

# Microbial Genomics & Bioprocessing Research

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## Research

### **Molecular Systematics and Taxonomy of Yeasts**

Current research in my laboratory focuses on characterizing the phylogenetic diversity of ascomycetous yeasts and developing molecular tools for rapid strain identification and prediction of agriculturally and biotechnologically significant properties of those species. Yeasts are nearly ubiquitous in nature and are essential for the production of numerous foods and beverages as well as for various industrial and biotechnological processes. Yeasts are common spoilage organisms of foods and beverages as well as accounting for 80% of human and animal mycotic infections. Despite the enormous importance of yeasts, species identification has been problematic. Traditional methods rely on phenotypic characters such as cellular morphology and reactions on various growth tests. Molecular genetic comparisons have shown that morphology and growth reactions are often strain variable and therefore unreliable for recognizing species (Kurtzman and Fell, 1998). Gene sequence comparisons offer a relatively rapid alternative that allows resolution of both close and distant relationships. Research shows certain yeast clades to be sparsely populated and this has been largely attributed to absence of undiscovered taxa rather than lack of divergence (Kurtzman, 2001). Consequently, an improved understanding of yeast biodiversity is highly dependent on discovery of missing taxa, and a phylogenetic framework for classification will provide a prediction of the utility of new taxa.

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## Selected Publications

**Kurtzman, C.P.** 2005. Description of *Komagataella phaffii* sp. nov. and the transfer of *Pichia pseudopastoris* to the methylotrophic yeast genus *Komagataella*.  
Int. J. Syst. Evol. Microbiol. 55:973-976.

**Kurtzman** CP, Robnett CJ, Ward JM, Brayton C, Gorelick P, Walsh TJ. 2005. Multigene phylogenetic analysis of pathogenic candida species in the *Kazachstania* (*Arxiozyma*) *telluris* complex and description of their ascosporic states as *Kazachstania bovina* sp. nov., *K. heterogenica* sp. nov., *K. pintolopesii* sp. nov., and *K. slooffiae* sp. nov. J. Clin. Microbiol. 43:101-111.

Vaughan-Martini A, **Kurtzman CP**, Meyer SA, O'Neill EB. 2005. Two new species in the *Pichia guilliermondii* clade: *Pichia caribbica* sp. nov., the ascosporic state of *Candida fermentati*, and *Candida carpophila* comb. nov. FEMS Yeast Res. 5:463-469.

**Kurtzman**, C.P. 2003. Phylogenetic circumscription of Saccharomyces, Kluyveromyces and other members of the Saccharomycetaceae, and the proposal of the new genera Lachancea, Nakaseomyces, Naumovia, Vanderwaltozyma and Zygoturulaspora. FEMS Yeast Res. 4:233-245

**Kurtzman**, C.P. and Robnett, C.J. 2003. Phylogenetic relationships among yeasts of the "Saccharomyces complex" determined from multigene sequence analyses. FEMS Yeast Res. 3:417-432.

Tomaszewski, E.K., Logan, K.S., Snowden, K.F., **Kurtzman**, C.P. and Phalen, D.N. In Press. Phylogenetic analysis identifies the 'megabacterium' of birds as a novel anamorphic ascomycetous yeast, *Macrorhabdus ornithogaster* gen. nov., sp. nov. Int. J. Syst. Evol. Microbiol. 53.

Gimenez-Jurado, G., **Kurtzman**, C.P., Stramer, W.T. and Spencer-Martins, I. In Press. *Metschnikowia vanudenii* and *Metschnikowia lachancei* spp., nov., two novel species from flowers and associated insects in North America. Int. J. Syst. Evol. Microbiol. 53.

**Kurtzman**, C.P., Fell, J.W., Robert, V., and Boekhout, T. 2003. Methods to identify yeasts. In: Yeasts in Food, T. Boekhout and V. Robert (eds.), chap. 3. pp. 69-121. B. Behr's Verlag GMBH & Co., Hamburg, Germany.

Middelhoven, W.J., and **Kurtzman**, C.P. 2003. Relation between phylogeny and physiology in some ascomycetous yeasts. Antonie van Leeuwenhoek. 83: 69-74.

Perez, J., Infante, F., Vega, F.E., Holguin, F., Macias, J., Valle, J., Nieto, G., Peterson, S.W., **Kurtzman**, C.P. and O'Donnell, K. 2003. Mycobiota associated with the coffee berry borer (*Hypothenemus hampei*) in Mexico. Mycological Res. 107:879-887.

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Vega, F. E., Blackburn, M.B., **Kurtzman**, C.P. and Dowd, P.F. 2003. Identification of a coffee berry borer-associated yeast: does it break down caffeine? Netherlands Entomological Soc. 107:19-24.

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