

KAVAKA 42: 25-29(2014)

Four new records of the genus *Hyphoderma* Wallr. from Punjab

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(Submitted in January, 2014 ; Accepted on July 15, 2014)

ABSTRACT

An illustrated account of four species of the genus *Hyphoderma* (*H. argillaceum*, *H. bicycistidium*, *H. lapponicum* and *H. setigerum*) based on collections made from Punjab has been given. All the four species are being reported as new records for the state of Punjab.

Keywords: Basidiomycota, Agaricomycetes, Meruliaceae, Corticioid fungi

INTRODUCTION

The genus *Hyphoderma* (Meruliaceae, Polyporales) is characterized by membranaceous to ceraceous basidiocarps, clamped generative hyphae, some kind of cystidia, smooth basidiospores with oily contents and somewhat constricted basidia. Wallroth (1833) proposed this genus with *H. spiculosum* (= *H. setigerum*) as the type. Later, significant contributions were made by Donk (1957), Eriksson (1958), Parmasto (1968), Eriksson and Ryvarden (1975), Maekawa (1994), Larsson (2007) and Bernicchia and Gorjon (2010). Various researchers from India [Thind and Rattan (1970), Rattan (1977), Dhingra (1989), Natarajan and Kolandavelu (1998), Bhosle *et al.* (2005), Ranadive *et al.* (2011), Dhingra and Singla (1993), Dhingra and Kaur (2005), Dhingra *et al.* (2009; 2011; 2014), Singh *et al.* (2010), Priyanka and Dhingra (2012)] have made contributions towards the study of this genus, but without any report from Punjab. All the four species (*H. argillaceum*, *H. bicycistidium*, *H. lapponicum* and *H. setigerum*) dealt with here are reported for the first time from Punjab. The material have been deposited at the Herbarium, Botany Department, Punjabi University, Patiala (PUN). The color standards used are according to Kornerup and Wanscher (1978).

Key to the species

1. Cystidia of two types.....*H. bicycistidium*
1. Cystidia of one type2
2. Cystidia septate, clamped, encrusted, basidiospores narrowly ellipsoid.....*H. setigerum*
2. Cystidia not as above, basidiospores broadly ellipsoid to subglobose.....3
3. Cystidia tubular, basally widened, thin-walled, with brown patches of resinous matter.....*H. argillaceum*
3. Cystidia subcylindrical, thin-walled, with oily contents.....*H. lapponicum*

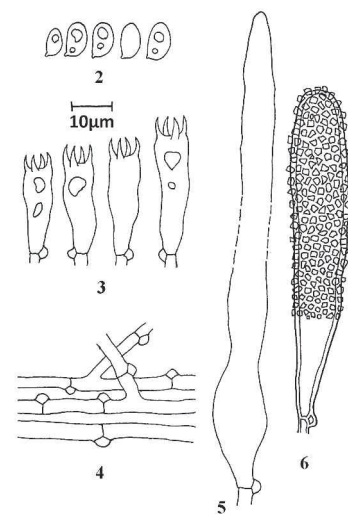
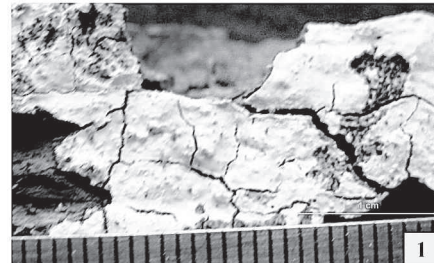
TAXONOMIC DESCRIPTIONS

1. *Hyphoderma bicycistidium* Priyanka & Dhingra, *Mycotaxon* **119**: 255-260, 2012.

Figs 1-6

Basidiocarp resupinate, adnate, effused, up to 460 µm thick in section; hymenial surface smooth to tuberculate,

yellowish white; margins thinning out or indeterminate, concolorous or paler. Hyphal system monomitic. Generative hyphae up to 4.6 µm wide, septate, clamped, thin-walled; basal hyphae parallel to the substrate, sparsely branched; subhymenial hyphae vertical, densely branched. Cystidia of two types: 1. 87.0–117.0 × 12.0–13.0 µm, tubular, smooth, basally widened, thin- to somewhat thick-walled, with basal clamp, embedded or slightly projecting. 2. 69.0–81.0 × 12.4–17.6 µm, clavate to subclavate, thick-walled, encrusted, with basal clamp, embedded. Basidia 21.0–29.0 × 6.6–7.4 µm, clavate to subclavate, thin-walled, 4–sterigmate, with basal clamp; sterigmata up to 5.0 µm long. Basidiospores 6.6–9.0 × 3.8–



Figs 1-6. *Hyphoderma bicycistidium*: 1. Basidiocarp showing hymenial surface; 2. Basidiospores; 3. Basidia; 4. Generative hyphae; 5. Tubular basally widened cystidia; 6. Clavate cystidia

4.8 μm , ellipsoid to subellipsoid, smooth, thin-walled, inamyloid, acyanophilous, with oily contents.

