

# Report on the Special Committee on the Nomenclature of Fungi with a Pleomorphic Life Cycle

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**Abstract** Historically, nonlichenized fungi in two phyla, *Ascomycota* and *Basidiomycota*, with pleomorphic life cycles may have more than one acceptable legitimate name with priority given to names typified by teleomorphs. This idea has been challenged amidst considerable prolonged debate. An intermediate step towards normalized nomenclature was made in Vienna through the introduction of teleomorph epitypes. A Special Committee was formed to provide guidance on another proposal to prohibit future dual nomenclature and to review the need for Article 59. Committee membership fluctuated between ten and twelve individuals whose opinions were divided over three options: (1) delete Article 59, (2) remove the option for epitypification, or (3) revise the Article further. The Committee reached an impasse and as a body could not recommend acceptance or rejection of any particular proposal. A set of proposals discussed by the Committee is made separately and independently.

**Keywords** anamorph; teleotype

## ■ INTRODUCTION

This publication is a report ‘on’ the Special Committee rather than a report ‘of’ the Committee as is explained below.

Article 59 in the *International Code of Botanical Nomenclature (Vienna Code)* (McNeill & al., 2006), governs the naming of fungi with pleomorphic life cycles, and under some circumstances permits two or more binomial or generic names for fungi with anamorphs. Five proposals to change Art. 59 from the *St. Louis Code* (Greuter & al., 2000) by way of limiting the publication of multiple names (Hawksworth, 2004) were considered at the XVII International Botanical Congress, Vienna, Austria (McNeill & Turland, 2005). After extensive ‘friendly’ amendments from the ‘floor’ the “Provision to avoid the introduction of unnecessary teleomorph names, by designation of epitypes” (Proposal B) was approved (McNeill & al., 2005). Consequently, Art. 59.7 along with modifications to other paragraphs in Art. 59, now allows for names originally typified by an anamorph to be epitypified by a teleomorph, resulting in the conveyance of holomorphic status to that name (Art. 59. 1).

## ■ COMMITTEE MANDATE

The remaining Art. 59 proposals – lettered A, C–E (McNeill & Turland, 2005) – were referred to this ‘Special Committee on the Nomenclature of Fungi with a Pleomorphic Life Cycle’. The proposals were:

- A) Proposal to prohibit the introduction of new formal dual nomenclature in pleomorphic fungi from 1 January 2008.
- C) Provision for the use of informal designations for anamorphs.

- D) Recommendations on the use of informal designations for anamorphs.
- E) Authorize the Editorial Committee to amend cross-references in the *Code* to conform to any revisions approved in Art. 59.

The more controversial proposal was ‘A’ because it would prohibit alternate morph names by making them illegitimate. The establishment of a Special Committee on Art. 59, also provided the opportunity for mycologists to discuss Art. 59 in its entirety, including its *raison d’être* and the consequences of adopting Art. 59.7.

## ■ THE COMMITTEE

Formation of the Special Committee was delayed until the 8th International Mycological Congress in Cairns, Australia, exactly one year later (August 2006), when a public appeal was made to mycologists at the nomenclatural session to volunteer to join the Committee. On behalf of the General Committee for Botanical Nomenclature, Fred Barrie, its Secretary, appointed Amy Rossman as Chair, and Scott Redhead as Secretary of the Committee. Membership of the Committee has waxed and waned between ten and twelve members as individuals joined voluntarily or by appointment or as some left for various reasons: J.F. Bischoff (2006–present), P.W. Crous (2008–2009), W. Gams (2006–present), C.A. Grgurinovic (2006–2008), D.L. Hawksworth (2006–present), T. Hosoya (2006–2007), P.M. Kirk (2006–present), S.A. Redhead (2006–present), A.Y. Rossman (2006–present), J.P. Sampaio (2006–present), K.A. Seifert (2006–present), J.A. Simpson (2008–present), F.W. Spiegel (2006–present), M.J. Wingfield (2006–2009). Several other non-voting interested individuals received circulars for information purposes or comments.

## ■ IDEOLOGICAL IMPASSE

The Committee was unable to reach consensus or majority on any issue. After one year and six circulars that provided background and the opportunity to offer suggestions and comments, a non-binding vote was taken in July 2007 to gauge the general direction of the members' opinions. Three members equally favoured two preferences rather than one, hence each of these opinions was assigned half a vote. Of twelve voting members the votes in favour were:

- A) Delete Art. 59 in its entirety. 2.5 [21%]
- B) Return to *St. Louis Code* wording [or minor variation not allowing for epitypification with a teleomorph]. 2 [16.5%]
- C) Continue working on modifications of Art. 59 such as epitypification or variations. 7.5 [62.5%]

Based upon this non-binding vote, work continued on potentially rewording of the Article assuming that options to delete Art. 59 entirely or to revert back to the *St. Louis Code* version would not pass. Notably, the Committee was informed that Hawksworth (2007) had polled mycologists in three international meetings and found strong general support for retaining Art. 59 but with the intent to modify it to reduce and eventually eliminate dual nomenclature.

