International Journal of Botany Studies
ISSN: 2455-541X
Impact Factor: RJIF 5.12
www.botanyjournals.com
Volume 3; Issue 2; March 2018; Page No. 168-171

Two new species of *Curvularia* Boedijn from Sagar, (M.P.) India

Sandhya Parihar, AN Rai
Department of Botany, Dr. H.S. Gour Vishwavidyalaya, Sagar, Madhya Pradesh, India

Abstract
During frequent and periodic survey for the collection of foliicolous fungi from the Sagar, Madhya Pradesh (India), a large number of specimens were collected. The detailed mycotaxonomic treatment was given to some of the interesting fungal specimen, which resulted into the description and illustration of two new species of genus *Curvularia* Boedijn namely *C. revenallae* sp. nov. on *Revenalla medagascariensis* J.F. Gmel. (Strelitziaceae) and *C.poacearum* sp. nov. on Unidentified grass (Poaceae).

Keywords: *Curvularia*, foliicolous fungi, Hyphomycetes, morphotaxonomy

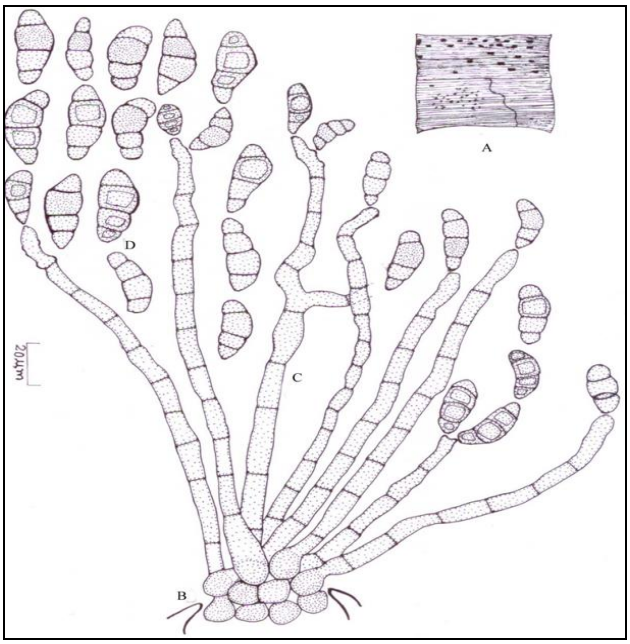
Introduction
Plants are the living organisms that exist on earth. Plants are the only organisms able to sustain themselves by producing their own food. In turn, they provide food for animals and humans, through the food chain. Plants, such as trees, flowers, fruits and vegetables, produce chlorophyll, a substance that allow them to convert solar energy into nutrition, or food. The leaves are the most important part of the plant body due to photosynthetic activity largely inherent to them. Leaves provide a very suitable habitat for the growth & development of fungal pathogen by providing ample surface area and nutrient supply. Taxonomy of fungi is basic to all sorts of investigations in fungal pathology.

On systematic and periodic survey of Sagar, M.P. (India) on 2004-05. A number of collections of living leaves exhibiting leaf spots and blights were encountered. Of these, upon critical examination and comparison of morphotaxonomic features with those of the allied forms two taxa of species rank have found to be hitherto undescribed. This is described and illustrated as *Curvularia revenallae* and *C.poacearum* Parihar and Rai sp. nov. parasitizing in the living leaves of *Revenalla medagascariensis* J.F. Gmel. (Strelitziaceae) and Unidentified grass (Poaceae), illustratrstions have been executed with camera - lucida and latin diagnoses. Type spacimens has been deposited in H.C.I.O.,New Delhi and the accession number is allotted. Morphotaxonomic treatment of isotype has been done by comparing with allied taxa in question and consulting the current literature.

Materials and Methods
The specimens were collected from Botanic Garden of Dr. H.S. Gour University and Ratouna, Sagar, M.P. in India. The collected specimens were sprayed with aqueous HgCl2 0.1% solution to check the microbial decomposition and stored in airtight polithylene bags along with naphthalene balls. Microscopic slides were prepared by using lactophenol cotton blue mixture. The slides were studied under the compound microscop in different combination of eye pieces (10x, 12.5x, 15x) and objectives (10x, 40x, 45x and oil immersion). The desired camera lucida drawings of the interesting forms were made showing maximum diagnostic features available in the morphology and ontogeny of reproductive propagules and their measurements. The observation including symptomatology was then consolidated. The observations taken for each specimen were then compared with the forms already described about the particular fungus on the particular host species, host genus or host family, from India. The specimens constituting new records at least for this country and forms new to science were retained with care. Thus, the final sorting of specimens was done at this stage. Afterwards a thoroughly scrutinized and revised final host. Type spacimens has been deposited in H.C.I.O., New Delhi and the accession number is allotted. Morphotaxonomic treatment of isotype has been done by comparing with allied taxa in question and consulting the current literature.

