungi were done from September 2016 to November 2019, 20-25 days after heavy rainfall from different localities of the Gangapur Tehsil, Aurangabad district. The specimens of basidiome were photographed in the field and all important morphological characters were recorded according to hosts name, locality, collection number, collection date, color, pilear surface, hymenial surface, and the dimension of basidiome. All specimens were identified according to macroscopic and microscopic characteristics with respect to appropriate literature (Gilbertson & Ryvarden 1986; Nunez & Ryvarden 2000). As per international mycological herbarium guidelines, sun-dried specimens were kept in the brown paper packet. The freehand thin section cutting of basidiome done with the help of sharp razor blades, stained and studied in 5% KOH, Lacto phenol, and Melzer's reagent, and microscopic observations were made under 40X and 100X Magnification under a compound light microscope in a laboratory.

RESULTS AND DISCUSSION:

In the present study, 16 species of wood-decaying fungi were identified according to the macroscopic and microscopic character (plate 1), collected from Gangapur Tehsil, Aurangabad district (M.S.) India. Have been summarized below.

***Auricularia mesenterica* (Dicks.) Pers.**

Basidiome resupinate to effused reflex, pileate, 2–8 × 1.5–4 cm, up to 0.2 cm thick, ear-shaped, loosely laterally attached, elastic, gelatinous, occurs in imbricate clusters extending over an area of several centimeters. Sterile surface, hairy, yellowish-brown to greyish brown bands. Hymenium smooth to slightly wrinkled, bluish to purplish brown with a whitish bloom. Hairs thick-walled, up to 4 mm long. Basidia cylindrical, hyaline, 3-septate, 45–60 × 5–5.5 µm with 1–3 sterigmata lateral, 3–12 × 1–10 µm. Spores hyaline, reniform to allantoids, 12–13.5 × 5–5.5µm, guttulate.

Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Asegaon, 06/10/2016, on wood log *Acacia nilotica* (L.) Delile, 539m, 19°53′19″N 75°11′14″E, GVU/MVP-477.

***Auricularia nigricans* (Sw.) Birkebak, Looney & Sánchez-García.**

Basidiome initially resupinate to pileate 2.5–4.6 × 1.5–3.1 cm, up to 0.3 cm thick, loosely attached, laterally and sometimes by a very short stalk, elastic, gelatinous. Sterile surface, hairy, silky, dark yellowish-brown to dark brown with greyish brown bands. Hymenium smooth or wrinkled, pale brown to dark brown to blackish-brown with a whitish bloom. Hairs thick-walled, up to 3 mm long. Basidia cylindrical, hyaline, 3-septate, 46–60 × 4–5.5 µm with 1–3 lateral sterigmata. Sterigmata 9–15 × 1.5–11 µm. Spores, hyaline, reniform to allantoid, 13–15 × 4–5.5 µm, guttulate.

Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Asegaon, 06/10/2016, on wood log *Acacia nilotica* (L.) Delile, 539m, 19°53′19″N 75°11′14″E, GVU/MVP-481.

***Cyathus striatus* (Huds.) Willd.**

Basidiome small-sized, flower-port shaped, 0.7 – 1.4 cm tall, 0.6 – 0.8 cm wide, brown and shaggy on the outside, grayish brown, and vertically striate or fluted on inside. Peridioles 8–15 grey, about 2 mm diam., free within the peridium and immersed in mucilage. Spores 15–20 × 8–10.5 µm, ellipsoidal, smooth, hyaline, and thin-walled. Hyphal system dimitic and clamp-connections present.

Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Rajangaon pol, 06/10/2016, on wood log *Acacia nilotica* (L.) Delile, 541m, 19°54′05″N 75°08′46″E, GVU/MVP-480.

Coriolopsis brunneoleuca (Berk.) Ryvarden.

Basidiome pileate, reflexed and widely effused to almost resupinate, 2–13.1 × 1.6–4.8 × 0.1– 0.4 cm, fused laterally to imbricate or elongated rows, flexible and separable from the substrate, tomentose, concentrically sulcate, finely scrupose warts, with age, the tomentum becomes paler and disappears zone wise, pileus the becomes blackish. Margin is very thin and way. Pore surface ochraceous to pale brown, pores round to angular, 2–3 per mm. Context up to 2 mm deep, dark brown to the bay, distinctly darker than the tubes, with a narrow agglutinated zone towards the pileus. Tubes up to 2 mm deep. Hyphal system trimitic, Generative hypahe with clamps 1.5–3 µm wide. Skeletal hyphae yellowish to pale brown, thick-walled and dominating, 3.5–5 µm wide, dextrinoid. Binding hyphae are rather rare and mostly golden yellow, almost solid, 2.5–4 µm wide. Cystidia and other sterile elements are absent. Basidia clavate, 20–30 × 4.5–6 µm, with the basal clamp. Spores cylindrical, hyaline, thin-walled, 8–12 × 2.5–4 µm.

Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Asegaon, 06/10/2016, on wood log *Acacia nilotica* (L.) Delile, 539m, 19°53′19″N 75°11′14″E, GVU/MVP-485.

***Daldinia concentrica* (Bolton) Ces. & De Not.**

Basidiome appears as hard hemispherical to variously shaped cushions 2.4–4.5 cm diam., reddish-brown to purplish brown, soon changes to black. The outer surface is smooth, somewhat shiny, dotted with minute pores formed by the ostiole of the perithecia. In a vertical section, stromata show distinct concentric zoning of its fibrous hyphal tissues caused by the regions of thick-walled hyphae alternating with less thick regions. Perithecia crowded in a single layer just below the outer crust, immersed in stomatal tissue, possess a conical neck. Asci within the perithecium immersed in mucilage, cylindrical, 75 – 150 × 8.5 – 12 µm, with a long stalk. Ascopores are uniseriate, elliptical to inequilateral, opaque at maturity, 12.5–16.5 × 6 – 9.5 µm. Conidia ovate to ellipsoid, olive green, 6.5 – 8 × 4 – 5 µm.

Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Asegaon, 06/10/2016, on wood log *Acacia nilotica* (L.) Delile, 539m, 19°53′18″N 75°11′13″E, GVU/MVP-483.

***Flavodon flavus* (Klotzsch) Ryvarden.**

Basidiome resupinate to pileate, 1.5 – 11.5 × 1.1–5 × 0.2–0.4 cm, thin, leathery. Pileus 0.5 – 5.5 × 0.4–1.1 × 0.2–0.4 cm, tomentose, with concentric zonation, dull, concentrically ridged, faint yellowish to yellowish-brown. Pore surface grayish-yellow to brown, poroid near margin, round to angular, becomes hydnoid towards the center, 1–2 per mm. Context up to 1 mm, homogenous to duplexed, upper tomentum separated from the context by a thin layer, greyish-yellow, Tubes up to 3 mm wide, faint yellowish to yellowish-brown. Hyphal system dimitic. Generative hyphae hyaline, thin to slightly thick-walled, simple septate, branched, 2.5 – 4.5 µm wide. Skeletal hyphae pale yellowish-brown in KOH, thick-walled, sparingly branched, 3.5–7 µm wide. Basidia 024–30 × 4.5–6 µm, clavate, hyaline, thin-walled. Spores hyaline, ellipsoid, smooth, thin-walled 5.5–7 × 3–4 µm. Cystidia occur as skeletal hyphal projection, thick-walled, encrusted at the tip, 24–35 × 3–5 µm.

Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Asegaon, 06/10/2016, on wood log *Azadirachta indica* A.Juss, 539m, 19°53′19″N 75°11′14″E, GVU/MVP-476.

***Funalia leonina* (Klotzsch) Pat.**

Basidiome pileate, semicircular to elongated, 3.4–5.5 × 2.1–3.6 cm, up to 24 cm thick near the base, covered with a dense mat of strigose hairs, becoming hispid when old, cream white when fresh, soon pale yellow to straw-colored, tomentum up to 9 mm deep. Pores surface 1– 2 per mm, hydnoid, angular, thick-walled. Context up to 18 mm thick. Tube up to 6 mm deep. Hyphal system trimitic, Generative hyphae with clamps, 3.5–5 µm wide. Skeletal hyphae more or less thick-walled to solid, hyaline 3–5 µm wide. Binding hyphae 2.5– 6 µm. Cystidia absent. Basidia clavate, cylindric, 25–30 × 6.5–8 µm with a basal clamp. Spores 11.5–15× 3–5 µm, cylindrical, hyaline.

Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Dhegaon Bangla, 29/09/2016, on wood log *Mangifera indica* L., 485m, 19°44′06″N 75°07′45″E, GVU/MVP-439.

