



CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

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Project Title Are Lower Percentages of Glyphosate with Natural Herbicides as Effective as Full Strength Glyphosate?	
<p style="text-align: center;">Abstract</p> <p>Objectives The objective is to determine if lower percentages of glyphosate with natural herbicides is more effective than using full strength glyphosate. Because glyphosate is a possible carcinogen, I wanted to test if lower percentages of glyphosate with natural herbicides could be a possible herbicide alternative.</p> <p>Methods Seven sections of weeds were sprayed with a different herbicide. In the first plot 50% glyphosate with 20% vinegar and soap was sprayed. In the second plot 25% glyphosate with 20% vinegar, and soap was sprayed. In the third plot 25% glyphosate with 20% vinegar, orange oil, and soap was sprayed. In the fourth plot 12.5% glyphosate with 20% vinegar, orange oil, and soap was sprayed. In the fifth plot full strength glyphosate was sprayed. In the sixth plot 20% vinegar, orange oil, and soap was sprayed. In the seven plot of weeds nothing was added. Each mixture of herbicides were placed in its own spray unit to prevent cross contamination. Observations were recorded daily for the first two weeks then weekly for the remaining 3 months.</p> <p>Results All the lower percentages of glyphosate with natural herbicides and the natural herbicides by itself were equally effective and appeared completely dead by day 4. Full strength glyphosate appeared completely dead by day 14. Regrowth did occur in natural herbicides by itself on day 35. Regrowth occurred in 12.5% glyphosate with 20% vinegar, orange oil, and soap on day 84. Regrowth occurred in the 25% glyphosate with the 20% vinegar and soap on day 56. No regrowth occurred in the full strength glyphosate, 50% glyphosate with 20% vinegar and soap, and the 25% glyphosate with 20% vinegar, orange oil, and soap.</p> <p>Conclusions At the end of the 3 month study two combinations of herbicides, 50% glyphosate with 20% vinegar and soap and 25% glyphosate with 20% vinegar, orange oil, and soap, were found to be equally effective as full strength glyphosate. These two combinations worked faster than full strength glyphosate in the beginning of my experiment and had no regrowth at the end of my experiment. Therefore these two combinations are the best alternative to full strength glyphosate.</p>	
Summary Statement I found lower percentages of glyphosate with natural herbicides to be at least as effective as full strength glyphosate during a three month study.	
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