

Town to Table: Brookline

*Health and Education through community partnership
and collaborative programming*



We operate at the intersection of innovative agriculture technology and educational programming

Who We Are

Community-Based Food Producer

- Equitable access across student population
- Locally-grown, healthy greens
- Year-round production
- Sustainable community development
- Community farm

Our Programming

Educational Care Farming

- Encourages health, well-being and education
- Empowers students to be sustainability advocates
- Develops NextGen skills
- Exposes students to innovative technology
- Provides internship opportunities



A Freight Farm is a fully assembled, vertical hydroponic farm housed inside a shipping container

Freight Farm

Year-round production, independent of weather

- Controlled Environment Agriculture (CEA)
- Climate resilient, environmentally responsible
- Water efficient – 90% less water than conventional agriculture
- GMO, herbicide, pesticide free

Our Greens

Acre of farm in 40ft

- Hyper-local, weekly deliveries to each school
- 600-800 Heads of lettuce/kale/chard per week
- 256 Growing Towers
 - 12-18 plants each
 - 6,000 plants sites (including seedlings)



Integrated program designed to promote healthy habits, education and sustainable career pathways

Education

Exposure to Innovative Technology

- Hands-on, Next Gen skills building
- Real-world application
- Field trips
- Internship program
- Fosters entrepreneurial culture

Nutrition

Equitable access

- Hyper-local, year-round production
- Grown in Brookline
- Plant-based options
- Food miles → Foot steps
- Positive spillover effect

Freight Farms Nutrient Uptake Experiment

Kathryn Perry
Clark University, Worcester MA
Advisor: Dr. Kaitlyn Mathis

Introduction

Vertical farming, an innovative and adjusted method of growing food, is becoming a more readily grown or planted in high-density systems.

Vertical farming is a method of growing crops in vertically stacked layers, often in a controlled environment. This method allows for year-round production and reduces the need for pesticides and herbicides. It also allows for the use of recycled water and nutrients, making it a more sustainable method of food production.

Questions

1. Is nutrient uptake dependent on crop age?
2. How does nutrient uptake differ between varying species?
3. Is there an overabundance of nutrients in our Freight Farms?

Methods

Collection

Analysis

UV-Vis Spectrophotometry

1. Is nutrient uptake dependent on crop age?

Figure 1: The amount of nutrient uptake for all three species (lettuce, basil, and arugula) over time. The x-axis represents the number of days, and the y-axis represents the amount of nutrient uptake. The data shows that nutrient uptake increases over time for all three species, with lettuce showing the highest uptake and arugula showing the lowest.

Figure 2: The amount of nutrient uptake for all three species (lettuce, basil, and arugula) over time. The x-axis represents the number of days, and the y-axis represents the amount of nutrient uptake. The data shows that nutrient uptake increases over time for all three species, with lettuce showing the highest uptake and arugula showing the lowest.

2. Is there an overabundance of nutrients in our Freight Farms?

Figure 3: The amount of nutrient uptake for all three species (lettuce, basil, and arugula) over time. The x-axis represents the number of days, and the y-axis represents the amount of nutrient uptake. The data shows that nutrient uptake increases over time for all three species, with lettuce showing the highest uptake and arugula showing the lowest.

Figure 4: The amount of nutrient uptake for all three species (lettuce, basil, and arugula) over time. The x-axis represents the number of days, and the y-axis represents the amount of nutrient uptake. The data shows that nutrient uptake increases over time for all three species, with lettuce showing the highest uptake and arugula showing the lowest.

Discussion

The data for question 1 indicates there is a difference between nitrogen and phosphorus consumption for all three species. For nitrogen, the young crop barely uptake anything until halfway into their life cycle where they reach a peak at 20 days. Nitrogen uptake follows a bell-shaped curve for all species, unless phosphorus, which was more sporadic. There is a significant difference ($p < 0.05$) in concentration for all species in both figures.

Figure 2 indicates there is a significant difference between the total and nitrate leaflet lettuce (ANOVA, $F(2,20) = 10.03$, $p = 0.001$) and leaf lettuce and nitrate lettuce (ANOVA, $F(2,20) = 10.03$, $p = 0.001$) for the average nitrogen uptake. Figure 4 indicates leaf lettuce and leaf lettuce (ANOVA, $F(2,20) = 10.03$, $p = 0.001$) and leaf lettuce and leaf lettuce (ANOVA, $F(2,20) = 10.03$, $p = 0.001$) in a significant difference for phosphorus uptake. This indicates that different varieties of plants require different nutrient levels to grow properly.

The answer to question 3 is similar yes. The amount of nutrients that Freight Farms recommends to add to the water source is much greater than what the plants are actually using. This can lead to problems such as algae blooms and phytoplankton growth in the water. I would advise reducing the amount of nutrients added to the water.

References

Clark University, Worcester MA

Thank you!



Farm location and expansive, inclusive programming

Farm Site

- Spot
 - Level ground → max 3% grade
- Electricity
 - 125 kWh/day → Avg \$400/month = \$4,800/year
- Water
 - Access to garden hose → Within 50' of farm

Programming

Sustainable After School + Summer Program

- Field trips
- Peer to peer learning
- Community mural
- Growing buddies
- Sustainability focus



Sustainable student-centric programming on a path towards career development

Internships

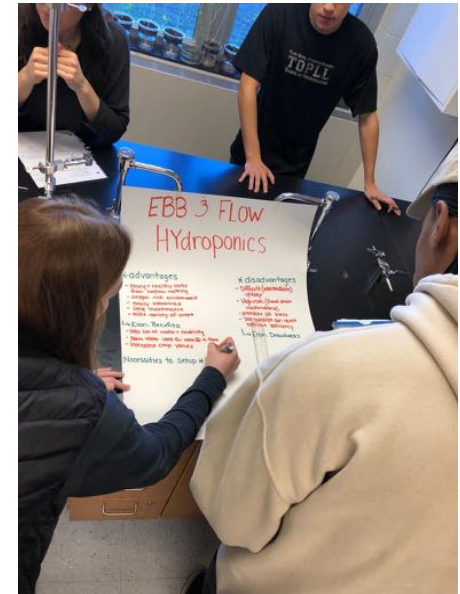
Manage Brookline's Urban Agriculture Initiatives

- Work in Town to Table's Freight Farm
- Partnership with: Food Justice Club + Steps to Success
- Student grown produce
- Workforce development
- Community liaison

Career Pathways

Exposure to Environmentally Responsible Technology

- Equitable access to technology
- Future-focused development
- Vertical education
 - Brookline, College and Master's students working together



Sustainable community development through collaboration, partnership and solutions

Integrated Services	Description	Quantity
Software	Care Farm Platform: Curriculum + Garden Report Promotes health, wellness and education 7 th Grade + Career and Technology Department	12+ Users
Hardware	Vertical, hydroponic classroom garden Additional growing materials provided	6-8 Gardens 6-8 Growing Kits
Farm	Weekly deliveries of hyper-local produce Year-round sustainable production Main crops: Leafy greens, hearty greens, herbs	600+/week \$1.25-1.50/head
Field Trips	K-12 Field trips: Community tours and informational sessions	50+ events/year 20 students/trip
Internships	Partnership with Steps to Success + Food Justice club Support operations of classroom gardens Green career pathways	10+/Year
Expertise	Install and support classroom gardens Available for call, text and email Contacts: Jack Levine, Isaac Moss, Temen Kim	12pm-4pm Monday-Friday

