could not be adequately resolved in an ITS rDNA study, the application of the name is now secured by epitypification and the synanamorphs are described in culture (pp. 1271–1282). Morphological and molecular data establish that '*Cephalosporium careulens*', used for over 40 years in industrial fermentations to produce cerulenin and helvolic acid, is actually *Sarocladium oryzae*, a genus now shown to belong the hypocrealean family *Ceratostomataceae* (pp. 1291–1300). Species complexes in *Colletotrichum* are especially hard to resolve, and in some cases isolates with different genetic compositions appear able to arise rapidly; studies of anastomoses formed between conidia show that these may occur between different species of the genus, which may explain at least part of the variation (pp. 1320–1326).

A third part of a revision of the *Hygrophoraceae* in the Greater Antilles is included, previous parts having been published in 2000–2001 (*Mycological Research* **103**: 215–224, **104**: 873–878); 17 species are treated here, including five new to science and five new to the region (pp. 1301–1314). Species of *Laboulbeniales* occurring on different parts of their insect hosts showing some differences in the thalli have often been regarded as separate species. However, studies of a new *Laboulbenia* species found on a South American fly suggest that at least in this host the different thalli are better interpreted as 'growth forms' of a single species (pp. 1315–1319).

The fungi associated with birch shoots where the trees are exhibiting crown die-back in Scotland have been compared with those on shoots of healthy trees, and the pathogenicity of the fungi isolated has been tested against birch seedlings; while detailed information on the biology and points of entry of the predominant species is presented, their role in relation to the disease requires further study (pp. 1327–1334). In the entomopathogenic *Metarhizium anisopliae*, the effects of water stress and washing treatments in relation to the sugar alcohol content (especially erythritol) and the germinability of conidia are reported, generating information that will need to be considered in relation to the production and storage of inoculum for use in biocontrol (pp. 1337–1345).

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AN ONLINE DATABASE OF NAMES AND DESCRIPTIONS AS AN ALTERNATIVE TO REGISTRATION

Taxonomists should spend their time meaningfully with the study of organisms and the publication of novel observations rather than wasting time determining if names are available for use or not (Hawksworth 1992). A compulsory registration of new names and their accessibility on the Internet seemed to be the solution, but the idea of a registration system, which entailed sending copies of publications to a documentation centre, was first mooted in a nomenclature meeting organized under the auspices of the International Union of Biological Sciences in Geneva in 1954 (Hawksworth 1992). After years of preparation (Brummitt *et al*. 1986, Greuter & von Raab-Straube 1998, Wilson 1997, 1998), proposals were made in the years 1991–1998 with the aim of making the registration of names of new taxa and other nomenclatural novelties compulsory before they are accepted as validly published (Faegri 1991, Borgen *et al*. 1997, 1998, Greuter & Hawksworth 1999). It was thought that this registration mechanism would help solve frequent problems encountered in determining which names are effectively published (Art. 29.1) and when (Art. 32.1). Proposals made by a special committee on registration and formulated by Faegri (1991) were not approved at the meeting of the nomenclatural section preceding the Tokyo Botanical Congress (Greuter, McNeill & Barrie 1994: 138–156, 168–169), but a sentence forecasting such a procedure was included in the Tokyo Code (Greuter *et al*. 1994: Art. 32.1, last sentence). After publication of vivid objections (Eggli 1998, Turland & Davidse 1998), and the proposals concerned with registration having failed in the mail vote, these were withdrawn at the beginning of the St Louis Congress (Barrie & Greuter 1999). Following a motion from the floor, the clauses concerned with registration were removed from the St Louis Code (Greuter *et al*. 2000).

A related proposal was made to recognize nomenclatural novelties published in doctoral theses as validly published (Farjon 1998) only if an ISBN number was printed in the book. In spite of some friendly amendments, this proposal received only 50% support, too little to be accepted (Greuter *et al*. 2000: 141–154). In the time of laser printers it is often impossible to decide what has been sufficiently multiplied and what are single prints of a manuscript. As a consequence, there is still a grey area of doubtfully published work, and many questions concerning criteria of effective and valid publication remain unanswered. Whether publications on the Internet or on CD-ROM can ever be recognized as appropriate for nomenclatural novelties is still debated (Zander & Wilson 1998). A new special committee was established at the St Louis congress to look into this matter, and proposals of some amendments to the *Code* have been published (Zander 2004).

