

HYPHOMYCETES—IV*

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50. *Arthrobotryum nilgirensis* sp. nov.

THIS fungus was found growing saprophytically on dead bamboo at the Sim's Park, Coonoor, during a visit in November 1956. It forms dark conspicuous colonies consisting of scattered synnemata. The synnemata are usually simple, erect, straight, consisting of a stalk and a capitate, broadened, fertile head. The stalk is somewhat cylindrical, rigid, tall, with a broadened base, dark opaque, composed of numerous simple, septate, brown, thin hyphæ closely aggregated together, 560–1,302 μ tall inclusive of the head, 56–196 μ wide at the base, 28–63 μ wide above and 28–70 μ wide immediately below the head. The heads are usually elongate-clavate, opaque black, 168–406 μ tall and 70–224 μ wide where they are widest. The heads are composed of conidiophores and conidia borne on them. The conidiophores are the free ends of the hyphæ of the synnema and they are of variable length, brown in colour, septate, somewhat clavate and dark brown towards the tip, bearing conidia singly and acrogenously. Each hypha of the synnema in most cases terminates in one conidiophore; in other cases it may, in addition, give out one or more conidiophores arising usually from immediately below the penultimate septum in the main hypha. The conidia are obclavate to fusiform or irregular in shape, straight, curved or bent, usually 4–6-septate when mature, with roughened outer wall, with all cells except the apical one usually dark brown in colour, the apical cell being paler and subhyaline, with a somewhat flat basal scar indicating the point of attachment to the conidiophore, broadest towards the base or middle and tapering above sometimes into an elongate-conical apical cell. The conidia are 26.6–50.8 μ long, 6.3–8.4 μ wide (where widest), each with a basal scar 2.1 μ wide; the basal cell is 4.9–5.6 μ wide; the apical cell is 4.9–14.0 \times 2.8–5.6 μ .

The aggregation of dark brown hyphæ to form synnemata which bear distinct heads of conidia and the production of phæophragmospores singly and acrogenously on the conidiophores indicate that the fungus may be placed in the genus *Arthrobotryum*. It has features quite distinct from

* Hyphomycetes I, II and III were published in *J. Indian bot. Soc.*, 35, 53–91, 446–94 and 36, 61–67, respectively.

species of this genus so far known and is, therefore, classified here as a new species:

Arthrobotryum nilgirensis Subramanian sp. nov.

Coloniæ fuscae, constantes e synnematis dispersis. Synnemata ut plurimum simplicia, erecta, recta, constantia e stipite atque capitulo latiore fertili. Stipes aliquantum cylindricus, basi latiori, fusce haud pellucidus,

