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ARTICLE

The impacts of the discontinuation of dual nomenclature of pleomorphic fungi: the trivial facts, problems, and strategies

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Abstract: The symposium "One fungus = Which name" held in Amsterdam 12–13 April 2012, addressed the drastic changes in the naming of pleomorphic fungi adopted by the 18th International Botanical Congress in Melbourne in 2011. Possible solutions and ways to face resulting problems were suggested. The fundamental change is that under the new rules fungi in future will be treated nomenclaturally like plants and all other groups of organisms ruled by the ICN, i.e. with one correct name for each species. Numerous discussions and statements during the Symposium reflected widespread anxieties that these rules could negatively influence taxonomic work on pleomorphic fungi. However, they are groundless, being based on misunderstandings and confusion of nomenclature and taxonomy. With pleomorphic fungi, taxonomists will in future have to answer the question whether different morphs can represent one fungus (taxon), but this remains a taxonomic decision and has nothing to do with nomenclature. Furthermore, the ICN does not and cannot rule on how this decision is made. Thus it cannot provide rules based solely on methods involving morphology *in vivo* or *in vitro*, molecular analyses, physiological and biochemical data, inoculation experiments in pathogenic groups or any other methods or combinations of them. It is up to the taxonomist to select appropriate methods and to decide which data are sufficient to introduce new taxa. Some future problems and strategies around the application of anamorph- and teleomoph-typified taxon names (genera and species), are discussed here, using the recently monographed powdery mildews (*Erysiphales*) as an example.

Key words:
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INTRODUCTION

During the KNAW-CBS Fungal Diversity Centre-organized symposium "One fungus = One name" held in Amsterdam in April 2011 ways to overcome dual nomenclature in pleomorphic fungi were discussed culminating in the "Amsterdam declaration" (Hawksworth *et al*. 2011) with recommendations on how to deal with such fungi in future. However, all aspects of this declaration did not receive general acceptance, and opposing arguments were also presented and published (Gams *et al*. 2011). A few months later, the sweeping decisions of the 18th International Botanical Congress in Melbourne, Australia, in July 2011 nullified the opposing viewpoints, discussions and proposals of the first Amsterdam Symposium, rendering the Amsterdam Declaration a 'fait accompli'.

Various proposals to emend the International Code of Botanical Nomenclature adopted by the Melbourne Congress caused worldwide surprise to most mycologists and can be considered revolutionary. The possibility to publish valid diagnoses or descriptions of new taxa in English besides Latin in future, the recognition of effective electronic publications of new taxa under certain, defined conditions, the mandatory requirement to deposit new fungal names in a recognized repository, the renaming of the *Code* (now the "International Code of Nomenclature for algae, fungi, and plants"), and some other changes have been accepted by the overwhelming majority of mycologists and are welcome. Detailed discussions and explanations of the Melbourne decisions have been published by Hawksworth (2011), Knapp *et al*. (2011), and Norvell (2011). However, the abolition of the special provisions of the previous Art. 59 of the ICN, allowing the separate naming of morphs of pleomorphic fungi, which was based on the most drastic 'floor' proposal concerning this Article made by Scott A. Redhead (the Secretary of a Committee appointed by the Vienna Congress in 2005 to address this matter) among two other less drastic ones (Norvell 2011), was unexpected and a shock to most mycologists. After the first shock, followed by deeper objective considerations of the consequences, advantages and disadvantages of the

new rules for fungi I came to the conclusion that these drastic changes are probably the best solution, since they provide a good prospect of more stability and flexibility in future and should prevent endless discussions and attempts to modify the old Art. 59. However, reactions and comments by numerous mycologists worldwide after the first symposium held in Amsterdam in 2011 ("One fungus = One name") and the Melbourne decisions, as well as various discussions during the second Amsterdam conference in 2012 ("One fungus = Which name?") revealed widespread anxieties that the new rules could negatively influence future taxonomic work with pleomorphic fungi. Viewed objectively, however, most of the discussed problems and obvious reservations are mainly based on a confusion of nomenclature and taxonomy, i.e. they have nothing to do with the changed rules and reflect a widespread misunderstanding concerning the function of the *Code*.

