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Pseudocercospora desmodiicola sp. nov. on *Desmodium triquetrum* from Campierganj forest, Gorakhpur, U.P., India

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During survey for the foliicolous fungi from diversified habitats of Campierganj Forest, Gorakhpur U.P. India we came across an important plant of the locality, *Desmodium triquetrum* DC (Leguminosae, Subfamily-Papilionaceae) is an erect or suberect undershrub, distributed throughout central and eastern Himalayas, South India and Sri Lanka. On critical study the living leaves were found to be infected with *Pseudocercospora*. Since it has also been customary for plant pathologists and mycologists to describe as new any *Cercospora* or *Pseudocercospora* found a host for the first time (Ellis, 1971), this undescribed taxa has been described and illustrated as *Pseudocercospora desmodiicola* sp. nov. Rajiv Ranjan. The review of available literatures reveals that there has been no record of this fungus from India on this host so far. Therefore, this host of the new species is a new record to Indian mycoflora from Campierganj Forest, Gorakhpur U.P. India.

Keyword: Follicolous fungi, *Pseudocercospora*, Gorakhpur, morphotaxonomic treatment, camera lucida

Introduction

The leaves provide a very suitable habitat for the growth & development of fungal pathogen by providing ample surface area and nutrient supply. Such leaf inhabiting fungi are known as foliicolous and the invaded area of the leaf appears as leaf spot or leaf lesion. Taxonomic studies of such fungal forms have been generally considered as only of academic interest but the taxonomic treatment of a fungal organism in the first requirement for any studies concerning its biology. Correct identification of a fungus absolutely free from ambiguities is vital for its employment in applied disciplines. In fact without being equipped for ascertaining the correct identity of a fungal pathogen all studies concerning its phytopathological aspects would be misleading. The weed and forest plants serve as reservoirs of leaf spot pathogens which on getting opportunity may spread to agriculture and horticulture plants.

India is the one of the twelve mega biodiversity countries of the world, has two of the worlds

eighteen biodiversity hot spot located in the Western Ghats and in the Eastern Himalayas. In North of North Tarai Forests, the Himalayas rise as a virtual wall beyond the snow line. Above the alluvial plain lies the Tarai strip, a seasonally marshy zone of sand and clay soils. The Tarai has higher rainfall than the plains, and the downward-rushing rivers of the Himalayas slow down and spread out in the flatter Tarai zone depositing fertile silt and reproductive means during the monsoon season and receding in the dry season. The Tarai, as a result has high water level and is characterized by moist sub tropical conditions and a luxuriant turn over of green vegetation all the year around. The climatological and topographical conditions favor the luxuriant growth and development of foliar fungi. This North Tarai region of U.P. is next only to Eastern and Western Ghats, as one of the hottest spots for biodiversity in general and the diversity of fungal organism inhabiting plant leaves in particular offers an ideal opportunity for the morphotaxonomic exploration of fungal organism

in general and foliicolous fungi in particular. Keeping this in view we surveyed the locality of Campierganj (on the name of British "station master" of this railway station) also called as Chaumukha, is a small Town in the province of Uttar Pradesh in north India, approximately 34 kilometres north of Gorakhpur city near the border with Nepal on National Highway-24 (NH-24) in Gorakhpur District. This is situated on the Buddhist Circuit which is built from Lumbini (Nepal), Kushinagar, Sarnath up to Bodh Gaya. Campierganj is a Tahsil (subdivision) in Gorakhpur district during April to December 2001.

The Foliicolous Fungi causes huge losses every year in different parts of the world. The fungal pathogens producing leaf spots infect a large variety of hosts including most of the crops, forests and other plants. The destruction caused by these enemies of leaves is a serious problem before us. The focus of this research is identification & documentation of foliicolous fungi which will assist in the discovery of new fungicides and ideas to overcome from the severity of these enemies of nature as well as in the protection of floral diversity from the infection of these pathogens and also in the conservation of valuable flora of the area.

Materials and Methods

The climatic condition favors the growth of various types of phanerogamic vegetation along with seasonal and annual crops and other plants. With a view to study the foliicolous fungi in their natural habitat, frequent collection trips will be arranged. The following articles would be required for collecting foliicolous fungi- collection containers, hand lens, pruning scissor or secateurs, light plant pressures, blotting paper, paper envelop, field note book etc.

