Additions to *Mycovellosiella* from the Indian Subcontinent

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Three hitherto unknown taxa of *Mycovellosiella* Rangel including two new species and a new variety, viz. *Mycovellosiella anamirtae* sp. nov., *M. perfoliati* (Ellis & Everh.) Muntañola var. *nepalensis* var. nov. and *M. ziziphi* sp. nov., collected on *Anamirta paniculata*, *Ageratum conyzoides* and *Ziziphus mauritiana*, respectively, are described, illustrated and compared with allied taxa.

Key Words: Taxonomy, Fungi, Hyphomycetes, Mycovellosiella, Systematics.

Mycovellosiella Rangel is a well defined genus of approximately 122 species (Ellis, 1971, 1976; Deighton, 1974, 1979; Braun, 1990, 1991, 1993a, 1993b, 1995; Crous & Braun, 1994, 1995), many of which were originally placed in such genera as *Cercospora* Fresen., *Cercosporella* Sacc., *Cladosporium* Link: Fries, *Phaeoramularia* Muntañola and *Ramularia* Unger.

Mycovellosiella resembles *Stenella* H. Sydow, *Phaeoramularia* and *Cladosporium* in having mostly superficial mycelium, producing mostly single conidiophores which produce lightly coloured, phragmosporic and catenate conidia in simple or branched chains and with thickened hila. *Mycovellosiella*, however, can be distinguished by its superficial seconday mycelium forming prostrate and procumbent hyphal systems, the latter forming rope-like structures often ascending the leaf hairs, and micronematous to semimacronematous conidiophores (Deighton, 1974, 1979). *Mycovellosiella* is also distinct from *Ramularia* in having coloured conidia (Braun, 1990).

Our recent collections from the Terai forests of Uttar Pradesh, India and Kathmandu Valley, Nepal, have revealed the presence of some hitherto undescribed forms of *Mycovellosiella*. *M. anamirtae* sp. nov., *M. perfoliati* (Ellis & Everh.) Muntañola var. *nepalensis* var. nov. and *M. ziziphi* sp. nov., collected on *Anamirta paniculata*, *Ageratum conyzoides* and *Ziziphus mauritiana*, respectively, are described here. The former was collected from India and the latter two from Nepal and India.

Taxonomy

Mycovellosiella anamirtae K. Bhalla, K. Srivastava & A. K. Srivastava sp. nov. – Fig. 1.

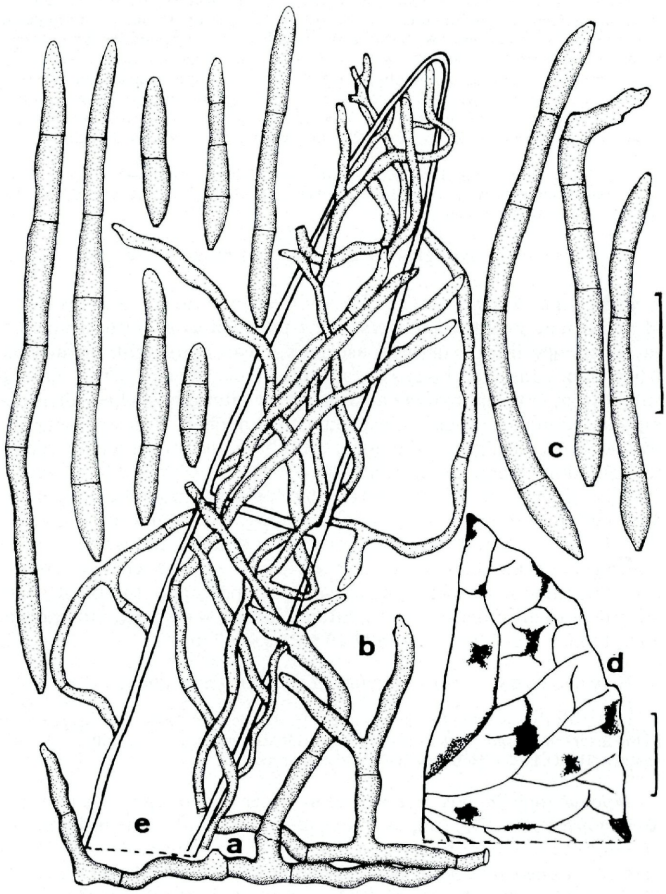

Fig. 1. – *Mycovellosiella anamirtae*. – a. External hyphae. – b. Conidiophores. – c. Conidia. – d. Infection spots. – e. External hyphae climbing leaf hairs. – Bars : a–c, e : 20 µm; d : 20 mm.

