

## THE GENERIC ICEBERG\*

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When Kendrick and Carmichael were commissioned to produce a chapter on hyphomycetes for Volume IVA of 'The Fungi - an advanced treatise' (Ed. Ainsworth, Sparrow and Sussman: Academic Press 1973) they compiled over 1500 generic names which were believed to be attached to hyphomycetes of some description.

Over 500 names appear to be both validly published, and attached to a generic concept which is at once recognisable and distinctive. These form the core of the chapter, and of our current knowledge of hyphomycetes. Another 600 or so names were found to be: (1) Synonyms attested to by a reputable, recent authority, and therefore gratefully accepted; (2) *Nomina dubia* or *nomina confusa*, again on reputable authority; (3) Illegitimate; or (4) Sterile.

This paper is concerned with the residue, about 400 names, which are still shrouded in mystery. These dog our footsteps, causing us to look uneasily over our shoulder whenever we have the temerity to describe a new genus, in case we are merely adding one more to the vast catalogue of synonyms.

These 400 names suffer from a variety of obfuscatory handicaps which have so far prevented us from making clear-cut decisions about them. The problems may be categorised as follows:

(1) Many facultative synonyms are so listed on the authority of such august personages as Saccardo and von Höhnel. It is no slight to these earlier mycologists to point out that they were working with grossly inadequate literature, and were inescapably unaware of the taxonomic features now used to delineate many genera. If no one has looked at a particular fungus since Saccardo, von Höhnel and others like them, we may be excused for questioning the accuracy of the existing disposition.

(2) Some generic names are accompanied by what would appear, at first sight, to be diagnostic illustrations, adequate to characterise the taxon. But as the plethora of taxa increases, the 'taxonomic distance' between adjacent genera often decreases; adjacent becomes contiguous, and contiguous becomes overlapping (if not actually congruent!), so we are led to seek more information than even an apparently 'good' drawing may provide. Taxonomists are digging deeper every year, and existing illustrations tend to become dated, inadequate to contemporary needs.<sup>1</sup> Even a good drawing,

\* Financial support towards publication is gratefully acknowledged [Ed.].

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<sup>1</sup> The fault is not always the author's. If one is fortunate enough to describe something like *Dendrosporium* Plakidas & Edgerton ex Crane, *Arachnophora* Hennebert, or *Candelabrum* Van Beverwijk (Kendrick & Carmichael, Plates 60D, 60F and 59G, respectively) it is unlikely that the bizarre conidia of these fungi will be confused with those of any other hyphomycete. On the other hand, the unique and beautiful fructifications of

then, may in the long run be found wanting, as the bases of classification change, and renewed reference *must* be made to a type specimen.

In many cases cited in the generic listing, no such examination has been made since the original publication of the name. Thus, although Kendrick and Carmichael reproduce illustrations of *Agaricostilbum* Wright, *Akanthomyces* Lebert, *Antromyces* Fresenius, *Arthrographis* Cochet, *Beniowskia* Raciborski, *Sphaeromyces* Arnaud, and *Crinula* Fries, to mention just a few which appear to fall into this category, these illustrations are definitely not regarded as satisfactory, and I am sure that they will have to be supplanted by authoritative data drawn from examinations of the type material, where this still exists. I note here that the synnematosous and sporodochial genera of hyphomycetes, particularly those which produce ameroconidia, are among the most poorly illustrated of all hyphomycetes – vital information on the branching of the conidiophores and the nature of the conidiogenous cells is often lacking – and will require a considerable input of taxonomists' time if the situation is to be remedied.

(3) An inadequate description is accompanied either by a poor illustration or none at all. Such gross deficiencies are noted over and over by Kendrick and Carmichael (1973) who were goaded into the following diatribe, and thence into radical proposals. 'At best the "authors" of these "genera" have published a named reference to an herbarium specimen, leaving it for later workers to unearth the remains and delineate a taxon. All too often there is not even a clear reference to a specimen. In our opinion, every generic name whose type species has never been illustrated and whose publication did not explicitly specify (directly or indirectly) a type specimen should be declared invalid. In addition all generic names published before 1900 which have not yet been illustrated should be declared invalid whether or not a type specimen was specified. The botanical code should be emended to require illustrations of the conidia and conidiogenous cells as part of the required diagnosis for every new hyphomycete genus or species'. Strong words, and a castigation richly deserved by many authors – but not merely those of the nineteenth century, as the choice of 1900 for cut-off point might imply.

