KAVAKA 50: 69-72(2018)

The genus *Sistotrema* Fr. (*Hydnaceae, Cantharellales*) from district Shimla (Himachal Pradesh)

Maninder Kaur, Ramandeep Kaur, Avneet Pal Singh* and Gurpaul Singh Dhingra
Department of Botany, Punjabi University, Patiala147002 (Punjab), India
**Corresponding author Email: avneetbot@gmail.com*
(Submitted on February 10, 2018; Accepted on April 27, 2018)

ABSTRACT

Four species of genus *Sistotrema* Fr. i.e. *S. brinkmannii* (Bres.) J. Erikss., *S. diademiferum* (Bourd. & Galz.) Donk, *S. kirghizicum* (Parmasto) Domanski and *S. porulosum* Hallenb. have been described and illustrated. Of these, *S. diademiferum* and *S. kirghizicum* are new records for India and *S. porulosum* is the first report from the study area. A key to all the known species of genus *Sistrotrema* from the study area is also provided.

Keywords: *Basidiomycota, Hydnaceae, Cantharellales*, Himalaya, Himachal Pradesh.

INTRODUCTION

Genus *Sistotrema* Fr. (*Hydnaceae*, *Cantharellales*) is characterized by resupinate, effused, adnate basidiocarps with smooth to tuberculate to odontoid to porulose hymenial surface; monomitic hyphal system with clamped generative hyphae which are frequently ampullate at the septa; clavate to urniform, 4-6-8- sterigmate basidia and ellipsoid to ovoid to allantoid, smooth, thin-walled, inamyloid, acyanophilous basidiospores. Fries (1821) proposed the genus with *S. confluens* Pers.:Fr. as the type. It is responsible for white rot (Ryvarden and Gilbertson, 1994) and can be differentiated from the allied genera by the presence of oil droplets in the protoplasm (Eriksson *et al*., 1984). It is a wide spread genus with 155 known taxa world over (Mycobank, 2018). Earlier, only 3 species i.e S. *brinkmanni* (Bres.) J. Erikss., *S. sernandari* (Litsch.) Donk and *S. subtrigonospermum* D.P. Rogers, of this genus have been reported from the study area (Dhingra and Singla 1997; Dhingra *et al*., 2009 and Prasher and Ashok 2013). Presently, four species of the genus namely, *S. brinkmannii* (Bres.) J. Erikss., *S. diademiferum* (Bourd. & Galz.) Donk, *S. kirghizicum* (Parmasto) Domanski and *S. porulosum* Hallenb. have been described and illustrated on the basis of collections made during the fungal forays conducted in different localities of district Shimla (Himachal Pradesh) during the rainy season of years 2012-2015. Of the described species, *S. diademiferum* and *S. kirghizicum* are being described for the first time from India whereas, *S. porolosum* is new to the study area. A workable key to the species, including those described earlier but not encountered during present studies, has also been given. The material of all the specimens has been deposited at the Herbarium, Department of Botany, Punjabi University, Patiala (PUN). The colour standards used are as per Methuen's Handbook of Colors (Kornerup and Wanscher, 1978).

TAXANOMIC DESCRIPTIONS

Key to the species of genus *Sistotrema*

1. Cystidia present.....2
1. Cystidia absent.....3
2. Cystidia basally widened, without oily contents..... .....*S. kirghizicum*
2. Cystidia flexuous, with oily contents.....*S. sernanderi**
3. Basidiospores tetrahedral.....*S. subtrigonospermum**
3. Basidiospores differently shaped…….....4
4. Basidiospores ellipsoid to ovoid.....*S. diademiferum*
4. Basidiospores allantoid.....5
5. Basidiocarp smooth to grandinioid.....*S. brinkmannii*
5. Basidiocarp smooth to porulose.....*S. porulosum*

1. *Sistotrema brinkmannii* (Bres.) J. Erikss., K. fysogr. Sällsk. *Lund Förh*.: 134, 1948. - *Odontia brinkmannii* Bres., *Annales Mycologici* **1**(1): 88, 1903. **Figs.1-3**

