New assay helps track termites and other insects

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An Agricultural Research Service (ARS)-developed method to safely and reliably mark termites and other insects over vast acreage so their movements can be tracked is just as effective as the previous method -- and more affordable.

That's according to recently published research by ARS entomologist James Hagler, at the agency's U.S. Arid-Land Agricultural Research Center in Maricopa, Ariz., and his collaborators at the University of Arizona.

They studied the movement patterns of the desert subterranean termite, which poses a threat to wood structures in the southwestern United States and causes an estimated $1.5 billion in losses each year. In the early 1990s, Hagler developed the first-generation immunoglobulin G (IgG) protein insect markers, which used expensive rabbit or chicken IgG proteins to track insects.

In a recent study, the scientists tested the rabbit IgG protein mark on termites in three field locations across the Arizona desert landscape. Each location consisted of 51 termite feeding stations placed at various distances around a rabbit-IgG-impregnated central feeding station infested with termites.

The protein would later be detected on field-collected termites using a rabbit-IgG-specific assay. The study showed that the rabbit protein marked the termites as they fed on the bait placed in the central feeding

station, even after long-term exposure to harsh desert elements.

Now Hagler and his cooperators have developed a less expensive method of marking the insects with egg white, cow milk, or soy milk proteins, which can be sprayed on insects in the field using conventional spray equipment such as helicopters, airplanes and ground rigs. Each protein is detected by a protein-specific ELISA test. The test is less expensive because the assays have been optimized for mass production.

Working alongside fellow ARS entomologist Steven Naranjo in Maricopa and collaborators at the University of Arizona and the University of California, Hagler has also successfully tested this method on a wide variety of pest and beneficial insects.

Ultimately this state-of-the-art method will lead to better and more cost-effective control of termites, glassy-winged sharpshooters, lygus bugs, mosquitoes and other pests.

Results of two termite studies were recently published in the International Union for the Study of Social Insects' scientific journal *Insectes Sociaux*.

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