***Ganoderma chalceum* (Cooke) Steyaert.**

Basidiome pileate, semicircular, applanate, 12.9 × 9.4 cm, up to 2.7 cm thick near stipe juncture, laterally stipitate, sometimes sessile, mostly sulcate, weakly zonate, glabrous, faint reddish-brown to dark reddish brown. Pore surface poroid round, regular, pores 3–5 per mm. Context up to 18 mm wide, black resinous band starting at the base and extending almost to the margin, coffee brown. Tubes up to 9 mm deep, pale brown. Stipe 4.1× 2.4 cm, homogenous, reddish-brown. Hyphal system dimitic, generative hyphae 1.5–3 µm wide, clamped, thin-walled, branched, smooth, hyaline. Skeletal hyphae 2–7 µm wide, thick-walled to solid. Spores 8–11 × 6.5–7.5 µm, ellipsoid, bitunicate, truncate at apex.

Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Waluj, 29/09/2016, on the living tree at root *Pithecellobium dulce* (Roxb.) Benth, 511m, 19°48′31″N 75°14′03″E, GVU/MVP-444.

***Gymnopilus pampeanus* (Speg.) Singer.**

Basidiome 2.9–5.6 cm diam., convex when young, becoming plane finally depressed at the center. depression often deepens to the stipe, surface deep yellow when young, grayish orange at maturity, dry, silky to fibrillose, appressed fibrillose- squamulose. Margin thin, entire. Gills free, 14-16 per cm, sinuate to adanate, rather crowded, golden yellow. Stipe 4–6.3 × 0.3– 0.9 cm, pale yellowish-white, on bruising change to pale reddish-brown, strongly fibrillose-

striate with scattered fibrillose squamules. Basidia 21 – 24 × 6.5 – 8 µm, sterigmata up to 6 µm long. Lamella-edge sterile with cheilocystidia. Cheilocystidia 22 – 25 × 6 – 8.5 µm, ventricose, lecythiform capitate, capitellum up to 6 µm diam., thin-walled, Pleurocystidia not observed. Spores 7–8 × 4–5 µm, broadly ellipsoid, without germ-pore, thick-walled.
Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Sangvi (Bu), 06/10/2016, on wood log *Mangifera indica* L., 523m, 19°54′34″N 75°01′54″E, GVU/MVP-491.

***Navisporus floccosus* (Bres.) Ryvarden.**

Basidiome pileate 16.3 × 12.4 cm, up to 7.8 cm thick at the base, fleshy, becomes corky after drying, sessile, light in weight after drying, yellowish-brown to dull, smooth, glabrous, soft, white to brown powdery appearance on the pileus. Pore surface pale orange to grayish orange, on bruising change to dark brown, pores round, regular, 2– 3 per mm. Margin obtuse, smooth. Context up to 54 mm thick at middle, pale orange to orange-white, homogenous. Tube up to 24 cm long, light brown. Hyphal system dimitic, Generative hyphae thin-walled, hyaline, septate with clamp, 2–2.5 µm wide. Skeletal hyphae thick-walled, hyaline, unbranched, 5–10 µm wide. Spores 11–13 × 5–7 µm, slightly thick-walled, smooth, hyaline, with large oil guttules, oblong to navicular, dextrnoid.
Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Waluj, 29/09/2016, on living tree at main trunk *Ficus benghalensis* L., 515m, 19°50′27″N 75°15′24″E, GVU/MVP-433.

***Phellinus allardii* (Bres.) S. Ahmad.**

Basidiome mostly resupinate, effused reflex to pileate 9.2 × 5.9 × 0.2–2.1 cm, heavy when fresh, corky hard on drying, broadly attached and elongated frequently sub-resupinate with a steep margin and thickened in the central part, narrowly sulcate with numerous narrow ridges and zones, first deep reddish brown and covered with a tomentum under which there is a distinct black line, Margin fertile, sharp, undulating, velvety. Pore surface poroid, round, regular, pores 6–8 per mm, yellowish brown when young, glancing when turned in incident light. Context very thin, sometimes almost absent and only a black zone may be observed on the top of tubes, reddish brown to umber brown. Tubes stratose, up to 3 mm deep in each layer. Hyphal system dimitic, generative hyphae thin-walled, simple septate, 1.5– 2.5 µm wide, skeletal hyphae thick-walled, golden brown to rusty brown, 2–3.5 µm wide. hymenial setae none. Basidia 9–13 × 4.5–6 µm. 4–sterigmate. Spores 5–6 × 3.5–4 µm, broadly ellipsoid to subglobose, abundant in the section, moderately hick-walled, smooth, brown.
Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Waluj, 29/09/2016, on living tree at main trunk *Senna siamea* (Lam.) H.S.Irwin & Barneby, 411m, 19°49′10″N 75°14′29″E, GVU/MVP-445.