Maculae primo circulares vel irregulares, discretae, 1.5-4.0 mm latae, deinde coalescentes et extensae per totam foliam, pallide brunneae. Coloniae hypophyllae, pallide brunneae. Mycelium plerumque superficiale; hyphae externae septatae, ramosae, funiculares vel pilos foliorum ascendentes, pallide olivaceae, 2.0–4.0 µm latae. Stromata absentia. Conidiophora singularia, ex hyphis superficialibus terminaliter vel lateraliter oriunda, micronematosa, mononematosa, non ramosa vel ramosa, tenuitunicata, laevia, erecta, recta vel flexuosa, cylindrica, 0–1 transverse septata, interdum geniculata, pallide olivacea, 2.0–49.5 x 2.5–4.5 µm. Cellulae conidiogenae in conidiophoris incorporatae, terminales, polyblasticae, sympodiales, cylindricae, cicatricibus incrassatis 2.0–32.0 x 2.0–4.0 µm praeditae. Conidia solitaria vel catenata, in catenis plerumque simplicibus formata, sicca, acropleurogena, holoblastica, recta vel curvata, non ramosa, 1–5 transverse septata, tenuitunicata, laevia, pallide olivacea, apice acuta vel obtusa, basi obconica vel obconico-truncata, hilo conspicuo et leniter incrassato, 20.0–110.0 x 2.5–5.0 µm (60.2±27.16 x 3.85±0.67 µm).

Habitat in foliis vivis *Anamirtae paniculatae* Colebr. (Menispermaceae); Nichlaul forest, Maharajganj, U.P. India; Jan. 1994; A. K. Srivastava, HCIO 42034 (Holotypus) GPU 3254 (Isotypus).

Leaf spots hypogenous, primarily circular to irregular, discrete, 1.5–4.0 mm wide, later coalescing and spreading on the whole leaf surface, light brown. – Colonies hypophyllous, light brown. – Mycelium mostly superficial; external hyphae septate, branched, forming rope-like structures ascending leaf hairs,light olivaceous, 2.0–4.0 µm wide. – Stromata absent. – Conidiophores arising singly from external hyphae as terminal or lateral branches, micronematous, mononematous, unbranched to branched, thin and smooth-walled, erect, straight to flexuous, cylindrical, 0–1 transversely septate, sometimes geniculate, light olivaceous, 2.0–49.5 x 2.5–4.5 µm. – Conidiogenous cells integrated, terminal, polyblastic, sympodial, cylindrical, cicatrized, scars thickened, 2.0–32.0 x 2.0–4.0 µm. – Conidia solitary to catenate in mostly simple chains, dry, acropleurogenous, holoblastic, straight to curved, 1–5 transversely septate, thin and smooth-walled, light olivaceous, apex acute to obtuse, base obconical to obconico-truncate, hilum distinct and slightly thickened, 20.0–110.0 x 2.5–5.0 µm (60.2±27.16 x 3.85±0.67 µm).

Etymology. – Specific epithet based on host genus.

Collection examined. – India, U. P., Nichlaul forest, Maharajganj, on living leaves of *Anamirta paniculata* Colebr. (Menispermaceae); Jan. 1994; A. K. Srivastava, HCIO 42034 (Holotype) GPU 3254 (Isotype).

Mycovellosiella has not yet been described on any host of the Menispermaceae. The fungus in question has branched conidiophores and unbranched conidial chains. As such, it is comparable with *Mycovellosiella cucurbiticola* (Speg.) Deighton (1974), *M. myrtacearum* A. N. Rai & al. (1986), *M. teucrii* (Schw.) Deighton (1974) and *M. urariae* Khan & al. (1992). *M. anamirtae* is, however, distinct from these species based on its few conidial septa and/or longer conidiophores. Fur-

thermore, *M. anamirtae* is also distinct from these species in having wider conidia.

Mycovellosiella perfoliati (Ellis & Everh.) Muntañola var. ***nepalensis*** var.nov., K. Bhalla, K. Srivastava & A. K. Srivastava. – Fig. 2.