Laboratory processing and preliminary examination Preparations

- (a) Photograph of both host and pathogen will be taken.
- (b) Scrap mount: If the organisms are superficially attached with the host tissue

scrap mounts are made by a sharp razor or scalpel.

- (c) Collodion Preparation: A drop of collodion solution is applied to a colony on the leaf. The fungus gets embedded entirely and the dried film is peeled off readily from the host surface. Removal of collodion by acetone on a glass slide gives undisturbed preparation.
- (d) Squash preparation: The fruiting body is mounted, cleared and examined. Then the preparation is tapped vigorously and reheated. In this way the fruiting body is broken and content is released.
- (e) Hand cut Section preparation: A hand cut section of infected tissue is made with sharp razor to study immersed or semi-immersed fungi. Section cutting for host parasite interaction / relation.

Staining and Mounting

For routine microscopic study in the lab temporary slides are made in different type of stains and mountants according to nature of fungal forms involved.

- (a) **Lacto- phenol cotton blue:** The lacto-phenol mounting fluid is used for mounting-colored fungi. For locating cytoplasm, septa, guttules other structures and hyaline forms 0.05-0.01% cotton blue is added.
- (b) **Poly- vinyl Alcohol:** Benson, 1969 is used in routine staining and mounting.
- (c) **Lacto-fuchsin:** By this cell walls are stained more clearly, rapidly and with more suitable color specially for photography [Carmichael., 1955] ^[15]. Slides prepared in mountants are sealed with wax or commercial good quality nail polish and are stored for further study.

Camera Lucida: Drawings will be made of the distinctly different taxa of generic or species rank so as to show the morpho taxonomic features of vital importance.

Morpho-taxonomic treatment: Hitherto undescribed forms of foliar fungi will be executed with the help of present literature and expertise available at hand.

- New taxon will be described in English or Latin or both as and when required.
- Material (holotypes) will be deposited in recognized Herbaria for accession no.
- The Mycobank number of each new Taxa will be procured.

During collection, infected leaf samples were taken in separate polythene bags. Suitable mounts of surface scrapping and hand cut sections were prepared from infected portions of the leaf samples. Slides were prepared in cotton-blue lacto phenol mixture & were examined. Camera Lucida drawing were made and the morpho-taxonomic determination of taxa was done using available literature and with the help of resident's expertise available. The fungal taxa were identified using microscopic preparation.

Result and Discussion

The author surveyed during April to December, 2001 in diversified habitats of Campierganj Forest, Gorakhpur U.P. India for the collection, study and documentation of the leaf spot micro fungi infecting variety of the angiosperms has resulted in abundant gathering of the fungal specimens. During survey the author came across an important plant of the locality, *Desmodium triquetrum* DC (Leguminosae, Subfamily-Papilionaceae) is an erect or suberect undershrub, distributed throughout central and eastern Himalayas, South India and Sri Lanka. On critical study the living leaves were found to be infected with *Pseudocercospora*. Since it has also been customary for plant pathologists and mycologists to describe as new any *Cercospora* or *Pseudocercospora* found on a host for the first time (Ellis, 1971) ^[22], this undescribed taxa has been described and illustrated as *Pseudocercospora desmodiicola* sp. nov. Rajiv Ranjan. The holotype specimen has been submitted in HCIO, IARI New Delhi for allotment of accession number. The Accession no. is 43858.

Pseudocercospora desmodiicola Rajiv Ranjan sp. nov.

Maculae: Hypophyllae, rotundatae vel irregulars, griseae vel nigrae, 2.0-4.0 um., saepe colaescentes,

Mycelium: Hyphae immersae, ramosae levibus, pallid olivaceae, 1.5 um. latae.

Stromata: Substomatibus posita, fuaco-olivacea, pseudoparenchymatosa, 15.0-46.0 um diam.

Conidiophora: In Fasciculo stromatibus oriunda, macronematosa, monomematosa, recta vel flexuosa, stomatalitar emergentia, septata, apicem versus pallentes, levia, ramose, 55.0-180.5X4.0-6.5 um.

Cellulae Conidiogenae: Integrate, terminals, polyblasticae, geniculatae, denticulatae.

Conidia: Holoblastica acropluro solitaria, sicca, pallid olivacea, 1-6 transverse septata, glabra, obclavato-cylindricavel subclavata, apice subacuta vel raro obtuse, basim obconico-truncata, 16.0-42.0X3.0-5.0um.

