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CURRENT SYSTEMATICS OF *PENICILLIUM* AND *ASPERGILLUS* AND THE IMPLICATION TO FUNGAL BIODIVERSITY AND APPLIED RESEARCH

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Penicillium and *Aspergillus* are common ubiquitous genera and they have shown to have a great impact for our society. Numerous examples of their beneficial role as a medicine and in food fermentation are known, whereas many other species can be dangerous organisms as pathogens and toxin producers. Penicillia and Aspergilli can be often found in food and feedstuffs [1, 2], but they also cause problems in home and working environments. Particularly in damp houses the health of inhabitants can be affected when they are exposed to high concentrations of spores [3]. Examples of the commons species in indoor environments are given.

Many mycotoxins have been reported and they are produced by many fungal species [4]. Although our knowledge on the fungi producing the toxic metabolites is increasing, many reports in the literature on mycotoxins are unfortunately based on incorrect identification of the fungi and this is causing a lot of confusion. Particularly in *Penicillium* and *Aspergillus* many mistakes have been made. Wrong data can lead to wrong conclusions and this will have serious effects for example on strategies for safety or on economical and political decisions.

This paper also discusses the recent progress in the taxonomy of *Penicillium* and *Aspergillus*. The nomenclature of these genera has been greatly improved by the publication of list of names in current use (NCU), the accepted species and the synonyms. The NCU list has been approved by the IUMS International Commission of *Penicillium* and *Aspergillus* and this will contribute to the stabilization and standardization of the taxonomy. For the most important mycotoxins, aflatoxins and

ochratoxins, a lot of research has been carried out and it is now becoming evident which species are potential producers of these toxins. Aflatoxins were thought to be restricted to the species of *Aspergillus* section *Flavi*, but recent investigations have shown that the metabolites are also produced by other Aspergilli including species with an *Emericella* teleomorph. Recent reports on the occurrence of ochratoxins produced by black Aspergilli appeared and this has started a renewed interest in *Aspergillus niger* and related taxa.

Although taxonomic research of *Penicillium* and *Aspergillus* started already in the 19th century and many mycologists have studied the genera, it become apparent that still new species are discovered. New taxa can be found from exotic or extreme environments, but also new taxonomic tools including an integration of classical morphological methods, biochemical, physiological and molecular approaches reveal that new or neglected taxa can be recognized. An example of the important group of *Penicillium aurantiogriseum* complex will be discussed.

Presently there are only a few experts available for a correct identification of the species and training to recognize and identify *Penicillium* and *Aspergillus* will be crucial to assist researchers. Suggestions will be made for approaches how to develop a better mycological knowledge.

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