

Diversity of genus *Scytinostroma* from district Sirmaur (Himachal Pradesh)

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ABSTRACT

Genus *Scytinostroma* Donk is being described for the first time from district Sirmaur (Himachal Pradesh) based on five species (*S. aluta*, *S. cystidiatum*, *S. duriusculum*, *S. galactinum* and *S. ochroleucum*). Of these, *S. galactinum* is being described for the first time from Himachal Pradesh.

Keywords : Basidiomycota, Agaricomycetes, Himalaya, wood-rotting fungi.

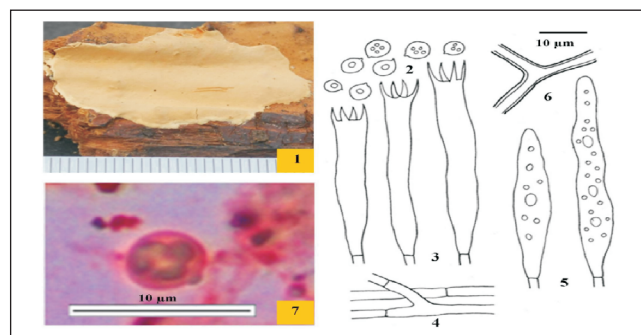
INTRODUCTION

Genus *Scytinostroma* is characteristic in having resupinate, effused, adnate, smooth to tuberculate basidiocarps with dimittic hyphal system; simple-septate generative hyphae; aseptate, dichotomously to irregularly branched, skeleto-binding hyphae; two to four sterigmate basidia without basal clamp and ellipsoid to globose to allantoid, thin-walled, smooth/ornamented, amyloid/inamyloid, acyanophilous basidiospores. As per Hibbet *et al.* (2007), Kirk *et al.* (2008) and MycoBank (2021), this genus has been placed in the family *Lachnocladiaceae*, order *Russulales*, class *Agaricomycetes*, subphylum *Agaricomycotina* of the phylum *Basidiomycota*. Five species viz., *Scytinostroma aluta* Lanquetin, *S. cystidiatum* Boidin, *S. duriusculum* (Berkeley & Broome) Donk, *S. galactinum* (Fries) Donk, and *S. ochroleucum* (Bresadola & Torrend) Donk identified on the basis of macroscopic and microscopic features and comparison with the literature (Thind and Rattan, 1968; Rattan, 1974, 1977; Natarajan and Kolandavelu, 1998; Bernicchia and Gorjón, 2010; Sharma, 2012; Ranadive, 2013; Dhingra, 2014; Dhingra *et al.*, 2014) are described for the first time from district Sirmaur (Himachal Pradesh). *S. galactinum* is a new record for Himachal Pradesh. All the specimens have been deposited at the Herbarium, Department of Botany, Punjabi University, Patiala (PUN). The colour standards used are as per Methuen's Handbook of colours by Kornerup and Wanscher (1978).

TAXONOMIC DESCRIPTION

Scytinostroma aluta Lanquetin, *Bulletin Mensuel de la Société Linnéenne de Lyon* 53 (5): 187, 1984. (Figs. 1-7)

Basidiocarp resupinate, effused, adnate, up to 360 µm thick in cross section; hymenial side tuberculate, orange white (5A2) to pale orange (5A3) to grayish orange (5B4) to brownish orange (6C8) when collected, no prominent change on drying; margins fibrillose, paler concolorous, occasionally indeterminate. Hyphal system dimittic. Generative hyphae subhyaline, septate, without clamps, up to 3.4 µm wide, branched, thin-walled. Skeleto-binding hyphae aseptate, up to 4.5 µm wide, dichotomously to irregularly branched, thick-walled, positive to Cotton Blue. Cystidia fusiform to subfusiform, 43-61 × 7.4-8.3 µm, smooth, thin-walled; with oily contents positive to Sulphovanillin; projecting up to 18 µm beyond the hymenium. Basidia clavate, 40-53 × 6-7.7 µm,



Figs. 1-7: *Scytinostroma aluta*: 1. Basidiocarp showing hymenial side; 2-6. Line diagrams (2. Basidiospores; 3. basidia; 4. generative hyphae; 5. cystidia; 6. skeleto-binding hyphae); 7. Photomicrograph showing a basidiospore.