Let us examine the consequences, in terms of our list of questionable names, of bringing the 'starting point' forward in steps (Table 1). For the purposes of this exercise I have ignored the 25 names for which I have been unable to establish a year of publication.

Starting point	Number of names eliminated	Starting point	Number of names eliminated
1850	50	1920	220
1860	73	1930	251
1870	75	1940	277
1880	77	1950	292
1890	110	1960	334
1900	132	1970	363
1910	166		

*Wiesneriomyces* Koorders (Kendrick and Carmichael, Plate 55E) have given rise to no fewer than 5 generic names – hence the need for compilations like the one referred to here.

It seems, then, that an arbitrary selection of the year 1900 as a cut-off point would not achieve the desired result, since only 132 of the problem names appeared before then (actually about 150, since most of the undated names clearly appeared in the nineteenth century). Perhaps, like the bacteriologists, we should be thinking in terms of a 1980 starting point.

So far, I have delineated the picture as it appeared in 1971. One may be excused for wondering if things have improved since then. In an admittedly incomplete survey of taxonomic papers which concern themselves with hyphomycetes, I have found no fewer than 70 new generic names. One is a later homonym, two appear to be invalidly published, and three are supplied to replace existing later homonyms. As a gesture to the confusion which lies behind us, a few names are validated, and five of the mystery names on my list are satisfactorily explained.

When we consider that several of the new names are liable to be mysteries in themselves, it will be seen that, far from clearing up the mess, we are in that respect just about standing still, while there is a net gain of about 20 new hyphomycete genera per year. Unlike Lot's wife, most of us cannot be persuaded to look back. The lure of novelty is too strong. It seems a gloomy picture: at the present rate it would be many years before we cleared off the backlog. Fortunately the rate of progress is not unvarying. Because of the activities of relatively few mycologists who have concerned, and are concerning, themselves with old names (I think of Hughes and Ellis in the hyphomycetes, Morgan-Jones and Nag Raj in the coelomycetes) we have made considerable progress in the last twenty years. Works like 'Revisiones hyphomycetum aliquot' (Hughes 1958) 'Dematiaceous hyphomycetes' (Ellis 1971) and the 'Icones generum coelomycetum' (Morgan-Jones & Nag Raj 1972, 1974) represent giant strides forward. Nevertheless, the very size of the problem that still persists is a persuasive argument for a concerted attack on these closeted skeletons, perhaps along the lines of a hyphomycete IGY - 'International Genus Year'.

It is less glamorous, and often more difficult, to reassess old taxa than to describe new ones, but at present the need for such activities should override other considerations. It is tempting to suggest a moratorium on the description of new taxa while we attempt to cope with those already in existence (see Oldroyd 1966).

If mycologists feel compelled to go on describing new taxa (as I am sure they will, and with good reason, in the mycologically less well-known areas of the globe) may I enter yet another plea for the laying down of adequate type material in one of the world's major herbaria, and for illustrations that are not just a gesture toward convention, but sum up all the insight the author has had into the organism - every salient, stable feature he can find - so that taxonomists of future generations will not be left in doubt or despair.

#### LIST OF GENERIC NAMES ASCRIBED TO HYPHOMYCETES BUT OF UNCERTAIN STATUS

Achitonium Kunze 1819	Acrotheciella Koorders 1907
Aciculariella Arnaud 1954	Actinodochium Sydow 1927
Acontium Morgan 1902	Actinomma Saccardo 1884
Acrocladium Petrak 1949	Actinopelte Saccardo 1913
Acrospira Montagne 1857	Actinostilbe Petch 1925