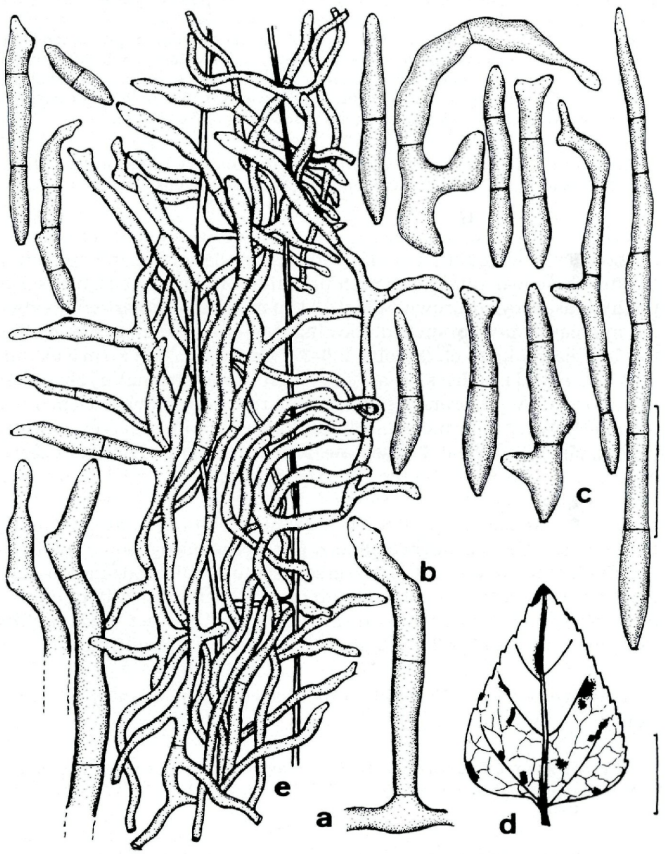

Fig. 2 . – *Mycovellosiella perfoliati* var. *nepalensis*. – a. External hyphae. – b. Conidiophores. – c. Conidia. – d. Infection spots. – e. External hyphae climbing leaf hairs. – Bars : a–c, e : 20 µm; d : 20 mm.

Maculae amphigenae, primo discretae, angulares et per venas limitatae vel irregulares, 1.0–5.0 mm latae, deinde coalescentes et extensae per totam foliam, griseo brunneae vel brunneae. Coloniae hypophyllae, brunneae. Mycelium plerumque superficiale; hyphae externae septatae, ramosae, funiculares vel pilos foliarum ascendentes, pallide olivaceae, 2.0–3.5 µm latae. Stromata absentia. Conidiophora singularia, ex hyphis superficialibus lateraliter vel terminaliter oriunda, micronematosa vel semimacronematosa, mononematosa, non ramosa, tenuitunicata, erecta, recta vel flexuosa, cylindrica, 0–2 septata, interdum geniculata, pallide olivacea, 22.5–46.5 x 2.0–4.5 µm. Cellulae conidiogenae in conidiophoris incorporatae, terminales, polyblasticae, sympodiales, cylindricae, cicatricibus praeditae, cicatricibus incrassatis, 9.0–24.0 x 2.0–4.5 µm. Conidia solitaria vel catenata in catenis simplicibus vel ramosis formata, sicca, acropleurogena, holoblastica, recta vel curvata, 1–6 transverse septata, tenuitunicata, laevia, pallide olivacea, obclavato-cylindrica, apice sub acuta vel obtusa, basi obconica vel obconico truncata, hilo conspicuo et leniter incrassato, 12.5–94.5 x 2.0–5.0 µm (39.1±24.41 x 3.85±0.81 µm).

Habitat in foliis vivis *Agerati conyzoidis* L. (Asteraceae); Narayan Ghat, Nepal; Jan. 1994; Kamal, HCIO 42038 (Holotypus) GPU 3334 (Isotypus).

