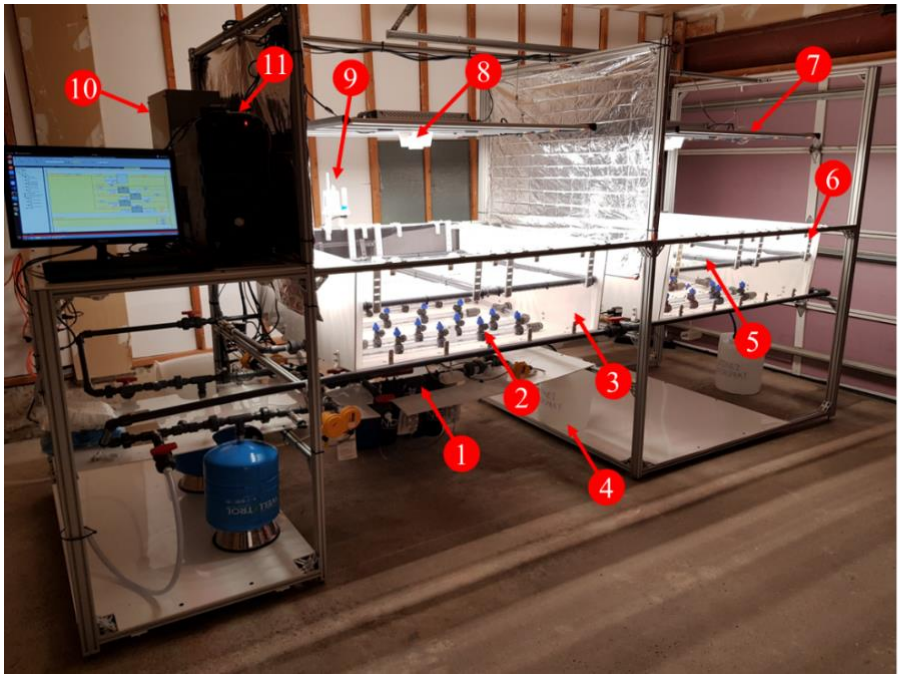
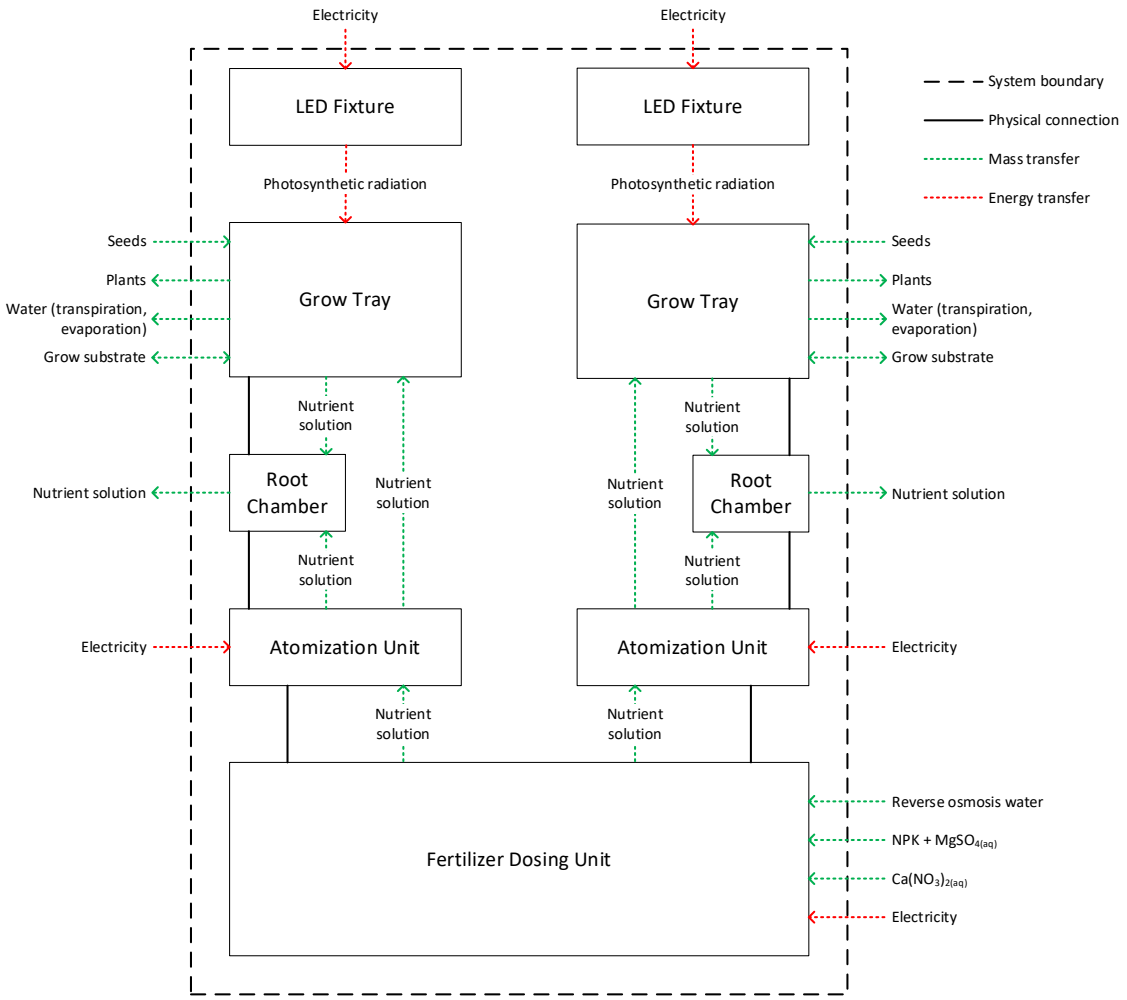
Appendix

