

## ADDITIONS TO THE FUNGI OF MADRAS—XV

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### *Synchytrium emiliae* sp. nov.

GALLS numerous, on petioles and lamina, minute, crowded, yellow to brown, amphigenous; hyphospores spherical, solitary or sometimes two in each gall, dark brown, 47–124  $\mu$ , wall thick, 3-layered, epispore dark brown, up to 15  $\mu$  thick; sporangial sorus yellow, subglobose or oval, 78–140  $\times$  65–93  $\mu$ , made up of numerous sporangia; sporangia rounded or angular by pressure, thin walled, 19  $\times$  15  $\mu$  (16–22  $\times$  12–19), yellow.

Gallæ plures, in petiolis atque foliis, minutæ, aggregatæ, luteæ vel brunneæ, amphigenæ; hyphosporæ sphaericæ, solitariæ vel nonnumquam binæ in singulis gallis, fusce brunneæ, 47–124  $\mu$ , parietibus crassis, 3-seriatis, episporio fusce brunneo, usque ad 15  $\mu$  crasso. Sorus sporangialis luteus, subglobosus vel ovalis, 78–140  $\times$  65–93  $\mu$ , constans ex plurimis sporangiis; sporangia rotundata vel angularia ob pressionem, tenuibus parietibus prædita, 19  $\times$  15  $\mu$  (16–22  $\times$  12–19), lutea.

On petiole and lamina of *Emilia sonchifolia* DC. (Compositæ), Bantwal (South Kanara), 27–8–52, T. S. Ramakrishnan.

The infected portions are thickened and the galls form a brownish crust on both sides of the leaves. The resting spores which are formed freely, are thick walled. Outside the epispore is an indefinite yellowish layer. The sorus escapes out of the resting spore as a yellowish globular body with numerous sporangia. The fungus bears a resemblance to *S. vulgatum* Rytz. But comparison with an authentic specimen of *S. vulgatum* however showed that the fungus under study is different as judged by the size, appearance and formation of the hyphospores.

### *Meliola stenospora* Winter

Saccardo, P. A., *Syll. Fung.*, 9, 423, 1891.

On living leaves of *Strychnos nuxvomica* L. (Loganiaceæ), Taliparamba (Malabar), 27–7–52, N. V. Sundaram.

The fungus is prevalent in several parts of Malabar and South Kanara. The colonies form black growths mostly epiphyllously. Hyphopodia are alternate or sometimes opposite with subglobose to cylindrical top cells, measuring up to  $18-24 \times 9-12 \mu$ . Very rarely pointed hyphopodia are also noticed. The hyphæ are up to  $9 \mu$  thick and bear numerous black, long, multicellular pointed setæ up to  $350 \mu$  long. The perithecia are globose sometimes depressed at the top and have rugose surface. They are  $62-127 \mu$  in diameter. The spores are 4 septate, dark brown,  $34 \times 12 \mu$  ( $28-40 \times 9-16$ ), constricted at the septa and with rounded ends.

