SporeStrike

Aria Das, Avni Iyer, Abhay Shukla, Dominic Wang

The Team

Aria Das

Avni Iyer

Abhay Shukla

Dominic Wang

Fungal Infections:

Destroy:

20% of all crops

Cost:

$200 billion

Take food from:

4 billion people

Current Solutions

X Inefficient
X Expensive
X Inaccurate

Sporestrike

✓ Targeted
✓ Efficient
✓ Data Driven

Introducing:

SPORESTRIKE

SporeStrike System

Agricultural drone battery (LiPo)

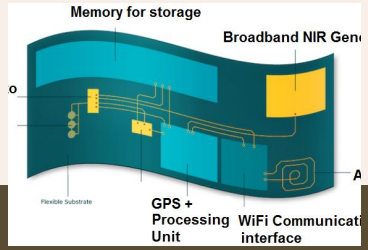
Sensor 2: Fungal impedance analyzer

Sensor 1: hyperspectral imagery analysis

Fungicide dispensers (with gimbals)

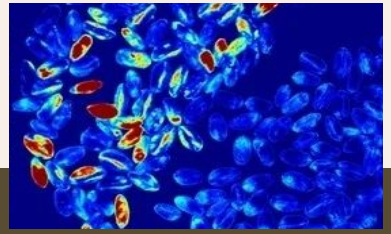
Phase 1: Detection

Hyperspectral sensor scans 4ftx4ft area



FHE stores optical data & location

Drone returns to homebase & uplinks data



AI/ML determines infection

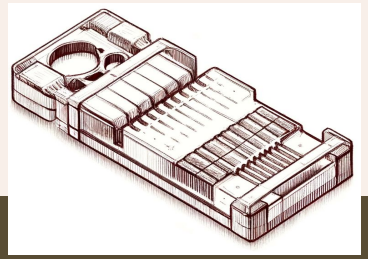
Phase 2

Powered by Li Ion Battery

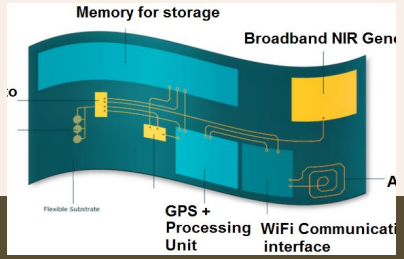
- **99% Detection Accuracy**

Phase 2: Extermination

Impedance analyzer collects current resistance data



Drone collects spores via microfluidic chip



FHE uses resistance data to identify infection

Drone releases infection specific fungicide

Powered by Li Ion Battery

- **97% Extermination Accuracy**
- **75% Faster than manual methods**

Total ROI

Farmers	Humans	Investors
20% higher crop yield 63k dollars saved Decrease fungicide waste and resistance	176 million people fed in the US	$65 million profit

Business MODEL

Target Market

The USDA

Farmers

Organizations

OEM

Competitive Analysis

	Sporestrike	Croptix	PCR Testing	Satellite Imaging	Manual spraying
Low Cost	✓	✓			
High accuracy in detection	✓	✓	✓	✓	
Targeted disease elimination	✓				✓
Time efficient	✓			✓	
Simplicity of operation	✓	✓		✓	✓

Manufacturing

Component	Manufacturing
Agricultural Drone	FREEFLY
FHE	NEXTFLEX
Hyperspectral Camera	SPECIM A Konica Minolta Company
Impedance Analyzer	KEYSIGHT
Microfluidic Chip	vantiva Pushing the edge

Key Partners

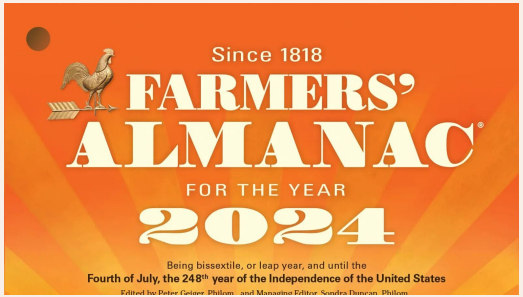
Prototyping	NEXTFLEX, FREEFLY
Funding, Research, Data	UC DAVIS BIOLOGICAL AND AGRICULTURAL ENGINEERING, PURDUE UNIVERSITY Agricultural and Biological Engineering, NSF
Market knowledge, networking	John Deere, California Growers Association Established 2015, United States Department of Agriculture

