

## ADDITIONS TO FUNGI OF MADRAS—XVI

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*Synchytrium alysicarpi* sp. nov.

GALLS numerous, on stem and leaves, reddish orange in colour, galls on stem swollen, sometimes irregularly lobed; on leaf amphigenous, becoming cupulate and whitish with age; hydnospores numerous, imbedded within hypertrophied cells and surrounded by proliferating tissue, sub-globose or oval, orange brown, thick-walled, wall differentiated into a thickened endospore surrounded by laminated thicker exospore, with granular contents,  $53-130 \times 50-98 \mu$ ; sorus sub-globose or elliptical made up of several sporangia, orange yellow in colour,  $90-218 \times 82-150 \mu$ ; sporangium thin-walled, with orange yellow contents,  $25 \times 22 \mu$  ( $19-43 \times 19-37$ ), round or polygonal due to pressure.

Gallae plurimæ, in culmis atque foliis, rubro-aurantiacæ colore; gallæ in culmis tumidæ, nonnumquam irregulariter lobatæ; gallæ in foliis amphigenæ, evadentes cupulatæ atque albidæ ætate provecta; hydnosporæ plurimæ, inclusæ in cellulis hypertrophiatæ atque circumdatæ texture proliferante, sub-globosæ vel ovales, aurantiaco-brunneæ, crassis parietibus,  $53-130 \times 50-98 \mu$ ; sorus subglobosus vel ellipticus constans nonnullis sporangiis, aurantiaco-luteus colore,  $90-218 \times 82-150 \mu$ ; sporangium parietibus tenuibus præditum, contentis aurantiaco-luteus,  $25 \times 22 \mu$  ( $19-43 \times 19-37$ ), teres vel ob pressionem lateralem polygonale.

On living leaves and stem of *Alysicarpus vaginalis* DC. (Papilionatæ), Walayar (Malabar), 19-9-1953, N. V. Sundaram and A. Venkata Rao.

Galls are formed on the leaves and stem. Those formed on the stem are much bigger and sometimes confluent forming irregular fleshy masses. On the leaves the galls are smaller and in later stages become cupulate with one or more cups formed in each gall. The cups turn white in colour and are hairy at the margin. Numerous hydnospores and sporangia are present. The wall of the hydnospore can be differentiated into two regions, an inner brown endospore and an outer lighter coloured lamellated thickened portion. The measurements of the resting spores and sporangia and the peculiar formation of the galls indicate that the fungus under study is different from the other species recorded on the Leguminosæ.

*Phyllachora ventilaginis* sp. nov.

Spots yellowish brown, irregular, amphigenous, 2–5 mm. long and 1–3 mm. broad; stromata amphigenous, black, shiny, often reticulate, multiloculate, clypeate, occupying the entire thickness of the mesophyll; loculi  $181\text{--}224 \times 140\text{--}220 \mu$ , ostiolate; asci cylindrical, hyaline, 8-spored, paraphysate, paraphyses rare, filiform, gelatinising,  $78 \times 7.5 \mu$  ( $62\text{--}99 \times 6\text{--}9$ ); spores hyaline, one-celled, spindle-shaped, obliquely uniseriate,  $12 \times 4.5 \mu$  ( $9\text{--}15 \times 3\text{--}6$ ).

Maculae luteo-brunneae, irregulares, amphigenae, 2–5 mm. longae, 1–3 mm. latae; stromata amphigena, nigra, nitentia, saepe reticulata, multiloculata, clypeata, totum mesophyllum occupantia; loculi  $181\text{--}224 \times 140\text{--}220 \mu$ , ostiolata; asci cylindrici, hyalini, octospori, paraphysati, paraphysibus paucis filiformibus, evadentes gelatinati,  $78 \times 7.5 \mu$  ( $62\text{--}99 \times 6\text{--}9$ ); sporae hyalinae, unicellulatae, fusiformes, oblique uniseriatae,  $12 \times 4.5 \mu$  ( $9\text{--}15 \times 3\text{--}6$ ).

On living leaves of *Ventilago maderaspatana*, Gært. (Rhamnaceae), Kallar (Coimbatore), 21–7–1953, N. V. Sundaram.

The spots appear as black irregular, raised formations visible on both sides of the leaf. Small projections are evident on either surface of the shining stromata indicating the position of the ostioles of the young perithecia. *Phyllachora* has not been recorded on this host.

*Phyalospora pyrenacanthae* sp. nov.

