

## The Hyphomycetous Genus *Ceratocladium* - An Overview

Sushma<sup>1</sup>, R. K. Verma<sup>2</sup>, I. B. Prasher<sup>3</sup>, AK Gautam<sup>4</sup>

<sup>1</sup>Department of Bio-Sciences, University Institute of Biotechnology, Chandigarh University,  
Gharuan 140413, India

<sup>2</sup>Department of plant pathology, Panjab Agricultural University, Ludhiana, 141004, India

<sup>3</sup>Department of Botany, Punjab University, Chandigarh, 160014, India

<sup>4</sup>Faculty of Science, School of Agriculture, Abhilashi University, Mandi-175028, India

Email: sushma.e10454@cumail.in

**Abstract:** This paper contains an overview of genus *Ceratocladium* which belongs to the hyphomycetous group of fungi and the taxonomy of one species that has been collected from Himachal Pradesh which constitutes a new record for the Sirmaur district.

**Keywords:** Hyphomycetes, taxonomy, anamorphic fungi, new record

### INTRODUCTION

Hyphomycetes includes the fungi which lacks conidiomata. In this group of fungi the sporulation takes place on separate or aggregated hyphae which are called as conidiophores which can be separate or aggregated. The hyphae may or may not be septate. During a survey in Himachal Pradesh for such fungi one species of genus *Ceratocladium* i.e. *C. microspermum* has been collected and described in this paper.

### MATERIALS AND METHODS

The wood samples were collected and brought to the laboratory in separate bags. The specimens were mounted in 4% KOH or Lactophenol on glass slides Kirk et al. (2008). Microscopic studies were done using Matrix stereo trinocular microscope (VL-Z60) and transmission microscope (VRS-2f). All the measurements were taken with the help of Pro MED software. The specimens have been deposited in herbarium of Department of Botany, Panjab University (PAN).

### RESULTS

*Ceratocladium* Corda, Pracht–Fl. Eur. Schimmelpild.: 41 (1839)

Colonies are dark brown in color, velvety and effuse on natural substratum. Hyphopodia are absent. Setae present which are erect and having branches at the apex, with dark stipe that is brown in color, branches flexuous, smooth in appearance, tapering, septate, and pale in color at the tips. Conidiophores are macronematous, smooth, narrow, having branches, pale brown in color and encasing the lower part of the setae. Conidiogenous cells are solitary, percurrent, discrete, many in number, lateral in position, polyblastic and ampulliform or lageniform. Conidia arises from the conidiogenous cell in a form of ring around the apex, simple, solitary, straight or curved, smooth in appearance, cylindrical having rounded ends or fusiform, colorless and aseptate.

**Type species:** *Ceratocladium microspermum* Corda, Pracht - Flora. Europaeischer Schimmel-Bildungen: 40 (1839).

*Ceratocladium microspermum* Corda, Pracht-Fl. Eur. Schimmelbild.: 40 (1839)

=*Margarinomyces microspermus* (Corda) F. Mangenot [as 'microsperma'], *Rev. gén. Bot.* 59: 397 (1952)

### Fig 1

Colonies are effuse, mid to dark brown in color and velvety on natural substratum. Superficial or sometimes immersed mycelium found. Setae are present, having branches which are tapering and up to 200 µm long, thickness of stipe is 4.2–4.8 µm. The conidiogenous cells are numerous in number, lateral, polyblastic, neumerous, 6–11 µm long and in the broadest part 2.8–3.9 µm thick. Conidia are simple, colorless, aseptate, smooth, and  $4.5\text{--}5.8 \times 0.9\text{--}1.4$  µm.

**Collection examined:** India, Himachal Pradesh, Sirmaur, Nahan, on dead twigs of *Bombax* sp., 05 May 2013, Sushma, PAN (31523).

### CONCLUSION:

*Ceratocladium* was established by Corda (1839) as a genus along with *C. microspermum* as type species. Presently *Ceratocladium* comprises of five species (Table 1) (March 2021: www.speciesfungorum.org). The above described species in its morphological range agrees well within the range of *Ceratocladium microspermum*. Earlier it has been reported from Himachal Pradesh (Bilaspur district) and other parts of India i.e. Sikkim and Poona (Bilgrami *et al.*, 1991 & Jamaluddin *et al.*, 2004), so it constitutes a new report from Sirmaur district.

Table 1: An account of *Ceratocladium* spp.

S.No.	Species	Seate (µm)	Conidiogenous Cells (µm)	Conidia (µm)	References
1.	* <i>C. indicum</i>	400 – 650 long, width 5 – 7.5 at base and tapering up to 1.6 – 2	3 – 8 long and 3–4.5 wide	4–6 length, 1.6–2 width	Sharma & Munjal, 1978
2.	* <i>C. microspermum</i>	Up to 300 in length	6–11 long, 3–4 wide	4–7 long, 0.5–1 wide	Corda, 1839
3.	<i>C. polysetosum</i>	Up to 400 long and 5–7 wide	6–12.5 long and 2.5–5 wide	8–10 long, 1.5–2 broad	Mena-Portales <i>et al.</i> , 2011
4.	<i>C. pseudocladum</i>	Up to 750 in length, 3.5–6 broad	5–10 long and width 2.5–4 near the base	10 – 16 long, 1.2–1.6 wide	Mena-Portales <i>et al.</i> , 2011
5.	* <i>C.</i>	Up to 350 in	4–9 × 2.5–4	8–	Sutton,

	<i>purpureogriseum</i>	length and		12.5×1.5	1973b
--	------------------------	------------	--	----------	-------

\* These species have also been reported from India (Bilgrami *et al.*, 1991 & Jamaluddin *et al.*, 2004).