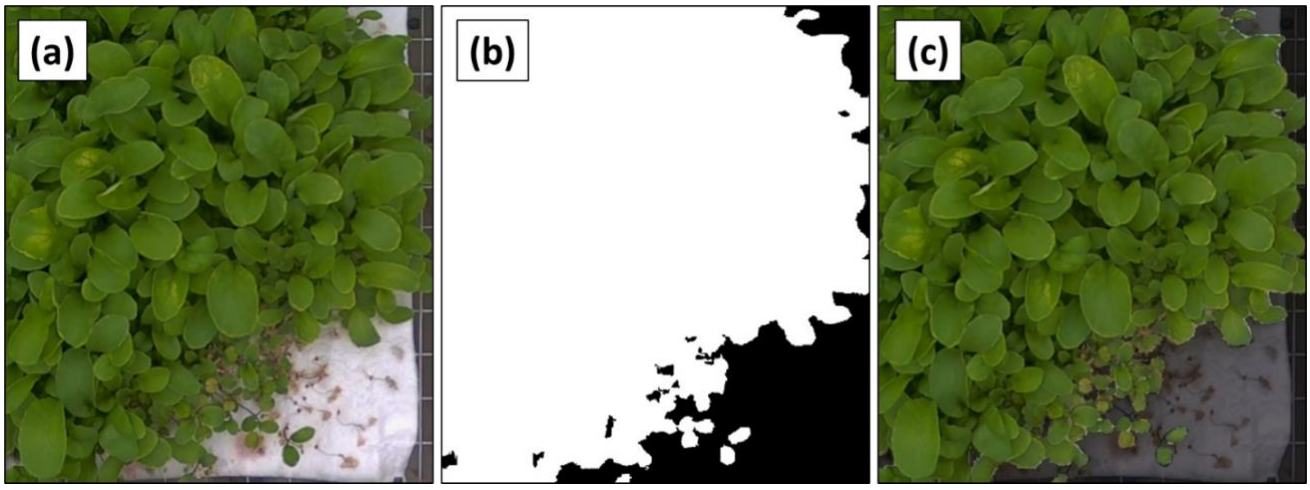


1. Fertilizer dosing unit (entire lower shelf)
2. Pressure atomizer
3. Root chamber
4. Drain reservoir
5. Grow tray
6. Grow tray height adjustment bracket
7. LED fixture
8. Camera
9. Climate sensor suite
10. Control panel
11. Other hardware (desktop, router, PoE switch, peripherals)

