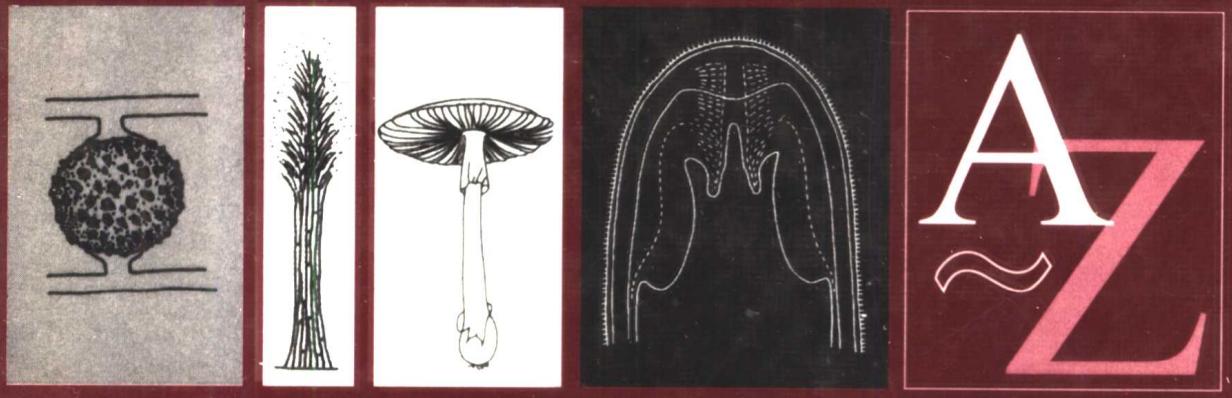
Ainsworth & Bisby's

DICTIONARY OF THE FUNGI

Eighth Edition

D.L. Hawksworth, P.M. Kirk, B.C. Sutton and D.N. pegler

真菌词典（第8版）



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AINSWORTH & BISBY'S

DICTIONARY OF THE FUNGI

by

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and D.N. Pegler

with the assistance of

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Dictionary of the Fungi

真 菌 词 典

by D. L. Hawksworth et al.

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Dedicated to
GEOFFREY C. AINSWORTH
on the occasion of his 90th birthday

This eighth edition of the *Dictionary* is dedicated to Dr Geoffrey Ainsworth as a token of respect for his immense contribution to mycology worldwide. He has already published an account of the origins of the *Dictionary* in the Preface to the seventh edition: leafing through the mycological literature and filling in index cards while 'fire-watching' at Kew in World War II, the adoption of Basic English, a special dispensation to use paper, and the first copy sent to Winston Churchill in September 1943.

He appreciated the value of synthetic reference works early in his career, producing *The Plant Diseases of Great Britain* in 1937. The five volume *The Fungi: An Advanced Treatise* (co-edited with A.S. Sussman and F.K. Sparrow) of 1965-73 provided an unparalleled in-depth reference work, including the most complete keys to genera to have been compiled since 1931. His intimate and wide-ranging interests in the history of the subject, are evident in the scholarly triumvirate, *Introduction to the History of Mycology* (1976), *Introduction to the History of Plant Pathology* (1981), and *Introduction to the History of Medical and Veterinary Mycology* (1986).

His desire to strengthen mycology worldwide led to his proposal to hold the First International Mycological Congress (IMC1) in Exeter in 1971, the Organizing Committee for which he chaired. The International Mycological Association (IMA) was founded at IMC1 following on his suggestion; he was made an Honorary President of the IMA in 1977.

Other honours he has received include a DSc from the University of Exeter in 1978, the Linnean Medal in 1980, and honorary membership of several mycological societies, including the American (1965), British (1965), and Indian (1984). IMI's new laboratory block at Egham was named after him in 1992 in recognition of his work in developing the Institute, especially during his time as Assistant Editor (1957-61), Assistant Director (1961-64) and Director (1964-68).

His industry and scholarship in the service of mycology have provided an example to all who know him. Those of us associated with this edition of the *Dictionary*, join in sending him and Frances our best wishes on his ninetieth anniversary.

Preface

This *Dictionary*, now in its 52nd year, aims to provide all those who work with fungi a way into our accumulated knowledge on them. We regard fungi as all organisms studied by mycologists, including lichens, mushrooms, slime moulds, water moulds and yeasts. The inclusion of names of lichens (more correctly lichen-forming fungi) in the sixth edition occasioned some surprise; we trust that in the 1990s it can be assumed that wherever we use 'fungi', we are automatically including those that form lichens.

In preparing and revising entries for this eighth edition we are fortunate in not only being able to build on the pioneering compilation of G.C. Ainsworth and G.R. Bisby (q.v), but also to have had the benefit of a wide range of contributors (p. viii) and other help from numerous mycologists. At the same time, we have personally revised many of the entries, so that all errors found are our responsibility.

This edition is the first to accept that fungi have to be dispersed through three kingdoms of eukaryotes: *Chromista*, *Fungi*, and *Protozoa*. It also abandons the deuteromycetes as a formal systematic category and endeavours to incorporate them in the system of ascomycetes and basidiomycetes; this is the only defensible treatment as these fungi can be assigned to the different phyla on ultrastructural, molecular and biochemical grounds. Our decision to use 'mitosporic fungi' has been extensively debated at international workshops (Portland, Oregon 1993; Paris 1994). The system adopted for the ascomycetes here is that developed in collaboration with O.E. Eriksson (University of Umeå), with whom D.L.H. has been privileged to cooperate in this endeavour since 1985. The system of higher categories of chromistan fungi used is deliberately more conservative than proposed by M.W. Dick (*Mycol. Pap.*, in press) as we feel that classifications are hypotheses that need a period of testing before they can be commended for general use.

We also wish to record our particular gratitude to D.N. Pegler (Royal Botanical Gardens, Kew) for joining us to take primary responsibility for the system of and updating entries on *Basidiomycetes*, and further for compiling the key to accepted families in that group.

This eighth edition also has several other new features: (a) the inclusion of a key to the accepted families for the first time since the fifth edition in 1961; (b) a synopsis of the genera referred to particular orders and families (also the first time since the fifth edition); (c) notes on major mycological collections and cross references to their acronyms; (d) the revision of most general entries by specialists; (e) the separate listing of many prefixed terms; (f) the inclusion of entries for all accepted families and some frequently used synonyms; (g) the inclusion of illustrations adjacent to the appropriate entries; and (h) a larger page size to help its stay-open factor.

The updates for this edition were greatly aided by the computerization of the previous edition arranged in 1982 by J. Gilmore (Director-General of CAB INTERNATIONAL from 1994) using BASIS software. The database was then adapted to run under SMARTWARE II on the personal computer network at IMI so that we could update entries on screen. The database is now one of the suite of major systematic mycological databases available in IMI.

Having been intimately involved in the compilation and proof-stage revisions, we are acutely aware of imperfections and improvements that we would have liked to have made. As remarked recently of another major compilatory work, our aspiration is that it will at least prove to be 'a marvellously imperfect work needed by all'.

Do send us your corrections and comment so that the ninth edition will be less imperfect and of even more value to mycologists of all disciplines world-wide.

13 October 1995
IMI, Egham

D.L. Hawksworth
P.M. Kirk
B.C. Sutton

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The following kindly provided new material or revised entries on the subjects indicated:

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A.D.M. Rayner	(University of Bath), population biology
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M.A.J. Williams	(ex IMI), terms
V. Winchester	(University of Oxford), lichenometry

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E. Punithalingam and A.E. Ansell (both of IMI) assisted in the bibliographic checking of citations; the IMI Librarians (L. Ragab, E. Wheater) located copies of elusive references, and M.S. Rainbow (IMI) keyboarded many of the corrections, revisions and new entries. I. Smith (CABI Information Technology Services) prepared the camera-ready copy from output supplied.