Results and Discussions
Taxonomic Description
***Curvularia revenallae* Parihar and Rai sp.nov. Fig.-1**
Maculae amphigenosae, parvae, irregulares, circulares, evidens, distincate,
dispersae per totam superficiem folii. Coloniae epiphyllosae ir ed faciesei de evidens praeditae. Mycelium hypharum immersum vel superficiale, ramosum, septata, laevia, fusco. Stromata bene formata, superficiale vel immersum, fusco olivacea vel brunneae. Conidiophora solitaria, interdum ir laxusa fasciculis, enatusa de mycelium et interdum etiam orientes de stromata, ramosum, geniculata, macronematosa, *mononematosa*, flexuosa, laevia, transversae septata, basim afficionis vel stromata cellulae, pleraeque tumoribus conidiophora afficionis vel mycelium arcus non tumoribus, tenuibus parietibus, pallide vel medio olivacea, 59-429x7-10 µm. Conidiogenosae cellulae intergrate, terminales, sympodiales, polytretica, cicatrices, apissis, distinctae, et subelevatusa in evidens genus incurvatio. Conidia, solitaria, obclavateae, ellipsiformia, curvata, tenuibus parietibus, laevia, dictyospora, usque 3 transversae septata, medio vel fusco olivacea brunneae, apicem obtusa, basim obconicotruncta, hilo

incrassato, 16.5-37 x 6-10 µm. Fig.-1.



A: Symptom, B: Stroma, C: Conidiophores, D: Conidia

Fig 1: *Curvularia revenallae* Parihar and Rai sp.nov.

In foliis vivis *Revenalla medagascariensis* J.F.Gmel. (Strelitziaceae), Aug. 2005. Botanical Garden, University, Sagar, M.P. India, leg. S.Parhar, S.U. Herb No. SRR-355 holotypus, HCIO No.46, 421.

Lesions amphigenous, small, irregular, circular, clear distinct, distributed all over the leaf surface. Colonies epiphyllous in the form of clear fine black dots. Mycelium of hyphae immersed to superficial, branched, septate, smooth, dark. Stromata well developed, superficial to immersed, dark olivaceous to brown. Condiophores solitary, sometimes in loose fascicles, arising from mycelium and sometimes also arising from stroma, branched, geniculate, macronematous, mononematous, flexuous, smooth, transversely septate, bases attached to stroma cell mostly swollen conidiophores attached to mycelium are not swollen (normal), thick walled, light to mid olivaceous, 59-429x7-10 µm. Conidiogenous cell integrated, terminal, sympodial, polytretic, cicatrized, scars distinct and raised on clear knee bendings. Conidia solitary, obclavate, ellipsoidal, curved, thick walled, smooth, dictyosporic, upto 3 transversely septate, mid to dark olivaceous brown, apices obtuse, bases obconicotruncate, hila thickened 16.5-37 x6-10 µm. Fig.-1.

On living leaves of *Revenalla medagascariensis* J.F. Gmel. (Strelitziaceae), Aug.2005, Botanical Garden, University, Sagar, M.P. India, leg. S.Parihar, S.U. Herb No. SRR-355 holotype, HCIO No.46, 421.

Curvularia tritici Kumar & Nema (Ellis, 1976) [7] & *C.richardiae* Alcorn (Ellis, 1976) [7] are the two species found for comparison with the present species (Table –1). A look to the data show that the present species is clear in symptomatology having well developed stroma, excessively long conidiophores with swollen conidiogenous cell, solitary & longer conidia against *C. tritici* but shorter & thinner against *C.richardiae* of the table. Looking to the over all description it is desired to describe the proposed taxon as a new species. It is also noteworthy that no *Curvularia* species has earlier been validly described on the host genus as well as on host family.

