

Studies on some Indian soil Fungi

I. Some new or noteworthy Sphaeropsidales

By P. N. Mathur and M. J. Thirumalachar
(Pimpri, Poona, India)

With 9 Textfig

In the course of the studies on fungi from soil samples collected in different parts of India, several species of *Sphaeropsidales* have been isolated and studied. It is interesting to note that very few members of the *Sphaeropsidales* have been isolated from soil, though large numbers have been reported as plant pathogens. Only 10 species have been reported by Gilman (1957) as occurring in soil, of which *Macrophomina phaseoli* and *Botryodiplodia theobromae* are again plant pathogens. The only soil fungus reported from India belonging to the *Sphaeropsidales* is *Phoma hibernica* Grimes et al. While no reason could be adduced for this paucity of *Sphaeropsidales* in the large groups of soil fungi, one of the reasons for not detecting them appears to be the difficulty of their isolation. Many of them are slow growing and by the time the fruiting structures are formed, they become overgrown with other fungi. Secondly many of the species do not develop pycnidia readily on media usually employed for isolation, and are thus overlooked. The present study has indicated that with an intensive study of the slow growing mycelial types of colonies grown under proper conditions, it is possible to obtain quite a large number of the *Sphaeropsidales* from the soil fungi group. In the present paper an account of four undescribed species of *Sphaeropsidales* including a new genus is presented.

1. *Cyclodomella* a new genus of soil fungus.

This fungus was isolated from a soil sample from Pimpri, Poona by Dr. V. V. Bhatt. On Czapek's agar the fungus grows rapidly producing a white arachnoid mycelium which covers the Petri plate within a week's period, when incubated at room temperature (24° C). The mycelium for the most part remains submerged, and even after prolonged incubation no fruiting structures are formed. Few hyphal knots are formed at random, but no further development takes place. On potato dextrose agar and glucose-yeast agar, the growth of the fungus is very rapid and abundant black pycnidia are formed within 10 days. The pycnidia are so numerous in some cases, that it imparts

a black colour for the colony masking the white colour of the mycelium. There is no diffusion of any pigment into the medium.

The pycnidia are gregarious, distinct without coalescing with one another. They are free on the sides and attached to the mycelium by a small mound of pseudoparenchymatous tissue at the base. They are black and carbonous, conical, without possessing any well defined ostiole. There are 5 to 6 layers of cells composing the wall, the outer 3 or 4 layers being thin-walled and hyaline, and the two inner wall layers being thick-walled and dark brown. (Fig. 2). There is a central columella or dome-like structure developed at the base of the pycnidium projecting into the cavity of the pycnidium (Fig. 1). The conidiophores are grouped compactly like a sporodochium on this columella-like mound of tissue and none on the inner wall layers. The conidiophores are hyaline and slender and develop acrogenously one-celled dark coloured conidia. In the process of development, a small basal cell is also cut off, which in detached spores appears like a stalk cell (Fig. 3). In mature pycnidia, the spores are liberated by the rupture of wall layers at the top of the pycnidium in two or three places and there is no definite pre-formed structures for liberating the spores.

Mature spores are ovate-elliptical, flattened on one side and asymmetric, olive-brown to dark coloured, possessing a whip-like gelatinous raphae-like structure on one side. When the spores are mounted in water, this gelatinous structure gradually dissolves out, often separating from the spore wall near the basal end and along the side, giving it a whip-like appearance. This characteristic whip-like structure along with the type of columella-like structure within the pycnidium brings it close to the genus *Anthasthoopa* described by Subramanian and Ramakrishnan from India as saprophyte on the decaying pods of *Caesalpinia pulcherrima* Sw.

The occurrence of a dome shaped columella at the base of the pycnidium on which the conidiophores are compactly arranged, is characteristic of the genera *Cyclodomus* V. Hoehn, *Conostroma* Moesz. and *Anthasthoopa* Subr. & Ramak. While there is a general resemblance in the pycnidial structure, the spores in *Anthasthoopa* with its type species *A. simba* Subr. & Ramak. possess the characteristic gelatinous appendage in the form of whip-like structure. The fungus under study resembles *Anthasthoopa* except for the fact that it has phaeospores as against hyaline spores of *A. simba*, and therefore has to be accommodated in a new genus. The pedicel like-cell remaining persistent with the spores is not mentioned in *A. simba*.