Various problems and open questions have already been addressed by Gams *et al*. (2012), and the present paper adds to the debate by addressing some further more minor points. Strategies to overcome problems and to prepare the mycological community for the enormous load of work caused by the new rules are also discussed using powdery mildews (*Erysiphales*) as an example. Comments, explanations and proposals summarized in this paper are based on a lecture given during the second Amsterdam symposium, discussions during this meeting, and other critical notes, enquiries and discussion between the first and second Amsterdam symposia.

GENERAL NOTES, PROBLEMS, AND STRATEGIES

Special problems at the generic level

At the generic level, the new rules provide obvious advantages and more freedom for the application of anamorph-typified genus names, which are now treated equally for priority purposes, so that they may now be used as holomorph names, i.e. for all morphs belonging to one fungus. Names of an anamorph-typified genus and a teleomorph-typified genus now compete nomenclaturally, if they belong to one taxon ("one fungus"). If in this case the anamorph genus represents the oldest valid and legitimate name, and it is the most widely used and preferred, (e.g. *Aspergillus*, *Cladosporium*, *Penicillium*), this name has priority over any younger meiosporic genus and can be applied and used immediately as the name for all morphs involved (holomorph). This applies, for instance, in the case of *Cladosporium* Link 1816, v. *Davidiella* Crous & U. Braun 2003. If anamorph-typified genera are younger but nevertheless preferred, proposals may be made in future to accept these genus names. If a teleomorph-typified genus name is younger, it may also be proposed as the name for all morphs. The procedures for such proposals, which can be submitted as Lists of entire fungal groups, are outlined in Art. 4.13 and Art. 56.3 of the new version of the *Code*. Hence, in future we have a high degree of flexibility in the application of competing names at generic rank.

However, problems in the application of genus names are usually connected with their typification and taxonomic implications. Anamorph as well as teleomorph genera are ruled by typification, i.e. by their type species. In cases where we indeed have "one fungus" that deserves "one name", decisions regarding synonymy can be made on the basis of molecular examinations (preferred), associated development of anamorphs and teleomorphs in culture or any other methods. This is not under the jurisdiction of the *Code*. As the application of all fungal names is ruled by their types, it is necessary to have convincing data for the type species of both, the anamorph-typified genus and the teleomorph-typified genus, showing that the taxa concerned are, indeed, congeneric. However, we have often only molecular or other indications that certain anamorph and teleomorph genera are probably congeneric merely based on data derived from non-type species. Fortunately in such cases, the synonymy of these generic names can also be proposed. This is then just a taxonomic decision leading to a proposal which in any case is allowed and is not under the jurisdiction of the *Code*. The *Code* only rules which name has to be adopted in this case of facultative synonymy. Any treatments and concepts of genera are possible, e.g. widening or reducing the circumscriptions, and in an extreme case reducing them to a monotypic genus only containing the type species, and these modifications are only nomenclaturally, not taxonomically, ruled by the *Code*.

Other problems, also discussed during the Amsterdam Symposium in April this year, concern the naming of often numerous phylogenetically unproven species previously assigned to a certain anamorph genus whose name, based on its type species, is now considered synonymous with (part of) a holomorph name. Allocations of species to certain genera are taxonomic decisions, not ruled by the *Code*, and can be done on the basis of any method, ranging from morphology to molecular sequence analysis. If an anamorph-typified generic name is reduced to synonymy with a teleomorph-typified generic name, based on molecular data referring to their two type species, it would be theoretically possible, but not in all cases advisable, to re-allocate all species names previously assigned to the anamorph genus to the teleomorph genus name that now has priority. The phylogenetically unproven species can be retained in the anamorph genus, which is then only a facultative (heterotypic) synonym.

