
***Phomopsis indica*, *Cordana chittarae*- two new fungal species from the Chittar forest soil, Pathanamthitta, Kerala, India**

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In the current investigation, two new fungal species, *Phomopsis indica* and *Cordana chittarae* are isolated and identified from the soil samples collected from Chittar forest coming under Vadasserikkara range of Pathanamthitta district, Kerala state of India. The present study is the first study ever done to report the above two species. Both the two new species were reviewed and compared with the previously known species and found some differentiating characteristics so considered as the new species.

Key words: Ascomycota, Valsaceae, Chittar, soil microfungi, anamorphs

INTRODUCTION

Fungi are everywhere- beneath our feet, almost everywhere we look and even in the air we breath, without these strange fascinating life forms we, nor the inhabitants of our native forest survive for long. The fungus genus *Phomopsis* was first documented as an anamorphs of nectriaceous fungi, with several changes over time in its nomenclatural status. *Phomopsis* name became more stable when *Phomopsis* was defined as a group of *Phoma* species that produced beta-conidia, but he did not transfer any species to *Phomopsis*. The genus is a phytopathologically important micro-organism with diverse host range and distributed worldwide. In addition only two species *Phomopsis sclerotioides*, (Shishido *et al.*, 2010) and *Phomopsis liquidambari* (Yan Chen *et al.*, 2013) are recorded exclusively from soil or having saprophytic activities.

Preuss, as early as the nineteenth century established *Cordana* with four species, without designating a type species. However, Saccardo in 1886 redescribed *Cordana*, retaining only one species, *C. pauciseptata* Preuss, which thus effectively became the type species (Seifert *et al.*, 2011) epitypified by Hernández-Restrepo (2014) and *Cordana meilingensis* and *C. lushanensis* sp.nov.

from Jiangxi, China (Ai *et al.* 2019). The asexual fungal genus *Cordana* Preuss was erected with a lectotype species namely *Cordana pauciseptata* Preuss from bark of deciduous trees and conifers. This genus commonly isolated from dead wood or leaves and easily cultured. Most of the species characterized with having brown coloured, swollen, septate conidiophores and with intercalary and terminal conidiogenous cells mostly. Conidia 0-1 septate, pale brown to brown in colour usually, recorded parasitic or saprophytic on rotten plant materials.

MATERIALS AND METHODS

Soil samples were collected randomly from different areas of Chittar forest, in Vadasserikkara range of Pathanamthitta district, Kerala upto 15cm in depth and they mixed together to get one composite soil sample. After serial dilution, three dilutions such as 10^{-3} , 10^{-4} and 10^{-5} were used for the isolation of fungi on Potato Dextrose Agar medium (Waksman, 1922).

RESULTS AND DISCUSSION

1. *Phomopsis indica* Sandhya and Neeta, sp.nov (Fig: 1, A-F)

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Ethymology:- The specific epithet is named after it isolated from soil.

Colonies grew rapidly on PDA reaching 7.5 cm after 15 days of incubation at 25°C with dark brown fluffy mycelium, releasing light yellow pigments into the medium. Mycelium grew immersed, branched, septate, hyaline to pale brown. Conidiomata acervulate, sporodochial, superficial, semi-immersed, initially hyaline, later turning brown to dark brown, immersed, septate, globose, ampulliform,

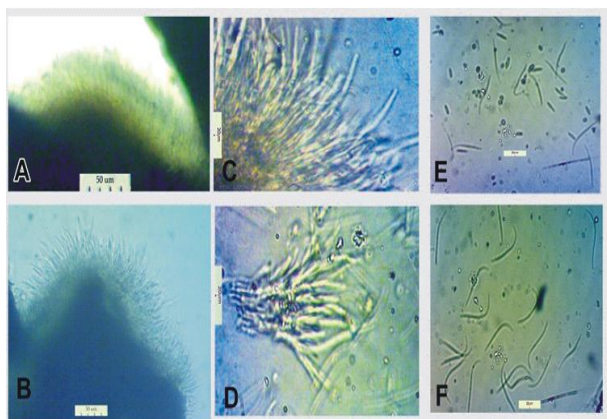


Fig.1: *Phomopsis indica*, A.Acervulate conidiomata, B. Sporodochial conidiomata, C. Erect sterile paraphyses, D. Branched conidiophore with paraphyses, E. Alfa and beta conidia, F. Beta conidia.



Fig.2: *Cordanachittarae*, G. Simple and branched conidiophores with conidia growing intercalary cell.

unilocular, walls brown, thin- textura globularis. Conidiophore, branched, septate at the base and above. Conidiogenous cells enteroblastic, phialidic, determinate, integrated, rarely discrete, hyaline, cylindrical. Conidia alpha, ellipsoidal, cylindrical, straight, less often fusiform, hyaline, sometime septate, usually biguttulate (one guttule at each end) often 3-4 guttules, 2-4 x 8-15 µm. Conidia, beta, were hyaline, straight, curved, hamate 25-40

µm.long. Soil samples from Chittar forest, Vadasserikkara range of Pathanamthitta district, Kerala state. Collected by Sandhya Susan Alex, august 2020, NCFT, No 9872.21

2. *Cordana chittarae* Sandhya and Neeta, sp. nov. (Fig:2, G)

Mycobank#839272

Ethymology:- Named after origin of Chittar forest, Vadasserikkara range, Pathanamthitta (Kerala), India.

