

THE PERFECT STATES OF *ASPERGILLUS**

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RECENT interest in conidium ontogeny as a criterion in the classification of Hyphomycetes has evoked justifiable interest in their perfect states as a means of obtaining correlations between these states and using such correlations, if any, as adjuncts to a sound classification of these fungi. Though it is unlikely that perfect state connections for all Hyphomycetes will be established, it seems plausible that perfect-imperfect state correlations can prove helpful in determining relationships or at least in refining the present unsatisfactory systems of classification of both perfect and imperfect states. There is no doubt that we need an integrated approach to the study of both imperfect and perfect states. As part of a programme of work on this problem, some genera of "phialidic" Hyphomycetes and their perfect states have been taken up for study. This paper deals with the perfect states of *Aspergillus* Mich. ex Fries.

So far as we know, the genus *Aspergillus* is characterized by conidia ("phialoconidia") that are produced in simple, basipetal, persistent chains^{1,2} from conidiogenous cells ("phialides"). The conidia are synechidic, novitunicogenous, porrectic and dry³. That several *Aspergilli* produce perfect states is well known and, despite the arguments for separate generic designations for some of these perfect states⁴, opinion is divided on the question. Thom and Raper⁵, and Raper and Fennell⁶, who have made very valuable contributions to our knowledge of this group of fungi, retain the generic name *Aspergillus* for both perfect as well as imperfect states. Those who believe that separate designations are needed for the perfect state—and this will be in conformity with the International Code—will find that perfect states of some *Aspergilli* cannot be placed in the three genera (*Eurotium*, *Emericella*, *Sartorya*) recognized by Benjamin¹ or the recently described genus *Hemicarpenteles*⁷. Accordingly, some new genera are proposed here to accommodate these perfect states and this has necessitated new designations for several perfect states currently classified in *Aspergillus*. One cannot be certain if the various genera considered here to be perfect states of *Aspergillus* are closely related, but quite obviously some are not. Thorough developmental

studies of ascocarps of the different genera are needed and, in time, may strengthen the expectation that not all of them may be closely related, despite the fact that their conidial states are similar and appear to be congeneric.

The following Key to the perfect states of *Aspergillus* is intended to highlight the differences and similarities between them. The Key is followed by a listing of the species in each of these genera.

KEY TO THE PERFECT STATES OF *Aspergillus*

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|---|------------------|
| 1. Ascocarp none | EDYUILLIA |
| 1. Ascocarp present | 2 |
| 2. Ascocarp developing within sclerotium or sclerotic tissue | 3 |
| 3. Ascocarp in the form of multiple "cleistothecia" in sclerotic tissue | SYNCLEISTOSTROMA |
| 3. Ascocarp not so : single ascocarp developing within sclerotic body | 4 |
| 4. Ascocarp wall thick and many-layered ; ascospores hyaline | HEMICARPENTELES |
| 4. Ascocarp wall one-layered ; ascospores coloured | SCLEROCLEISTA |
| 2. Ascocarp not developing within sclerotium or sclerotic body | 5 |
| 5. Ascocarp without trace of definite wall ; ascospores not lenticular | WARCUPIELLA |
| 5. Ascocarp with definite wall ; ascospores lenticular | 6 |
| 6. Ascocarp surrounded by hülle cells | EMERICELLA |
| 6. Ascocarp not surrounded by hülle cells | 7 |

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