

A gene cluster responsible for biosynthesis of phomenoic acid in the plant pathogenic fungus, *Leptosphaeria maculans*.

Elliott CE, Callahan DL, Schwenk D, Nett M, Hoffmeister D, Howlett BJ (2013) A gene cluster responsible for biosynthesis of phomenoic acid in the plant pathogenic fungus, *Leptosphaeria maculans*. *Fungal Genet Biol* 53, 50-58. [PubMed](#)

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Abstract

Phomenoic acid, a long chain aliphatic carboxylic acid is a major metabolite produced by *Leptosphaeria maculans*, a fungal pathogen of *Brassica napus* (canola). This fungus has 15 predicted polyketide synthases (PKS) and seven of them have the appropriate domains for the biosynthesis of phomenoic acid. The most highly expressed PKS gene after 7 days growth in 10% V8 juice, PKS2, was silenced and the resultant mutant produced very low levels of phomenoic acid, indicating that this PKS is involved in phomenoic acid biosynthesis. This gene is part of a co-regulated cluster of genes. Reduced expression of an adjacent gene encoding the transcriptional regulator C6TF, led to reduced expression of genes for PKS2, P450, a cytochrome P450 monooxygenase, YogA, an alcohol dehydrogenase/quinone reductase, RTA1, a lipid transport exporter superfamily member and MFS, a Major Facilitator Superfamily transporter, as well as a marked reduction in phomenoic acid production. Phomenoic acid is toxic towards another canola pathogen *Leptosphaeria biglobosa* 'canadensis', but not towards *L. maculans* and only moderately toxic towards the wheat pathogen *Stagonospora nodorum*. This molecule is detected in infected stems and stubble of *B. napus*, but biosynthesis of it does not appear to be essential for pathogenicity of *L. maculans*. Phomenoic acid may play a role in allowing *L. maculans* to outcompete other fungi in its environmental niche.

Identifier

doi: 10.1016/j.fgb.2013.01.008 PMID: 23396262