According to the new Art. 59, 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, such anamorph generic names may be retained and used for morphologically similar species with unproven phylogenetic affinity. Another case concerns the names of anamorph-typified genera having priority over competing names of teleomorph-typified genera or younger names being given priority following a proposal to use them in future for all morphs. In these cases, all species with unproven affinity may remain alongside type species with proven phylogenetic affinity and other phylogenetically proven species awaiting future clarification of their status and affinity. This is possible and may be advisable since any assignment of species to a genus is just a taxonomic decision, as explained above. The only alternative would be to re-allocate such unproven species to another genus, if

available, or even to introduce a new genus for them, which would result in numerous new genera and new combinations. That is not quite what was intended by the new rules. In such cases, the genera concerned remain paraphyletic or even polyphyletic for a certain time until the phylogenetic positions of all species assigned to these genera are known and confirmed. This is acceptable and possible in the interim. Monophyletic genera are the goal, but it will be a long time before all fungal genera can be correctly assigned in this way. For a considerable period of time we will need paraphyletic and even polyphyletic genera. These must be recognized as recently emphasized by Gams *et al*. (2012) with whom I fully agree.

As already mentioned, concepts and circumscriptions of genera, including phylogenetic aspects (monophyly, paraphyly, polyphyly) are taxonomic decisions not under the jurisdiction of the *Code*. First priority should be given to the biodiversity at species level. All newly encountered species have to be named so that they are determinable for all users, ranging from ecologists, phytopathologists, physicians engaged in human pathogenic fungi to researchers in fungal genetics and physiology. The correct allocation to an appropriate, whenever possible monophyletic, genus is important, but has only secondary priority.

Facts and problems at the species level and below

Changes in the *Code* become immediately effective when ratified by the final Plenary Sesssion of an International Botanical Congress, unless another date is specified. In the case of dual nomenclature, this ended on 30 July 2012, from which date anamorph-typified and teleomnorph-typified names compete on an equal nomenclatural footing. However, a period of immunity to the end of 2012 was allowed so as not to disrupt works in press which introduced new names for different states of the same species. Thus, as Hawksworth (2011: 158) stressed, “After 1 January 2013, one fungus can only have one name, the system of permitting separate names to be used for anamorphs then ends”. This statement is not wrong, but needs to be clarified as it can cause misunderstandings and confusion since it only refers to new names introduced after 1 January 2013. As already mentioned above, names based on different morphs for the same taxon published before 1 January 2013, are to be considered neither as alternative nor nomenclaturally superfluous names (according to Art. 59 of the Melbourne *Code*). Hence, such names, including those of anamorphs, remain legitimate but compete with teleomorph-typified names.

Another question concerns the conditions applying when one fungus can only have one name in future. The future introduction of alternative names for different morphs is only forbidden if an author definitely states that the morphs concerned belong to one fungus (taxon), independent of the scientific methods that led to this conclusion. If such a statement (or taxonomic treatment) is lacking, possibly due to uncertainty on the part of an author, it will still be possible in future to give two names. Furthermore, other authors could come to a more definite conclusion. They might, for instance, state that the merging of the two morphs in one fungus is incorrect and not justified, e.g. due to different cryptic taxa being involved and confused. Then the statement that only one fungus is present cannot be upheld and the two morphs must be given separate names. This is again solely a taxonomic decision.

Another possible scenario concerns two different morphs independently and validly described by different authors as new species after 1 January 2013. When the two morphs (species) later prove to be conspecific, they have to be merged under application of the priority rule, i.e. the younger name just becomes a heterotypic synonym of the older one but remains legitimate and valid. This is another example where in future, after 1 January 2013, one fungus may have two legitimate and valid names.