Basidiocarp resupinate, effused, adnate, ≤140 µm thick in section; hymenial surface smooth to grandinioid (under lens), grayish white when fresh, almost invisible on drying; margins thinning, pruinose, paler concolorous, or indeterminate. **Hyphal system** monomitic. Generative hyphae ≤2.8 µm wide, nodose-septate, thin-walled, with oily contents; basal hyphae, parallel to the substrate, less branched; subhymenial hyphae vertical, more branched. **Basidia** 17-26 × 3.7-5 µm, subclavate to suburniform, 4-8 sterigmate, with basal clamp; sterigmata ≤3 µm long. **Basidiospores** 3.7-4.6 × 1.5-2.5 µm, allantoid, smooth, thin-walled, inamyloid, acyanophilous.

Specimen examined: India, Himachal Pradesh, Shimla, about 2 kms from Baghi towards Narkanda on Baghi road, on bark of *Cedrus deodara*, Maninder & Dhingra 7914(PUN), August 19, 2012.

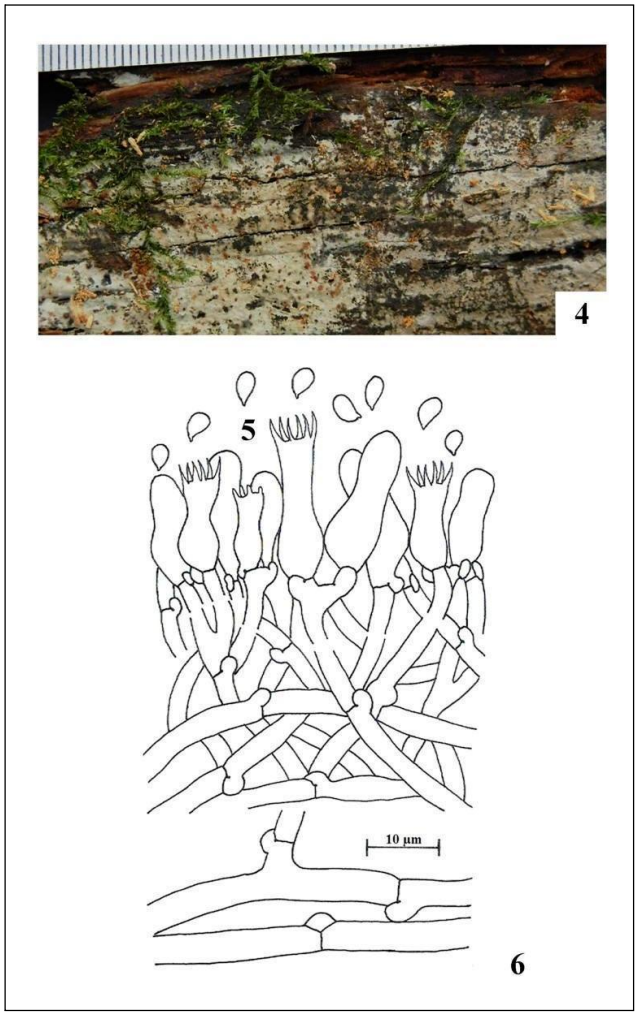
Remarks: This species is peculiar in having smooth to grandinioid (under lens) basidiocarp, 4-8 sterigmate basidia and allantoid basidiospores. Dhingra *et al*. (2009) were first to describe it from India from district Shimla (Himachal Pradesh). Later on Prasher and Ashok (2013) also documented it from Himachal Pradesh.

2. *Sistotrema diademiferum* (Bourd. & Galz.) Donk, Fungus **26**: 4, 1956.- *Corticium diademiferum* Bourd. & Galz., *Bull. Soc. Mycol. France* **27**: 244, 1911. **Figs. 4-6**

Basidiocarps resupinate, effused, adnate, ≤150 µm thick in section; hymenial surface smooth, pale orange to grayish orange when fresh, brownish gray on drying; margins thinning, pruinose, paler concolorous, or indeterminate.