The earlier proposals for the registration of nomenclatural novelties foresaw the establishment of numerous national nodes to whom authors were supposed to send published material containing nomenclatural

novelties. These distributed registration centres would, without further screening, pass on the material to central institutions responsible for generating indexes. At present the date of effective publication establishes priority, but with the registration system, the date of registration would have determined priority of a name. However, serial publications could choose to be vehicles of nomenclatural novelties and supply copies of all issues as they appeared to indexing centres to be screened automatically for any novelties (Borgen *et al*. 1997, 1998, Greuter & von Raab-Straube 1998), thus relieving the authors of papers published in those journals of this task.

To the benefit of the biological community, central institutions generate indexes, for example, the International Plant Name Index (IPNI, produced by collaboration between the Royal Botanic Gardens Kew, Harvard University Herbaria, and the Australian National Herbarium), and Index Fungorum (maintained by CAB International under the auspices of CABI Bioscience, UK, and the Centraalbureau voor Schimmelcultures, The Netherlands). These highly beneficial indexes covering all nomenclatural novelties published for angiosperms and fungi are indispensable sources of information, the content having been screened for validity, legitimacy and orthography (implicitly in IPNI, and explicitly in Index Fungorum). These indexes are accessible on the Internet: the International Plant Names Index at http://www.ipni.org/ and Index Fungorum at http://www.indexfungorum.org/. However, the current workload of these centres is becoming insurmountable because of the extremely voluminous and intricate extracting work, which requires access to an ever increasing amount of literature. Furthermore, this type of work has little priority in the minds of scientific boards and funding agencies, and consequently is not financially well-supported. Defraying the costs to the customer who has to pay what appears to be exorbitant prices for the hardcopies is not a good solution.

In contrast to this situation, we see databases of DNA sequences (GenBank, EMBL, etc.) growing almost automatically with the spontaneous on-line input from individual contributors who, after a minimal screening of their submission, receive an accession number for each deposited sequence that must be cited in the ensuing publication, a requirement now imposed by many scientific periodicals. This mechanism works well, although the source of the sequenced material is often insufficiently documented. The sequence banks are, however, an indispensable source of information and have gained worldwide appreciation.

We propose a similar procedure, possibly with a subsequent modification of the *Code*, to ensure the *effective and valid publication* of nomenclatural novelties for fungi. A two-step procedure is necessary. (1) At the time a paper is editorially accepted by a journal (or book editor/publisher), the author submits the relevant protologue (Latin diagnosis, a description in another language, illustrations (optional but recommended) and typification, or proposed recombinations with basionyms and indication of types), electronically to the indexing centre. This can be one central institution, or several interconnected nodes. The proposed name(s) will be screened with respect to validity, legitimacy and orthography and placed in the on-line database, but without public access to unpublished names. Each nomenclatural entity *will receive a MycoBank accession number*, analogous to a GenBank number issued for each sequence submitted, that is communicated to the author and should be cited in the final version of the paper. In cases where the proposed names do not fulfil the requirements of the *Code*, the author will be informed and invited to make a correction. (2) Immediately after effective publication, the author responsible informs the indexing centre of this fact and communicates the exact date and bibliographic details, so that the numbered database entry with the associated information (text and, if permitted, illustrations) becomes freely accessible. The direct communication of nomenclatural novelties to MycoBank by the publishing journals at the very moment of publication would of course speed up the procedure further.

The responsibility for submitting details of proposed new taxa rests with the author(s), and this kind of submission should be imposed by high standard journals as a good practice policy. This could become a mandatory requirement, if the botanical *Code* and other codes were to be modified.

The date for priority purposes will remain, as in the present situation, the date of effective publication, assuming the name complies with all requirements for valid publication. The indexing centre will include *all* nomenclatural novelties in their indexes.

Although this procedure requires some extra activity by author(s), it will not be more cumbersome than the submission of DNA sequences (already an accepted practice), and it has substantial advantages. The indexing authority can inform the author in time about inadequacies of the submission in order to ensure valid publication. No censorship will be exerted on the publication. The indexing centre will be greatly relieved from bibliographic search that is otherwise necessary to keep the index up-to-date and which is always bound to be incomplete. The biological community, however, gets immediate access to all novelties on-line.

The arguments put forward by Turland & Davidse (1998) and Eggli (1998) against registration can now easily be rebutted:

A clumsy, bureaucratic fallible system: The proposed system is straightforward with a minimum of bureaucracy. There can be a short time between submission of the final data and publication on the web.

Duplication of efforts: This is no longer the case, because the indexing centres, and the central GBIF Taxonomic Name Service (ECAT), are already

interlinked, and doing this work. Their efforts can be reduced when the proposed system works.

A clumsy remedy for a few 'troublesome bibliographic citations', i.e. publication of invalid or illegitimate names: The percentage of such incorrect publications is not negligible. It causes irritation and contributes to the existing disrepute of nomenclature. If the results of the screening are communicated to an author before publication, the percentage can be reduced significantly.