Implication of nomenclature and taxonomy

“One fungus = One name” is the premise of the changed Article 59 of the Melbourne *Code*, but the basic question is which criteria should be used to decide whether different morphs actually belong together as one fungus (taxon). It is solely up to the taxonomist to determine these criteria and the methods to answer this question (in this respect previous practices are not different). This question cannot be answered by the *Code*, and it is not the role of the *Code* to define criteria for “one fungus”. These criteria are tightly connected with technical possibilities and methods of taxonomic work that develop continuously and often rapidly. The *Code* simply rules the nomenclature and was not created to interfere in taxonomic questions and decisions. Any method is just a method and not sacrosanct; even molecular results are often debatable and open to interpretation. There are still many unanswered questions, many of which may never be finally answered as they depend on scientific (technical) progress. For instance: is a certain difference in the ITS sequences sufficient? Do we need several markers? If so, which markers and how many at different taxonomic levels? What percentage of genetic similarity of samples (populations) is sufficient to classify them as a single species? Do connections between anamorphs and teleomorphs have to be sufficiently proven by molecular analyses? Etc. Different authors will have different opinions and answers to these questions, and we cannot expect to reach any kind of general agreement on them. Authors will be influenced by differences in circumscriptions of taxa, e.g. whether they are *sensu lato* or *sensu stricto,* the presence of different evaluations of certain characters, the discovery of cryptic species, etc. Taxonomy is always a combination of objective facts and subjective interpretations of results. Hence, even uniform data may result in different taxonomic conclusions by different authors. There are no objective, universal criteria for, and definitions of, taxonomic ranks like order, family or genus, and the most difficult lasting problem concerns the question “what is a species?” Indeed, it is often quoted that a ‘species’ is in the eye of the beholder! There is no general answer, but careful individual taxonomic interpretations are necessary for any particular taxon. Different taxonomic concepts and interpretations are always in competition with each other, and the best solutions prevail, following their eventual adoption by applicants and users of names. We had good and bad taxonomy in previous times and will have it in future, but whether it is good or bad does not depend on the methods applied, and taxonomy

Table 1. Current names in *Erysiphales* proposed for inclusion in a List of accepted names where there is an earlier anamorph-typified name available (placed in **bold** type and listed as a synonym).

Erysiphe arcuata U. Braun, S. Takam. & Heluta**,** *Schlechtendalia* **16**: 99 (2007).
Synonym: **Oidium carpini** Foitzik, *in* Braun, *Powdery Mildews Eur.*: 222 (1995).

Erysiphe azaleae (U. Braun) U. Braun & S. Takam., *Schlechtendalia* **4**: 5 (2000).
Basionym: *Microsphaera azaleae* U. Braun, *Mycotaxon* **14**: 370 (1982).
Synonym: **Oidium ericinum** Erikss., *Meddn Kungl. Landtbr.-Akad. Exper.* **1**: 47 (1885).

Erysiphe buhrii U. Braun, *Česka Mykol.* **32**: 80 (1978).
Synonyms: *Erysiphe pisi* var. *buhrii* (U. Braun) Ialongo, *Mycotaxon* **44**: 255(1992).
Oidium dianthi Jacz., *Karm. Opred. Gribov* **2 (***Muchnisto-rosyanye griby*): 461 (1927).

Erysiphe caricae U. Braun & Bolay, *in* Bolay, *Cryptog. Helv.* **20**: 46 (2005).
Synonyms: *Oidium caricae* F. Noack, *Bol. Inst. Agron. Estado São Paulo* **9**: 81 (1898).
Acrosporum caricae (F. Noack) Subram., *Hyphomycetes*: 835 (1971).
Oidium papayae Marta Sequ., *Garcia de Orta*, *sér. Est. Agron.* **18**: 24 (1992).

Erysiphe catalpae S. Simonyan, *Mikol. Fitopatol.* **18**: 463 (1984).
Synonym: **Oidium bignoniae** Jacz., *Ezhegodnik* **5**: 247 (1909).

Erysiphe celosiae Tanda, *Mycoscience* **41**: 15 (2000).
Synonym: **Oidium amaranthi** R. Mathur *et al.*, *Indian Phytopath.* **24**: 64 (1971).

Erysiphe cruciferarum Opiz ex L. Junell, *Svensk. Bot. Tidskr.* **61**: 217 (1967).
Synonyms: *Erysiphe cruciferarum* Opiz, *Lotos* **5**: 42 (1855), *nom. inval.* (Art. 32).
E. pisi var. *cruciferarum* (Opiz ex L. Junell) Ialongo, *Mycotaxon* **44**: 255 (1992).
Oidium matthiolae Rayss*, Palestine J. Bot.*, *Jerusalem ser.* **1**: 325 (1940) [“1938–1939”].

Erysiphe oehrensii (Havryl.) U. Braun & S. Takam., *Schlechtendalia* **4**: 11 (2000).
Basionym: *Microsphaera oehrensii* Havryl., *Mycotaxon* **49**: 259 (1993).
Synonym: **Oidium robustum** U. Braun & Oehrens, *Mycotaxon* **25**: 268 (1986).