* Species reported earlier but not encountered during present studies

Figs. 1-3 ***S. brinkmannii:*** 1.Basidiocarp showing hymenial surface; 2. Basidiospores; 3. Vertical section through basidiocarp.



Figs. 4-6 ***S. diademiferum:*** 4.Basidiocarp showing hymenial surface; 5. Basidiospores; 6. Vertical section through basidiocarp.

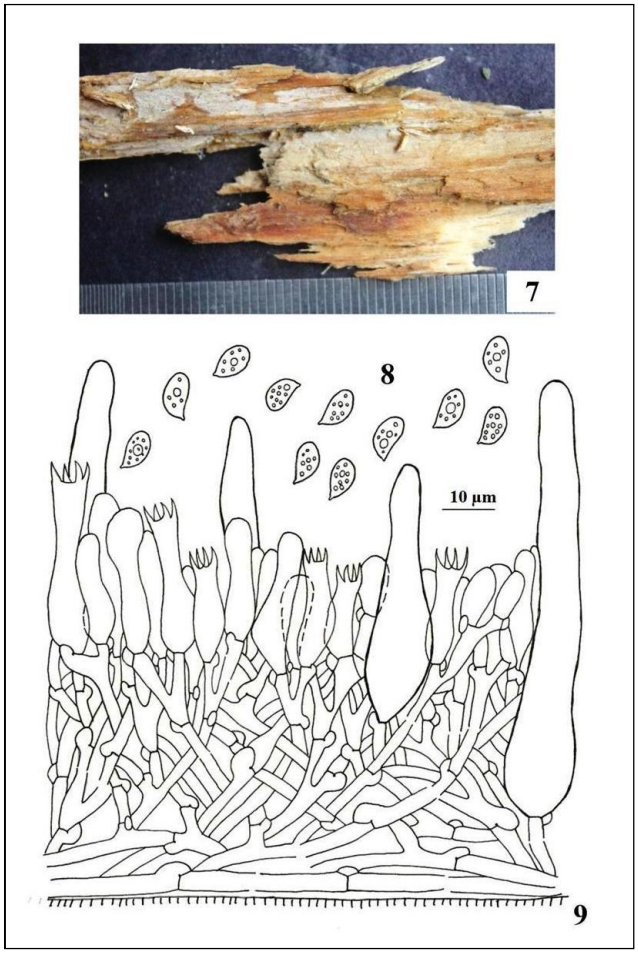
Hyphal system monomitic. Generative hyphae ≤4.0 µm wide, nodose-septate, thin-walled; basal hyphae parallel to the substrate, sparesly branched; subhymenial hyphae vertical, richly branched. **Basidia** 9-20 × 4-8 µm, suburniform, 4-6 sterigmate, with basal clamp; sterigmata ≤4 µm long. **Basidiospores** 3-5 × 2-3 µm, ellipsoid to ovoid, smooth, thin-walled, inamyloid, acyanophilous.

Specimens examined: India, Himachal Pradesh, Shimla, Sarain, on bark of *Pinus wallichiana*, Avneet 7921(PUN), August 17, 2012; about 2 km from Chaupal towards Khirki, on stump of *C. deodara*, Maninder 7922(PUN), August 18, 2012.

Remarks: This species differs from *S. brinkmannii* in having ellipsoid to ovoid basidiospores and smooth hymenial surface. It is being described for the first time from India. Bourdot and Galzin (1911) described it for the first time as *Corticium diademiferum* from France. Donk (1956) shifted it to genus *Sistotrema*. Presently, it is distributed in Canada, Turkey, France, Germany, Italy, United Kingdom, Belgium, Denmark, Finland, Russia and the Caucasus (MycoBank, 2018).