Additional ideas on rewording Art. 59 were circulated but either received little feedback or a lack of support. Consequently, to fulfil minimally the requirements of the mandate, a formal vote was taken in October 2009 on proposal 'A' as it was originally worded with minor adjustments for initiation date and article numbering:

“Proposal to prohibit the introduction of new formal dual nomenclature in pleomorphic fungi from 1 January XXXX”

Add a new Art. 59.X: “59.X. A separate name, proposed on or after 1 January XXXX, for an anamorph associated with a pre-existing named teleomorph, or for a teleomorph associated with a pre-existing named anamorph, is illegitimate (Art. 52.1) and to be rejected. Where the earliest legitimate name is that of an anamorph, an epitype exhibiting the teleomorphic state is to be selected so that the anamorph name can be used as the name of the holomorph (see Art. 59.X).”

Ballot: Do you support this proposal as it is currently worded? Yes: 6; no: 6.

The votes were split 50/50 and therefore the proposal was not supported by the required 60%. It follows that in this context Proposals C–E were unnecessary.

## ■ THE EXTERNAL MYCOLOGICAL POLITICAL ENVIRONMENT

Actions taken by various mycologists and groups since the Vienna (IBC) and Cairns (IMC) Congresses have overtaken and overshadowed the working of the Committee. A few significant examples are: Despite the opportunity provided by Art. 59.7 to epitypify anamorph-typified names with newly

discovered teleomorphs and the benefits provided by Art. 59.1, and in the absence of rules making such names illegitimate (e.g., Prop. 'A'), some mycologists continue to publish new names for nomenclatural 'new species' that are typified by the newly discovered teleomorph. High profile examples of significant economically important fungi are the new teleomorph-typified names: *Neosartorya fumigata* O'Gorman & al. (2009), *Petromyces parasiticus* B.W. Horn & al. (2009b), and *Petromyces flavus* B.W. Horn & al. (2009a) for the sexual states of *Aspergillus fumigatus* Fresen, *Aspergillus parasiticus* Speare and *Aspergillus flavus* Link respectively.

Hawksworth (2009) criticized the publication of the name *Neosartorya fumigata* and, while noting that no rules were broken, suggested that creating such a new name ran counter to current general opinion, and further suggested that mycologists continue using the name *Aspergillus fumigatus* for the holomorph (a pragmatic opinion that nonetheless runs contrary to Art. 59.1).

Independent of the Committee, Gams & al. (2010a,b) have published three more proposals regarding Art. 59, the first (Prop. 172) to delete 59.7, and the other two (173, 174) being alternatives to Prop. 172 and intended to limit application of Art. 59.7 via rules and recommendations. Gams had since 2007 shared with the Committee various versions of his manuscript. Returning to the *St. Louis Code* version of Art. 59 received little support in the Committee.

Aime & Phillips-Mora (2006) published the new combination *Moniliophthora perniciosa* (Stahel) Aime & Phillips-Mora that combined the teleomorph-typified epithet from the name *Marasmius pernicius* Stahel, with the presumably anamorph-typified generic name *Moniliophthora* for the fungal causal agent of witches broom of cacao. This case remains ambiguous because it is not known if the phylogenetically congeneric taxa have two kinds of teleomorphic morphs.

Some authors have 'epitypified' anamorph types, following Art. 59.7 after the discovery of new teleomorphs, e.g., the holotype of *Fusarium tucumaniae* T. Aoki & al. was epitypified with a teleomorph-bearing specimen by Covert & al. (2007). Alternatively, the holotype of the anamorphic *Readeriella mirabilis* Syd. & P. Syd., was epitypified by another anamorphic specimen by Crous & al. (2009a). This action would prevent future epitypification with any newly discovered teleomorph because Art. 9.18 blocks multiple epitypifications.

Some authors have created their own rules of nomenclature for specific publications. Crous & al. (2009b) abandoned Art. 59 at the generic rank, adopting the oldest legitimate generic name regardless of anamorph or teleomorph typification, e.g., the teleomorphic generic name *Mycosphaerella* Johanson [1884] is abandoned in favour of the anamorphic name *Ramularia* Unger [1833]; the teleomorphic *Cymadothea* F.A. Wolf [1935] is abandoned for the anamorphic *Polythrincium* Kunze [1817]. However, for species and subspecific names, they preferentially adopted the oldest teleomorph-typified name over anamorph-typified names except in selected cases chosen by them. *Zasmidium citri* (Whiteside) Crous 'comb. nov.' (Crous & al., 2009b: 105) was based upon *Mycosphaerella citri* Whiteside [1972]. This combines a teleomorphic species epithet

with an anamorphic generic name. They failed to follow completely the philosophical position of ignoring of Art. 59, i.e., adoption of the oldest legitimate name at any rank because they did not adopt the oldest legitimate species epithet which is anamorphic, i.e., *Cercospora citri-grisea* F.E. Fisher [1961]. Similarly, *Readeriella dendritica* (Crous & Summerell) Crous & Summerell 'comb. nov.' was based on *Mycosphaerella dendritica* Crous & Summerell [2007] and not the listed synonym, *Spilomyces dendriticus* Hansf. [1956].