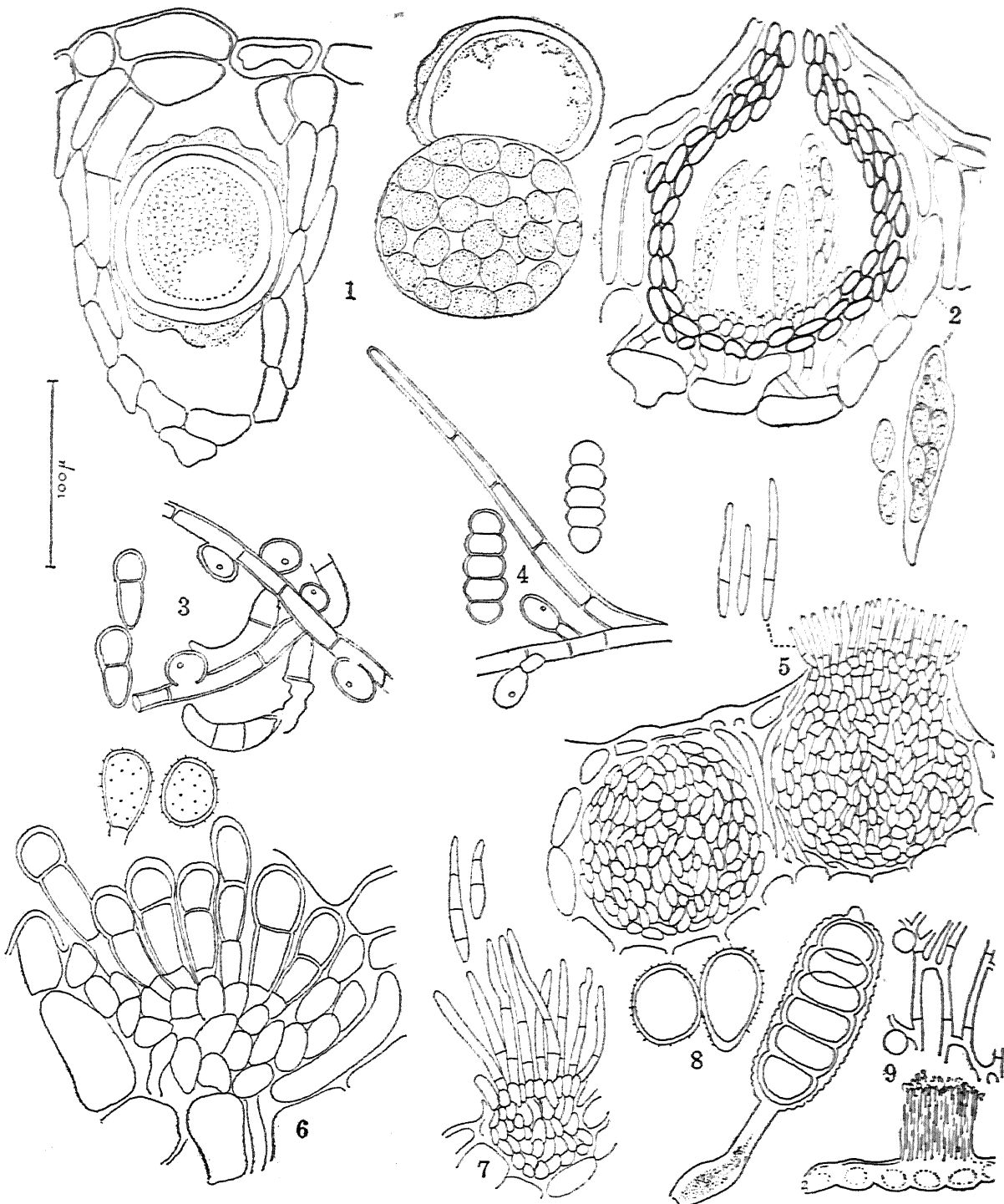
*Schiffnerula malabarensis* sp nov.

Colonies amphigenous, thin, black; mycelium of brown hyphæ forming loose network, up to  $9 \mu$  thick; hyphopodia alternate or sometimes opposite, sessile, subglobose, one celled, sometimes elongate and tapering, measuring  $12-18 \times 9-12 \mu$ , the longer ones two celled; perithecia globose, scattered,  $78-170 \times 69-150 \mu$ ; ascospores dark brown, ellipsoid, one septate, constricted at the septum, the upper cell shorter than the lower cell,  $12.6 \times 5.6 \mu$  ( $11-16 \times 4-7$ ).

Coloniæ amphigenæ, tenues, nigræ; mycelium constans hyphis brunneis efformantibus reticulationem quamdam liberam, ad  $9 \mu$  crassum; hyphopodia alterna vel aliquando opposita, sessilia, subglobosa, unicellulata, aliquando elongata atque fastigata, magnit  $12-18 \times 9-12 \mu$ , longiora quæque bicellulata; perithecia globosa, dispersa,  $78-170 \times 69-150 \mu$ ; ascosporæ fusce brunneæ, ellipsoidæ semel septatæ, constrictæ ad septum, cellula superiore breviora quam inferiore,  $12.6 \times 5.6 \mu$  ( $11-16 \times 4-7$ ).