Cyclodomella Mathur, Bhatt & Thirumal. Gen. Nov.

Pycnidia minute, black, conical, opening by the rupture of wall layers at maturity. Conidiophores formed on a columella-like dome

formed by the ingrowth of the fungal tissue from the base into the cavity of the pycnidium; conidiophores compacted together as in sporodochium, conidia ovate-elliptic, one-celled, phaeosporous, with a small stalk-cell and a gelatinous raphae-like structure which often opens out as a whip-like structure.

Type: *Cyclodomella nigra* Mathur, Bhatt & Thirum.

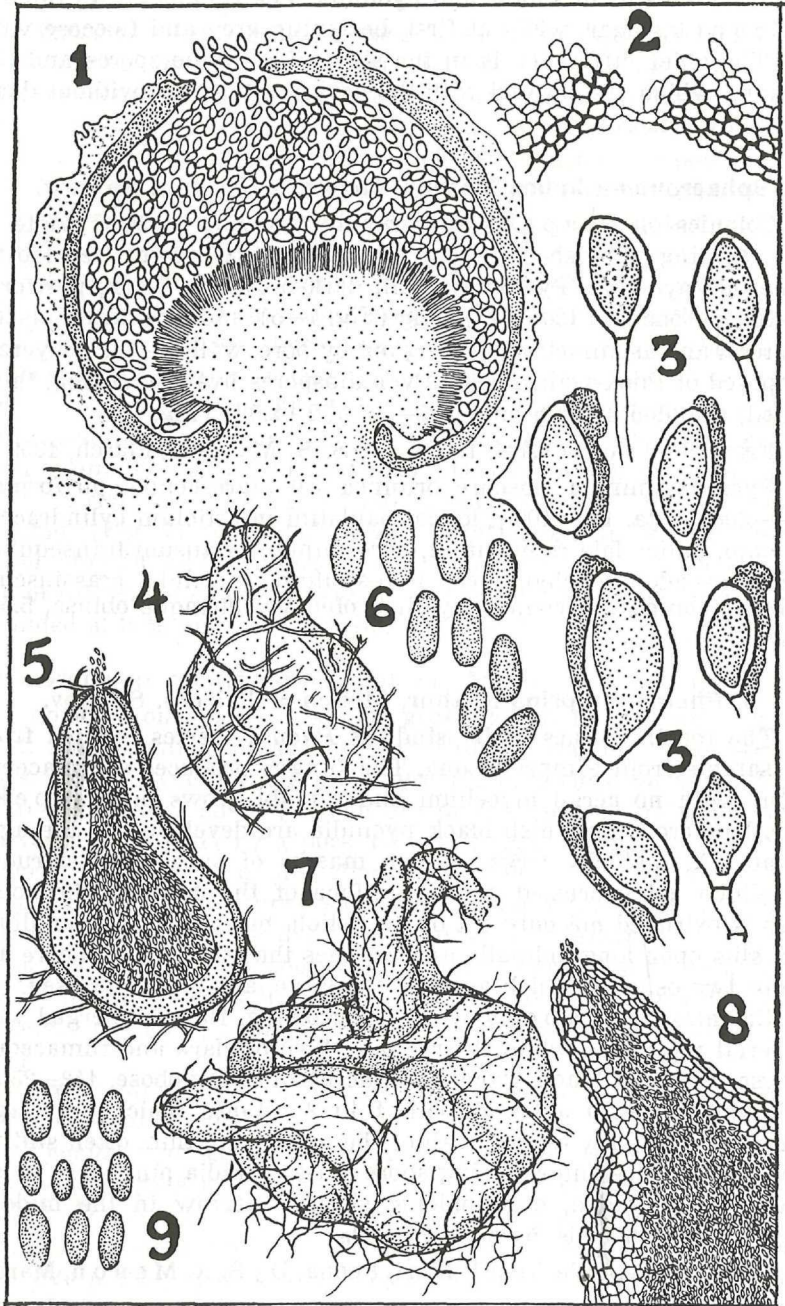
Pycnidia minuta, nigra; pariete pseudoparenchymatico, primum omnino clauso, postea in verticis centro disrumpente; conidiophora totam parietis incrassationem columellae ad instar tantum obtegentia, densissime et parallele stipata, simplicia; conidia acrogena, ellipsoidea vel oblongo-ovoidea, continua, olivacea, in uno latere muco gelatinoso praedita.