Marketing Plan

Agricultural Conventions and Farmers Co-ops

Search & Social Media

Print & Almanacs



Cost Breakdown

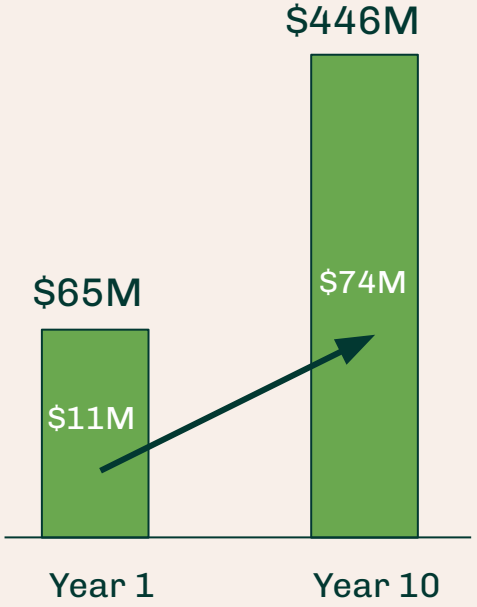
TOTAL MATERIALS COST	$5,437

Component: Drone hardware	Per Unit Cost
Hyperspectral Camera Attachment	$4,600
Microfluidic Chip Attachment	$800
9 V Battery for Impedance Analyzer	$3.00
FHE	$5.00
Processor	$1.70
WiFi Antenna	$5.00
Fungicide Dispenser	$19.00
Near Field Communication Antenna	$2.80

Financial Plan

Per Unit Economics	
Sale Price	$ 13,048
Cost of materials	$ 5,437
Total Item Cost	$ 10,873
Gross Profit	$ 2,175

Total profit:



Units:	5K	34K

Change the face of farming globally:

Spore

Strike

Questions?

Works Cited

Yiting Xie a, et al. “Hyperspectral Imaging Detects Biological Stress of Wheat for Early Diagnosis of Crown Rot Disease.” *Computers and Electronics in Agriculture*, Elsevier, 30 Dec. 2023, www.sciencedirect.com/science/article/pii/S0168169923009596.

Bove, Tristan. “A ’Last of Us’–Style Fungi Outbreak Could Obliterate Crops Worldwide.” *Fortune*, Fortune, 4 May 2023, fortune.com/2023/05/04/last-of-us-fungi-outbreak-could-obliterate-crops/.

El-Baky, Nawal Abd, and Amro Abd Al Fattah Amara. “Recent Approaches towards Control of Fungal Diseases in Plants: An Updated Review.” *Journal of Fungi (Basel, Switzerland)*, U.S. National Library of Medicine, 25 Oct. 2021, www.ncbi.nlm.nih.gov/pmc/articles/PMC8621679/.

Fang, Yi, and Ramaraja P Ramasamy. “Current and Prospective Methods for Plant Disease Detection.” *Biosensors*, U.S. National Library of Medicine, 6 Aug. 2015, www.ncbi.nlm.nih.gov/pmc/articles/PMC4600171/.

Ivanov, Marija, et al. “Emerging Antifungal Targets and Strategies.” *International Journal of Molecular Sciences*, U.S. National Library of Medicine, 2 Mar. 2022, www.ncbi.nlm.nih.gov/pmc/articles/PMC8911111/.

Kutawa, Abdulaziz Bashir, et al. “Trends in Nanotechnology and Its Potentialities to Control Plant Pathogenic Fungi: A Review.” *Biology*, U.S. National Library of Medicine, 8 Sept. 2021, www.ncbi.nlm.nih.gov/pmc/articles/PMC8465907/.

“Prevent and Control Fungal Disease in Fruit and Vegetable Gardens.” *GardenTech*, www.gardentech.com/blog/pest-id-and-prevention/prevent-and-control-fungal-disease-in-fruit-and-vegetable-gardens. Accessed 25 Apr. 2024.

Wilde, Matthew. “Farmers Willing to Spend Money on Crops If Yield Potential, Roi Are Promising.” *DTN Progressive Farmer*, DTN Progressive Farmer, 5 July 2021, www.dtnpf.com/agriculture/web/ag/crops/article/2021/07/05/farmers-willing-spend-money-crops#:~:text=On%20average%2C%20it%20costs%20%2428,cost%20about%20%2410%20per%20acre.

“‘devastating’ Fungal Infections Wiping out Crops and Threatening Global Food Security, Experts Warn.” *ScienceDaily*, ScienceDaily, 3 May 2023, www.sciencedaily.com/releases/2023/05/230503121323.htm.