On living leaves of *Passiflora edulis* Sims. (Passifloraceæ), Wynaad, 10-8-52, K. Govindakutty Kurup.

The fungus forms a sooty growth on both sides of the leaves. The hyphæ penetrating through the stomata can be seen here and there. Otherwise the mycelium is superficial. The perithecia are superficial and occur as black round bodies distributed on the sooty growth. By the time the perithecia are mature the ascus is not clearly distinguishable. The spores come out in groups of 6 to 8 when the perithecium is crushed. The two-celled nature of the ascospores and the presence of hyphopodia show that the fungus is to be included in *Schiffnerula*. A prominent pore is seen in the hyphopodial cell. *S. mirabilis* v. Höhn has been recorded on leaves of *Passiflora* sp. from Java; but the measurements of the perithecia and the ascospores are widely differing. Perithecia of the fungus under study are more than twice as big and the ascospores are much smaller than those of



FIGS. 1-9. Fig. 1. *Synchytrium emiliae*—Hypnosporangia and sporangia. Fig. 2. *Phomatospora artocarpi*—Section through perithecium and an ascus. Fig. 3. *Schiffnerula malabarensis*—Hyphopodia and ascospores. Fig. 4. *Meliola stenospora*—Hyphopodia, seta and ascospores. Fig. 5. *Ramulispora capparidis*—Section showing sclerotoid stromata, conidiophores and conidia. Fig. 6. Telium of *Puccinia curcumæ* and urediospores. Fig. 7. *Cercospora wendlandiæ*—conidiophores and conidia. Fig. 8. Urediospores and teliospore of *Phragmidium butleri*. Fig. 9. *Beniowskia graminis*—Sporodochium (diagrammatic) and hyphae with conidia.

*S. mirabilis*. Furthermore the ascospores of the latter are described as hyaline whereas they are dark brown in the former.

*Phomatospora artocarp* sp. nov.

Spots irregular, of varying sizes, grey coloured with a dark brown margin; perithecia mostly epiphyllous, subepidermal, appearing as minute black dots, ostiolate,  $130-170 \times 126-155 \mu$ ; peridium of 2-5 layers of dark brown cells; asci cylindrical, clavate, hyaline, thin-walled,  $78 \times 12 \mu$  ( $59-96 \times 9-16$ ); paraphysate; ascospores 8, one-celled, elliptic, sometimes slightly curved, with rounded ends, irregularly biseriata, hyaline,  $15.5 \times 6 \mu$  ( $12-19 \times 4-8$ ).

Maculae irregulares, magnitudinis diversae, griseae sed marginibus fusce brunneis; perithecia ut plurimum epiphylla, subepidermalia, apparenthia ut minuta puncta nigra, ostiolata,  $130-170 \times 126-155 \mu$ ; peridium constans 2-5 seriebus cellularum fusce brunnearum; asci cylindrici, clavati, hyalini, parietibus tenuibus praediti,  $78 \times 12 \mu$  ( $59-96 \times 9-16$ ), paraphysati; ascosporae 8, uni-cellulatae, ellipticae, nonnumquam tenuiter curvatae, apicibus rotundatis, irregulariter biseriatae, hyaline,  $15.5 \times 6 \mu$  ( $12-19 \times 4-8$ ).

On living leaves of *Artocarpus hirsuta* Lamk. (Moraceae), Gudalur (Nilgiris), 25-5-52, N. V. Sundaram.

The spots vary in size according to the place of formation.

*Aecidium gymnematis* sp. nov.

