

### Chromomycosis

by MORRIS MOORE<sup>1</sup>

The disease known as *chromomycosis* (chromoblastomycosis) or *dermatitis verrucosa*, is one which has received little attention until recently, because of the small number of cases. Clinically, it is a dermatitis usually of the extremities, hands or feet, which may be papular, nodular, verrucoid or granulomatous, with or without ulceration and abscess formation, and usually yellowish-brown in color. There has been no report of a systemic invasion, lymphangitis, pain or pruritus. Microscopically, the picture may resemble that of tuberculosis, sporothricosis, syphilis, a granuloma or foreign body reaction. However, brown, thick-walled cells are seen in the tissue, probably chlamydospores, with intracellular wall formation and no budding. These structures are usually seen within the abscess.

The microbiological aspects of the disease are interesting because of the number of organism that are being found which may produce the infection. In the United States, there have been only two cases published, one by MEDDLAR and LANE in 1915, and the other by WILSON, HULSEY and WEIDMAN in 1933. Both cases were the result of an infection with *Phialophora verrucosa* THAXTER. The organism has as its chief characteristic, « cup-like » conidiophores which are easily recognizable. In South America, a greater number of cases have been published with several organisms being the causative agents. Chief among the fungi of South American chromomycosis is *Botrytoides pedrosoi* (BRUMPT) MOORE and ALMEIDA, n. g. (*Acrotheca* of DA FONSECA and LEO, *Gomphinarina* of Dodge). This microbe is characterized chiefly by the conidiophores which may be single, simple or branched, successive, terminal, lateral or intercalary.

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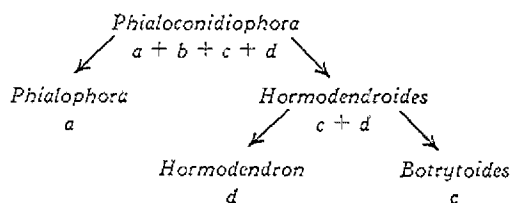
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John Simon Guggenheim Memorial Foundation Fellow in South America. 1935-1936.

*Phialophora verrucosa* has also been reported from Uruguay by MACKINNON in 1933, and one of the fungi reported by PEDROSO and GOMES in 1920 from a case of chromomycosis, was formal to be a new species of *Phialophora*, *P. macrospora* MOORE and ALMEIDA.

In 1929, LANGERON working with a culture from Brasil found characteristics which to him appeared similar to those of *Trichosporium*. Consequently, the organism was named *I. Pedrosoi*. The designs of his publication appear similar to those of *Hormodendron*, to a great extent. An examination of this organism showed that it has the properties of *Hormodendron* plus those of *Botrytoides*. As a result, the new name of *Hormodendroides* is proposed for this fungus, forming this a new genus. The genus *Hormodendron* is also responsible for cases of chromomycosis and has been isolated in Brasil, Argentina, Algeria, and is no doubt present elsewhere.

Most interesting from a biological point of view, however, is an organism isolated in Brasil which has characteristics peculiar to all four genera. This genus has been named *Phialoconidiophora* MOORE and ALMEIDA, and the species *P. guggenheimia*. It has the «cup» formation of *Phialophora*, the conidiophora of *Botrytoides*, *Hormodendroides* and *Hormodendron* and in addition, a peculiar «cup» formation on conidiophores of the *Hormodendron* type.

Phylogenetically, if we consider the most complicated organism as the oldest, and the simplest as the youngest, then the phylogeny of the known fungi of chromomycosis may be diagrammatically outlined. To simplify the diagram, let «a» represent «cup» formation; «b» the conidiophore and «cup» combination formed in *Phialoconidiophora*; «c» the conidiophora formation of the *Botrytoides* type; and «d» the conidiophora of *Hormodendron*.



Pending further investigations, the group may be placed temporarily in the order *Phialophoreae*, removing thus temporarily *Botrytoides* from the order *Periconieae* and *Hormodendron* from the order *Haplographieae* of Dodge's classification.

In the schematic arrangement, *Phialophora* shows a complete loss of the characteristics, retaining in culture only the «cup» formation (a). *Hormodendroides* has retained only two types of conidiophores (c and d), while *Botrytoides* and *Hormodendron* have only their own peculiar conidiophores (c and d respectively) as evidence of relationship. In the parasitized tissue, the cells are apparently similar for all the genera, with no differences being as yet reported. Whether these generic entities are natural progressive changes or genetic variations due to external forces will perhaps be decided by the cytological investigation.

It may be concluded, therefore, that due to improved clinical and laboratory methods of diagnoses, there are recognized more cases of chromomycosis; that at present there are at least five genera which may produce the disease; and that the organism may be included in the order *Phialophoreae*, showing a definite phylogenetic sequence in loss of characters.