ADDITIONS TO THE FUNGI OF MADRAS—XIII

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Sclerospora graminicola (Sacc.) Schr.

Butler, E. J. .. *Mem. Dept. Agric. India, Bot. Ser.*, 1907, **2**, 1, 24.

On *Panicum miliaceum* L. (Gramineæ) causing downy mildew, near Coimbatore, 24–5–51, T. S. Ramakrishnan.

Downy white growth of the conidial state was first noticed on both surfaces of the leaves and in the course of a fortnight the leaves turned yellow and then brown and the plants dried up in patches even before flowering. In some plants the symptoms were exhibited as yellowish long stripes. Ears were produced in some plants but the spikelets were chaffy and there was no grain setting. In most cases, whole plants were involved. In a few, partial infection of the plants was prevalent the rest of the plant forming normal ears. Shredding of the leaf was evident only rarely. Oospores were found in large numbers in the tissues of the leaves which had turned brown or become shredded.

The fungus closely resembles the one noticed on *Pennisetum typhoides* Stapf. and Hubb. in the measurements of the sexual and asexual reproductive bodies. The rapidity with which the disease spread over the whole field and the partial infection of several plants indicated that besides primary infection secondary spread through the agency of the sporangia should have taken place.

Pseudoperonospora cubensis (Berk. and Curt.) Rost.

Butler, E. J. .. *Fungi and disease in plants*, 1918, 311.

On leaves of *Luffa acutangula* Roxb. (Cucurbitaceæ), Coimbatore, 25–12–51, T. S. Ramakrishnan.

This fungus causes the downy mildew of several cucurbitaceous hosts. In Siddout (Cuddapah District) melon (*Cucumis melo* L.) is often affected by this fungus. At Coimbatore, the same fungus was recorded on *Cucumis sativus* L., *Trichosanthes anguina* L. and *Cucumis melo*. In order to find out

whether any specialisation was prevalent in this species, cross inoculation experiments were carried out with the fungus on the different hosts. The fungus readily passed on from one to the other hosts and *vice versa*. But *Cucurbita maxima* Duch. which was growing alongside them was quite free from infection in nature. Even when artificially inoculated with the fungus from the other hosts no instance of positive infection was evident. The plant has however been recorded as a host for this fungus from other parts of India. The strains growing on *Cucumis* and other hosts recorded above did not pass on to *Cucurbita maxima*, showing thereby the existence of specialisation in this pathogen. According to Fitzpatrick this fungus is included in the genus *Peronoplasmopara* as the name *Pseudoperonospora* by Rostowzew did not satisfy the requirements of Article 38 of International Rules of Botanical Nomenclature.

Claviceps paspali Stev. and Hall.

Sprague, R. .. *Diseases of cereals and grasses*. The Ronald Press Co., New York, 1950, 60.

On the inflorescence of *Paspalum dilatatum* Poir. (Gramineæ), Kodaikanal, 21–12–51, N. V. Sundaram.

Paspalum dilatatum is the South American fodder grass. Attempts have been made to introduce this grass on the hill stations in South India and it is common in and around Ootacamund and Kodaikanal and has occasionally run wild. In December 1951, this grass was found to be heavily infected at Kodaikanal. The honeydew stage was the most prevalent state. Cross inoculations with this fungus on the ears of *P. scrobiculatum* L. were highly successful. Both the conidia and sclerotia were formed on this host. On analyses the sclerotia were found to contain the alkaloid ergotoxine. Stock poisoning has been reported from other countries caused by grazing on infected ears of *P. dilatatum*. The spread of *P. dilatatum* as a fodder grass in localities liable to ergot infection is to be watched for freedom from ergot.

Epichloe typhina (Fr.) Tul.

Sprague, R. .. *Diseases of cereals and grasses*. The Ronald Press Co., New York, 1950, 77–78.

On culm and leaf sheath of *Alloteropsis cimicina* Stapf. (Gramineæ), Pattambi, 15–6–51, N. V. Sundaram.

The stromata are brownish orange 6–22 mm. long and 2–5 mm. thick. The conidia are ovoid and hyaline. This is a new host for this fungus.