Longer Entries

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Authors
Cladistics
Classification
Coevolution
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Common names
Conidia
Genetic resource collections
Fungicides
Genetics
Growth
History
Hyphal analysis
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Media
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Methods
Mitosporic fungi
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Medical & veterinary mycology
Mushroom culture
Mycetism
Mycotoxicoses
Phytotoxic mycotoxins
Plant pathogenic fungi
Seed-borne fungi
Starters
Truffles
Wine making
Wood-attacking fungi

KINGDOMS OF FUNGI is the starting point for all systematic entries; see also CHROMISTA, FUNGI, PROTOZOA.

User's Guide

To extract the maximum amount of information from this *Dictionary* with the minimum of effort it is necessary to understand the scope of the compilation and certain conventions used to compress the data recorded and minimize repetition; the full citation of any publication or the statement of any fact is rarely given more than once, except where that greatly facilitates accessibility.

Content. The longest series of entries are those of the generic names (both accepted names and synonyms) complied to the end of *Index of Fungi* **6** (10) July 1995. Every accepted generic name is referred to a higher group (family, order, class, or phylum) and brief descriptions are given of these higher taxa. The systematic entries are supplemented by a glossary of terms, English common names, and the names of important fungal antibiotics, toxins, etc. In addition, there are entries on general mycological topics, ecology and distribution, applied mycology, and historical and biographical notes on some well known mycologists and major reference collections. See opposite (p. x) for information on larger entries.

Suprageneric names. Author citations are given only for accepted names to the rank of family as only these have been comprehensively catalogued to date (see Literature, Catalogues of names).

Generic names. Every generic name is followed by the name (abbreviated according to Kirk & Ansell, 1992; see Author) of the author(s) who first proposed the genus and the year of publication. The place of publication of a generic name can be found from the catalogues of names listed under Literature. For example, '*Curvularia* Boedijn (1933)' is found via the cumulative index to *Petrak's Lists* to have been complied in *List 7* where the reference is given as 'Bull. Jard. Bot. Buitenzorg, 3 sér., XIII, Livr. 1: 123'; that for the earlier '*Coniothyriella* Speg. (1889)' can be found from Saccardo's *Sylloge fungorum*, Clements & Shear's *Genera of Fungi*, or the *Index nominum genericorum (plantarum)*, provided that it was validly published (see Nomenclature). The available Catalogues of names are listed under 'Literature'.

The list of generic names is as complete as possible. Some dates and authorities differ from those that may be found in the literature, many of which have been checked in the original for this edition, some names omitted from previous compilations are included, as are some which are not validly published (included as nevertheless present in the mycological literature). Where genera are not properly typified, p.p. (*pro parte*) has been used when species cited in the protologue are currently dispersed among more than one accepted genus.

For generic names consigned to synonymy, the authority for the disposition is usually given. For each accepted genus estimates are given for the number of its species and its geographical distribution. Where possible these data are based on recent revisions or the personal knowledge of specialists, but in the majority of cases they have not been updated in the absence of such authorities. In the case of larger genera particularly, we have not revised species numbers upwards even though many may have been described since the last edition, in the absence of modern treatments (see Numbers of fungi). This policy is adopted as critical reassesments in such genera usually result in reductions in species numbers.

The distributions given are approximate, especially for genera not critically revised in recent years, and should be regarded as indicative rather than comprehensive. Whenever possible users should verify the facts for themselves and draw their own conclusions.

Coding. The coding used for Mitosporic fungi is explained under that entry.

Systematic arrangement. The synopsis of generic names by order and families following the keys can be used in collaboration with the keys to attempt the identification to genus of an unknown fungus.

References. For the full citation of a reference given by author's name and date only see Literature, or the literature list for the group, e.g. 'Buller, **1-6**' under 'Spore discharge and dispersal' is found expanded under Literature as 'A. H. R. Buller, *Researches on fungi*, vols. **1-6**, 1909-34'; Eriksson (1981) under *Dothideales* is found expanded under *Ascomycota*, the next higher level.

Abbreviations. See p. 1.

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a- (**an-**) (prefix), not having; not; as in **acaudate**, **anaerobe**, **aniso-**.

AAA pathway, **alpha- aminoadipic acid pathway** for lysine synthesis (*cf.* **DAP pathway**).

Aaosphaeria Aptroot (1995), Dothideales (inc. sed.). 1, Colombia, C. Afr.

ab- (prefix), position away from.

Abacina Norman (1853) ≡ Diplotomma (Physc.).

Abaphospora Kirschst. (1939) = Massarina (Lophiostom.) fide Bose (1961).

abaxial (of a basidiospore), the side away from the long axis of the basidium (Corner, 1948); cf. adaxial.

Abbreviations and signs frequently used in this work are:

adj(ective)
Afr(ica)
Am(erica)
Ann(ales) Myc(ologici)
Auct(ores), authors; used esp. as the authority of a name to indicate frequent (and usually incorrect) usage
Austr(alasia)
bibl(iography)
biogr(aphy)
B(ulletin Trimestriel de la) S(ociété) M(ycologique de) F(rance)
C(anadian) J(ournal of) B(otany)
C(entral)
(International) Code (of Botanical Nomenclature)
c(irca), approximately
c(on)f(er), compare; make a comparison with
cosmop(olitan), probably in almost all countries
D(ematiaceous) H(yphomycetes) (1971)
E(ast)
Ed(itor)
Ed(itor)s
ed(itio)n
et al(ia), and others
e(xempli) g(ratia), for example
em(ended by)
esp(ecially)
Eur(ope)
Fam(ily, -ilies)
fide, used for 'on the authority of'
Fig(ure)
f(orm) cat(egory)
gen(us, -era)
Hemisph(ere)
hypog(eous)
I(ndex) N(ominum) G(enericorum)
Isl(and, -s)
L(ichen-forming)
Lit(erature)
Mediterr(anean region)
M(ore) D(ematiaceous) H(yphomycetes) (1976)
Mycol(ogia)
Mycol(ogical) Pap(ers)
M(ycological) R(esearch)
n(oun)
N(orth)
nom(en) cons(ervandum), nom(en) rej(iciendum); see Nomenclature
Obit(uary)
obsol(ete), no longer in use
p(atho)v(ar)
Philipp(ine Islands)
pl(ural)
portr(ait)
pos(itio)n
p(ro) p(arte), in part
q(uod) v(ide), which see
R(eview of) A(pplied) M(ycology)
R(eview of) P(lant) P(athology)
S(ystema) A(scomycetum)
s(ensu) l(ato), in the broad sense; widely
s(ensu) str(icto), in the strict sense; narrowly
S(outh)
sp(ecies), spp. (pl.)
syn(onym, -s) (q.v.)
T(axonomic) L(iterature) (edition)-2
T(ransactions of the) B(ritish) M(ycological) S(ociety)
temp(erate parts)
trop(ics), -(ical)
v(erb)
W(est)
widespr(ead), in a number of countries
O, I, II, III, see *Uredinales*
=, is heterotypic (taxonomic, facultative) a synonym of
≡, is homotypic (nomenclatural, obligate) a synonym of
(), sign for 'is the cause of'; e.g. *Ascochyta pinodella* (foot rot of pea)
±, more or less
µm, micron.
:, in references precedes page number; in author citations, see Nomenclature.