Spots irregular, amphigenous, hypertrophied, raised on the upper surface, brown, 1–4 mm. across, studded with numerous black dot-like projections; perithecia sub-globose, crowded in the hypertrophied area, separate, opening predominantly on the upper surface, innate, reaching up to the middle of the mesophyll, uniloculate, ostiolate,  $140\text{--}210 \mu$  in diameter; asci clavate to cylindrical with rounded apex, hyaline, the wall slightly thickened at the apex,  $120 \times 18 \mu$  ( $93\text{--}150 \times 16\text{--}21$ ), paraphysate, paraphyses multicellular, hyaline; ascospores 8, irregularly biseriate, one celled, oblong, hyaline,  $19 \times 9 \mu$  ( $15\text{--}22 \times 8\text{--}12$ ).

Maculae irregulares, amphigenae, hypertrophiatæ, elevatæ in pagina superiore, brunneae, 1–4 mm. diameter, punctata pluribus punctis nigris eminentibus; perithecia subglobosa, aggregata in area hypertrophiatæ, separata, ut plurimum dehiscentia in pagina superiore, innata, decurrentia usque in medium mesophyllum, uniloculata,  $140\text{--}210 \mu$  diameter; asci clavati vel cylindrici apice rotundato, hyalini, pariete aliquantum crasso ad apicem,  $120 \times 18 \mu$  ( $93\text{--}150 \times 16\text{--}21$ ), paraphysati, paraphysibus multicellularibus, hyalinis; ascosporae octo, irregulariter biseriatae, unicellulatae, oblongae, hyalinae,  $19 \times 9 \mu$  ( $15\text{--}22 \times 8\text{--}12$ ).

On living leaves, stem and fruits of *Pyrenacantha volubilis* Hk. (Icacinaceæ), Kallar (Coimbatore), 17-7-1953, N. V. Sundaram.

The infection spots are prominent on the leaves and may occur isolated or a number of them coalesce together. The spots are yellowish brown in the beginning but later turn brown. The upper surface of the spot is raised and there is a corresponding depression on the lower surface. In some cases however both the upper and lower surfaces are raised. There is an increase in the number of layers of cells in the mesophyll in the affected region resulting in the thickening of the tissues to twice or thrice the normal thickness. The hyphæ are inter- and intra-cellular and are usually hyaline in the deeper tissues but those accumulating near the surface turn brown. The perithecia appear as minute, black raised dots in the hypertrophied region. They are isolated and sunk in the tissues of the mesophyll. The peridium consists of two to three layers of brown cells but towards the ostiole a thickened black clypeus like development is formed. The ascus is fairly stout with very short stalk. The ascus wall is thickened and glistening at the apex. The paraphyses are many, multicellular, often presenting a beaded appearance. The ascospores are irregularly arranged.

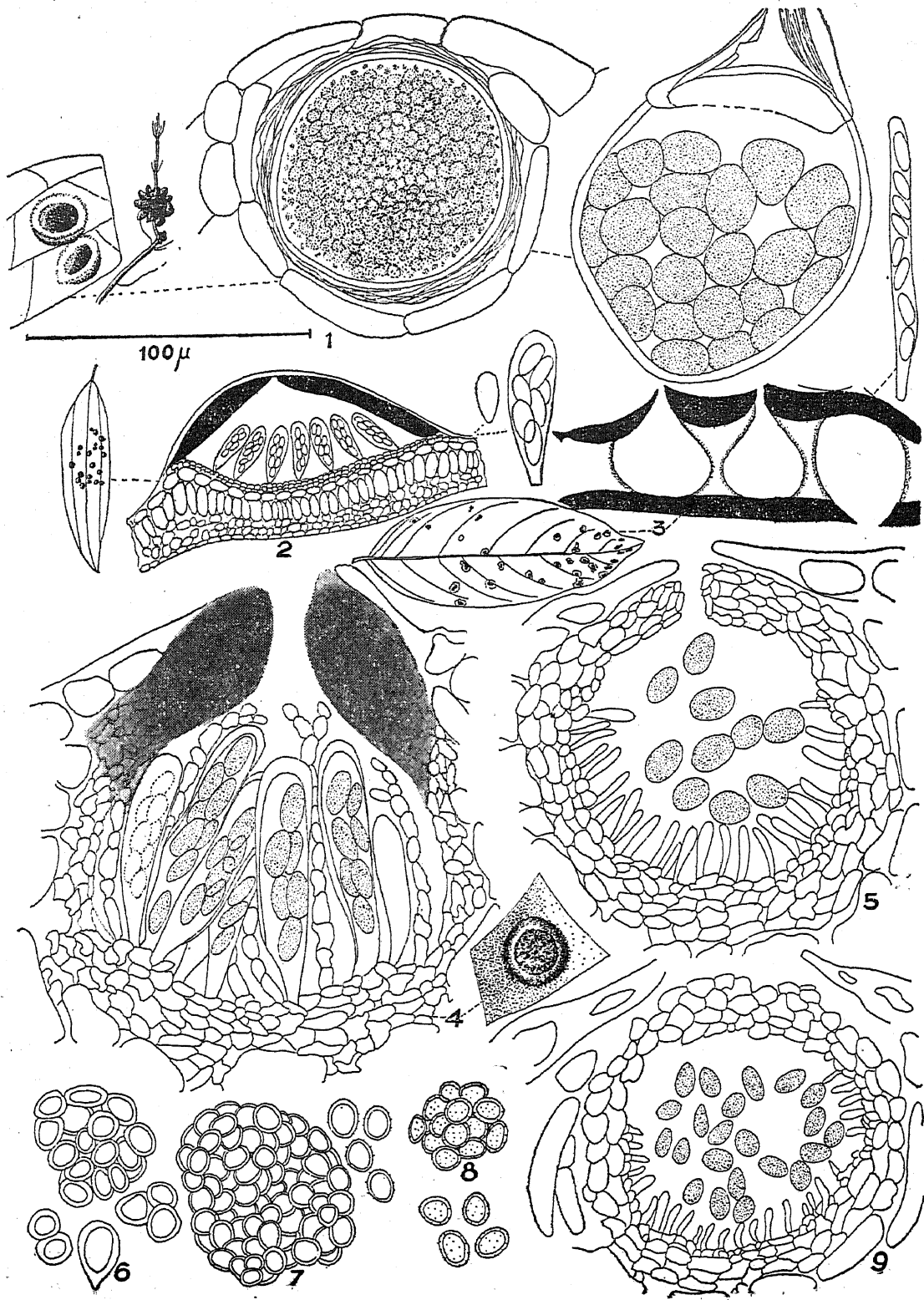
*Trabutia osbekia* sp. nov.

