

Microbial Genomics & Bioprocessing Research

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Research

Molecular Systematics and Taxonomy of Actinobacteria

Members of the actinobacterial order *Actinomycetales* have been widely exploited for biotechnological applications including production of antibiotics, enzymes, and enzyme inhibitors and at least 4,607 patents have been issued on actinomycete-related products and processes. Polyphasic systematics of strains of the various genera of the suborder *Pseudonocardineae*, including *Amycolatopsis*, *Crossiella*, *Lechevalieria*, *Lentzea*, and *Saccharothrix*, have been an ongoing research effort in this laboratory for over 20 years. Current research is aimed at compiling a multigene sequence database for the rapid identification of actinobacteria of agricultural and biotechnological significance at the species level. Application of these data may allow clarification of the species concept in the genera under study and permit prediction of phenotypic properties based on phylogenetic placement. The genera *Amycolatopsis* and *Streptomyces* are the focus of these studies because of the importance of strains of these genera in production of commercially important antibiotics and because of the predominance of numbers of *Streptomyces* species in nature, particularly in soil. The research on species of the genus *Streptomyces* is part of a multinational cooperative research project involving scientists at institutes and universities in at least 6 different countries..

In cooperation with researchers at several land grant universities, there are ongoing taxonomic studies on novel plant pathogenic *Streptomyces* and several actinobacterial genera, including *Amycolatopsis*, *Crossiella*, and *Microbacterium* implicated in placental infections and abortions in horses (Donahue et al., 2002; Labeda et al., 2003)

Professional Activities

Executive Secretary/Treasurer (1994-1999;2002-present), Vice-Chairman (1999-2002) IUMS International Committee on Systematic Bacteriology (ICSB). Chair of ICSB Subcommittee on the *Streptomycetaceae*, and member of the ICSB Subcommittees on the *Pseudonocardiniae*, the *Thermomonosporaceae*, *Micromonosporaceae*, and *Streptosporangiaceae*. Member of Sigma Xi, American Society of Microbiology (past chair of Systematic and Evolutionary Microbiology Division), American Academy of Microbiology, and Society for Industrial Microbiology. Associate Editor for International Journal of Systematic and Evolutionary Microbiology.

Selected Publications

Labeda DP, Kroppenstedt RM. 2004. Emended description of the genus *Glycomyces* and description of *Glycomyces Algeriensis* sp. nov., *Glycomyces arizonensis* sp. nov. and *Glycomyces lechevalierae* sp. nov. Int. J. Syst. Evol. Microbiol. 54:2343-2346.

Zitouni A, Lamari L, Boudjella H, Badji B, Sabaou N, Gaouar A, Mathieu F, Lebrihi A, **Labeda DP**. 2004. *Saccharothrix Algeriensis* sp. nov., isolated from Saharan soil. Int. J. Syst. Evol. Microbiol. 54:1377-1381.

Labeda, D.P., Donahue, J.M., Williams, N.M., Sells, S.F., and Henton, M.M. 2003. *Amycolatopsis kentuckyensis* sp.nov., *Amycolatopsis lexingtonensis* sp.nov., and *Amycolatopsis pretoriensis* sp.nov., isolated from equine placentas. Int. J. Syst. Evol. Microbiol. 53:1-5.

Donahue, J.M., Williams, N.M., Sells, S.F., and **Labeda**, D.P. 2002. *Crossiella equi* sp. nov., isolated from equine placentas. Int. J. Syst. Evol. Microbiol. 52:2169-2173.

Bukhalid, R.A., Takeuchi, T., **Labeda**, D., and Loria, R. 2002. Horizontal transfer of the plant virulence gene, *nec1*, and flanking sequences among genetically distinct *Streptomyces* strains in the Diastatochromogenes cluster. Appl. Environ. Microbiol. 68:738-744.

Labeda, D.P. 2002. The family *Actinosynnemataceae*. In: The Prokaryotes: An Evolving Electronic Resource for the Microbiological Community, 3rd edition (latest update release 3.9, March 2002). M. Dworkin et al., eds. New York, Springer-Verlag.

Labeda, D.P. 2001. *Crossiella* gen. nov., a new genus related to *Streptoalloteichus*. Int. J. Syst. Evol. Microbiol. 51:1575-1579.

Labeda, D.P., Hatano, K., Kroppenstedt, R.M., and Tamura, T. 2001. Revival of the genus *Lentzea* and proposal for *Lechevalieria* gen. nov. Int. J. Syst. Evol. Microbiol. 51:1045-1050.

Labeda, D.P. and Kroppenstedt, R.M. 2000. Phylogenetic analysis of *Saccharothrix* and related taxa: proposal for *Actinosynnemataceae* fam. nov. Int. J. Syst. Evol. Microbiol. 50:331-336.

Labeda, D.P. 1998. DNA relatedness among the *Streptomyces fulvissimus* and *Streptomyces griseoviridis* phenotypic cluster groups. Int. J. System. Bacteriol. 48:829-832.

Labeda, D.P., Lechevalier, M.P., and Testa, R.T. 1997. *Streptomyces stramineus* sp. nov., a new species of the verticillate Streptomycetes. Int. J. System. Bacteriol. 47:747-753.

Labeda, D.P. 1996. DNA relatedness among verticil-forming *Streptomyces* species (formerly *Streptoverticillium* species). Int. J. Syst. Bacteriol. 46(3):699-703.

Labeda, D.P. 1995. *Amycolatopsis coloradensis* sp. nov., the avoparcin (LL-AV290)-producing strain. Int. J. of System. Bacteriol. 45:124-127.

Labeda, D.P., Kurtzman, C.P., and Swezey, J.L. 1995. Taxonomic Note: Use of patent strains as type strains in the valid description of new microbial taxa. *Int. J. Syst. Bacteriol.* 45:868-869.

Labeda, D.P. 1993. DNA relatedness among strains of the *Streptomyces lavendulae* phenotypic cluster group. *Int. J. of Syst. Bacteriol.* 43:822-825.

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