



CALIFORNIA STATE SCIENCE FAIR 2007 PROJECT SUMMARY

Name(s) Daniel M. Kari	Project Number S1707
Project Title Helping Pinus ponderosa Fight Dendroctonus brevicomis and Dendroctonus ponderosae	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project was to explore the best natural ways to deter Dendroctonus brevicomis and Dendroctonus ponderosae from attacking Pinus ponderosa in the San Bernardino National Forest and the surrounding areas. Secondary research indicated that using pesticides and deterrents related to verbenone antiaggregates have to date proven expensive (costing \$3.60 to \$14.50 per tree per season), ineffective beyond one season, and destructive of all insects in the areas treated, thereby deteriorating the ecosystem. This same literature, combined with interviews with botanists working for the U.S. Forest Service and the California Department of Forestry, confirmed that the best defense against bark beetle attacks is a healthy tree.</p> <p>Methods/Materials This project examined 50 Pinus ponderosa in the Barton Flats Camp Ground where stand management and thinning has taken place since the early 1950s, and 50 Pinus ponderosa around the Blue Sky Science Institute several miles away on Highway 38 where few or no attempts have been made to manage bark beetle infestations. Trees in both locations were selected that were 6 inches or larger since smaller ones were relatively immune to bark beetle attacks. Trees were examined for signs of attack (such as bark beetle holes) and dead branches. Woodpecker holes were also noted as evidence of bark beetle infestation.</p> <p>Results Examination of 50 trees selected in the Barton Flats Camp Ground showed 8 attacks and only 2 trees had died as a result of bark beetle attacks. The survival rate for these trees was 96 percent. Examination of 50 trees selected in the Blue Sky Science Institute showed 17 attacks and 19 trees had died, two from causes other than bark beetles. The survival rate of trees at this location was only 62 percent. Fatalities among trees of the Blue Sky Science Institute were 8.5 times higher than those among trees at the Barton Flats Camp Ground.</p> <p>Conclusions/Discussion This study helps demonstrate that the best defense against attacks by Dendroctonus brevicomis and Dendroctonus ponderosae is healthy trees, namely trees that can fight off attacks with good resin flow. Chemical treatments, in contrast, deteriorate the ecosystem and plants in the forest. Future research will examine the use of certain plants to deter the presence of bark beetles.</p>	
Summary Statement This project demonstrates that when forests are properly managed through thinning dense growth and through removing trees already infested by bark beetles, then these forests are far less vulnerable to bark beetle attacks.	
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