

Clarifications needed concerning the new Article 59 dealing with pleomorphic fungi

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Abstract: The new rules formulated in Article 59 of the *International Code of Nomenclature for algae, fungi, and plants* (ICN) will cause numerous, often undesirable, name changes, when only phylogenetically defined clades are named. Our task is to name fungal taxa and not just clades. Two suggestions are made here that may help to alleviate some disadvantages of the new system. (1) Officially an epithet coined in a list-demoted genus that is older than the oldest one available in the list-accepted genus would have to be recombined in the accepted genus. We recommend that individual authors and committees establishing lists of protected names should generally not recombine older epithets from a demoted genus into the accepted genus, when another one from pre-2013 is available in that genus. (2) Because the concepts of correlated teleomorph and anamorph genera are often incongruent, enforced congruence leads to a loss of information. Retaining the most suitable generic name is imperative, even when this is subordinated to another, list-accepted, generic name. Some kind of cryptic dual generic nomenclature is bound to persist. We therefore strongly recommend the retention of binomials in genera where they are most informative. With these recommendations, the upheaval of fungal nomenclature ensuing from the loss of the former Art. 59 can be reduced to an unavoidable minimum.

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INTRODUCTION

The new ruling and abandonment of the former Article 59 of the *International Code of Botanical Nomenclature* (ICBN) not only has abandoned the intricacies of dual nomenclature for pleomorphic fungi but also sacrificed the formerly recognized precedence of teleomorph-typified names over those of the associated anamorphs (McNeill *et al.* 2012). This precedence was not an expression of sexism, but it simply recognized that with the description of a teleomorph–anamorph association the knowledge of a fungus was more complete and more thorough than without it. It is not a matter of chance that the suprageneric classification is and remains generally based on teleomorph names. According to the new rules, many teleomorph-generic names will have to be replaced by older anamorph-generic names in cases where each morph of a fungus can unequivocally be tied to a particular taxon.

Hawksworth (2012) analyzed the consequences of the new rules in coping with the names involved in a period of transition. He did, however, not question the rigid priority of

all kinds of names and analyze and propose a solution for the two problems addressed here. The examples below are given not to criticize the respective authors, who tried to find the best solution for a difficult nomenclature. For example, when an author did not give preference to the older anamorph-generic name against the corresponding teleomorph name, he/she still followed the new *Code* correctly which states (Art. 14.13 ICN): “...lists of names may be submitted to the General Committee, which will refer them to the Nomenclature Committee for Fungi (see Div. III) for examination by subcommittees established by that Committee in consultation with the General Committee and appropriate international bodies. Accepted names on these lists, which become Appendices of the *Code* once reviewed and approved by the Nomenclature Committee for Fungi and the General Committee, are to be listed with their types together with those competing synonyms (including sanctioned names) against which they are treated as conserved (see also Art. 56.3).” These lists do thus not dictate that a particular taxonomy has to be adopted; that choice remains a matter of judgement; the list indicates only the

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choice of names in whatever taxonomy an author wishes to adopt. We maintain that it is important that the list entries not be made before a careful analysis and a decision taken by the competent committees. We are aware that difficulties may have arisen from misleading formulations in the *Code* and thus indicate the need for clarification.

Gams *et al.* (2012) pointed out the desirability of calling the preferred/listed names “prioritized” to distinguish the situation from that of conservation. The opposite would have been a “suppressed” name (which in certain situations can still be used). This terminology is not sufficiently clear and may cause misunderstandings. Therefore we speak now of list-accepted and list-demoted names, in order to distinguish the situation from that of conservation/rejection.

CLARIFICATIONS REQUIRED

I. The new rules would imply that an older epithet coined in a list-demoted genus has to be recombined in the list-accepted genus

This would entail a very high number of undesirable name changes in some genera.

Examples

(1) If the genus name *Trichoderma* 1794 is listed with preference over *Hypocrea* 1825, the older epithet of *Hypocrea schweinitzii* (Fr. 1828) Sacc. 1883 would have to be recombined in *Trichoderma*, displacing the established name *Trichoderma citrinoviride* Bissett 1984. This is fortunately not done by Samuels *et al.* (2012). Conversely, according to this suggestion, the now established name *Hypocrea citrina* (Overton *et al.* 2006) would have to be called *Trichoderma lacteum* Bissett 1992, a so far hardly used name that may also not be desirable, because *Hypocrea lactea* is now regarded as a synonym of *H. citrina*. Thus a critical judgement is required when establishing a list of accepted names.

(2) Hirooka *et al.* (2011), in a paper written just before the new rules were set, retained *Nectria canadensis* Ellis & Everh. 1884, although the anamorph name *Tubercularia grayana* (Sacc. & Ellis 1882) Seifert 1985 is older. Similarly: *Nectria pseudotrichia* Berk. & M.A. Curtis 1853 is predated by the anamorph *Tubercularia lateritia* (Berk. 1843) Seifert 1985 but not replaced nomenclaturally. Note that the generic name *Nectria* (Fr. 1825) Fr. 1849 also is younger than *Tubercularia* Tode 1790, but obviously deserves preference.