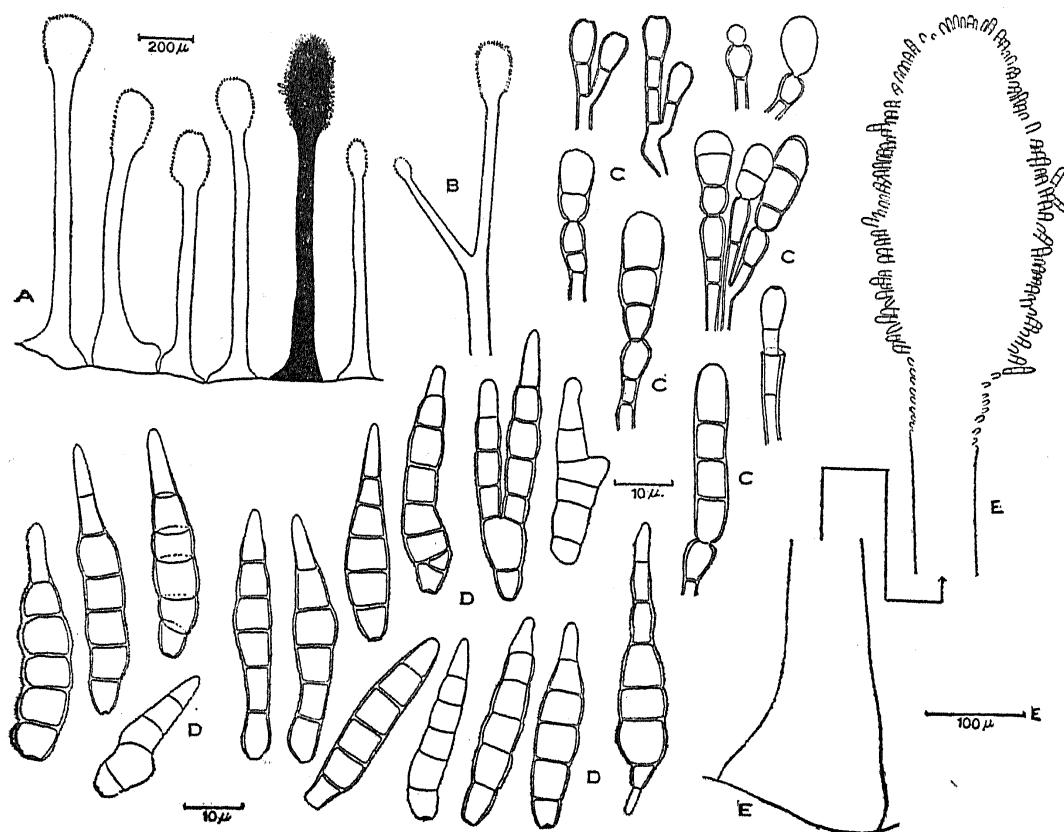


FIG. 1. *Arthrobotryum nilgirensis* from type specimen, Herb. M.U.B.L. 1738. A, synnemata; B, portion of a branched synnema; C, conidiophores and stages in the development of conidia; D, mature conidia; E, enlarged drawing of a synnema.

constans hyphis plurimis simplicibus, septatis, tenuibus, brunneis arcte aggregatis, capitulo incluso 560–1,302 µ altus, 56–196 µ latus ad basim, 28–63 µ latus supra, 28–70 µ latus sub ipso capitulo. Capitulum ut plurimum elongato-clavatum, nigrum, 168–406 µ altum, 70–224 µ latum latitudine maxima, constans e conidiophoris conidia ferentibus. Conidiophori (qui sunt apices liberi hypharum synnematis) longitudinis variæ, brunnei, septati, aliquantum clavati atque fusce brunnei ad apicem. Conidia singulariter atque acrogene producta e conidiophoris, obclavato-fusiformis vel irregularia, recta, flexa vel curvata, ut plurimum 4–6-septata ad maturitatem,

parietibus externis asperis, cellulis omnibus una apicali excepta fusce brunneis, apicali vero pallidiori atque subhyalina, cicatrice basali aliquantum complanata monstrante punctum unionis cum conidiophoro, latissima ad basim vel ad medium atque fastigata supra haud raro in cellulam apicalem elongato-conicam; conidia $26.6-50.8 \mu$ longa, $6.3-8.4 \mu$ lata ad partem latiore, singula ornata cicatrice basali 2.1μ lata; cellula basalis conidii $4.9-5.6 \mu$ lata; cellula vero apicalis conidii $4.9-14.0 \times 2.8-5.6 \mu$.

Typus lectus in Bambusa emortua, in loco Sim's Park, ad Coonoor, in regione Nilgiris, in Statu Madras, die 22 novembris anni 1956 a C. V. S. et positus in Herb. M.U.B.L. sub numero 1738.

51. *Ceratosporella deviata* sp. nov.

The fungus forms conspicuous, dark, somewhat velutinous colonies on the substratum (dead leaf base of *Raphilostyles sapida*). The conidiophores are simple, erect, straight, dark brown, septate (up to 3-septa), cylindrical, thick-walled, smooth, and arising from a highly lobed, dark brown basal cell. The basal cells are of variable length and are $10.5-12.6 \mu$ wide. The conidiophores are up to 5.6μ wide at the base, $4.2-4.9 \mu$ wide in the middle, abruptly narrowed and about 2.8μ wide at the tip, and $126-210 \mu$ long. The conidia are produced singly and acrogenously at the tips of the conidiophores. Apical proliferation of the conidiophores through scars of fallen conidia is common. The conidia are brown, mostly three-armed, sometimes two- or four-armed, the arms arising from a somewhat obpyriform basal cell with a short or long basal prolongation, and are attached to the conidiophores directly by their basal cells. The basal cell of each conidium is thick-walled and brown. The conidial arms are of variable length, darker, thicker walled and wider towards the base, septate (up to 4-septate), and often constricted at septa. The apical (central) arm is $22.4-37.8 (-61.6) \mu$ long and $5.6-7.0 (-7.7) \mu$ wide; the lateral arms are $16.8-43.4 \mu$ long and $4.9-7.0 \mu$ wide.

The details of the development of the conidia appear to be as follows. A swelling appears at the tip of the conidiophore. This swelling elongates and is cut off from the conidiophore by a septum. The swelling becomes narrow-obclavate in shape and a lateral swelling then appears about the middle or just below the middle part of the swelling. One septum appears in the main swelling immediately above the region of the origin of the lateral swelling, thus cutting off a basal cell for the conidium. Elongation and further septation of the primary swelling results in the apical arm of the conidium. The lateral swelling elongates and in the meanwhile another lateral swelling appears on the basal cell of the conidium. These lateral

swellings elongate, are cut off by septa from the basal cell of the conidium and become septate, forming the lateral arms of the mature conidium. The cells of the apical and the lateral arms are wider towards their base than

