

A novel fungal species of *Spiropes* on *Glochidion zeylanicum* - An important medicinal plant from Jashpur, Chattisgarh, India

Anurag Dubey* and Akhila Nand Rai

Department of Botany, School of Biological Sciences, Dr. Harisingh Gour Central University, Sagar, M.P. -470003, India

*Corresponding author Email: anu15011991@gmail.com

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ABSTRACT

Survey to collect the fungal samples from Upperghat area of Jashpur District in Chattisgarh, India was undertaken during the months from September 2016 to December 2018. During the field survey a new species of *Spiropes* Cif. was encountered infecting *Glochidion zeylanicum* (Gaertn.) A. Juss. This novel species has been named as *Spiropes glochidionis* sp. nov. It is characterized based on morphological comparison with previously described closely related species of this genus which exhibits both true and pseudosepta and also differs from other species in the dimensions of conidiophore and conidia. Field photographs showing symptoms on the host plant along with photomicrographs and SEM pictures of the fungus are also provided.

Keywords: *Glochidion zeylanicum*, *Spiropes*, new species, amphigenous, synnamata

INTRODUCTION

During field survey conducted from September, 2016 to December, 2018 in Upperghat region of Jashpur District forest in Chattisgarh, leaves of *Glochidion zeylanicum* (Gaertn.) A. Juss. were found heavily infected by leaf spot pathogen which was identified as belonging to the genus *Spiropes* Cif. Based on unique diagnostic features and comparison with the existing related species of the genus, a new species *Spiropes glochidionis* sp. nov. has been proposed to accommodate this pathogen. The genus *Spiropes* Cif. includes near about 30 species in which most of the species are reported to be mycoparasitic (Ellis, 1968, 1971, 1976; Seifert and Hughes, 2000). It is classified under *Incertae sedis* family. The other closely related genera of *Incertae sedis* are *Sclerographium*, *Pseudospiropes*, *Dictyospiropes* and *Dactylosporium* (Seifert and Hughes, 2000). Only six species of genus *Spiropes*, viz. *S. clavatus* (Ellis, 1968), *S. melanoplaca* (Ellis, 1968, 1971), *S. japonicus* (Ellis, 1968; Hosagoudar *et al.*, 1996), *S. dialii* (Ellis, 1968), *S. penicillium* (Ellis, 1968) and *S. desmodiicola* (Braun, 1999) have synnematos conidiophores while remaining species shows mononematous conidiophores. Newly designated species *S. glochidionis* sp. nov., which is described and illustrated in this communication is also synnematos.

MATERIALS AND METHODS

At the time of sample collection field notes containing information about date of collection, locality, nature of infection, symptoms and nature of colony were taken (Mall and Kumar, 2014; Sabeena *et al.*, 2018). Infected samples were collected in neat and clean polythene bags and brought to the Departmental laboratory. Collected materials were dried and pressed carefully by using blotting papers (Sabeena *et al.*, 2018). Transfer of infected samples to the fresh and dry blotters at regular intervals was done so as to ensure complete dryness of the collection (Thomas *et al.*, 2013). Completely dried and pressed samples were kept in adsorbent paper envelopes (Awasthi *et al.*, 2016). From the infected area of fresh collection scraping and hand cut sections in lactophenol cotton blue mounts were prepared for examination of microscopic taxonomic characters (Awasthi *et al.*, 2015).

Labomed light microscope was used for making observations. SEM photomicrographs were taken at Dr. H.S. Gour University, Sagar, M.P., India. For this purpose leaf samples were coated with gold-palladium and examined with a double beam FEI Nova nano SEM-450. The dimensions of conidiophores and conidia were taken with the aid of an



Fig. 1. Symptoms of *Spiropes glochidionis* sp. nov. on *Glochidion zeylanicum* plant (Holotype AMH 9959). **A.** Infected host plant. **B-C.** Early stage of infection. **D-F.** Late stage of infection

ocular micrometer. Samples were sent for deposition and accessioning to Ajrekar Mycological Herbarium (AMH), Agharkar Research Institute (ARI) Pune and duplicate collections were kept in Mycological Herbarium of Botany, Dr. H.S. Gour University, Sagar, M.P., India.