- Aegeritopsis Höhnel 1903  
 Aerophyton Eschweiler 1824  
 Agaricostilbum Wright 1970  
 Alliospora Pim 1883  
 Allonema Sydow 1934  
 Allosphaerium Link  
 Alphitomyces Reissek 1856  
 Amblyosporiopsis Fairman 1922  
 Amphiblistrum Corda 1837  
 Amphoromorpha Thaxter 1914  
 Ampulliferella Batista & Cavalcanti 1964  
 Ampulliferopsis Batista & Cavalcanti 1964  
 Andreaeana Palm & Jochems 1924  
 Anematidium Gronchi 1931  
 Anodotrichum (Corda) Rabenhorst 1844  
 Anomyces Höhnel 1919  
 Antromyces Fresenius 1850  
 Antromycopsis Patouillard & Trabut 1897  
 Aposporella Thaxter 1920  
 Apotemnoum Corda 1833  
 Arnaudina Trotter 1931  
 Arthrobotryella Sibia 1928  
 Arthrobotryomyces Batista & Bezerra 1961  
 Arthrographium Cesati  
 Astelechia Ciferri 1962  
 Astrabomyces Batista 1961  
 Astrodochium Ellis & Everhart 1897  
 Atractiella Saccardo 1886  
 Azosma Corda 1831  
  
 Baryeidamia Karsten 1888  
 Basididyma Ciferri 1962  
 Basidiella Cooke 1878  
 Bilboque Viegas 1960  
 Bizzozzeriella Spegazzini 1888  
 Blastoconium Ciferri 1931  
 Bomplandiella Spegazzini 1886  
 Bostrychonema Cesati 1859  
 Botryocladium Preuss 1851  
 Brachydesmium (Saccardo) Costantin 1888  
 Bromicolla Eichwald 1843  
 Broomeola Kunze 1891  
 Bryochysium Link  
  
 Calcarispora Marvanova & Marvan 1963  
 Caldariomyces Woronichin 1926  
 Campsotrichum Ehrenberg 1819 in Link  
 Capnobotrys Hughes 1970  
 Capnostysanus Spegazzini 1918  
 Cephalocladium Reichardt  
 Cephalodochium Bonorden 1851  
 Cephalophorum Nees  
 Ceracea Craigin 1885  
 Ceratopodium Corda 1837  
 Cercoseptoria Petrak 1925  
 Cercosperma Arnaud 1954  
 Cercosporina Spegazzini 1910  
 Cercosporiopsis Miura 1928  
  
 Cercosporula Arnaud 1954  
 Chaetobasidiella Höhnel 1918  
 Chaetodochis Clements ?  
 Chaetostroma Corda 1829  
 Chardonina Ciferri 1930  
 Cheliosporium Spegazzini 1911  
 Chlamyodorubra Deshpande & Deshpande 1966  
 Chlamydosporium Peyronel 1913  
 Chloridiella Arnaud 1954  
 Chmelia Svoboda 1966  
 Chromostylum Giard ?  
 Chroostroma Corda 1837  
 Chrysachne Ciferri 1938  
 Cladographium Peyronel 1918  
 Cladosterigma Patouillard 1892  
 Clathrococcum Höhnel 1911  
 Coelographium (Saccardo) Gäumann 1920  
 Collodochium Höhnel 1902  
 Coniodictyum Hariot & Patouillard 1909  
 Conioscypha Höhnel 1904  
 Coniotheciella Spegazzini 1919  
 Corallinopsis Lagarde 1917  
 Corallodendron Junghuhn 1838  
 Cordalia Gobi 1885  
 Coremiopsis Sizova & Suprun 1957  
 Corethrospis Corda 1839  
 Corollium Sopp 1912  
 Cosmariospora Saccardo 1880  
 Cremasteria Meyers & Moore 1960  
 Crinula Fries 1821  
 Cristula Chenantais 1919  
 Cristularia (Saccardo) Costantin 1888  
 Cristulariella Höhnel 1930  
 Curculiospora Arnaud 1954  
 Curvidigitus Sawada 1943  
 Cystodendron Bubak 1914  
  
 Dacrina Fries 1832  
 Dacrymycella Bizzozero 1885  
 Dacrydochium Karsten 1896  
 Dactylariopsis Mechtieva 1967  
 Damnosporium Corda  
 Dematoidium Stautz 1931  
 Dendrina Fries 1832  
 Dendrostilbella Höhnel 1905  
 Desmotrichum Léveillé 1843  
 Diaphanium Fries 1835  
 Dicellispora Sawada 1944  
 Dichitonium Berkeley & Curtis ?  
 Dictyoarthrinopsis Batista & Ciferri 1957  
 Dictyocephala Medeiros 1962  
 Dictyochaeta Spegazzini 1923  
 Dictyophrynella Batista & Cavalcanti 1964  
 Didymariopsis Spegazzini 1910  
 Didymobotryopsis Hennings 1902  
 Didymopsis Saccardo & Marchal 1885  
 Didymothozetia Rangel 1915

