

Dual function of the polyketide synthase A of the nematode-trapping fungus *Duddingtonia flagrans* in pigment biosynthesis and regulation of trap formation

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Nematode-trapping fungi (NTF) are a large and diverse group of fungi, which may switch from a saprotrophic to a predatory lifestyle if nematodes are present. Secondary metabolites play important roles in the function and evolution of fungi, such as the nematicidal and antimicrobial activity in nematophagous fungi. Based on the genomic annotation of *Duddingtonia flagrans* we have got, the preliminary analysis revealed the presence of 29 putative SM-cluster, 4 PKS/PKS-NRPS hybrids and 3 NRPS genes, besides 2 terpenoid synthases. One of the PKS displays similarity to 6-MSAS type polyketide synthases, which is negatively involved in trap formation in *D. flagrans*. The lack of *pksA* can lead to increased numbers of the traps. Importantly, when the *pksA* is deleted, it interferes the chemotaxis, suggesting that *pksA* affect the production of volatile compounds to attract *C. elegans*. The pigment of *D. flagrans* can be synthesized by two pathways, DHN-melanin pathway and L-DOPA pathway. *PksA* mediates the biosynthesis of the pigment production and other secondary metabolites. Nematicidal activities of crude extracts and the virulence assay are also identified in the *pksA* mutant. It's believed that the exploration of related secondary metabolites genes is one of the key points to decipher the connection between the two species during the co-evolution of life and sheds light on the biological research in the deep sea biosphere.