

Microbial Genomics & Bioprocessing Research

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Research

Molecular Systematics and Taxonomy of *Aspergillus* and *Penicillium*

Current research in my laboratory is directed at identifying new species of *Aspergillus* and *Penicillium* and at resolving the phylogeny of both newly identified and currently recognized species within those lineages. Many species of *Aspergillus* and *Penicillium* beneficially impact humanity through the production of medically important secondary metabolites, such as penicillin and griseofulvin and through their utility in food production (e.g., to produce Roquefort and Camembert cheeses and to aid the ripening of sausages). However, some species of *Aspergillus* and *Penicillium* pose significant health risks through the production of toxic metabolites that may reduce animal productivity or cause human disease, such as ochratoxin A, tremorogenic toxins, rubratoxins and aflatoxins. The relationship between toxin production and taxonomy is an unsettled issue, primarily because species defined phenotypically do not always correspond with those defined in terms of genetic isolation and gene flow. As a result, there is the certainty of incorrect identification of some isolates because of unclear species concepts that result in the incorrect placement of genetically differentiated isolates into the same species. Thus, a taxonomic system based on genetically defined species will enhance the accuracy of the species identification system and, therefore, will markedly improve our ability to predict the useful agricultural, biotechnological and medical characteristics of a strain.

Selected Publications

Peterson, S.W. 2004. Multilocus DNA sequence analysis shows that *Penicillium biourgeianum* is a distinct species closely related to *P. brevicompactum* and *P. olsonii*. *Mycological Research* 108:434-440.

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Peterson, S.W., Perez, J., Vega, F.E., and Infante, F. 2003. *Penicillium brocae* a new species associated with the coffee berry borer in Chiapas, Mexico. *Mycologia* 95(1): 141-147.

Goto, T., Wicklow, D.T., McAlpin, C.E. and **Peterson**, S.W. 2003. *Aspergillus bombycis* genotypes (RFLP) from silkworm cultivation. *Mycoscience* 40:209-215.

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Peterson, S.W. 2000. Phylogenetic relationships in *Aspergillus* based on rDNA sequence analysis. In: *Integration of Modern Taxonomic Methods for Penicillium and Aspergillus Classification*, R.A. Samson and J.I. Pitt (eds.), pp. 323-355. Harwood Academic Publishers.

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Hjelle, J.T., Miller-Hjelle, M.A., Nowak, D.A, Dombrink-Kurtzman, M.A. and **Peterson**, S.W. 2000. Polycystic kidney disease, fungi, and bacterial endotoxin: shifting paradigms involving infection and diet. *Rev. Med. Microbiol.* 11:23-25.

Peterson, S.W., Corneli, S., Hjelle, J. Thomas, Miller-Hjelle, M.A., Nowak, D.M., and Bonneau, P.A. 1999. *Penicillium pimateouiense*: a new species isolated from polycystic kidney cell cultures. *Mycologia* 91(2): 269-277.

Ito, Y., **Peterson**, S.W., and Goto, T. 1998. Isolation and characterization of *Aspergillus nomius* from Japanese soil and silkworm excrement. *Mycotoxins* 46:9-15.

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Padhye, A.A., Godfrey, J.H., Chandler, F.W., and **Peterson**, S.W. 1994. Osteomyelitis caused by *Neosartorya pseudofischeri*. *J. Clinical Microbiol.* 32:2832-2836.

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