Some new or interesting fungi III *).

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With 1 Textfig.

1. Two new smuts on *Setaria pallidifusca* Stapf.

An inflorescence smut on the panicles of *Setaria pallidifusca* Stapf was collected in Coorg, South India. The smut was ovaricolous infecting all the spikelets in the inflorescence and concerting them into loose powdery mass. The wall of the ovary completely disintegrated scattering the spores on the rachis and rachilla, (Fig. 1).

Microscopic examination of the fungus revealed that the smut was a species of *Sorosporium* with subglobose to spherical spore balls. All the spores in the spore ball were uniformly tinted, firmly united with one another, dark reddish-brown, thick-walled and verruculose (Figs. 2 & 3). The chlamydospores germinated readily when placed on drops of water and incubated in moist chambers for 48 hours at room temperature (20—24 C). The promycelium that emerged out of the chlamydospore became septate, bearing laterally and terminally ovate to ellipsoid sporidia in succession. The conjugation of the sporidia has not been noticed (Figs. 4 & 5).

Comparative studies indicated that the *Sorosporium* species under study was undescribed. *Sorosporium Setariae* McAlp. recorded on *Setaria* sp. in Australia and South Africa is also ovaricolous, but has smooth spores in contrast to the verruculose ones of the smut under study.

Sorosporium setaricolum Thirumal. & Safee. sp. nov.

Sori in ovaries, infecting all the spikelets in the inflorescence and converting them into loose powdery spore mass, partially enclosed by the glumes; spore balls subglobose to irregular, dark-brown to opaque, up to 70 μ in diameter, spores firmly united, subglobose to spherical, reddish-brown, 8,5 to 13,5 μ in diameter with a mean of 9,1 μ, epispore moderately thick, verruculose. Spores germinating by promycelium bearing lateral and terminal sporidia.

Hab. In the inflorescence of *Setaria pallidifusca* Stapf., Makut, Coorg, leg. K. M. Safeeulla, 15. 8. 1950.

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Sori in ovariis evoluti, totam inflorescentiam eiusque spiculas inficientes easque in massam pulverulentam partim glumis inclusam destruentes. Sporarum glomeruli subglobosi vel irregulares, fusci, brunnei vel opaci, usque ad 70 μ diam. sporae coalitae, subglobosae vel sphaericae, rubro-brunneae, 8,5—13,5 μ, plerumque 9,1 μ diam. episporio subcrasso, verruculoso. Sporae promycelio germinant in quo sporidia lateralia atque terminalia nascuntur.

Hab. in inflorescentia *Setariae pallidifuscae* Stapf.

In the same collection of *Setaria pallidifusca* made at Makut, Coorg, an ovaricolous smut infecting the stray spikelets in the inflorescence was observed. The smutted spikelets were indistinguishable from healthy ones in size and shape except for some black tinge in the infected grains. On teasing such grains, the black powdery mass of brand spores became evident.

Microscopic examination of the smut revealed it to be a species of *Tilletia*. Comparative studies with *T. echinosperma* Ainsworth and *T. setaricola* Pavgi & Thirumal. recorded on species of *Setaria* have indicated that the smut under study is undescribed.

Tilletia makutensis Thirumalachar & Safee. sp. nov.

Sori in the ovaries, not all the spikelets in the inflorescence attacked, infected ovaries inconspicuous and opaque. Spore mass black and agglutinated; spores subglobose to spherical, deep reddish-brown to opaque, with an evident hyaline membrane enveloping the spores, 19 to 30 μ in diameter with a mean of 23 μ, epispore with truncate scale-like projections extending into the hyaline membrane and appearing as papillae in the surface view; sterile cells numerous, hyaline to pale cinnamon-yellow, thick-walled, up to 34 μ in diameter.

Hab. in the ovaries of *Setaria pallidifusca* Stapf., Makut, Coorg, leg. K. M. Safeeulla, 15. 10. 1950.

Sori in ovariis evoluti non omnia ovaria sunt infecta, ea vero quae inficiuntur sunt inconspicua atque nigra. Sporarum glomeruli nigri atque agglutinati. Sporae subglobosae vel sphaericae, rubro-brunneae vel opacae, membrana hyalina sporas circumdante ornatae, 19—30 μ, plerumque 23 μ diam., episporio papillulis truncatis ornato; cellulae steriles complures, hyalinae vel pallide flavo-brunneolae, parietibus crassis ornatae, usque 34 μ diam.