## REFERENCES

- [1] Bilgrami KS, Jamaluddin and Rizvi MA (1991). The Fungi of India Part-III (List and Reference). Today and Tomorrow's Printers and Publishers, New Delhi. 798 pp.
- [2] Corda ACJ (1839). Pracht- Flora. Europaeischer Schimmel-Bildungen. Gerhard Fleischer, Leipzig, Berlin.
- [3] Jamaluddin, Goswami MG and Ojha BM (2004). Fungi of India 1989-2001. Scientific Publishers, Jodhpur, India. 326 pp.
- [4] Kirk PM, Cannon PF, Minter DW and Stalpers JA (2008). Dictionary of the Fungi, 10th edn. CABI, Wallingford.
- [5] [www.speciesfungorum.org](http://www.speciesfungorum.org)

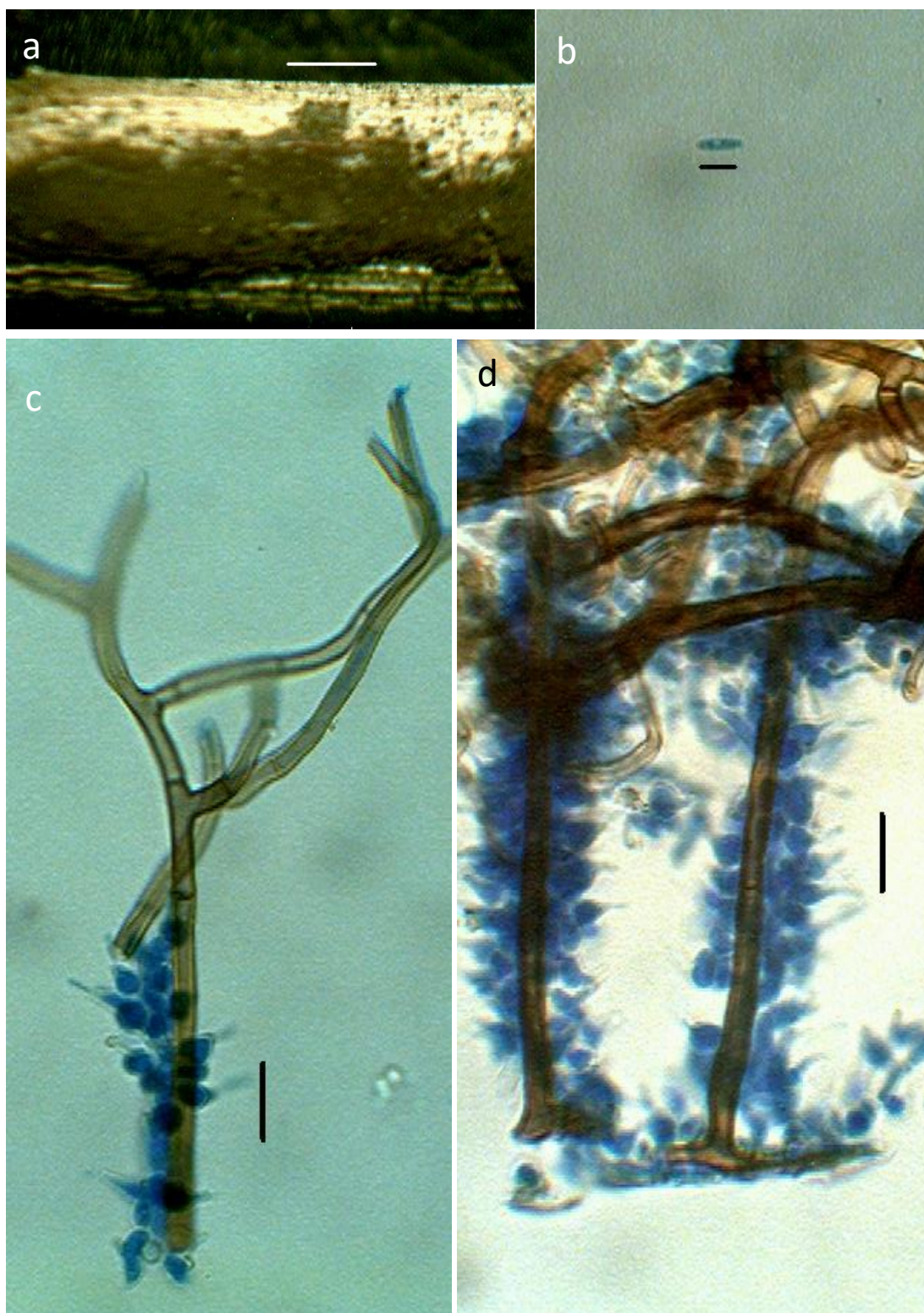


Fig. 1 *Ceratocladium microspermum* a) Colony on substrate b) Conidium c,d) Conidiogenous cells attached to setate. Scale bars a = 1 mm; b = 5  $\mu$ m; c,d = 10  $\mu$ m.