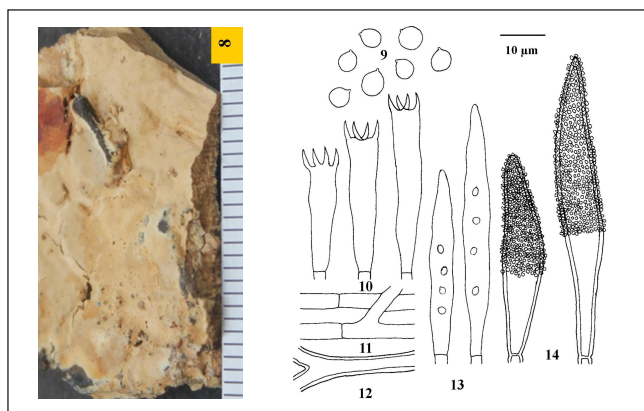
four sterigmate, without basal clamp; sterigmata up to 6 µm long. Basidiospores globose to subglobose, subhyaline, 4-6 × 3.7-6 µm, smooth, with oily contents, thin-walled, positive to Melzer's reagent.

Specimen examined: Himachal Pradesh: Sirmaur, Paonta Sahib, on an angiospermous log, Ramandeep 11028 (PUN), October 3, 2015.

Remarks: This species has fusiform to subfusiform gloeocystidia in combination with globose to subglobose, positive to Melzer's reagent basidiospores and being described for the first time from the study area. Formerly in Himachal Pradesh, it has been reported as *S. alutum* from Chamba district by Dhingra *et al.* (2014) and Kullu District by Ram *et al.* (2021).

Scytinostroma cystidiatum Boidin, *Bulletin du Jardin Botanique de l'État à Bruxelles* 30 (3): 285, 1960. (Figs. 8-14)

Basidiocarp resupinate, effused, adnate, up to 350 µm thick in cross section; hymenial side smooth to tuberculate, orange white (5A2) to pale orange (5A3) to grayish orange (5B4) to brownish orange (6C8) when collected, no prominent change on drying; margins fibrillose, paler concolorous, occasionally indeterminate. Hyphal system dimittic. Generative hyphae subhyaline, septate, without clamps, up to 4.5 µm wide, branched, thin-walled. Skeleto-binding hyphae aseptate, up to 5 µm wide, dichotomously to irregularly branched, thick-walled, positive to Melzer's reagent as well as Cotton Blue. Cystidial elements of two types: i. Encrusted cystidia subfusiform, 43-65 × 8.3-10 µm, arise from different levels of the



Figs. 8-14: *Scytinostroma cystidiatum*: 8. Basidiocarp showing hymenial side; 9-14. Line diagrams (9. basidiospores; 10. basidia; 11. generative hyphae; 12. skeleto-binding hyphae; 13. gloeocystidia; 14. encrusted cystidia).

subiculum, thick-walled, heavily encrusted all over except at the base; projecting up to 24 μm beyond the hymenium. ii. Gloeocystidia subfusiform, sinuous, 39-55 \times 5-6.8 μm , present both in the subhymenium and hymenium, thin-walled, with oily contents positive to Sulphovanillin, without basal clamp. Basidia clavate to subclavate, 23-35 \times 5.0-6.8 μm , four sterigmate, without basal clamp; sterigmata up to 3.8 μm long. Basidiospores globose to subglobose, subhyaline, 5.0-6.7 \times 4.5-5.3 μm , smooth, with oily contents, thin-walled, positive to Melzer's reagent.

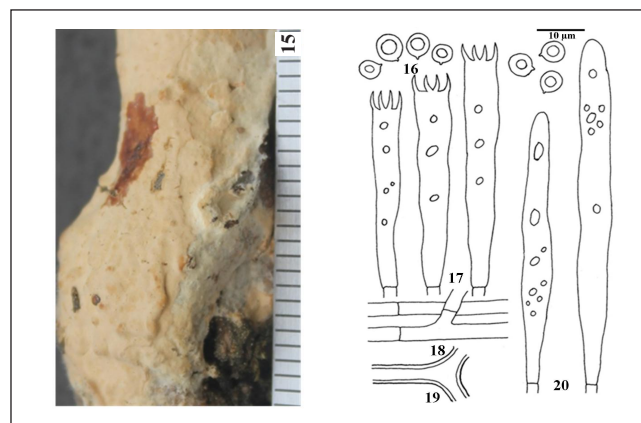
Specimen examined: Himachal Pradesh: Sirmaur, Nahan, on an angiospermous log, Ramandeep 11029 (PUN), October 5, 2015.

Remarks: This species has two types of cystidial elements in combination with positive to Melzer's reagent basidiospores and being described for the first time from the study area. Formerly in India, it has been reported from Chamba and Kangra districts of Himachal Pradesh by Dhingra *et al.* (2014); Haryana, J&K and Punjab by Rattan (1974, 1977); Tamil Nadu by Natarajan and Kolandavelu (1998); Punjab and Uttarakhand by Sharma (2012) and Maharashtra by Ranadive (2013).

Scytinostroma duriusculum (Berkeley & Broome) Donk, *Fungus* 26: 20, 1956.