In foliis vivis *Desmodi triquetri* DC. (Fabacearum), Nov. 1988; Campierganj Forest, Gorakhpur, leg. R.R. Srivastava, M.L.K./R.R.-796 Holotypus, HCIO-43858 isotypus

Leaf spot: Hypophyllous, rounded to irregular, grey to black, upto 2.0-4.0 um in diam. Coalescing each other, sometimes produced along the leaf margins.

Mycelium: Hyphae internal, branched, thin and smooth-walled, pale olivaceous. 1.5um.wide.

Stromata: Dark-olivaceous, pseudoparenchymatous, 15.0-46.0 um in diam.

Conidiophores: Fasciculate, macronematous, monomematous, straight to flexuous, emerging through stomata, septate, becoming paler towards apex, branched and smooth-walled, 55.0-180.5X4.0-6.5 um.

Conidiogenous cell: Integrated, terminal, polyblastic, geniculate, denticulate.

Conidia: Holoblastic, solitary, acropleurogenous, dry, dark olicaceous, 1-6 transversely septate, obclavato-cylindric to subclavate, apices subacute to rarely obtuse, bases obconico-truncate to subtruncate, measuring 16.0-42.0X3.0-5.0 μm .

On living leaves of *Desmodium triquetrum* DC. (Fabaceae), Nov. 1988; Campierganj Forest, Gorakhpur, leg. R.R. Srivastava, M.L.K./R.R.-796 Holotype, HCIO-43858 iso type

Survey of Literature Kamal *et al.*, 1986 [25]; Ellis, 1971 [22], 1976 [23]; Deighton, 1967 [17], 1973 [18], 1974 [19], 1976 [20], 1979 [21]; Braun, 1987 [10], 1988a, b [11, 12], 1991 [13]; Braun *et al.*, 1992 [14]; Bagyanarayan and Braun, 1991 [1], 1992 [2, 3], 1999 [6]; Bagyanarayan *et al.*, 1991 [1], 1992 [2, 3], 1994 [4], 1995 [5]; Vasudeva, 1963 [26]; Chupp, 1954 [16]; Bilgrami *et al.*, 1979 [7, 9], 1981 [8], 1991 reveals that there is no record of *Pseudocercospora desmodiicola* species of this type on the host family. Therefore, it is described and illustrated as a new species to accommodate it.

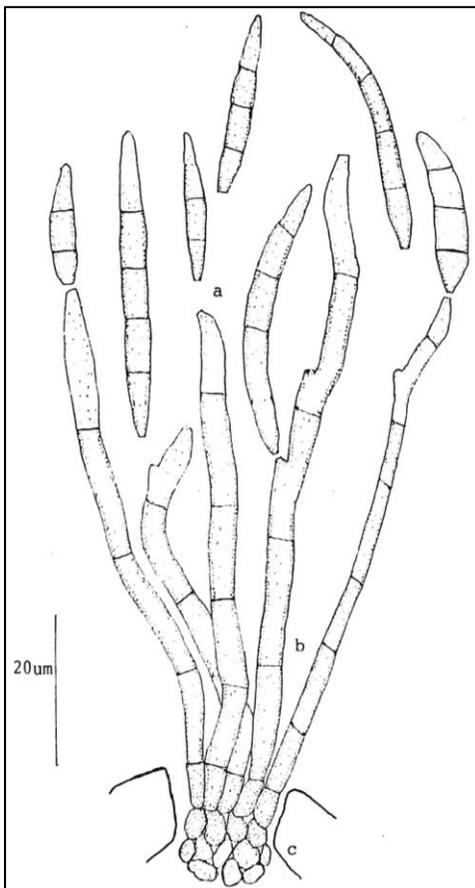


Fig 1: *Pseudocercospora desmodiicola* Sp. nov.
a. Conidia b. Conidiophore c. Stroma

Conclusion

The Region of Campierganj Forest, Gorakhpur, U.P., India is rich in phytodiversity in general as well as the diversity of fungal organisms inhabiting plant leaves in particular and it provides great scope for study of foliicolous fungi. Correct identity of a fungus absolutely free

from ambiguities is vital for its employment in applied disciplines in general and it is more so for plant pathology where precision of details about the biology of the pathogen is primarily conditioned by its identity. In fact, without being equipped for ascertaining the correct identity of a fungal pathogen all studies concerning its

phytopathological aspects would simply be misleading. However the end is still not insight and further investigation is warranted.

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