Aecidium meliosmæ-wightiæ sp. nov.

Woody galls formed on twigs, petioles and veins of leaves, galls brown, 5–7 cm. long and 1–3 cm. thick, studded with pycnia and æcia. Pycnia black, subcuticular, hemispherical or conical, 105–145 μ wide and 42–80 μ high, paraphyses lacking. Aecia numerous, deeply immersed in the gall, 700–1,500 μ broad, peridiate, peridial cells polygonal, 51 $\times$23 μ, promiently verrucose; æciospores catenulate, light to deep brown, of different shapes, oblong to angular, sometimes pointed, 28–72 $\times$20–35 μ, wall subhyaline upto 4 μ, thick, prominently verrucose.

Gallæ lignosæ ramis petiolis atque venis foliorum insidentes, brunneæ, 5–7 cm. longæ, 1–3 cm. crassæ, punctatæ pycniis atque æciis. Pycnia nigra, subcuticularia, hemispherica vel conica, 105–145 μ lata, 42–80 μ alta, paraphysibus nullis. Aecia plurima, profunde in gallam immersa, 700–1,500 μ lata, peridiata, cellulis peridialibus polygonalibus 51 $\times$23 μ, prominenter verruculosis; æciosporæ catenulatæ, pallidæ vel profunde brunneæ, multiformes, oblongæ, vel angulares, aliquando acutæ, 28–72 $\times$20–35 μ; parietes subhyalini, ad 4 μ crassi, prominenter verruculosi.

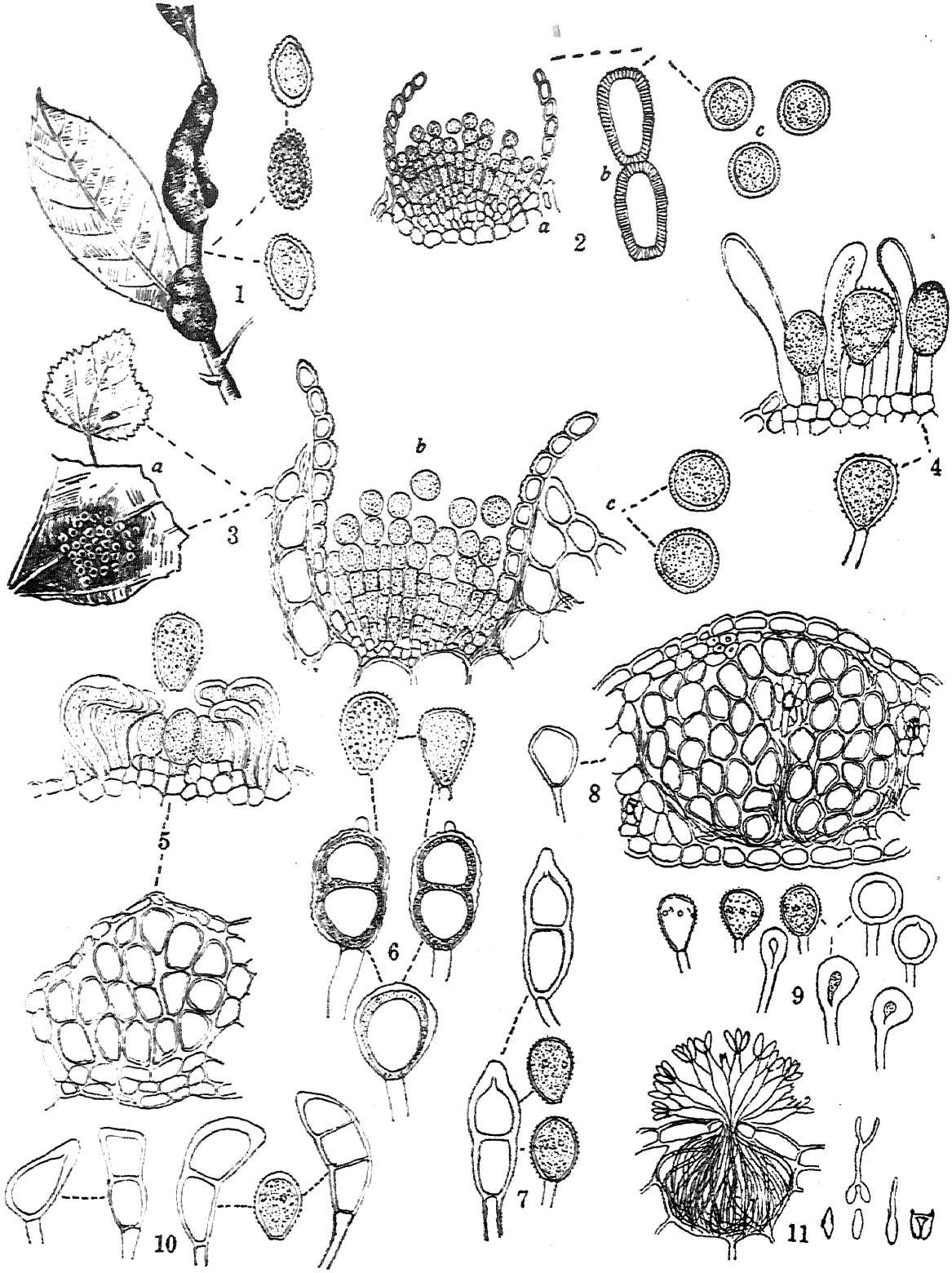
On living twigs petioles and leaves of *Meliosma wightii* Planch. (Sabiaceæ), Ootacamund, 15–7–1951, T. S. Ramakrishnan.