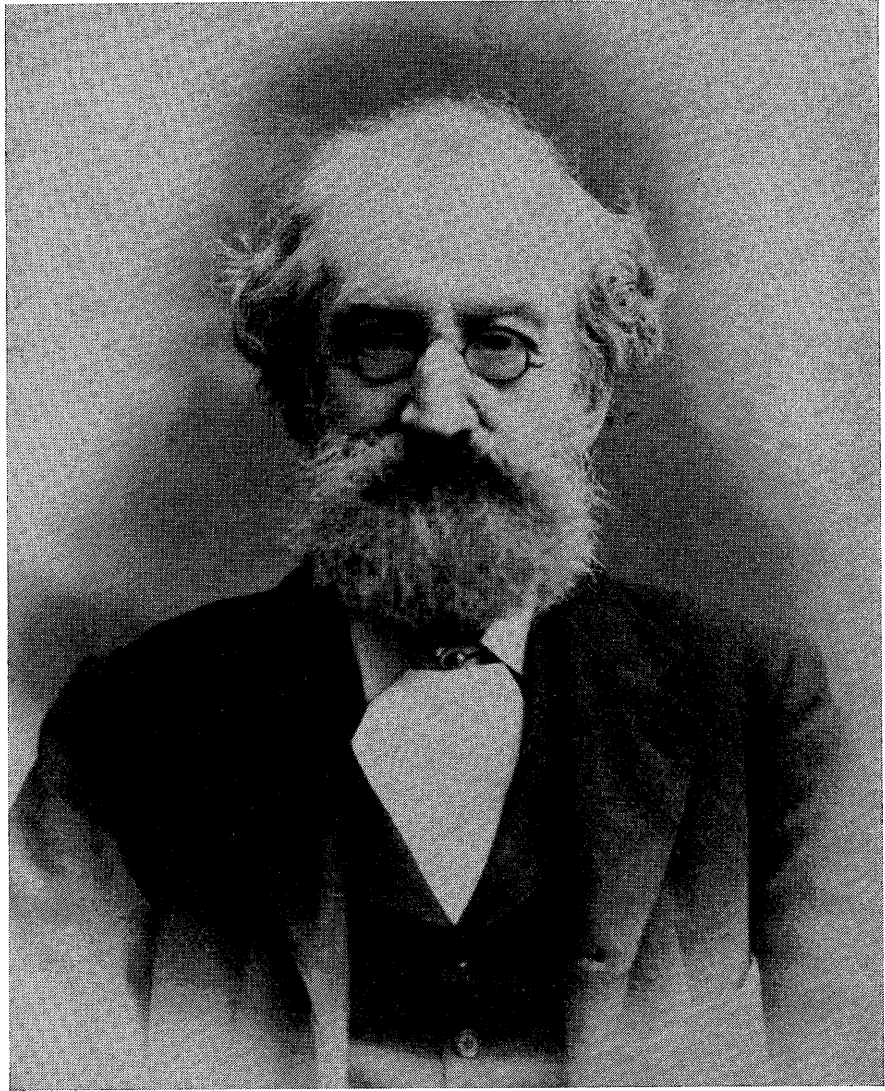
- Discocolla Prillieux & Delacroix 1894  
 Discosporium Saccardo & Sydow ?  
 Divinia Ciferri 1955  
 Echinoidea Patouillard 1918  
 Elaeodema Sydow 1922  
 Ellisia Batista & Peres 1965  
 Endoconidium Prillieux & Delacroix 1891  
 Epiclinium Fries 1849  
 Epidochiopsis Karsten 1892  
 Epilithia Nylander 1855  
 Epochniella Saccardo 1880  
 Ericianella Brondeau  
 Exobasidiopsis Karakulin 1922  
 Exosporella Höhnel 1912  
 Exosporina Oudemans 1904  
 Exotrichum Sydow 1914  
 Flahaultia Arnaud 1951  
 Floccaria Greville 1828  
 Frasieriella Ciferri & Corte 1957  
 Freynella O. Kuntze  
 Fusella Saccardo 1886  
 Fusicladina Arnaud 1952  
 Fusicolla Bonorden 1851  
 Fusidiomus Grove 1929  
 Fuisporella Spegazzini 1911  
 Fuisporium Link 1809  
 Gemmophora Schkobatow 1912  
 Geotrichella Arnaud 1954  
 Gliocladochium Höhnel 1926  
 Gliostroma Corda 1837  
 Gloeocercospora Bain & Edgerton ex  
 Deighton 1971  
 Glycyphila Montagne 1851  
 Golovinia Mechtieva 1967  
 Gomphitaria Preuss 1851  
 Gonatorrhodum Corda 1839  
 Gonyella Sydow 1919  
 Gonytrichella Emoto & Tubaki 1970  
 Granularia Saccardo 1882  
 Graphidium Lindau 1910  
 Guelichia Spegazzini 1886  
 Gutturomyces Rivolta ?  
 Hadrosporium Sydow 1938  
 Halobysus Zukal 1893  
 Haplariella Sydow 1908  
 Harpagomyces Wilcz 1911  
 Helicosporangium Karsten 1865  
 Helicosporella Arnaud 1954  
 Helminthophora Bonorden 1851  
 Helminthosporiopsis Spegazzini 1880  
 Heterobotrys Saccardo 1880  
 Heteroconidium Sawada 1944  
 Heterosporiopsis Petrak 1950  