3. ***Sistotrema kirghizicum*** (Parmasto) Domanski, Mala flora grzybów. Tom I: *Basidiomycetes (Podstawczaki), Aphyllophorales (Bezblaszkowe) Corticiaceae, Sarcodontia-Ypsilonidium, Christiansenia* and *Syzygospora* **7**: 48, 1992. *Urnobasidium kirghizicum* Parmasto, *Conspectus Systematics Corticiacearum*: 225, 1968. **Figs. 7-9**

Basidiocarp resupinate, effused, adnate, reticulate-porulose, ≤150 µm thick in section; hymenial surface hypochnoid when young, smooth with age, grayish white to orange white to pale orange when fresh, grayish orange on drying; margins thinning, pruinose to somewhat fibrillose, paler concolorous, or indeterminate. **Hyphal system** monomitic. Generative hyphae ≤2.5 µm wide, nodose-septate, generally with ampullate swellings; basal hyphae parallel to the substrate, loose, less branched; subhymenial hyphae vertical, compact, more branched. **Cystidia** 44-100 × 10-12 µm, subcylindrical, basally widened, generally sinuous, without oily contents, thin- to somewhat thick-walled, with basal clamp. **Basidia** 13-32 × 6.2-6.8 µm, suburniform to urniform, 4-sterigmate,



Figs. 7-9 ***S. kirghizicum:*** 7.Basidiocarp showing hymenial surface; 8. Basidiospores; 9. Vertical section through basidiocarp.

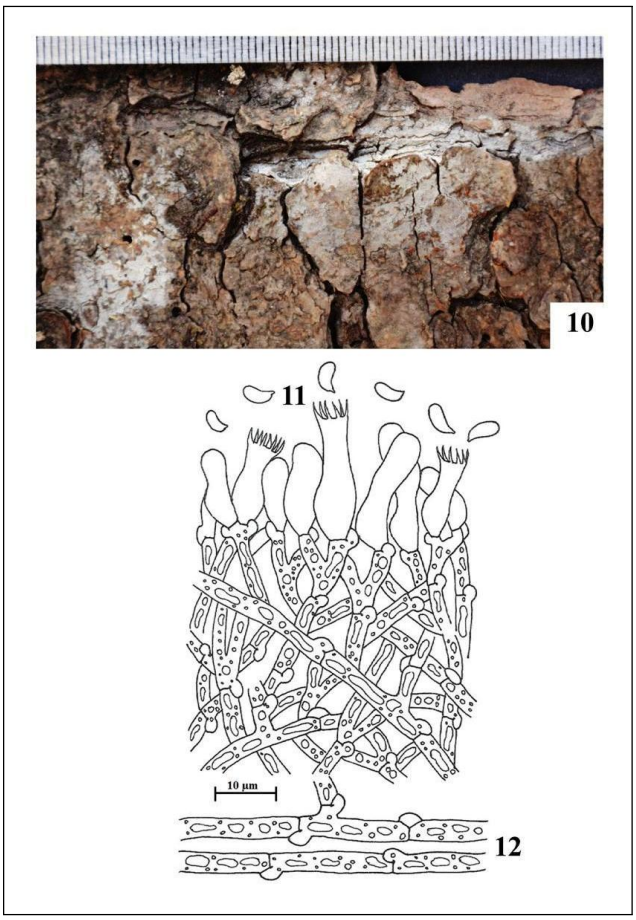
with basal clamp; sterigmata ≤3.5 µm long. **Basidiospores** 6-8.5 × 3.4-4 µm, ellipsoid, smooth, thin-walled, with oily contents, inamyloid, acyanophilous.

Specimen examined: India, Himachal Pradesh, Shimla, about 23 km from Shalaghat towards Shimla, on stump of *C. deodara*, Maninder 8924 (PUN), August 1, 2015.

Remarks: It is the first report of this species from India. Parmasto (1968) described it for the first time as *Urnobasidium kirghizicum* on the basis of collections made from Kyrgyzstan. Domanski (1992) shifted it to the genus *Sistotrema*.

4. ***Sistotrema porulosum*** Hallenb., *Mycotaxon* 21: 407, 1984. **Figs. 10-12**

Basidiocarps resupinate, effused, adnate, ≤200 µm thick in section; hymenial surface smooth to porulose, grayish white; margins thinning, pruinose, paler concolorous, or indeterminate. **Hyphal system** monomitic. Generative hyphae ≤3.4 µm wide, branched, nodose-septate, thin-walled, with oily contents; basal hyphae parallel to the substrate, less branched; subhymenial hyphae vertical, more branched. **Basidia** 12-20 × 4-5 µm, suburniform to urniform, 6-8 sterigmate, with basal clamp; sterigmata ≤3.1 µm long.