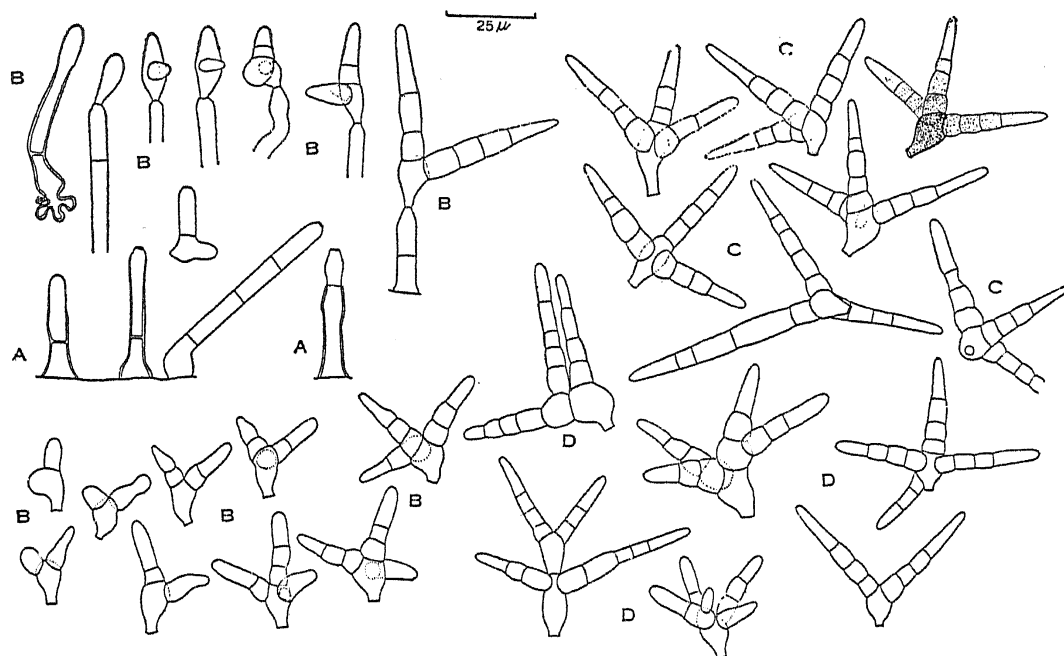


FIG. 2. *Ceratosporella deviata* from type specimen, Herb. M.U.B.L. 1778. A, conidiophores; B, stages in the development of conidia; C, normal mature conidia; D, abnormal mature conidia.

above and the apical cells of these arms are long-obconical and have smoothly rounded ends.

The fungus just described has a close resemblance to *Triposporium elegans* Corda; but a critical analysis of its features indicates that it is probably identical with the *Ceratosporella* sp. described by Hughes (1951). Hughes described and figured *Ceratosporella* sp. (? nov.) from a collection labelled "*Triposporium elegans* Ca. with *Microthyrium*. 2,437 on *Quercus* (leaves, probably from California) Harkness (scripsit Cooke)" ex Herb. R.B.G., Kew. The presence of a distinct stalk cell in the conidium and repeated apical proliferation of conidiophores are features found in *Ceratosporella bicornis* (Morgan) Hoehnel, the type species of the genus *Ceratosporella* Hoehnel (see Hughes, 1951) and I follow Hughes in classifying this fungus in *Ceratosporella*. My fungus is quite distinct from *C. bicornis*, but is probably the same as *Ceratosporella* sp. described by Hughes. It is classified here as a new species:

***Ceratosporella deviata* Subramanian sp. nov.**

Coloniæ fuscæ, velutinæ. Conidiophori simplices, erecti, recti, fusce brunnei, septati (septis usque 3), cylindrici, crassis parietibus præditi, leves,

surgentes e cellula alte lobata, fusce brunnea, basaliq̄ue, usque ad $5.6\ \mu$ lati ad basim, $4.2\text{--}4.9\ \mu$ ad medium, $2.8\ \mu$ ad apicem, $126\text{--}210\ \mu$ longi; cellula basalis $10.5\text{--}12.6\ \mu$ lata, longitudinis variæ. Conidia producta singulariter atque acrogene, brunnea, ut plurimum ter brachiata, nonnumquam bis vel quater brachiata, brachiis surgentibus e cellula basali aliquantum obpyriformi prædita brevi longave prolongatione basali; conidii cellula basalis crassis parietibus prædita, brunnea; brachia longitudinis variæ, obscuriora, parietibus crassioribus et latioribus ad basim prædita, septata (usque quater) atque sæpe constricta ad septa; brachium apicale (centrale) $22.4\text{--}37.8\text{--}61.6$) $\times 5.6\text{--}7.0$ (-7.7) μ ; brachia lateralia $16.8\text{--}43.4 \times 4.9\text{--}7.0\ \mu$.

Typus lectus in foliis emortuis *Raphilostyles sapidæ* in loco Government Garden, Ootacamund, in regione Nilgiris, in Statu Madras, die 24 novembris anni 1956 a C. V. S. et positus in Herb. M.U.B.L. sub numero 1778.

52. *Periconia nilagirica* sp. nov.