No definite spots; stromata amphigenous, black, shiny, raised, conical or mammiform, isolated or confluent forming small groups, subcuticular, ostiolate, with one or more locules; locules  $120-169 \times 38-70 \mu$ , paraphyses sparse; asci clavate, thin-walled, 8-spored,  $47 \times 12 \mu$  ( $31-62 \times 9-19$ ); ascospores oblong, biseriata, thin-walled, hyaline, one-celled  $16 \times 6 \mu$  ( $12-19 \times 4.5-8$ ).

Maculæ haud definitæ; stromata amphigena, nigra, nitentia, elevata, conica vel mammiformia, separata vel confluentia in catervas parvas, subcuticularia, ostiolata, uno vel pluribus loculis prædita; loculi  $120-169 \times 38-70 \mu$ , paraphyses raræ; asci clavati, tenui pariete præditi, hyalini, octospori,  $47 \times 12 \mu$  ( $31-62 \times 9-19$ ); ascosporæ oblongæ, biseriatae, tenuipariete præditæ, hyalinæ, unicellulatæ,  $16 \times 6 \mu$  ( $12-19 \times 4.5-8$ ).

On living leaves of *Osbeckia octandra* DC. (Melastomaceæ), Wynaad (Malabar), 25-5-1953, T. S. Ramakrishnan.

Isolated or confluent stromata are formed on either surfaces of the leaf. Hyaline hyphæ penetrate into the mesophyll. The single celled nature of ascospores and the location of the stroma between the cuticle and the epidermis indicate that the fungus belongs to the genus *Trabutia*.



FIGS. 1-9

FIGS. 1-9. Fig. 1. *Synchytrium alysicarpi*: Galls on leaf (diagrammatic and enlarged), on petiole (natural size), hypnospores and sorus. Fig. 2. *Trabutia osbeckiae*: Leaf showing the symptoms (natural size), section of perithecium (semi-diagrammatic), ascus and ascospore. Fig. 3. *Phyllachora ventilaginis*: Section of leaf showing the loculi (semi-diagrammatic) and ascus. Fig. 4. *Physalospora pyrenacanthae*: Section of perithecium and affected part of the leaf (enlarged). Fig. 5. *Macrophoma pyrenacanthae*: Section of pycnidium. Fig. 6. *Sorosporium tumefaciens*: Spore ball and spores. Fig. 7. *Tolyposporella sporoboli*: Spore balls and spores. Fig. 8. *Sorosporium cenchri*: Spore ball and spores. Fig. 9. *Macrophoma morindae*: Section of pycnidium.

### *Sorosporium tumefaciens* McAlpine

McAlpine, D., *Smuts of Australia*, Dept. Agric., Victoria, 1910, 184.

Mundkur, B. B. and Thirumalachar, M. J., *Ustilaginales of India*, Commonwealth Mycological Institute, 1952, 56-58.