Table 1: Comparative account of *Curvularia revenallae* sp. nov. With *C.tritici* & *C.richardiae*

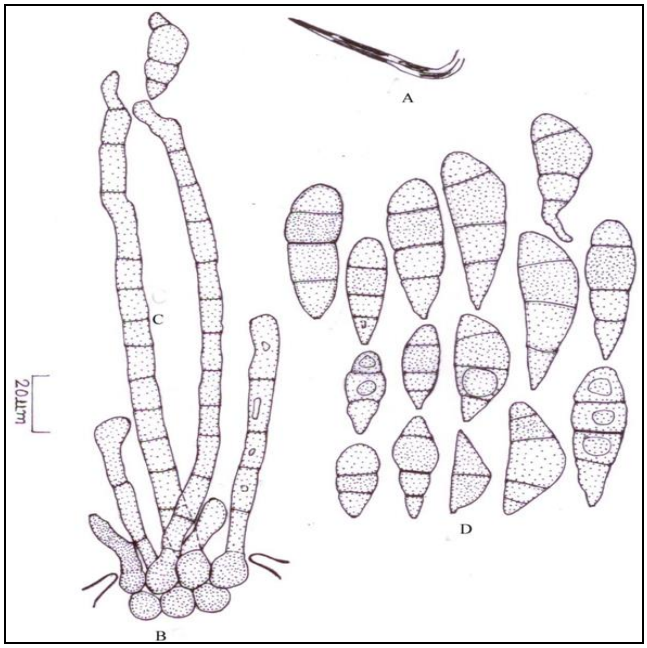
***Curvularia* spp.**	**Spots & Colonies**	**Stroma**	**Conidiophores**	**Conidia**
Curvularia tritici Kumar & Nema (Ellis, 1976) [7]	Colonies on p.d.a. effuse, sepia, velvety	-	Straight or flexuous sometimes nodose, pale to mid brown, 150×4-7	Catenate often forming short, conidia from the apical cell, straight or very slightly, curved, ellipsoidal, clavate or fusiform, smooth, 2-3 septate the central cells mid or mid pale brown, end cells paler, 18-30×6-11 thick in the broadest part
C. richard-iae Alcorn (Ellis, 1976) [7]	Amphigenous, effuse, hairy, grey	Erect, cylindri-cal, simple or branch-ed,black 4 mm high, occasi-onally formed in culture	Solitary or in small groups, mid to dark brown, paler at the apex, 250×7-12 tapering to 4-8 µ at the apex, sometimes with the basal cell swoller to 17µ	Conidia usually straight but occasionally slightly curved, clavate, septate, smooth, 2-5 (most commonly 3) septate mid to dark brown with the basal cell & sometimes the cell above it paler than the others, 30-55 × 28-28 thick in the broadest part
C. revenal-lae sp. nov.	Lesions amphigenous,colonies epiphyllous in the form of clear fine black dots	Well develop-ed, superficial to immers-ed dark oliv. to brown	Solitary, sometimes in loose fascicles, arising from mycelium and sometimes also arising from stroma, branched, geniculate, macronematous, flexuous, smooth, trans. septate, bases attached to stroma cell mostly swollen conidoiophores attached to mycelium are not swollen, thick walled, light to mid oliv, 59-429 ×7-10	Solitary, obclavate, ellipsoidal curved, thick walled, smooth, dictoyosporic, apices obtuse, bases obconicotruncate, hila thickened, 2-3 septate, mid to dark oliv. brown, 16.5-37×6-10

Maculae amphigenosae, parvae vel magnae, irregulares evidens, distinctae, dispersae per totam superficiem folii. Coloniae epiphyllosae, effusae, evidens, velutinae, fuscae. Mycelium hypharum immersum, ramosum, septata, laevia. Stromata paulo formata, immersum, pseudoparenchymatosa, olivacea brunnea. Conidiophora macronematosa,

mononematosa, solitaria, interdum ir laxusa fasciculis, enatusa de mycelium et interdum etiam orientes de stromata, eramosum, recta vel flexuosa, geniculata, laevia, transversae septata, basim afficionis vel stromata cellulae, pleraeque tumoribus, conidiophora afficionis vel mycelium arcus non tumoribus tenuibus parietibus, medio vel fusco olivacea, 33-198x6-10µm. Conidiogenosae cellulae polytretica, intergrate, terminales, sympodiales, cicatrices, apissis distinctae, et subelevatusa in evidens genus incurvatio. Conidia solitaria, recta vel curvata, obclavata, ellipsiformia, tenuibus parietibus, laevia, dictyospora, usque 3 tranversae septata, medio vel fusco olivacea brunneae, apicem obtuse, basim obconicotruncta vel roundata, hilo incrassato 20-66x10-23µm. Fig.-2.

In foliis vivis Unidentified grass (Poaceae), Jan.2005 Ratouna, Sagar, M.P. India, leg. S.Parihar, S.U. Herb No. SRR-300 holotypus HCIO No.46, 668.