The fungus forms scattered groups of conidiophores with conidia, on the substratum. Each conidiophore consists of a stipe bearing a head of conidia at its tip. The stipe is erect, straight, bent or curved, smooth, thick-walled, brown in colour, darker towards the base, slightly paler towards

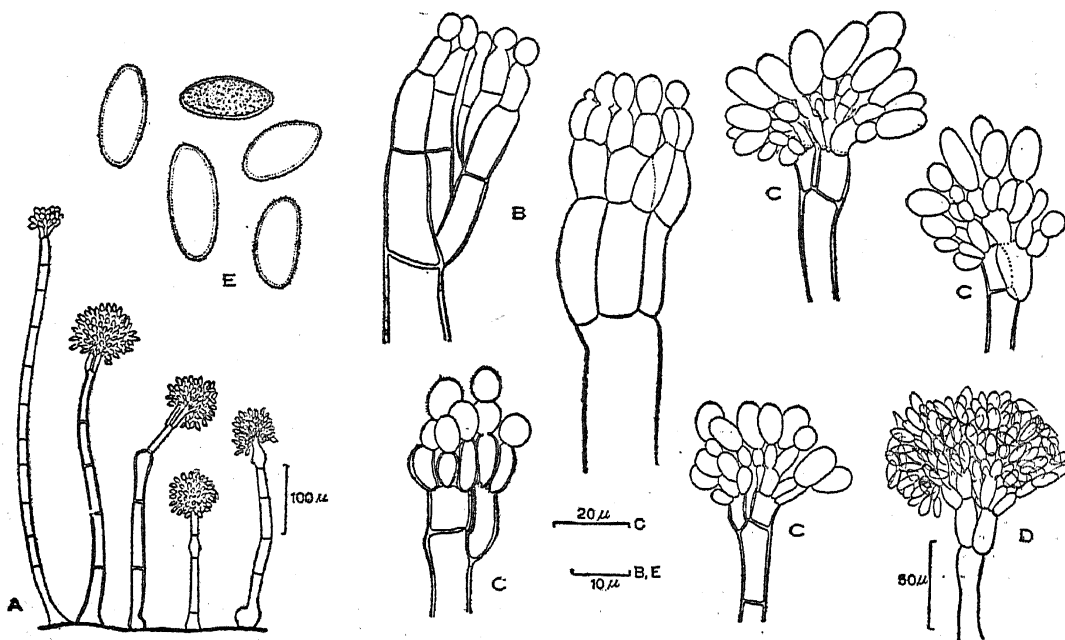


FIG. 3. *Periconia nilagirica* from type specimen, Herb. M.U.B.L. 1621. A, conidiophores and heads of conidia; B, C, development of conidia; D, head of conidia; E, mature conidia.

the apex, broad or swollen and $21\text{--}25\ \mu$ wide at the base, cylindrical and $9.8\text{--}14.0\ \mu$ wide immediately above the swollen base and further up, $168\text{--}560\ \mu$ long, septate, simple but often producing short lateral branches singly or in

twos or threes below the apex beneath transverse septa. The head is globose or irregular in shape; it is $36.0\text{--}111.6\ \mu$ high and $45.8\text{--}126.0\ \mu$ wide. The apical branches of the stalk are cylindrical, tapering towards the distal ends, at first adpressed, later spreading, brown at the base, paler above, usually producing secondary and tertiary branches; the primary branches are $16.8\text{--}21.0 \times 8.4\text{--}9.1\ \mu$; the secondary branches are up to $9.8 \times 5.6\ \mu$; the tertiary branches up to $8.4 \times 4.9\ \mu$. The conidia are always borne in simple or branched acropetal chains at the tips of the ultimate branches, maturing from the apex downwards. The mature conidia are dark brown, fusiform with rounded ends, markedly echinulate, thick-walled, one-celled and $14\text{--}21 \times 7.0\text{--}9.8\ \mu$.

It is obvious that the fungus is a *Periconia* with fusiform spores. It comes close to *P. sacchari* Johnston (see Saccardo, 1931, p. 768). Through the courtesy of Dr. J. A. Stevenson of the National Fungus Collections, U.S.D.A., I have been able to examine type material of *P. sacchari*, but it appears to be somewhat different from my fungus. *P. sacchari* has conidiophores up to $840\ \mu$ long or more, and the conidia are mostly $22 \times 11\ \mu$, whereas in my fungus the conidiophores are seldom longer than $560\ \mu$ and the majority of conidia are $16.8 \times 8.4\ \mu$. I am, therefore, classifying my fungus as a new species of *Periconia*.