(3) *Orbilia brochopaga* (Drechsler 1937) comb. nov. would have to be introduced to replace *Orbilia orientalis* (Raitv. 1991) Baral 1999, simply because of the available older anamorph epithet of *Drechslerella brochopaga* (Drechsler 1937) M. Scholler *et al.* 1999. More about this question below.

Comments

The new wording of Art. 59 may be misleading in this respect. Its explicit statement that names introduced before 2013 separately for teleomorphs and associated anamorphs are not automatically each other's (legitimate or illegitimate) synonyms as they are based on different types permits

retention of either name. Braun (2012) rightly emphasized that “names published prior to 1 January 2013 for the same taxon, but based on different morphs, are neither considered to be alternative names according to Art 34.2 nor superfluous names according to Art. 52.1, i.e. they are legitimate (if not illegitimate due to other reasons). Such synonyms are valid names, and valid names remain available for use.”

Therefore individual authors and committees establishing lists of protected names should generally not recombine older epithets from a list-demoted genus into the list-accepted genus, when another one from pre-2013 is already available in that genus. This is in line with the botanical ‘Kew Rule’, adopted in the first volumes of *Index Kewensis* but never in the *Code*, which says: “Under this rule, priority within a genus was reckoned from the date when a specific epithet was first associated with that generic name. Older epithets, previously associated with species placed in other genera, were ignored” (Stevens 1991).

II. Presently the concepts of correlated teleomorph and anamorph genera are often incongruent, while both of them are meaningful. Enforcing congruence leads to unnatural and unworkable Procrustean¹ beds and loss of information

In such cases, retaining the most suitable generic name is imperative, even when this is subordinated to another list-accepted generic name. Many ‘orphan’ species (Hawksworth 2012) remain anyhow, which cannot yet be properly classified.

Examples

(1) Crous *et al.* (2009) found *Mycosphaerella sensu stricto* to phylogenetically coincide with species having anamorphs in *Ramularia*, and gave preference to binomials in that genus, but the same author (Crous 2009) happily continued to use the generic name *Mycosphaerella* for the hundreds of species that are not yet phylogenetically reorganized.

(2) *Scopulariopsis* Bainier 1907 is predated by the associated teleomorph-generic name *Microascus* Zukal 1885, but older than *Kernia* Nieuwl. 1916, which also has *Scopulariopsis* anamorphs. Merging these genera into one would be confusing and undesirable.

(3) In the monophyletic genus *Hypocrea*, a name to be subordinated under the older anamorph name *Trichoderma*, as accepted by a majority of members of the International Subcommittee on *Trichoderma* and *Hypocrea* (ISTH), certain species lack an anamorph or have anamorphs quite different from *Trichoderma*. Would it not be the best solution to simply retain these in *Hypocrea*?

(4) In the example of *Orbilia*, discussed under “I” above, it would be the simplest solution to retain for the species in question the anamorph name *Drechslerella brochopaga*, because the generic name *Drechslerella*, like *Arthrotrichia*

¹Procrustes, in Greek mythology, a son of Poseidon who placed his guests on an iron bed, stretching them or cutting off their legs, so as to force them to fit the size of the bed.

and other anamorph-generic names for nematode-trapping species, conveys phylogenetic and ecological information that would be lost by merging all species in *Orbilia*. Unpublished morphological and phylogenetic data on a vast number of species of *Orbiliaceae* indicate that the nematode-trapping fungi form a comparatively young clade out of many further taxonomic groups that comprise very numerous species. These remaining groups are rather well-defined by teleomorphic features and possess various other, non-nematophagous anamorphs. When treating the nematode-trapping group as three or four different genera, the remaining groups would then need to be handled similarly. The associated anamorphs are only diagnostic for some of these genera in regard to conidial morphology, and trapping organs are unknown in all of them. Hence, a classification according to teleomorph and DNA characteristics may be the preferable option.

Classifying the nematode-trappers in the genera *Arthrobotrys*, *Drechlerella*, *Dactylellina* and *Gamsylella*, as proposed by Scholler *et al.* (1999), may be the beginning of a generic inflation. Such a procedure could eventually lead to the erection of numerous genera within the large genus *Orbilia* as presently circumscribed. As a further complication, trapping organs are also known in *Lecophagus* and *Hyalorbilia*, two quite basal genera of the *Orbiliomycetes* with no genetic connection to the nematode-trapping taxa.

(5) *Cordyceps militaris* (L. 1753) Link 1833 is the oldest and indispensable name of a well-known fungus, in contrast to its still not definitely named and less known *Lecanicillium* anamorph. It would, however, be totally irresponsible to combine all species of the paraphyletic genus *Lecanicillium* into *Cordyceps*.

Comment

Some kind of cryptic dual generic nomenclature is therefore bound to persist. For binomials of species it will be easier to choose the most plausible unique name. Many systematists seem to forget that our task is to name fungal taxa, and not just clades. We therefore strongly recommend **to retain binomials in genera where they are most informative**. When following these recommendations, the upheaval of fungal nomenclature ensuing from abandoning the old Art. 59 can be reduced to an unavoidable minimum.

CONCLUSION

At the moment we can only offer guidelines for taxonomic revisions and the work of committees involved in establishing lists of names to be protected. It is hoped that such mechanisms of fine-tuning will eventually also find their way into subsequent editions of the *Code*.

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