

Accepted Manuscript

Insights into natural products biosynthesis from analysis of 490 polyketide synthases from *Fusarium*

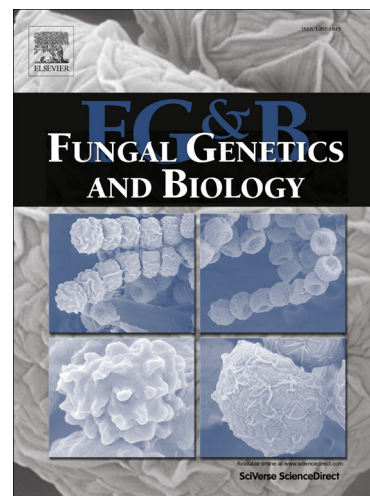
Daren W. Brown, Robert H. Proctor

PII: S1087-1845(16)30007-X
DOI: <http://dx.doi.org/10.1016/j.fgb.2016.01.008>
Reference: YFGBI 2937

To appear in: *Fungal Genetics and Biology*

Received Date: 25 September 2015
Revised Date: 14 January 2016
Accepted Date: 16 January 2016

Please cite this article as: Brown, D.W., Proctor, R.H., Insights into natural products biosynthesis from analysis of 490 polyketide synthases from *Fusarium*, *Fungal Genetics and Biology* (2016), doi: <http://dx.doi.org/10.1016/j.fgb.2016.01.008>



This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Insights into natural products biosynthesis from analysis of 490 polyketide synthases from *Fusarium*

Daren W. Brown* and Robert H. Proctor

Mycotoxin Prevention and Applied Microbiology

U.S. Department of Agriculture, Agricultural Research Service, National Center for Agricultural
Utilization Research, 1815 N. University St., Peoria, Illinois 61604,

*Corresponding author. Tel: (309)-681-6230; Fax: (309)-681-6672; e-mail:

daren.brown@ars.usda.gov

Abstract

Species of the fungus *Fusarium* collectively cause disease on almost all crop plants and produce numerous natural products (NPs), including some of the mycotoxins of greatest concern to agriculture. Many *Fusarium* NPs are derived from polyketide synthases (PKSs), large multi-domain enzymes that catalyze sequential condensation of simple carboxylic acids to form polyketides. To gain insight into the biosynthesis of polyketide-derived NPs in *Fusarium*, we retrieved 488 PKS gene sequences from genome sequences of 31 species of the fungus. In addition to these apparently functional PKS genes, the genomes collectively included 83 pseudogenized PKS genes. Phylogenetic analysis resolved the PKS genes into 67 clades, and based on multiple lines of evidence, we propose that homologs in each clade are responsible for synthesis of a polyketide that is distinct from those synthesized by PKSs in other clades. The presence and absence of PKS genes among the species examined indicated marked differences in distribution of PKS homologs. Comparisons of *Fusarium* PKS genes and genes flanking them to those from other Ascomycetes provided evidence that *Fusarium* has the genetic potential to synthesize multiple NPs that are the same or similar to those reported in other fungi, but that have not yet been reported in *Fusarium*. The results also highlight ways in which such analyses can help guide identification of novel *Fusarium* NPs and differences in NP biosynthetic capabilities that exist among fungi.

Keywords: *Fusarium*; secondary metabolite; natural product; polyketide; evolution; polyketide synthase

Download English Version:

<https://daneshyari.com/en/article/8470574>

Download Persian Version:

<https://daneshyari.com/article/8470574>

[Daneshyari.com](https://daneshyari.com)