Leaf spots amphigenous, at first discrete, angular and limited to the vein to irregular, 1–5 mm wide, later coalescing and spreading on the whole leaf surface, greyish brown to brown. – Colonies hypophyllous, greyish brown. – Mycelium mostly superficial; external hyphae septate, branched, forming rope- like structures ascending the leaf hairs, light olivaceous, 2.0–3.5 µm wide. – Stromata absent. – Conidiophores arising singly from external hyphae, terminal or as lateral branches, micronematous to semimacronematous, mononematous, unbranched, thin and smooth-walled, erect, straight to flexuous, cylindrical, 0–2 septate, sometimes geniculate, light olivaceous, 22.5–46.5 x 2.0–4.5 µm. – Conidiogenous cells integrated, terminal, polyblastic, sympodial, cylindrical, cicatrized, scars slightly thickened, 9.0–24.0 x 2.0–4.5 µm. – Conidia solitary to catenate in simple to branched chains, dry, acropleurogenous, holoblastic, straight to curved, 1–6 transversely septate, thin and smooth-walled, light olivaceous, obclavate-cylindrical, apex sub acute to obtuse, base obconical to obconico-truncate, hilum distinct and slightly thickened, 12.5–94.5 x 2.0–5.0 µm (39.1±24.41 x 3.85±0.81 µm).

Etymology. – Varietal epithet based on the country of collection.

Collection examined. – Nepal, Narayan Ghat, on living leaves of *Ageratum conyzoides* L. (Asteraceae); Jan. 1994; Kamal, HCIO 42038 (Holotype), GPU 3334 (Isotype).

This fungus differs from *M. perfoliati* (Ell. & Ever.) Muntañola described earlier on *Ageratum conyzoides* (Muntañola, 1960). *Mycovellosiella perfoliati* has cylindric conidia with rounded or subacute

ends, whereas our fungus has obclavate-cylindric conidia with subacute to obtuse apices and obconic to obconico-truncate bases. Zero septate conidia, which frequently occur in *M. perfoliati*, are absent in the present fungus. The latter also differs in having larger conidia which are more frequently and distinctly branched. However, in view of the geographically wide-spread occurrence of *M. perfoliati* on *Ageratum conyzoides* (Deighton, 1974) and also due to other similarities between the two fungi, the fungus has been described as a new variety of *M. perfoliati*.

Mycovellosiella ziziphi K. Bhalla, K. Srivastava & A. K. Srivastava sp. nov. – Fig. 3.

Maculae amphigenae, angulares vel irregulares, discretae, 5–8 mm latae, interdum coalescentes et extensae per totam foliam, griseo-brunneae vel atro-brunneae. Coloniae hypophyllae, griseo-brunneae. Mycelium plerumque superficiale; hyphae externae septatae, ramosae, funiculares vel pilos foliorum ascendentes, olivaceo-brunneae, 2.5–3.5 µm latae. Stromata absentia. Conidiophora singularia, ex hyphis superficialibus terminaliter vel lateriter oriunda, micronematosa vel semimacronematosa, mononematosa, non ramosa, tenuitunicata, erecta, recta vel flexuosa, cylindrica, 0–3 transeverse septata, interdum geniculata, olivaceobrunnea, 1.5–21.5 x 2.5–4.5 µm. Cellulae conidiogenae in conidiophoris incorporatae, terminales, polyblasticae, sympodiales, cylindricae, cicatrices ferentes, cicatribus incrassatis, 2.0–20.0 x 2.0–4.0 µm. Conidia solitaria vel catenata in catenis simplicibus vel ramosis formata, sicca, acropleurogena, holoblastica, recta vel curvata, 0–4 transverse septata, tenuitunicata, laevia, olivaceo brunnea, apice subacuta vel rotundata, basi obconica vel obconico truncata, hilo conspicuo et leniter incrassato, 9.5–41.0 x 2.5–5.0 µm (25.85±13.92 x 3.85± 0.76 µm).

Habitat in foliis vivis *Ziziphi mauritianae* Lam. (Rhamnaceae); Gorakhpur, U.P., India; Jan. 1994; Kamal, HCIO 42033 (Holotypus), GPU 3251 (Isotypus).