See also **Mitosporic fungi for abbreviations for conidiomatal types (1-9), spore groups (A1, B1, etc.), and conidiogenous events (1-44).**

Most abbreviations of names of periodicals, except for those noted above, are taken from the *World List of Scientific Periodicals*, 1952 and 1965-67.*

If the abbreviation of a Family given with a synonym is not clear the cross-reference gives it in full.

And see Authors' names.

Abeliella Mägd. (1937), Fossil fungi (mycel.). 2 (Cretaceous, Oligocene), Eur.

aberrant an organism that deviates in one or more ways from the norm.

Abgliophragma R.Y. Roy & Gujarati (1966), Mitosporic fungi, 1.C1.10. 1, India. ? = Wiesneriomyces (Mitosp. fungi) fide Pirozynski (*Mycol. Pap.* **129**, 1972).

abhymenial, opposite the spore-producing surface.

abjection, the separating of a spore from a sporophore or sterigma by an act of the fungus.

abjunction, the cutting off of a spore from a hypha by a septum.

Abkultur, see Normkultur.

aboospore, a parthenogenetic oospore.

Abortiporus Murrill (1904), Coriolaceae. 1, USA. See Ryvarden (*Synopsis Fung.* 5: 104, 1991).

abraded (of lichen thalli), having the surface worn; eroded.

Abropelta B. Sutton (1986), Mitosporic fungi, 5.C1.15. 1, India.

Abrothallomyces Cif. & Tomas. (1953) ≡ Dactylospora (Dactylospor.).

Abrothallus De Not. (1845), Ascomycota (inc. sed.). c. 12 (on lichens), widespr. See Bellemère *et al.* (*Cryptogamie, Mycol.* 7: 47, 1986; ultrastr.). Anamorph *Vouauxiomyces*.

abrupt, as if cut off transversely; **truncate**.

abscission, separating by disappearance of a joining layer or wall, as of conidia from a conidiogenous cell.

Absconditella Vězda (1965), Stictidaceae (L). *c.* 8, Eur., N. Am. See Vězda & Vivant (*Folia geobot. phytotax.* **10**: 205, 1975; key 5 spp.).

Absidia Tiegh. (1878), Mucoraceae. *c.* 20 (esp. in soil), widespr. See Ellis & Hesseltine (*Sabouraudia* **5**: 59, 1966), Hesseltine & Ellis (*Mycol.* **56**: 568, 1964, cylindrical-spored spp.; **57**: 234, 1965, globose-spored spp.; **58**: 761, 1966, ovoid-spored spp.), Nottebrock *et al.* (*Sabouraudia* **12**: 64, 1974), Zycha *et al.* (1969), Váňová (*Česká Myk.* **37**: 151, 1983), Schipper (*Persoonia* **14**: 133, 1990; key), Hesseltine *et al.* (*Mycol.* **82**: 523, 1990; key), Burmester *et al.* (*Curr. Genetics* **17**: 155, 1990; transformations), Wöstemeyer *et al.* (*Curr. Genetics* **17**: 163, 1990; somatic hybrids), Kayser & Wöstemeyer (*Curr. Genetics* **19**: 279, 1991; karyotype), Ginman & Young (*Microbios* **66**: 39, 1991; ultrastr.), Wöstemeyer & Burmester (*Microbiol. Res.* **149**: 407, 1994; rDNA).

Absidiaceae, see *Mucoraceae*.

absorb, to obtain food by taking up water and dissolved substances across a membrane. Cf. ingest.

Abstoma G. Cunn. (1926), Lycoperdaceae. 2, Asia, Australasia, N. & S. Am. See Wright & Suarez (*Cryptog. Bot.* **1**: 372, 1990; key).

abstriction, abjunction and then abscission, esp. by constriction.

Abyssomyces Kohlm. (1970), Ascomycota (inc. sed.). 1 (marine), S. Atlantic.

Acallomyces Thaxt. (1902), Laboulbeniaceae. 3, N. Am., Jamaica, Philipp., Japan. See Tavares (*Mycol.* 65: 929, 1973).

Acalyptospora Desm. (1848) , nom. dub.; based on gland-like hairs.

acantha, a sharp pointed process; a spine.

Acantharia Theiss. & Syd. (1918), Venturiaceae. 5, widespr. See Hsieh *et al.* (*MR* **99**: 917, 1995; key), Bose & Müller (*Indian Phytopath.* **18**: 340, 1965), Sivanesan (*TBMS* **82**: 507, 1984; anamorphs). Anamorphs *Fusicladium*, *Stigmina* s.l.

Acanthobasidium Oberw. (1966), Aleurodiscaceae. 3, Eur.

Acanthocystis (Fayod) Kühner (1926) = Hohenbuehelia (Tricholomat.) fide Singer (1975).

acanthocyte, spiny cell produced on a short branch from the vegetative mycelium of *Stropharia* spp. (Farr, *Mycotaxon* **11**: 241, 1980).

Acanthoderma Syd. & P. Syd. (1917), Mitosporic fungi, ?.C1.?. 1, Philipp.

Acanthodochium Samuels, J.D. Rogers & Nagas. (1987), Anamorphic Xylariaceae, 3.A1.10. Teleomorph *Collodiscula*. 1, Japan.

Acanthographina Walt. Watson (1929) ≡ Acanthothecis (Graphid.).

Acanthographis (Vain.) Walt. Watson (1929) = Acanthothecis (Graphid.).

acanthohyphidium, see hyphidium.

Acanthomyces Thaxt. (1892) [non *Akanthomyces* Lebert (1858)] ≡ Rhachomyces (Laboulben.).

Acanthonitschkea Speg. (1908), Nitschkiaceae. 4 (2 on lichens), widespr. See Nannfeldt (*Svensk bot. Tidskr.* 69: 49, 1975).

Acanthophiobolus Berl. (1893), Dothideales (inc. sed.). 1, widespr. See Walker (*Mycotaxon* **11**: 1, 1980).

Acanthophysellum Parmasto (1967), Aleurodiscaceae. 2, Eur. = Aleurodiscus (Aleurodisc.) fide Eriksson & Ryvarden (1973).

acanthophysis, see hyphidium.

Acanthophysium (Pilát) G. Cunn. (1963), Aleurodiscaceae. 26, cosmop.

Acanthorhynchus Shear (1907) = Physalospora (Hyponectr.) fide Barr (*Mycol.* **68**: 611, 1976).

Acanthorus Bat. & Cavalc. (1967), Mitosporic fungi, 5.A1.?. 1, Brazil.

Acanthosphaeria Kirschst. (1939), Trichosphaeriaceae. 2, Eur. See Petrak (*Ann. Myc.* **38**: 198, 1940).

Acanthostigma De Not. (1863) ? = Nematostoma (Pseudoperispor.) fide v. Arx & Müller (1975).

Acanthostigmella Höhn. (1905), ? Tubeufiaceae. 5, Eur., N. & S. Am. See Barr (*Mycotaxon* 6: 17, 1977; key), Untereiner (*MR* **99**: 897, 1995; posn).

Acanthostigmella Rick (1933) = Acanthostigma (Pseudoperispor.).

Acanthostigmina Höhn. (1909) = Tubeufia (Tubeuf.) fide v. Arx & Müller (1975).

Acanthostoma Theiss. (1912) = Phaeodimeriella (Pseudoperispor.) fide Müller & v. Arx (1975).

Acanthotheca Clem. & Shear (1931) [non DC. (1838), *Compositae*] ≡ Acanthotheciella (Sordariales, inc. sed.).

