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Characterization of relationship among *Dendrotonus Frontalis* and specific funguses in Loblolly pine (*Pinus taeda*)

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Objectives

Relationships among symbiotic organisms may change over time and ranges of resources. Other organisms may indirectly facilitate or interfere with these relationships. Interactions among bark beetles and their associated fungi in *Pinus taeda* are complex examples of the manner in which symbioses change and are indirectly affected by other organisms. To break the mutual interaction between the SPB and the fungus species, pine trees can be engineered to induce effecters that interrupt the function of the molecular targets in the mycangium. An essential enzyme in this interaction is identified; such enzyme can be used as a molecular target for engineering the induced effecters which bind with the enzyme, so that the enzyme is not available for its function.

Materials and Methods

1. Material

Plant: *Pinus taeda,* Fungus: *Ophiostoma ranaculosum* , *Ceratocystiopsis ranaculosus, Entomocorticium* sp, Insect: *Dendrotonus Frontalis*

2. Methods:

In vitro culture: MS medium, zip 0.5ppm for Plant, MEA (Malt Extract Agar) for fungus
Extraction of proteins: Tissues were ground with liquid nitrogen in protein extraction buffer
Analysis of 2DE: IPG strips were dehydrated for 12 or 16 h with 150 mg of proteins by proteomics manual.

Results and Discussion

The multiple interdependencies in this system provide novel opportunities for control of, and further research on, this damaging forest pest complex. This selectivity, wherein a given beetle species will attack only one or two conifer species, reflects the extended period of evolution between insect and host. The biology, behavior, and ecology of bark beetles and their unusual mutualistically relationship with the pathogenic fungi they carry as well as the role of host resin production in resistance against attack have been described for a range of specific beetle-conifer interactions, which permit a generalized description for the purpose of this review. Size of lesions formed and quantity of secondary metabolites produced in response to fungal inoculations varied significantly among *Pinus* species. Such targets in the mycangium could be associated with metabolic pathways that are involved in the biosynthesis of defense chemicals to which the specific fungus species have been adapted.

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