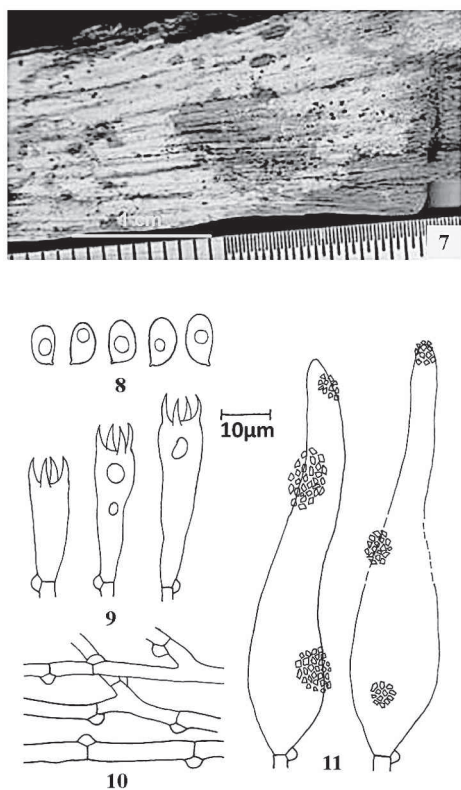
Collections examined-Punjab: Roopnagar, about 15 km from Kurali towards Tarapur, on decaying stump of *Ficus religiosa*, Harminder 4729 (PUN) September 1, 2011; about 1 km from Roopnagar city towards Pincasia resort, on decaying wood of *Dalbergia sissoo*, Harminder 4740 (PUN), September 23, 2011; Roopnagar, about 15 km from Kurali towards Tarapur, on decaying angiospermic stump, Gurpreet & Dhingra 6597 (PUN) October 4, 2012.

Remarks: This species is characteristic in having two types of sterile elements and ellipsoid to subellipsoid basidiospores with oily contents. Earlier, it was only known from its type locality in Himachal Pradesh (H.P.) by Priyanka and Dhingra (2012). Here, it is reported as a new record for Punjab.

2. *Hyphoderma setigerum* (Fr.) Donk, *Fungus, Wageningen* 27: 15, 1957. – *Thelephora setigera* Fr., *Elench. Fung.* (Greifswald) 1: 208, 1828.

Figs 7-11

Basidiocarp resupinate, adnate, effused, up to 240 μm thick in section; hymenial surface grandinioid, grayish white to yellowish white; margins thinning out or indeterminate, concolorous or paler. Hyphal system monomitic; generative hyphae up to 4.1 μm wide, branched, septate, clamped; subicular hyphae loosely interwoven, somewhat



Figs 7-11. *Hyphoderma setigerum*: 7. Basidiocarp showing hymenial surface; 8. Basidiospores; 9. Basidia; 10. Generative hyphae; 11. Cystidia

thick-walled; subhymenial hyphae densely branched, closely united, thin-walled. Cystidia 50.0–69.0 \times 6.0–8.6 μm , numerous, cylindrical, septate, clamped, thick-walled, encrusted; projecting up to 35 μm out of the hymenium. Basidia 21.0–37.0 \times 3.8–6.8 μm , clavate to subclavate, somewhat constricted, 4-sterigmate, with basal clamp; sterigmata up to 5.6 μm long. Basidiospores 6.4–12.0 \times 4.0–4.4 μm , narrowly ellipsoid, thin-walled, smooth, inamyloid, acyanophilous.

Collections examined-Punjab: Roopnagar, about 5 km from Roopnagar towards Anandpur Sahib, on burnt angiospermous stump, Harminder 4730 (PUN), September 23, 2011; about 5 km from Roopnagar towards Anandpur Sahib, on decaying angiospermous stump, Gurpreet & Dhingra 6596 (PUN) October 4, 2012.

Remarks: The diagnostic feature of this species is the presence of cylindrical, septate and clamped, encrusted cystidia. It has earlier been reported from India by Thind and Rattan (1970) from Jammu and Kashmir (J & K); Rattan (1977) from H. P.; Dhingra (1989) from the Arunachal Pradesh and rerecorded by Dhingra and Singh (2009) from H.P. Here it is reported for the first time from Punjab.

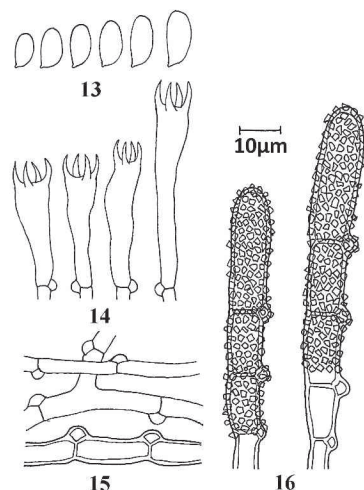
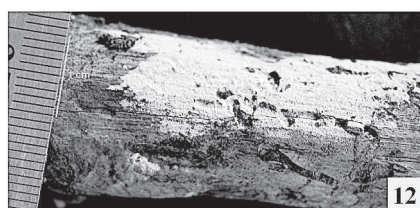
3. *Hyphoderma argillaceum* (Bres.) Donk, *Fungus, Wageningen* 27: 14, 1957. – *Corticium argillaceum* Bres., *Fung. trident.* 2 (11-13): 63, 1898.