 Heydeniopsis Naumov 1915  
 Hormiactina Bubak 1916  
 Hormisciopsis Sumstine 1914  
 Hormocladium Höhnel 1923  
 Hormodochis Clements 1909  
 Hyalopus Corda 1838  
 Hyalotrochophora Finley & Morris 1967  
 Hymenella Fries 1823  
 Hymenobactron Höhnel 1923  
 Hymenopsis Saccardo 1886  
 Hymenostilbe Petch 1931  
 Hyphelia Fries 1825  
 Infracungus Ciferri 1951  
 Insecticola Mains 1950  
 Isariella Hennings 1909  
 Isariopsella Höhnel 1929  
 Isariopsis Fresenius 1865  
 Itersonilia Derx 1948  
 Jacobaschella Kuntze  
 Jacobia Arnaud 1951  
 Jaczewskiella Murash 1926  
 Jainesia Fragoso & Ciferri 1925  
 Kmetia Bresadola & Saccardo 1902  
 Kmetiopsis Batista & Peres 1960  
 Kordyanella Höhnel 1904  
 Kurssanovia Pidoplichko 1948  
 Kutilakesopsis Agnihothrudu & Barua 1957  
 Lachnidium Giard  
 Lachnodochium Marchal 1895  
 Lacinocladium Petri 1917  
 Leandria Rangel 1915  
 Leptotrichum Corda 1842  
 Leucodochium Sydow 1917  
 Leucosporium Corda 1836  
 Lindauopsis Zahlbruckner 1906  
 Macrostilbum Patouillard 1898  
 Macrotrichum Greville 1825  
 Malleomyces Rivolta  
 Mauginiella Cavara 1925  
 Medusula Corda 1837  
 Melanodiscus Höhnel 1918  
 Melanodochium Sydow 1938  
 Melanotrichum Corda 1833  
 Menoidea Mangin & Hariot 1907  
 Miainomyces Corda 1833  
 Microbasidium Bubak & Ranojevic 1914  
 Microcera Desmazières 1848  
 Microspatha Karsten 1889  
 Milowia Masee 1884  
 Miuraea Hara 1948  
 Moniliger Letellier ?  
 Moniliopsis Ruhland 1908  
 Monilochaetes Halstead ex Harter 1916  
 Monochaetopsis Patouillard

