



Editorial to the special issue in honor of Walter Gams

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On the occasion of this special issue, we are very honored and pleased to have the task to present the curriculum vitae of our dear late mentor and close personal friend K. Walter Gams, who has suddenly passed away in April 2017 in the age of 83 years in his beloved “second home” near Bomarzo, Italy. We are looking back to many decades of close interactions with Walter ourselves and are very pleased that this special issue includes contributions from many other colleagues who are likewise looking back to several decades of collaborative research on fungal biodiversity with him. As some obituaries have already been published even in Wikipedia, we decided to do without the usual, meticulous account of his outstanding scientific accomplishments. We rather want to emphasize on the importance of his life work for the future of mycology.

Walter was born in Zurich in August of 1934, but he was actually an Austrian citizen. Curiously, he then spent most of his life time in Germany and in particular, the Netherlands and Italy. He quickly felt at home wherever he found colleagues sharing his interests or at any botanically or mycologically interesting place and can therefore be regarded as a true cosmopolitan.

His father, Helmut Gams, was one of the most renowned European botanists, specializing in “cryptogams” and edited the *Kleine Kryptogamenflora*, which was for many decades the standard volume for identification of algae, mosses, liverworts, pteridophytes, and fungi (including fungi-like or algae-like organisms that are traditionally treated in mycology) in the German speaking countries. Apparently, Walter became

introduced to the diversity of these “lower plants” early on and even in the age of 82 he could name almost every liverwort or cyanobacterium on the spot when he came across them during field trips. By studying botany in Innsbruck, he decided to follow in his fathers’s footsteps but turned to his own way by adopting pure culture based techniques for studying fungi taxonomically. During his PhD project on humus-inhabiting alpine microfungi, he discovered *Tolypocladium inflatum*, the producer organism of the blockbuster drug cyclosporin! After his PhD exam in 1960, he moved from his mountainous home area to the flat maritime Baltic area of Northern Germany and worked for several years at the *Biologische Bundesanstalt* BBA in Kiel-Kitzeberg. During this time, he studied very intensively the mycota of agricultural soils together with Klaus Domsch, with whom he later co-published the “Compendium of soil fungi” (Domsch et al. 1980a, b), one of the most comprehensive work on filamentous fungi ever written. A second edition of this compendium that Walter revised taxonomically was published in 2007 (Domsch et al. 2007).

Even though Walter was very proficient in botanical and “cryptogamic” systematics and nomenclature in general, and could always follow the work of his peers, e.g., on taxonomy of macromycetes as well as rust and smut fungi, his most favorite objects of study were always the most tricky and challenging ones. He was soon focusing on so-called cephalosporium-like molds and finally chose this intriguing topic as the subject of his habilitation thesis, which was later published in a book that has been serving thousands of basic and applied mycologists as a highly important (Gams 1971). The book was published when he had already been working at the CBS, Baarn/Delft, The Netherlands (now Westerdijk Fungal Biodiversity Institute, Utrecht), for five years. Walter stayed there for more than 30 years on staff, and during that time, he was part of a golden generation of mycologists that contributed significantly to the prestige of the renowned institute, which already at that time was recognized as a global Centre of Excellence in mycological biodiversity research.

One of the authors (MS) met Walter for the first time in 1994, on the occasion of IMC5 (Vancouver), where we had a

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very fruitful discussion about the connections of morphological and other phenotypic traits in nematode trapping fungi. Walter was then very interested to see that we had found novel molecules with antibiotic activity in various lineages of nematode trapping hyphomycetes that were then scattered over several genera according to the conidiophore morphology, but the results of a preliminary chemotaxonomic study were in disagreement. We then discussed that the truth must come out by eventually connecting various phenotypic features including a broad range of morphological traits and even secondary metabolite profiles, and should not take it for granted that the taxonomic system would remain like that for long. In the end, a polythetic approach including molecular phylogenetic data showed that the type of nematode traps was more significant to segregate these fungi at the genus level (Scholler et al. 1999). This is just one of many examples showing that polythetic approaches are required for solving taxonomic problems and that taxonomic systems always need to adapt to alternative data sets generated with the help of newly coming-up techniques.

Some years later, Walter started to become interested in the advent of molecular phylogenetic tools, which was at that time unusual for a traditionally trained mycologist. While he greatly appreciated the new options that the PCR-based techniques provide, in particular for studying his difficult acremonium- or verticillium-like molds, he has always been compelled to fight premature taxonomic and nomenclatorial changes. However, Walter was always open to adapt to the results of innovative techniques, as exemplified by his monographic works that he published with Rasoul Zare and other colleagues on the segregation of *Verticillium* (Sung et al. 2001; Gams and Zare 2001). These studies paved the way to a robust polythetic taxonomic concept, combining morphological and molecular data to resolve an extremely complicated group of hypocrealean fungi that have a very interesting ecology as they are often associated with various invertebrates or other fungi. The results of these studies, the last of which was just published in 2016 (Zare and Gams 2016) eventually allowed a re-classification and recognition of the hypocrealean Ophiocordicipitaceae and Cordycipitaceae (Quandt et al. 2014; Kepler et al. 2017) that eventually took place under the One Fungus–One Name (IFIN) concept. Walter has also given tremendous input to the most comprehensive reference book on hyphomycetes that is available up to date (Seifert et al. 2011). Among the many awards Walter received in recognition of his outstanding work, we only want to mention the Anton de Bary Medal, which he was awarded in 2012. He has authored or coauthored over 130 papers and books in total.

