Engineering Poison-Free Animal Control Solutions for Residential and Industrial Irrigation

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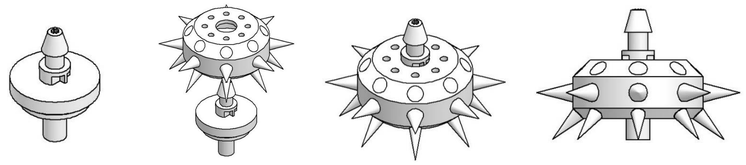
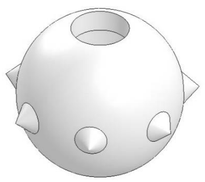
Design Challenge

Our goal was to create a product that could effectively mitigate costly animal damage to irrigation emitters while maintaining compatibility with all major residential and industrial emitter systems.

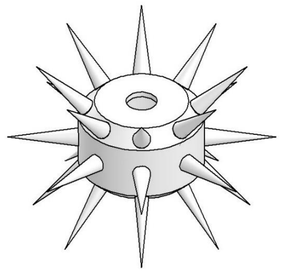


An Iterative Approach

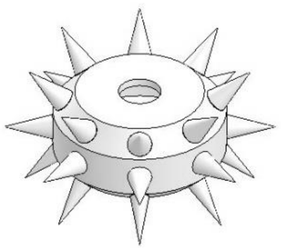
Iterative design is a design methodology based on a cyclic process of prototyping, testing, analyzing, and refining a product or process. Based on the results of testing the most recent iteration of a design, changes and refinements are made. This process is intended to ultimately improve the quality and functionality of a design. In iterative design, interaction with the designed system is used as a form of research for informing and evolving a project, as successive versions, or iterations of a design are implemented.



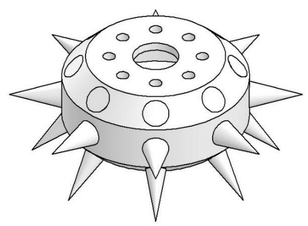
Prototype 1. A 3D concept design



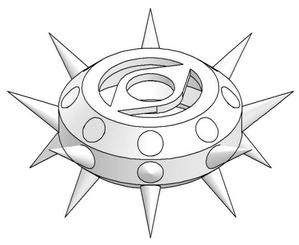
Prototype 2. The first model constructed using the geometry from one type of drip nozzle



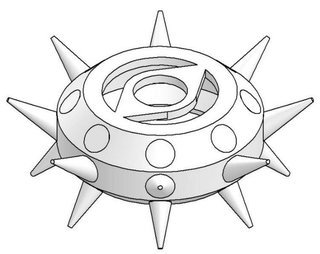
Prototype 3. The second model constructed using the geometry from two different drip nozzles



Prototype 4. The first model to accommodate three different drip geometrie



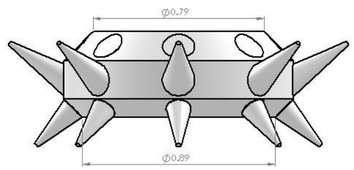
Prototype 5. This model incorporated a pop out design to accommodate the third drip head

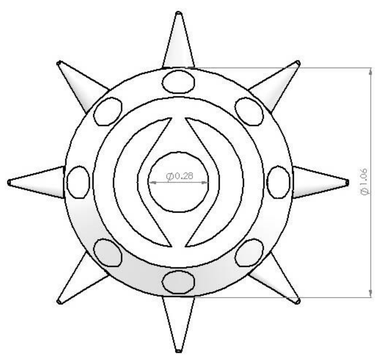


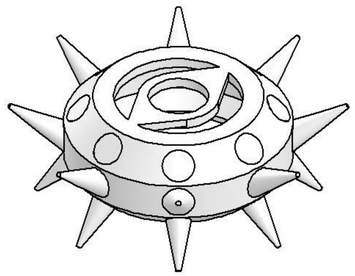
Prototype 6. The final model accounted for manufacturing limitations

Final Product

By utilizing an adjustable interior diameter we were able to obtain a complimentary interference fit for three of the most common residential and commercial emitter designs. Due to its availability and amorphous properties, acrylonitrile butadiene styrene was chosen as the final polymer production material.







Field Testing

Three home sites featuring animals with a demonstrated history of irrigation damage were selected for testing. Each site received an installation of four protected and four unprotected drip heads. The functionality of each drip emitter was tested and inspected every 12 hours.

Day Zero. Protected

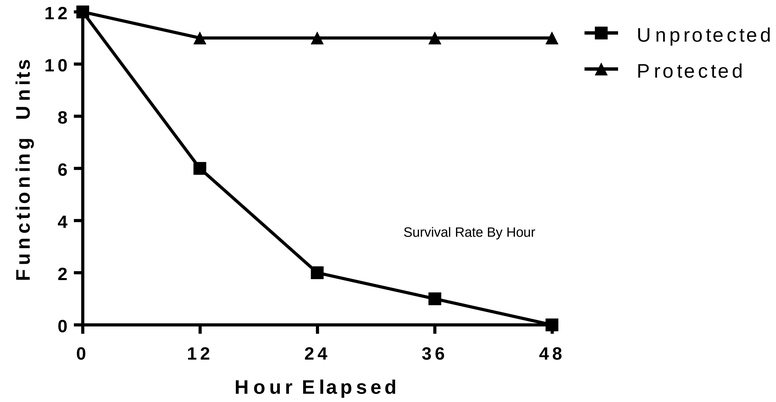
Day Zero. Unprotected

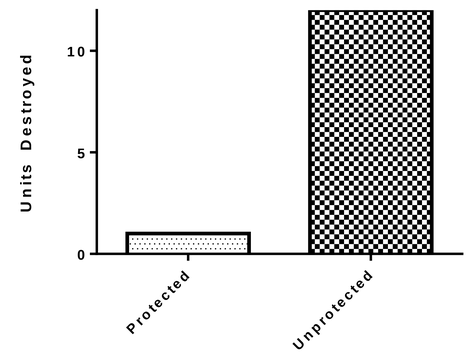
Day Two. Protected

Day Two. Unprotected

Results

After 48 hours there were no functioning unprotected emitters at any of the test sites. Only one emitter that was equipped with our protective device was destroyed by the conclusion of our field test.





Conclusions

- 83% of all unprotected emitters were destroyed in the first 24 hours, with 100% destroyed in the first 48.
- Our animal control device increased emitter survivability by 75% during the first 24 hours
- Passive behavior control systems are a viable alternative to poison and shock control methods

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- Coffman Family and Pets
- Brasil Family and Pets
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