Acanthotheciella Höhn. (1911), Sordariales (inc. sed.). 3, S. Am., Asia. See Barr (*Mycotaxon* **39**: 43, 1990; posn.), Nag Raj (*CJB* **55**: 1518, 1977). Anamorph *Ypsilonia*.

Acanthotheciopsis Zahlbr. (1923) = Acanthothecis (Graphid.).

Acanthothecis Clem. (1909), Graphidaceae (L). 4, S. Am.

Acanthothecium Speg. (1889) ? = Ypsilonia (Mitosp. fungi) fide Sutton (1977).

Acanthotherium Vain. (1890) ≡ Acanthothecis (Graphid.).

Acanthothecomyces Cif. & Tomas. (1953) ≡ Acanthothecis (Graphid.).

Acarella Syd. (1927), Mitosporic fungi, 5.A1.?. 1, C. Am.

Acarellina Bat. & H. Maia (1960), Mitosporic fungi, 5.A1.?. 1, Brazil.

Acariniola T. Majewski & J. Wiśn. (1978) = Pyxidiophora (Pyxidiophor.) fide Lundqvist (1980).

Acarocybe Syd. (1937), Mitosporic fungi, 2.A2.28. 2, Afr. See Ellis (*Mycol. Pap.* 76, 1960; key).

Acarocybella M.B. Ellis (1960), Mitosporic fungi, 1.C2.28. 1, trop. Afr., Trinidad.

Acarocybellina Subram. (1992), Mitosporic fungi, 1.C2.26. 1, trop.

Acaropeltis Petr. (1937), Mitosporic fungi, 5.A1.?. 1, C. Am.

Acarospora A. Massal. (1852), Acarosporaceae (L). *c.* 100, cosmop. See Castello & Nimis (*Lichenologist* **26**: 283, 1994; Antarct.), Clauzade & Roux (*Bull. Mus. Hist. nat. Marseille* **41**, 1981; key 69 Eur. spp.), Magnusson (*K. svenska VetenskAkad. Handl.* ser. 3 7 (4), 1929; *Ann. Crypt. Exot.* **6**: 13, 1933; *Rabenh. Krypt.-Fl.* **9**(5.1): 104, 1935; *Göteborgs K. Vetensk.-o. VitterhSamh. Handl.* ser. 6B, **6** (17), 1956), Weber (*Lichenologist* **4**: 16, 1968; sect. *Xanthothallia*), Golubkova & Shapiro (*Nov. Sist. niz. Rast.* **13**: 150, 1976; sect. *Trochia*). See also *Pleopsidium*.

Acarosporaceae Zahlbr. (1906), Lecanorales (L). 12 gen. (+ 21 syn.), 173 spp. Thallus usually crustose, often squamulose; ascomata usually deeply immersed, rarely almost perithecial, with a varied margin; paraphyses simple, immersed in gel; asci usually with a well-developed apical dome, usually I-though sometimes with an outer layer of I+ gel, polysporous; ascospores small, hyaline, usually aseptate. Lichenized with green algae.
Lit.: Golubkova (*Lishaĭniki semeĭstva Acarosporaceae Zahlbr. v. SSSR*, 1988; keys 8 gen., 91 spp.).

Acarosporina Sherwood (1977), Stictidaceae. 4, N. & S. Am., Asia. See Johnston (*Mycotaxon* **24**: 359, 1985; anamorph).

Acarosporium Bubák & Vleugel ex Bubák (1911), Anamorphic Sclerotiniaceae. 8.B1-2.39. Teleomorph *Pycnopeziza*. 2, Eur., N. Am.

Acarosporomyces Cif. & Tomas. (1953) = Pleospidium (Lecanor.).

Acarothallium Syd. (1937) = Wentiomyces (Pseudoperispor.) fide Müller & v. Arx (1962).

acaryallagic, see caryallagic.

acaudate, not having a tail.

Acaulium Sopp (1912) = Scopulariopsis (Mitosp. fungi) fide Raper & Thom (*Manual of the Penicillia*, 1949).

Acaulopage Drechsler (1935), Zoopagaceae. 27, Kenya, N. Am, U.K. See Drechsler (*Mycol.* **27**: 185, 1935; **28**: 363, 1936; **30**: 137, 1938; **31**: 128, 1939; **33**: 248, 1941; **34**: 274, 1942; **37**: 1, 1945; **38**: 120, 1946; **38**: 253, 1947; **40**: 85, 1948; **47**: 364, 1955; **51**: 747, 1959; *Am. J. Bot.* **49**: 1089, 1962). Juniper (*TBMS* **36**: 356, 1953), Jones & Peach (*TBMS* **42**: 95, 1959), Saikawa & Morikawa (*CJB* **63**: 1386, 1985).

Acaulospora Gerd. & Trappe (1974), Acaulosporaceae. 33, widespr. See Mosse (*Arch. Microbiol.* **70**: 167, 1970, **74**: 120, 146, 1970; life cycle, ultrastr.), Schenck *et al.* (*Mycol.* **76**: 685, 1984; key), Berch (*Mycotaxon* **23**: 409, 1985; emend.), Morton (*Mycol.* **78**: 787, 1986; effect of mountants & fixatives on spores), Sieverding & Toro (*Angew. Bot.* **61**: 217, 1987), Sieverding (*Angew. Bot.* **62**: 373, 1988), Błaszkowski (*Karstenia* **27**: 32, 1987, *Mycol.* **82**: 794, 1990, *Mycorrhiza* **4**: 173, 1994). Maia & Kimborough (*MR* **97**: 1183, 1993; spore wall ultrastr.), Ingleby *et al.* (*Mycotaxon* **50**: 99, 1994), Yao *et al.* (*Kew Bull.* **50**: 349, 1995).

Acaulosporaceae J.B. Morton & Benny (1990), Glomales. 2 gen., 37 spp.

accumbent, resting against anything.

acellular, not divided into cells, e.g. a myxomycete plasmodium.

Acephalis Badura & Badurowa (1964) = Syncephalis (Piptocephalid.) fide Skirgiełło & Zadara (*Sydowia Beih.* **8**: 366, 1979).

acephalous, not having a head.

Acerbia (Sacc.) Sacc. & P. Syd. (1899) ? = Rosenscheldia (Dothideales) fide Eriksson & Yue (*SA* **13**: 129, 1994).

Acerbiella Sacc. (1905), Ascomycota (inc. sed.). 2 or 3, S. Am., Java.

acerose, needle-like and stiff; like a pine needle (Fig. 37.3).

acervate, massed up; heaped; growth in heaps or groups.

Acerviclypeatus Hanlin (1990), Anamorphic Phyllachoraceae, 8.E1.?. Teleomorph *Ophiodothella*. 1, USA.

Acervulopsora Thirum. (1945) = Maravalia (Chacon.) fide Cummins & Hiratsuka (1983).

acervulus (pl. **-i**; adj. **-lar**), a ± saucer-shaped conidioma (embedded in host tissue) in which the hymenium of conidiogenous cells develops on the floor of the cavity from a pseudoparenchymatous stroma beneath an integument of host tissue which ruptures at maturity; acervular conidioma (Fig. 10 O).

Acervus Kanouse (1938), Otideaceae. 2, N. & S. Am., Asia, Afr. See Pfister (*Occ. Pap. Farlow Herb. Crypt. Bot.* **8**: 1, 1974; key), Pant (*TBMS* **71**: 326, 1978), Pfister & Bessette (*Mycotaxon* **22**: 435, 1985).

Acetabula (Fr.) Fuckel (1870) = Helvella (Helvell.) fide Dissing (1966).