Hard woody galls of varying sizes are seen on the trees. These galls are studded with numerous æcia and pycnia mixed together. The æcia are sunk in the tissues of the gall. On bursting, the frayed edges of the whitish evanescent peridium are seen round the brown contents of the æcia. Older æcia appear as cavities in the gall. Four other species of *Aecidium* have been recorded on this genus. But the formation of the big woody galls is characteristic of this rust.

Aecidium anaphalis-leptophyllæ sp. nov.

Pycnia minute, amphigenous, subepidermal, 46–93 $\times$28–68 μ; æcia hypophyllous, sparse or crowded, 0·3–0·6 mm. high, peridiate, peridial cells polygonal, hyaline, thick-walled, walls with striæ-like thickenings, 34–77 $\times$22–46 μ; æciospores orange yellow, globose, wall hyaline and finely verruculose, catenulate, 25–31 $\times$19–25 μ.

Pycnia minuta, amphigena, subepidermalia, 46–93 $\times$28–68 μ; æcia hypophylla, sparsa vel aggregata, 0·3–0·6 mm. alta, peridiata, cellulis peridialibus polygonalibus, hyalinis, crasso pariete præditis, pariete vero striis instar crassitatum ornato, 34–77 $\times$22–46 μ; æciosporæ aurantiaco-luteæ, globosæ, parietibus hyalinis et minute verruculosis ornatæ, catenulatæ, 25–31 $\times$19–25 μ.



FIGS. 1 to 11.—Fig. 1. Sketch of the galls formed by *Aecidium meliosmae-wightii* (×½); æciospore (×300). Fig. 2. (*a*) Section of æcium of *Aecidium anaphalis-leptophyllæ* (×100); (*b*) peri-

dial cells (×500); *c*, æciospores (×500). Fig. 3. (*a*) Sketch of the leaf of *Pavonia odorata* showin æcial cups of *Aecidium pavoniæ-odoratæ* (magnified); (*b*) section of æcium (×250); (*c*) æciospores (×500). Fig. 4. *Uredo acalyphæ-fruiticosæ*, portion of uredium and one urediospore (×400). Fig. 5 *Phakopsora incompleta*, uredium and telium, (×400). Fig. 6. *Puccinia gymnopetali-wightiæ* urediospores, teliospores and one mesospore (×400). Fig. 7. *Puccinia desertorum*, urediospores and teliospores (×400). Fig. 8. *Uromyces leptodermus*, telium and teliospore (×400). Fig. 9. *Uromyces amphilophis-insculptæ*, urediospores, teliospores and paraphyses (×300). Fig. 10. *Puccinia bulbostylidis*, urediospore, teliospores and mesospore (×400). Fig. 11. *Microstroma delonicis*, acervulus and germinating conidia (× 300).