Walter has engaged himself for decades in the Nomenclature Committee for Fungi and he was the secretary of this committee for several years. He was in general rather conservative and skeptical when it came to the discussions about fundamental changes in the nomenclature system, and

has heavily opposed the implementation of the IFIN concept. However, at the same time, Walter supported taxonomic refinements mainly at the genus and species level whenever he was convinced that reclassifications were sufficiently mature and required for addressing natural relatedness of species and their importance in applied fields (Gams 2000). On the other hand, once the decision for the IFIN concept had been made at the International Botanical Congress in Melbourne, Walter has been working very constructively with his peers in the respective subcommittees of the International Committee for the taxonomy of Fungi (ICTF) and used his profound knowledge in taxonomy and nomenclature to guide the implementation of this change. Therefore, he has also been one of the leading authors in various guideline papers, and was also co-author in that on Orbiliomycetes by Baral et al. (2018), which was only published shortly after Walter had passed away.

Over 20 years ago, Walter co-founded the “Studienstiftung Mykologie,” which has since then provided many young mycologists, in particular from poorer countries with funding for travel or experimental work. We are happy that we have now managed to transfer Walter’s foundation into the hands of the German Mycological Society (DGfM), and hope that the funding activities can continue soon after the formalities have been completed.

Patiently working at the microscope and elucidating fungal morphologies by preparing camera lucida pencil drawings had been his preferred methodology to collect data. It is clear that his morphocentric approach for understanding the macro- and microscopic characters of a fungus would oppose any technical approach of selecting DNA sequences for the typification of names or the recognition of species (see also, Seifert 2017; Thines et al. 2018; Zamora et al. 2018; Hongsanan et al. 2018; Lücking et al. 2018). Were he still alive, his view would certainly match the opinions of the vast majority of the mycologists who have recently voted strictly against the premature implementation of the DNA-based typification. One of Walter’s attitudes has been to use the various nomenclatural tools implemented in the code reasonably and for the purpose of solving individual taxonomic problems. Could a DNA sequence thus be interpreted as an illustration that could serve as a type for a name? Walter may have answered such question solely with a silent awkward smile, a slight head shake, hardly recognizable, or a gesture of raising his eyebrows.

Walter Gams not only gathered fungi, what he did to satisfy his diversity related scientific curiosity. He also was a collector and systematist of diapositives he was shooting himself (mainly of colleague mycologists, plants and fungi), scientific reprints (a collection filling more than 150 reprint boxes, inventoried with reference manager software, last updated on 1st April 2017), and books. Illustrations including photographs and line drawings and the written word that he sometimes liked to type as small caps (“kleinkapitalen”) where his preferred tools to process and preserve taxonomically relevant data.

One of the authors (HJS) got Walter to know first as a docent in courses and lectures at RWTH Aachen University where Walter habilitated in 1972 and used his first language for teaching, while living and working in Baarn, the Netherlands. It is to say that listening to his lectures was perhaps one of the more complex experiences a student could have had while consuming the biology agenda at this university at that time. Notes Walter used during lectures consisted perhaps of a few keywords written on some pieces of paper sometimes in shorthand and such keywords were every now and then written on the chalkboard when he interrupted his walking back and forth, while addressing themes such as general mycology, fungal taxonomy, soil ecology, and microbial interactions. Walter mentored or co-mentored perhaps hundreds of student projects. Correcting written words and educating not only inexperienced and young authors in how to write scientific texts concisely and consistently was a matter of utmost concern for him. Correct language was matter of scientific culture to him, which was exemplified by his profound knowledge of Latin demonstrated by his many helpful corrections of wrongly formed Latin diagnosis and scientific names. He did this in unnumbered examples when he functioned as (co-)mentor, reviewer or editor. To undertake publishing a special issue with papers in honor of Walter Gams is perhaps therefore a difficult task, if we consider his high standards and profound knowledge based attitudes. However, while he would have wished to improve and correct any works during preparation and review process, he eventually respected the work of his colleagues and he may have expressed that with a slow and lengthy head nod.

Nevertheless, this Special Issue contains in total 17 articles on various topics, authored by many friends and alumni of Walter, mostly treating the biology and taxonomy of anamorphic Ascomycota and in particular the Sordariomycetes, with which Walter was most familiar. We hope that this compilation of papers will serve the mycological community well to keep his memory for many years. His thoughts and ideas will in any case prevail in the work of numerous mycologists who have been deeply influenced by collaborating with him and have got to know him as a good friend and highly resourceful mentor, including ourselves.

Some announcements of novelties for the journal

This Special Issue will be the last one that Mycological Progress is going to publish for the time being. The reason is that we will switch to giving all newly accepted articles page numbers from 2019 on and in return forego the Online First publication of new papers. Instead, all new papers will be published immediately after acceptance and appear on the web with consecutive page numbers. We will thus be able to

avoid the awkward DOI appendices in the names of newly described fungal taxa that have arisen due to the nomenclatural changes that were proposed in the Melbourne Code (for a detailed discussion on this matter, see, e.g., Kirschner and Thines (2016)). We hope that we are also doing the curators of the nomenclature repositories a favor because they will not need to insert page numbers and change the entries after the respective papers have been published in the final version and avoid that two different versions of the fungal names published in our journal are in use.

Instead of special issues, Mycological Progress will henceforth publish “Topical Collections,” which are likewise thematic but will consist of a lead article or editorial and several other papers that will be published in different issues of the journal over a longer period of time, but be combined on the same website, so they can be found by all users using an URL link that is available from the journal homepage.

The first Topical Collection will be edited by Meike Piepenbring and Dominik Begerow in honor of the first Editor-in-Chief of our journal, Franz Oberwinkler, and deals with systematics of Basidiomycota in general. All mycologists who are interested in acting as guest editors are cordially invited to make further proposals on additional topics to the Editor-in Chief or the Managing Editor.

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