Erysiphe quercicola S. Takam. & U. Braun, *Mycol. Res.* **111**: 819 (2007).
Synonym: ***Oidium anacardii*** Noack, *Bol. Inst. Estado São Paulo* **9**: 77 (1898).

Golovinomyces biocellatus (Ehrenb.) Heluta, *Ukr. bot. Zh.* **45**(5): 62 (1988).
Basionym: *Erysiphe biocellata* Ehrenb., *Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur.* **10**: 211 (1821).
Synonyms: *Erysibe biocellata* (Ehrenb.) Link, *Sp. Pl.*, edn 4, **6**(1): 109, 1824) [as ‘*biocellaris*’].
Oidium erysiphoides Fr., *Syst. mycol.* **3**: 432 (1832).

Golovinomyces magnicellulatus (U. Braun) Heluta, *Ukr. bot. Zh.* **45**(5): 63 (1988).
Basionym: *Erysiphe magnicellulata* U. Braun, *Feddes Repert.* **88**: 656 (1978).
Synonyms: *E. cichoracearum* var. *magnicellulata* (U. Braun) U. Braun, *Nova Hedwigia* **34**: 695 (1981).
Oidium drummondii Thüm., *Mycoth. Univ* **12**: no. 1177 (1878).

Golovinomyces sonchicola U. Braun & R.T.A. Cook, *in* Cook & Braun, *Mycol. Res.* **113**: 629 (2009).
Synonym: **Oidium sonchi-arvensis** Sawada, *Bull. Dept. Agric. Gov. Res. Inst. Formosa* **24**: 34 (1927).

Golovinomyces verbasci (Jacz.) Heluta, *Ukr. bot. Zh.* **45**(5): 63 (1988).
Basionym: *Erysiphe cichoracearum* f. *verbasci* Jacz., *Karm. Opred. Gribov* **2 (***Muchnisto-rosyanye griby*): 224 (1927).
Synonyms: *E. verbasci* (Jacz.) S. Blumer, *Beitr. Krypt.-Fl. Schweiz* **7**(1): 284 (1933).
Oidium balsamii Mont., *Ann. Mag. Nat. Hist.*, sér. 2, **13**: 463 (1854).

Leveillula rutae (Jacz.) U. Braun, *in* Braun & Cook, *CBS Biodiversity Series* **11**: 205 (2012).
Basionym: *Leveillula taurica* f. *rutae* Jacz., *Karm. Opred. Gribov* **2 (***Muchnisto-rosyanye griby*): 417 (1927).
Synonyms: *L. rutae* (Jacz.) Durrieu & Rostam, *Cryptog. Mycol.* **5**: 291 (1985) [“1984”]; *comb. inval.* (Art. 33.3).
Oidium haplophylli Magnus, *Verh. zool.-bot. Ges. Wien* **50**: 444 (1900).
Ovulariopsis haplophylli (Magnus) Trav., *Atti Accad. Sci. Veneto-Trentino-Istriana* **6**: 1 (1913).

Table 1. (Continued).

Oidiopsis haplophylli (Magnus) Rulamort, *Bull. Soc. Bot. Centre-Ouest* **17**: 191 (1986).

Phyllactinia ampelopsidis Y.N. Yu & Y.Q. Lai, *Acta Microbiol. Sin*. **19**: 14 (1979).
Synonym: **Ovulariopsis ampelopsidis-heterophyllae** Sawada, *Bull. Dept. Agric. Gov. Res. Inst. Formosa* **61**: 8 (1933).

Phyllactinia chubutiana Havryl. *et al*. *Mycoscience* **47**: 238 (2006).
Synonyms: **Oidium insolitum** U. Braun *et al*., *Sydowia* **53**: 35 (2001).
Ovulariopsis insolita (U. Braun *et al.*) Havryl. *et al.*, *Mycoscience* **47**: 238 (2006).

Phyllactinia gmelinae U. Braun & Bagyan., *Sydowia* **51**: 1 (1999).
Synonyms: *Phyllactinia suffulta* var. *gmelinae* Patil, *Curr. Sci*. **30**: 156 (1961); *nom. inval.* (Art. 36).
P. gmelinae Hosag. *et al.*, *Indian J. Trop. Biol*. **1**: 318 (1993); *nom. inval.* (Art. 37.6).
Ovulariopsis gmelinae-arboreae Hosag. *et al.*, *Indian J. Trop. Biol*. **1**: 316 (1993).

