



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) John G. Reid	Project Number J1699
Project Title The Effect of Biuret and Urea on Citrus Leaf Necrosis and Growth	
Abstract Objectives/Goals I wanted to find out how various levels of biuret in urea fertilizer affect citrus leaves, specifically in relation to toxic effects. I also wanted to find out how different levels of urea fertilizer affect the growth of leaves on young citrus trees. This is important because citrus growers need to use the right balance of nitrogen on their groves to get the best growth without damaging their trees or polluting the groundwater. It is especially important when trying to get young trees into production as quickly as possible. Methods/Materials I chose 65 young navel orange trees in my family's citrus grove. I marked 130 branchlets on the selected trees with ID tags. I made 6 concentrations of low biuret (LBU)urea fertilizer (less than .1% biuret) and 6 concentrations of high biuret (HBU)urea fertilizer (between .65% and .80% biuret). I then painted the leaves of 120 of the marked branchlets with the assigned urea formulation, and used 10 branchlets as controls. Over the next month, I evaluated the 130 replicates using rating scales for necrosis and growth. Results Significant necrosis occurred at urea concentrations of 0.32 and 0.64, regardless of biuret content. At the 0.64 concentration, the mean necrosis for HBU urea was 3.8 compared to LBU urea necrosis of 2.4. At the 0.16 concentrations and lower, necrosis was minimal regardless of biuret content. All concentrations of LBU urea produced more growth than equivalent HBU urea concentrations, except at the 0.02 and 0.04 concentrations. For those concentrations, the HBU urea produced significantly more growth than equivalent LBU urea concentrations. Conclusions/Discussion Citrus growers avoid HBU urea because of its reputation for nitrogen burn (necrosis). Growers must also work to prevent groundwater contamination from urea (nitrogen) use. LBU urea at the 0.08 and 0.16 concentrations produced the best growth with the least necrosis. However, HBU urea at the 0.02 and 0.04 concentrations also produced minimal necrosis and very good growth. These data suggest that HBU urea at lower concentrations may be a viable foliar fertilizer for young citrus trees. Because biuret degrades more slowly than urea, this could reduce groundwater contamination and improve grower economics.	
Summary Statement My project investigates how biuret and urea affect the health and growth of young navel orange trees.	
Help Received Mother helped with typing and research. Dr. Krueger helped with project design.	