



**CALIFORNIA STATE SCIENCE FAIR  
2003 PROJECT SUMMARY**

<b>Name(s)</b> <b>Craig F. Smith</b>	<b>Project Number</b>  23644
<b>Project Title</b> <b>Can Allelopathy Be Used in Our Favor for No More Weeds?</b>	
<b>Objectives/Goals</b> To determine if top dressings made from leaves affect the germination of radish seeds. <b>Abstract</b> <b>Methods/Materials</b> A commercial top dressing, pine needles ( <i>Pinus halipensis</i> ), eucalyptus ( <i>Eucalyptus leucoxyton</i> ) & sycamore ( <i>Platanus racemosa</i> ) leaves were shred and sifted to a uniform size. 50 radish seeds were planted in commercial potting soil in each plastic container. The containers were topped with one type of shredded leaves, commercial top dressing or potting soil (control). Sunlight & water were controlled. The number of seeds germinated from each container were recorded daily until there were no new seedlings for 3 consecutive days. Two trials (250 seeds each, 50 per bin) were completed (100 seeds for each variable). The average & percent germination were computed & graphed. <b>Results</b> The average germination of radish seeds after 13 days was: 5% pine needles, 18% eucalyptus leaves, 29% sycamore leaves, 27% commercial top dressing & 50% potting soil (control). The pine needles showed the greatest effect on germination followed by eucalyptus leaves, with sycamore & the commercial top dressing being close to the same, but almost half the percent germination rate of the control. <b>Conclusions/Discussion</b> Pine needles affected the ability of the radish seeds to germinate successfully in high numbers. Eucalyptus leaves also affected the average germination rate as well. Sycamore leaves & the commercial top dressing affected the average germination, but to a lesser degree. I conclude that there is a significant difference in the average germination of radish seeds between containers with pine needles or eucalyptus leaves & the control. My hypothesis may be correct for some types of leaves, but not for others. Chemicals that cause allelopathy are released when leaves fall to the ground & decay. Leaves from some plants might be able to be used as a top dressing to reduce weed germination. I used what I thought was a large sample size (100 seeds for each container), but I was able to complete only 2 trials. There is a discrepancy between trials 1 & 2 for the germination rate of seeds with the sycamore leaves. I would like to complete more trials, identify chemicals that affect germination, & refine this experiment to control unexpected variables (i.e. water loss or its inability to penetrate the surface of the top dressings).	
<b>Summary Statement</b> My project is to determine if top dressings made from shredded leaves have an effect (due to allelopathy) on the germination of radish seeds, which might be used to control similar weedy species.	
<b>Help Received</b> My mom discussed research on allelopathy with me, took pictures, & typed my report. My dad helped me build a sieve, buy materials & gather leaves. Mr. Post taught me Excell for data tables & graphs.	