***Periconia nilagirica* Subramanian sp. nov.**

Conidiophori dispersi in substratum atque constantes e stipite atque apice capitato fertili. Stipes erectus, rectus, flexus vel curvatus, levis, crassis parietibus praeditus, brunneus, obscurior ad basim, tenuiter pallidior ad apicem, latus vel tumescens atque $21\text{--}25\ \mu$ latus ad basim, cylindricus atque $9.8\text{--}14.0\ \mu$ latus supra ipsam basim tumescentem atque superius, $168\text{--}560\ \mu$ longus, septatus, simplex vel saepe ramis lateralibus brevibus nonnullis ornatus ad apicem infra septa; rami cylindrici fastigati ad apicem, primo adpressi, tum patentes, brunnei, ut plurimum producentes ramos secundarios et tertiarios; ramuli primarii $16.8\text{--}21.0 \times 8.4\text{--}9.1\ \mu$; secundarii vero usque ad $9.8 \times 5.6\ \mu$; tertiarii ad $8.4 \times 4.9\ \mu$. Capitula conidiorum forma irregulari, $36.0\text{--}111.6 \times 45.8\text{--}126.0\ \mu$. Conidia semper apicibus ramulorum ultimarum insidentia acropetale catenulata, maturitatem attingentia ex apice deorsum; matura conidia fusce brunnea, fusiformia, apicibus rotundatis, distincte echinulata, crassis parietibus praedita, semel-cellulata, $14\text{--}21 \times 7.0\text{--}9.8\ \mu$.

Typus lectus in culmis emortuis graminum, in loco Government Garden, Ootacamund, in regione Nilgiris, in Statu Madras, die 24 mensis septembris anni 1955 a C. V. S. et positus in Herb. M.U.B.L. sub numero 1621.

53. *Stachybotrys nilagirica* sp. nov.

This fungus was collected on dead twigs of *Althaea rosea* at the Sim's Park, Coonoor, during a visit in November 1956. It produces scattered conidiophores on the substratum. The conidiophores (phialophores) are erect, straight, hyaline, subcylindrical, being slightly narrower above than below, 1-4-septate (septa $18.0-61.2 \mu$ apart), swollen and $9.8-12.6 \mu$ wide at the base, $8.4-9.8 \mu$ wide above, $112-224 \mu$ long, thick-walled below, thin-walled above, smooth, slightly swollen and $6.3-7.0 \mu$ wide at the tip, and terminating in a cluster of about 6-7 phialides. The apical cell of the phialophore is $50.4-61.2 \mu$ long. The phialides are short-clavate, subhyaline when young, pale olivaceous green when mature, smooth, $12.6-15.4 \mu$ long and $7.0-8.4 \mu$ wide. The conidia are borne singly and acrogenously at the apices of the phialides and are one-celled, globose, markedly tuberculate, dark greenish black when mature, $15.4-28.0$ (mostly $21.0-25.2 \mu$) in diameter.

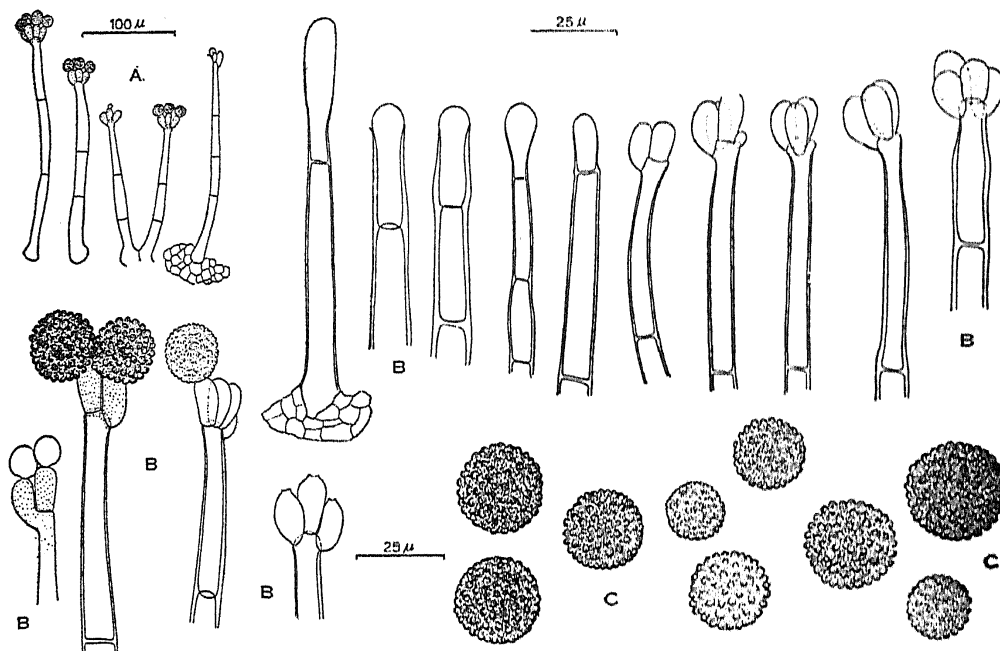


FIG. 4. *Stachybotrys nilagirica* from type specimen, Herb. M.U.B.L. 1813. A, phialophores; B, stages in the development of phialides and phialospores; C, mature phialospores.

The growth of the phialophore is terminated by the production of a terminal phialide usually $11.2-12.6 \mu$ long and $7.0-8.4 \mu$ wide. Later, 1-6 phialides develop from immediately below the apical phialide just below the septum, thus forming an apical cluster.

