THE MUSHROOM MISTER

WHAT IS THE MUSHROOM MISTER?

The Mushroom Mister is a device that automates tending to mushrooms by sensing and adjusting fluctuations in air humidity within their growth chamber.

1 BACKGROUND

The Black Creek Community Farm promotes accessibility and agricultural education for all ages. The Mycology Lab, though still in development, is set to host cohorts of TDSB students, as well as annual volunteering and residency programs, all with fungi cultivation at its core.

2 OPPORTUNITY

The main crop, oyster and Lion's Mane mushrooms, require

85% - 95% HUMIDITY

for optimal growth.

To maintain these conditions, misting must be performed

TWICE A DAY.

A day skipped can lead to loss of an entire crop, making manual maintenance

TIME-CONSUMING, TEDIOUS & HIGH-RISK

KEY OBJECTIVES

AUTOMATION
reduces stakeholder workload & intervention

AIR HUMIDITY CONTROL
maintains optimal conditions for growth

MINIMAL PARTS
allows easy use and construction

CORROSION PREVENTION
provides longevity

EFFICIENT WATER USE
increases sustainability

MALFUNCTION PREVENTION
minimizes electrical risk

3 FEATURES

FOUR HUMIDITY SENSORS

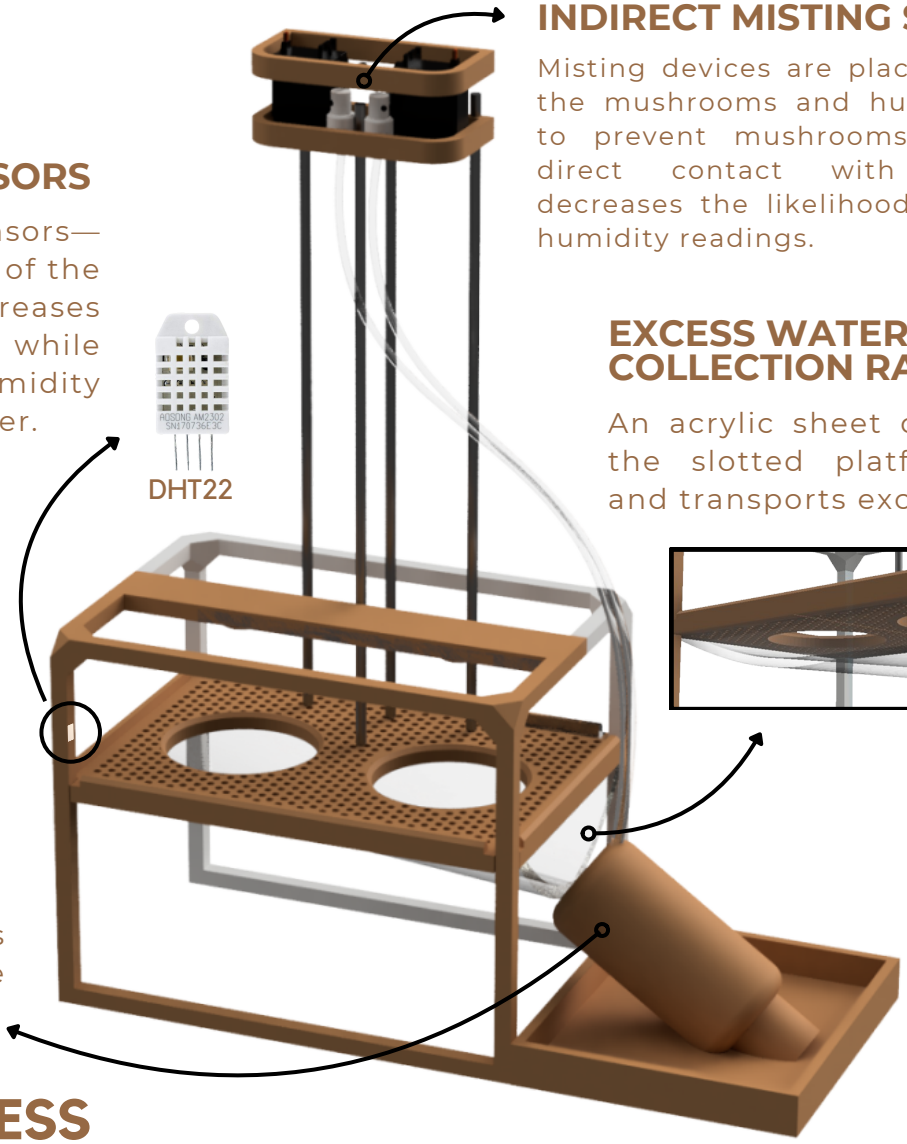
Four DHT22 humidity sensors—placed outside the reach of the misting devices—increases accuracy of readings, while maintaining over 85% humidity inside the growth chamber.

QUALITY CONSTRUCTION

Sturdy build made from corrosive, humidity resistant and renewable material: polylactic acid (PLA).

WATER COLLECTION RESEVOIR

Bottle that collects excess water to be recycled for future use.



INDIRECT MISTING SYSTEM

Misting devices are placed high above the mushrooms and humidity sensors to prevent mushrooms from having direct contact with water and decreases the likelihood of inaccurate humidity readings.

EXCESS WATER COLLECTION RAMP

An acrylic sheet draped under the slotted platform collects and transports excess water.

4 EFFECTIVNESS

- ☑ MINIMAL PARTS
- ☑ MALFUNCTION PREVENTION
- ☑ AIR HUMIDITY CONTROL
- ☑ EFFICIENT WATER USE
- ☑ AUTOMATION
- ☑ CORROSION PREVENTION

Through testing our functional prototype, we have been able to maintain the optimal humidity over the course of 30 hours.

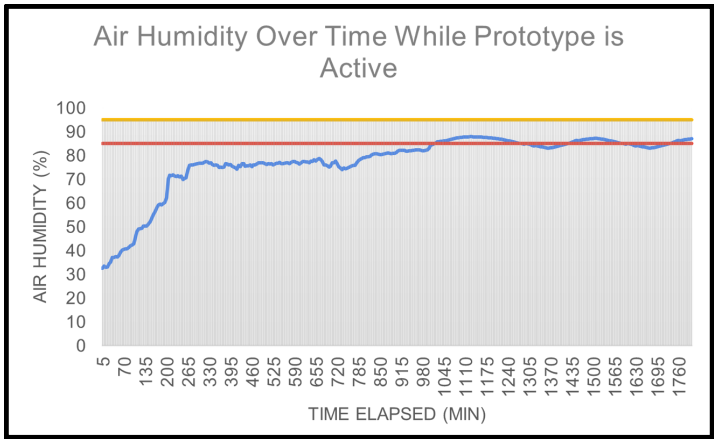


Figure 1. Graphed data generated from Arduino serial monitor

5 NEXT STEPS

As a result of the materials available, this prototype does not serve as a complete representation of what we had envisioned, with respects to size and function. The humidity sensors can be faulty at times, which is why we chose to implement four sensors. Additionally, this prototype cannot decrease humidity.

To further progress this design, a higher fidelity prototype can be developed with more stakeholder validation. It could also be constructed with higher-quality materials to be tested for long-term use.