Rust spots yellowish, indefinite, almost circular; pycnia mostly hypophyllous, subepidermal, globose,  $196-280 \times 169-210 \mu$ ; aecia hypophyllous, clustered, cupulate, peridiate, margin of the peridium lacerated and reflexed,  $280-490 \times 210-310 \mu$ ; peridial cells polygonal,  $28-47 \times 16-31 \mu$ , hyaline, the free surfaces prominently verrucose; aeciospores subglobose, catenulate,  $28 \times 25 \mu$  ( $25-35 \times 21-28$ ), wall irregularly thickened, finely verrucose, contents yellowish orange in colour.

Maculae luteolae, indefinitae, fere circulares, ut plurimum constantes ex pycniis hypophyllae, subepidermales, globose,  $196-280 \times 169-210 \mu$ ; aecia hypophylla, aggregata, cupulata, peridiata, marginibus laceratis atque reflexis,  $280-490 \times 210-310 \mu$ ; cellulae peridiales polygonales,  $28-47 \times 16-31 \mu$ , hyalinae, verrucosae in faciebus liberis; aeciosporae sub-globosae, catenulatae,  $28 \times 25 \mu$  ( $25-35 \times 21-28$ ), parietibus irregulariter incrassatis, minute verrucosis, contentis aurantiacis colore.

On living leaves of *Gymnema sylvestre* R. Br. (Asclepiadaceae), Manantoddy (Malabar), 26-5-52, N. V. Sundaram.

The rust occurs in indefinite spots on the leaves. The upper surface is yellowish. On the lower surfaces the æcia and pycnia are mixed together in crowded groups. The pycnia are reddish brown and open out flush with the epidermis. The æcial cups have a whitish reflexed peridium with orange coloured mass of spores inside.

*Aecidium walayarens* sp. nov.

Spots rounded, amphigenous, hypertrophied, convex on the lower surface and concave on the upper surface, brownish; pycnia epiphyllous, subepidermal,  $140-210 \times 126-182 \mu$ , reddish brown, paraphyses projecting beyond the epidermis in mass; æcia crowded and immersed in the thickened tissue, hypophyllous,  $330-518 \times 210-330 \mu$ , peridiate, peridial cells polygonal,  $21-35 \times 15-25 \mu$ ; æciospores subglobose, catenulate,  $22 \times 19 \mu$  ( $19-25 \times 18-22$ ), wall uniform, finely verruculose, contents yellowish.

Maculæ rotundatæ, amphigenæ, hypertrophiatæ, convexæ in inferiore atque concavæ in superiore superficie, brunneolæ; pycnia epiphylla, subepidermalia,  $140-210 \times 126-182 \mu$ , rubrobrunnea; paraphyses emergentes ex epidermate in massa; æcia aggregata atque immersa in textura crassa, hypophylla,  $330-518 \times 210-330 \mu$ , peridiata, cellulæ peridiales polygonales,  $21-35 \times 15-25 \mu$ ; æciosporæ subglobosæ, catenulatæ,  $22 \times 19 \mu$  ( $19-25 \times 18-22$ ), parietibus uniformibus, minute verruculosis, contentis luteolis.

On living leaves of *Cordia obliqua* Willd. (Boraginaceæ), Walayar (Malabar), 12-6-52, N. V. Sundaram.

The infected portion is thickened. A hemispherical swelling is formed on the lower surface of the leaf and the æcia are arranged on this. There is a corresponding depression on the upper surface. The pycnia have no definite shape. They are formed subepidermally but occupy a position between the palisade and the epidermis. The æcia are deep-seated.

Three species of *Aecidium*, viz., *A. brasilense* Diet., *A. cordia* P. Henn. and *A. lindavianum* Syd., have been recorded on this host genus from America. But the rust under study differs from them in the position of the pycnia, the formation of galls and in spore size.

*Phragmidium butleri* Sydow.

Sydow, H. and P. and Butler, E. J., *Ann. Mycol.*, 5, 501, 1907.