Acetabularia (Berk.) Massee (1893) [non J.V. Lamour. (1812), *Algae*] = Cyphellopus (Agaric.) fide Singer (1951).

acetabuliform, saucer-like in form.

Achaetobotrys Bat. & Cif. (1963), Antennulariellaceae. 2, trop. See Hughes (1976).

Achaetomiaceae, see *Chaetomiaceae*.

Achaetomiella Arx (1970) = Chaetomium (Chaetom.) fide Udagawa (*Trans. mycol. Soc. Japan* **21**: 34, 1980). Cannon (*TBMS* **87**: 50, 1986).

Achaetomium J.N. Rai, J.P. Tewari & Mukerji (1964), Chaetomiaceae. 3, Asia, Afr. See Cannon (*TBMS* **87**: 50, 1986; key), Kauser *et al.* (*Biologia* Lahore **34**: 257, 1988; Pakistan spp.).

Acharius (Erik; 1757-1819). Country doctor at Vadstena, Sweden, a pupil of Linnaeus (q.v.) and correspondent of Fries (q.v.). Laid scientific basis for the study and classification of lichens. Responsible for the terms thallus, podetium, apothecium, perithecium, soredium, cyphella as applied in lichen morphology. Described many new species, esp. from Europe. Main collections in **H**, other material in **BM**, **UPS**, **LINN** (Smith Herb.). Main works include the *Methodus qua omnes detectos Lichenes*, 1803; *Lichenographia universalis*, 1810; and *Synopsis methodica Lichenum*, 1814. See Galloway (*Bull. Br. Mus. nat. Hist., Bot.* **18**: 149, 1988; influence on Br. lichenology, specs in BM), González Bueno & Rico (*Acta Bot. Malast.* **16**: 141, 1991; impact on Spanish lichenology), Grummann (1974: 469), Vitikainen (Intro., *Lich. univ.* [reprint], 1976), Stafleu & Cowan (*TL-2* **1**: 4, 1976), Stafleu & Mennega (*TL-2, Suppl.* **1**: 14, 1992). Tibell (*Ann. bot. fenn.* **24**: 257, 1987; *Caliciales*).

Achitonium Kunze (1819) = Pactilia (Mitosp. fungi).

Achlya Nees (1823), Saprolegniaceae. 35, N. temp. See Johnson (*The genus Achlya*, 1956).

Achlyella Lagerh. (1890), ? Chytridiales (inc. sed.). 1, Eur.

Achlyites Mesch. (1902), Fossil fungi. 1 (Silurian, Tertiary), Atlantic.

Achlyogeton Schenk (1859), Chytridiales (inc. sed.). 1, N. temp. See Dick (*in press*).

Achlyogetonaceae, see *Chytridiales* (inc. sed.).

Achlyopsis De Wild. (1896) nom. dub. (? Pythiales).

Achorella Theiss. & Syd. (1915), ? Dothideales (inc. sed.). 4, widespr.

Achorion Remak (1845) = Trichophyton (Mitosp. fungi).

Achorodothis Syd. (1926), Mycosphaerellaceae. 1, Costa Rica.

Achoropeltis Syd. (1929), Mitosporic fungi, 5.A1.?. 1, Costa Rica.

achroic (achromatic, achrous), having no colour or pigment; see Colour.

Achroomyces Bonord. (1851) = Platygloea (Platygl.) fide Donk (*Persoonia* **4**: 145, 208, 1966).

Achrotelium Syd. (1928), Chaconiaceae. 4, Philipp., USA, India.

Acia P. Karst. (1879) [non Schreb. (1791), *Rosaceae*] = Mycoacia (Merul.).

acicular, slender and pointed; needle-shaped (Fig. 37.33).

Aciculariella Arnaud (1954), Mitosporic fungi, 1.E2.?. 2, Eur.

Aciculoconidium D.S. King & S.C. Jong (1976), Mitosporic fungi, 1.A1.3. 1, USA.

Aciculosporium I. Miyake (1908), Clavicipitaceae. 1, Japan. See Kao & Leu (*Plant Prot. Bull. Taiwan* **18**: 276, 1976).

acid rain, the wet acidic deposition of air pollutants, can affect lichen-forming and other fungi. Lichens with cyanobacterial partners are most at risk and have declined dramatically in some parts of Europe (Farmer *et al.*, *in* Bates & Farmer, 1992: 284); nitrogenase activity may be affected (Fritz-Sheridan, *Lichenologist* **17**: 27, 1985). Reductions in many mycorrhizal fungi in Europe have been correlated with acid rain, though it is not often clear whether this is a cause of or a result from damage seen in the trees. The decline in fruiting of *Cantharellus cibarius* has been especially noticeable (Jansen & van Doben, *Ambio* **16**: 211, 1987; Derbsch & Schmitt, *Atlas der Pilze des Saarlandes* **2**, 1987). *Russula mustelina*

fruiting has been singled out as a valuable early indicator of acid rain problems in European forests (Felher, *Agric. Ecosyst. Envir.* **28**: 115, 1990).

Lit.: Arnolds (*in* Hawksworth (Ed.), *Frontiers in mycology*: 243, 1991), Bates & Farmer (Eds) (*Bryophytes and lichens in a changing environment*, 1992), Pegler *et al.* (Eds) (*Fungi of Europe*, 1993), Richardson (*Pollution monitoring with lichens*, 1992).

See Air pollution, Bioindication.

acid-fast (of bacteria), keeping carbol fuchsin stain after the addition of 25 per cent sulphuric acid (H_2SO_4).

acidiphilous (**acidophilous**, **acidophilic**), growing on or in conditions of low hydrogen ion concentration (q.v.); e.g. *Scytalidium acidophilum* with an optimum pH for growth of 3, with good growth even at pH 1 (Miller *et al.*, *Internat. Biodet.* **20**: 27, 1984); also used of lichens on peaty soils or bark of a pH below 5.

Aciella (P. Karst.) P. Karst. (1899) [non Tiegh. (1894), *Loranthaceae*] = Asterodon (Asterostrom.) fide Donk (1956).

Aciesia Bat. (1961), Mitosporic fungi (L), 8.A2.?. 1, Brazil.

Acinophora Raf. (1808) nom. dub. (Tulostomatales, inc. sed.).

Acinula Fr. (1822), Mitosporic fungi, 9.-.-. 1, Eur.

Acitheca Currah (1985), Gymnoascaceae. 1, N. Am. = Gymnoascus (Gymnoasc.) fide v. Arx (*Persoonia* **13**: 173, 1986).

Ackermannia Pat. (1902) = Sclerocystis (Glom.) fide Zycha *et al.* (1969).

Acladium Link (1809), Anamorphic Thelephoraceae, 1.A1.3. Teleomorph *Botryobasidium*. 4, widespr.

Acleistia Bayl. Ell. (1917), Anamorphic Leotiaceae, 7.A1.15. 1, Eur. Teleomorph *Ombrophila*.

Acleistomyces Bat. (1961), Mitosporic fungi L. 8.A1.?. 2 (L), Brazil.

Acmosporium Corda (1839) = Aspergillus (Mitosp. fungi) fide Hughes (1958).

Acollomyces Cif. & Tomas. (1953) = Thelomma (Calic.).

Acolium (Ach.) Gray (1821) = Cyphelium (Calic.).

Acolium Trevis. (1862) = Pseudacolium (Calic.).

Acompsomyces Thaxt. (1901), Laboulbeniaceae. 6, Eur., N. & S. Am. See Benjamin (*Mem. N.Y. Bot. Gdn* **49**: 20, 1989; key, ontogeny).