Faced with such contradictory actions, even by members of the Committee, the Secretary concluded that the Committee was dysfunctional. Efforts to reconcile differences were placed on hold at the end of 2009 and awaited guidance from the 9th International Mycological Congress, August 1–6, 2010. A separate report from that Congress by Norvell & al. (2010) reports that mycologists were equivocal about continuing to use Art. 59 to allow dual nomenclature. However, a return to the *St. Louis Code* wording was rejected. Significant majorities favoured continued use of 'epitypification' via Art. 59.7, using a new term, 'teleotypification' (see Redhead, 2010), and in prohibiting publication of alternative names as is currently allowed by Art. 59. There was some support for Prop. 'A' but the wording was not discussed. Although the vote to continue to use Art. 59 was split, a majority favoured elimination of Art. 59 totally, but this is qualified by the desire not to do this drastically. These seemingly contradictory opinions accurately reflect the deep divisions and uncertainty within the mycological community.

## ■ OBSERVATIONS BY THE SECRETARY

As an alternative to modifying Art. 59, some members advocated removal of the article. However, total removal of Art. 59 would delete from the *Code* any reference to anamorphs or teleomorphs or past applications. Therefore it would be preferable to leave a reminder to assist in future applications of the *Code*. Neither within the Committee nor outside of it have any proposals been made to cover such a situation.

Deletion of Art. 59 would have the following results: (1) Without limitation the effect would be retroactive. (2) All fungal names would have equal status under the *Code*. (3) The earliest valid name that is legitimate would have priority.

Article 34.2 renders all names based on the same type appearing simultaneously on or after 1 January 1953 not validly published. It is possible that simultaneously published teleomorph names and anamorph names (if based upon the same type specimen) may be declared not validly published unless Art. 34.2 were reworted.

Article 52.1 makes superfluous names illegitimate. If simultaneously published names for the same taxon (anamorph & teleomorph or synanamorph) are not based on the same type, they could be validly published but be illegitimate. This article would need to be modified as would Art. 51.1. Similarly, for later named anamorphs or teleomorphs directly linked to the earlier names, most would become illegitimate. This applies to both species names and generic names. Notably if a generic name is illegitimate (because it was taxonomically

superfluous), then any family name based upon it would become illegitimate (Art. 18.3). The number of affected names at the species and generic levels is unknown. This article could be reworted.

A peculiar situation may arise regarding homonyms or potential homonyms, where a later species name bearing the same final epithet was published but would be illegitimate if Art. 59 were removed because the alternative name would be considered to have been superfluous if it were taxonomically linked to the other morph when published. If it were the earliest combination in the currently preferred generic name for the species, it could not be adopted because it would be illegitimate (Art. 52.1) and on the other hand the earliest published legitimate name could not be combined with the desired generic name without creating a later homonym (Art. 53.1). Therefore an alternative species epithet would be needed – either from synonymous names or by the creation of a nomen novum. This is a technically correct yet almost needless nomenclatural exercise that would generate more names. Alternatively, conservation would be required. The number of such cases is unknown.

## ■ CLOSING NOTES

Very few mycologists exist who have sufficiently broad taxonomic knowledge or sufficient interest to understand the full repercussions of eliminating Art. 59 upon current nomenclature. Additionally, almost no mycologist has been able to keep abreast of the phylogenetic revelations in different fungal taxonomic groups and none can foresee all the potential consequences. Because of time constraints it would seem that each member looked only at their own selected fungal groups of interest, making it difficult to impossible to engage with others on the specifics of other taxonomic groups. The inability of this Committee to make progress may fuel the urge to abandon the *Code* entirely by future taxonomists, but it is doubtful if disinterested or frustrated individuals could write a better *Code* and hope that other taxonomists would follow their rules. However, a future Special Committee could draft new rules if given a clear directive to accomplish a specific goal as a mandate rather than deal with conflicting ideologies.

It is suggested that a new Special Committee be convened with a mandate to phase out dual nomenclature, which would eliminate the option of returning to the *St. Louis Code* wording. Additionally, some ideas regarding changes to Art. 59 that were circulated within the Committee enjoyed moderate levels of support and they and a few additional proposals are submitted in another article (Redhead, 2010) for further debate prior to the IBC.

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