Comparison of the features of my fungus with those of species of *Stachybotrys* indicates that the former is distinct from *Stachybotrys* spp. so far known. My fungus is, therefore, treated here as a new species.

Stachybotrys nilagirica Subramanian sp. nov.

Conidiophori erecti, recti, hyalini, subcylindrici, simplices, 1-4-septati (septis inter se $18.0-61.2\mu$ distantibus) tumescentes atque $9.8-12.6\mu$ lati ad basim, $8.4-9.8\mu$ lati supra, $112-224\mu$ longi, crassis parietibus infra, tenuibus vero supra ornati, leves, aliquantum tumescentes et $6.3-7.0\mu$ lati ad apicem, desinentes in fasciculum 6-7 phialidum. Phialides brevi-clavatae, juniores quidem subhyalinae, vetustiores vero pallide olivaceo-virides, leves, $12.6-15.4 \times 7.0-8.4\mu$. Conidia singulariter atque acrogene insidentia apicibus phialidum, semel cellulata, globosa, distincte tuberculata, fusce viridi-nigra ad maturitatem, $15.4-28.0$ (ut plurimum $21.0-25.2$) μ diam.

Typus lectus in ramulis emortuis *Althææ roseæ* Cav. in loco Sim's Park, ad Coonoor, in regione Nilgiris, in Statu Madras, die 22 novembris anni 1956, a C. V. S. et positus in Herb. M.U.B.L. sub numero 1813.

54. **Drumopama girisa** gen. et. sp. nov.

The fungus forms scattered synnemata on both surfaces of decaying and dead leaves of Gramineæ, sometimes in groups. The synnemata are erect, dark, consisting of a stalk broadened and $25.2-36.0\mu$ wide below the base, $14.4-18.0\mu$ wide at the base, $14.4-21.6\mu$ wide in the middle and are $434-1,332\mu$ long. The hyphæ of the synnema are thin, simple, septate, pale brown, and become free above at varying lengths from the base and these free hyphæ are the conidiophores bearing conidia. The stalk of the synnema is $266-364\mu$ tall, cylindrical and dark in colour. The free conidiophores vary considerably in length, being $56-882\mu$ long; they are simple, straight, curved, bent or flexuose, dark brown, paler to subhyaline towards the tip, cylindrical and somewhat of uniform thickness, $3.5-4.2\mu$ wide at the base, $2.8-4.2\mu$ wide towards the tip, septate towards the base (septa $168-280\mu$ apart) and markedly geniculate. The conidia are produced singly and acrogenously; they are ovoid to subglobose, with a basal papilla indicating the point of attachment to the conidiophore, hyaline, smooth, $8.4-12.6\mu$ long and $7.0-9.8\mu$ wide. The conidiophore elongates from a point just below the scar of the first acrogenous conidium and after growing for a length produces another conidium acrogenously. Successive production of conidia in this way gives the fertile part of the conidiophore the geniculate appearance.

The fungus is obviously a member of the Moniliales-Phæostilbeæ. It has some resemblance to the genus *Melanographium* Sacc. (= *Sporostachys* Sacc.) (see Saccardo, 1931, p. 936). Through the courtesy of Dr. J. A. Stevenson of the National Fungus Collections, U.S.D.A., I have examined the type specimen of *Sporostachys maxima* Sacc. and I find that it produces

synnemata composed of closely aggregated parallel brownish hyphæ which become free above and produce one-celled, brown, convex, lenticular conidia (similar to those of genera such as *Pseudocampoum*, *Papularia*, *Arthrinium*,