Acontiopsis Negru (1961) = Cylindrocladium (Mitosp. fungi).

Acontium Morgan (1902), Mitosporic fungi, 1.A1.?. 2 or 3, N. Am.

acquired immunity, see immune.

acquired resistance, see resistance.

Acrasaceae, *see Acrasiaceae*.

Acrasiales, Acrasiomycota. 4 fams., 4 gen. (+ 3 syn.), 12 spp. The only order of *Acrasiomycota* (q.v.) comprising fams:

(1) **Acrasiaceae**.
(2) **Copromyxaceae**.
(3) **Guttulinopsidaceae**.
(4) **Fonticulaceae**.

acrasin, a chemotactically active substance which controls the streaming together of the myxamoebae of *Dictyostelium discoideum* (Bonner, *J. exp. Zool.* **110**: 259, 1949) and other *Acrasales*.

Acrasiomycetes, see *Acrasiomycota*.

Acrasiomycota (Acrasea, Acrasiomycetes, Acrasiales, Sorophorae), Protozoa; the acrasid cellular slime moulds; acrasids. 1 ord., 3 fam., 4 gen. (+ 3 syn.), 12 spp. Trophic phase amoeboid, pseudopodia lobose; aggregating without streaming; nuclei with a compact centrally placed nucleolus; sporocarp sessile, independent and dividing when vegetative, some with simple supportive stalks; multispored, in chains or deliminted sori; flagellate cells usually absent; sexual reproduction unknown. On dung and isolated from a wide range of decaying plant materials and macromycetes, and also soil. Ord.:

Acrasiales.

Raper (1973) included the dictyostelids (see *Dictyosteliomycota*) and protostelids (see *Myxomycota*) in the class *Acrasiomycetes*, later excluding the protostelids as a separate class (Raper, 1984). Molecular data show these three groups not to be closely allied (see Phylogeny, *Protozoa*) so they are treated in separate phyla here.

Lit.: Olive (1975), Raper (*in* Ainsworth *et al.* (Eds), *The fungi* **4B**: 9, 1973; keys gen.; *The dictyostelids*, 1984).

Acrasis Tiegh. (1880), Acrasiaceae. 2 (on beer yeast), widespr.

Acremoniella Sacc. (1886), Mitosporic fungi, 1.A2.1. 5, widespr. See Groves & Skolko (*Can. J. Res.* **24**: 74, 1946). Nom. illegit. = Harzia (Mitosp. fungi) fide Holubová-Jechová (1974).

Acremonites Pia (1927), Fossil fungi. 1 (Oligocene), Eur.

Acremoniula G. Arnaud (1954) = Acremoniula (Mitosp. fungi).

Acremoniula G. Arnaud ex Cif. (1962), Mitosporic fungi, 1.A2.1. 1 (on *Schiffnerula* and *Meliola*), widespr., trop. See Deighton (*Mycol. Pap.* **118**, 1969).

Acremonium Link (1809), Mitosporic fungi, 1.A1.15. *c.* 105 (sometimes as endophytes, then important in *Gramineae*), cosmop. Teleomorphs reported in many ascomycete groups, probably polyphyletic (Kendrick & DiCosmo, *in* Kendrick (Ed.), *The whole fungus*, 1979). See Gams (*Cephalosporium-artige Schimmelpilze*, 1971, keys; *TBMS* **64**: 389, 1975), Lowen (*Mycotaxon* **53**: 81, 1995; key 9 spp. sect. *Lichenoidea*). Samuels (*N.Z. Jl Bot.* **14**: 231, 1976; teleomorphs), Chesson *et al.* (*TBMS* **70**: 345, 1978; electrophoresis). Bałazy (*Bull. Soc. Annls Sci. Lett. Poznán* D **14**: 101, 1973; entomogenous spp.), White & Morgan-Jones (*Mycotaxon* **30**: 87, 1987; keys to sect. *Albo-lanosum*), Peberdy (Ed.) (*Biotech. Handb.* **1**, 1988; taxonomy and morphology), Pitson *et al.* (*MR* **95**: 352, 1991; β-glucanase production), Christensen *et al.* (*MR* **95**: 918, 1991; variation in endophytic spp.), Walz (*Bibl. Mycol.* **147**: 1, 1992; molecular analysis of *A. chrysogenum*), Quisenberry & Joost (Eds) (*Proc. Int. Symp Acremonium/grass Interactions*, 1990), Leuchtmann (*MR* **98**: 25, 1994; isozyme relationships of *Festuca* endophytes), Okada *et al.* (*Trans. Mycol. Soc. Jap.* **34**: 171, 1993; *A. alcalophilum*, an alkalophilic cellulolytic sp.), Christensen *et al.* (*MR* **97**: 1083, 1993; taxonomy of fescue endophytes).

Acriasaceae Poche (1913), Acrasiales. 1 gen., 2 spp. Sorocarp cells differentiated into spores and stalk cells.

acro- (combining form), at the end; apical; terminal.

acroauxic (of conidiophores), growth in length restricted to the apical region.

Acrocalymma Alcorn & J.A.G. Irwin (1987), Anamorphic Lophiostomataceae, 4.A1.15. Teleomorph *Massarina*. 1 (on *Medicago*), Australia. See Shoemaker *et al.* (*CJB* **69**: 569, 1991; teleomorph).

acrochroic, see Colour.

Acrocladium Petr. (1949) [non Mitt. (1869), *Musci*] = Periconiella (Mitosp. fungi) fide v. Arx (*Persoonia* **11**: 39, 1981).

Acroconidiella J.C. Lindq. & Alippi (1964), Mitosporic fungi, 1.C2.26. 1, widespr.

Acroconidiellina M.B. Ellis (1971), Mitosporic fungi, 1.B2.26. 4, trop.

Acrocordia A. Massal. (1854), Monoblastiaceae (L). *c.* 30, mainly N. temp. See Coppins & James (*Lichenologist* **10**: 179, 1978; UK spp.).

Acrocordiaceae, see *Monoblastiaceae*.

Acrocordiella O.E. Erikss. (1982), Pyrenulaceae. 1 (on *Ribes*), Sweden. = Requienella (Pyrenul.) fide Boise (*Mycol.* **78**: 37, 1986). See Eriksson & Hawksworth (*SA* **5**: 115, 1986).

Acrocordiomyces Cif. & Tomas. (1953) = Acrocordia (Monoblast.).

Acrocordiopsis Borse & K.D. Hyde (1989), Melanommataceae. 1, India.

Acrocorelia R. Doll (1982) nom. nud. (? Dothideales (L), inc. sed.).

Acrocylindrium Bonord. (1851), Mitosporic fungi, 1.A1.?. 3, Eur. See Gams & Hawksworth (*Kavaka* **3**: 60, 1976). ? = Sarocladium (Mitosp. fungi) fide Gams (*in litt.*).

Acrocystis Ellis & Halst. ex Halst. (1890) nom. dub. (Plasmodiophorales).

Acrodesmis Syd. (1926) = Periconiella (Mitosp. fungi) fide Ellis (1967).

Acrodictyopsis P.M. Kirk (1983), Mitosporic fungi, 1.D2.1. 1, U.K.

Acrodictys M.B. Ellis (1961), Mitosporic fungi, 1.D2.1/19. 26, widespr. See Ellis (*DH*, *MDH*).

Acrodontium de Hoog (1972), Mitosporic fungi, 1.A1.1. 9, widespr.

Acrogenospora M.B. Ellis (1971), Mitosporic fungi, 1.A2.19. 4, widespr. See Hughes (*N.Z. Jl Bot.* **16**: 312, 1978).