Lesions amphigenous, small to large, uniformly distributed all over the leaf surface, black. Colonies epiphyllous, effuse, clear, velvety, blackish brown. Mycelium of hyphae immersed, branched, septate, smooth. Stromata poorly developed, immersed, pseudoparenchymatous, olivaceous brown. Conidiophores macronematous, mononematous, solitary, sometimes in loss fascicles, arising from mycelium and sometimes also arising from stroma, thick walled, unbranched, straight to flexuous, geniculate, smooth, transversely septate, bases attached to stroma cell mostly swollen conidiophores attached to mycelium are not swollen (normal), mid to dark olivaceous, 33-198x6-10µm. Conidiogenous cells polytretic, integrated terminal, sympodial, cicatrized, scars distinct sometimes raised on clear knee banding. Conidia solitary straight to curved, ovclavate, ellipsoidal, thick walled, smooth, dictyosporic, upto 3 transversely septate, apices obtuse, base obconicotruncate to rounded, mid to dark brown, hila thickened, 20-66x10-23µm. Fig.-2



A: Symptom, B: Stroma, C: Conidiophores, D: Conidia

Fig 2: *Curvularia poacearum* Parihar and Rai sp.nov.

On living leaves of Unidentified grass (Poaceae), Jan. 2005 Ratouna, Sagar, M.P. India, leg. S. Parihar, S.U. Herb No. SRR-300 holotype HCIO No.46, 668. *Curvularia tritici* Kumar & Nema (Ellis, 1976) [7], is the only species described on the host family found for comparison with the present species (Table –2). A critical look of the table shows that our species is similar to *C.tritici* in symptomatology while largely dissimilar in characters such as presence of stroma, longer & broader conidiophores with swollen bases alongwith much longer & broader conidia. It is clearly evident that *C.poacearum* is altogether different and has a separate identity of being a new species.

Table 2: Comparative account of *Curvularia poacearum* sp. nov. With *C.tritici.*

***Curvularia* spp.**	**Spots & Colonies**	**Stroma**	**Conidiophores**	**Conidia**
Curvularia tritici Kumar & Nema (Ellis 1976) [7]	Colonies on p.d.a. effuse, sepia, velvety	-	Straight or flexuous sometimes nodose, pale to mid brown, 150×4-7	Catenate often forming short, conidia from the apical cell, straight or very slightly, curved, ellipsoidal, clavate or fusiform, smooth, 2-3 septate the central cells mid or mid pale brown, end cells paler, 18-30×6-11 thick in the broadest part
C. poacearum sp. nov.	Lesions amphi genous, small to large, uniformly distributed all over the leaf surface, black, colonies epiphyllous, effuse, clear, velvety, blackish brown	Poorly develo-ped, immer-sed, pseudo-parenc-hymat-ous, mid to dark oliv.	Macronematous, mononematous, straight or flexuous, solitary, sometimes in loose fascicles, unbranched, geniculate, smooth, trans. septate, bases swollen, thick walled, mid to dark oliv., 33-198×6-10	Solitary, obclavate, ellipsoidal, straight to curved, thick walled, smooth, dictyosporic, apices obtuse, bases obconicotruncate, to rounded, hila thickened, 1-3 septate, mid to dark brown, 20-66×10-23

Acknowledgements

The author is thankful to the Curator H.C.I.O. Division of plant Pathology. Indian Agricultural Research Institute New Delhi, for Accession and confirming the identity of several leaf spot fungal organisms collected for this investigation.

References

1. Ellett CW. *Curvularia* Blight of *Ophioglossum vulgatum.* Mycologia. 1989; 81(5):815-817.
2. Ellis MB, Ellis JP. Microfungi on Land Plant as Croom Helm, London, Macmillain, New York, 1985.

3. Ellis MB, Ellis JP. Microfungi on Miscellaneous Substrates. Croom Helm, London, Macmillian New York, 1989.
4. Ellis MB. Dematiaceous Hyphomycetes: 8. Mycol, Pep. 1967; 111:1-46.
5. Ellis MB. Dematiaceous Hyphomycetes C.M.I., Kew England, 1971.
6. Ellis MB. Dematiaceous Hyphomycetes-11. Mycol. Pap., Kew. 1972; 82:1-55.
7. Ellis MB. 'More Dematiaceous Hyphomycetes'. C.M.I., Kew, England, 1976.
8. Nelson RR, Charles Hodges S. A new species of *Curvularia* with a protuberant conidial Hilum. *Mycologia.* Mycological Society of 825. America. 1965; 57(5):822-825.