***Cyclodomella nigra* Mathur. Bhatt & Thirumal. sp. nov.**

Colonies on Czapek's agar rapidly growing, white, arachnoid, with white submerged mycelium, without producing any fruiting structures. On potato dextrose agar and glucose-yeast agar, colonies white, floccose and rapidly growing, soon turning dark due to formation of numerous pycnidia, without any soluble pigment in the medium. *Pycnidia* gregarious, separate, black, spherical, conical at apex, without distinct ostiole, measuring $130-250 \times 150-250 \mu$, wall 5 to 6 layers, outer 3 or 4 layers hyaline and thin-walled, inner two wall layers composed of thick-walled dark-brown cells. Conidiophores formed on dome shaped columella-like structure, dome composed of thin-walled cells, measuring $106-245 \mu$ in diameter and $50-115 \mu$ high. Conidiophores compacted together as sporodochia, hyaline, slender, $8.5-13.5 \mu$ long, 2μ broad; conidia produced acrogenously, subtended by basal cells ($3.5-6.5 \mu$ long), ovate-elliptic, olive-brown, black in mass, $8-10.5 \times 5-7.5 \mu$, asymmetric on one side, with gelatinous raphae-like structure on one side which readily swells in water and protrudes out as a whip-like structure, spores extruded out as gelatinous mass, which on drying forms a hardened crust.

From soil, Pimpri, Poona, India, Dr. V. V. Bhatt, Jan. 1959.

Pycnidia gregaria, solitaria, nigra, plus minusve globosa, $130-250 \cong 150-250 \mu$, primum clausa, postea in verticis centro disrumpentia et poro irregulari aperta; pariete pseudoparenchymatico, extus e stratis 3-4 cellularum hyalinarum, intus e stratis 2 cellularum olivacearum composito; conidiophora totam parietis incrassationem columellae instar tantum obtegentia, densissime et parallele stipata, simplicia, $8.5-13.5 \cong 2 \mu$; conidia mucoso-conglutinata, acrogena, ellipsoidea vel oblongo-ovoidea, utrinque vel postice tantum attenuata, obtusa; recta vel inaequilatera, continua, olivacea, $8-10.5 \cong 5-7.5 \mu$, episporio crassiusculo, in uno latere muco gelatinoso praedita.



ostiolis 1—2 latis, parum prominulis praedita; pariete membranaceo, facile irregulariter discindente et conidiorum massam protudente; conidia hyalina, oblongo-ovoidea, ad medium parum contracta, utrinque obtusa, $5-8.5 \Rightarrow 2.5-4 \mu$.

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Explanation of Figs.

Fig. 1. V. S. of the pycnidium of *Cyclodomella nigra* showing the central dome-like column with conidiophores, and conidia $\times 250$. Fig. 2. showing the rupture of the pycnidial wall. $\times 500$. Fig. 3. gelatinous raphae-like structure of spores, $\times 2000$. Fig. 4. Pycnidium of *Sphaeronema indica* $\times 150$. Fig. 5. Sectional view of a pycnidium with spores $\times 200$. Fig. 6. Spores $\times 1500$. Fig. 7. Pycnidium of *Sphaeronema multirostrata* showing three snouts $\times 100$. Fig. 8. Section of the apical portion of a snout of the pycnidium $\times 400$. Fig. 9. Spores $\times 1500$.

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Autor(en)/Author(s): Mathur P. N., Thirumalachar M. J.

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