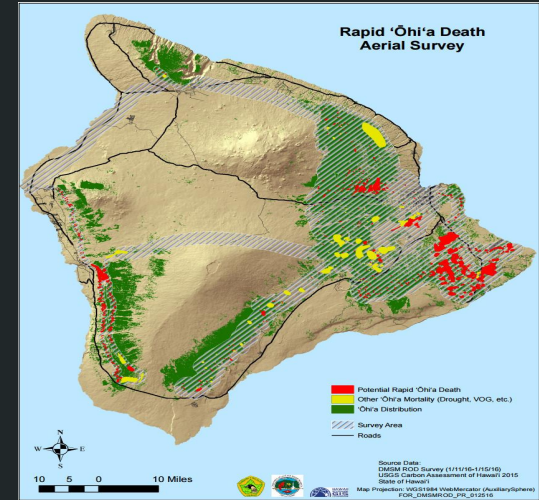


Rapid 'Ōhi'a Death Team: MVCC



By: Jonathan Machado, Ian Brady, Gerald Piimauna, Nakoa Santiago

Problem Statement

- We need to develop a method of detecting the Rapid 'Ohia death before symptoms are shown. (1)
-

Specifications

Specification	Weight	Reasoning
Cost per tree is below \$57	4	Important, but should not get in the way of saving the trees.
Does not harm the trees	5	The goal is to save them
Needs to detect the fungus before symptoms show	5	Is part of the goal.
Does not affect the surrounding environment	4	The surrounding area is also important, however the trees are the top priority.
Is user friendly	3	Is not the most important specification but would be nice.

Possible Solutions

Gerald, pGLO Detection:

- Detects presence of fungus by putting infected tree samples in antifungal bacteria colonies.
- Benefit- Relatively safe for the environment
- Challenge- Breeding fungal resistant bacteria
- Inspiration- Inspired by AP Biology lab

Jon, Water Potential:

- Compares average water potential of non-infected trees to ones that might be infected.
- Benefit- a potential way of detecting the fungus.
- Challenge- A set cost is not specified
- Inspiration- an article about water transport in plants. (2)

Possible Solutions

Ian, : (insert name)

- Cut down infected tree to get samples, then do tests with chemicals to find what kills the fungus.
- Benefit- Can use this chemical to maybe kill other fungi
- Challenge- Does not solve the chosen problem (detection)
- Inspiration- Self inspiration

Nakoa, Kill the Beetles:

- Kill the beetles with something
- Benefit- will slow down spread of fungus
- Challenge- Does not solve chosen problem (detection)
- Got it from a website.(3)

Solution Selection

Pugh Chart Part 1

		Solution 1: pGLO detection		Solution 2: Water potential	
Specs	Weight (1-5)	Score (1-10)	Weighted Score	Score (1-10)	Weighted Score
Cost per tree below \$57	4	7	28	0	0
Does not harm the trees	5	8	40	6	30
Needs to detect fungus before symptoms show	5	10	50	8	40
Does not affect the surrounding environment	4	10	40	10	40
User Friendly	3	6	18	3	9
Totals			166		119

Pugh Chart Part 2

		Solution 3: Kill the Beetles		Solution 4:	
Specs	Weight (1-5)	Score (1-10)	Weighted Score	Score (1-10)	Weighted Score
Cost per tree below \$57	4	0	0	0	0
Does not harm the trees	5	10	50	10	50
Needs to detect fungus before symptoms show	5	0	0	0	0
Does not affect the surrounding environment	4	3	12	10	40
User Friendly	3	0	0	0	0
Totals			62		90

Selected Solution: pGLO

- The pGLO solution was selected because:
 - It provides a solution to the problem statement
 - Was the least invasive solution (affects the 'Ohia and environment the least)
 - Was the only solution that specified a budget
 - Solution is very specific, compared to the other solutions, which were mostly just broad ideas.



Budget

Materials	Quantities	Costs	Justifications
pGLO Kit (note: 1 kit can test about 8 trees)(4)	As many trees that need to be tested.	About \$99	What is needed for the solution to work
Power drill(5)	1	About \$69	Needed to get samples for testing
Ziploc bags(6)	As many trees that need to be tested.	About \$55 for 100 pack	Needed to hold samples.
Rubbing alcohol (7)	Use as needed	About \$5 for 16 oz bottle	Needed to disinfect tools

Challenges

- Some problems that might come up include:
 - Funding
 - Could be solved by getting funding from the school
 - The selected solution might not work
 - Might need to select a different solution or brainstorm a new one.



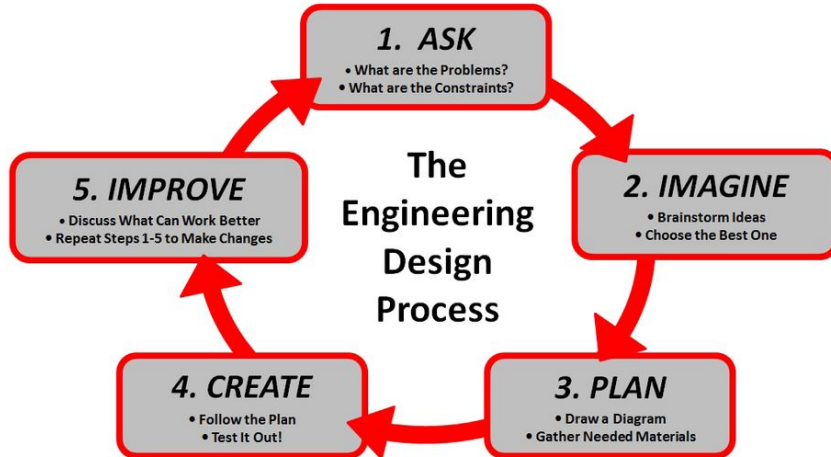
(8)

Reflection

What we learned

Re- Learned

- The Engineering design process
 - E.g. problem statements, specifications, brainstorming solutions, pugh designs etc.



(9)

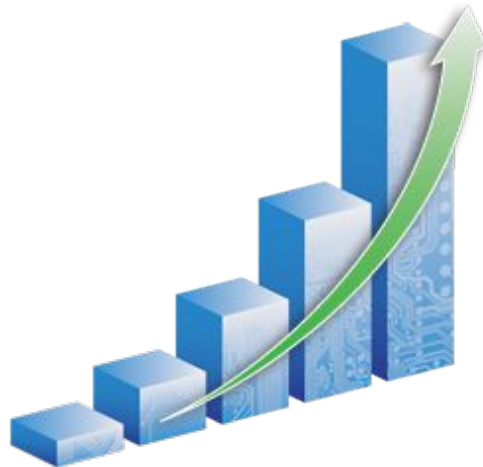
Learned

- What rapid 'Ohia Death is?
- How the fungus is spread?
- Different ways to detect the fungus.
- Benefits of those detection methods.
- Challenges that those methods entail.



Future work/ Improvements

- Continue researching Rapid 'Ohia death to better understand the disease
- Brainstorm more materials that might be needed for the solution.
- Make a detailed procedure for testing if the trees are infected using pGLO
- Eventually test the solution



(10)

References

- (1)-<https://www.savetheohia.org/guidelines>
- (2)-<http://bio1520.biology.gatech.edu/nutrition-transport-and-homeostasis/plant-transport-processes-i/>
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