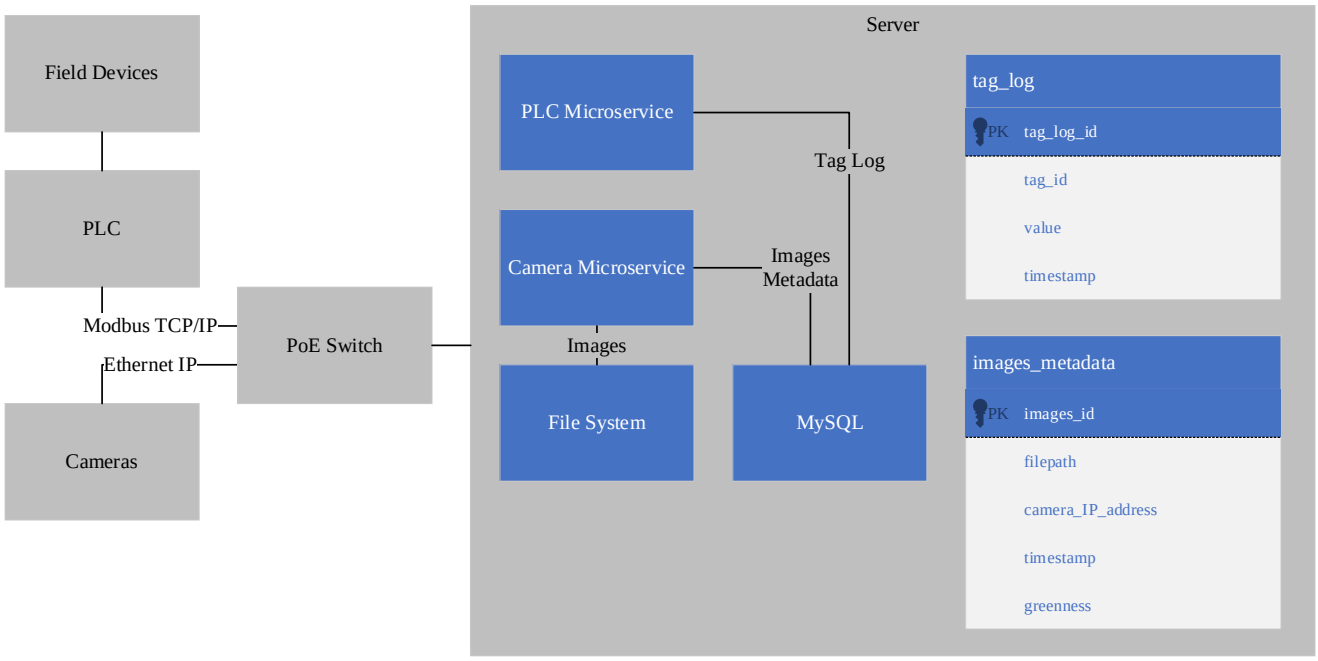
Appendix Figure 1. System-level overview of the prototype system developed by PowerPlant Agriculture Inc in 2020.



