



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> <b>Paul T. Cummins</b>	<b>Project Number</b> <b>J1905</b>
<b>Project Title</b> <b>Selection of Case-Building Materials by the Caddisfly Hydatophylax hesperus</b>	
<b>Objectives/Goals</b> I conducted an experiment to determine if larvae of the caddisfly Hydatophylax hesperus (Trichoptera: Limnephilidae) would use unnatural material to build their cases if natural materials were unavailable, and if they would prefer natural materials if they were offered both natural and unnatural materials.	
<b>Abstract</b> <b>Methods/Materials</b> I forced the caddisflies to rebuild their cases by removing approximately half of the front end of their cases. I weighed each larva with its remaining case, and then provided it with either natural (maple leaves), artificial (paper), or a combination of natural and artificial materials with which it could rebuild its case. Leaf and paper pieces were each cut in 1 cm <sup>2</sup> squares, and a total of 10 pieces was provided to each larva for each trial. For the leaf and paper combination, 5 pieces of each were used. At the end of a 2-day trial, I reweighed each larva and case, and counted the number of pieces that it used in rebuilding its case. I conducted 10 trials for each of the 3 treatments (paper only, leaf only, and paper + leaf), using a total of 30 larvae.	
<b>Results</b> I found that the larvae would rebuild their cases with paper if that was all that was available to them, and that the mean weight and number of pieces used in case rebuilding was not significantly different between leaves and paper. However, when larvae were given a choice of both leaves and paper, they showed a clear preference for leaves.	
<b>Conclusions/Discussion</b> Scientists believe that caddisflies are very selective about the materials they use to build their cases and that, like all insects, their behavior is fixed rather than flexible. The ability of caddisflies to use unnatural materials in case-building that was shown in my experiment suggests some flexibility in their behavior. This flexibility may be very important in helping the caddisflies to survive during time when their natural case materials may not be abundant. This could happen, for example, if leaf litter is lost when riparian trees surrounding a stream are logged.	
<b>Summary Statement</b> My experiment showed that caddisfly larvae were able to use unnatural materials to rebuild their cases when that was all that was available to them, but they preferred to use natural materials.	
<b>Help Received</b> Father helped with insect collection; Mother taught me how to use Excel software for data analysis.	