Phyllactinia populi (Jacz.) Y.N. Yu, *in* Yu & Lai, *Acta Microbiol. Sin*. **19**: 18 (1979).
Basionym: *Phyllactinia suffulta* f. *populi* Jacz., *Karm. Opred. Gribov* **2 (***Muchnisto-rosyanye griby*): 439 (1927).
Synonym: ***Ovulariopsis salicis-warburgii*** Sawada, *Bull. Dept. Agric. Gov. Res. Inst. Formosa* **61**: 89 (1933).

based on molecular approaches is not *per se* superior over morphotaxonomy.

Opinions and proposals to restrict descriptions of new taxa, above all species, in future to those accompanied by data of molecular sequence analyses have been discussed, but they are unrealistic and must be refused. Molecular support of new taxa is advisable, very useful and should be included whenever possible, but its inclusion cannot and should not be mandatory. This would be a kind of unacceptable "molecular censorship" that would inhibit taxonomic work in several parts of the world or would even force certain mycologists to give up taxonomic work. Also, fungi of certain groups cannot be cultivated at all; in other cases it may be very difficult to get cultures or to extract DNA, and further to be confident that the DNA is from the target fungus and not a contaminant. Furthermore, there would be a drastic cut in taxonomic input from amateur mycologists, who study various important fungal groups in, for instance, agaricology, and lichenology. Indeed, we need all available resources for the inventory of worldwide fungal diversity. Demands to insert a particular method like molecular sequence analysis in the *Code* as being essential for valid publication would undoubtedly not gain general acceptance. Such a requirement could only be indirectly applied, outside the *Code*, by particular journals making this a requirement for the acceptance of new species descriptions. However, it is unrealistic to believe that such policies could ever be a way of preventing publication of new taxa not following such a dictat. Editors of other journals will disagree, and publications of new taxa in books would not follow the rule.

Concepts for names in powdery mildews (*Erysiphales*) – an example

A new updated taxonomic monograph of the powdery mildews has recently been published (Braun & Cook 2012). Within this group of obligate plant pathogens, clear connections between anamorph and teleomorph genera (e.g. *Blumeria* with *Oidium s. str.*, *Erysiphe* with *Pseudoidium*, *Golovinomyces* with *Euoidium*) are evident and proven by means of morphology and molecular sequence analyses. All anamorph-typified genera are younger than the corresponding teleomorph-typified genera (except for *Oidium*) and hence will be younger facultative synonyms in future, but nevertheless they will remain legitimate and valid. Anamorph genera play an important role in the taxonomy of powdery mildews and reflect phylogenetic relations within this fungal group. Indeed they provided crucial evidence for the recent re-classification of all the holomorph genera. On the other hand, at species level anamorph species (unlike the anamorph genera) and particularly the conidial stages of powdery mildew species are morphologically often poorly differentiated and of little diagnostic value. Therefore, teleomorphs traditionally prevail in the taxonomy at species level. Hence, in all cases it is proposed to give preference to teleomorph-typified names when they are threatened by anamorph names.

There is only a single generic problem in powdery mildews, viz. the anamorph genus *Oidium* Link 1824, with its type species *Oidium monilioides*, which is the anamorph of *Blumeria graminis*, the type species of the teleomorph genus *Blumeria* Golovin ex Speer 1974. Hence, *Oidium* would be an older name for *Blumeria*, and "*Oidium graminis*" would be the correct name for the powdery mildew of grasses and cereals in future; this is, of course, unacceptable, and *Blumeria* will be proposed as the accepted generic name for this taxon.