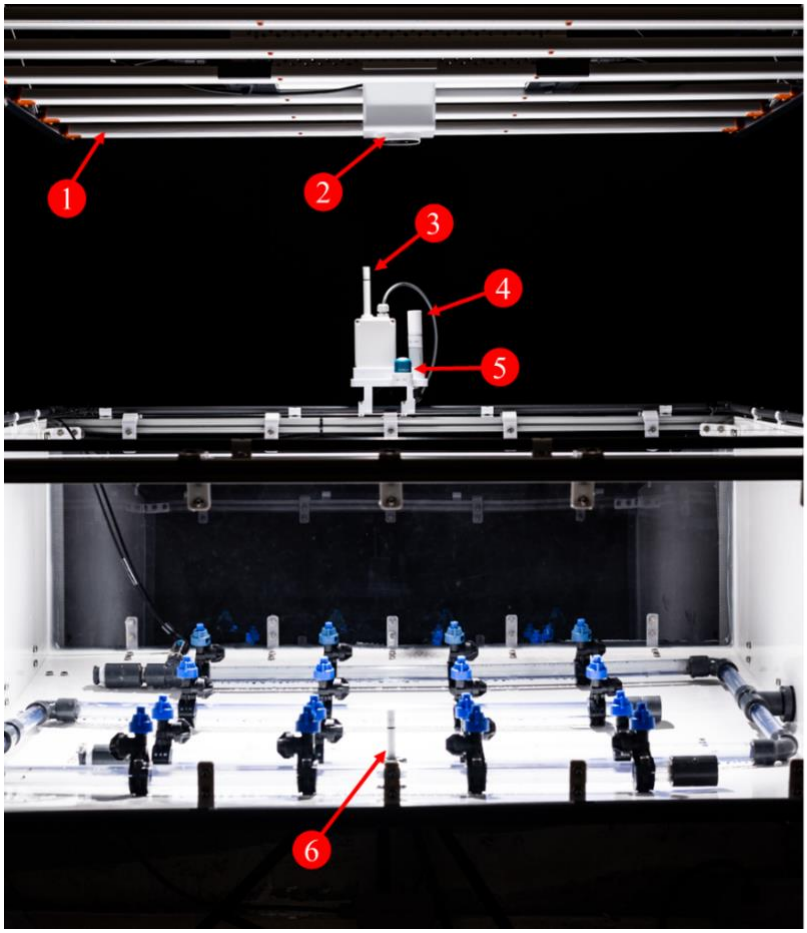
Appendix Figure 2. Schematic diagram of aeroponic prototype, excludes control hardware as subsystem.



Appendix Figure 3. Identifying plant leaves process: original image (a), plant and non-plant pixels (b), and comparison with highlighted plants and darkened non-plant background (c).

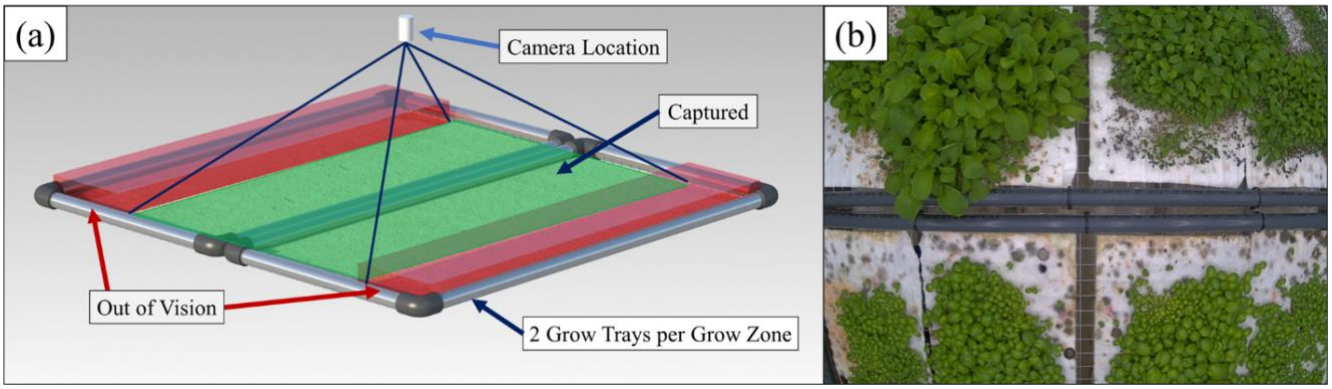


Appendix Figure 4. Data collection schematic. Gray boxes are hardware components, blue boxes are software components. The 2 tables tag_log and images_metadata show the columns for each.

