



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Patrick R. Mullens	Project Number S1414
Project Title Organic Pest Control: Broccoli Extract Controls Root Knot Nematodes	
Abstract Objectives/Goals The objective of the project was to see if broccoli extract could control damage to cowpea plants by root knot nematodes. Methods/Materials Cowpea seeds were planted in growth pouches. A 5% broccoli extract solution was made by combining water and chopped broccoli. This was incubated at 30 C for 5 days and then diluted and added to nematodes for the various treatments. Meloidogyne incognita eggs were extracted from tomato roots and allowed to develop into juveniles. The treatments, each with four replicates, contained 0, 0.5, 1, 2, or 4% broccoli extract and approximately 1700 root knot juveniles per plant. Eleven days after planting, the plants were inoculated with these treatments. The number of root knot galls per plant was counted 1 week after inoculation. Nematodes were also put into the various concentrations of extract and checked for motility after 10 minute, 30 minute, 60 minute and 24 hour periods. Results The motility counts showed that the broccoli extract was harmful to nematodes. The 0 and 0.5% concentrations showed very little change over time, but the final 24 hour count of the nematodes in the 1, 2, and 4% extract solutions showed large decreases in motility. Nematodes in higher concentrations of broccoli extract caused fewer root knot galls than the those in lower concentrations or the treatment without broccoli extract. The average number of galls for the 0% concentration was over 120, and the average number of galls for the 4% concentration was under 40. Conclusions/Discussion The experiment showed that broccoli extract is an effective means of controlling root knot nematode damage in cowpea plants in growth pouches and also showed that increasing broccoli extract concentration decreases motility of root knot nematodes.	
Summary Statement Broccoli extract was used as an alternative to nematicides to minimize root knot nematode damage to cowpea plants.	
Help Received Lab equipment at UCR was used under the supervision of Teresa Mullens; I received advice about using broccoli extract from Dr. Antoon Ploeg; Dr. Philip Roberts let me use growth chamber space and nematode cultures from his greenhouse.	