Most powdery mildew anamorphs are morphologically poorly differentiated at species level, and it is often difficult to truly distinguish separate species in the absence of the teleomorph. However, their relations to teleomorphic genera are almost always clear. Host switches often occur in glass houses, and also in nature, usually connected with anamorph growth but lacking the teleomorph. Even results of molecular sequence analyses are often not helpful here due to a lack of data from other specimens for comparision or other problems. Hence descriptions of anamorph-typified taxa should be avoided, also in future, but when new descriptions are intended, they should only be based on

striking morphological differences combined, if possible, with molecular data, and the taxa concerned should preferably be assigned to the existing anamorph genera, which can also be used in future as they remain legitimate, valid, and available, as already explained. Descriptions of anamorph-typified new species in *Erysiphe*, *Golovinomyces*, *Neoërysiphe* and other teleomorph-typified genera are in future of course also valid and in accordance with the *Code*, but they should only be proposed in absolutely clear, molecularly proven cases.

A recently found powdery mildew anamorph on *Solanum betaceum* (tamarillo or tree tomato) in India is a striking example. This host is phylogenetically closely related to *S. lycopersicum* (tomato), and the anamorph found on tree tomato is morphologically indistinguishable from *Pseudoidium neolycopersici* (syn. *Oidium neolycopersici*) on tomato (Baiswar *et al*. 2009). Nevertheless, this powdery mildew disease was only recorded as *Oidium* sp. and not as *O. neolycopersici* because reviewers refused the latter denomination without inoculation results and/or molecular analyses. Therefore, cross inoculation tests were later carried out and the tree tomato powdery mildew was subjected to molecular examinations based on amplification of the rDNA ITS region, including the 5.8S rDNA, but, unfortunately, these new results also failed to elucidate its taxonomy. The powdery mildew on *S. betaceum* was unable to infect tomato and several other species of *Solanum*, but the sequence derived from this powdery mildew differed only in one base pair from that of *Pseudoidium neolycopersici*. Is the tree tomato powdery mildew conspecific with the latter species and only a special form? Or is it a separate species, morphologically indistinguishable from *P. neolycopersici*, but biologically distinguished and genetically distinct in one base pair in rDNA ITS sequence data? A final answer cannot yet be given. Incidently, in this case a study of the morphology of this pathogen would now allow it to be referred to the morphospecies *Pseudoidium lycopersici* as listed in the updated monograph (Braun & Cook 2012). As made apparent above, the anamorphic genus *Oidum s. str.* belongs solely to *Blumeria*.

The *Erysiphales* in its current circumscription comprises 873 known species. The number of teleomorph-typified species names threatened by anamorph names is rather limited. Table 1 details the names that come into this category (all of them will be put on a proposed List of accepted names according to the new provisions of the Melbourne *Code* (Art. 14).

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REFERENCES

Baiswar P, Braun U, Chandra S, Ngachan SV (2009) First report of an *Oidium* sp. [*neolycopersici*] on *Solanum betaceum* in India. *Australasian Plant Disease Notes* **4**: 32–33.

Baiswar P, Chandra S, Ngachan SV, Braun U, Takamatsu S, Harada M (2012) Molecular Characterization of *Oidium* sp. on *Solanum betaceum* in India. *The Plant Pathology Journal (Korea)*: in press.

Braun U, Cook RTA (2012) *Taxonomic Manual of the Erysiphales (Powdery Mildews)*. [CBS Biodiversity Series no. 11.] Utrecht: CBS-KNAW Fungal Diversity Centre.

Gams W, Humber RA, Jaklitsch W, Kirschner R, Stadler M (2012) Minimizing the chaos following the loss of Article 59: Suggestions for a discussion. *Mycotaxon* **119**: 495–507.

Gams W, Jaklitsch W *et al*. (2011). A critical response to the 'Amsterdam Declaration'. *Mycotaxon* **116**: 501–512.

Hawksworth DL (2011) A new dawn for the naming of fungi: impacts of decisions made in Melbourne in July 1011 on the future publication and regulation of fungal names. *IMA Fungus* **2**: 155–162.

Hawksworth DL, Crous PW, Redhead SA, Reynolds DR, Samson RA, Seifert KA, Taylor JW, Wingfield MJ *et al*. (2011) The Amsterdam Declaration on fungal nomenclature. *IMA Fungus* **2**: 105–112.

Knapp S, McNeill J, Turland NJ (2011) Changes to publication requirements made at the XVIII International Botanical Congress in Melbourne – what does e-publication mean for you? *Mycotaxon* **117**: 509–515.

Norvell LL (2011) Melbourne approves a new Code. *Mycotaxon* **116**: 481–490.