On living leaves of *Anaphalis leptophylla* DC. (Compositæ), Sholada near Ootacamund, 15–10–1951, T. S. Ramakrishnan.

Since pycnia and æcia were alone observed and no associated telial stage was present this is placed in the form genus.

Aecidium pavoniæ-odoratæ sp. nov.

Pycnia amphigenous, reddish brown, sub-epidermal, globose with a protruding column of paraphyses upto 200 μ long. Aecia hypophyllous, cupulate, clustered, yellow, subepidermal, peridiate, peridial cells hyaline, polygonal, 16–33 ×12–22 μ, strongly verrucose; æciospores catenulate, round, wall subhyaline, finely verruculose, yellowish orange, 19–28 ×16–22 μ.

Pycnia amphigena, rubro-brunnea, subepidermalia, globosa, ornata columna paraphysum exserta usque ad 200 μ longa. Aecia hypophylla, cupulata, aggregata, lutea, subepidermalia, peridiata, cellulis peridialibus hyalinis, polygonalibus, 16–33 ×12–22 μ, fortiter verruculosa; æciosporæ catenulatæ, rotundæ, parietibus subhyalinis, minute verruculosis, luteo-aurantiacæ, 19–28 ×16–22 μ.

On living leaves of *Pavonia odorata*, Willd. (Malvaceæ), Kallar (Coimbatore), 26–1–52, N. V. Sundaram and G. Siddhalinga Reddy.

Pycnia and æcia alone were observed. These stages have not been recorded on this host genus. Hence it is identified as a new species of the form genus.

Puccinia bulbostylidis Doidge.

Doidge, E. M. .. *Bothalia*, 1926, **2**, 117.

On living leaves and peduncle of *Bulbostylis barbata* Kunth. (Cyperaceæ) Pattambi, Malabar, 15–11–1951), N. V. Sundaram.

Two species of *Puccinia* have been described on this host genus, *viz.*, *P. bulbostylidis* and *P. bulbostylidicola*, Thirum. The rust under study has urediospores which are brown, 16–25 ×12–22 μ and with the germpores just above the middle. The telia are black and long covered by the epidermis,

The teliospores are clavate normally 2-celled with the apices pointed or flattened, and thickened upto 6·5 μ. One- and three-celled teliospores are also present. The teliospores measure 31–62 ×12–22 μ and have a persistent stalk upto 31μ long and coloured brown. The above characters show that this rust closely resembles *P. bulbostylidis* and is identified as such.

Puccinia desertorum Syd.

Saccardo, P. A. .. *Syll. Fung.*, 1912, **21**, 664–65.

On the leaves of *Evolvulus alsinoides* L. (Convolvulaceæ) Kallar, (Coimbatore), 26–1–52, N. V. Sundaram.

Five species of *Puccinia* have been recorded on this host genus, *viz.*, *P. lithospermi* Ell. and Kellerm., *P. tuyutensis* Speg., *P. enecta* Speg., *P. bellurensis* Thirum. and *P. desertorum* Syd. Of these, the first two are claimed to be synonymous by some, though Jackson (1931) does not accept this. The rust under study has thickened apices (upto 12 μ) for the teliospore. The teliospores measure 31–47 ×19–25 μ and urediospores are mixed with the teliospores. The rust most closely resembles *P. desertorum* which has been recorded on the same host from Africa.

Puccinia gymnopetali-wightiæ sp. nov.

Uredia amphigenous, mostly hypophyllous, subepidermal, erumpent, brown; urediospores pedicellate, ovate, elliptic or subglobose, brown, echinulate, wall brown in colour, 4 germpores above the middle, 22–31 ×16–24 μ; telia black, amphigenous, mostly hypophyllous, subepidermal; teliospores usually 2-celled elliptic with rounded ends, 28–74 ×25–31 μ, wall warty, lamellated, outer layers subhyaline, inner chestnut brown, pedicellate, pedicel hyaline, upto 33 μ long and 10 μ broad, with a distinct knob-like papilla at the apex (upto 3·5 μ) of the spore; mesospores rare, 25–31 ×19–25μ with a thick many-layered wall and tapering apex, wall upto 4·3 μ thick.