- Monoconidia Roze 1897  
 Monosporiella Spegazzini 1918  
 Monostachys Arnaud 1954  
 Monotrichum Gäumann 1922  
 Mucrosporium Preuss 1851  
 Muirella Sprague 1958  
 Multicladium Deshpande & Deshpande 1966  
 Multipatina Sawada 1928  
 Myceloderma Ducomet 1907  
 Mycobacillaria Naumov 1915  
 Mycochaetophora Hara & Ogawa 1931  
 Mycomyces Wyss-Chodat 1928  
 Mydonosporium Corda 1833  
 Mydonotrichum Corda 1833  
 Myriophysis Fries 1849  
 Myropyxis Cesati 1851  
 Myxodochium Arnaud 1951  
  
 Necator Masee 1898  
 Necraphidium Ciferri 1951  
 Nematographium Goidanich 1935  
 Neomichelia Penzig & Saccardo 1901  
 Nigrocupula Sawada 1944  
 Nothospora Peyronel 1913  
 Nyctalina Arnaud 1952  
  
 Oidiopsis Scalia 1902  
 Ommatosporella Batista, Bezerra & Poroca 1967  
 Oreophylla Ciferri 1954  
 Osteomorpha Arnaud 1952  
 Oxysporium Léveillé  
  
 Pactilia Fries 1835  
 Paipalopsis Kuhn 1883  
 Pantospora Ciferri 1938  
 Paraspora Grove 1884  
 Patouillardia Roumeguère 1885  
 Patouillardiella Spegazzini 1889  
 Penomyces Giard 1891  
 Peridiomyces H. Karsten  
 Periola Fries 1822  
 Pestalozzina Saccardo 1894  
 Phacellula Sydow 1927  
 Phaeodochium Farr 1968  
 Phaeohymenula Petrak 1954  
 Phragmodochium Höhnel 1924  
 Phymatostroma Corda 1837  
 Physospora Fries 1849  
 Piminella Arnaud 1954  
 Pirobasidium Höhnel 1902  
 Pithosira Petrak 1949  
 Placentaria Auerswald & Rabenhorst ?  
 Plectothrix Shear 1902  
 Pleurocolla Petrak 1924  
 Polycephalomyces Kobayasi 1941  
 Polyschema Upadhyay 1966  
 Polyscytalina Arnaud 1954  
  
 Polythrinciella Batista & Maia 1960  
 Prismaria Preuss 1851  
 Pritzeliiella Hennings 1903  
 Prophytroma Sorokin 1877  
 Proteophiala Ciferri 1957  
 Pseudocordyceps Hauman 1936  
 Pseudofumago Briosi & Farneti 1906  
 Pseudogaster Höhnel 1907  
 Pseudohansfordia Arnold 1970  
 Pseudopolystigmina Murash 1928  
 Pseudoprotomyces Gibelli  
 Pucciniopsis Spegazzini 1888  
  
 Questeriella Arnaud 1954  
  
 Rachisia Lindner 1913  
 Radiciseta Sawada & Katsuki 1959  
 Ragnhildiana Solheim 1931  
 Ramalia Batista 1957  
 Ramulariopsis Spegazzini 1910  
 Ramulaspera Lindroth 1902  
 Ranojevicia Bubak 1910  
 Recticharella Scheer 1944  
 Redaellia Ciferri 1930  
 Rhinocephalum Kamyschko 1961  
 Rhizosporium Rabenhorst  
 Rhizostilbella Van der Wolk 1914  
 Rhodocephalus Corda 1837  
 Rhopaliconidium Petrak 1952  
 Rhynchosporina Arx 1957  
 Riccoa Cavara 1903  
 Rotaeta Cesati 1851  
 Rupina Roumeguère & Spegazzini 1880  
  
 Saprophragma Deshpande & Deshpande 1966  
 Sarcinodochium Höhnel 1905  
 Sarcophorum Sydow & Sydow 1916  
 Savulescuella Ciferri 1959  
 Sceptromyces Corda 1831  
 Schizocephalum Preuss 1852  
 Sclerococcum Fries 1819  
 Sclerodiscus Patouillard 1890  
 Sclerostilbum Povah 1932  
 Scoriomyces Ellis & Saccardo 1884  
 Scutisporium Preuss 1851  
 Selenosporium Corda 1837  
 Selenotila Lagerheim 1892  
 Septotis Buchwald 1849  
 Setodochium Batista & Ciferri 1957  
 Sigmatomyces Saccardo & Sydow 1913  
 Sirodochiella Höhnel 1925  
 Sorosporiella Sorokin 1888  
 Spelaomyces Fresenius ?  
 Sphaerocolla Karsten 1892  
 Sphaerocybe Magrou 1945  
 Sphaeromycetella Arnaud 1954  
 Sphinctrosporium Kunze ex Fries 1849