Acrogenotheca Cif. & Bat. (1963), Dothideales (inc. sed.). 2, trop. See Hughes (*N.Z. Jl Bot.* **5**: 504, 1967; 1976). Anamorph *Hiospira*.

acrogenous, development at the apex.

Acrogynomyces Thaxt. (1931), Laboulbeniaceae. 6, Afr.

acronema, extension of flagellum tip containing the two central microtubules but none of the nine peripheral elements.

acropetal, (1) describes chains of conidia in which the youngest is at the apex, basifugal; cf. basipetal; (2) a pattern of apical growth.

Acrophialophora Edward (1961), Mitosporic fungi, 1.A1.15. 3, Asia, Eur., Tahiti. See Samson & Mahmood (*Acta bot. neerl.* **19**: 804, 1970; key).

Acrophragmis Kiffer & Reisinger (1970), Mitosporic fungi, 1.C2.19. 1, Congo, Australia.

Acrophytum Sacc. (1883) = Cordyceps (Clavicipit.).

acropleurogenous, formed at the end and on the sides.

Acrorixis Trevis. (1860) = Thelenella (Thelenell.) p.p., Diploschistes (Thelotremat.) p.p., and ? Anthracothecium (Pyrenul.) p.p.

Acroscyphus Lév. (1846), Caliciaceae (L). 1, C. & S. Am., Asia.

Acrospeira Berk. & Broome (1857), Mitosporic fungi, 1.D2.1. 4, N. temp. See Wiltshire (*TBMS* **21**: 211, 1938).

Acrospermaceae Fuckel (1870), Ascomycota (inc. sed.). 2 gen. (+ 3 syn.), 11 spp. Stromata ± superficial, hyaline to brown, pulvinate or stipitate, composed of gelatinous pseudoparenchymatous tissue, often containing only a single ascoma; ascomata perithecial, thin-walled, the ostiole large, not periphysate; interascal tissue composed of narrow paraphyses; asci cylindrical, elongated, ? with separable wall layers, not fissitunicate, usually with a capitate apical thickening with a narrow pore; ascospores hyaline, elongate, multiseptate, not fragmenting, without a sheath.

Family of doubtful affinity; included in *Pyrenulales* by Eriksson (1982) and *Xylariales* by Barr (1994).

Acrospermoides J.H. Mill. & G.E. Thomps. (1940), Lasiosphaeriaceae. 1, USA. See Barr (*Mycotaxon* **39**: 43, 1990; posn).

Acrospermum Tode (1790), Acrospermaceae. 10, widespr. See Tonolo (*R.C. 1st Sup. Sanit.* **20**: 842, 1957), Eriksson (*Ark. Bot.* II, **6**: 381, 1967), Sherwood (*Mycotaxon* **5**: 39, 1977; posn), Webster (*TBMS* **39**: 361, 1956; conidia).

Acrosphaeria Corda (1842) = Xylaria (Xylar.) fide Læssøe (*SA* **13**: 43, 1994).

Acrospira Mont. (1857), Mitosporic fungi, 1.?.?. 1, Eur.

acrospore, an apical spore.

Acrosporella Riedl & Ershad (1977) = Cladosporium (Mitosp. fungi) fide Sutton (*in litt.*).

Acrosporium Nees (1816) nom. rej. = Oidium (Mitosp. fungi).

Acrosporium Bonord. (1851), Mitosporic fungi, 1.A1.?. 1, Germany.

acrosporogenous (of conidial maturation), cells delimited and maturing in sequence from base to apex as the tip of the conidium expands (Luttrell, 1963).

Acrostalagmus Corda (1838) = Verticillium (Mitosp. fungi) fide Hughes (1958).

Acrostaphylus G. Arnaud ex Subram. (1956), Mitosporic fungi, 1.A2.6. 8, widespr. = Nodulisporium (Mitosp. fungi) fide Jong & Rogers (1972).

Acrostaurus Deighton & Piroz. (1972), Mitosporic fungi, 1.G2.19. 1 (on ascomycete), trop.

Acrostroma Seifert (1987), Anamorphic Batistiaceae, 2.A1.15. Teleomorph *Batistia*. 1, Venezuela.

Acrotamnium Nees (1816) nom. dub. (? 'basidiomycetes') fide Donk (*Taxon* **11**: 103, 1962).

Acrotellomyces Cif. & Tomas. (1953) = Acrotellum (Verrucar.).

Acrotellum Tomas. & Cif. (1952) = Thelidium (Verrucar.).

Acrothamnium, see *Acrotamnium*.

Acrotheca Fuckel (1860) = Pleurophragmium (Mitosp. fungi) fide Ellis (*MDH*).

Acrotheciella Koord. (1907), Mitosporic fungi, 3.C2.?24. 1, Java.

Acrothecium (Corda) Preuss (1851), Mitosporic fungi, 1.C1.?. *c.* 15, widespr.

acroton, a spinule in lichens bearing side branches.

actidione, trade name for cycloheximide (q.v.).

Actidium Fr. (1815), Mytilinidiaceae. 9, Eur., N. Am. See Zogg (*Ber. Schweiz. bot. Ges.* **70**: 195, 1960; key).

Actigea Raf. (1814) = Scleroderma (Sclerodermat.).

Actigena Raf. (1814) = Actigea (Sclerodermat.).

actin, and **mycosin** are proteins associated with contraction and relaxation of muscle; also present in several lower eukaryotic organisms and responsible for the periodic reversal of protoplasmic streaming in the plasmodium of myxomycetes.

Actiniceps Berk. & Broome (1876), Pterulaceae. 5, trop. See Boedijn (*Persoonia* **1**: 11, 1959).

Actiniopsis Starbäck (1899) = Trichothelium (Trichothel.) fide Santesson (1952).

Actinobotrys H. Hoffm. (1856) = Bremia (Peronospor.) fide Saccardo (1888).

Actinocephalum Saito (1905) = Cunninghamella (Cunninghamell.) fide Hesseltine (1955).

Actinochaete Ferro (1907) nom. conf. (Mitosp. fungi) = Aspergillus (Mitosp. fungi) p.p. and Septobasidium (Septobasid.) p.p. fide Ellis (*in litt.*).

Actinocladium Ehrenb. (1819), Mitosporic fungi, 1.G2.1. 1, widespr.

Actinocymbe Höhn. (1911), Chaetothyriaceae. 1 or 2, trop.

Actinodendron G.F. Orr & Kuehn (1963) = Oncocladium (Mitosp. fungi) fide Hughes (*CJB* **46**: 939, 1968).

Actinodermium Nees (1816) ≡ Sterbeeckia (Scleroderm.).

Actinodochium Syd. (1927), Mitosporic fungi, 3.A1.3. 2, C. Am., India.

Actinodothidopsis F. Stevens (1925) = Venturia (Ventur.) fide Müller & v. Arx (1962).

Actinodothis Syd. & P. Syd. (1914) = Amazonia (Meliol.) fide Hansford (1961).

Actinoglyphis Mont. (1856) = Sarcographa (Graphid.).

Actinogyra Schol. (1934) = Umbilicaria (Umbilicar.).

actinogyrose (actinogyr) (of apothecia), disc gyrose and having no proper margin.

actinolichen, a lichen-like association between a green alga and an actinomycete (e.g. *Chlorella* and *Streptomyces* sp.; Lazo & Klein, *Mycol.* **57**: 804, 1965) occurring in nature and also in mixed laboratory cultures. See Kalakoutskii *et al.* (*Actinomycetes*, n.s. **1**(2): 27, 1990; lab. expts, bibliogr.).