Uredia amphigena, ut plurimum hypophylla, subepidermalia, erumpentia, brunnea; uredosporæ pedicellatæ, ovatæ, ellipticæ vel subglobosæ, brunneæ, echinulatæ, pariete brunneo, 4 germinationis poris supra medium, 22–31 ×16–24 μ; telia nigra, amphigena, ut plurimum hypophylla, subepidermalia; teliosporæ generatim 2-cellulatæ, ellipticæ apicibus rotundis, 28–74 ×25–31 μ, pariete verrucoso, lamellatæ, straturæ exteriores subhyalinæ, interiores vero castaneo-brunneæ, pedicellatæ, pediculo hyalino, usque ad 33 μ long., 10 μ latit., papilla tuberosa usque ad 3·5 μ in apice sporæ; mesosporæ raræ, 25–31 ×19–25 μ, ornatæ pariete crasso, multis stratis consistente, apice fastigato, pariete usque ad 4·3 μ crasso.

On living leaves of *Gymmopetalum wightii* Arn. (Cucurbitaceæ), Pannaikadu (Palnis), 20–12–51, N. V. Sundaram.

The teliospores resemble those of *Uropyxis* in appearance but the absence of two germpores in each of the telial cells preclude the inclusion of this rust in this genus. It differs from *P. cephalanadræ* Thuem. recorded on *Cephalandra* in having much bigger teliospores. Furthermore the wall has many layers in the rust under study and is warty instead of having fine lines as in the former. It is described as a new species of *Puccinia*.

Puccinia chloridis-incompletæ sp. nov.

Uredia amphigenous, brown, subepidermal, paraphysate with marginal incurved thick walled clavate paraphyses; urediospores subglobose to obovate, yellowish brown, 19–28 ×15–22 μ, echinulate, with 6 distributed germpores. Telia mainly hypophyllous, black, erumpent, oblong, paraphysate, paraphyses 25–46 ×9–13 μ, marginal, incurved with thickened walls, yellowish; teliospores two-celled, chestnut brown, elliptic with rounded ends, apex slightly thickened or not, slightly constricted at the middle, smooth, 25–31 ×19–21 μ, stalk persistent, hyaline to subhyaline, upto 77 μ long, mesospores present, 22–25 ×19–22 μ, apices of mesospores much thickened upto 10 μ.

Uredia amphigena, brunnea, subepidermalia, paraphysata paraphysibus marginalibus, incurvis, clavatis, pariete, crasso præditis; uredosporæ subglobosæ vel obovatæ, luteo-brunneæ, 19–28 ×15–22 μ, echinulatæ, germinationis poris 6 dispersis. Telia ut plurimum hypophylla, nigra, erumpentia, oblonga, paraphysata, paraphysibus 25–46 ×9–13 μ, marginalibus, incurvis, luteis, pariete crasso præditis; teliosporæ 2-cellulatæ, castaneo-brunneæ, ellipticæ apicibus rotundis, apice vel tenuiter vel nullo modo incrassato, tenuiter constrictæ ad medium, leves, 25–31 ×19–21 μ, pediculo persistente, hyalino vel subhyalino, ad 77 μ longo; mesosporæ adsunt, 22–25 ×19–22 μ, apicibus valde incrassatis ad 10 μ.

On living leaves of *Chloris incompleta* Roth. (Gramineæ), Kallar (Coimbatore), 26–1–52, N. V. Sundaram.

Two rusts have been recorded on this host genus, *viz.*, *P. chloridis* Speg. and *P. gymnopogonis* Syd. The rust under study differs from these in the possession of paraphyses in the sori. The teliospores resemble those of *P. gymnopogonis* but due to the presence of the urediospores with 6 germpores and the paraphyses, the rust under study is considered to be different.

Puccinia nakanishikii Diet.

Saccardo, P. A. .. *Syll. Fung.*, 1912, **21**, 691.

