



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Stephen Show Tran	Project Number J1632
Project Title An Investigation of the Bioelectric Response of Mimosa pudica to Physical Stimuli	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The Mimosa Pudica is a member of the Pea family which also includes the Venus fly trap. The Mimosa folds its leaves and droops its petioles rapidly when the leaves are stimulated by brushing, and by exposure to cold water droplets. The purpose of my experiment is to test the hypothesis that an electrical potential is generated when the Mimosa responds to these stimuli.</p> <p>Methods/Materials Stainless steel electrodes were inserted into the petioles and adjacent stems of the Mimosa plant. A differential preamplifier, an analog-to-digital converter, and a computer were used to monitor and record the electrical responses in real time. The leaves were stimulated either by varying degrees of brushing or different number of ice cold water droplets. The experiments were conducted on four healthy petioles and adjacent stems chosen from three Mimosa plants.</p> <p>Results Voltage waveforms were recorded from the implanted electrode. The amplitudes of the responses were graded. When the leaf was brushed more forcefully, a higher voltage was recorded for the response. Therefore, there was a qualitative correlation between the forcefulness of brushing and magnitude of the electrical response. The recorded voltages averaged between 10mV to 35mV. Similar results were obtained when the leaves were stimulated by a droplets of ice-cold water.</p> <p>Conclusions/Discussion The results of my experiments show that the Mimosa Pudica generates a graded electrical potential in response to different strength of stimuli. Recently, a broad class of chemical molecules, called the Turgorins, has been isolated and identified from the Mimosa. Turgorins can effect a seismonastic reaction in the Mimosa Pudica. Further studies are suggested by the results of my experiments: 1. What is the biological significance of the electrical potential generated by the Mimosa Pudica upon physical stimulation? 2. Does the electrical potential precede the seismonastic reaction, or is it a product of the seismonastic reaction? 3. Does electrical potential cause the release of chemical molecules such as Turgorins which subsequently cause a seismonastic response?</p>	
Summary Statement Experiments were conducted to verify that an electrical potential was generated within the petioles when the Mimosa Pudica leaves were physically stimulated.	
Help Received My father helped me with the design of the experiments and acquired the necessary equipments. My mother edited my report.	