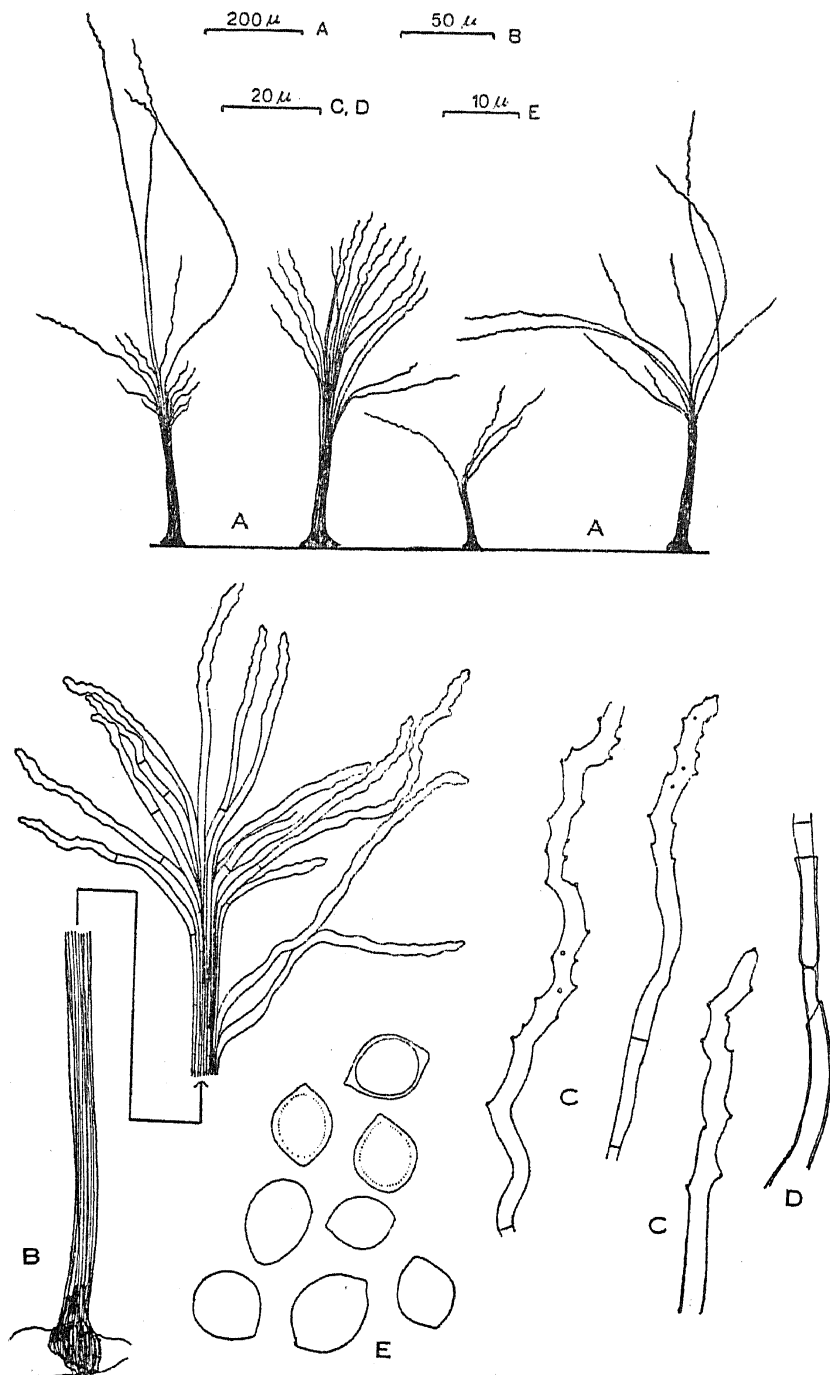


FIG. 5. *Drumopama girisa* from type specimen, Herb. M.U.B.L. 1753. A, synnemata; B, enlarged drawing of a synnema; C, fertile parts of conidiophores; D, proliferation of conidiophore; E, mature conidia.

etc.) acrogenously. In my fungus, the conidia, although one-celled, are hyaline and are not lenticular. I consider the lenticular nature of conidia of fungi to be of generic significance. For this reason, I do not place my fungus in *Melanographium* (= *Sporostachys*). The genus *Tharoopama* recently described by me (Subramanian, 1956) belongs to the Phæostilbeæ-Amerosporæ and produces hyaline one-celled conidia acrogenously on conidiophores which are the branched free ends of the hyphæ of the synnemata. The unbranched conidiophores of my fungus distinguish it from the type species of the genus *Tharoopama*, *T. trina* Subram., whose conidiophores are profusely and intricately branched. I know of no genus of the Phæostilbeæ in which the present fungus can be suitably classified. I am, therefore, proposing a new genus for it. The generic and specific names are both derived from Sanskrit: the generic name *Drumopama* from द्रुम (*druma*) = tree, and उपम (*upama*) = like, from the tree-like appearance of the synnemata: the specific epithet *girisa* from गिरि (girisa) = dwelling in the mountains, indicative of the occurrence of the fungus at an altitude over 7,000 feet above sea-level.

Drumopama Subramanian gen. nov.

Fungus imperfectus, Moniliales, Phæostilbeæ, Amerosporæ.

Synnemata simple, dark, erect, composed of simple, septate, brown hyphæ becoming free above. Conidiophores (free ends of hyphæ of synnema) simple, brown, geniculate. Conidia one-celled, hyaline, produced acrogenously and singly.

Pertinet ad Fungos Imperfectos, ad Moniliales, Phæostilbeas, Amerosporas. Synnemata simplicia, fusca, erecta, constantia e hyphis simplicibus, septatis, brunneis, quæ supra liberæ evadunt. Conidiophori (apices liberi hypharum synnematis) simplices, brunnei, geniculati. Conidia semel cellulata, hyalina, singulariter et acrogene producta. Species typica sequens.

Drumopama girisa Subramanian sp. nov.