On living leaves of *Cymbopogon coloratus* Stapf. (Gramineæ), Pannaikadu (Pulney Hills), 20–12–51, N. V. Sundaram.

The sori are linear and both uredia and telia are present.

Uromyces amphilophis-insculptæ sp. nov.

Uredia hypophyllous, brown, linear, subepidermal, erumpent; urediospores obpyriform, ovate or subglobose, reddish brown, echinulate, 23–32 ×17–22 μ, germpores 6, above the middle, paraphyses numerous, capitate, with yellow much thickened wall. Telia hypophyllous, erumpent, black; teliospores one celled, smooth, chestnut brown, 21–30 ×21–26 μ, subglobose, with one pore at the apex, pedicellate, pedicel hyaline or subhyaline upto 30 μ long.

Uredia hypophylla, brunnea, lineraria, subepidermalia, erumpentia; uredosporæ obpyriformes, ovatæ vel subglobosæ, rubro-brunneæ, echinulatæ, 23–32 ×17–22 μ, germinationis poris 6 supra medium, paraphysibus plurimis, capitatis, luteo, valdeque incrassato pariete ornatis. Telia hypophylla, erumpentia, nigra; teliosporæ unicellulatæ, leves, castaneo-brunneæ, 21 ×30 ×21–26 μ subglobosæ, unico poro ad apicem ornatæ, pedicellatæ, pediculo hyalino vel subhyalino usque ad 30 μ longo.

On living leaves of *Amphilophis insculpta* Stapf. (Gramineæ), Musiri (Trichinopoly District), 11–12–1951, T. S. Ramakrishnan.

This rust differs from the other species of *Uromyces* recorded on *Andropogoneæ* in the shape and size of the spores and the presence of paraphyses.

Uromyces leptodermus Syd.

Doidge, E. M. .. *Bothalia*, 1926, **2**, 48.

On living leaves of *Brachiaria ramosa* Stapf. (Gramineæ), Coimbatore, 26–1–52, N. V. Sundaram; on *Panicum antidotale* Retz. (Gramineæ), Coimbatore, 28–1–52, T. S. Ramakrishnan.

Both uredia and telia are present. The telia are deep seated more or less occupying the space between the two epidermal layers. The spores are massed together simulating the sorus of *Phakopsora*. But they are pedicellate. The wall is thin and the spores are of many shapes owing to pressure. The sorus remains covered by the epidermis.

The same rust is present on *Panicum antidotale* also. The uredia on this host are amphigenous, in groups and erumpent. The urediospores

have the triangular appearance in sectional view with a germpore at each angle. The telia are minute, black, in groups mixed with uredia and immersed in the tissues. The spores are pedicellate, brown, thick-walled and without any apical thickening.

Sydow, H. and P. (1910) have described *U. superfluus* Syd. on this host from India. The rust now recorded is not this species but *U. leptodermus.*

Phakopsora incompleta (Syd.) Cumm.

Cummins, G. B. .. *Mycologia,* 1950, **42**, 786–87.

On living leaves of *Ischæmum aristatum,* L., Kallar (Coimbatore), 26–1–52, N. V. Sundaram.

Both uredia and telia were present on the specimens.

Uredo acalyphæ-fruiticosæ sp. nov.

Rust spots minute, brown; uredia hypophyllous, clustered in the spots, erumpent, paraphysate, paraphyses clavate, erect or bent, hyaline to subhyaline, 28–77 ×6–16 μ, distributed throughout the sorus; urediospores pedicellate, obovate, subglobose, light brown, minutely echinulate, 24–34 ×15–25 μ, pores not distinct.

Maculæ rubiginosæ minutæ, brunneæ; uredia hypophylla, aggregata in maculis, erumpentia, paraphysata, paraphysibus clavatis, erectis vel curvis, hyalina vel subhyalina, 28–77 ×6–16 μ, distributa per sorum; uredosporæ pedicellatæ, obovatæ, subglobosæ, pallide brunneæ, minute echinulatæ, 24–34 ×15–25 μ, poris haud distinctis.

On living leaves of *Acalypha fruiticosa* Forsk. (Euphorbiaceæ), Kallar (Coimbatore), 26–1–52, N. V. Sundaram.