Habitat in ovariis *Setariae pallidifuscae* Stapf.

2. An ovaricolous bunt of *Panicum trypheron* Schult.

While examining grass collections in herbarium, the occurrence of an ovaricolous bunt in the panicles of *Panicum trypheron* Schult.

a common grass species of the dry waste lands was noticed. The smut parasitised one or two spikelets in the panicle, and owing to the sparse nature of the infection was easily missed in the field. The infected ovary enlarged two to five times the size of normal healthy ones, appearing dark and opaque, and later rupturing at the apex and exposing the chocolate-brown spore mass.

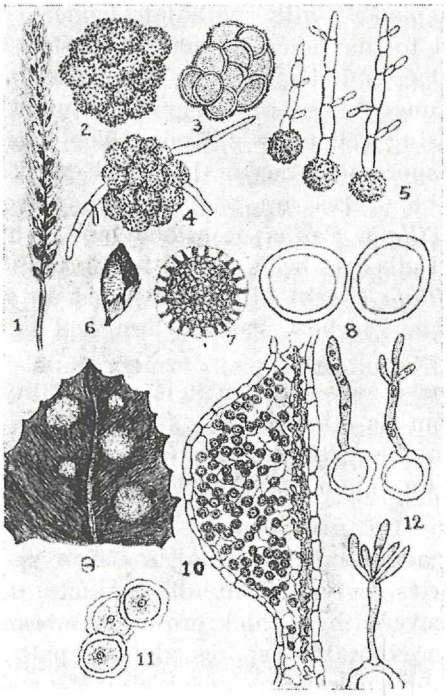

Fig. 1—5. *Sorosporium setaricolum:* 1. infected panicle, ½ nat. size; 2—3. spore balls ×500; 4—5. germination stages ×500. — Figs. 6—8. *Tilletia makutensis:* 6. infected ovary, ×4; 7. chlamydospore ×500; 8. sterile cells ×500. — Figs. 9—12. *Entyloma globigenum:* 9. infected leaf showing sori ×2; 10. section through sorus ×75; chlamydospores showing syncaryon ×75; 12. germinating chlamydospores ×500.

Microscopic examination revealed that the smut was a species of *Tilletia.* The spore mass was chocolate-brown and dusty. Mature spores were pale cinnamon-brown, spherical and associated with numerous hyaline sterile cells which swell and burst away in water. There was an evident hyaline sheath enveloping the spore. The epispore was coloured, thick-walled, reticulate and areolate. The reticulations were 5 to 6-angled and slightly raised. Mature spores measured 20 to 27 μ with a mean of 23 μ. The sterile cells were numerous measuring up to 33 μ in diameter.

Several species of *Tilletia* have been described on species of *Panicum*. Considerable confusion has arisen in some cases due to the misdetermination of the host species. The smut under study differs from *Tilletia Ayresii* Berk., *T. verrucosa* Cooke & Massee, *T. pulcherrima* Ell. & Gall. and *T. Maclagani* (Berk) Clinton recorded on species of *Panicum*. *Tilletia Narayanaraoana* recorded on the same host species *Panicum trypheron* (Thirumalachar & Mundkur 1951) has epispore with spathulate truncate scale-like projections in contrast to the reticulate nature of the smut under study. *T. courtetiana* Har. & Pat. occurring in ovaries of *Panicum proliferum* Lam. in Congo has spores somewhat similar to the smut under study in possessing reticulate epispore. The spore mass is olive-brown and the spores are darker brownish-black than the present fungus where the spores are pale cinnamon-brown, and slightly larger in size. *Tilletia Panici* described by Mundkur (1940) on *Panicum* sp. in India has been shown by Ling (1949) to be synonymous with *T. vittata* (Berk) Mundkur, based on an examination of the type specimen. The host was redetermined as *Oplismenus compositus* (L) Beauv.

From the above consideration it is evident that the smut under study differs from tle other *Tilletia* species described on species of *Panicum*. The name *Tilletia Narasimhanii,* named in honour of Prof. M. J. Narasimhan, Mycologist, Mysore, for its accomodation.