Synnemata erecta, fusca, 434–1,332 μ alta, constantia e stipite atque parte fertili superiore quæ constat e conidiophoris (apicibus liberis hypharum synnematis) conidia ferentibus. Stipes cylindricus, latior ad basim (25.2–36.0 μ latus), 14.4–18.0 μ latus supra ipsam basim, 14.4–21.6 μ latus supra, atque 266–364 μ altus. Hyphæ synnematis tenues, septatæ, simplices, pallide brunneæ, evadentes liberæ supra ad efformandos conidiophoros. Conidiophori longitudinis variæ, 56–882 μ longi, simplices, recti, flexi vel curvati, fusce brunnei, pallidi ad hyalinos ad apicem, cylindrici atque plus minusve

uniformes crassitudine, $3.5-4.2 \mu$ lati ad basim, $2.8-4.2 \mu$ lati ad apicem, septati ad basim (septis $168-280 \mu$ inter se distantibus), distincte geniculati. Conidia producta acrogame atque singulariter, ovoidea ad subglobosa, papilla basali monstrante punctum unionis cum conidiophoris, hyalina, levia, $8.4-12.6 \mu$ longa, $7.0-9.8 \mu$ lata.

Typus lectus in foliis emortuis graminum in loco Government Garden, ad Ootacamund, in regione Nilgiris, in Statu Madras, die 19 novembris anni 1956 a C. V. S. et positus in Herb. M.U.B.L. sub numero 1753.

55. *Harpographium fasciculatum* Sacc., 1880, *Michelia*, 2, 33; *Fungi ital.*, t. 13; 1884, *Sylloge Fungorum*, 4, 619.

The fungus forms conspicuous synnemata on dead stems. The synnemata are gregarious, arising from a common stromatic base, dark brown, erect, straight or bent, somewhat cylindrical to conical, up to 560μ tall, $42-98 \mu$ wide at the base, $28-84 \mu$ wide in the middle, up to 42μ wide towards the tip, fertile all along the length except for a short distance from the base

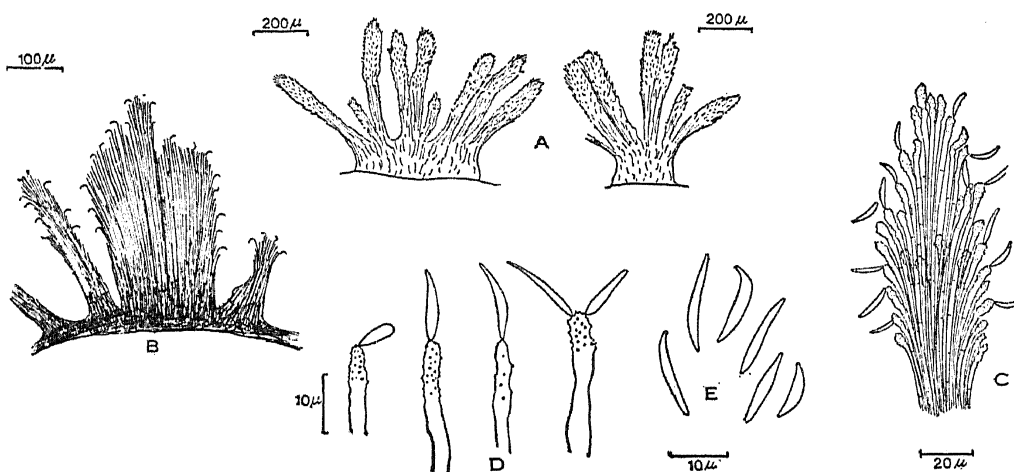


FIG. 6. *Harpographium fasciculatum* from Herb. M.U.B.L. 1784. A, B, groups of synnemata; C, apical part of a synnema; D, fertile apices of conidiophores bearing conidia; E, mature conidia.

and composed of pale to dark brown simple hyphæ. The apical parts of these hyphæ are free and do not lie closely adpressed or parallel to the synnematal strands. They are sometimes somewhat verrucose above, septate, $1.4-2.1 \mu$ wide, $2.8-4.2 \mu$ wide towards the tip which has distinct conidial scars crowded together or with fewer ones and then presenting a distinct geniculate appearance. The scars indicate the points of attachment of fallen conidia. The conidia are produced singly and acropleurogenously, and are one-celled, fusiform to falcate, hyaline, $7.0-15.4 \mu$ long and $1.4-2.1 \mu$ wide.

Habit.—On dead stems, Sim's Park, Coonoor, Nilgiris, Madras State, 22 November 1956, coll. C. V. S., Herb. M.U.B.L. 1737 and 1784.

This is apparently the first record of this fungus from India.

SUMMARY

The following five new species of Hyphomycetes, collected from the Nilgiris, Madras State, are described in this paper: *Arthrotryum nilgirense* on dead bamboo, *Ceratosporella deviata* on dead leaf base of *Raphilostyles sapida*, *Periconia nilagirica* on dead culms of grass, *Stachybotrys nilagirica* on dead twigs of *Althæa rosea*, and *Drumopama girisa* on dead leaves of Gramineæ. Of these, *D. girisa* is proposed as a gen. et sp. nov. and is placed in the Moniliales-Phæostilbeæ-Amerosporæ. *Harpographium fasciculatum* Sacc. is recorded from India for the first time.

ACKNOWLEDGEMENTS

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