On living leaves of *Rosa leschenaultiana* W. and A. (Rosaceæ), Ootacamund, 20-5-52, N. V. Sundaram.

Uredia and telia are present. The former are orange coloured and are surrounded by numerous hyaline incurved paraphyses. Telia appear as

black growths. The pedicel of the teliospore is hyaline, up to  $68\mu$  long, hygroscopic and swelling gradually at the base. The urediospores measure  $26 \times 22\mu$  ( $22-31 \times 19-25$ ). The teliospore is 3-7 septate, reddish brown in colour,  $78 \times 28\mu$  ( $50-91 \times 25-31$ ), prominently verrucose and with a short hyaline apiculus.

*Puccinia curcumæ* sp. nov.

Uredia hypophyllous, minute, subepidermal, light yellow; urediospores subglobose to ovate, with very short stalks, echinulate,  $31 \times 24\mu$  ( $25-47 \times 19-28$ ); telia hypophyllous, light yellow, subepidermal, erumpent, minute; teliospores pedicellate, pedicel up to  $12\mu$  long, two-celled, clavate, apex slightly thickened, up to  $6\mu$ , constricted at the septum,  $37 \times 16\mu$  ( $28-47 \times 12-19$ ), either pointed or rounded at the apex, subhyaline, germinating *in situ*.

Uredia hypophylla, minuta, subepidermalia, pallide lutea; uredosporæ subglobosæ vel ovatæ, pedicellis brevissimis, echinulatæ,  $31 \times 24\mu$  ( $25-47 \times 19-28$ ); telia hypophylla, pallide lutea, subepidermalia, erumpentia, minuta; teliosporæ pedicellatæ, pediculo usque ad  $12\mu$  longo, 2-cellulatæ, clavatæ, apice tenuiter crasso usque  $6\mu$ , constrictæ ad septum,  $37 \times 16\mu$  ( $28-47 \times 12-19$ ), vel acutæ vel rotundatæ ad apicem, subhyalinæ, germinantes *in situ*.

On living leaves of *Curcuma* sp. (Zingiberaceæ), Mundage (South Kanara), 27-8-52, T. S. Ramakrishnan.

The rust forms minute, dot-like sori clearly visible on the lower surface. It bears a resemblance to the rust, *Uredo amomi* Petch, recorded on *Amomum* sp. But both telia and uredia are present on *Curcuma*. Inoculations were carried out with viable urediospores on *Canna indica*, *Maranta arundinacea* and *Curcuma longa*. Successful infection was obtained on *C. longa* alone.

*Cercospora wendlandiæ* sp. nov.

Spots irregular, amphigenous, brownish grey on the upper surface and brown on the lower surface; conidiophores developed on sub-stomatal erumpent stromata, amphigenous, black in mass; individual conidiophores smoky brown, straight or bent, sparsely septate,  $24-75 \times 3-4.5\mu$ ; conidia subhyaline, elongated, tapering towards the apex, septate up to 5 septa,  $28-46 \times 4.5-6\mu$ .

Maculæ irregulares, amphigenæ, brunneolo-griseæ in superiore, brunneæ vero in inferiore superficie; conidiophori insidentes stromatibus erumpentibus substomatalibus, amphigeni, nigri in massa; singuli conidiophori

effumato-brunnei, recti vel curvati, sparse septati,  $24-75 \times 3-4.5 \mu$ ; conidia subhyalina, elongata, fastigata ad apicem, usque quinquies septata,  $28-46 \times 4.5-6 \mu$ .

On living leaves of *Wendlandia notoniana* Wall. (Rubiaceæ), Manantoddy (Wynaad), 26-5-52, N. V. Sundaram.

Irregular spots are formed on the leaves. The fructifications appear as black dots on the upper surface. Well-developed stromata are present.

*Ramularia mimosæ* Stev. and Dalbey

Stevens, F. L. and Dalbey, N. E. *Mycologia*, **11**, 6, 1919.