Sori affecting the apices of the shoots and remaining concealed by the leaf-sheath, 15-25 mm. long covered by a greyish brown membrane which becomes lacerated at the apex, often recognised by protruding, dark, twisted columella; sporemass black, granular, surrounding the well-developed dark, central columella 15-20 mm. long, spore balls of various shapes, 43-115  $\times$  31-68  $\mu$ , black, opaque, permanent, composed of up to 160 spores; spores subglobose, verrucose on the free surface, dark brown in colour, 11.2  $\times$  9.8  $\mu$  (8-14  $\times$  7-12.5).

On shoots of *Chrysopogon montanus* Trin. (Gramineæ), Bhavanisagar (Coimbatore), 23-7-1953, Daniel Sundararaj.

This smut affects the culms and the sorus is mostly hidden in the leaf-sheath. The spore balls are fairly firm and the spores do not easily separate.

### *Sorosporium cenchri* (Bref.) Zundel

Zundel, G. L. I., *Bothalia*, 1938, 3, 283-330.

Smut ovaricolous, infecting all the spikelets in the inflorescence; sorus covered by false membrane which ruptures at the apex exposing the dark brown granular contents; a prominent central columella is present, spore balls evanescent; spores subglobose, brown, wall pitted, 11  $\times$  10  $\mu$  (8-13  $\times$  7-11).

On the inflorescences of *Cenchrus ciliaris* L. and *C. setigerus* Vahl. (Gramineæ), Coimbatore, 20-9-1951, N. V. Sundaram.

This smut has been recorded from Coimbatore and Kovilpatty. In some years a high incidence of this smut has been observed. Infection is systemic and all the ears of a plant are affected and in an ear all the spikelets are involved. Inoculation experiments have shown that the infection

is seed borne. Plants raised from artificially infected seeds were found affected by the smut while the controls were quite healthy.

*Tolyposporella sporoboli* Jackson

Whetzel, H. H. and Kern, F. D., *Mycologia*, **18**, 122, 1926.

Sori foliicolus, forming black and raised circular or elongated spots measuring upto 2 mm. in length, scattered or confluent, rupturing at a later stage; spore balls variable, indefinite, dark brown, 30–140  $\mu$ ; spores dark reddish brown, subglobose to oblong, often angular, sometimes occurring in pairs, outer wall drawn out to a point at one end in some cases, 15.4  $\times$  11.2  $\mu$  (11.2 – 16.8  $\times$  9.8 – 14), smooth and thickened upto 3  $\mu$ .

On living leaves of *Sporobolus wallichii* Munro (Gramineae), Walayar (Malabar), 19-9-1953, N. V. Sundaram and A. Venkata Rao.

This smut closely resembles *T. sporoboli* recorded from Porto Rico and is identified as such. This genus of smut has not been recorded on *Sporobolus* in India.

*Macrophoma morindae* sp. nov.

Spots amphigenous, irregular, whitish grey, surrounded by a brown margin; pycnidia amphigenous, sometimes arranged in lines along the veins as black dots, immersed in the tissues, erumpent, ostiolate, 93–143  $\times$  66–124  $\mu$ ; pycnidiospores oblong to elliptical, hyaline, pedicellate, one-celled, with granular contents, 10  $\times$  7  $\mu$  (7–14  $\times$  5.5–8.5).

Maculae amphigenae, irregulares, albido-griseae, circumdatae margine brunneo; pycnidia amphigena, nonnumquam disposita in lineas ad nervos ut puncta nigra, immersa in textus, erumpentia, ostiolata, 93–143  $\times$  66–124  $\mu$ ; pycnidiosporae oblongae vel ellipticae, hyalinae, pedicellatae, unicellulatae, contentis granularibus, 10  $\times$  7  $\mu$  (7–14  $\times$  5.5–8.5).

On living leaves of *Morinda tinctoria* Roxb. (Rubiaceae), Coimbatore, 21-9-1953, N. V. Sundaram.

The spots are conspicuous. The pycnidiospores are often embedded in mucilaginous substance.

*Macrophoma pyrenacanthae* sp. nov.

Pycnidia occurring in hypertrophied spots, sparse or crowded, amphigenous, ostiolate, dark brown, oval to subglobose, 120–210  $\mu$  in diameter; pycnidiospores oblong, hyaline, pedicellate, one-celled with granular contents, 16  $\times$  9  $\mu$  (12–22  $\times$  6–12).

Pycnidia in locis hypertrophiatis, sparsa vel aggregata, amphigena, ostiolata, fusce brunnea, ovata vel subglobosa, 120–210  $\mu$  in diameter; pycnidiosporæ oblongæ, hyalinæ, pedicellatæ, unicellulatæ, contentis granularibus, 16  $\times$  9  $\mu$  (12–22  $\times$  6–12).

On living leaves of *Pyrenacantha volubilis* Hk. (Icacinaceæ), Kallar (Coimbatore), 17–7–1953, N. V. Sundaram.

The pycnidia are often found associated with the perithecia of *Physalospora pyrenacanthæ*.

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