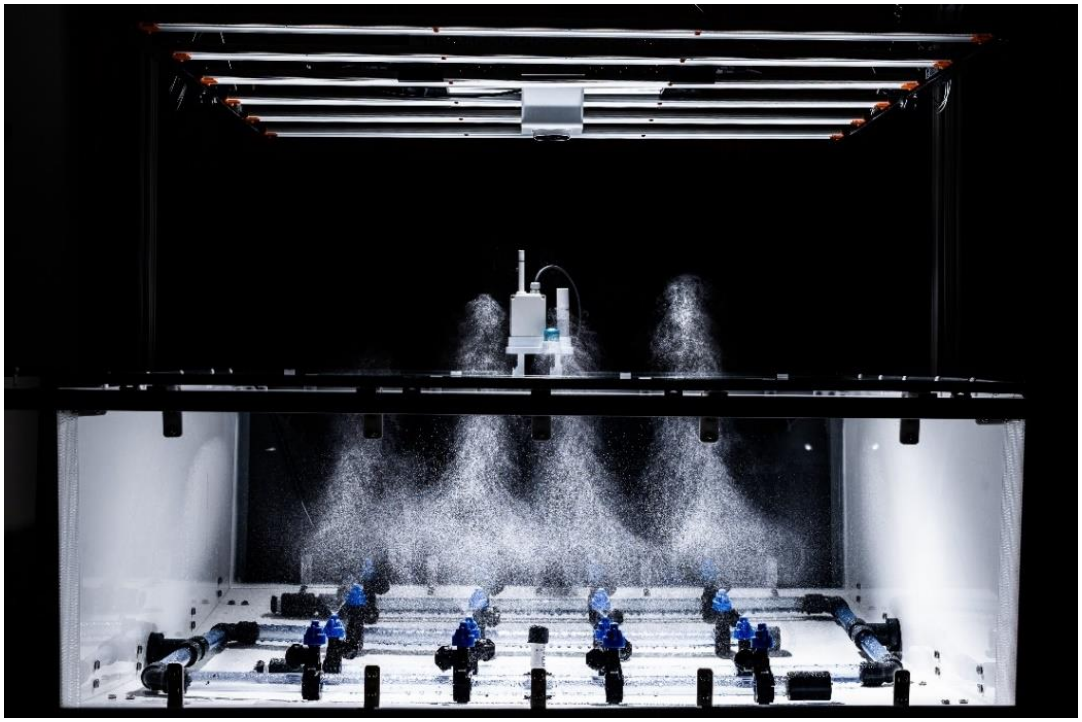


1. LED fixture
2. Camera
3. Temperature and humidity sensor, canopy
4. CO_2 sensor, canopy
5. PAR sensor, canopy
6. Temperature and humidity sensor, root chamber

Appendix Figure 5. Climate and radiation-related hardware and camera.

