

## Developing a Laboratory Rearing Protocol for Rootworm

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Rootworms (southern corn rootworm/SCR and banded cucumber beetle/BCB) are serious economic pests of peanut in Georgia, and the incidence of injury has increased in recent years. Elevated rootworm pressure is due in part to the increase in abundance of the non-native banded cucumber beetle and in part to the cancellation of tolerances for chlorpyrifos (the only registered insecticide with proven efficacy against rootworm in peanut). The UGA Peanut Entomology program has been working for several years to quantify the economic impact of rootworm and to identify alternatives to chlorpyrifos for rootworm management. One finding of this work is that banded cucumber beetle is currently much more abundant than southern corn rootworm and is likely responsible for most of the rootworm injury in Georgia peanut. Relative to southern corn rootworm, banded cucumber beetle has been poorly studied. The recent occurrence of banded cucumber beetle injury in Georgia peanut fields with no prior history of rootworm infestation suggests that this species may survive under environmental conditions that previously limited the economic importance of southern corn rootworm. The UGA Peanut Entomology program currently needs a consistent supply of high-quality banded cucumber beetle larvae and adults for laboratory and greenhouse experiments designed to improve our understanding of the insect's biology with a focus on developing effective management tactics. The objective of the work described here was to develop a laboratory rearing protocol for banded cucumber beetles that will ensure a reliable, year-round supply of insects for on-going and future research.

Insect rearing is a critical but often overlooked and/or undervalued area of entomological research. This project evaluated the effects of parameters such as temperature, humidity, soil moisture, soil/substrate type, food type (natural and artificial diet), photoperiod, and handling procedures on egg production, larval growth and development, survival, and longevity of banded cucumber beetle in a controlled environment. Replicated rearing studies were conducted in environmental chambers, an open laboratory setting, and the greenhouse. Practices that improve production efficiency and insect health will be immediately incorporated into protocols for care of existing rootworm colonies.

Rootworm rearing research resulted in notable improvements in the quantity and quality of banded cucumber beetles produced from the UGA Peanut Entomology rootworm colony. The GPC funded work led to the development of a rearing protocol that is currently in use to maintain a population of banded cucumber beetle for on-going projects. Examples of recently completed projects include the evaluation of the effect of transgenic "rootworm traits" in commercial corn hybrids on BCB and assessing the impact of contact and dietary exposure to the insecticide diflubenzuron on oviposition.

Key changes in the rearing protocol included: using controlled environment chambers in the laboratory instead of the greenhouse for growing corn and larval rearing steps, increasing the seeding rate of corn used for larval diet, and replacing organic squash with sweetpotato root for adult diet. The colony currently produces an average of 400 adult banded cucumber beetles per week, and we have the ability to increase production when needed to meet research demands.