Figs. 12-16

Basidiocarp resupinate, adnate, effused, up to 150 μm thick in section; hymenial surface smooth to tuberculate, yellowish white to pale yellow; margins thinning out or indeterminate, concolorous or paler. Hyphal system monomitic; generative hyphae up to 4.0 μm wide, branched, septate, clamped, thin- to somewhat thick-walled; basal hyphae parallel to the substrate, loosely interwoven, sparsely branched; subhymenial hyphae vertical, densely interwoven, much branched. Cystidia 76.0–130.0 \times 14.4–20.6 μm , tubular but basally widened, thin-walled, with basal clamp and brown resinous encrustations in patches, which dissolves in 3% KOH solution; projecting up to 20.0 μm out of the hymenium. Basidia 19.0–33.0 \times 6.6–8.0 μm , subclavate to clavate, 4-sterigmate, with basal clamp; sterigmata up to 5.4 μm long. Basidiospores 7.8–9.4 \times 4.0–5.0 μm , broadly ellipsoid to subglobose, apiculate, smooth, thin-walled, inamyloid, acyanophilous, with oily contents.

Collection examined – Punjab: Roopnagar, about 1 km from bus stand towards forest department, on angiospermous stump, Harminder 4732 (PUN), September 18, 2011.

Remarks: This species is characterized by thin-walled, tubular and basally widened cystidia, and broadly ellipsoid basidiospores. Thind and Rattan (1970) were the first to describe it from districts Kullu, Chamba (H.P.) and Pehalgam (J & K). Later, Dhingra (1989) reported it from



Figs 12-16. *Hyphoderma argillaceum*: 12. Basidiocarp showing hymenial surface; 13. Basidiospores; 14. Basidia; 15. Generative hyphae; 16. Cystidia

the Eastern Himalaya and Singh (2007) from district Shimla (H.P.). Here, it is being reported for the first time from Punjab.

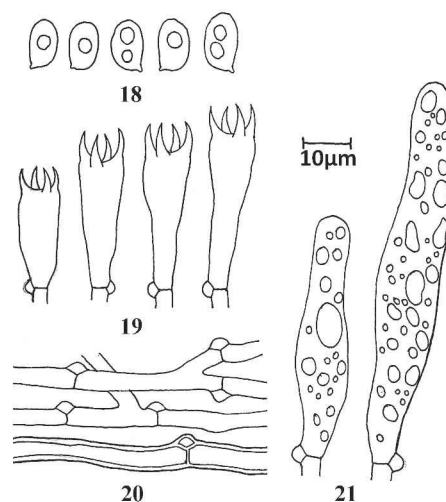
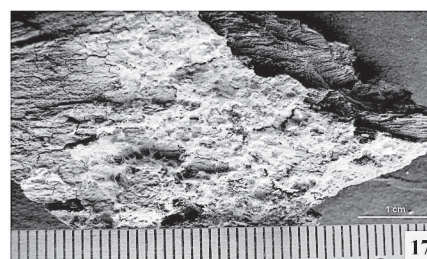
4. *Hyphoderma lapponicum* (Litsch.) Ryvarden, *Rept. Kevo subarct. Res. Stn* **8**: 149, 1971.—*Gloeocystidium lapponicum* Litsch., *Annls mycol.* **39**: 133, 1941.

Figs 17-21

Basidiocarp resupinate, adnate, effused, up to 200 µm thick in section; hymenial surface smooth to somewhat tuberculate, yellowish white to grayish yellow; margins thinning out or indeterminate, concolorous or paler. Hyphal System monomitic; generative hyphae up to 5.0 µm wide, septate, clamped; basal hyphae parallel to the substrate, sparsely branched; thin- to somewhat thick-walled; subhymenial hyphae vertical, densely branched, thin-walled. Cystidia 41.0–74.0 × 10.0–14.0 µm, embedded, subcylindrical, thin-walled, with basal clamp. Basidia 19.0–31.0 × 8.4–10.0 µm, clavate, 4-sterigmate, with basal clamp; sterigmata up to 5.3 µm long. Basidiospores 9.2–11.4 × 5.2–7.6 µm, broadly ellipsoid, smooth, thin-walled, inamyloid, acyanophilous, with oily contents.

Collection examined – Punjab: Roopnagar, Tarapur, on fallen angiospermous stick, Harminder 4731 (PUN) September 1, 2011.

Remarks: This species is characteristic in having thin-walled cystidia with oily contents and broadly ellipsoid basidiospores. From India, it has earlier been listed by



Figs 17-21. *Hyphoderma lapponicum*: 17. Basidiocarp showing hymenial surface; 18. Basidiospores; 19. Basidia; 20. Generative hyphae; 21. Cystidia

Ranadive *et al.* (2011) from the Western Ghats (Maharashtra), but is a new record for Punjab.

ACKNOWLEDGEMENTS

The authors thank Head, Department of Botany, Punjabi University, Patiala for providing research facilities and UGC–DRS SAP III for financial assistance.

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