OFFICIAL ABSTRACT and CERTIFICATION

Use of Mycorrhizal Fungi to Improve Soil Conditions for Agricultural Use

Emma Foster and Julia Nadolne
Sachem High School East, Farmingville, NY 11738 USA

Due to the overuse of land for agriculture and desertification, the world's soil is becoming increasingly infertile. It was hypothesized that by using fungal mycelia it is possible to convent overused or barren soil into fertile soil, and this could aid in feeding the world's growing population. Intact mycelial networks have been known to increase the fertility of the soil by increasing the water and nutrient absorption capacity of plants if the land is left untilled. Three different blends of commercially available mycorrhizal inoculum, tested individually, and a control group with no mycelia were used consistently throughout this investigation. Experimental trials used: two-parts sterile sand to one-part sterile compost and 2% of one of the three mycorrhizal inoculants (vol./vol./vol) with Brassica rapa and Triticum aestivum. Additionally, behavioral studies were carried out using Eisenia fetida. T. aestivum results showed that mycelial inoculation improves plant growth and survival under drought conditions. B. rapa results showed that adding a mycelial inoculant was beneficial toward plants: although the experimental groups didn't grow as tall as the control, they were greener, less wilted, and had firmer stems than the control (no inoculant). Also, mycelia aided in aggregation of "soils" because the sand and compost mixture did not leach out from the bottom of containers (compared to controls). Over 94% of E. fetida were attracted to mycorrhizal inoculants in behavior tray trials. Further studies are analyzing the potential of mycorrhizal fungal to stimulate plant root hairs.

Category
Pick one only—
mark an "X" in box
at right

Animal Sciences	☐
Behavioral & Social Sciences	☐
Biochemistry	☐
Biomedical & Health Sciences	☐
Biomedical Engineering	☐
Cellular & Molecular Biology	☐
Chemistry	☐
Computational Biology & Bioinformatics	☐
Earth & Environmental Sciences	☐
Embedded Systems	☐
Energy: Chemical	☐
Energy: Physical	☐
Engineering Mechanics	☐
Environmental Engineering	■
Materials Science	☐
Mathematics	☐
Microbiology	☐
Physics & Astronomy	☐
Plant Sciences	☐
Robotics & Intelligent Machines	☐
Systems Software	☐
Translational Medical Sciences	☐

1. As a part of this research project, the student directly handled, manipulated, or interacted with (check ALL that apply):

   ☐ human participants ☐ potentially hazardous biological agents

   ☐ vertebrate animals ☐ microorganisms ☐ rDNA ☐ tissue

2. I/we worked or used equipment in a regulated research institution or industrial setting: ☐ Yes ■ No

3. This project is a continuation of previous research. ☐ Yes ■ No

4. My display board includes non-published photographs/visual depictions of humans (other than myself): ☐ Yes ■ No

5. This abstract describes only procedures performed by me/us, reflects my/our own independent research, and represents one year's work only ■ Yes ☐ No

6. I/we hereby certify that the abstract and responses to the above statements are correct and properly reflect my/our own work. ■ Yes ☐ No

This stamp or embossed seal attests that this project is in compliance with all federal and state laws and regulations and that all appropriate reviews and approvals have been obtained including the final clearance by the Scientific Review Committee.