-*Stereum duriusculum* Berkeley & Broome, *Botanical Journal of the Linnean Society* 14: 66, 1875. (Figs. 15-20)

Basidiocarp resupinate, effused, adnate, up to 0.9 mm thick in cross section; hymenial side smooth, reddish white (7A2) to grayish red (7B2) to grayish orange (6B4) when collected, no prominent change on drying; margins fibrillose, paler concolorous, occasionally indeterminate. Hyphal system dimitic. Generative hyphae subhyaline, septate, without clamps, up to 4 μm wide, branched, thin-walled. Skeleto-binding hyphae aseptate, up to 5 μm wide, dichotomously to irregularly branched, thick-walled, positive to Melzer's reagent as well as Cotton Blue. Gloeocystidia tubular, 65-82 \times 7.1-7.8 μm , present both in the subhymenium and hymenium, thin-walled, with oily contents positive to Sulphovanillin, without basal



Figs. 15-20: *Scytinostroma duriusculum*: 15. Basidiocarp showing hymenial side; 16-20. Line diagrams (16. basidiospores; 17. basidia; 18. generative hyphae; 19. skeleto-binding hyphae; 20. cystidia).

clamp; projecting up to 26 μm beyond the hymenium. Basidia clavate to tubular, 42-55 \times 6.4-8.5 μm , four sterigmate, without basal clamp; sterigmata up to 5.0 μm long. Basidiospores globose to subglobose, subhyaline, 5-7 \times 5-6.4 μm , smooth, with oily contents, thin-walled, positive to Melzer's reagent.

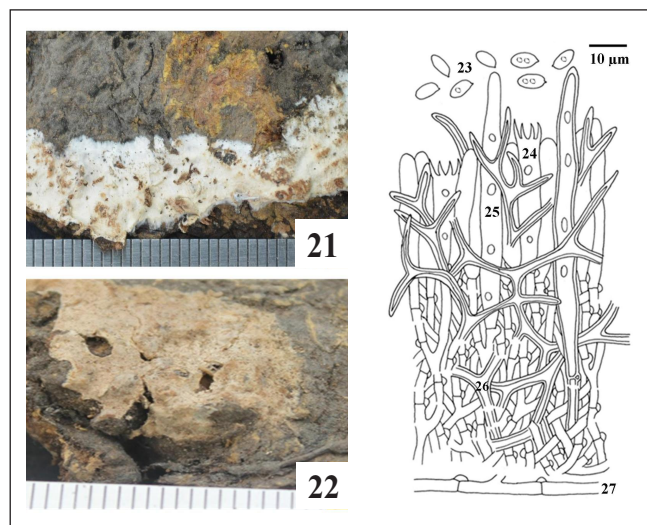
Specimen examined: Himachal Pradesh: Sirmaur, Nahan, about 2 km from Nahan towards Sainwala, on trunk of *Eucalyptus tereticornis*, Ramandeep 11030 (PUN), October 5, 2016.

Remarks: This species has tubular cystidia in combination with positive to Melzer's reagent basidiospores and being described for the first time from the study area. Formerly in India, it has been reported from Chamba, Kangra, Kullu and Shimla districts of Himachal Pradesh by Thind and Rattan (1968), Rattan (1974, 1977) and Dhingra *et al.* (2014); from Jammu and Kashmir and Uttarakhand by Rattan (1974, 1977) and Sharma (2012) and from Assam, Meghalaya and West Bengal by Dhingra *et al.* (2011).

Scytinostroma galactinum (Fries) Donk, *Fungus, Wageningen* 26: 20, 1956.

-*Thelephora galactina* Fries, *Nova Acta Regiae Societatis Scientiarum Upsaliensis Ser. 3*: 136, 1851. (Figs. 21-27)

Basidiocarp resupinate, effused, adnate, up to 445 μm thick in cross section; hymenial side smooth to grandinoid, pale orange (5A3) to brownish orange (6C8) when collected, reddish white (8A2) to grayish red (8B4) on drying; margins fibrillose, paler concolorous, occasionally indeterminate. Hyphal system dimitic. Generative hyphae subhyaline, septate, without clamps, up to 4 μm wide, branched, thin-walled. Skeleto-binding hyphae aseptate, up to 4.5 μm wide, dichotomously to irregularly branched, thick-walled, positive to Melzer's reagent as well as Cotton Blue. Gloeocystidia subfusiform to tubular, 68-89 \times 5.8-7.2 μm , present both in the subhymenium and hymenium, thin- to thick-walled, with oily contents negative to Sulphovanillin, without basal clamp; projecting up to 20 μm beyond the hymenium. Basidia



Figs. 21-27: *Scytinostroma galactinum*: 21-22. Basidiocarp showing hymenial side (21. fresh, 22. dry); 23-27. Line diagrams (23. basidiospores; 24. basidium; 25. cystidium; 26. skeleto-binding hyphae; 27. generative hyphae).

clavate, $34-41 \times 5.6-6.5 \mu\text{m}$, four sterigmate, without basal clamp; sterigmata up to $5.6 \mu\text{m}$ long. Basidiospores ellipsoid to broadly ellipsoid, subhyaline, $6.6-8 \times 3-5 \mu\text{m}$, smooth, with oily contents, thin-walled, positive to Melzer's reagent.