Tilletia Narasimhanii Thirumal. & Safee. sp. nov.

Sori in ovaries, only few in the panicle destroyed, infected ovaries bullate, covered by a thick brown membrane which ruptures exposing the spores. Mature spores globose, pale cinnamon-brown, with evident hyaline membrane enveloping the spores, 20 to 27 μ in diameter with a mean of 23 μ; epispore thick, with 5 to 6-angled reticulations which are up to 3,5 to 4 μ in diameter. Sterile cells numerous, hyaline, up to 33 μ in diameter.

Hab. in the ovaries of *Panicum trypheron* Schult., Patna, Bihar, leg. M. J. Narasimhan, 2. 8. 1950.

Soris in ovariis nonnullis tantum evoluti; ovaria infecta bullata, membrana crassa tecta, Maturae sporae globosae, pallidae cinnamomeo-brunneae, membrana hyalina involutae, 20—27 μ, plerumque 23 μ diam.; episporio crasso, reticulato, areolis 5—6-angulosis, 3,5—4 μ diam.; sporae steriles numerosae, hyalinae, usque 33 μ diam.

Habitat in ovariis *Panici trypherontis* Schult.

3. On a gall inciting *Entyloma* species on *Blumea*.

On the leaves of *Blumea* sp., a gall inciting smut species was collected which on examination proved to be species of *Entyloma*.

The infection spots were circular, bullate and pustulate, 2 to 3 mm broad and up to 1,5 mm high, raised and crustose (Fig. 9). Young infection spots were ochre-yellow, gradually turning brown. Usually most of the species of *Entyloma* produce pale yellow flecks or dark patches and incite very little malformation of the host tissue. However certain species of *Entyloma* like *E. Ameghinoi* Speg. and *E. Eryngii* (Corda) de Bary emend. Cif. (Ciferri 1924) incites pustulate or noduliform thickenings of the host tissue similar to the smut under study.

Sections through the sorus indicated that the pustulate nature was due to the multiplication of the host cells in the infected region. The differentiation between the palisade and spongy cells in the leaf was lost, resulting in the formation of hyperplastic cells. The hyphae were intercellular developing into chlamydospores. In mature sori they were scattered or grouped into compact crusts (Fig. 10). The chlamydospores were spherical or polygonal, pale cinnamon-yellow, smooth, 9 to 18 μ in diameter with a mean of 15 μ. The endospore was firm and slightly tinted, but the exospore was hyaline and hygroscopic. In stained microtome perparations the nuclear details of the spore formation were observed. Young chlamydospores were dicaryotic, the mature spores showed the syncaryon (Fig. 11).

The chlamydospores were germinated and stained on slides. The promycelium remained unseptate, bearing a terminal whorl of usually four and rarely 6 sporidia. Each sporidium was uninucleate at the time of formation and no conjugation stages have been noticed (Fig. 12). The smut under study differs from the other *Entyloma* species described on *Compositae*.

Entyloma globigena Thirumal. & Safee. sp. nov.

Sori in the leaves, pustulate, 2 to 3 mm in diameter, 1,5 mm high, raised and crustose due to thickening of leaf tissue, ochre-yellow at first, later turning brown. Chlamydospores inter-cellular, compactly grouped, pale-cinnamon-yellow, subglobose to angular, 9 to 18 μ with a mean of 15 μ; epispore hyaline, 1,5 to 2 μ thick rarely 4 μ thick, smooth; spores germinating by promycelia bearing terminal cluster of 4 to 6 sporidia which do not conjugate insitu.

Hab. in the leaves of *Blumea* sp., Coorg, leg. K. M. Safeeulla, 15. 10. 9150.

Sori in foliis evoluti, pustulas 2—3 mm diam., 1,5 mm altas efficientes, primo ochracei postea brunnei. Chlamydosporae intercellulares, aggregatae, pallidae cinnamomeo-luteae, subglobosae vel angulares, 9—18 μ plerumque 15 μ diam.. Episporio hyalino, 1,5—2 μ, raro 4 μ crasso, laevi; sporae 4—6-sporidiis germinant, quae nequaquam conjugant.

Habitat in foliis *Blumeae* sp.

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