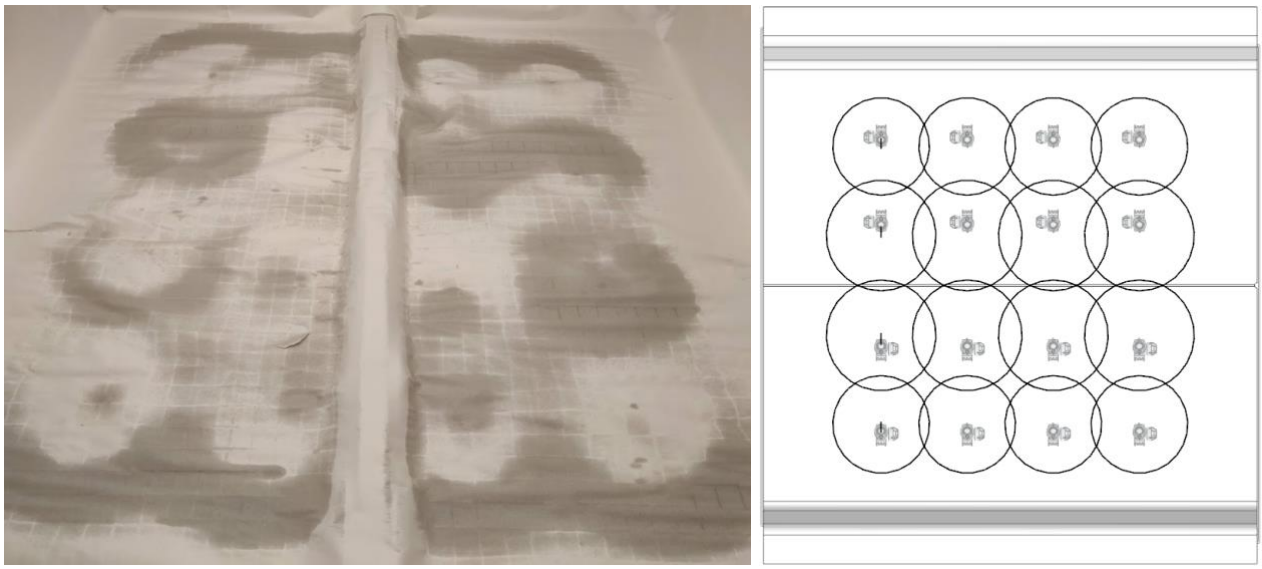


Appendix Figure 6. Camera location above the grow zone (a) and the captured image (b).