***Pseudofavolus tenuis* (Fr.) G. Cunn.**

Basidiome effused-reflexed to pileate, 2.8–3.8 × 1.6–2.6 cm, up to 0.3 cm thick at base, dimidiate, flabelliform to semicircular, when pileate attached broad lateral base, rarely connate, smooth concentrically zonate, sulcate, glabrous, radially wrinkled, grayish brown to light brown to dark blonde to teak brown, becoming distinctly reddish-brown to dark purplish at the base and cuticle spreading towards margin. Pore surface poroid 1–2 per mm wide, angular to hexagonal, pale grey to brownish-grey. Context up to 1 mm wide, homogenous. Tubes up to 2 mm long, homogenous. Hyphal system trimitic. Generative hyphae hyaline, thin-walled, clamp, branched, 2–3.5 µm wide. Skeletal hyphae thick-walled, yellow to pale brown, 2.5–6 µm wide. Binding hyphae hyaline, thick-walled, 3.5–6 µm wide. Spores 12–18 × 4–6.5 µm, cylindrical, hyaline, thick-walled.
Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Waluj, 29/09/2016, on fallen twing of *Limonia acidissima* Groff, 494m, 19°47′01″N 75°12′15″E, GVU/MVP-435.

***Psathyrella* sp**

Basidiome 1.6–4.3 cm in diameter, rounded, conical then convex, when young, convex expanding to applanate when mature, cream grey to pinkish grey to dull brown. Margin cernate to striate, creamy to greyish white. Gills free, 13–14 per cm, close to rather crowded, greyish to dark brown. Stalk 2.6–6.1 × 0.3–0.5 cm, central, swollen at base, tapering toward apex, smooth, solid, greyish white. Context papery thin, fleshy, homogenous, dull brown. Hyphal system monomitic; generative hyphae 4–22 µm wide, septate, thin-walled, smooth, hyaline. Cheilocystidia 20–35 × 5.5–13 µm, elongated cylindrical, obtuse apex, thin-walled, smooth, hyaline. Basidia 16–23 × 5–7 µm, clavate, 4-sterigmate, septate at base. Spores 6.5–7.5 × 3–5 µm, ellipsoid, thin-walled, smooth.

Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Gangapur, 29/09/2016, on wood log *Acacia nilotica* (L.) Delile, 511m, 19°42′07″N 75°01′19″E, GVU/MVP-442.

***Schizophyllum commune* Fr.**

Basidiome pileate, flabelliform to kidney or bean-shaped 1–3.9 × 0.7–2.8 cm, up to 0.3 cm thick, laterally attached by a small base. surface pale to dark grayish brown, villose lobed. Fertile surface falsely gilled, separating along gill's-edge. Context up to 1 mm thick. Hyphal system monomitic, Generative hyphae thin to thick-walled not inflating, septate with clamps. Basidia 16–20 × 4–6 µm, narrowly clavate, bearing four sterigmata. Cystida absent. Spores 3–5 × 1.4–2.5 µm, allantoids, cylindrical, hyaline, thin-walled, smooth.
Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Tembapuri, 29/09/2016, on standing stump of dried tree *Delonix regia* (Hook.) Raf, 497m, 19°45′36″N 75°09′47″E, GVU/MVP-438.

***Tremella mesenterica* Retz.**

Basidiome cerebriform or lobed, 2.1 × 1.6 × 1.5 cm, solitary or in groups, gelatinous, moist, bright golden yellow to yellowish-orange, basidiome becomes greasy or smily during the wet weather. Basidia 13–30 × 10–22 µm, with clamps. Sterigmata 124–145 × 2.5–4 µm. Spores 11–15 × 4–6 µm, broadly ellipsoid to subspherical, smooth, hyaline.
Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Asegaon, 06/10/2016, on fallen twigs *Acacia nilotica* (L.) Delile, 539m, 19°53′18″N 75°11′13″E, GVU/MVP-482.