The colonies grew on Potato Dextrose Agar 7.5 cm. after 10 days at 25°C, effuse, black, releasing no pigment into the agar. Conidiophores, erect, stout, flexuous, septate(12-15 septa with double wall of 2-4 µm thickness) pale to mid brown, straight or branched, smooth wall, up to 200 µm long, 6-8 µm wide, and 8-12µm wide at the base, no swelling in each cell or without nodulose swelling except at terminal end. Conidia produced in between intercalary cylindrical cells, without swelling of conidiophore or only at a terminal swelling, initially globose, (2-5µm diameter) non septate, later with maturity turns thick medium septate, ovoid or pyriform 8-12 x 4-6 µm size, size, (basal cell up to 5 µm and terminal up to 12µm) constricted at septa, pale to dark brown without producing a scar.

The *Phomopsis* species is compared based on the review of Indian literature, it indicates that only six different species namely *Phomopsis viticola*, *Phomopsis anacardii*, *Phomopsis azadirachtae*, *Phomopsis castanea*, *Phomopsis heveae* and *Phomopsis lantanae* recorded on variety of host plants by different workers till date from India. Amongst the world literature many more species recorded but only as pathogen on different host plants having variations in their host, conidiomata, conidiophores and conidia etc with particular reference to their, size, shape, septation, and with conidial oil globules formation. In addition to above only two more new species with the presence of paraphyses namely *Phomopsis javanica* and *Phomopsis longiparaphysata* on *Asparagus officinalis* from Indonesia (Java) and *Phomopsis longiparaphysata* on *Vitis vinifera* (Grapevine) from Taiwan reported respectively. The present Indian isolate was taxonomically compared with *Phomopsis* species recorded from India and world over as well as two other species having paraphyses stages.

The new Species *Phomopsis indica* isolated from forest soil (Chittar, Vadasserikkara range, Pathanamthitta district, Kerala, India), differed from other species in colony character as well as with *Phomopsis javanica* and *Phomopsis longiparaphysata* in having paraphyses among the branched conidiophores, conidiogenous cell, shape, size, colour and septation.

The reviewed literature of earlier known species namely *Cordana abramovii*, *Cordana andinopatagonica*, *Cordana bisbyi*, *Cordana ellipsoideade*, *Cordana inaequalis*, *Cordana indica*, *Cordana johnstonii*, *Cordana lushanensis*, *Cordana meilingensis*, *Cordana martini*, *Cordana mercadiana*, *Cordana musae*, *Cordana pauciseptata*, *Cordana solitaria* and *Cordana versicolor* characterized with a single septate conidia of different shape, size and color exclusively grew on nodulose swelling of conidiophores (Markovskaja, 2003).

The new isolate *Cordana chittarae* sp. nov. have intercalary cylindrical conidiogenous rather than nodulose structure recorded in earlier known species except at terminal end of conidiophores. In addition the new isolate have significant variation in shape, size, septation and colour of the conidia. Thus the above new taxon after the name of Chittar forest, Vadasserikkara range, Pathanamthitta district, (Kerala), India has been proposed.

The genus *Cordana* has been revised by Markovskaja (2003). Three species of *Cordana* have been described from India, viz. *C. indica* Subramoniam & Rao, *C. martini* and *C. indica* Srivastava. Type material of these species was unavailable for study, and the original descriptions and drawings are very poor. They are of doubtful

identity. *C. indica* Subramoniam & Rao is probably a synonym of *C. musae* (Zimm.) Höhnel. *C. indica* Srivastava is an illegitimate later homonym of *C. indica*. The cited type material of the latter, IMI 242255, was discarded before the name was published, since it was a poor specimen. *C. martini* was not validly published, lacking a Latin diagnosis. No material is known to be preserved of the invalidly published species *Cordana quercina* and *C. reticulata* is considered to be a synonym of *Ityorhoptrum verruculosum*.

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REFERENCES

- Ai, C.C., Jian Ma, Zhang, X.G., Castañeda, R.F., 2019. *Cordana meilingensis* and *Cordana lushanensis* spp. nov. from Jiangxi, China. *Mycotaxon* **134**:329-334.
- Chen, Y. T., Ren, C. G., Bo Yang, B., Peng, Y., Dai, C. C. 2013. Priming Effects of the Endophytic Fungus *Phomopsis liquidambari* on Soil mineral transformations. *Microb. Ecol.* **65**:161–170.
- Hernández-Restrepo, M., Gené J., Mena-Portales, J., Cano, J., Madrid, H., Castaneda-Ruiz, R. F., Guarro, J., 2014. New species of *Cordana* and epitypification of the genus. *Mycologia*, **106**:723–734.
- Markovskaja, S. 2003. A new species of *Cordana* from Lithuania. *Mycotaxon* **87**:179-185
- Seifert, K., Morgan-Jones, G., Gams, W., Kendrick, B. 2011. The Genera of Hyphomycetes. [CBS Biodiversity Series no. 9.] Utrecht: Central bureau voor Schimmel cultures.
- Shishido, M., Sato, K., Yoshida, N., Tsukui, R., Usami, T. 2010. PCR-based assays to detect and quantify *Phomopsis sclerotoides* in plants and soil. *J. Gen. Plant Pathol.* **76**: 21–30.
- Waksman, S. A. 1922. A method for counting the number of fungi in the soil. *J. Bacteriol.* **7**:303-309.