TAXONOMIC DESCRIPTION

Spiropes glochidionis A. Dubey & A.N. Rai, sp. nov.

Figs. 1-3

Type: India, Chattisgarh, Jashpur, Upperghat forest, on living leaves of *Glochidion zeylanicum* (Gaertn.) A. Juss. (*Phyllanthaceae*), January 2018, leg. Anurag Dubey (Holotype AMH 9959; Isotype BOT DR 1).

Etymology: New species epithet is derived from host genus name.

Mycobank no: MB813023

Lesion amphigenous, small to large, regular, brown to grayish on upper surface and light brown on lower surface. Colonies effuse, velvety, punctiform, pale olive to brown. Mycelium of hyphae superficial. Conidiophores become tightly packed

to each other and form erect, dark blackish brown to black synnemata measuring up to 160-530 μm in length and 12.5-70 μm in thickness; synnemata swollen at the base, after maturity apical region of synnemata splays out bearing conidia; individually conidiophores dark brown, cylindrical, smooth, septate, geniculate, unbranched, straight to flexuous and 2.5-4.8 μm thick. Conidiogenous cell enteroblastic, cylindrical, cicatrized with well-defined conidial scars. Conidia solitary, acropylrogenous, variable in shape, straight to curved, with 1-7 transverse septa and few are pseudoseptate, subhyaline, 8-50 μm long and 2.0-7.5 μm thick.

Distribution and habitat: *Spiropes glochidionis* sp. nov. (Holotype AMH 9959) is found in hilly belt such as Sanna, Manora, Bagicha, Badarkhol of Jashpur and infection is favored by high moisture hence it is found wide spread during the months of September to December and can be spotted easily by its fabulous ring spots on the foliage of the host plant.

DISCUSSION

A survey of literature reveals that the new taxon *Spiropes glochidionis* (Holotype AMH 9959) is the first species to be

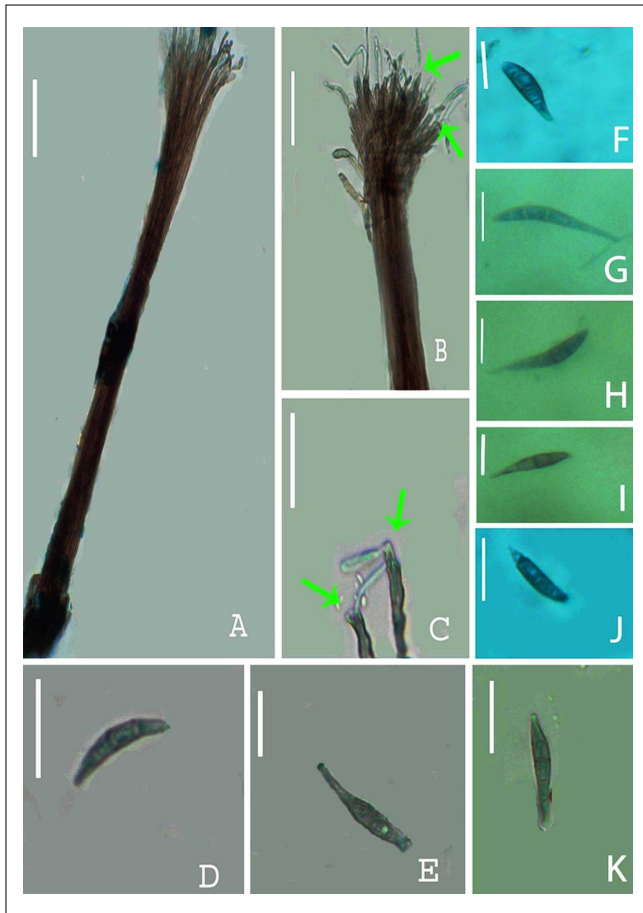


Fig. 2. *Spiropes glochidionis* sp. nov. photomicrograph (AMH 9959, holotype). **A.** Synnemata. **B.** Attachment of conidium. **C.** Conidiogenesis. **D-K.** Conidia. Scale bars: **A-B.** 20 μm , **C-K.** 10 μm .

