Fungal Endophytes Interact with Endophytic Yeast Isolated from Soybean Leaves

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Introduction

Endophytes (endo = inside and phyto=plant) are microscopic fungi that live inside of the leaves of all species of plants and can have beneficial effects on their hosts.

Previous work in our lab has shown a significant decrease of Sporobolomyces sp., an endophytic yeast, within soybean hosts exposed to elevated levels of CO2 (See the figure).

Sporobolomyces sp. has certain properties to enable them to act as natural biocontrol agents. This pink yeast may have untapped potential to protect crops from pathogenic organisms.

If Sporobolomyces sp. interacts with fungal pathogens, it may have strong effects on other fungal endophytes in the community.

The aim of this experiment was to: Examine how Sporobolomyces sp. interacts with endophytes isolated from soy leaves both in terms of fungal growth and phenotypic changes.

Methods

31 fungal samples were cultivated in Petri Dishes with Malt Extract Agar. These samples were previously isolated from leaves of soy plants.

Plates were spread with a Sporobolomyces sp. suspension.

From each plate four fungal plugs were taken and each placed in the center of the yeast plates (Y+). An additional four plugs were placed on control plates (Y-) that lacked the yeast suspension.

The growth and interactions of the fungi and yeast were compared between the Y- and Y+ groups.

For Experiment 1, the yeast were cultivated overnight before plating the fungi. For Experiment 2, the cultivation of yeast was increased to four days.

Results

The presence of the yeast caused more changes in fungal growth in Experiment 2 compared to Experiment 1. Overall, the effects on fungal growth tended to be negative.

The magnitude of these changes in growth was greater in Experiment 2 compared to Experiment 1.

Previous work in our lab identified positive and negative correlations between fungi and yeast in soybean. Most of the fungal endophytes were predicted to have negative correlations with Sporobolomyces sp., but this was not always the case in our experimental tests.

The presence of yeast also caused phenotypic changes in certain fungal endophytes.

Conclusions

Individual fungal endophyte species exhibited a wide range of responses when interacting with an endophytic yeast species.

Sporobolomyces sp. may influence the population growth of other endophytic fungal species in its community, which could have positive or negative effects on plant health and physiology.

Future Work

We will conduct a third experiment testing how Sporobolomyces sp. affects growth of Colletotrichum sp.1 isolated from ambient and elevated CO2 environments.

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References