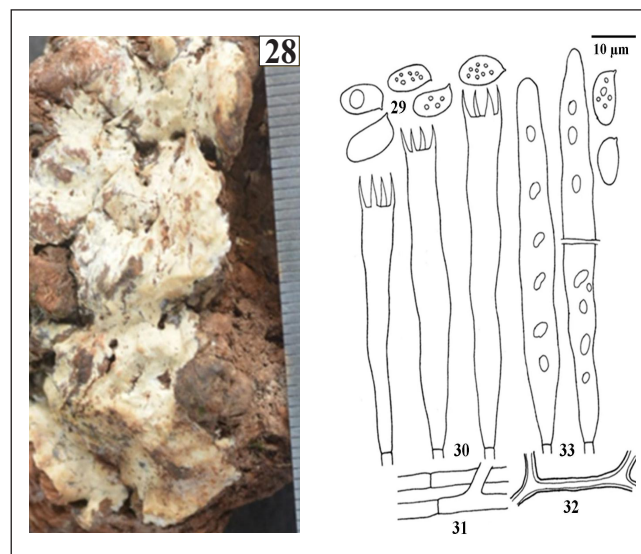
Specimen examined: Himachal Pradesh: Sirmaur, Nahan, Kala Amb, on trunk of *Ficus benghalensis*, Ramandeep and Dhingra 11031 (PUN), August 23, 2015.

Remarks: This species is different from rest of the species listed under this genus in the present work in having gloeocystidia with oily contents negative to Sulphovanillin and being described for the first time from the state of Himachal Pradesh and second time from India. The only former report is from Uttarakhand by Dhingra (2014).

Scytinostroma ochroleucum (Bresadola & Torrend) Donk, *Fungus* 26: 20, 1956. (Figs. 28-33)

-*Gloeocystidium ochroleucum* Bresadola & Torrend, *Brotéria Sérié Botanica* 11: 81, 1913

Basidiocarp resupinate, effused, adnate, up to $250 \mu\text{m}$ thick in cross section; hymenial side smooth to tuberculate, pale orange (5A3) to grayish orange (6B4) when collected, no prominent change on drying; margins fibrillose, paler concolorous, occasionally indeterminate. Hyphal system dimitic. Generative hyphae subhyaline, septate, without clamps, up to $3.5 \mu\text{m}$ wide, branched, thin-walled. Skeletal binding hyphae aseptate, up to $2.8 \mu\text{m}$ wide, dichotomously to irregularly branched, thick-walled, positive to Cotton Blue, covering other structures. Gloeocystidia tubular, $60-72 \times 7-8.3 \mu\text{m}$, present both in the context and hymenium, thin to thick-walled, with oily contents positive to Sulphovanillin, without basal clamp; projecting up to $30 \mu\text{m}$ beyond the hymenium. Basidia clavate, $45-66 \times 6.3-8.2 \mu\text{m}$, four sterigmate, without basal clamp; sterigmata up to $5.6 \mu\text{m}$ long. Basidiospores ellipsoid to broadly ellipsoid, subhyaline, $8.5-12 \times 5-6.3 \mu\text{m}$, smooth, with oily contents, thin-walled, posi-



Figs. 28-33: *Scytinostroma ochroleucum*: 28. Basidiocarp showing hymenial side; 29-33. Line diagrams (29. basidiospores; 30. basidia; 31. generative hyphae; 32. skeleto-binding hyphae; 33. cystidia)

tive to Melzer's reagent.

Specimen examined: Himachal Pradesh: Sirmaur, Rajgarh, on log of *Cedrus deodara*, Ramandeep and Avneet 11032 (PUN), September 13, 2016.

Remarks: This species with tubular cystidia and ellipsoid to broadly ellipsoid basidiospores is being described for the first time from the study area. Formerly, it has been reported from Chamba, Kangra, Kullu and Shimla districts of Himachal Pradesh and Uttarakhand by Rattan (1974, 1977); from Shimla and Solan districts of Himachal Pradesh by Dhingra *et al.* (2014); Uttarakhand by Sharma (2012) and Maharashtra by Ranadive (2013).

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