The uredial stage alone is present. *Phakopsora antiguensis* Cumm. has been recorded on this genus. But the urediospores of the rust under study are pedicellate and the paraphyses are not confined to the margin of the sorus. In *P. antiguensis* the urediospores are sessile and the paraphyses marginal.

Uredo tephrosiæ Rabenh.

Sydow, H. and P. .. *Ann. Mycol.,* 1916, **4**, 257.

On living leaves of *Tephrosia purpurea* Pers. (Papilionatæ), Pattambi (Malabar), 15–9–51, T. S. Ramakrishnan.

The uredial stage alone was prevalent. The Sydows are of the opinion that this may belong to *Ravenelia mitis* Syd. The measurements of the

spores and the presence of the 4 equatorial germ pores bring out the identity of the uredial state now recorded with *U. tephrosiæ*.

Russula lepida Fr.

Saccardo, P. A. .. *Syll. Fung.*, 1910, **19**, 461.

On the ground in the pine forests at Kodaikanal, 15–10–51, E. Amritharaj.

This grows on the ground in the pine forests. The stipe is whitish, firm and 4–6 cm. high. The pileus is of varying shades of violet, convex or depressed in the middle and the gills are whitish and crowded. The spores are hyaline and possess the characteristic markings. This mushroom is edible and is regularly gathered from the forests and immediately cooked or stored for future use. The mushrooms are threaded into strings and hung over the oven smoke for drying for a week before storage. The dried mushrooms are used later locally or sent out to other cities.

Microstroma delonicis sp. nov.

Spots indefinite, yellowish, acervuli hypophyllous, minute, white, aggregated into circular spots upto 2 mm. in diameter, rarely epiphyllous. Conidiophores emerging through stoma, fasciculate, fusoid to lageniform, 16–27 $\times$4–6 μ; sterigmata conical, 2 $\times$1 μ; conidia two to six from each conidiophore, oblong to spindle-shaped, with bluntly rounded ends, hyaline, one-celled, 8–12 $\times$2–4 μ.

Maculæ indefinitæ, flavidæ; acervuli hypophylli, minuti, albi, aggregati sæpe in maculis circularibus ad 2 mm. diam; raro etiam epiphylli; conidiophoræ erumpentia per stoma fasciculatæ, fusoidea vel lageniformia, 16–27 $\times$4–6 μ; sterigmata conica, 2 $\times$1 μ; sporæ binæ vel senæ insidentes singulis conidiophoris, oblongæ vel fusiformes, apicibus hebete rotundatis, hyalinæ, unicellulatæ, 8–12 $\times$2–4 μ.

On living leaves of *Delonix elata* Gamb.(Cæsalpineæ), Bapatla, 17–8–1951, K. V. Srinivasan.

The fungus forms snow white growths on the lower surface of the leaflets. Sometimes defoliation results owing to increased incidence of the disease. The hyphæ collect in the substomatal air space forming fascicles. From these conidiophores originate.

Microstroma albizziæ Syd.

Sydow, H. and P. .. *Ann. Mycol.*, 1914, **12**, 263.

On living leaves of *Albizzia amara* Boiv. (Mimosoidæ), Kallar (Coimbatore), 26–1–52, N. V. Sundaram.

The fungus produces whitish growths on the lower surface of the leaves. The same fungus was collected from the Pulney Hills also.

Pestalotia macrotricha Klebh.

Guba, E. F. .. *Phytopath*, 1929, **19**, 214.

On living leaves of *Rhododendron arboreum* Sm. (Ericaceæ), Ootacamund, 12–12–51, N. V. Sundaram.

Large grey spots are formed on the leaves. The pustules are black, punctiform and amphigenous in the central portions of the spots.

We are grateful to Rev. Dr. H. Santapau of St. Xaviers College, Bombay, for kindly rendering the diagnoses into Latin. Our thanks are also due to the Government Lecturing and Systematic Botanist, Coimbatore, for identifying some of the host plants.

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Sydow, H. and P. .. *Monographia Uredinearum*, 1910, **2**, 337.