***Truncospora tephropora* (Mont.) Zmitr.**

Basidiome resupinate to widely effused, 67 × 29 cm, up to 1.7 cm thick at the center, tough to hard when fresh, woody hard on drying, broadly elongated. Margin sterile, obtuse, grayish-yellow to yellowish. Pore surface poroid, 4–6 per mm pores, round, regular, cracked when mature, grayish-yellow to grayish brown on drying. Context papery thin to almost absent, hard, homogenous, grayish-yellow to grayish brown. Tubes up to 17 mm wide, duplex or in the layer, each layer or strata up to 3 mm wide, light brown to coffee brown. Hyphal system trimitic, Generative hyphae 2–3 µm wide, clamped, thin-walled, smooth, hyaline. Skeletal hyphae 3–4µm wide, thick-walled, smooth, olivaceous in KOH. Binding hyphae1.5–3 µm wide, thin to thick-walled, branched, smooth, hyaline. Basidia 12.5–16 × 4–5 µm, narrowly clavate, 4-sterigmata, clamped at the base. Spores 4.5–6 × 3.5–4.5 µm, broadly ellipsoid, truncate, collapsed partly, moderately thick-walled.
Specimen examined: INDIA; Maharashtra, Marathwada, Aurangabad district, Taluka Gangapur, Gangapur, 29/09/2016, on wood log *Acacia nilotica* (L.) Delile, 490m, 19°42′15″N 75°02′02″E, GVU/MVP-441.

CONCLUSION:

Sixty-two wood-decaying fungi collected during the present study represented the nine families Auriculariaceae, Hymenochaetaceae, Hymenogastraceae, Hypoxylaceae, Irpicaceae, Polyporaceae, Psathyrellaceae, Schizophyllaceae, and Tremellaceae. From the above observation and discussion, it is concluded that the family Polyporaceae was dominant consisting of six genera. Mostly dominating macrofungi were observed *Auricularia mesenterica, Auricularia nigricans, Coriolopsis brunneoleuca, Daldinia concentrica, Flavodon flavus, Pseudofavolus tenuis, Schizophyllum commune*, and *Truncospora tephropora*. While *Cyathus striatus, Funalia leonina, Ganoderma chalceum, Gymnopilus pampeanus, Navisporus floccosus, Phellinus allardii, Psathyrella* sp, and *Tremella mesenterica* were of rare occurrence. The macrofungi reported during this study belonged to eight hosts *Acacia nilotica, Azadirachta indica, Delonix regia, Ficus benghalensis, Limonia acidissima, Mangifera indica, Pithecellobium dulce*, and *Senna siamea*.

Plate- 1

Auricularia mesenterica (Dicks.) Pers.

Auricularia nigricans (Sw.) Birkebak, Looney & Sánchez-García.

Cyathus striatus (Huds.) Willd.

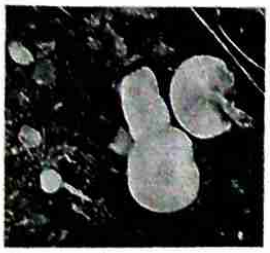
Coriolopsis brunneoleuca (Berk.) Ryvarden.

Daldinia concentrica (Bolton) Ces. & De Not.

Flavodon flavus (Klotzsch) Ryvarden.

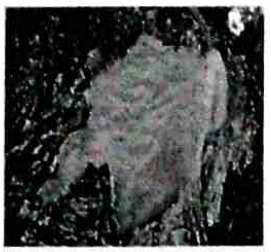
Funalia leonina (Klotzsch) Pat.

Ganoderma chalceum (Cooke) Steyaert.



Gymnopilus pampeanus (Speg.) Singer.

Navisporus floccosus (Bres.) Ryvarden.



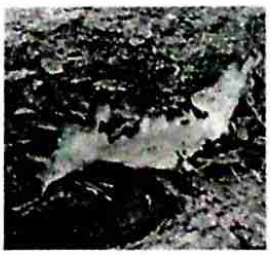
Phellinus allardii (Bres.) S. Ahmad.

Pseudofavolus tenuis (Fr.) G. Cunn.

Psathyrella sp

Schizophyllum commune Fr.

Tremella mesenterica Retz.



Truncospora tephropora (Mont.) Zmitr.

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J. Watumull Sadhubella Girls College
Ulhasnagar 421 001 Thane (India)

PRINCIPAL
J. Watumull Sadhubella Girls College
Ulhasnagar- 421 001.

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

Vijay Udhav Gore[1]*, Vasant Pandit Mali[2]

[1]Shiveshwar Junior College Takli (A), Taluka Kannad, Dist. Aurangabad - 431147, Maharashtra, India

[2]J. Watumull Sadhubella Girls College, Ulhasnagar, Dist. Thane - 421001, Maharashtra, India

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 hypoxylon*, and *Xylaria symploci* were rarely observed. four species are new reported for Aurangabad district, are *Xylaria feejeensis*, *Xylaria hypoxylon*, *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