

Title: **Statewide Termite Survey**

Project Leader: Paul B. Baker Extension Specialist-Termites

Project Team Members:

Cochise	Kim McReynolds
Coconino	Tom DeGomes
Gila	Chris Jones
Maricopa	Dawn Gouge
Mohave	Rob Grumbles
Pima	Baker Lab and Michael Riehle (Entomology)
Pinal	Rick Gibson
Yuma	John Palumbo

Other counties can be added as we proceed.

Location: Statewide

Situation

Termites are considered by experts and homeowners alike to be our number one urban pest. Back in 2003 Americans spent over \$2.5 billion dollars on control of subterranean termites alone (National Pest Management Association). Nearly 90% of the control focused on the 3 major pest species, one of which resides in Arizona, *Heterotermes aureus*. To date, neither this termite nor any of the 16 non-pest species of termites within our borders has had its statewide distribution well documented.

Since the 1950's, liquid chemical barriers have been the primarily method of control in the pest management industry. With the urbanization of Arizona, more homes are being built with more chemical termiticide applications being applied, regardless whether termites are present or not. Two key components to any viable pest management strategy are proper identification and the targeted application of chemicals to the pest. It is a common misconception that all termites are pests and therefore are in need of control usually chemical. To compound the problem, applications of termiticide are made to non-pest species by both pest control operators and do it your self-homeowners just because they are present near a structure. This adds undue burden to the environment and could result in potential health risks.

With this statewide termite survey, we will not only increase our knowledge and understanding of our termites biology, ecology and their statewide distribution, but it will lead to better control strategies, reductions to the environmental pesticide load as well as the reduction of termiticide applications in locations that do not have economically important termites.

We propose to place several termite-collecting collars in at least 8 counties (listed above). Each cooperator will receive personalized instruction on the setup and maintenance of the collection collars, along with collection procedures for the preservation of the termites. In addition, a Baker lab representative will travel to each location for observational data collection and to determine GPS coordinates. All specimens will be preserved in 100% alcohol for species identification and future DNA analysis. DNA analysis will be performed by Dr. Riehle laboratory at the University. Some preliminary results have indicated that identification and separation of colonies are promising. The basic procedure consists of using two mitochondrial genes, and cytochrome oxidase I and II (COI and COII) to identify the species of termites. Individual termites will be visually identified if possible and given a unique identification number. To identify the termite's species, sequences will be compared with the extensive database of known termite COI and COII sequences in Genbank using blastn (<http://www.ncbi.nlm.nih.gov/BLAST/>). These molecular approaches have a twofold advantage. First, the procedure is straightforward and can be reliably performed after minimal training. This contrasts with visual identification, which requires extensive experience and precise measurements. Second, this approach can be used on foraging worker termites as well as alates and soldiers, something that is nearly impossible with visual identification. This is important since soldiers represent only a small fraction of the total colony and alates are often not present. Support for analysis has been solicited and obtained from the pest control industry and termiticide manufacturers.

Once an adequate number of samples have been identified, a statewide distribution map of termite species will be placed on the Baker laboratory website (<http://cals.arizona.edu/pito/termites/>), in addition each county office will receive notices of the availability of the information. Overall this will result in valuable information about the biology and control strategies for that particular region, which will be integrate into the distribution map, enabling the decision maker/stakeholder to better informed.

Inputs-budget	<u>U of A</u>	<u>Others*</u>
-Costs: Cooperators will receive at least \$100 each, materials (collecting devices and supplies), travel in-state all sites, equipment (a GPS unit) and staff time	\$2,300	
-DNA analysis	_____	<u>\$3,000</u>
Totals	\$2,300	\$3,000

*Includes funding commitments from at least BASF, FMC and Truly Nolan for DNA analysis.

Outcomes -Impacts:

Short: Increase in knowledge and understanding of termite biology, ecology and distribution. This will lead to better control strategies and reduced pesticides to the environment and potential health risks.

Medium: A distribution map of the termites in Arizona, which will enable pest management professionals and homeowners to anticipate what type of termites they would encounter in their region of the state along with viable information regarding pest identification and control strategies. Primary access will be via a website.

Long Term: Samples will be utilized to determine DNA gene flow in termites.

Evaluation: We will measure the outcomes based on the termite samples received.

Outputs: We anticipate the following: Publication of the distribution map; DNA samples for gene flow; and communicate results with pest management professionals and the public via workshops and the website.