Inadequate access: The Internet is now significantly more accessible (especially in less developed countries) than it was three years ago. More biologists consult the net than read either *Taxon* or the *Code*. Because of increasing prices and declining budgets, access to the literature by individuals diminishes. GenBank is consulted thousands of times a day and the on-line version of Index Fungorum has hundreds of unique visitors each day.

Who would pay? The indexing institutes are now putting tremendous effort into screening periodicals and other publications. With the proposed system, less effort will be required for effective functioning of the indexing institutes, assuming that the time needed to scan publications for nomenclatural novelties is substantially reduced. Nevertheless, competent staff to check validity, legitimacy and orthography of names at the indexing centre remains indispensable. To ensure their continued existence, international bodies will have to consider investing in the project. The increased recognition and importance of the indexes may in itself be an incentive for scientific boards and responsible authorities to continue the financing.

Barrie, F. R. & Greuter, W. (1999) XVI International Botanical Congress: preliminary mail vote and report of Congress action on nomenclature proposals. *Taxon* **48**: 771–784.

Borgen, L., Greuter, W., Hawksworth, D. L., Nicolson, D. H. & Zimmer, B. (1997) Announcing a test and trial phase for the registration of new plant names (1998–1999). *Taxon* **46**: 811–814.

Brummitt, R. K., Hawksworth, D. L. & McNeill, J. (1986) (226–228B) Proposals for a method of defining effective publication by means of approved publications. *Taxon* **35**: 823–826.

Eggli, U. (1998) Why we don't need registration. *Taxon* **47**: 963–965.

Faegri, K. (1991) Proposals on registration of new names and combinations, and report of Special Committee 4. *Taxon* **40**: 681–683.

Farjon, A. (1998) (64) A proposal to clarify effective publication of theses. *Taxon* **47**: 771–772.

Greuter, W., Barrie, F. R., Burdet, H. M., Chaloner, W. G., Demoulin, V., Hawksworth, D. L., Jørgensen, P. M., Nicolson, D. H., Silva, P. C., Trehane, P. & McNeill, J. (1994) *International Code of Botanical Nomenclature* (*Tokyo Code*). [Regnum Vegetabile Vol. 131.] Koeltz Scientific Books, Königstein.

Greuter, W. & Hawksworth, D. L. (1999) Synopsis of proposals on botanical Nomenclature – St Louis 1999. *Taxon* **48**: 69–128.

Greuter, W., McNeill, J. & Barrie, F. R. (1994) Report on botanical nomenclature – Yokohama 1993. *Englera* **14**: 1–265.

Greuter, W., McNeill, J., Barrie, F. R., Burdet, H. M., Demoulin, V., Filgueras, T. S., Nicolson, D. H., Silva, P. C., Skog, J. E., Trehane, P., Turland, N. J. & Hawksworth, D. L. (2000) *International Code of Botanical Nomenclature* (*Saint Louis Code*). [Regnum Vegetabile Vol. 138.] Koeltz Scientific Books, Königstein.

Greuter, W., McNeill, J., Hawksworth, D. L. & Barrie, F. R. (2000) Report on botanical nomenclature – St Louis 1999. *Englera* **20**: 1–253.

Greuter, W. & von Raab-Straube, E. (1998) Registration progress report, 1. *Taxon* **47**: 497–502.

Hawksworth, D. L. (1992) The need for a more effective biological nomenclature for the 21st century. *Botanical Journal of the Linnaean Society* **109**: 543–567.

Turland, N. J. & Davidse, G. (1998) Registration of plant names: undesirable, unnecessary, and unworkable. *Taxon* **47**: 957–962.

Wilson, K. L. (1997) Registration as a positive step. *Taxon* **46**: 811.

Wilson, K. L. (1998) Why we need registration. *Taxon* **47**: 967–968.

Zander, R. H. (2004) Report of the special committee on electronic publishing with two proposals to amend the Code. *Taxon* **53**: 592–594.

Zander, R. H. & Wilson, K. L. (1998) Four proposals to amend the Code, and report of the Special Committee on electronic publishing and databasing. *Taxon* **47**: 175–177.

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ENZYME DISPENSABILITY IN *SACCHAROMYCES CEREVISIAE*

Previous studies have shown that as much as 80% of yeast genes are not essential for viability under laboratory conditions. Using a flux model, Papp, Pál & Hurst (2004), studied the optimal use of the metabolic network to produce major biosynthetic components for growth and the effects of gene deletions, testing these experimentally. The model indicates that 37–68% of the dispensable genes might be important under different environmental situations, although not in the laboratory conditions used; in some cases it was possible to predict conditions where these could become important. In addition, 15–28% of the genes are