Actinomadura H. Lechev. & M.P. Lechev. (1968), *Actinomycetes*, q.v.

Actinomma Sacc. (1884) = Atichia (Mitosp. fungi).

Actinomortierella Chalab. (1968) = Mortierella (Mortierell.) fide Gams (*Nova Hedw.* **18**: 30, 1969).

Actinomucor Schostak. (1898), Mucoraceae. 2, widespr. See Benjamin & Hesseltine (*Mycol.* **49**: 240, 1957), Jong & Yuan (*Mycotaxon* **23**: 261, 1985).

Actinomyce Meyen (1827) nom. dub. (? Fungi).

Actinomyces Harz (1877), *Actinomycetes*, q.v.

Actinomycetes ('Ray Fungi'). A group of morphologically diverse but usually filamentous gram positive bacteria which have sometimes been classified as Mitosporic fungi and which are still frequently referred to a mycologist for identification, esp. those pathogenic for humans to medical mycologists. *Actinomycetes* are typically saprobes (esp. in soil) but a few are pathogenic for humans, animals, and plants; some (esp. *Streptomyces*) are important sources of antibiotics (see amphotericin, cycloheximide, nystatin, streptomycin); some form lichen-like associations with green algae (see actinolichen). Some of the more common or recently described genera of *Actinomycetes*, which were omitted from the previous edition of this *Dictionary*, are included in the present edition for reference only.

Lit.: The literature on actinomycetes is extensive. Generic names are listed by Skerman *et al.* (*Approved lists of bacterial names*, Amended edn, 1989). See Williams *et al.* (Eds) (*Bergey's manual of systematic bacteriology* **4**, *The actinomycetes*, 1989), Balows *et al.* (*The procaryotes*, 2nd edn, 1992), Goodfellow *et al.* (Eds) (*Biology of the actinomycetes*, 1984), Ortiz-Ortiz *et al.* (Eds) (*Biological, biochemical, and biomedical aspects of actinomycetes*, 1984), Goodfellow *et al.* (Eds) (*Actinomycetes in biotechnology*), Goodfellow & Williams (*Ann. Rev. Microbiol.*, **37**: 189, 1983).

Actinomycites D. Ellis (1916), Fossil fungi (Actinomycetes). 1 (Jurassic), UK.

Actinomycodium K.M. Zalessky (1915), Fossil fungi (? Mitosp. fungi or Actinomycetes). 1 (Permo-Carboniferous), former USSR.

Actinomyxa Syd. & P. Syd. (1917), Microthyriaceae. 1, Australia.

Actinonema Pers. (1822) nom. dub. (Mitosp. fungi). See Sutton (*Mycol. Pap.* **141**, 1977), where interpreted as sterile mycelium, but often used for *Marssonina rosae* (teleomorph *Diplocarpon rosae*) (black spot of rose).

Actinonema Fr. (1849) = Spilocaea (Mitosp. fungi) fide Sutton (*Mycol. Pap.* **141**, 1977).

Actinonemella Höhn. (1916) = Asteroma (Mitosp. fungi) fide Sutton (*Mycol. Pap.* **141**, 1977).

Actinopelte Stizenb. (1861) = Solorinella (Solorinell.).

Actinopelte Sacc. (1913) ≡ Tubakia (Mitosp. fungi).

Actinopeltella Doidge (1924) = Actinopeltis (Microthyr.) fide v. Arx & Müller (1975).

Actinopeltis Höhn. (1907), Microthyriaceae. 10, Afr., S. Am., Eur. See Ellis (*TBMS* **68**: 145, 1977), Spooner & Kirk (*MR* 94: 223, 1990).

Actinophora Merr. (1943) ≡ Acinophora (Tulostomatales, inc. sed.).

Actinoplaca Müll. Arg. (1891), Gomphillaceae (L). 2, trop. See Vězda & Poelt (*Folia geobot. phytotax.* **22**: 180, 1987).

Actinoplacomyces Cif. & Tomas. (1953) ≡ Actinoplaca (Gomphill.).

Actinoplanes Couch (1950), *Actinomycetes*, q.v.

Actinopolyspora Gochn., K.G. Johnson & Kushner (1975), *Actinomycetes*, q.v.

Actinoscypha P. Karst. (1888) = Micropeziza (Dermat.) fide Nannfeldt (1976).

Actinosoma Syd. (1930) ? = Actinopeltis (Microthyr.). See Eriksson & Hawksworth (*SA* **9**: 6, 1991; status), Spooner & Kirk (*MR* **94**: 223, 1990).

Actinospira Corda (1854) ≡ Myxotrichum (Myxotrich.).

Actinospora Ingold (1952), Anamorphic Otideaceae, 1.G1.23. Teleomorph *Miladina*. 1 (in water), UK. See Descals (*TBMS* **67**: 208, 1976), Descals & Webster (*TBMS* **70**: 466, 1978; teleomorph).

Actinostilbe Petch (1925) = Sarcopodium (Mitosp. fungi) fide Sutton (*TBMS* **76**: 97, 1981). See Samuels & Seifert (*in* Sugiyama (Ed.) (*Pleomorphic fungi*: 29, 1987).

Actinostroma Klotzsch (1843) = Cymatoderma (Podoscyph.) fide Donk (1957).

Actinosynnema T. Haseg., H. Lechev. & M.P. Lechev. (1978), *Actinomycetes*, q.v.

Actinoteichus Cavalc. & Poroca (1971), Mitosporic fungi, 5.A1.?. 4 (L), Brazil.

Actinotexis Arx (1960), Mitosporic fungi, 5.E1.?. 1, Brazil.

Actinothecium Ces. (1854), Mitosporic fungi, 5.A1.?. 5, widespr.

Actinothecium Flot. (1855) = Verrucaria (Verrucar.).

Actinothyrella Edward, Kr.P. Singh, S.C. Tripathi, M.K. Sinha & Ranade (1974) nom. dub. (Mitosp. fungi) fide Sutton (*Mycol. Pap.* **141**, 1977).

Actinothyrium Kunze (1832), Mitosporic fungi, 5.E1.?. 10, widespr.

Actinotrichum Wallr. [not traced] nom. nud. (Mitosp. fungi) fide Sutton (*Mycol. Pap.* **141**, 1977).

Actonia C.W. Dodge (1935) nom. dub. (Fungi, inc. sed.) fide Batra (1978).

Actycus Raf. (1815) nom. dub. (Fungi, inc. sed.).

aculeate, having narrow spines (Fig. 29.3).

aculeolate, having spine-like processes.

acuminate, gradually narrowing to a point.

Acumispora Matsush. (1980), Mitosporic fungi, 1.C1/2.1. 3, Taiwan.

Acurtis Fr. (1849) nom. dub.: a sterile form of *Entoloma* (Entolomat.) fide Donk (*Taxon* **11**: 76, 1962).

acute, (1) pointed (Fig. 37.41); (2) less than a right angle.

Acutocapillitium P. Ponce de León (1976), ? Lycoperdaceae. 2, trop. Am. ? = Glyptoderma (Lycoperd.).

Acytosteliaceae Raper ex Raper & Quinlan (1958) (Acytosteliidae), Dictyosteliales. 1 gen., 4 spp. Sporocarp stalk slender and narrow.

Acytostelium Raper (1956), Acytosteliaceae. 4, widespr.

Adamson's fringe, the downward growing hyphae of a dermatophyte in the region above the bulb of a hair.

adapted race (Magnus), see physiologic race.