Figs. 10-12 ***S. porulosum:*** 10. Basidiocarp showing hymenial surface; 11. Basidiospores; 12. Vertical section through basidiocarp.

Basidiospores 4-5 × 1.9-2.4 µm, narrowly ellipsoid to allantoid, smooth, thin-walled, acyanophilous, inamyloid.

Specimens examined: India, Himachal Pradesh, Shimla, Sonadhar, on bark of *Pinus wallichiana*, Maninder 7916 (PUN), September 02, 2014; on way to Hattu Peak, on dead and decaying log of *Cedrus deodara*, Avneet 7923 (PUN), September 2, 2015.

Remarks: This species differs from *S. brinkmannii* in having narrowly ellipsoid basidiospores and smooth hymenium. It was earlier reported from India by Dhingra and Singla (1997) from district Chamba, which has also been listed by Dhingra *et al*. (2014). However, it is being reported for the first time from district Shimla.

ACKNOWLEDGEMENTS

The authors thank Prof. Nils Hallenberg, Gothenburg, Sweden for expert comments, Head, Department of Botany, Punjabi University, Patiala for providing necessary laboratory facilities and University Grants Commission, New Delhi for financial assistance under UGC BSR fellowship scheme and DRS-SAP, DSA Phase - I programme.

REFERENCES

Bourdot, H. and Galzin, A. 1911. *Hymènomycétes* de France:

III. Corticiées: *Corticium*, *Epithele*, *Asterostromella*. *Bulletin da la Société Mycologique de France* **27** (2): 223-266.

Dhingra G.S. and Singla, N. 1997. North-Western *Corticiaceae*- Three rare species from Dalhousie hills. *Geobios New Reports* **16**: 70-72.

Dhingra G.S., Priyanka and Singh, A.P. 2009. Three new records of genus *Sistotrema* from India. *J. Ind. Bot. Soc*. **88**: 76-79.

Dhingra, G.S., Singh, A.P., Kaur, J., Priyanka, Kaur, H., Rani, M., Sood, S., Singla, N., Kaur, H., Jain, N., Gupta, S., Kaur, M., Sharma, J., Rajnish and Kaur, G. 2014. A checklist of resupinate, non-poroid Agaricomycetous fungi from Himachal Pradesh, India. *Synopsis Fungorum* **32**: 8-37.

Domanski, S. 1992. *Mala flora grzybów. Tom I: Basidiomycetes (Podstawczaki), Aphyllophorales (Bezblaszkowe). Corticiaceae, Sarcodontia-Ypsilonidium, Christiansenia & Syzygospora* **7**: 1-258.

Donk, M.A. 1956. Notes on resupinate *Hymenomycetes*-III. *Fungus* **26**: 3-24.

Eriksson, J., Hjortstam, K and Ryvarden, L. 1984. The *Corticiaceae* of North Europe. Volume 7 *Schizopora - Suillosporium*. *Fungiflora*, Oslo, Norway. 1282-1449.

Fries, E.M. 1821. *Systema Mycologicum* 1: 1-520.

Kornerup, A. and Wanscher, J.H. 1978. *Metheun's Handbook of colours*, IIIrd Ed. Metheun and Co. Ltd. London, 1-252.

Mycobank. 2018. Fungal databases. Nomenclature and species banks. [Accessed: 02/02/2018] http://www.mycobank.org/

Parmasto, E. 1968. *Conspectus Systematics Corticiacearum*. Inst. Zool. Bot., Tartu,1-261.

Prashar, I.B. and Ashok, D. 2013. A checklist of wood rotting fungi (non-gilled *Agaricomycotina*) from Himachal Pradesh. *Journal on New Biological Reports* **2** (2): 71-98.

Ryvarden, L. and Gilbertson, R.L. 1994. *European polypores*. Part 2. *Synopsis Fungorum* **7**: 394-743.