Leaf spots amphigenous, angular to irregular, discrete, 5–8 mm wide, sometimes coalescing and spreading on the whole leaf surface, greyish brown to dark brown. – Colonies hypophyllous, greyish brown. – Mycelium mostly superficial; external hyphae septate, branched, forming rope-like structures, ascending the leaf hairs, olivaceous brown, 2.5–3.5 µm wide. – Stromata absent. – Conidiophores arising singly from external hyphae, terminal or as lateral branches, micronematous to semimacronematous, mononematous, unbranched, thin and smooth-walled, erect, straight to flexuous, cylindrical, 0–3 transeversely septate, sometimes geniculate, olivaceous brown, 1.5–21.5 x 2.5–4.5 µm. – Conidiogenous cells integrated, terminal, polyblastic, sympodial, cylindrical, cicatrized, scars thickened, 2.0–20.0 x 2.0–4.0 µm. – Conidia solitary to catenate in simple or branched chains, dry, acropleurogenous, holoblastic, straight to curved, 0–4 transversely septate, thin and smooth walled, olivaceous brown, apex subacute to rounded, base obconical

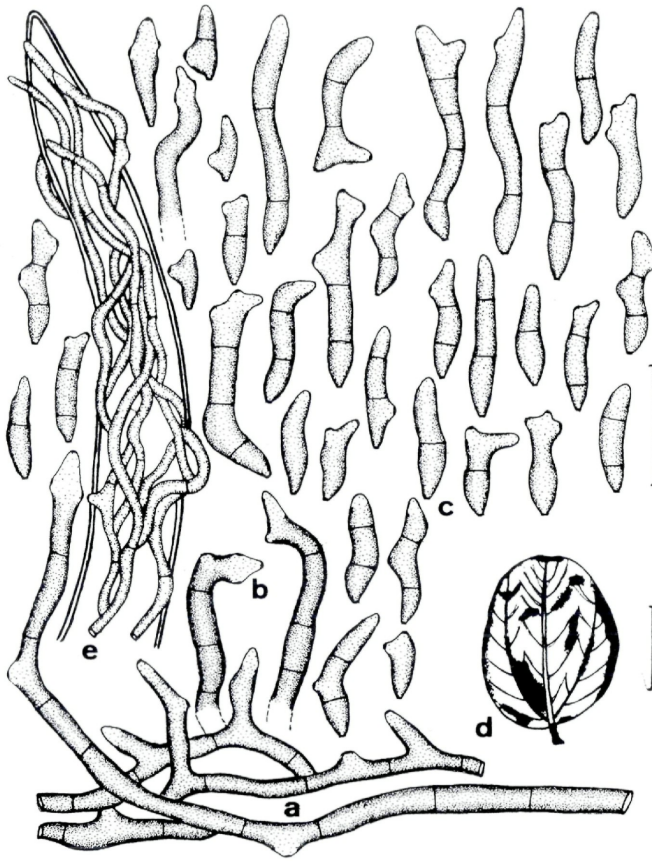

Fig. 3. – *Mycovellosiella ziziphi*. – a. External hyphae. – b. Conidiophores. – c. Conidia. – d. Infection spots. – e. External hyphae climbing leaf hairs. – Bars: a–c, e : 20 µm; d : 20 mm.

to obconico truncate, hilum distinct and slightly thickened, 9.5–41.0 x 2.5–5.0 µm (25.85±13.92 x 3.85±0.76 µm).

E t y m o l o g y . – Specific epithet based on host genus.

Collection examined. – India, U.P., Gorakhpur, on living leaves of *Ziziphus mauritiana* Lam. (Rhamnaceae); Jan. 1994; Kamal HCIO 42033 (Holotype), GPU 3251 (Isotype).

No species of *Mycovellosiella* has been reported earlier from any member of the Rhamnaceae. On the basis of its conidial dimensions, however, *M. ziziphi* is comparable with *M. haplophragmae* Kamal & R. P. Singh (1981), *M. broussonetiae* Goh & Hsieh (1989), *M. caiani* var. *caiani* Deighton (1974), *M. napomingenesis* Sutton (1973), *M. brachycarpa* (H. Syd.) Deighton (1974), *M. mimax* (J. J. Davis) Deighton (1974), *M. pilosae* (T. S. Ramakr.) Deighton (1974), *M. buddleiae* Deighton (1974) and *M. brideliae* P. Kumar & Kamal (1981). *M. ziziphi* differs from these fungi by its conidiophore dimensions, conidial septation and branching as well as its darker pigmentation.

Key to the taxa described

1. Conidiophores branched ..... *M. anamirtae*
1*. Conidiophores unbranched 2
2. Conidiophores 1.5–21.5 µm long ..... *M. ziziphi*
2*. Conidiophores 22.5–46.0 µm long ..... *M. perfoliati var. nepalensis*

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