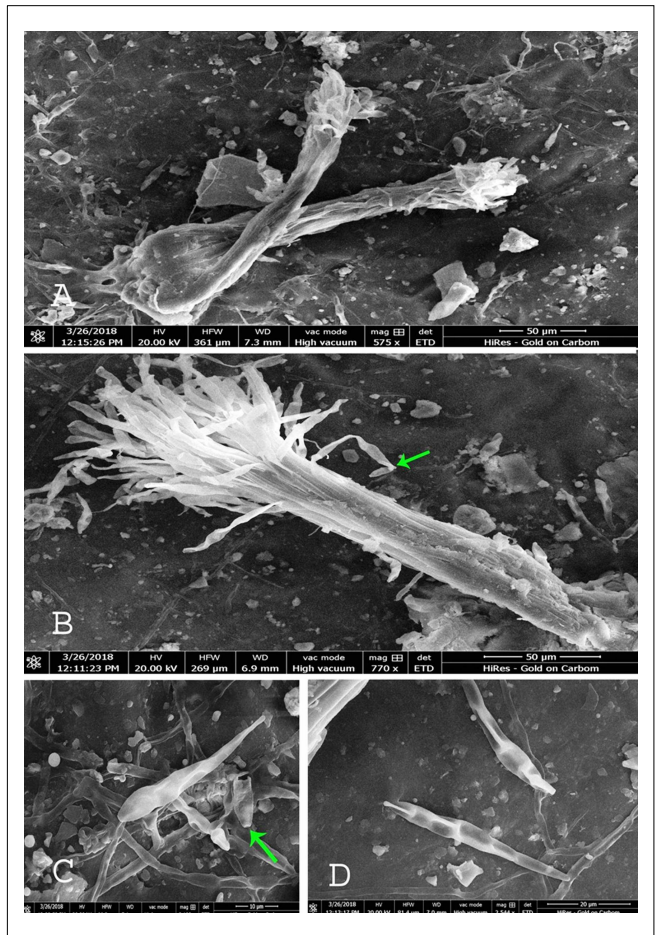


Fig. 3. Scanning electron microscopic images of *Spiropes glochidionis* sp. nov., (AMH 9959, holotype). **A.** Synnemata **B.** Attachment of conidium. **C-D.** Conidia.

Table 1: Comparative account of *Spiropes glochidionis* sp. nov. with similar taxa in the genus