- Spicariopsis Heim 1939  
 Spiculostilbella Morris 1963  
 Spilomium Nylander 1856  
 Spiralotrichum Yates 1918  
 Sporidiobolus Nyland 1949  
 Sporocephalum Arnaud 1952  
 Sporoclema Tiesenhausen 1912  
 Sporocystis Morgan 1902  
 Sporoglena Saccardo 1894  
 Sporophora Luteraan 1952  
 Sporophragma Deshpande & Deshpande 1966  
 Stachybotryella Ellis & Bartholomew 1902  
 Stagonostroma Diedicke 1914  
 Stemmaria Preuss 1851  
 Stilbodendron Sydow 1916  
 Stilbomyces Ellis & Everhart 1896  
 Stilbothamnium Hennings 1897  
 Streblocaulium Chevallier 1837  
 Stromatographium Höhnel 1907  
 Stromatostysanus Höhnel 1919  
 Strumellopsis Höhnel 1909  
 Symphyosira Preuss 1852  
 Syncollesia Agardh 1824  
 Syngliocladium Petch 1932  
  
 Tandonella Prasad & Venma 1970  
 Tapeinosporium Bonorden 1853  
 Tawdiella Deshpande & Deshpande 1966  
 Telligia Hendrick 1948  
 Termitosphaera Ciferri 1935  
 Tetracrium Hennings 1902  
  
 Tilachliidiopsis Keissler 1924  
 Tilachlidium Preuss 1851  
 Titaeella Arnaud 1951  
 Torulella Gyelnik 1938  
 Toruloidea Sumstine 1913  
 Torulopsiella Bender 1932  
 Trichaeogum Corda 1837  
 Trichodermia Hoffmann  
 Trichotheca Karsten 1887  
 Triglyphium Fresenius 1852  
 Triplicaria Karsten 1889  
 Tuberculariopsis Höhnel 1909  
 Tylomyces Cortini 1921  
  
 Urosporium Fingerhuth 1836  
  
 Vermiculariopsella Bender 1932  
 Verticilliastrum Daszewska 1912  
 Verticilliodochium Bubak 1914  
 Verticillioopsis Costantin 1892  
 Viscomacula Sprague 1950  
 Volutellaria Saccardo 1886  
 Volutellis Clements & Shear 1931  
 Volutellopsis Spegazzini 1910  
 Vrikschopama Rao & Rao 1964  
  
 Xenodiella Sydow 1935  
 Xenoplaca Petrak 1949  
 Xenostilbum Petrak 1959  
 Xiphomyces Sydow 1916  
  
 Zygodesmella Fragoso 1917

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HI-IAPT *Portraits of botanists* no. 69. MORDECAI CUBITT COOKE, photograph by H. J. Taylor, London, 1903, courtesy of Academy of Natural Sciences, Philadelphia, Pa., print Hunt Institute.

Mordecai Cubitt Cooke, *b.* Horwing, Norfolk, England, 12 Jul. 1825, *d.* Southsea, Portsmouth, England, 12 Nov. 1914. British mycologist and algologist, prolific author and popularizer, editor of *Grevillea* (1872-1892), published e.g. *Plain and easy accounts of British fungi* (ed. 1: 1862, ed. 6: 1897), *Rust, smut, mildew and mould* (ed. 1: 1865, ed. 7: 1902), *A fern book for everybody* (1867), *Handbook of British fungi* (ed. 1: 1870-1871, ed. 2: 1883-1891), *Mycographia* (1876-1879), *Illustrations of British fungi* (1881-1891), *British fresh-water algae* (1882-1884). Biogr. and bibliogr.: Ramsbottom, *J. Bot.* 53: 58 1915; Britten and Boulger, *Biogr. index* ed. 2. 72. 1931; Barnhart, *Biogr. notes Bot.* 1: 376. 1965.