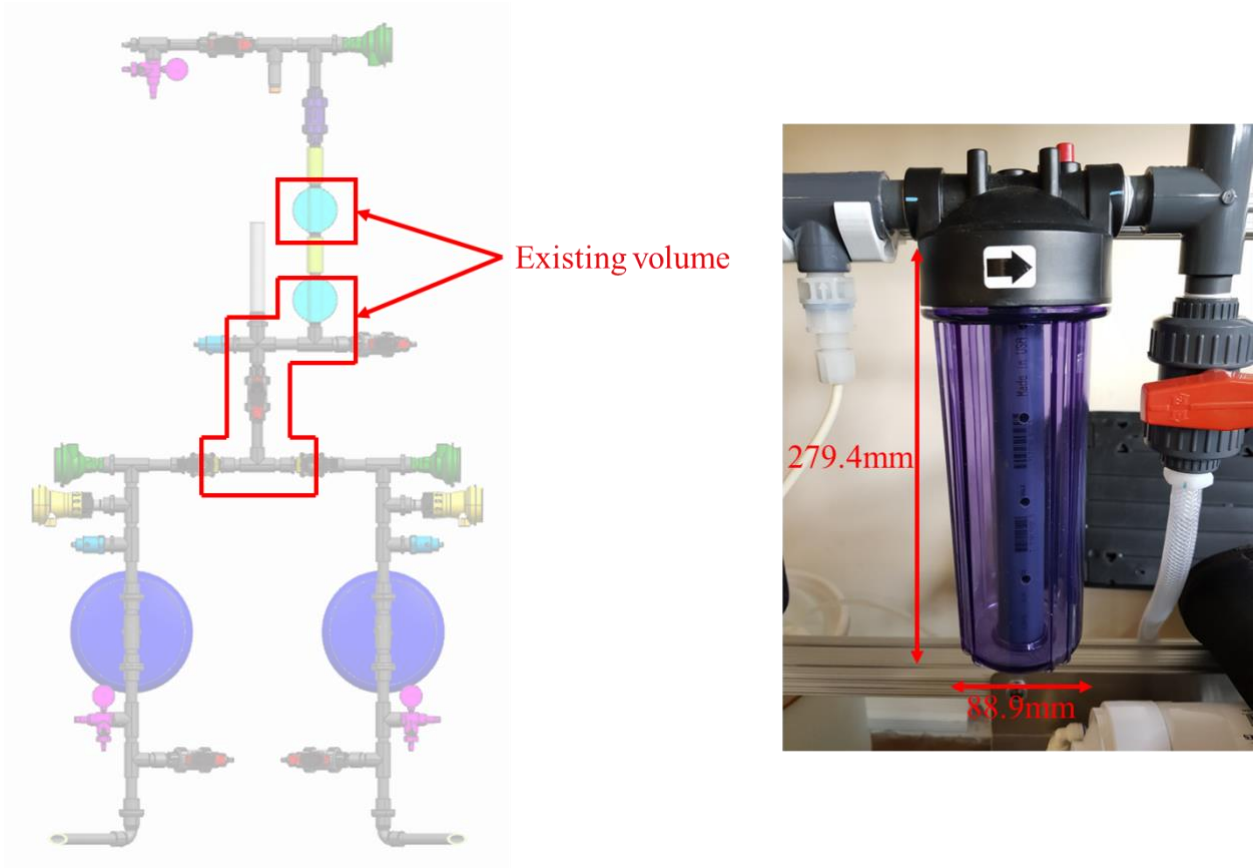


Appendix Figure 7. The spray turns turbulent before reaching the highest grow plane.

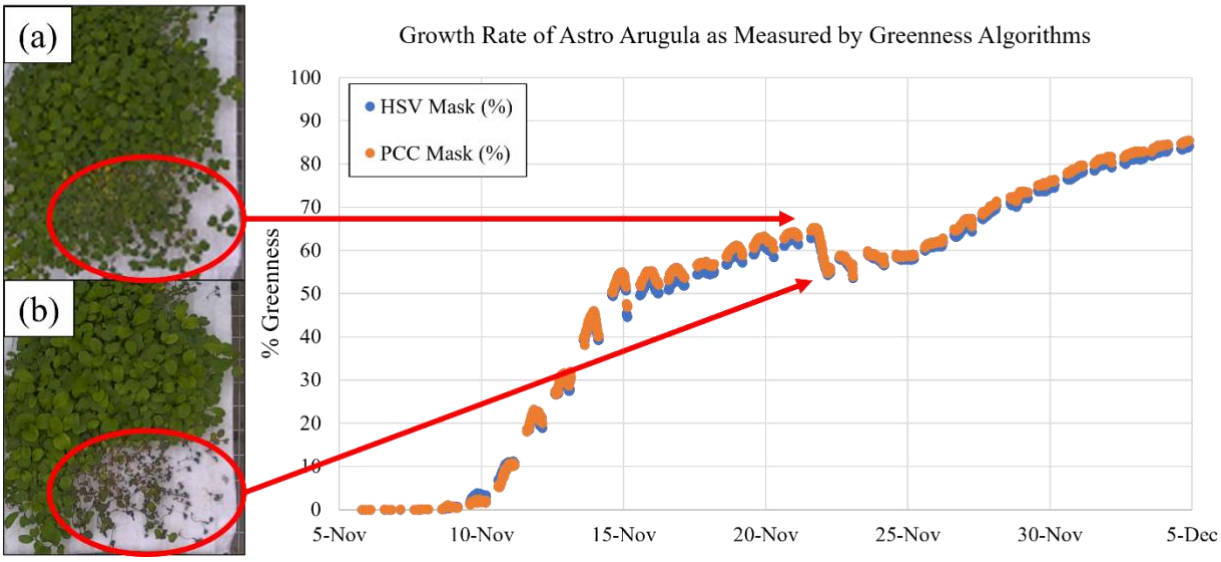
Appendix Figure 8. The spray patterns of the lowest and middle grow tray heights.



Appendix Figure 9. Comparison of the geometric spray model and experimental spray data.



Appendix Figure 10. Place where the existing volume is located in the fertilizer mixing unit (left figure) and one of the mixers downstream of the injection pump fitting (right figure).



Appendix Figure 11. Image greenness over time: Before nozzle clogging happens (a) and after the nozzle has clogged (b) (A side-by-side video of the raw, binary, and combined images with the greenness time-series graph can be found at https://youtu.be/TfaJolhYVuI).