Species	Leaf Spots & Colonies	Conidiophore			Conidia		
		Structure	Colour	Size	Structure	Colour & Septation	Size
<i>S. clavatus</i> (Ellis, 1968)	Colonies effused, grey or greyish brown to dark blackish brown or black.	Tightly packed together and forming erect synnemata splaying out at the apex in the form of brush, individually straight or flexuous, smooth.	Synnemata dark blackish brown to black, individually brown or dark brown.	Synnemata up to 700 µm long and 20-40 µm thick, individually 2-3 µm thick.	Conidia straight to slightly curved fusiform to obclavate, smooth or wrinkled.	The middle cells pale brown to brown, end cells paler, 3 or rarely 2 or 4 true transverse septate.	18-33 (25) µm long, 5-7 (5.6) µm wide at the broadest portion.
<i>S. dialii</i> (Ellis, 1968)	Colonies effused, dark blackish brown or black.	Tightly packed together and forming erect synnemata splaying out at the apex and base, individually straight or flexuous, cylindrical.	Synnemata dark blackish brown to black, individually brown.	Synnemata up to 850 µm long and 20-40 µm thick, individually 2-3 µm thick.	Conidia straight or curved fusiform to obclavate, verruculose.	Two middle cells usually brown, end cells paler, 3 true transverse septate.	40-64 (52) µm long, 7-9 (8.1) µm wide at the broadest portion.
<i>S. desmodiicola</i> (Ellis, 1968)	Definite leaf spot lacking.	Tightly packed together and forming erect synnemata splaying out at the apex and base appear as stroma, smooth walled.	Synnemata brown or dark brown, individually pale olive or brown.	Synnemata up to 150-450 µm long and 10-40 µm thick, individually 1-4.5 µm thick.	Conidia straight or curved, cylindrical, subclavate, smooth.	Olive brown, 3-12 eu- and distoseptate.	2-4 µm wide.
<i>S. penicillium</i> (Ellis, 1968)	Colonies effused, yellowish to dark olivaceous brown, velvety.	Tightly packed together and forming erect synnemata often splaying out at the apex, individually straight or flexuous, smooth.	Synnemata dark blackish brown to black, individually mid pale olivaceous brown.	Synnemata up to 650 µm long and 10-40 µm thick, individually 1-2 µm thick.	Conidia straight or slightly curved, cylindrical, smooth or verruculose.	Middle cells pale or mid pale brown, end cells small and paler, mostly 3 and rarely 4-5 true transverse septa.	16-37 (23) µm long, 3.5-5 (4.5) µm wide at the broadest portion.
<i>S. japonicus</i> (Hosagoudar <i>et al.</i> , 1996)	Colonies amphigenous, dense, velvety.	Tightly packed to form erect, compact synnemata spread out at apex and having swollen base (loose), individually cylindrical, smooth.	Conidiophores brown to dark brown, paler towards the apex.	Synnemata 245-520 µm long and 19-30 µm thick, individually 3-4 µm wide.	Solitary, dry, acropleurogenous, simple, fusiform to obclavate, wall smooth.	Pale brown to brown, 3-6 pseudoseptate.	40-70 µm long, 8-9 µm wide at the broadest portion.
<i>S. melanoplaca</i> (Ellis, 1971).	Colonies dark blackish brown to black, effuse and hairy.	Tightly packed to form synnemata splaying out at apex and base, individually cylindrical, smooth.	Synnemata dark blackish brown to black, individually brown or dark brown.	Synnemata up to 1.5 µm long and 20-80µm thick, individually 2-4 µm thick.	Conidia straight or curved, often rostrate, fusiform to obclavate, smooth or verruculose.	The two middle cells golden brown or brown, the cells at each end very pale, 3 true septate.	30-67(50) µm long, 9-14 (10.8) µm thick in the broadest part.
<i>S. glochidioni</i> (Present study)	Colonies epigenous effuse, velvety, punctiform, pale olive to brown.	Tightly packed to form erect, compact synnemata viz. swollen at the base (compact), at maturity its apex splays out, individually cylindrical, smooth geniculate.	Synnemata dark blackish brown to black, individually conidiophores dark brown.	Synnemata up to 160-530 µm long and 12.5-70 µm thick, individually 2.5-4.8 µm thick.	Conidia solitary, acroplurogenous, variable in shape, straight to curved.	Subhyaline, 1-7 transverse septate and few are pseudoseptate.	8-50 µm long and 2.0-7.5 µm thick at the broadest portion.

reported from the host genus *Glochidion* of family *Phyllanthaceae*. A critical examination and comparison with previously described species reveals that the proposed new species *Spiropes glochidionis* shows similarity with *S. clavatus* (Ellis, 1968), *S. melanoplaca* (Ellis, 1968; 1971), *S. japonicus* (Ellis, 1968; Hosagoudar *et al.*, 1996), *S. dialii* (Ellis, 1968), *S. penicillium* (Ellis, 1968) and *S. desmodiicola* (Braun, 1999) in having synnemata and some other generic features. However, there are some sharp differences from

these species in many characters (**Table-1**). The presently proposed species differs from *S. clavatus* (Ellis, 1968) and *S. penicillium* (Ellis, 1968) in having smaller sized synnemata and presence of both true and pseudo septate comparatively larger sized conidia. As compared to *S. dialii* (Ellis, 1968) and *S. melanoplaca* (Ellis, 1968; 1971) the present species possesses compact base, smaller sized synnemata and both true and pseudo septate, smaller sized conidia. From another species *S. desmodiicola* (Braun, 1999) it differs in having

compact base, larger sized synnemata and both true and pseudo septate, more thickened conidia. The presence of compact base, larger sized synnemata and both true and pseudo septate, smaller sized conidia makes it different from *S. japonicus* (Ellis, 1968 ; Hosagoudar *et al.*, 1996). In the light of the discussion above the presently proposed *S. glochidionis* sp. nov. infecting *Glochidion zeylanicum* represent an undescribed taxon.

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