On *Mimosa pudica* L. (Mimosoideæ), Kallar (Coimbatore), 15-5-52, N. V. Sundaram.

The fungus forms white patches and resembles in appearance growths of powdery mildew. The conidiophores are hyaline and arise in clusters emerging through the stomata. They measure  $12 \times 4.5 \mu$  ( $9-19 \times 3-8$ ). The conidia are hyaline and tapering and measure  $25 \times 3 \mu$  ( $13-40 \times 1.5-3.5$ ).

*Beniowskia graminis* Rac.

Raciborski, M. *Parasit. Algen und Pilze*, Javas, II, 37, 1900.

On living leaves of *Pennisetum hohenackeri* Hochst. (Gramineæ), Wynaad (Malabar), 27-5-52, N. V. Sundaram.

The sporodochia are white and erumpent with a mealy appearance. The hyphæ form a compact column bursting through the epidermis. At the top they form a loose anastomosing mass. At the free end the hyphæ are hyaline, septate, often twisted or coiled. Conidia are borne laterally. These are globose, hyaline one celled and measure  $10.5 \mu$  ( $6.5-12$ ) in diameter.

*Glæosporium alborubrum* Petch

Petch, T., *Ann. Roy. Bot. Gard. Peradeniya*, **3**, 8, 1906.

On living leaves of *Hevea brasiliensis* M. Arg. (Euphorbiaceæ), Koney (Travancore State), 5-6-52, Superintendent, Koney Estate.

The fungus causes die back of the twigs and defoliation of the young plants.

*Ramulispora capparidis* sp. nov.

Spots amphigenous, circular, brown with a well-defined raised margin; conidiophores borne on prominent hypophyllous dark brown sclerotoid

stromata,  $62-99 \times 46-76 \mu$ , septate, subhyaline, branching,  $24-46 \times 1.5-3 \mu$ ; conidia linear, hyaline, 1-4 septate,  $12-43 \times 1.5-2.5 \mu$ .

Maculæ amphigenæ, circulares, brunneæ, marginibus bene definitis elevatis; conidiophori insidentes stromatibus fusce brunneis prominentibus hypophyllis sclerotioideis,  $62-99 \times 46-76 \mu$ , septati, subhyalini, ramosi,  $24-46 \times 1.5-3 \mu$ ; conidia linearia, hyalina, 1-4 septata,  $12-43 \times 1.5-2.5 \mu$ .

On living leaves of *Capparis grandiflora* Wall. (Capparidaceæ), Maruthamalai (Coimbatore), 27-6-52, N. V. Sundaram.

Distinct spots are formed on the leaves. The fructifications appear as whitish dots on the lower surface. Black sclerotoid subepidermal bodies are formed. Later conidiophores are developed on these. The sclerotoid stromata indicate that the fungus should be included in the genus *Ramulispora*. Some of the sclerotoid bodies are round and do not bear conidiophores.

*Macrophoma toddaliæ* sp. nov.

Spots irregularly circular, amphigenous, greyish white on the upper surface, zonate, pycnidia mostly epiphyllous, sometimes hypophyllous, innate, erumpent, black, often arranged in rings; pycnidiospores oblong, hyaline, one celled,  $11.2 \times 5.6 \mu$  ( $8-14 \times 4-7$ ), with granular contents.

Maculæ irregulariter circulares, amphigenæ, griseo-albidæ in superiore facie, zonatæ; pycnidia ut plurimum epiphylla, aliquando hypophylla, innata, erumpentia, nigra, sæpe annulariter disposita; pycnidiosporæ oblongæ, hyalinæ, unicellulatæ,  $11.2 \times 5.6 \mu$  ( $8-14 \times 4-7$ ), contentis granularibus.

On living leaves of *Toddalia asiatica* Lamk. (Rutaceæ), Ootacamund, 20-5-52, N. V. Sundaram.

The spots were of varying sizes, but very characteristic with several concentric zones. Each zone is bounded by a greyish brown ring. The colour of the spot varies according to age.

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