CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
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Project Number
31015

Project Title
Weedfinder: An Eco-Friendly Herbicide Sprayer

Abstract

Objectives/Goals
Design and build a device using simple electronic components and a microcontroller to detect weeds in vineyards. This eco-friendly system will lower farmers' operating costs and reduce the volume of herbicide and water used by up to 50%. Weedfinder can be produced at a low cost for widespread use.

Methods/Materials
I designed and implemented electronic components with a microcontroller and computer programming. Weedfinder is equipped with sensors capable of identifying the plants' light reflectance because chlorophyll pigments reflect infrared light. It is then attached to a weed sprayer system that releases herbicide on weeds instead of covering the bare ground.

Results
The volume of herbicide and water saved, when using Weedfinder, is 25% with a #2 sprayer nozzle and 45.47% with a #3 sprayer nozzle.

Conclusions/Discussion
The initial hypothesis that farmers can reduce the amount of herbicide and water used by up to 50% is verified. Weedfinder can be improved in many ways to benefit farmers (water, herbicide, time and gas savings), the environment (less chemicals in groundwater, residue in fruits and vegetables, toxic effects on animals and microorganisms),and farm workers' health. The prototype is inexpensive to produce and can be distributed for widespread use.

Summary Statement
My project is about building an eco-friendly device that identifies and sprays weeds selectively to help farmers save on the herbicide, gas and water they use.

Help Received
My father helped spray chemicals, solder the electric components, and taught me about the basics of computer programming. My mother helped me arrange the board layout. I would like to thank Mrs. Anderson and Mr. Oliver for their support and guidance during this project.