



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Patrick F. Michaels	Project Number S1317
Project Title Methane Production and Consumption in Suburban Landscapes	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Methane, a potent greenhouse gas, is produced by specific archaea called methanogens and consumed by bacteria called methanotrophs. Methanogens reside in anaerobic ecosystems such as over watered lawns or compost heaps.</p> <p>Results Earlier experiments indicated that saturated yard compost produced methane, suggesting that levels of irrigation in suburban landscapes might influence methane production. This year, measurements of methane production in suburban environments found little methane and little variability with the level of water saturation. Plugs of lawn incubated under high methane concentrations showed that significant levels of methanotrophy were occurring or could be induced. Ammonia inhibits methanotrophs. Ammonia-based fertilizers, when added to portions of a lawn, reduced the level of methanotrophy compared to normally fertilized lawns.</p> <p>Conclusions/Discussion The study indicates that normal suburban landscapes are not significant methane sources and may even consume methane. Excessive use of ammonia-based fertilizers, particularly in over-watered areas, could turn them into a methane source.</p>	
Summary Statement The amount of water and fertilizer applied to suburban landscapes may influence whether they produce or consume methane, an important greenhouse gas.	
Help Received Dr. Anthony Michaels gave advice and supervised the use of a GC at the University of Southern California, Mr Robertson also provided advice.	